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Systems, Social Order, and the Global Debt Crisis

John Hamilton Bradford
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To the Graduate Council:

I am submitting herewith a dissertation written by John Hamilton Bradford entitled "Systems, Social Order, and the Global Debt Crisis." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Sociology.

Harry F. Dahms, Major Professor

We have read this dissertation and recommend its acceptance:

Steven P. Dandaneau, R. Scott Frey, Allen Dunn

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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SYSTEMS, SOCIAL ORDER, AND THE GLOBAL DEBT CRISIS

A Dissertation Presented for the
Doctor of Philosophy
Degree
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John Hamilton Bradford
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ABSTRACT

Part I examines the global rise of both public and private debt and its recent manifestations in the US housing bubble and the financial panic of 2007-8. A review of the most popular theories of the debt crisis is provided, including an explication of securitized banking and economic theory. The underlying condition of increasing ecological and energetic scarcity is accorded central significance in the broad trajectory of world growth and debt,

Part II explicates systems theories of social order and the social significance of markets. The theories of Niklas Luhmann, Talcott Parsons, Mario Bunge, Anthony Giddens, and Jürgen Habermas are evaluated with respect to their theories of social order and crisis. A central finding is that, although declining rates of exergy production inhibit the global economic recovery as measured by conventional economic tools, this fact is not likely to be widely recognized. A central theme of Part II is how social systems handle uncertainty, risk, and to what extent complex social systems can be regulated normatively by the public sphere. As global society becomes increasingly interconnected and dependent upon the depletion of material and energy resources, the communication channels that facilitate the self-understanding of modern society at the same time proliferate, becoming increasingly disconnected and self-referential. Luhmann's systems theory is used to explain why collective recognition and action is at once rendered more necessary and increasingly unlikely given the complexity of global society that Earth's terrestrial stock of nonrenewable energy resources has engendered.

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INTRODUCTION

Explaining the Global Debt Crisis

The following study offers a comprehensive explanation of the global debt crisis (GDC) that remedies many of the shortcomings of traditional economic and sociological theory. Most importantly, most of economics and sociology still regards the economy or society (respectively) as separate and autonomous from the natural environment. Factors such as biophysical resources, energy, and the scarcity of raw materials play virtually no role in most descriptions of our most pressing social problems found in the fields of sociology and economics.

I argue that this ecological blind spot is a consequence of the prevailing framing devices in economics and sociology. In mainstream economics (e.g. neoclassical and Keynesian), society is presumed to be a perpetual motion machine running without limits, whereas in sociology, much more theoretical focus has been placed upon the agency/system distinction, or that between manifest and latent functions (Merton 1967), obscuring the *indirect means* by which ecological scarcity *conditions* both intended and unintended social outcomes.

Phenomena are always embedded in a larger context, which Thomas Kuhn has called a *paradigm*, and Joseph Schumpeter has called a *pre-analytic vision (*1954). Herman Daly describes this pre-analytic vision as follows:

> [P]rior to analytic thought there must be a basic vision of the shape and nature of the total reality to be analyzed and some feeling for where natural joints and seams lie, and for the way in which the whole to be analyzed fits into the totality of things. Our basic definitions arise out o this preanalytic vision, which limits the style and direction of our thinking. (1991: 14)

The content of social phenomena, however, is not independent of the reference frame by which we view and understand them. This study has been undertaken with the conviction (or perhaps suspicion) that because the very definition of social phenomena binds the observer to some presuppositions which are usually hidden, and furthermore, that these presuppositions are probably wrong, unless empirically corroborated. The real problem, however, is not in testing explicitly stated hypotheses, but in uncovering the assumptions hidden or not explicitly stated in any and all preanalytic visions. The problem, in short, is to find an adequate starting point for empirical research. Consequently, part of my dissertation has been meta-theoretical.

The task of finding adequate foundations however, can prove interminable. To avoid a flight into philosophy and meta-physics, there ideally should be a feedback relation between the theoretical context that is being developed, the basic worldview, and the phenomena at hand. Because social phenomena are always already mediated by some theory, it is not necessarily the case that the *same* phenomenon will appear when apprehended through an alternative frame of reference. In this study, I therefore conducted an extensive survey of many meta-theoretical approaches, including classical, neoclassical, and Keynesian economics, and a variety of general

theories, systems theories and others within sociology. The latter set of theories include the works of Marx, Weber, Durkheim, Parsons, Luhmann, Habermas, Bunge, Giddens, Grannovetter, and others.

Initially, what I had set out to accomplish was an explanation of the global "financial crisis" rooted in systems theories, with an understanding that the latter frame of reference would amend or even contradict the significance of the phenomena that I was initially targeting in terms of the financial sector of the global economy. The theoretical frame would influence and specify my empirical work, which would in turn further specify and elaborate my theoretical work, in what some might call a dialectical manner. The work that follows presents the preliminary results of this long-term investigation.

The basic premise of this study is that the material growth is always limited, whether of an economy or a population of bacteria. The qualification "material" is used here because the conservation law and entropy law of thermodynamics only pertains to physical magnitudes. Non-physical stocks (e.g. wisdom or happiness) are not conserved. Concordantly, my argument can be understood as a contribution to the "limits to growth" genre (Meadows et al. 1972).

What has been called the "financial crisis" is better termed a global debt crisis (GDC). The inordinate rise in debt, both public and private, and the break neck pace at which lending institutions (i.e. "finance") have grown relative to the rest of the economy, has generated unsustainable asset bubbles, such as the housing bubble in the United States, which began to pop in 2007. Debt is nothing more than a promise to pay, which implies an expectation that the borrower will be able to pay the principle and the interest. Whether or not debt is sustainable or not depends upon a myriad of factors, the most important of which is that the growth rate of income exceeds or is equal to the growth rate of debt. When the growth rate of debt exceeds the growth rate of income, debt, after reaching some fraction of total income, crosses a tipping point beyond which systematic default or extensive debt devaluation in the form of inflation is unavoidable. To explain why debt generates financial crises and panics, therefore, it is necessary to identify not only that the *levels* of debt origination were high. It is also necessary to explain why the *rates* of debt origination were "too high" *in relation to rates of income growth*. One must explain, in other words, not only the anticipation of future growth *qua* debt, but the reality-test that disconfirmed the anticipation. An explanation of growth is therefore warranted.

An intuitive explanation of the waves of systemic default and over-indebtedness is that growth is predicated upon growth in the extraction and use of energy and raw materials, most notably fossil fuels such as coal, petroleum, and gasoline. The standard "peak oil" theory is that economic growth, at the global level, will stop once oil production peaks. The point is therefore not that oil will "run out", but rather, that oil production will not continue to increase, which ostensibly means an end to economic growth. As evidenced below, the growth rate of petroleum extraction has declined since the 1970s, and has nearly flat-lined since 2005. A decline in growth rates, combined with rising rates of debt, would generate economic stagnation and systemic debt defaults.

There does appear to be some "de-linking" between economic growth and energy consumption. This began at around the same time that energy prices began to rise in the mid-1970s. Mainstream economists have interpreted this as proof that there are no absolute limits to growth, only provisional, local, and temporary limits to certain kinds of production. Upon closer reflection, however, the de-linking is only a widening of the gap between economic growth rates and rates of energy consumption. A growth in the latter might still be a precondition of economic growth, *as it is organized in its specificity*. More importantly, GDP is a metric that is rooted in accounting identities found in economic theory. Although it has been used as a proxy for standard of living, it is arguable to what extent continued economic growth improves quality of life in the most wealth nations, considering that it has begun to decouple from both employment and also happiness, and at the same time has coincided with a massive rise in inequality. GDP measures economic activity, a flow variable that is only indirectly correlated with physical throughput of production. From the perspective of the distinction of stocks and flows (to be explicated below), it is incoherent in that it "adds together three very unlikely categories: throughput, additions to capital stock, and services rendered by the capital stock" (Daly 1991: 30). Although it can be decomposed in various ways, GDP is ultimately embedded in a self-referential theoretical-economic system. In addition, energy scarcity pertains to a global variable, the affects of which will most certainly be articulated differently across geographic space, economic sectors, and between persons occupying roles in economic organizations. In short, the *object* that GDP measures, is inseparable from the GDP metric itself.

The global debt crisis can be explained in part as a consequence of the declining growth and profit rates which set in around the 1970s, which in turn can be explained in terms of increasing scarcity of raw materials and energy. This results from what Jason W. Moore has called ***the tendency of the ecological surplus to fall:*** because "all financial instruments represent a deferred, and expanded, claim on ecological process … there is a general tendency for the expansion of finance capital to outrun the expansion of the relative ecological surplus" (2009: 28).

The link between energy and economy, however, is not deterministic. Ecological scarcity constitutes only a background condition or parameter that indirectly influences the causes and consequences of the performance of the economy, understood as a self-referential, operationally closed system. Changes in these background ecological conditions imply a change in the relationship between fundamental variables of a system so that what once facilitated growth and therefore improvements in human well-being may engender neither. In other words, the relationships between variables are themselves variable. A change in the parametric conditions of an economic system may engender new patterns between fundamental variables, such as growth, employment, debt, and inequality.

In a nutshell, the global debt crisis is a result of too much debt and too little growth. Explaining the former requires invoking cultural (i.e. ideological) factors, whereas explaining the latter entails an explanation of the link between economic growth and energy scarcity. It is my hypothesis that energy scarcity constitutes one such parametric change, and that the rising levels of debt have been a primary means of facilitating economic "growth" as measured by conventional accounting techniques such as GDP since the 1970s. Cultural and lifestyle factors

have played an important role as well, since previous rising incomes have accustomed both consumers and firms to expect the future growth rates to resemble past rates. In mainstream theory, savings facilitate investment and hence growth. If growth is assumed to be automatic, however, there is little or no reason to save. The Protestant Ethic of sacrificing the present for the future becomes, once rapid income growth is achieved, the propensity to take the future for granted, thereby sacrificing the future for present gratification. Moreover, this propensity to spend in the present accelerates the drawing down of resources, reinforces the need to borrow in order to sustain expected income levels.

Increasing ecological scarcity, or falling ecological surplus, constitutes only a long term *secular tendency*. It is also necessary to examine how these trends are translated into proximate economic and ecological effects via social structure. In any empirical investigation, the details matter. The specific means by which virtual claims on ecological surplus are distributed, as in the secondary "repo" markets, mediate between general trends and specific social outcomes. In this study, I examine how increasing scarcity of energy and raw materials at a global level amplify global interconnectedness and thus systemic vulnerability and risk.

This study begins with the most detailed analysis and ends with its consequences for more general theories, including economics and sociology. I then draw conclusions for a revised general theory of society and economics towards a study of the financial crash, including possible policy implications. Part I provides a detailed description of the global debt crisis, including the including the housing asset bubble, the rise of finance, and rise of international problem of debt growth. I then evaluate the question of whether or not politics or economics is the primary cause of the global debt crisis, focusing on specific policies that advocates of each thesis have used to exemplify their argument. I then give a detailed outline of the structure of the financial system (securitized banking and the repo markets) that generated the global debt crisis and the financial panic of 2007-8. Next, I provide a detailed analysis of some common explanations of economic crises, including theories of under-consumption, over-accumulation, and Marx's falling rate of profit thesis. Lastly, I present original findings on the role that ecological scarcity, manifested in rising energy prices and declining rates of production, have played on the recent debt crisis.

Part II examines some meta-theoretical reflections on social order and more specifically, the sociological significance of markets and the economy in modern society. The systems-theoretical perspectives of Parsons and Luhmann are central to this analysis. In particular, Luhmann's theory of the economy as a system of autopoietic communications that take the form of payments yields interesting insights into the recent financial panic. Money, as a steering medium increasing the odds that communications will be accepted by codifying motivations, becomes the primary means by which the allocation of goods and services is distributed *across time*, that is, the medium by which moments are bound together in a coherent temporal horizon that is collectively shared and negotiated. This function of time-binding, although necessary for the functioning of global markets in their current specificity, is not caused by this functional requirement. The monetary medium is an accident of history that makes possible modern temporality. Whether or not it continues or to what extent this medium successfully facilitates the autopoeisis of payments is contingent upon numerous other accidents of history, including

necessary conditions that the economy, as a channel of communication, cannot thematize directly. Modern society, because of its sheer size and increasing interconnectedness, becomes a complex and uncertain communication system, the channels of which are increasingly self-referential. Everything is connected in some way to everything else in the tangible field of energy, but not everything that is relatable can be focalized as a theme of communication at the same time. Topics or themes of communication begin to emerge at an aggregate or macro scale, to which people can contribute, but not radically change or alter, except in exceptional cases.

A central theme of Part II is how social systems handle uncertainty, risk, and to what extent complex social systems can be regulated normatively by the public sphere. In short, whereas Part I the underlying parametric condition of increasing ecological and energetic scarcity is accorded central significance in the broad trajectory of world growth and debt, Part II explains why collective recognition and action is at once rendered more necessary and increasingly unlikely given the complexity of global society that Earth's terrestrial stock of nonrenewable energy resources has engendered. Finally, I conclude with an unorthodox policy proposal that a basic, minimum income be guaranteed as a modern right of global citizenship.

PART I. THE GLOBAL DEBT CRISIS

I. THE HOUSING BUBBLE, FINANCE, AND THE RISE OF DEBT

1. The US Housing Bubble

The Boom: 1997-2005

The Housing Boom began in 1997 and lasted until 2006 (Jarsulic 2010; Baker 2010). During this period, high-risk, high-cost mortgages grew substantially in absolute dollar figures and in terms of the relative share of total mortgage lending. Figure 1 presents two time-series of housing price indexes, Standard and Poor's Case-Shiller Index, and the Federal Housing Finance Agency's Housing Price Index.[1] The Housing Price Index (HPI) time-series for the percentage change of the composite housing index for the US is given in Figure 2.

Between 1995 and 2006, house prices rose more than **70 percent**, adjusting for inflation. Moreover, according to the National Association of Realtors, by 2004 approximately a quarter of all homes were being purchased as investments (Baker 2009: 73).

Rising prices, of course, does not necessarily imply a bubble. Case and Shiller (2004), however, showed that this increase, prior to the financial crisis, could not be explained by the so-called fundamentals, such as the incomes of the borrowers, inflation, or population.

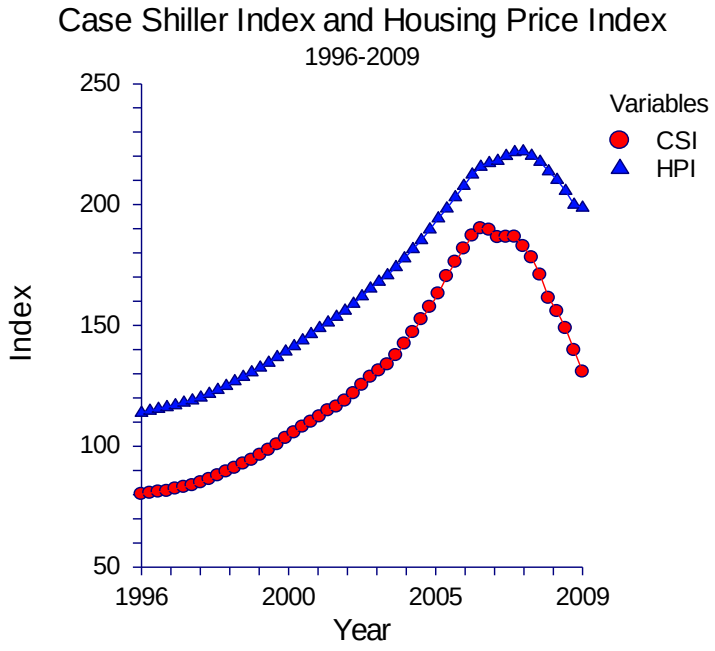

Figure 1. Case Shiller and Housing Price Index (1996-2009)

[1] Data are available at: http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us---- and http://www.fhfa.gov/Default.aspx?Page=87

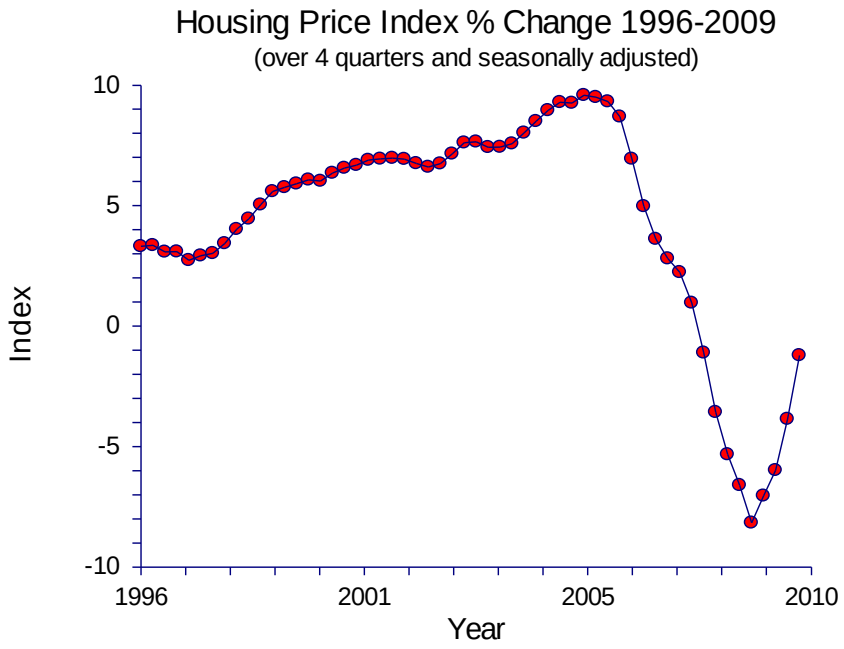

Figure 2. Housing Price Index percentage change (1996-2009)

Jarsulic (2010) argues that the bubble had two effects. First, it generated a temporary validation of the lending boom, and second, it caused a widespread shift in the expectations of the households and a "self-willingness to pay ever higher prices for houses", thus further fueling the bubble (3).

To put this in perspective, Robert Shiller notes that in the 45 years ending in 1997, the real value of home prices was basically unchanged. Between 1997 and 2006, however, real house prices increased at a compound rate of 6.8 percent, for a total increase of **85 percent** (Jarsulic 2010: 12). Moreover, this growth was accelerating from a growth rate of 3.37 percent in 1997 to 9.38 percent by 2006.[2]

Reinhart and Rogoff estimate that by 2008, the total value of mortgages outstanding in US was approximately 90 percent of the total Gross Domestic Product of the US (Reinhart and Rogoff 2009). During this period, home ownership also rose by 5 percent between 1995 and 2005; between 2004 and 2006, the majority of new homeowners were Alt-A and subprime borrowers, a significant portion of whom had taken out loans with high and variable interest rates (Schwartz 2009).

[2] Reinhart and Rogoff (2009) place this figure even higher: "*Between 1996 and 2006 (the year when prices peaked), the cumulative real price increase was about **92 percent**- more than three times the 27 percent cumulative increase from 1890 to 1996!* In 2005, at the height of the bubble, real housing prices soared by more than 12 percent (that was about six times the rate of increase in real per capita GDP for that year)." (207: italics in original).

Prior to the collapse, Greenspan and others (including Bernanke) testified in 2002 that there was no bubble. It is worth exploring Greenspan's line of reasoning in more detail. Greenspan provided 4 explanations for the rise in housing prices. These were: 1) a shortage of land; 2) environmental restrictions; 3) growing incomes; and 4) a growing population.

As a number of commentaries have pointed out, none of these explanations made sense. Even if there was a shortage of land, there was no reason why this should have suddenly occurred when housing prices began to rise. Environmental restrictions had already been in place and hadn't become tighter in the 1990s. Although incomes did grow from 1996 to 2001, afterward the growth was weak and cannot account for the inordinate rise in housing prices. Finally, the baby boomers began buying houses in the 1970s and 1980s, so Greenspan was off by at least a decade.

Baker (2009) points out two additional ways to check if economic "fundamentals" are responsible for a housing boom. First, compare housing prices with rents. If the fundamentals are responsible for housing prices, then rents should also go up. Baker points out, however, that rents didn't rise substantially.

Second, check vacancy rates. If increased demand caused the rise in housing prices, then vacancy rates on rental properties should be low. According to the Census Bureau, however, in 2007 vacancy rates in the US were 50 percent higher than at any point in the post WWII period (Baker 2009: 79). From the 1990s until 2001, subprime originations ranged from $125 to $160 billion, constituting 10 to 15 percent of loans. By 2006, subprime[3] and near prime (Alt-A) loans constituted approximately one-third of all mortgage originations, with combined value of approximately $4 trillion (Jarsulic 2010: 6).

DiMartino and Duca (2007) find that all nonprime loans (subprime and Alt-A) rose from 9 percent of total new mortgage originations in 2001 to 40 percent in 2006 (in Bullard et al. 2009: 405). According to Fligstein (2010) among the *non-agency* mortgage originations (i.e. those not being issued by Fannie Mae and Freddie Mac), subprime mortgages went from 10 percent of the total market to nearly 70 percent by 2007 (2010: 8).[4]

In addition, much of the CDO's (collateralized debt obligations) were subprime, that is, they made heavy use of subprime tranches as collateral. The rating agency Moody estimates that between 2003 and 2006 41-49 percent of the collateral used in the CDO's they rated was subprime (Jarsulic 2010: 11). Figure 3 lists the number of non-agency MBS issuance by type and is taken from Fligstein (2010).

[3] Near prime (Alt-A) loans refer to those loans issued to borrowers with good credit histories, but are either self-imployed or lack adequate income documentation. The term **subprime**, strictly speaking, refers to the credit scores of borrowers, not the terms of the mortgages, although the two have often become conflated (Friedman 2009).

[4] Unfortunately, I could not acquire the data used in these three studies because they are proprietary data provided by Inside Mortgage Finance.
http://www.imfpubs.com/data/

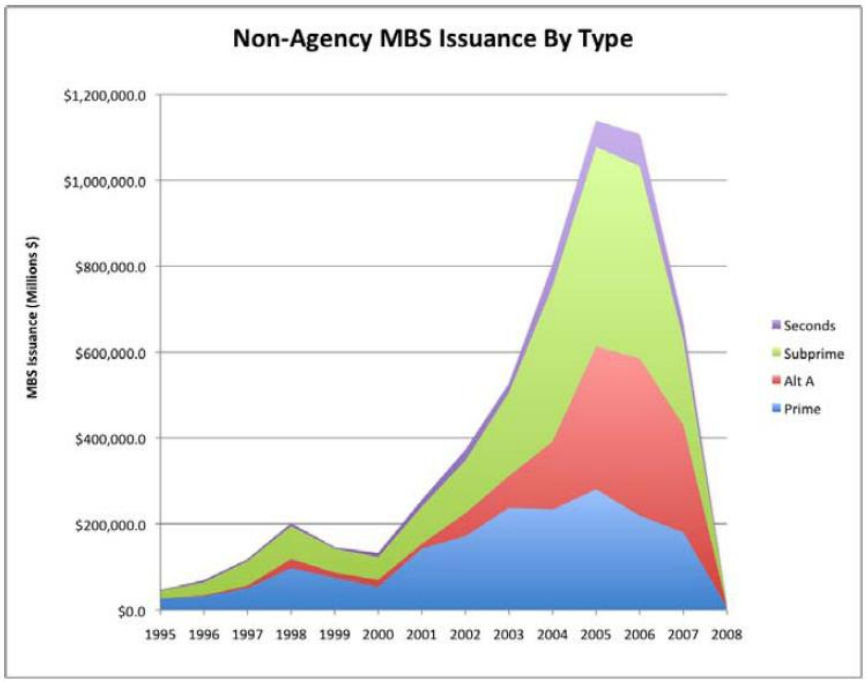

Figure 3. Fligstein. Non-Agency MBS by Type.

In addition to an increasing amount of total mortgages being subprime loans, an increasing amount of mortgages were also *adjustable rate mortgages* (ARMs). In an ARM, the interest rate *resets* annually based on the current level of some reference rate, such as the 12 month Libor (Murphy 2009: 40).

In an ARM, the initial rate is almost always a lower, teaser rate, which subsequently goes up. According to Baker (2009), ARMs constituted 35 percent of all mortgages between 2004 and 2006, compared to a previous average of only 10 percent. Among all nonprime loans, ARMs constituted 40 percent of the market in its peak in 2006. Friedman (2009: 139) places this number even higher at 90 percent.

Not surprisingly, resets on ARMS triggered defaults. Jarsulic (2010) cites a Federal Reserve Bank of St. Louis study in 2006 which showed that "When payment shock was larger than 5 percent and the LTV was greater than 90 percent, the probability of default increased by 83.5 percent" (11).

Lending standards declined dramatically during the boom. One important indicator is the **loan-to-value *(LTV)*** ratio, which measures the ratio of the dollar value of the loan to the dollar value of the mortgage. A loan that covers the entire cost of the house and hence requires no down payment from the home buyer has a LTV of 100%, or 1. Traditionally, an LTV of 80% was regarded as standard (Murphy 2009). By 2006, the share of loans with an LTV of 90% or higher reached a peak of 30 percent of total mortgage loans (Jarsulic 2010: 8).

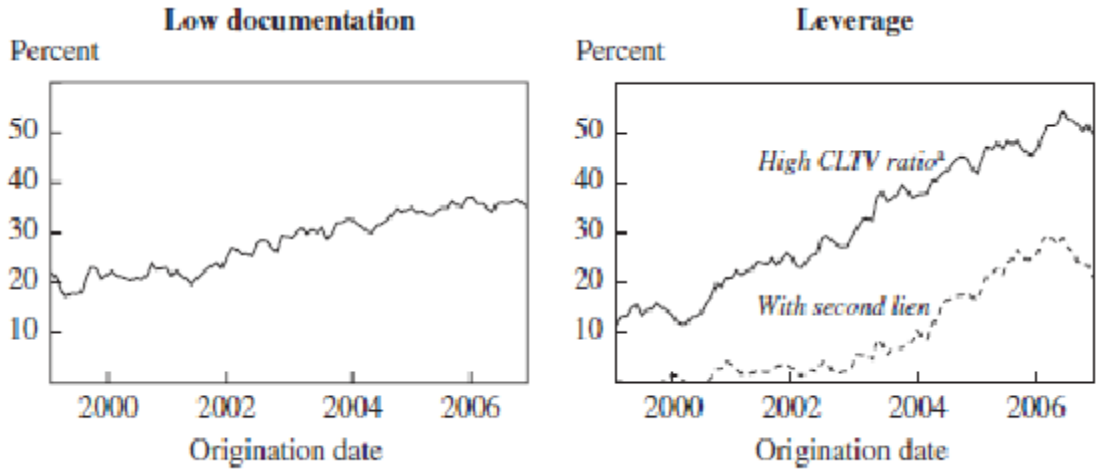

Figure 4. Housing Bubble. Low Documentation and High Leverage.

Conversely, we can infer that *at least* 30 percent or more borrowers were low income borrowers relative to the houses they were purchasing. The share of total *subprime* loans containing incomplete documentation of the borrower's credit history and income increased from 20 percent in 2001 to 35 percent in 2006 (Jarsulic 2010: 8).

One explanation for the lack of documentation is that it enabled lenders to avoid state predatory lending statutes. Figure 4shows the share of loans to borrowers with incomplete documentation and the share of loans with a high CLTV (combined loan-to-value) ratio (at 90% or higher) are provided by Gerardi (et. al. 2008: 81).

Moreover, statistical studies confirmed that variables like low FICO scores, higher LTV ratios, and missing documentation correlated with the likelihood of defaults. In their summary of the study they conclude:

> We find that the quality of loans deteriorated for six consecutive years before the crisis and that securitizers were, to some extent, aware of it. We provide evidence that the rise and fall of the subprime mortgage market follows a classic lending *boom-bust scenario*, in which *unsustainable growth* leads to the *collapse* of the market. Problems could have been detected long before the crisis, but they were masked by high house price appreciation between 2003 and 2005. (Demyanyk and Hemert 2008: my emphasis).

In addition, denial rates for subprime loan applications declined during the boom period. Banks were turning away fewer and fewer high-risk borrowers. Mian and Sufi (2008) show that the declining denial rates could *not* be explained by improved economic conditions, stating that:

> The expansion in mortgage credit from 2002 to 2005 to subprime zip codes occurs despite sharply declining relative (and in some cases absolute) income growth in these neighborhoods. In fact, 2002 to 2005 is the only period in the last eighteen years when

income and mortgage credit growth are negatively correlated. (Mian and Sufi 2008: abstract)

The Bust: 2006-2008

The housing boom was ultimately unsustainable and must eventually pop. The decline in housing values had a dramatic impact on housing construction. Housing starts are the number of privately owned new houses on which construction has been started in a given period.

Figure 5 shows data for housing starts from 1996 to 2010, measured as thousands per month, and calculated as a moving average of 4 months. From its height in 2006, the national monthly average for housing starts dropped by over 70% by the end of 2009. This is important, moreover, because construction constitutes about a quarter of all business investment and 5 percent of total GDP.

Nation-wide housing prices began to decline in the third quarter of 2006. What is interesting to note is that by mid 2008, average house prices had fallen back to 170 percent of 2000 levels. This was still a 70 percent return over 8 years. The question is then, how did this cause a widespread financial and economic crash? It should be noted that some cities were hit harder than others. Housing values were nearly cut in half in Las Vegas, Miama, Los Angeles (Murphy 2009).

An analysis of supply and demand shows that an excess supply of houses for sale had steadily accumulated throughout the bubble, an obvious anomaly if housing price appreciation is ostensibly due to increased demand.

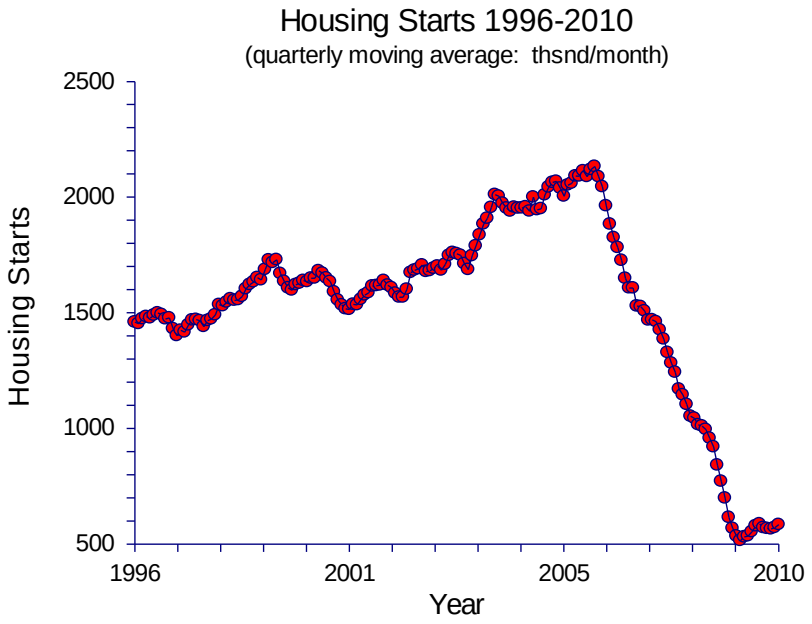

Figure 5. Housing Starts (1996-2010). Source: Federal Housing Finance Agency.

It wasn't rising aggregate demand, however, that was fueling the boom, as would be reflected in rising incomes or population growth, but rather, the belief that aggregate demand would continue to rise forever that fueled the growth (Jarsulic 2010: 38).

Evidence of a growing supply houses during the boom period are reflected in both the data on homes for sale and vacancy rates. Data for home sales and vacancies are both collected by the US Census Bureau.[5] Data for mortgage borrowing is taken from the Federal Funds Flow of Funds Accounts. Figure 6 depicts the number of houses for sale, houses sold, and mortgage borrowing for the United States from 1996 to 2010. Housing data are measured in thousands of unit houses, and mortgage borrowing data is measured in billions of US dollars.

The most important finding is that the peak for houses sold precedes the peak for houses for sale. The peak year for mortgage borrowing, housing values (CSI), and houses sold is 2005. **This indicates that the proximate cause of the failure of housing values to appreciate was an inability to sell at prevailing (inflated) prices.** This failure to sell houses at prevailing prices in turn generated subsequent devaluations in the secondary securities markets.

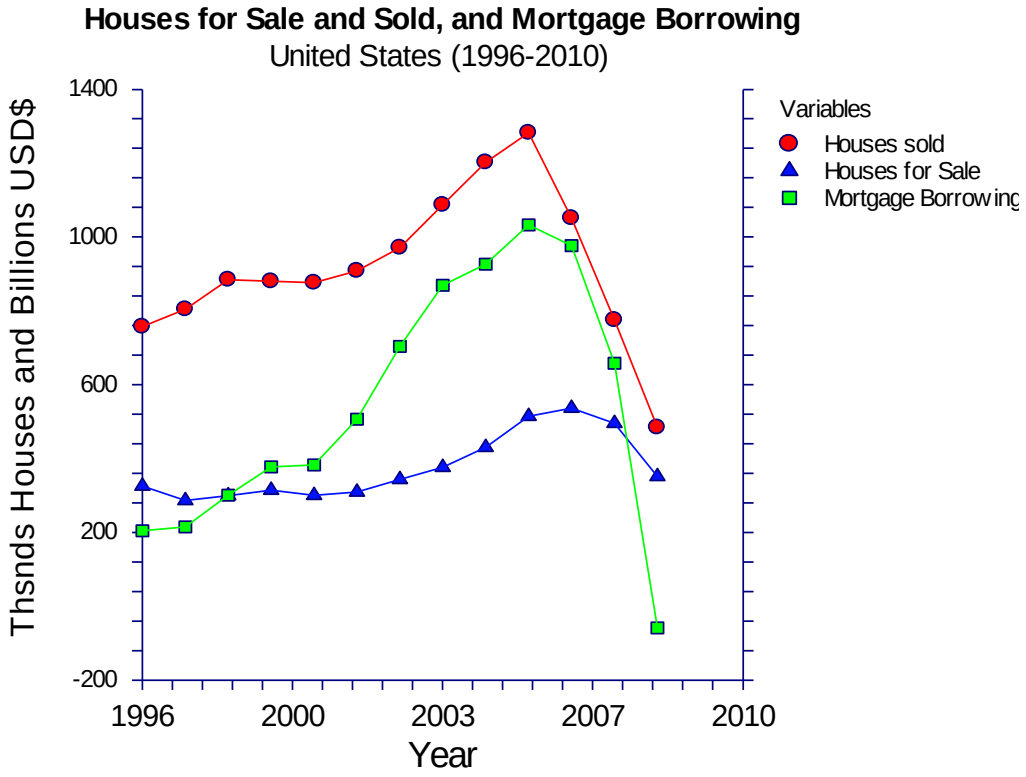

Figure 6. Houses for sale, houses sold, and mortgage borrowing (1996-2010)

[5] Houses for sale is measured in thousands of units and is located at:
http://www.census.gov/const/www/newressalesindex_excel.html
Vacancy rates are located at:
http://www.census.gov/hhes/www/housing/hvs/historic/index.html .

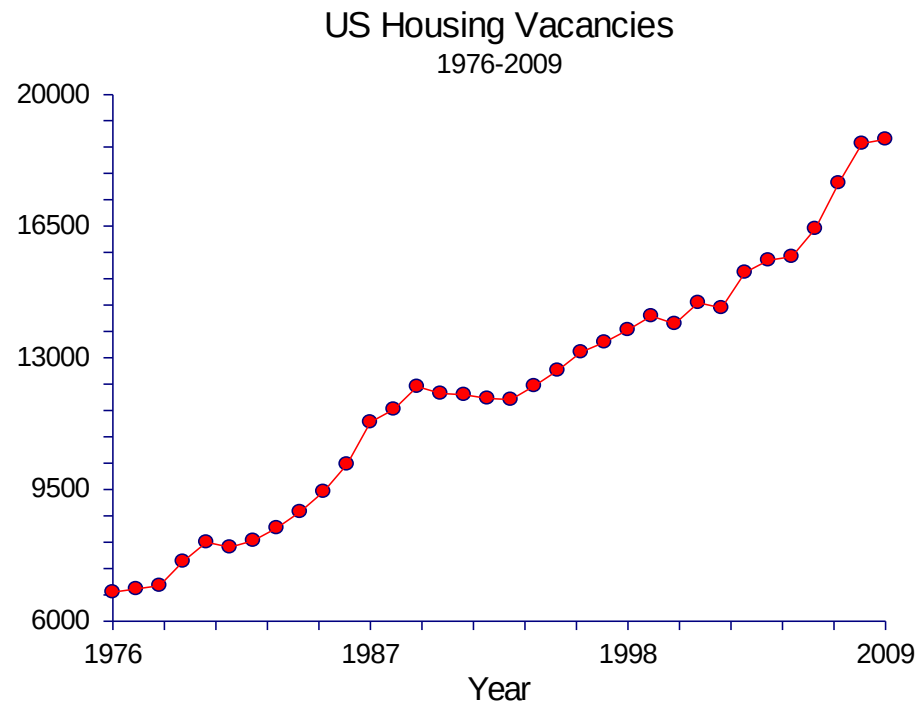

Figure 7. Housing vacancies (1976-2009)

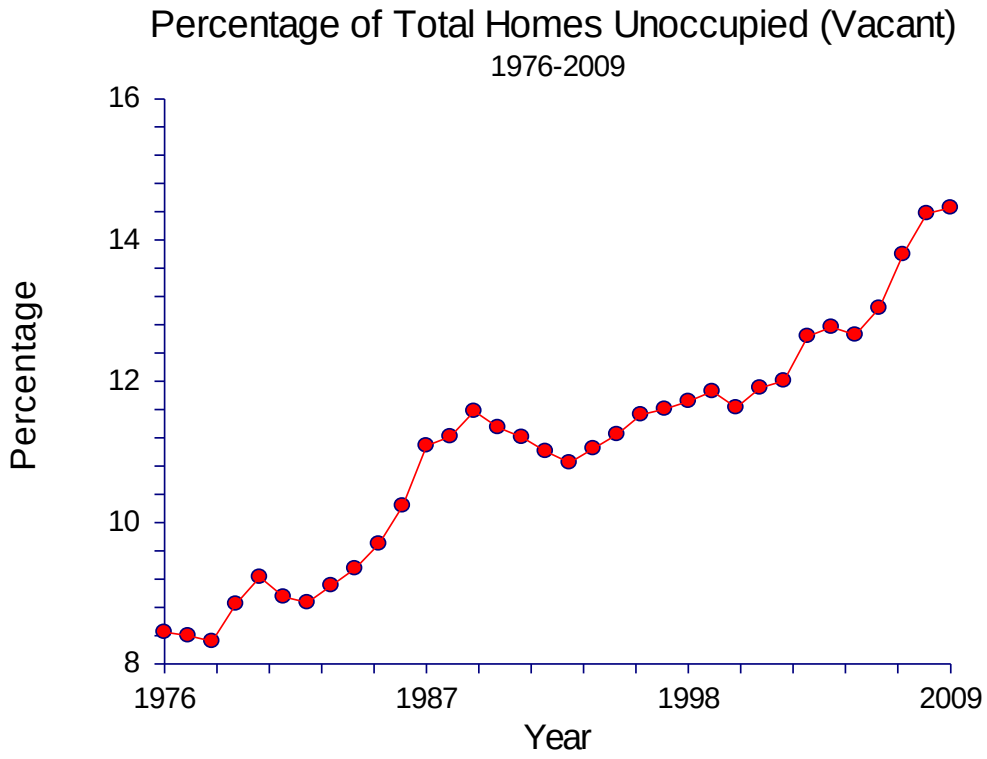

Figure 8. Percentage of total homes unoccupied (1976-2009)

Figure 9. Unemployment Rates. United States, monthly (1990-2010)

Figure 7 depicts housing vacancies in the United States from 1976 to 2009. House vacancies include homes for sale, homes for rent, homes unoccupied but held off of the market, and homes that are year-round vacant. In short, any home that is unoccupied is vacant. The data clearly indicate a glut in the market. Over the longer term, from 1976 to 2009, there is a steady increase in the percentage of total homes that are unoccupied, or vacant. Housing vacancy data are given in 8.

The *human and social costs* of the bust are indicated by the sharp rise in unemployment. Figure 9 depicts the official United States unemployment statistics from the Bureau of Labor Statistics.

2. Debt and the Rise of Finance

The housing bubble was generated through credit creation, that is, debt. The statistics are startling. As a percentage of total US corporate profits, profits from financial services (i.e. income generated from lending), has grown substantially. The financial sector includes insurance and banking. Financial profits are derived from interest on loans. A rise in financial profit therefore indicates a greater amount of lending and therefore a greater amount of debt.

In 2004, financial profits account for 40 percent of all US corporate profits.[6] Moreover, this profit corresponds with a concurrent rise in financial borrowing and financial debt. A lending

[6] Data for debt-outstanding and borrowing for this section are taken from the Federal Reserve's Flow of Fund's Accounts. Data for Gross Domestic Product are taken from the Bureau of Economic Analysis's National Income

institution makes its profits via lending, not borrowing. The correlation between profits and debt indicates that much of the lending that occurred during this period was financed by borrowing as indicated by the ratio of financial debt to total debt. Total debt includes also household and non-financial corporate debt.

This ratio is depicted along with the ratio of financial profits to total profits in Figure 10. The ratio of total debt to GDP for the United States is depicted in Figure 11. A comparison of the ratios of financial and non-financial business debt to gross private fixed investment is depicted in Figure 12.

Figure 12 shows a sharp rise in financial debt as a percentage of gross private domestic investment. Financial debt eclipses non-financial debt by 1993 relative to total private investment (including both financial and non-financial investment). The financial sector borrowed more per year and accumulated more debt in absolute terms than both the household sector and non-financial business sector.

Moreover, financial debt rose from 15 percent of GDP in 1976 to over 118 percent of GDP by 2008, as indicated in Figure 13. Crotty (2009) reports that the size of *all financial assets* in US grew from 4 times GDP in 1980 to 10 times GDP by 2007.

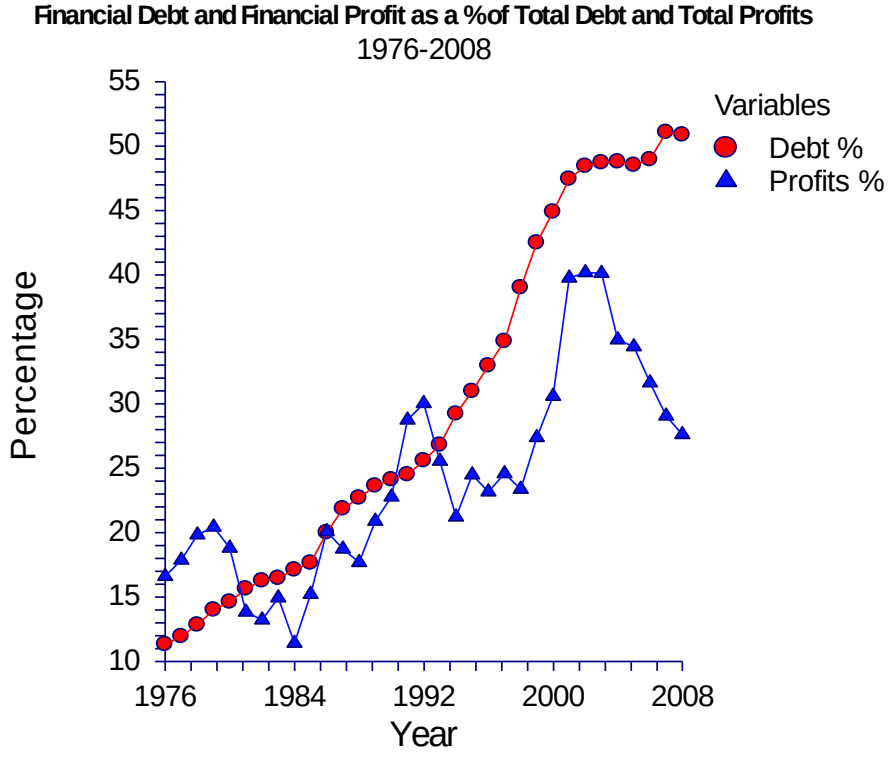

Figure 10. Financial debt as a% of total debt and financial profits as % total corporate profit (1976-2008)

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and Product Accounts (NIPA), Table 1.1.5. These are total, rather than per capita, figures, and are not deflated by the GDP deflator. Nominal rather than real figures are used to make the numbers compatible with the Federal Reserve figures, which are not deflated, and because most of the figures are ratios.

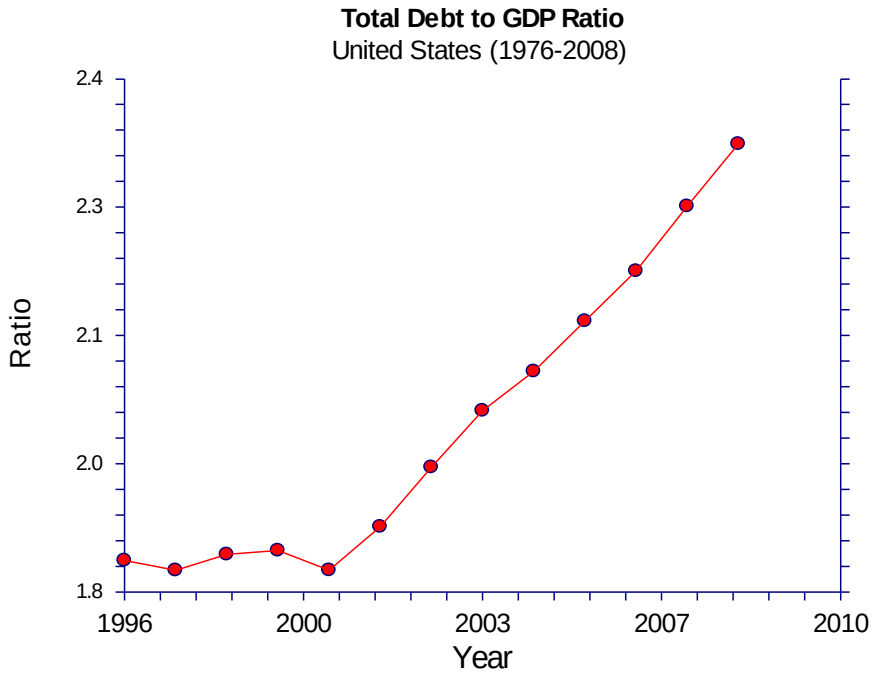

Figure 11. Ratios of debt to GDP, consumption, and investment (1976-2008)

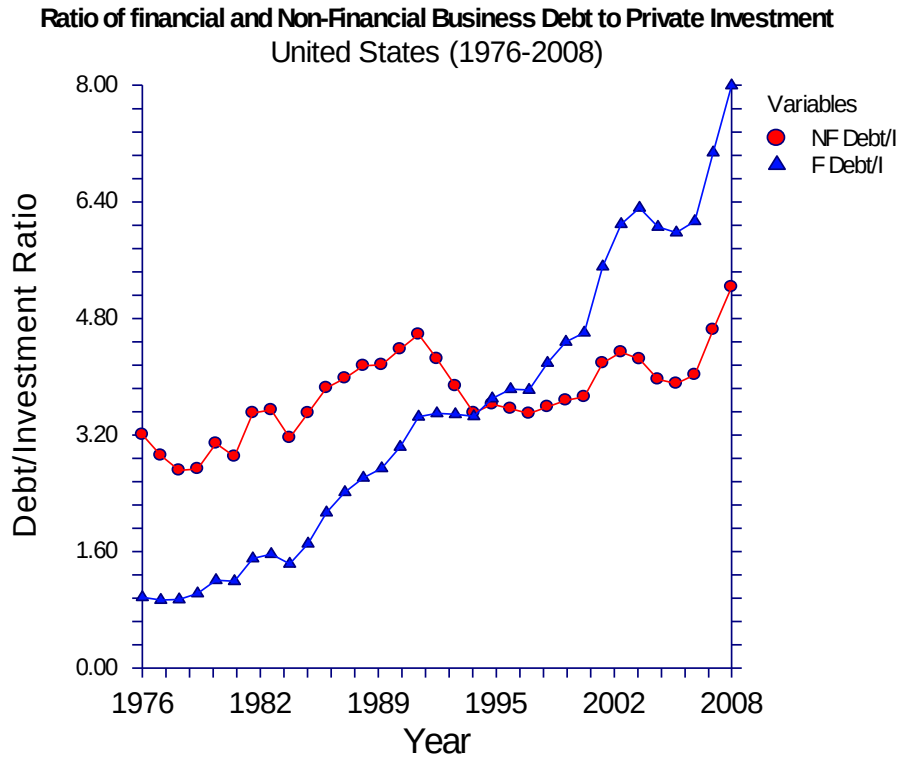

Figure 12. Ratio of financial and non-financial debt to gross private fixed investment (1976-2008)

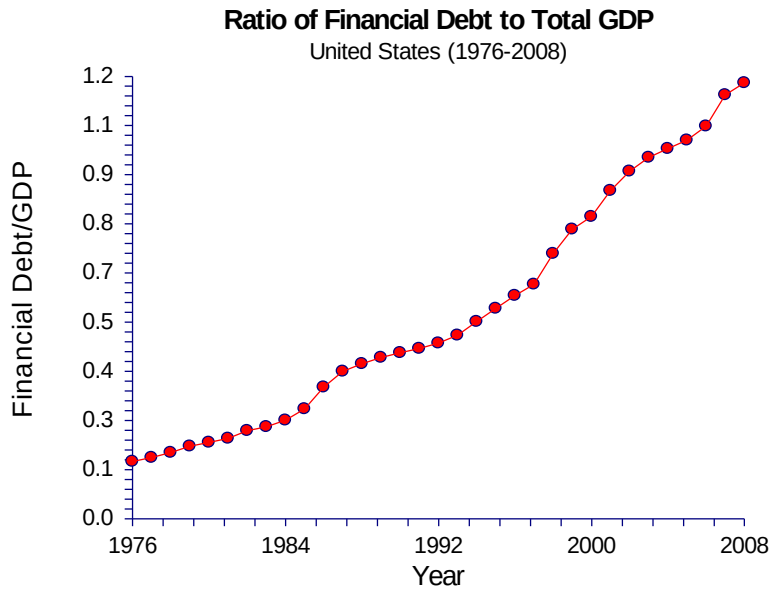

Figure 13. Ratio of financial debt to total GDP (1976-2008)

It is informative to compare and contrast stock and flow variables. Whereas debt-outstanding is a stock variable, borrowing is a flow variable. Debt is a stock that accumulates from the flow variable of borrowing and is drained by the flow variable of making payments. Gross domestic product and gross domestic income are likewise *flow* variables. Borrowing in the US economy by the financial sector, households, and non-financial corporate sector, is depicted in Figure 14.

In addition, financial borrowing as a percentage of total borrowing rose dramatically, constituting well over 90 percent of total borrowing from 1998 to 2000. Figure 15 depicts financial borrowing as a percentage of total borrowing in the United States from 1976 to 2008. In 1998 the total amount of financial borrowing exceeds the total possible. This is because in that year, the Flow of Funds accounts records that the Federal Government had a *surplus* of $52.6 Billion. This number is then deducted from the total, which equals $1005.5 Billion, compared to $1026.8 Billion in financial sector borrowing. The numbers are staggering. When the total is recalculated so that Federal borrowing is set to zero (rather than a negative), the total percentage of borrowing from the financial corporate sector is over 94 percent.

Household debt likewise increased dramatically. Figure 16 depicts the ratio of household debt to total GDP.[7] Figure 17 depicts the ratios of total household debt and mortgage debt to personal disposable income in the United States from 1976 to 2008. Disposable Income refers to income that is available after taxes.

[7] Other studies provide discrepant results. For example, according to Dynan and Kohn, the household debt-to-income ratio increased from .6 in 1983 to 1 in 2004 (cited in Jarsulic 2010); according to Reinhart and Rogoff (2009: 220), the household debt to GDP ratio had been roughly stable at 80 percent until 1993, when it began to rise reaching 130 percent by mid-2006. My numerical results differ, but the overall trend is confirmed.

Taking yet another look at this, we can see that debt grew at a faster rate than income. Figure 18 is a time-series index (1976=1) for household debt, mortgage debt, and personal disposable income. Figure 19 depicts total household debt as a percentage of personal compensation and personal income (rather than disposable income). Taken as a percentage of compensation, total household debt rises well over 100 percent. Moreover, mortgage debt becomes an increasingly larger percentage of total household debt. The ratio of mortgage debt to total household debt is provided in Figure 20. Between 1996 and 2006, the percentage of total household debt consisting of mortgage debt rose from 68 percent to approximately 76 percent.

To recap, the year 2005 is a peak year for all of the following: 1) consumption to income ratio; 2) borrowing to disposable income ratio; 3) houses sold; 4) mortgage borrowing (in nominal dollars); and 5) the Case Shiller Index (CSI) for housing values. The boom became a self-fulfilling prophecy, at least for awhile. Rising prices meant that even the weakest of borrowers could either sell their homes at a profit, or refinance (e.g. home equity loans) to cover any late payments. This inability to pay was further reinforced by ARM resets.

The failure of housing prices to appreciate generated a spike in late payments and defaults, and by mid-2008, delinquencies on all mortgages made in 2007 were at three times the level for 2005 vintage mortgages, with 15 percent of subprime, 7 percent of Alt-A, and 1 percent of prime mortgages made in 2007 counted as delinquent (WSJ 8/9/2008 in Schwartz 2009: 176).

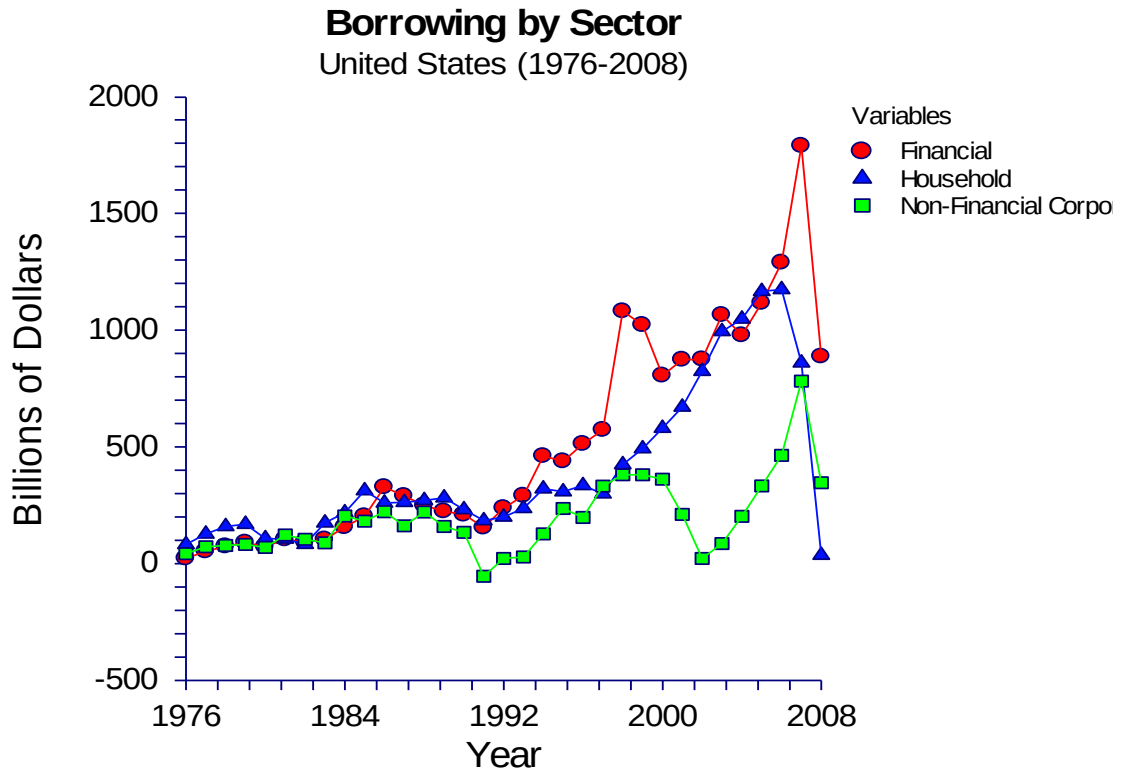

Figure 14. Borrowing by sector of the US economy (1976-2008)

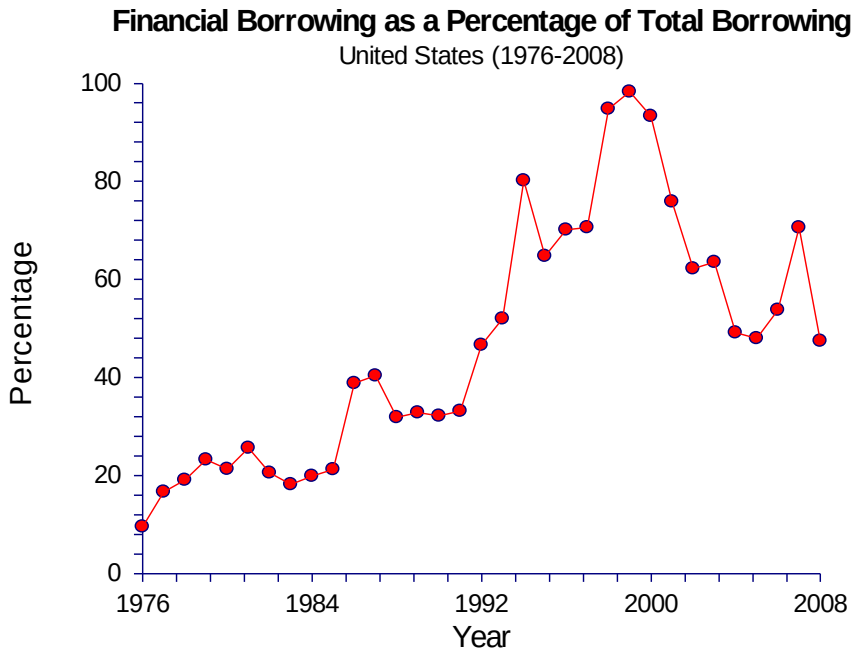

Figure 15. Financial borrowing as a percentage of total borrowing (1976-2008)

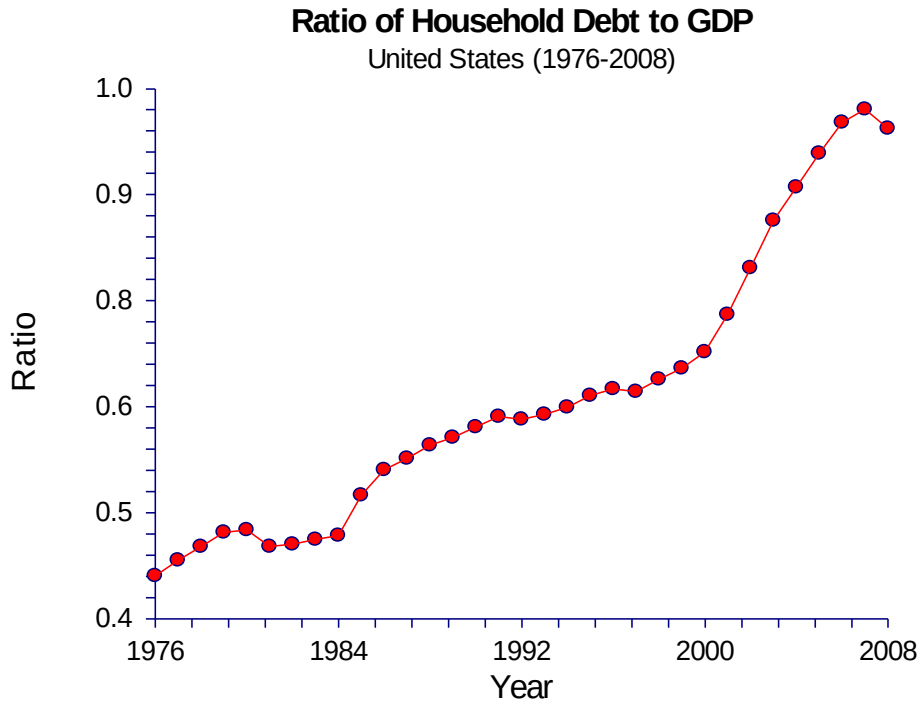

Figure 16. Ratio of total household debt to GDP (1976-2008)

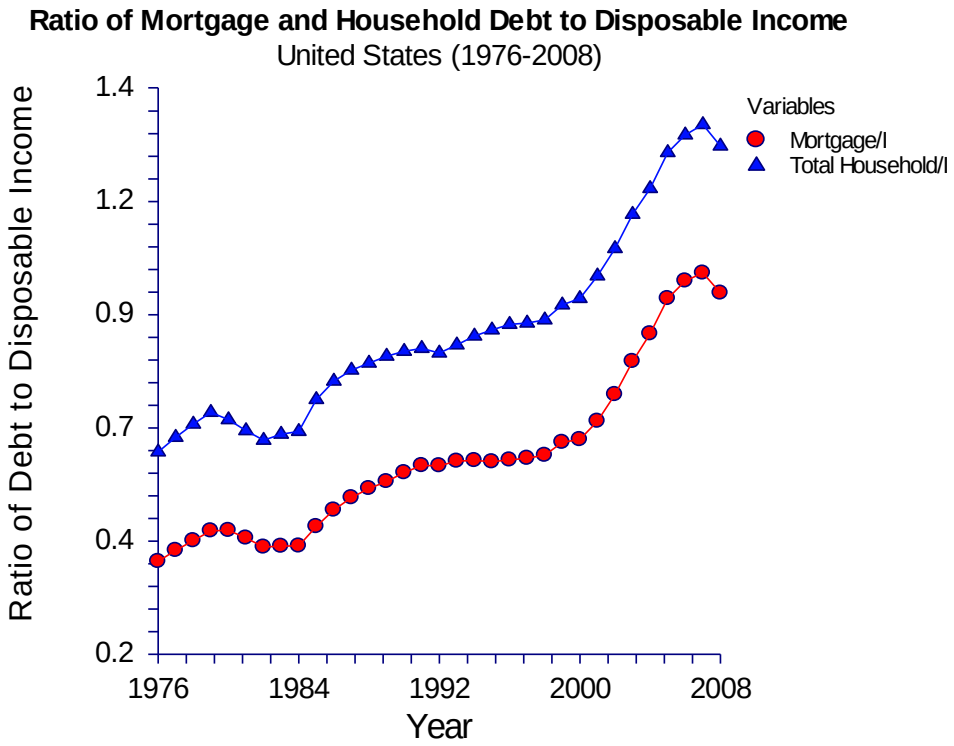

Figure 17. Ratio of mortgage and total household debt to personal disposable income (1976-2008)

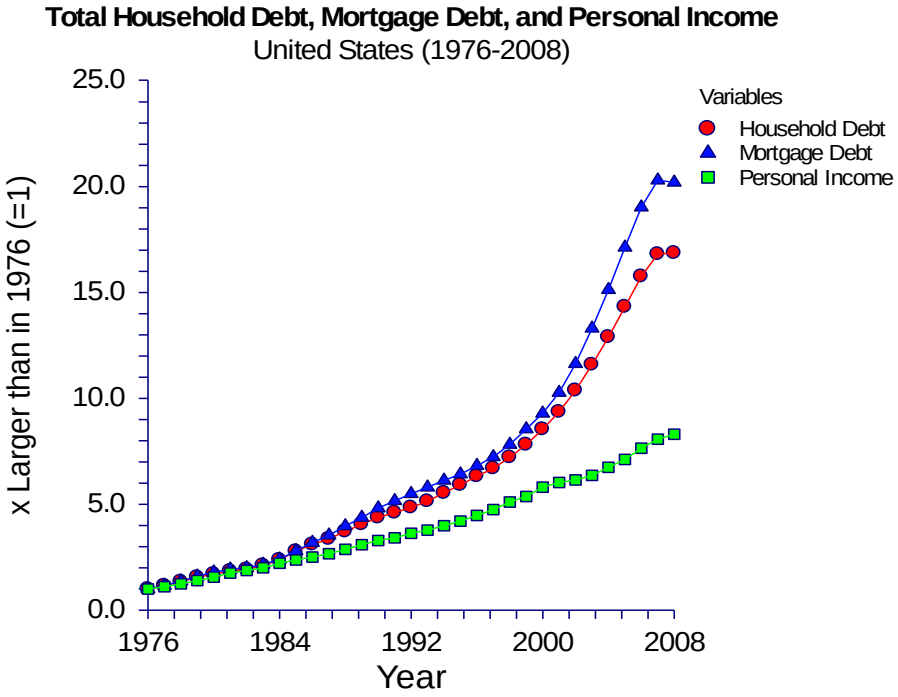

Figure 18. Household debt, mortgage debt, personal income (1976-2008)

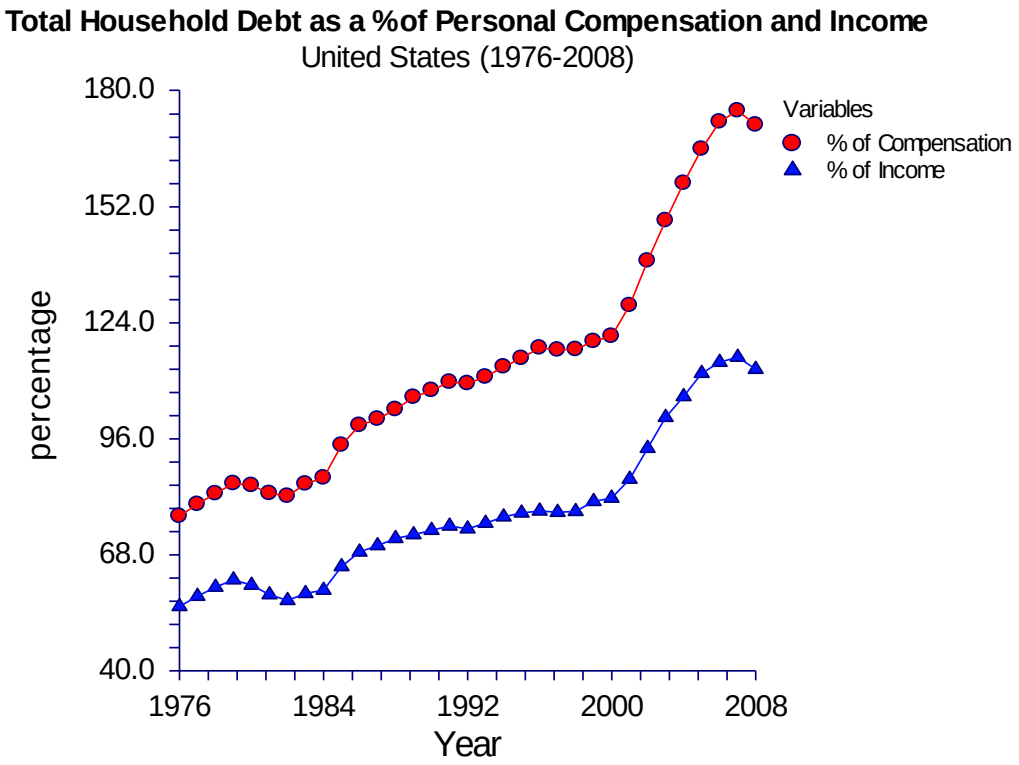

Figure 19. Total household debt as percentage of personal income and compensation (1976-2008)

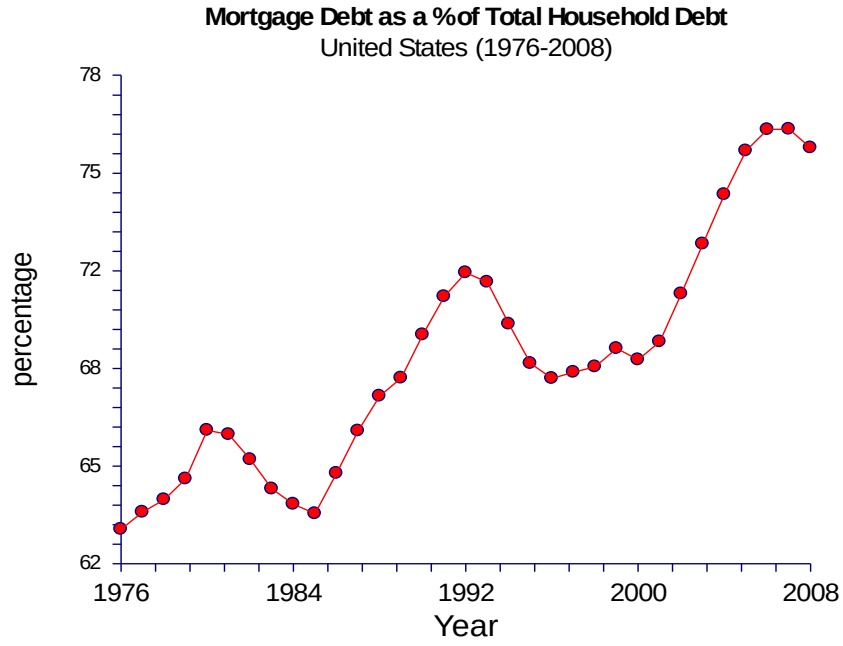

Figure 20. Mortgage debt as a percentage of total household debt (1976-2008)

Moreover, a large increase in foreclosures occurred in *both prime and sub-prime* at the same time. From 2006-2007, there was a larger percentage increase in ARM *prime* mortgages than in subprime ARMs (Woods 2009). This suggests that ARM resets served as a significant trigger for defaults. It also suggests that many prime borrowers were in reality nonprime borrowers and/or living well above their means.

A more comprehensive account of accumulating household debt is the Financial Obligations Ratio (FOR) calculated by the Federal Reserve. The FOR measures the ratio of debt payments to disposable personal income, where debt payments "consist of the estimated required payments outstanding mortgage and consumer debt."

The FOR also includes automobile lease payments, rental payments, property homeowner's insurance, and property taxes. This ratio has trended upwards until recently. Figure 21 presents quarterly FORs from 1996 to 2009. The FOR peaks in the first quarter of 2008 and then begins to decline sharply. This indicates that consumers are "de-leveraging", that is, they are paying off their debts and borrowing less.

3. The Global Debt Crisis

The economic crisis has extended beyond the housing bubble in the United States. The ongoing debt crisis in Greece, for example, threatens the economic health and stability of the EU. The

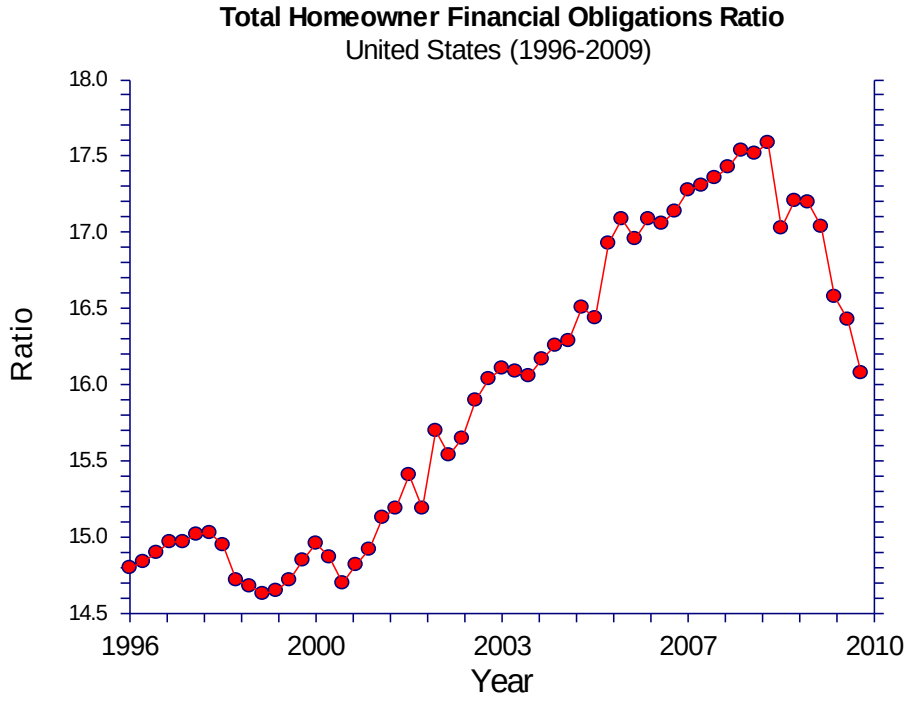

Figure 21. Total homeowner Financial Obligations Ratio (1996-2009)

underlying common denominator in the EU and US for these events has been an inordinate and unsustainable rise in debt. Figures 22-29 depict public debt as a percentage of GDP for France, Germany, Greece, Iceland, Ireland, Portugal, the United Kingdom, and the United States from 1999 to 2009.[8]

A similar pattern is exhibited in each case. Beginning around 2007, public debt begins to accelerate and outpace growth in GDP. It is important to emphasize that this data represents public or government owned debt. Much of the growth that occurred after 2005 can be attributed, however, to growth in *private* debt. Data for private international debt are much more difficult to obtain than public debt. The exponential growth in public debt beginning around 2007 represents a shifting of private debt to public debt, so we can infer that similar patterns are exhibited for privately issued debt in the years preceding 2007. This is confirmed in my analysis of the US housing bubble. Private borrowing in the mortgage markets peaks in 2005. This is also the year that global petroleum production begins to stagnate. Beginning in 2007, this debt crisis is shifted from the private to the public realm, but without steady growth, the stock of debt is unlikely to decline in absolute terms.

A comparison of a decomposition of GDP and total debt by sector for the United States in 2008 is provided in Figures 30 and31. Data are provided by NIPA Table 1.3.5, and the Federal Reserve's Flow of Funds Accounts, respectively.

Business constitutes only 74.8 percent of total GDP and 84.2 percent of total US debt. Over 50 percent of all US debt is located in the financial sector, and much of this is channeled to individuals rather than companies, as evidenced by the disproportionate amount of debt located among US households.

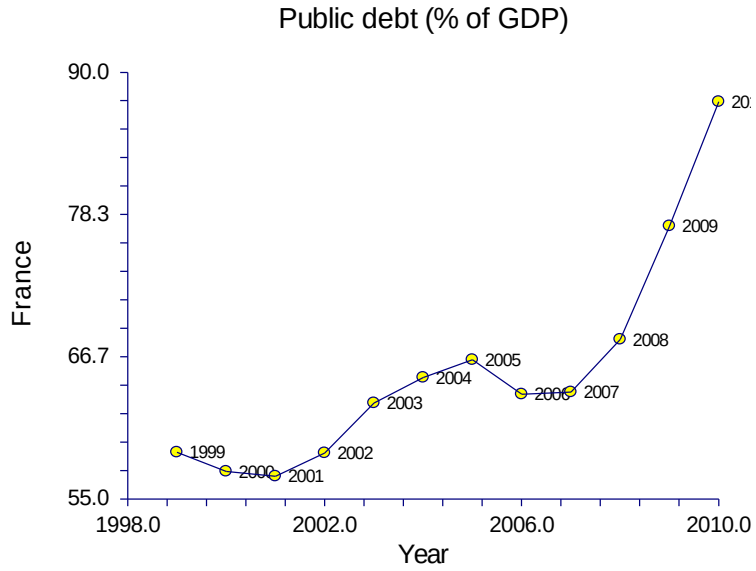

Figure 22. Public Debt as a percentage of GDP. France. (1999-2010)

[8] These data are available in spreadsheet format from http://buttonwood.economist.com/content/gdc

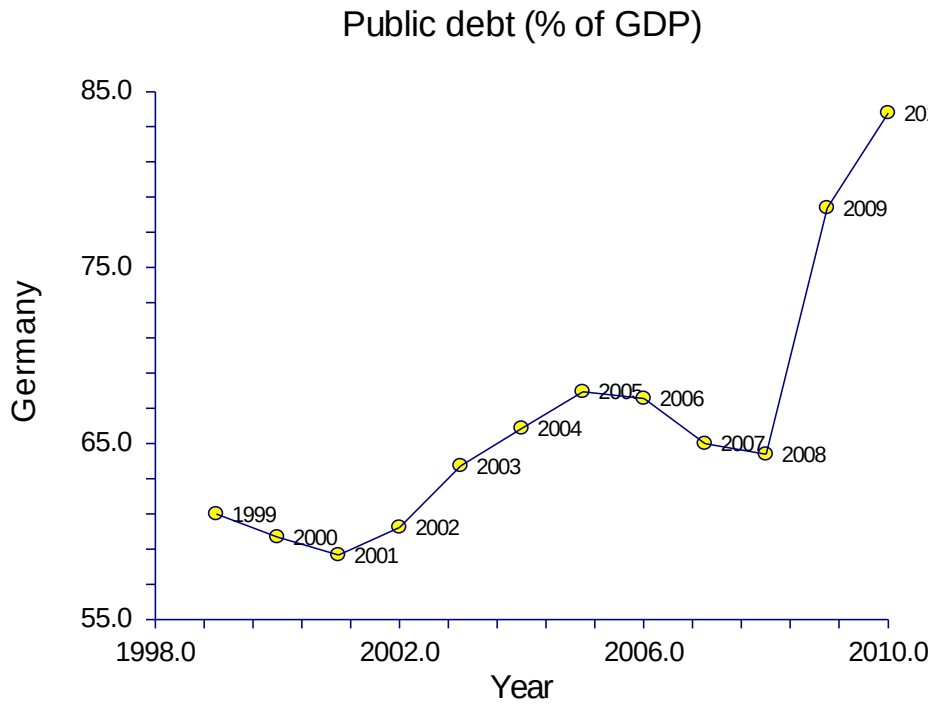

Figure 23. Public Debt as a percentage of GDP. Germany. (1999-2010)

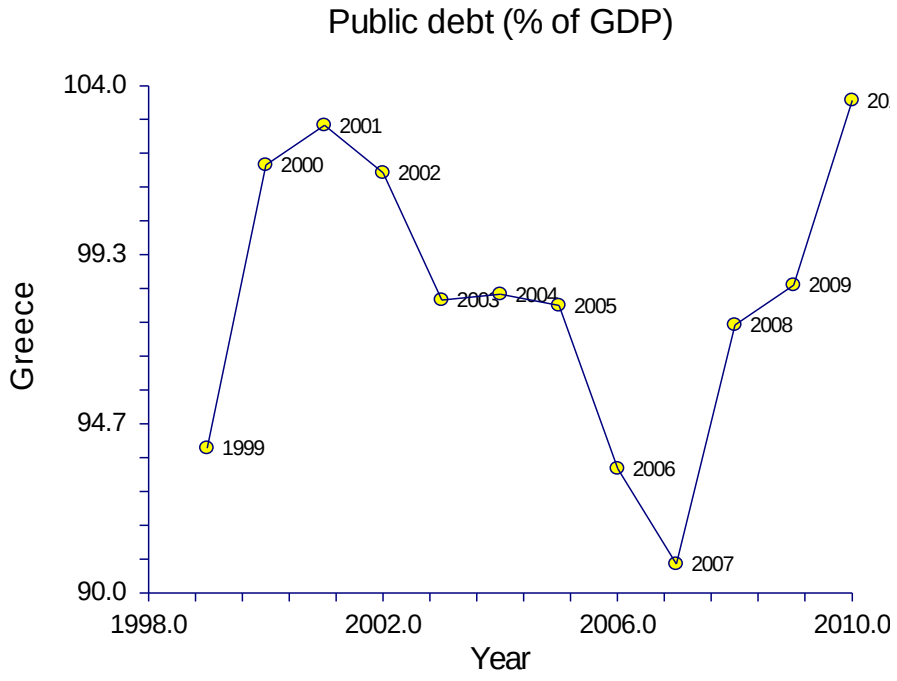

Figure 24. Public Debt as a percentage of GDP. Greece. (1999-2010)

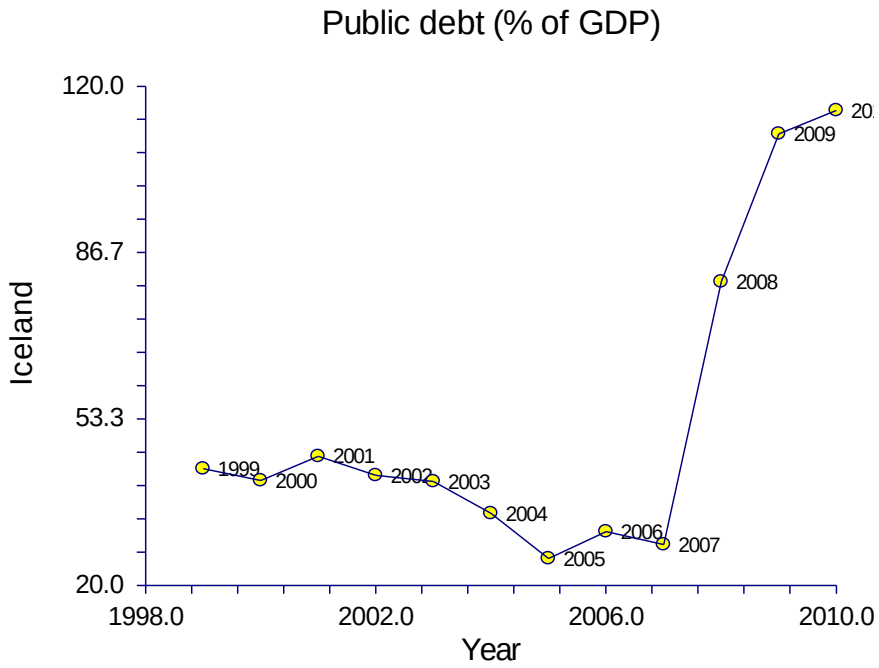

Figure 25. Public Debt as a percentage of GDP. Iceland. (1999-2010)

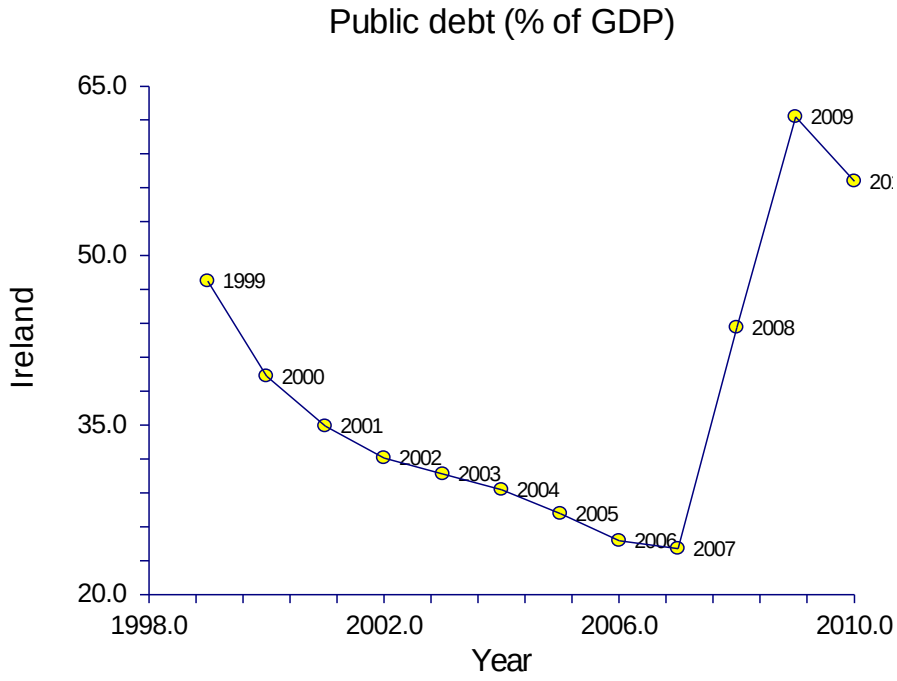

Figure 26. Public Debt as a percentage of GDP. Ireland. (1999-2010)

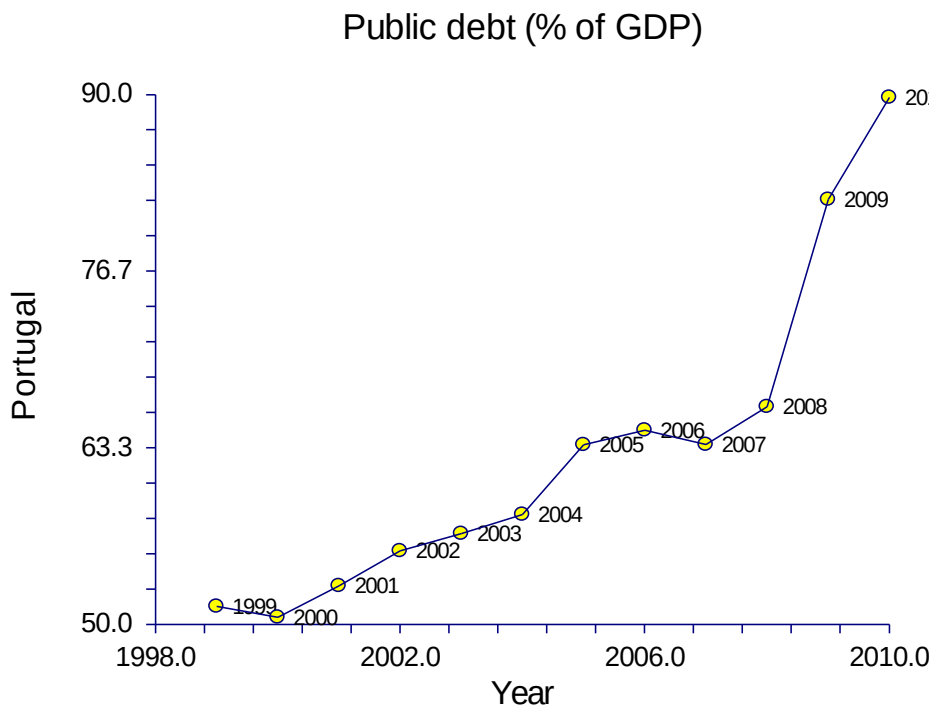

Figure 27. Public Debt as a percentage of GDP. Portugal. (1999-2010)

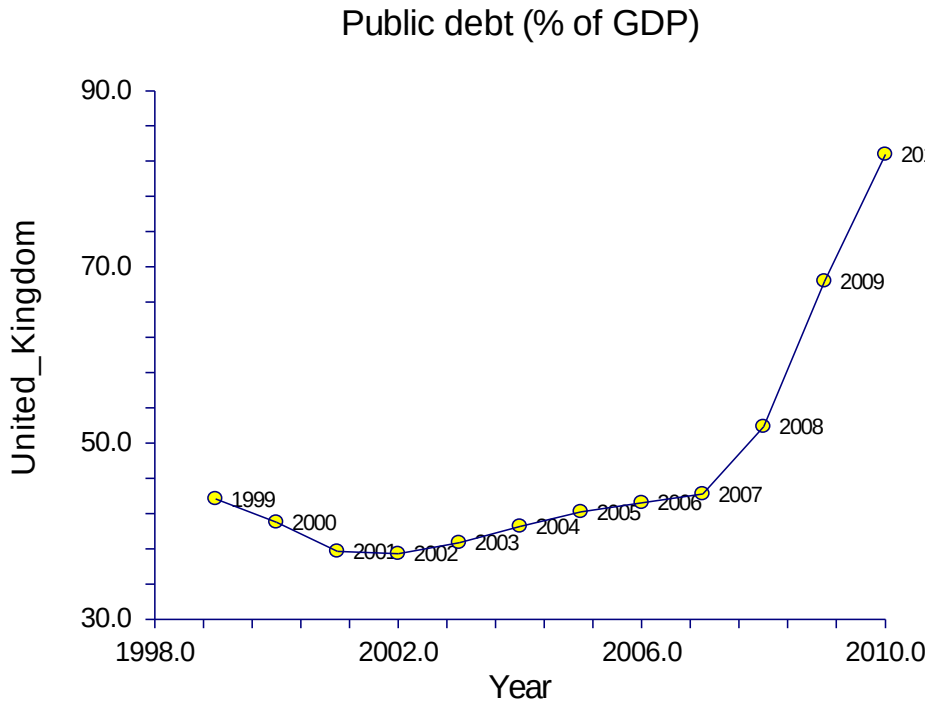

Figure 28. Public Debt as a percentage of GDP. United Kingdom. (1999-2010)

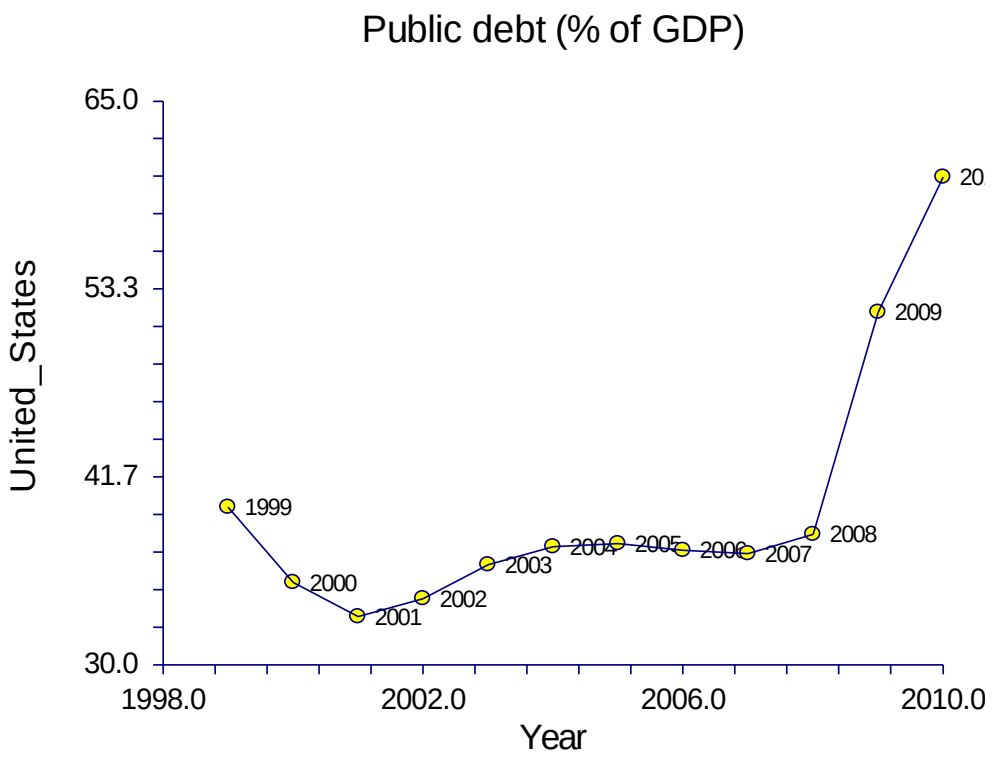

Figure 29. Public Debt as a percentage of GDP. United States. (1999-2010)

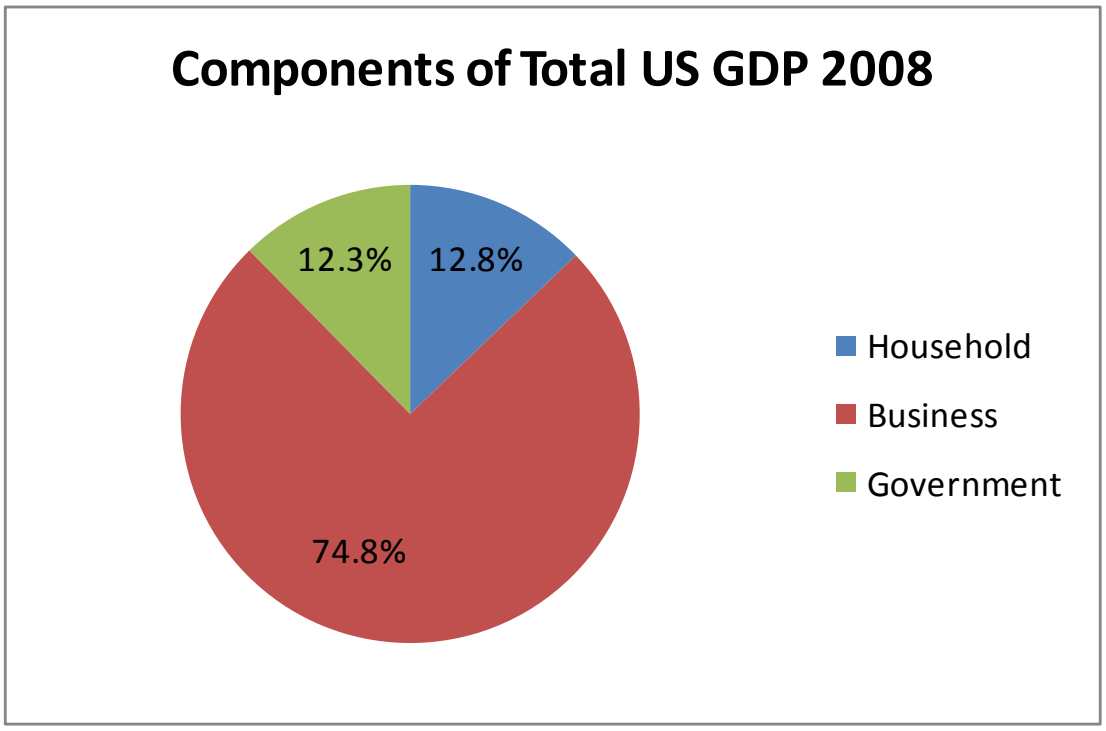

Figure 30. GDP by sector 2008.

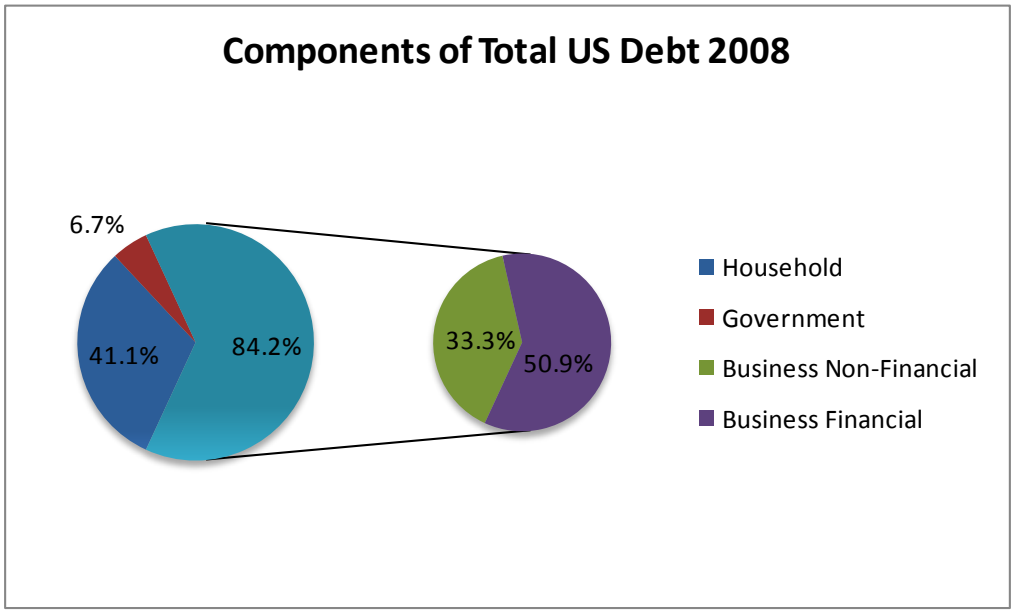

Figure 31. Components of total US debt by sector 2008.

In addition, the debt to income ratio for households is far greater than that of businesses. I calculate the business debt to income ratio as the ratio of total business debt (including financial and non-financial) to the business component of GDP, and the household debt to income ratio as the ratio of total household debt to the household component of GDP. In 1976 this ratio was 0.86 for businesses and 5.102 for households. By 2008, the respective ratios were 2.579 and 7.66.

II. A FAILURE OF POLITICS OR ECONOMICS?

There are two mainstream views regarding the origins of the crisis. The first is that government policy and regulation caused the crisis, and the second is that a lack of government regulation and oversight, including efforts to deregulate the financial markets beginning in the 1980s, caused the crisis. I'll address the arguments from both perspectives.

A failure of politics?

Jeffrey Friedman in an article entitled "A Crisis of Politics, Not Economics" (2009), cites five regulatory factors at work which led up to the crisis. These factors include:

> 1) directives by the department of Housing and Urban Development (HUD) to Fannie Mae and Freddie Mac, beginning in 1994, to increase their subprime and nonprime home mortgage loans;
> 2) regulations in place since 1936 which authorized only three ratings "agencies";
> 3) a 1975 Securities and Exchanges Commission (SEC) decision to confer legally protected status on the existing ratings agencies;
> 4) the loose monetary policy of the Federal Reserve (Fed) after 2001; and
> 5) the so-called "no-resource" laws in most states which prohibited lenders from seeking legal and financial retribution against borrowers who declared bankruptcy.

I will discuss each in turn.

Fannie Mae, Freddie Mac, Ginnie Mae

Mortgage backed securities (MBSs) were not the invention of Wall Street but of the federal government. The first MBS was offered by Ginnie Mae on April 24, 1970 (Fligstein 2010).

The Federal National Mortgage Association (Fannie Mae) was originally founded in 1938 in order to repurchase mortgages from banks, so that banks would be more willing to issue them. Fannie Mae was converted by the Johnson administration into a GSE (government sponsored enterprise) in 1968, the year the Government National Mortgage Association (Ginnie Mae) was also created. The Johnson administration sought to expand home ownership, but couldn't have the government offer loans directly because of federal deficits at home and political opposition. It thus moved the loans off the government books. The Federal Home Loan Mortgage Corporation (Freddie Mac) was founded in 1970 in part to compete against Fannie Mae. Fannie, Freddie, and Ginnie are under directives from HUD (Dept of Housing and Urban Development). Although the shares of these GSEs are owned by private investors, their congressional charters suggested they would be bailed out (which in fact happened in September of 2008).

The Federal Housing Authority (FHA) already had the job of subsidizing home ownership for the poor; issuing 1 million no-down-payment loans in each of the years 1998, 1999, 2000, and 2001, but in 1994, HUD ordered Fannie and Freddie to supplement FHA by directing 30 percent of their mortgage financing to low-income borrowers (Friedman 2009: 130). In 1997, Fannie

introduced the 3-percent down payment, whereas traditionally, non-FHA mortgages required a 20 percent down payment. In 2000, HUD increased the GSE's low-income target to 50 percent. Fannie launched the *American Dream Commitment* in 2000 and Freddie its *Catch the Dream* campaign in 2002, both of which were designed to increase lending to lower-income borrowers. According to Friedman (2009), 40 percent of all subprime and nonprime loans were guaranteed by GSEs by 2007.

Community Reinvestment Act

The Community Reinvestment Act (CRA) was passed in 1977 in order to encourage depository institutions to lend in low income neighborhoods. Critics charge that the CRA encouraged risky lending in the subprime market, which contributed to (or even caused) the crisis. The first securitization of *subprime* mortgages occurred in 1997, when Bear Sterns securitized $385 million of loans pooled together by First Union Capital Markets as a result of the CRA (Friedman 2009: 131). The subprime market then fizzled out, only to be revived again beginning around 2001.

There are a number of problems with this argument. First, the timing is off. The CRA was passed in 1977, but the crisis did not really begin until 2007. Second, the mere existence of subprime loans was not the problem, as evidenced by Gorton (2010) rather it was their complex and opaque securitization. Third, the CRA only pertains to federally insured depository institutions and to the geographical areas they serve. The CRA does not regulate what mortgage brokers and mortgage bankers do. According to a Federal Reserve study, only 10 percent of all mortgages were made by banks and their affiliates to lower income households located in their CRA assessment areas (cited in Jarsulic 2010: 144). About half of all subprime loans came from banks not regulated by the CRA, plus another 25 to 30 percent with very little CRA exposure, totaling 80 percent of subprime loans. Finally, non-CRA-covered firms issued subprimes at twice the rate of CRA-covered firms (Gordon 2008).[9]

Ratings Agencies and the Basel Accords

The capital requirements for banks in most Western countries are established by the Bank for International Settlements (BIS) located in Basel, Switzerland. Under the Basel Accords, banks must have capital reserves equal to *at least* 8 percent of its total assets. In the United States, this requirement is set to 10 percent for "well capitalized" banks. In 1991 and 1992, the United States phased in Basel I. The Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), and the Office of Thrift Supervision (OTS) assigned a 20 percent risk weight to both GSE issued securities and all asset backed securities that had received an AA or AAA rating from the Nationally Recognized Statistical Rating Organizations (NRSROs) (Friedman 2009: 145).

In other words, the reserve requirements were adjusted according to the risks associated with those reserves. Cash is clearly the best, most "liquid" reserve, but assets that it already had could

[9] Available at:
http://www.prospect.org/cs/articles?article=did_liberals_cause_the_subprime_crisis

be converted into securities, which if AAA-rated could further reduce its reserve requirements. The bank could also purchase securities from GSEs to accomplish the same end.

The three NRSROs included Moody's, Standard and Poor's, and Fitch, all of which enjoyed oligopoly status, conferred upon them by the Securities and Exchange Commission in 1975. In effect, the federal government forbade institutional investors from buying securities that were not rated as investment grade by these specific firms. In addition, the 1975 ruling effectively shut out any potential competitors (Friedman 2009: 134).

Friedman's argument is that a lack of competition between ratings agencies, and a widespread ignorance about the effective monopoly status granted to these three ratings agencies, exacerbated the risks that companies took when purchasing securities. Other ratings agencies could have, in theory, graded these assets more realistically. How much competition would have been required? How many ratings agencies would have been necessary to obviate the rush to purchase mortgage backed securities and mortgage backed CDO's?

The facts of this case belie the neat and tidy distinction between politics and economics established by Friedman. The fact that these institutions were granted effectively monopoly status does not demonstrate that the valuation of risk would have been less homogenous in the absence of these regulations. Friedman regards businesses as the passive objects of regulatory failure, but one can also, with equal justification, reverse this causal analysis and attribute the crisis to insufficient, rather than inadequate, regulatory oversight. The key difference lies in the counterfactuals that one imagines.

For example, one problem addressed by those who see the crisis as a failure of economics, is that the ratings agencies are paid by the companies whose securities they are rating. This creates the incentive for the ratings agencies to give the rating preferred by their clients, since these companies could take their business elsewhere if they perceived that their securities were being graded too stringently.

A failure of economics?

An exemplary analysis of the deregulation hypothesis is put forth Yves Smith in her book *Econned*. In chapter 6 entitled "How Deregulation Led to Predation" she writes:

> Deregulation ... changed everything, leading financial companies to become much more like the fiercely competitive firms idealized in neoclassical economics. With each company fighting for market share and profits, the aggressive impulses that had been checked by oversight and by quaint notions like propriety were now unleashed. It was easy for predatory firms to take advantage of their customers thanks to the rapid growth of a 'shadow banking system,' involving, in particular, over-the-counter markets derivatives The financial services industry developed a range of products and services that were both very difficult for their clients to understand and also substantially outside of the reach of regulation (2010: 130).

I will discuss two laws that are the most commonly cited examples of deregulation thought to generate the crisis: the Gramm-Leach-Blilely Act of 1999, which ostensibly repealed Glass-Steagall, and the Commodity Futures Modernization Act of 2000, which prohibited the regulation of credit default swaps (CDSs)

The Repeal of Glass-Steagall

The law popularly known as Glass-Steagall separated investment banks from commerical (depository) banks. It was ostensibly repealed in 1999 by the Gramm-Leach-Bliley Act (GLBA). Originally, Glass-Steagall consisted of only 4 short statutory provisions. These are described by Wallison (2009):

> Section 16 generally prohibits banks from underwriting or dealing in securities,[6] and Section 21 prohibits securities firms from taking deposits.[7] The remaining two sections, Section 20 [8] and Section 32,[9] prohibit banks from being *affiliated* with firms that are principally or primarily engaged in underwriting or dealing in securities

GLBA repealed sections 20 and 32, enabling banks to become *affiliated* with investment banks. It did not repeal sections 16 and 21. Investment banks are firms that trade securities. They do not take deposits, are not backed by FDIC, and are meant to be risk takers. Most banks in the US are subsidiaries of bank holding companies (BHCs), which are ordinary corporations that might also control firms engaged in securities trading. The big banks in the US, prior to the crisis, include Citibank, Wachovia, Bank of America, JP Morgan Chase, and Wells Fargo.

Contrary to popular misconception, Glass-Steagall did not prohibit banks from buying and selling securities, but instead only prohibited banks from "underwriting" and "dealing" in securities. Wallison further explains this crucial distinction:

> "Underwriting" refers to the business of assuming the risk that an issue of securities will not be fully sold to investors, while "dealing" refers to the business of holding an inventory of securities for trading purposes. Nevertheless, banks are in the business of making investments, and Glass-Steagall did not attempt to interfere with that activity. Thus, although Glass-Steagall prohibited underwriting and dealing, it did not interfere with the ability of banks to "purchase and sell" securities they acquired for investment. The difference between "purchasing and selling" and "underwriting and dealing" is crucially important. A bank may purchase a security--say, a bond--and then decide to sell it when the bank needs cash or believes the bond is no longer a good investment. This activity is different from buying an inventory of bonds for the *purpose* of selling them, which would be considered a dealing activity and involves considerable market risk because of the volatility of the securities markets. (2009)

Banks, before and after Glass-Steagall, were therefore permitted to buy and sell loans. They were also permitted to securitize loans, including government securities and mortgage-backed securities. This was not changed by GLBA. In addition, although it was possible after GBLA

for banks to have investment banks as subsidiaries, regulations by the Office of the Comptroller of the Currency (OCC) stipulate that these investment firms be treated as subsidiaries of the BHC, rather than the bank itself. These regulations are stipulated in sections 23a and 23b of the Federal Reserve Act, which, moreover, stipulates that the affiliation of banks with investment banks will have few negative consequences for the former.

Credit Default Swaps and the Commodity Futures Modernization Act of 2000

The Commodity Futures Modernization Act of 2000 (CFMA) stipulated that most over-the-counter derivatives transactions would not be regulated either as futures or as securities. Derivatives would therefore not be regulated by the Securities Exchange Commission (SEC), which regulates securities, or by the Commodities Future Trading Commission (CFTC), which regulates futures. This effectively meant that these entities would not be regulating credit default swaps, which, as the story goes, ultimately contributed to the financial collapse.

Firms purchasing CDO's (or any securities) can purchase insurance against the risk that the value of these securities will decline. Credit Default Swaps (CDSs) are a type of derivative[10] contract insuring against the default of a particular bond or tranche. In the case of default, the insurers (e.g. AIG) would be required to compensate for any losses. Credit default swaps *transfer risk*, for a price, from one party to another. If an investor who possesses a security does not want to incur the risk of that security, it can either a) sell the security, or b) transfer the risk of the security.

According to Wallison (2009):

> A CDS is nothing more than a contract in which one party (the protection seller) agrees to reimburse another party (the protection buyer) against default on a financial obligation by a third party (the reference entity). (381).

A CDS works as follows. A lender lends money to a borrower (the reference entity), who posts a bond in exchange as collateral. The bond is a promise to pay the principle plus interest, and can be backed up by collateral (i.e. securitized) or not. A "repo" contract is a typical example for which CDSs might be used.

Figure 32 is adapted from Wallison (2009: 381) and illustrates the transfer of risk associated with credit default swaps. The "fee" that is charged for the protection is called the CDS premium, or spread. The amount charged for the premium is based on an assessment of the risk of default by *A*. In this example, the risk is passed along from *A* to *E*. If *A* defaults, then the lender will seek insurance payment from the CDS dealer, which in turn will seek payment from *D*, which in turn will seek payment from *E*. Ultimately, whoever holds the CDS bears the risk. The CDS then transfers the risk. If the insurer defaults before *A*, then the firm purchasing the insurance will have to purchase its insurance elsewhere.

[10] **A derivative** is a financial contract whose value is derived from something else.
There are four kinds of derivatives: swaps, forwards, options, and futures contracts. (Derivates User Guide);

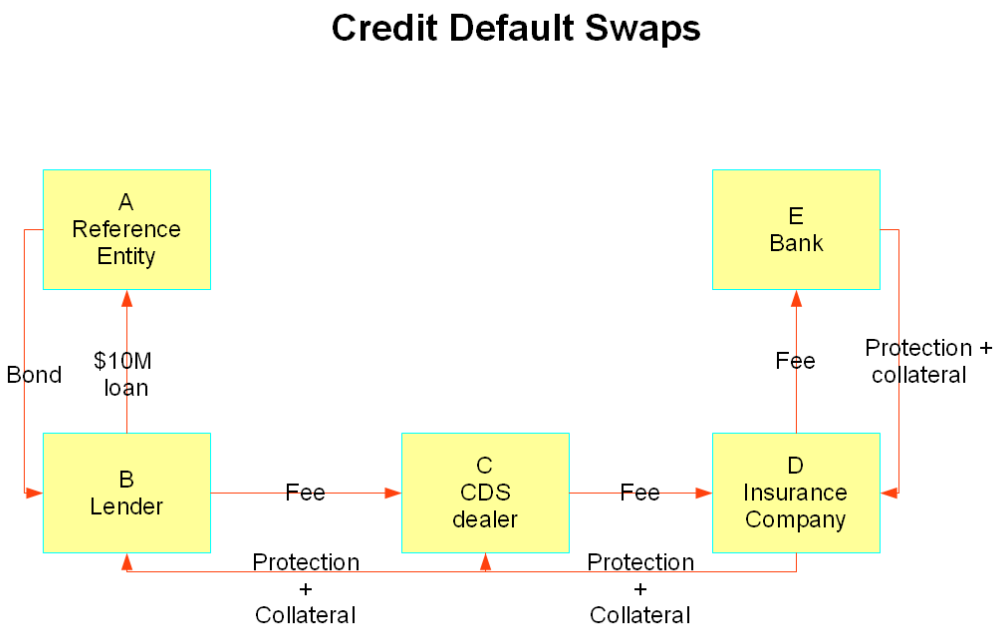

Figure 32. Credit Default Swaps (CDSs)

If, however, the insurer defaults *after A* defaults, then insurance purchaser incurs the risk. For example, assume that *A* defaults and shortly therefore, *E* defaults. The insurance company *D* would then have to pay.

Arguably, CDSs do not generate systemic risks that were not already present (Walliston 2009). In the above example, CDSs do not increase the risk associated with the original $10 million loan. It is still $10 million that has to be paid. If no CDS were purchased, and *A* defaults, then *B* would lose the $10 million, and because *B* most likely owes others, a default by *B* could generate systemic shocks to the financial system. On the other hand, CDSs can exacerbate opacity, especially since CDSs are *over the counter* (i.e. private) transactions, rather than "market" transactions. Estimates for outstanding CDSs range from $45 trillion to $62 trillion in 2007 (Brunnermeier 2009).

The failure of AIG has frequently been attributed to its inability to redeem its CDS contracts to Lehman Brothers. According to Wallison (2009: 378), however, AIG only owed about $6.2 million to Lehman:

> The collapse of A.I.G., then, had nothing to do with credit-default swaps *per se*. The cause was the same as with the collapse of the financial system as a whole: the faulty evaluation of the risks of residential mortgage-backed securities (RMBSs) that contained subprime loans.

When the value of the RMBSs declined, AIG had to immediately post more collateral as part of its CDS agreements. This resulted in loss and marginal spirals, and ultimately insolvency.

Conclusions

The global debt crisis is the result of a confluence of conditions (a "perfect storm") that include decisions, and their unintended and intended consequences, as well as non-decisions, such as ecological conditions of increasing energy scarcity. Although it is implasubiel to argue that de-regulation *qua* the repeal of already extant legislation caused the global debt crisis, or more proximately, the financial panic of 2007-8, it is not entirely implausible that some set of counterfactual policies might have obviated at least some aspects of the latter. To regard this is a failure of "regulation" however is to assume a level of control that is incompatible with the system as it is currently established, much like attempting to cap an erupting volcano. The system at work producing the global debt crisis as its own crisis of anticipation is strung together from communications that are nominally designated as belonging to both the state and economy. It is likely that, in this case, the distinction obscures more than it reveals.

The question concerning the primacy of the economy or society, the latter identified with politics or the state, has, since the birth of the modern era, been a prevailing distinction used to provide meaning and attribute causality to social events. Following Parsons, we can designate that the ability to create credit is a political function. The crisis would thus be a political crisis, but this designation would of course be arbitrary. We can also say that, following Luhmann, the crisis, at least in its credit and monetary (i.e. value as opposed to ecological) dimensions pertains to money and is therefore economic. The system at work is an emergent system operating globally, which means that it cuts across both nation-states and sectors of society (i.e. across the economy, the state, culture, and so on). An important element missing from this distinction is the medium of cultural and ideological expectations regarding the future. Expectations of future income growth, by both firms and individuals and also creditors and borrowers, became a universal background condition that enveloped both sides designated by our habitual distinctions. It became like the water in which fish swim. The fact that the water is becoming inhospitable is recognized only indirectly in symptoms which appear disparate and unrelated.

III. THE SYSTEM OF BANKING AND FINANCE

A Primer on Banking

Modern banking is often called *fractional reserve banking*. Fractional reserve banking occurs whenever a bank issues more certificates of deposit than it holds in reserves. To make a profit, banks typically make long term loans with short term deposits. This is referred to as *lending long and borrowing short*. Everything else being equal, short-term loans yields lower interest rates than do longer term loans. Lending long and borrowing short, however, means that the bank bears some *funding liquidity risk*.[11] Another term for this basic idea is *maturity mismatch*, which occurs whenever short-term debt is used to finance, or fund, long-term assets. To "finance" a long term asset means to raise money to make a loan, such as a mortgage. The mortgage is an asset for the bank because it constitutes a future income of monthly payments. Moreover, if the homeowner defaults, the bank can seize the house as collateral, which in periods of rising housing prices means the bank can sell the house at a profit.

The banks profits from the difference in interest rates, called the *net interest income*. Banks attempt to maximize their *return on equity* (ROE). Note that a bank would incur no liquidity risk if its loans are paid back before having to pay its depositors. When the duration of a bank's loans is equal to the duration of its borrowings, the bank is said to *borrow to term*. A simplified representation of how banks earn profits is provided in Figure 33. [12]

A bank can also acquire reserves from its own profits, or *equity*. Selling assets is another form of equity funding. The primary sources of *debt* funding are deposits, interbank money markets, and bonds. The reserve requirement only applies to transaction accounts, not to savings accounts, or deposits by companies. Other names for the reserve requirement include cash reserve ratio, cash asset ratio, and liquidity ratio. Because of maturity mismatch a bank can rarely pay back a depositor with the depositor's money. The bank won't have enough funds from the loan funded by the deposit until after the loan is paid off. Considering the example above, a bank that owes its depositor $103 might only have the $10 held in reserves, plus some fraction of the $99 loan. Assuming the bank only has $10, the bank would then have to borrow the remaining $93 from elsewhere. In normal circumstances, the bank can simply dip into its reserves acquired from the money it borrowed from *other* depositors. Another way to say this is that the bank must *roll its funding*.

---

[11] According to the European Central Bank, "funding liquidity is defined as the ability to settle obligations immediately when due. Consequently, a bank is illiquid if it is unable to settle obligations on time. Given this definition, it can be said that funding liquidity risk is driven by the possibility that, over a specific horizon, the bank will become unable to settle obligations when due" (Drehmann and Nikolaou 2009). John Taylor distinguishes *liquidity problems*, in which there is a shortage of funds to lend, from *liquidity risk* or what he prefers to call, *balance sheet risk*. The difference, however, is not at all clear to me. Indeed, Taylor acknowledges that "Liquidity is not always defined the same way by different market participants, and indeed the concept is elusive" (2009: 48).

[12] In this model I have sacrificed realism for clarity of conceptual exposition. It does not depict bank equity or other forms of bank borrowings (e.g. commercial paper, repurchase agreements, securities, etc). To make this more realistic, one would also need a string of zeros to the numbers I use above. This model will become progressively more complex as required to explain the dynamics of the 2007 bank panic.

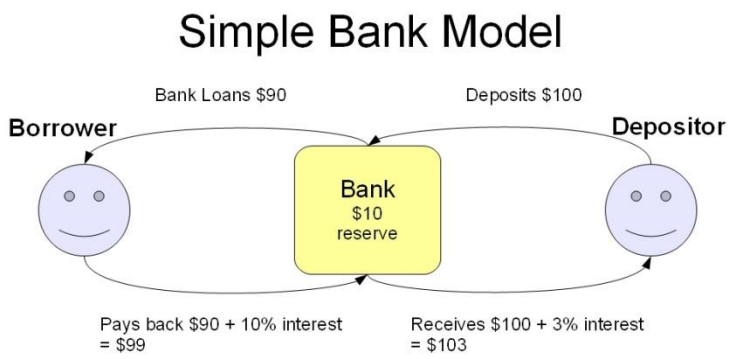

Figure 33. Simple Bank Model.

Because the bank only has 10 percent of its total deposits on reserve, however, it necessarily cannot redeem all deposits at the same time. A mass withdrawal by depositors is called a bank run. When a bank run happens, the demands for cash exceed the bank's ability to pay, and if the bank cannot raise enough money, the bank becomes insolvent. Bank runs are so called because prior to the introduction of federal insurance people would literally run to the banks to withdraw their holdings. When bank runs occur on a mass scale, a banking panic occurs. Banking panics were common in the United States until the introduction of federal deposit insurance in 1934. According to Gorton (2010), the financial crisis that began in 2007, what he refers to as the "Panic of 2007), was essentially a bank run in the unregulated shadow banking system, to be discussed below.

Interest rates and the time value of money

Interest is the price paid in the future for money in the present. More simply, interest can be regarded as the price of money. The price of money is constituted by three factors: 1) a compensation for perceived risk; 2) the discount rate, which is a compensation for delaying gratification (aka the time value of money); and 3) a compensation for expected inflation. Perceived risk is relatively easy to understand. The less likely a borrower will pay back the lender, the higher the price the lender will charge the borrower for borrowing money. Higher *perceived* risk generally translates into a higher interest rate.

The rate at which the value of money diminishes in the future is the discount rate, one component of the total rate of interest. It explains why, for example, long term loans are more

expensive than short term loans, everything else being equal. This is so because *money in the present is worth more than money in the future*, even if there is no inflation. The discount rate is used to calculate *present discounted value*, which is the amount a future payment is worth in the present, if paid immediately. Present-discounted value is calculated as:

$$PV=FV/(1+R)^t$$

In this equation PV means *present value*, FV means *future value*, R is the discount rate, and the exponent *t* is the amount of time that passes. For example, $100 today, at a discount rate of 5 percent per year is only worth $78.35 in 5 years.

$$100=100/(1+.05)^5=78.35$$

Note that this assumes that the future value of the $100 has not been diminished by inflation. The discount rate presents a problem that is rarely discussed in finance and economics, which has been adequately described as a *discount rate mismatch*. The discount rate mismatch refers to the difference between the risk-free return on investment that investors demand and the risk-free return on investment that is likely or possible in the real world.[13] The discount rate is already built into many of institutional investors at a standard rate of about 5-6 percent. This means that investors will demand *real* returns in excess of this amount, even disregarding expected inflation. This would not matter in a world where risk and inflation could be accurately evaluated by everyone. Because we do not live in that world, however, the discount rate has skewed the distribution of investments towards higher-return, but ultimately unsustainable and higher-risk assets.

The final component of the interest rate is *perceived* risk. Perceptions are often inaccurate, as indicated by the massive downgrading of mortgage-backed securities. One of the most frequently used indicators of perceived counter-party risk is the 3-month London Inter-Bank Offered Rate, or LIBOR. The Libor is the interest rate that banks charge each other.
There are two important sources of debt-funding for financial institutions: central banks and other large, private banks and lending institutions. In the United States, the rate set by the central bank (the Federal Reserve) is called the *federal funds rate*. In general, the short term rate set by central banks (e.g. the Fed or the European Central Bank) is called the *short rate*. The primary source of debt-funding for private banks, however, is from other banks.

Leverage: another word for Debt

In a traditional banking model, a bank *originates loans*, which means that it finds people who want to borrow money; raises money to make the loan, which is called *funding* or *financing* the loan; *services* the loan, which entails collecting payments, modifying terms of the loan, managing late payments and defaults, and so on; and finally, the bank *retains* the loan, which

[13] This phenomenon was brought to my attention by an anonymous blogger whose analysis can be found here: http://baselinescenario.com/2010/04/19/discount-rate-mismatch/

means it keeps the loan on its books and incurs the risk of loan default. In the *originate-and-retain model* of banking, the bank can make more money in three ways. The bank can:

1) pay less for its funding (i.e. it can borrow at lower interest rate);
2) originate higher spread assets (i.e. issue loans with higher interest rates); or
3) originate more assets (i.e. lend out more loans)

Banks and lending institutions cannot under normal circumstances control the first two options. Competition between banks for funding enforces some uniformity of interest rates, everything else (e.g. perceived risk and duration) being equal. To grow, therefore, a bank must originate more assets, that is, make more loans. There are only two impediments to making more loans: a) capital (i.e. its equity, whatever it has that isn't borrowed) and b) funding. After a certain point, however, a bank can no longer grow from deposits alone and must seek other sources of funding. In the UK, for instance, prior to 2001 deposits funded loans, which means aggregate customer lending approximately equals aggregate customer borrowings. After 2001, lending grew faster than deposits, a signal of increasing funding liquidity risk (Murphy 2009).

One way a bank can increase its assets is to increase its leverage. The concept of *leverage* is closely related to funding liquidity risk and maturity mismatch. Leverage measures the degree to which assets are funded by borrowed money. Leverage is calculated by the *debt-to-equity ratio*. A bank's balance sheet consists of "assets" on one side, and equity and liabilities on the other side. Assets equal equity plus liabilities.

A bank that issues ("funds") $100 worth of loans with only $10 has a debt-to-equity ratio, also called a *leverage ratio*, of $90/$10, or 9. A generic, simplified formula for leverage is:

$$L = D/E$$

L is leverage, *D* is already existing debt (liabilities), and *E* is equity. To calculate the changes to the leverage ratio with added borrowings *B*, use the following:

$$.L = (D_t + B_{t+1})/E$$

I include the time subscripts to distinguish debt already owed from the new debt added, since they are both debt. New borrowings could also be be represented as ΔD, for example. To determine how much more a bank can borrow to meet its maximum leverage ratio, solve for *B*:

$$B_{t+1} = L * E - D_t$$

For example, assume that the maximum leverage ratio is 10 rather than 9. Starting out from the same initial $10 in equity, a leverage ratio of 10 would enable the bank to borrow 10*10-90, or an additional $10. The banks total assets would become $110, $10 of which is equity, and $100 of which is debt. Increasing leverage also means increasing funding liquidity risk. The Board of Governors of the Federal Reserve System (the Fed) establishes the guidelines for capital requirements for bank holding companies in the United States. Capital requirements are

measured by the *capital ratio*, also known as the *capital adequacy ratio* (CAR). The CAR is the ratio of capital (primarily equity) to a bank's *risk-weighted* assets. It is therefore similar to leverage, except the capital ratio is measured as debt-to-assets rather than debt-to-equity.

The standard for adequate capitalization is currently a Tier 1 capital ratio of at least 4 percent, which consists of shareholder's equity and retained profits. Shareholder's equity refers to the original amount of money required to purchase the bank's stocks, not the stock's current trading value. Meanwhile, the *reserve* requirement for large US commercial banks is 10 percent of demand deposits (e.g. checking accounts). Table 1 depicts a simplified version of a bank's balance sheet. Table 2 gives a numerical example of a bank's balance sheet, and Table 3 shows how a bank can maximize its leverage. In this example, assets have been decomposed into reserve requirements and loans. The bank's cash reserve ratio is \$10/100, or 10%; its capital ratio is \$100/\$110, or 9.1 percent.

Often a bank will find that its reserve requirements are below the legal mandate. In these cases, the bank can *borrow* from other banks ("depository institutions) on a short-term basis, usually overnight. One bank lends its credits in the Federal Reserve Bank to another bank. The lending and borrowing banks determine the interest rate. The weighted average interest rate of all of these transactions is known as the *Federal Funds Effective Rate*. The Fed has no direct control over this rate.

Table 1. Components of a bank's balance sheet.

A Bank's Balance Sheet	
Assets = (loans)	**1) Equity** (capital), and
	2) Debt = Liabilities (deposits and other debt)

Table 2. Example of a bank's balance Sheet.

A Bank's Balance Sheet	
Assets \$10 cash reserves \$100 loans	**Equity** \$10
	Debt \$100 (demand deposits)

Table 3. Example of bank leveraging.

Maximizing Leverage	
Assets \$100→\$110	**Equity** \$10
	Debt \$90→\$100

A bank can also borrow money from the Fed directly, a process known as *going to the window.* The interest rate charged by the Fed is called the *discount rate*[14], and it is usually higher than the Federal funds rate.

US Banking Prior to Federal Deposit Insurance

Financial bubbles are not new. Prior to the Great Depression there were "panics" in: 1819, 1830s, 1857, 1873, and 1907.[15] Moreover, many of banking panics correlated with recessions or depressions. Prior to the Civil War from 1837-1862, no national currency was issued. Instead, individual banks issued their own currencies, which were backed by state bonds issued by whatever state in which the bank was chartered. In other words, the currency was redeemable on demand for state bonds. This era is known as the *Free Banking Era*. During this era, the value of the collateral backing the state bonds was questionable, resulting in frequent bank runs.

Afterward, the US federal government took over the printing of currency, ushering in the *US National Banking Era* from 1864-1931. During this era, there was a national currency but no central bank to serve as a lender of last resort. Bank runs were common. Towards the end of the era, however, private banks organized into what eventually became known as the *Clearinghouse Committee*. In the panics of 1893 and 1907, the clearinghouse issued a new form of money, called the clearinghouse loan certificates. During a bank run, banks do not have sufficient cash reserves to honor the requests of all the depositors who are withdrawing their money. The clearinghouse response was to suspend convertibility, that is, to refuse to convert the demand deposits into cash, issuing the clearinghouse certificates instead. These were essentially promises to pay the money back at a later time. The clearinghouse system did not prevent bank panics, but it did prevent the banks from becoming insolvent. Moreover, the clearinghouse certificates were designed as claims on the entire clearinghouse system, rather than claims on individual banks.

The Great Depression ushered in major reforms in banking. The two most important in the US were the Federal Securities Act of 1933 and the Securities Exchange Act of 1934. Together, they created the *Securities and Exchange Commission* (SEC). The SEC oversees securities markets, requires securities traders to disclose all relevant information about the securities to buyers, and made misleading or fraudulent statements in order to sell securities illegal (Murphy 2009: 123). In particular, the Banking Act of 1933 created the Federal Deposit Insurance Corporation (FDIC), which provided deposit protection. Federal Deposit Insurance effectively ended banking panics arising from a run on demand deposits, leading to the *Quiet Period* of US Banking from 1934 to 2007. At the time, most economists, bankers, and even FDR, opposed the introduction of deposit insurance on the grounds that it would create moral hazard. Moral hazard

[14] This should not be confused with the rate at which the value of money is discounted in the future, which is also called the "discount rate."

[15] For a thorough historical review of financial crises and panics see: Charles P. Kindleberger and Robert Z. Aliber *Manias, Panics, and Crashes* (2005[1978]); and Carmen M. Reinhart and Kenneth S. Rogoff's *This Time is Different: Eight Centuries of Financial Folly* (2009).

occurs when "an individual or firm engage in riskier behavior when they are protected from the danger that such behaviors create" (Bullard et al. 2009). Gorton describes the introduction of deposit insurance as follows:

> During the Civil War the government took over the money business; national bank notes ("greenbacks") were backed by U.S. Treasury bonds and there were no longer private bank notes. But, banking panics continued. They continued because demand deposits were vulnerable to panics. Economists and regulators did not figure this out for decades. In fact, when panics due to demand deposits were ended it was not due to the insight of economists, politicians, or regulators. Deposit insurance was not proposed by President Roosevelt; in fact, he opposed it. Bankers opposed it. Economists decried the "moral hazards" that would result from such a policy. Deposit insurance was a populist demand. People wanted the dominant medium of exchange protected. It is not an exaggeration to say that the quiet period in banking from 1934 to 2007, due to deposit insurance, was basically an accident of history." (2009: 4)

The Banking Act of 1935 added several clauses to the 1993 Banking Act. Four provisions were intended specifically to separate banking from securities trading. These provisions are collectively known as the *Glass-Steagall Act*, after Senator Carter Glass and Henry Steagall, who helped get the legislation passed.

The Originate and Distribute Model of Banking

Beginning in the 1990s the banking system underwent significant but largely unregistered transformations, none of which bear resemblance to either traditional banking or traditional, competitive markets. One of the narratives surrounding these transformations is the birth of the so-called *originate and distribute model* (ODM) of banking. According to this theory, instead of retaining their loans, banks began selling (i.e. "distributing") their loans to third party investors. The ODM model of banking is depicted in Figure 34.

As Acharya and Richardson (2009) note:

> Securitization alters the original idea of banking: banks are now intermediaries between *investors* (rather than just depositors) and borrowers. (199)

Consider the following example. A bank pays $100,000 for a mortgage valued at $115,000. The bank profits by selling the mortgage at any price above $100,000, while the investor *should* end up making a profit by purchasing the mortgage at any price below $115,000. In effect, the bank trades expected future income for income in the present.

The value of future money relative to money in the present is measured by the interest rate. The interest rate can be regarded as the cost of postponing gratification in the present. In other words, it reflects a preference for present consumption over future consumption, which means that the former has a higher price. The interest rate is in theory intended to compensate for the

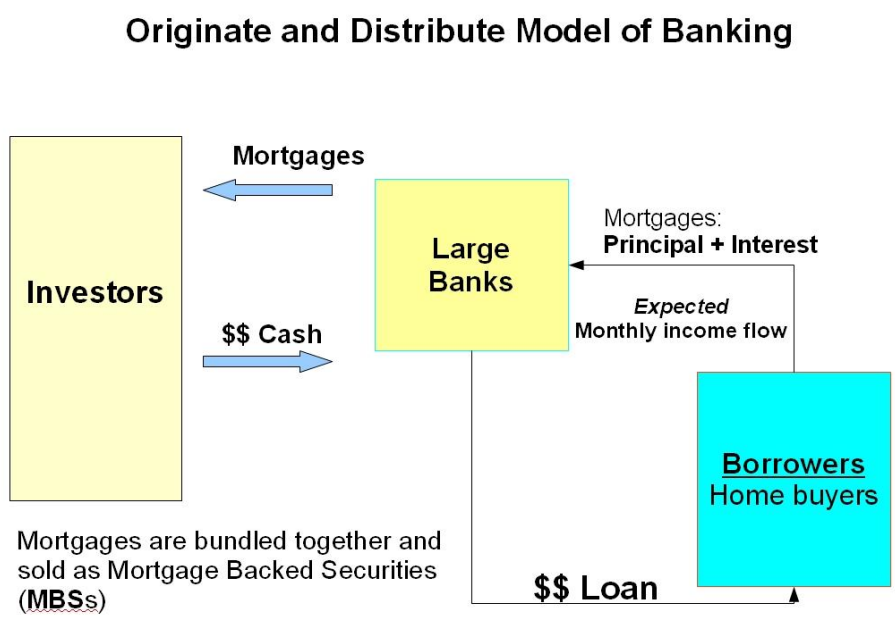

Figure 34. Originate and Distribute Model of Banking.

value depreciation of the principal of the loan. The general depreciation that occurs solely as a result of time, is calculated as a *discount rate*.[16] In theory, both parties to the transaction benefit.

Large banks, of course, do not sell individual loans, but rather a portfolio of loans, bundled together. A mortgage backed security (MBS) is one example. The selling of assets, (i.e. loans) provides the bank with profit (i.e. equity), enabling it to borrow more money and make more loans. This system, referred to as the *shadow banking system* (to be discussed below), *is the principle means by which the regular banking system has been funded for the past 30 years*. (Gorton 2010).

The ODM revised

The originate-and-distribute model, however, is somewhat misleading. Banks didn't sell all of their loans. Some of them were sold, and others were retained. In addition, many of the loans that were sold ended up in the hands of other banks, effecting a relative concentration of public debt in the financial sector. In short, *debt was not distributed but stock-piled*.

[16] Three, roughly approximate, methods of discounting the value of a present commodity over time are:
1. (1+d)^ -TIME
2. exp(-d*time)
3. (1+d*dt)^(-time/dt), or (1+d*dt)^(-time),
where *d* is the rate of discount and *dt* is the derivative of time. The discount rate presupposes that the future is worth less than the present. Some argue that this attitude towards time, contributes to environmental degradation and resource depletion, among other social ills (cf. Deb 2009).

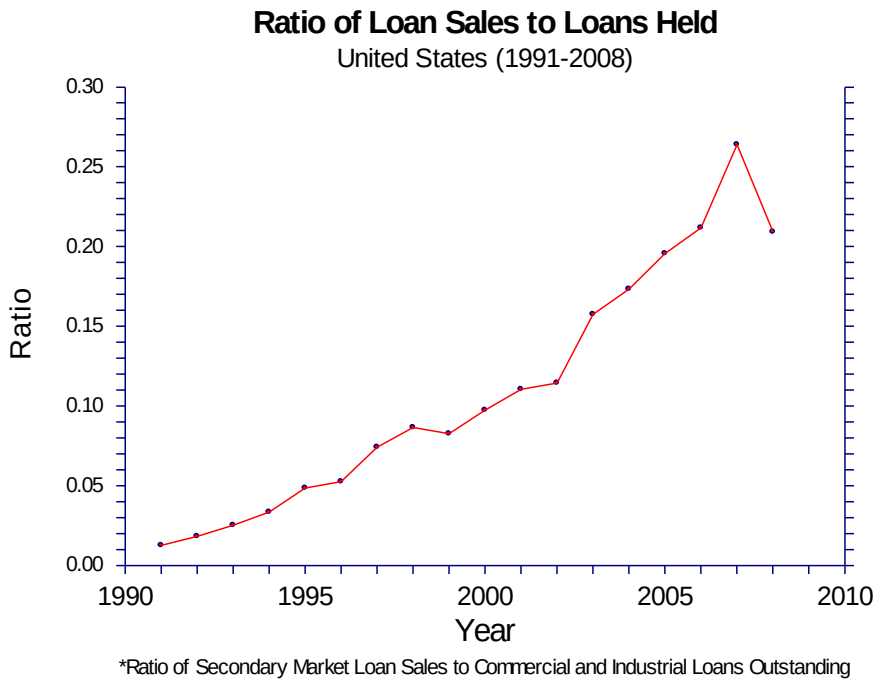

Figure 35. Ratio of Loan Sold to Loans Kept.

The ratio of loan sales to loans outstanding began to rise in the 1990s, but never exceeded 30 percent. Figure 35 is a time series depicting the ratio of secondary market loan sales to commercial and industrial loans outstanding. The data are provided by Gorton (2010: 42). Moreover, the securities markets were **heavily concentrated**. As Fligstein and Goldstein report,

> Contrary to view that there were too many players to control any facet of the market, by the end of the boom, *5 firms controlled at least 40% of the market (and in some cases closer to 90%)* (2010: 8; my emphasis).[17]

Numerous studies corroborate these findings. Acharya and Richardson (2009) note that about 30 percent of the world's AAA-rated asset backed securities were on the bank's balance sheets, and another 20 percent were on their off-balance-sheet-entities *(SIVs*). In total, about half of the securities were kept by the banks rather than sold to other investors (Friedman 2009: 145).

This indicates that the market was not characterized by perfect competition, but was instead dominated by a few big players; and second, *banks were themselves the primary investors of asset backed securities*. What then, explains the inordinate growth of securitization? For an individual bank, it is often more profitable for banks to sell loans than to keep them, but *en masse*, the banks were in large part simply securitizing and selling the loans to each other. One

[17] Available at: http://sociology.berkeley.edu/profiles/fligstein/pdf/The%20Anatomy%20of%20the%20Mortgage%20Securitization%20Crisis5.pdf

convincing explanation is provided by Acharya and Richardson (2009): *the banks securitized loans in order to circumvent capital requirements.*

Securitized Banking, or, the "Shadow Banking System"

The need for low-risk (secure), short-term lending between giant financial institutions gave rise to what is called the *shadow banking system*, also known as the *parallel banking system*. The pillar of the shadow banking system is the *repo*. In the shadow banking system (aka securitized banking), banks both sell loans and retain loans. Banks also move their assets off the books to what are variously called *off-balance sheet vehicles, special instrument vehicles (SIVs) special purpose vehicles (SPV)*, or *special purpose entities (SPE)*. The SPV is, for all intents and purposes, a part of the bank, but *legally* it is a regarded as a separate entity.

The process of securitization can be broken down into a few steps, depicted in Figure 36. First, the bank pools the cash flows from its assets and sells them to the SPV. Second, the SPV divides up the pooled assets into *tranches*, or slices, creating *asset backed securities* of varying risk. A collateralized debt obligation (CDO) is a type of ABS that is divided into *tranches* (a French word meaning "slice") of varying risk. So-called "structured finance CDOs" create securities from other securities, pooling together tranches of equal rating (e.g. AAA, Alt-A, etc) into a new security. Examples of collateral used in CDOs include residential mortgages, student loans, auto loans, and credit card debt. Central to the subprime crisis was the devaluation of residential mortgage backed securities (RMBSs).

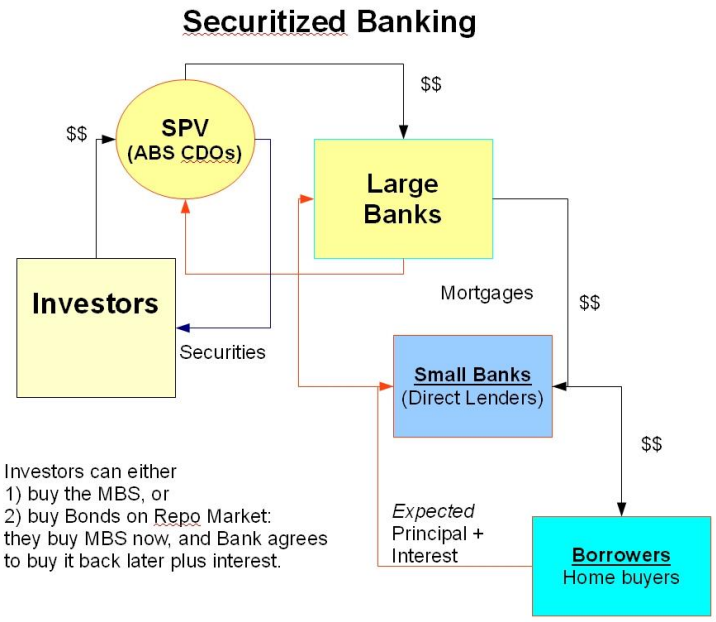

Figure 36. Securitized Banking.

In a CDO, securities in the senior (AAA) tranche receive lower returns in exchange for a lower risk. Losses are born first by the lowest tranches. CDO issuance more than tripled between 2004 and 2006 (Jarsulic 2010: 27). In addition, there were CDO-squared and CDO-cubed bonds, which pooled CDO's of varying risk (Friedman 2009; Crotty 2009).

Securitization was the primary channel of funding for mortgages during the bubble. Whereas in 1989 47.2 percent of all mortgage originations were securitized, by 2007 approximately 75 percent were securitized (Jarsulic 2010). Among subprime mortgages, between 2001 and 2006 the percentage securitized had risen from 60 percent to 80 percent.

It should be emphasized that *securitization was a means to increase leverage*. Securitizing enabled the banks to borrow more money, both by a) moving its assets off of its balance sheets and b) by holding reduced risk-weighted ABSs. Once the bank sells the securities to its SPV, it can then move all of those assets *off its books*. A bank with $100M in assets, consisting of $90M in loans financed by $10M in equity, for example, can move (if it can find the investors) $40M of the $90M to the SPV. The capital ratio has just gone from 10 ($100/$10) to 5 ($50/$10). It can thereby get around its capital requirements and borrow more money. Using SIVs thus enabled banks to exploit a loophole in the Basel I rules and allowed them to dramatically reduce their capital reserves. This gets around the capital requirement regulations, but how does the bank convince the lenders to lend it money? *The banks issued the ABSs as collateral for the money they borrowed to buy and/or originate more loans, which they could in turn securitize into more ABSs.*

Moreover, there was a strong *incentive to securitize* generated by the Basel I rules, which assigned a lower risk weight to all securities issued by GSE's (e.g. Fannie and Freddie) and to all ABSs receiving a AAA or AA-rating. According to Friedman (2009): "SIV purchases were paid for with money borrowed from money-market funds, and 95 percent of a money-market fund's investments have to be in double-A or triple-A securities"; he also adds that "of the $1.323 trillion in [MBSs] held by banks and thrifts in 2008, 93 percent were either rated triple-A or were issued by a GSE" (145).

Repos and short term borrowing

To acquire securities, the banks often borrowed money on the *repo* market. Repo is short for "repurchase and sale agreement." A *repo* is a "form of banking in that involves the short-term (mostly overnight) 'deposit' of money on call, backed by collateral" (Gorton 2010: 16). The repo enables both a) banks with excess funds to deposit them *short term* in lieu of alternative investments, and b) provides funding (i.e. loans that have to be paid back) to banks who need cash immediately in order to fund long-term investments such as ABSs.

One problem for banks, as they become larger and larger is deciding what they are going to do with their cash in the short run. Banks and other institutional investors need a place to keep (i.e.

deposit) their cash that is both a) short-term (i.e. they can recall their deposits on demand) and b) interest-bearing. Unfortunately, however, the Federal Deposit Insurance Corproation (FDIC) does not guarantee deposits over $100,000. The solution to this problem was the *repo*.

Recall that bonds are, promises to pay, which can be secured or unsecured. Secured bonds are backed up by collateral, whereas unsecured bonds, such as US Treasuries, are not. Secured bonds are called *securities*. In a repo, securities are used as collateral in exchange for short-term borrowings. Any kind of security can be used as collateral in a repo contract. Often, government bonds, such as US Treasuries, are used as collateral in the repo. During the housing market boom, mortgage-backed securities were also used.

In repo, the borrower agrees to buy back the security at a fixed price at some future date. When the future date arises, the two parties can either cancel the contract or agree to renew the repo agreement, which is equivalent to rolling funding. The steps of the repo are outlined in Figure 37 and Figure 38. In a repo contract, a Bank A (representing any lending institution) provides some collateral to Bank B in exchange for a loan. In this example, Bank A provides Bank B with a Treasury valued at $110. The discrepancy in values can be attributed to the *discount rate*, the rate at which the ability to spend in the future is valued less than the ability to spend in the present, and the risk of default.[18] Step one consist of the initial exchange. After an agreed upon period of time, the contract terminates and Bank A must provide Bank B with the $100 cash, *plus interest*. In return, Bank B returns the T-bill to Bank A. In case of default, Bank B will get to keep the $110 Treasury bill.

A repo is similar to a mortgage contract. In a mortgage contract, the lender provides cash up front in exchange for some collateral to secure against default. When the borrower pays off the debt, the lender returns the collateral (e.g. the mortgage). Repo is analogous except that it is primarily between banks and other large financial institutions, and the lending is very short-term. To understand this, imagine that every time you made a deposit into your savings account, you required some collateral approximating the value of your deposit, just in case the bank lost your money before you have a chance to withdraw it. This would of course presuppose that your deposits are not protected by federal deposit insurance.

Haircuts and Rehypothecation

A margin, or **haircut**, is the difference between a security's price and its value as collateral (Brunnermeier 2009). A haircut refers to the excess value of the security relative to the cash loan, and can therefore also be thought of as overcollateralization (Gorton 2010).

For example, if a bank provides a cash loan of $90 in exchange for a security valued at $100, the haircut is said to be ($100-90)/$100, or 10 percent. It is thus similar to a *loan-to-value ratio* (LTV).

[18] Note, this meaning of "discount rate" is generic and does not refer to the interest rate set by the Federal Reserve, which is also called the "discount rate."

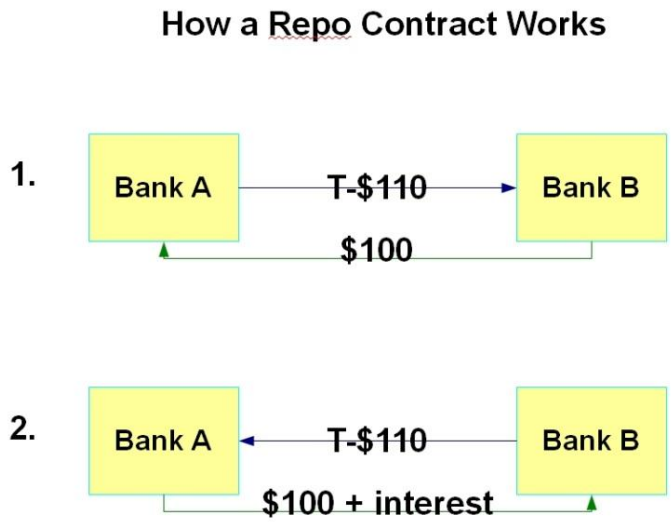

Figure 37. How a Repo Works.

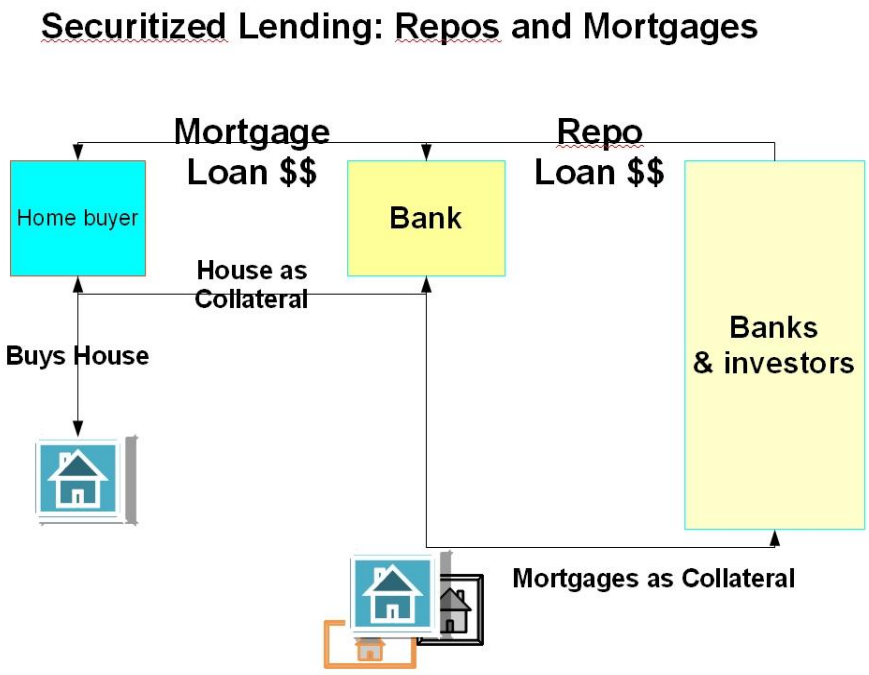

Figure 38. Securitized Lending: Repos and Mortgages.

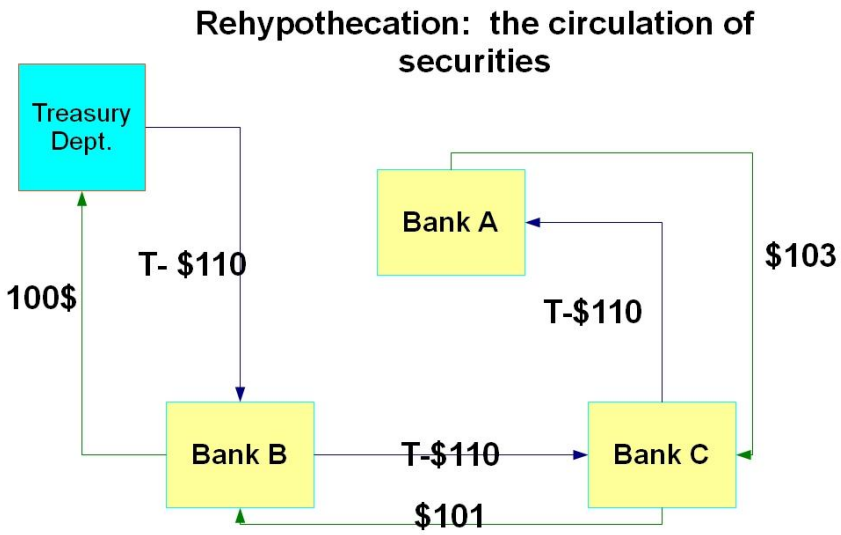

Figure 39. Repos and Rehypothecation.

In a repo market, once the lender receives the securities as collateral in exchange for a short-term loan, it can then spend this collateral elsewhere, using it as collateral for its own borrowings. The collateral, then, becomes akin to writing checks. This process is called *rehypothecation*.

According to Gorton, "hypothecation means the pledging of securities to secure a loan" 2010: 185 fn. 7). The collateral becomes a form of money, and was included in the Federal Reserve's estimates of M3, before being discontinued. The process of rehypothecation, in which *the same* asset can continue to exchange hands as collateral for loans, is depicted in Figure 39.

I chose to use short-term Treasuries, or T-bills, as the collateral, to emphasize that MBSs are not the only asset exchanged in repos, and also to underscore how the value of assets can rise or fall relative to cash. A Treasury is an IOU for more money in the future. A firm can receive Money (M_t) now in exchange for more money (M'_{t+}) in the future. The claim to future money, M'_{t+} can then be traded as collateral in a repo deal for cash in the present. It should be noted that the origination of the T-bill itself is a kind of repo: The Treasury issues a bond, as a collateral for cash in the present, which it promises to pay off at the termination of the contract. In this example, the value of the T-bill rises against the dollar.

The appreciation in value could occur, for instance, in times of inflation and insecurity. Whoever ends up legally owning the T-bill, is guaranteed $110 at some future date. This means that, in the *secondary markets, the value of the $110 at time (t) itself changes value*.

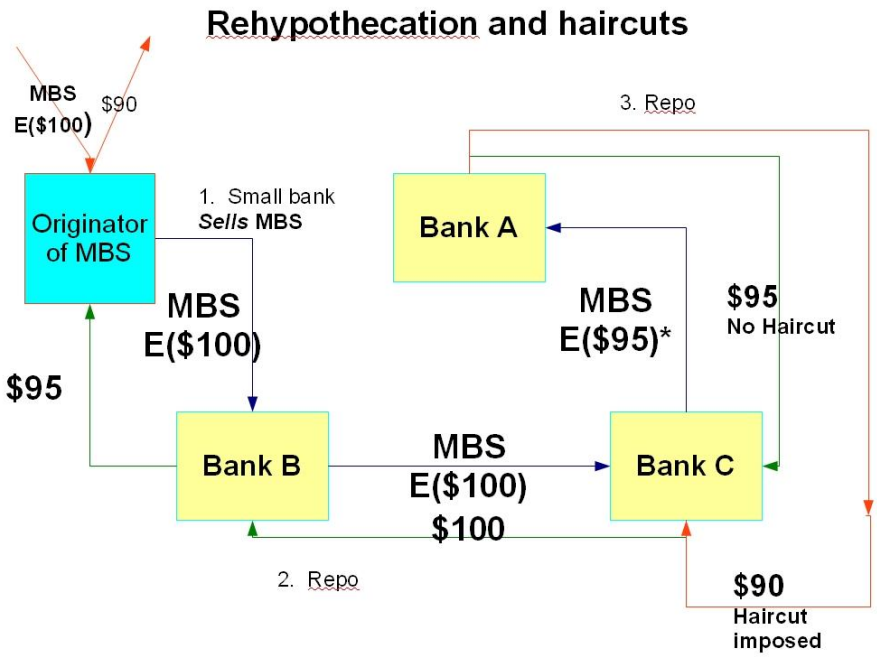

Figure 40. Haircuts.

Next, consider the second example, in which an MBS is traded on the market, depicted in Figure 40. This illustration can be read from left to right. In step 1, a small bank *sells* an MBS, whose *expected* value is $100, or E($100). It is important to emphasize that it is not entering a repo contract. In steps 2 and 3, however, the banks *lend* cash up front and keep the MBS *temporarily* as collateral in case of default. In step 2, the expected value of MBS remains constant at $100.

Bank C is actually owed $100 plus some amount of interest that accumulates until it cancels the contract. In step 3,a downward revision in the expected value of the MBS. It is now worth only $95. In this case, Bank C could only borrow $95 *even if haircuts remained at zero*.

The fact that Bank A is still willing to offer Bank C $95 for the mortgage whose expected value is $95 means that: a) Bank A is not any more concerned about Bank C's default than before the devaluation, and also b) Bank A is confident that the value of the MBS will not fall any further. If either of these assumptions is called into question, Bank A would impose a haircut upon Bank C. This is depicted in the red line, indicating that Bank A is only willing to provide Bank C with a $90 loan for $95 in collateral.

Devaluation in the expected value of the securities has the following aggregate consequences:

1) Banks are less able to borrow because the value of their assets has fallen
2) Banks are less willing to lend to each other because, in the aggregate, the banking system cannot increase the sum total of its collateral assets in a single instant

This is known as a *loss spiral*, which follows as a result of systemic downward shocks in asset prices. If asset prices fall quickly enough, banks won't be able to borrow and lend at previous rates, causing a contracting of liquidity or a ***liquidity crisis***. This is Milton Friedman and Anna Schwartz's now canonical interpretation of what happened during the Great Depression. However, if *uncertainty* is introduced, then a number of other consequences will follow, and a qualitatively different situation can emerge. I will add this consequence to the list:

3. Banks raise haircut rates, exacerbating the loss spiral. Banks are simultaneously less willing to borrow and less willing to lend.

Haircuts arise from a perceived risk of default, also known as ***perceived counterparty risk***.[19] Haircuts are thus a proxy for *perceived uncertainty,* as is the Libor-Repo spread, to be discussed below. Although a loss spiral can precipitate a haircut/margin spiral, the two should be kept analytically distinct. The former can generate a contraction of credit entirely because of a lack of liquidity resulting from asset losses, whereas the latter can generate the same effects due to a heightened uncertainty regarding a) the value of the securities, or b) the risk of default. In my opinion, because the value of the securities is an expectation generated from observations of other expectations, an observed volatility of expectations (valuation) is sufficient to generate contagion.

It should be noted that the speed at which the money is put back into circulation is variable. In liquidity crunches (aka credit crunches), banks have cash but refuse to make any loans due to the perceived risk of the loans. Normally, the collateral offered in exchange for the loan, plus the interest rate, is sufficient to entice banks to make loans. Problems arise, however, when the value of the collateral is unknown, and the banks (or other lending institutions) suspect that the loans might not be repaid. Under these circumstances, banks hoard cash. Injecting more cash (aka liquidity) into the system becomes tantamount to *pushing on a string*.

Reinforcing Feedback loops: How Loss Spirals Happen

Consider an investor who buys $100 million worth of assets, borrows $90 million, and finances only $10 million from equity. The capital ratio is $100/$10 or 10. Assuming that it cannot legally maximize this ratio any further, if the value of assets then falls to $95 million, the investor loses $5 million in capital.

Consider what happens next. Holding the capital ratio constant at 10, the investor is forced to reduce the overall position to $50 million (5/50), which means selling $45 million, exactly when the price is low. This can cause a fire-sale in which prices are depressed even further.

[19] Bullard (et al. 2009) defines counterparty risk as the ""danger that a party to a financial contract will fail to live up to its obligations" (407).

Table 4. Fire Sale and Loss Spiral.

Fire Sale as a result of asset price drop		
1- Initial Balance Sheet	Assets: $100M	Equity: $10M Debt: $90M
2- Drop in Asset prices causes a decline in equity	Assets: $95M	Equity: $5 Debt: $90
3- Must sell assets to retain required capital reserves	Assets: $50M	Equity: $5 Debt: $45

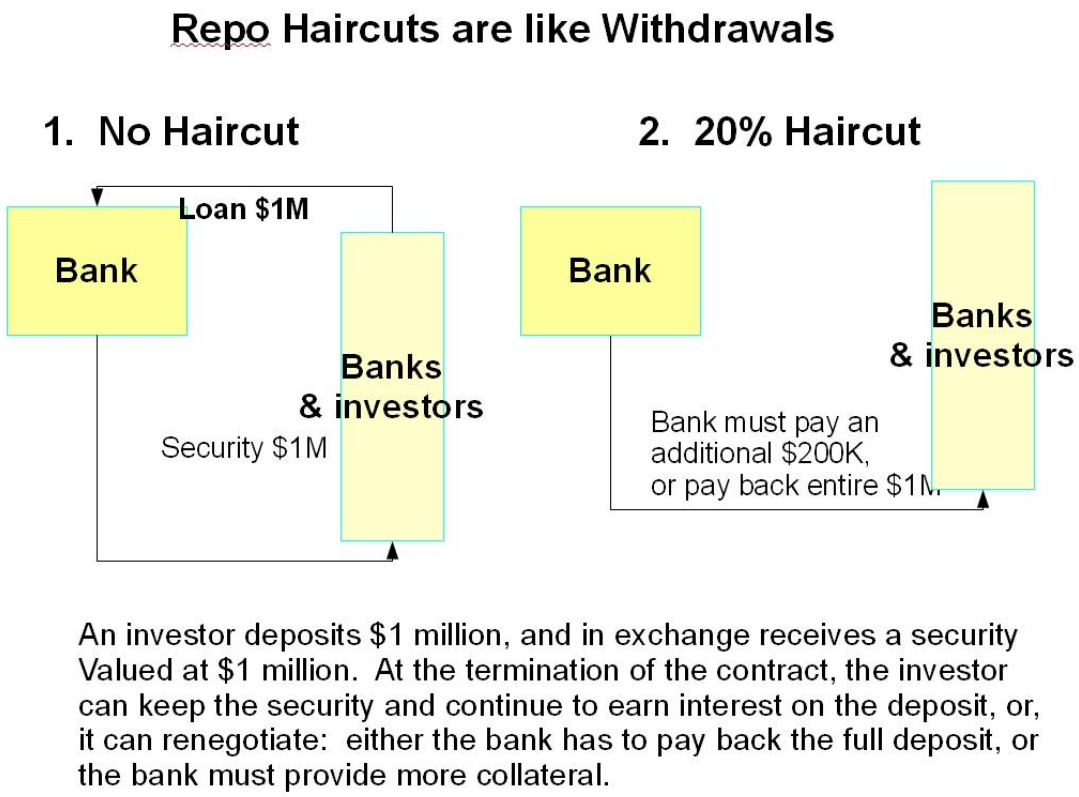

Figure 41. Repo Haircuts and withdrawals.

Table 4 shows how a *loss spiral* is reflected in a bank's balance sheet. The numbers used in this illustration are taken from **Brunnermeier (2009).** One way to think about this is that when the value of securities declines, the expected profits deriving from that security undergo a downward revision. This, according to standard accounting practices, results in a decline in the bank's equity. Think of the security as a form of money, which can be traded as a result of rehypothecation.

A decline in value means the bank, by definition, cannot acquire the same amount of liquid cash in exchange. A decline in equity forces a bank, whose capital and/or leverage ratios are already maxed out, to sell assets in order to raise money, since they cannot legally borrow any more. If all banks do this at the same time, however, it means that banks prefer cash over the securities, and so the value of the securities will have to decline relative to cash in order to attract buyers. A *fire sale* occurs.

Repo haircuts operate in the same manner, and can also generate fire sales. Importantly, *an additional haircut is equivalent to a withdrawal.* The difference has to be made up or financed by the trader's own equity capital. For instance, if a bank borrows a $1 million, and provides to the lender $1 million in securities, then the haircut is effectively zero. After a day (or several days), the contract terminates. The lender can either demand all of its $1 million back plus interest, or the lender can renew the contract, keep the security, and continue to earn interest, much like a depositor to a personal savings account.

Instead of literally withdrawing money, the lender has yet another option, not available to a savings account depositor: the haircut. When the contract terminates, the lender can decide to apply a haircut, which means that it demands more collateral. The result is an effective withdrawal from the borrowing bank, which must use up its assets.

According to Gorton (2010: 48), haircuts were zero until August 2007, when haircut rates on structured debt began to climb, reaching approximately 45 percent by 2008 and 2009. Although there are no official data estimating the size of the repo market, Gorton estimates that it is between $8 trillion and $10 trillion (2010: 50). This process is depicted in Figure 41. If repo haircuts increased by an average of only 20 percent, then the banking system would have to rise between $1.6 and $2 trillion dollars. This is essentially a bank run.

Financial Panic: perceived counterparty risk and the repo markets

In a series of articles and books variously with titles like "Slapped by the Invisible Hand" (2010) and ""Slapped in the Face by the Invisible Hand" (2009 in Gorton 2010), former Federal Reserve Employee and Yale School of Management professor Gary Gorton depicts the crisis as essentially an old-fashion bank run. In Gorton's view, a bank run began in 2007-8. The difference between traditional bank runs and what Gorton calls the "Panic of 2007-8" is that the latter occurred in the repo market, and the depositors were not individuals, but other banks. In his view, the shock in subprime loans was not sufficient to cause a general market downturn. Specifically, the values of AAA rated student loan debt, car loans, and credit card debt all dropped precipitously, but only after a few months after the housing bubble has burst.

According to Gorton (2009b), an adequate explanation of the crisis requires an explanation for how the subprime shock spread to other "unrelated" assets. In his words:

> "**The outstanding amount of subprime bonds was not large enough to cause a systemic financial crisis by itself.** It does not explain the figure above. **No popular theory (academic or otherwise) explains the above figure.** Let me repeat that another way. **Common "explanations" are too vague and general to be of any value. They do not explain what actually happened**. The issue is why **all** bond prices plummeted. What caused that?
>
> This does not mean that there are not other issues that should be explored, as a matter of public policy. Nor does it mean that these other issues are not important. It does, however, mean that **these other issues – whatever they are – are irrelevant to understanding the main event of the crisis**." (5)
>
> Gorton (2009b: 44) provides a time-series comparing the fall in the Libor-OIS spread, Student loans, credit cards, and auto loan securities.

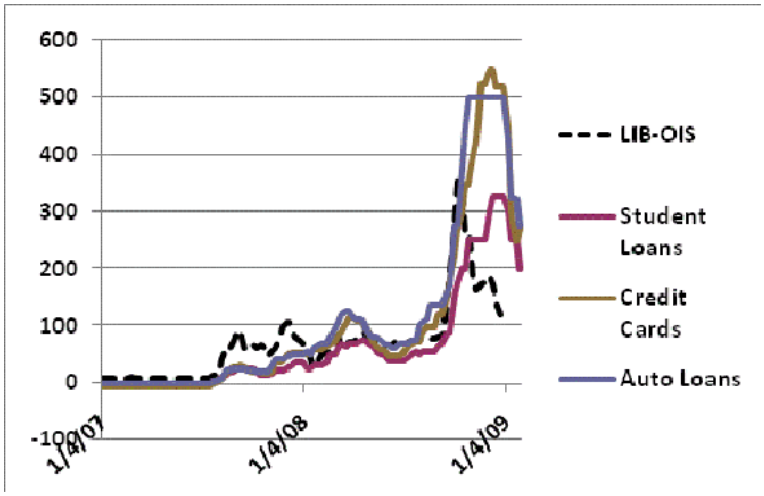

Figure 42. Gorton. Libor-OIS spreads.

How did the economic shock become a widespread panic? The key link in Gorton's narrative is *asymmetrical information*. Gorton compares the "toxic assets" in the securities markets to E. Coli (2009). Even a few outbreaks of E. Coli could bankrupt the meat industry so long as the sources of the contamination were not identified. Analogously, the distribution of risk was generally not known, leading to a preference for liquidity, a fire sale of assets, and a general decline in prices of all security types.

Gorton's time line of events is as follows:

1. Housing prices decline

2. Repo depositors (who accepted MBSs as collateral) become worried that they might not receive all of their cash back. Uncertainty about the value of the collateral, which they would receive in case of default, caused an increase in repo haircuts, meaning that the value of securities falls relative to cash. The increase in repo haircuts and uncertainty about which assets were at risk, leads to a widespread increase in haircuts.

3. The haircut increases generate a need for cash. Remember that the bank *borrowed the cash* in exchange for the collateral (the securities). Now they can borrow less cash, which means they have less liquid assets. To compensate for this loss, they must "sell assets" (because presumably they can't borrow any more against their existing securities, which have been devalued).

4. If all banks do this at the same time, this compounds and amplifies the devaluation of the securities against cash. Everyone "selling assets" means that everyone prefers cash, and so the assets have to lose value in order to be traded at all.

The general picture is of small shocks being amplified by uncertainty and opacity in the markets. Collateral only works if it is *information-insensitive*, that is, if everyone comes to some *approximate* agreement on the value or worth of the collateral. Once the worth of the collateral is called into question, however, it ceases to be collateral in the traditional sense. An analogy would be to not know whether the check someone writing is redeemable or worthless. Gorton argues that, once the withdrawals (haircuts) to the shadow banking system were systemic, this generated a widespread fire sale, in which banks attempted to sell their assets, rather than borrow against them, in effect glutting the market and causing a further devaluation.

The LIBOR, LIBOR-OIS, and LIBOR-Repo spreads

Ordinarily, if central banks cut the short rate, banks will borrow from the central banks and pass along these lower interest rates. In 2008, however, central banks cut their short rates, but the Libor remained high, indicating that private banks were refusing to lend even when central banks were providing them with the financial resources to do so. At zero interest, private banks could borrow and lend the money at interest and make a profit. The refusal of private banks to lower

their interest rates in spite of a lowering of interest rates at which they could borrow indicates an increase in the perceived risk of lending. Data on the LIBOR and LIBOR-OIS spreads are depicted in Figures 43 and 44.[20]

Notice, however, that the interest rate might still be high because of the other two components of interest: the discount rate and *expected* inflation. There is no clear measure of the discount rate, but expected inflation can be taken into account by subtracting the Overnight Index Swap (OIS) rate from the Libor. This is known as the Libor-OIS spread. The OIS (Overnight Index Swap) is a measure of what the market expects the federal funds rate to be over a 3 month period.

Subtracting the "OIS from Libor effectively controls for expectation effects", so that "the difference between Libor and OIS is thus due to things other than interest-rate expectations, such as risk and liquidity effects" (Taylor 2009: 15).

In addition, as explained above, *repo* contracts are a form of secured loans, which means that one borrows money using collateral. The Libor, however, reflects unsecured interest rates, that is, the preferred rates that banks lend to each other without any collateral. These loans are therefore made on good faith. Because secured loans have lower rates than unsecured loans, subtracting the repo from the Libor can thus be interpreted as a measure of risk. Figure 45 prevents data on the LIBOR-Repo spread provided by Taylor (2008: 11). Notice that the LIBOR-OIS spread tracks closely the LIBOR-Repo spread, suggesting that the changes in the former are primarily due to changes in perceived credit risk.

Comments

Gorton has persuasively argued that at least some aspects of the economic downturn, most especially those aspects having to do with the "credit crunch", were a result of a loss of confidence among banks, which in turn generated a historically novel form of bank run. However, he neglects to ask whether or not the "panic" was actually warranted. Gorton compares the financial crisis to a case of E. Coli. This implies that the crisis would not have spread had the location of the so-called "toxic" assets been known. The lack of information and transparency in turn caused a reinforcing spiral of asset sales, which then caused the devaluation of other "unrelated" types of securitized bonds.

Gorton's analysis not so much at fault for what it says and for what it omits. Gorton does not address the larger macro questions, such as "What caused the housing bubble?" or "What caused the explosion in debt?" His primary object of explanation is the mechanism of contagion between mortgage and non-mortgage backed securities, because in his view, the devaluation of subprime was insufficient to cause the devaluation of all securities. Gorton thus suggests that it is entirely the result of panic in financial system that generated the downturn in the *real* economy and does not consider the possibility that the two downturns may be mutually reinforcing.

[20] Data are available from http://www.financialstability.gov/impact/data.htm :

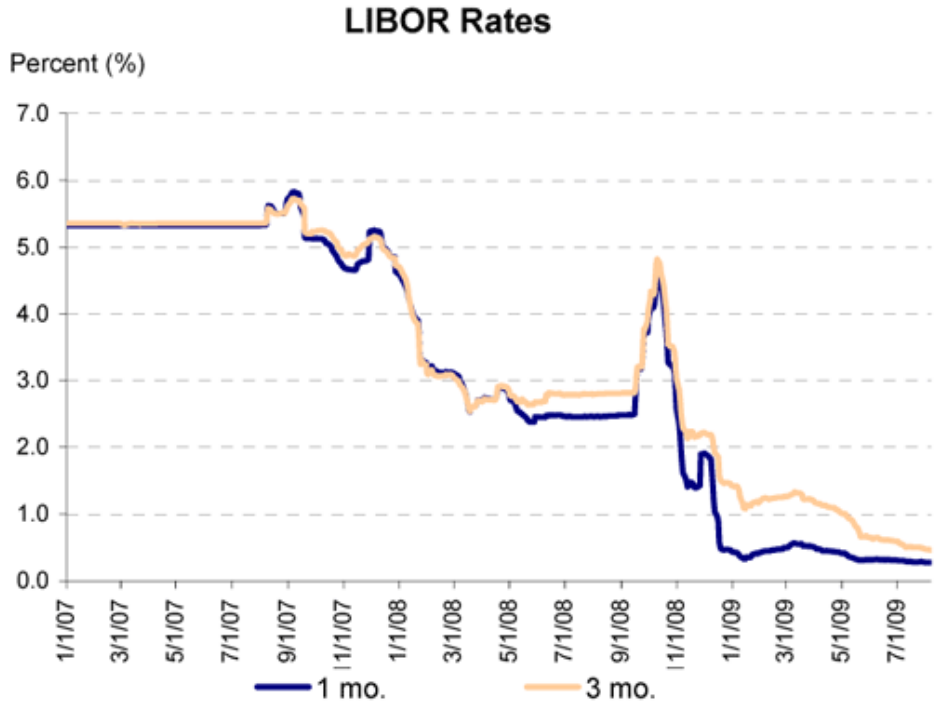

Figure 43. Libor rates.

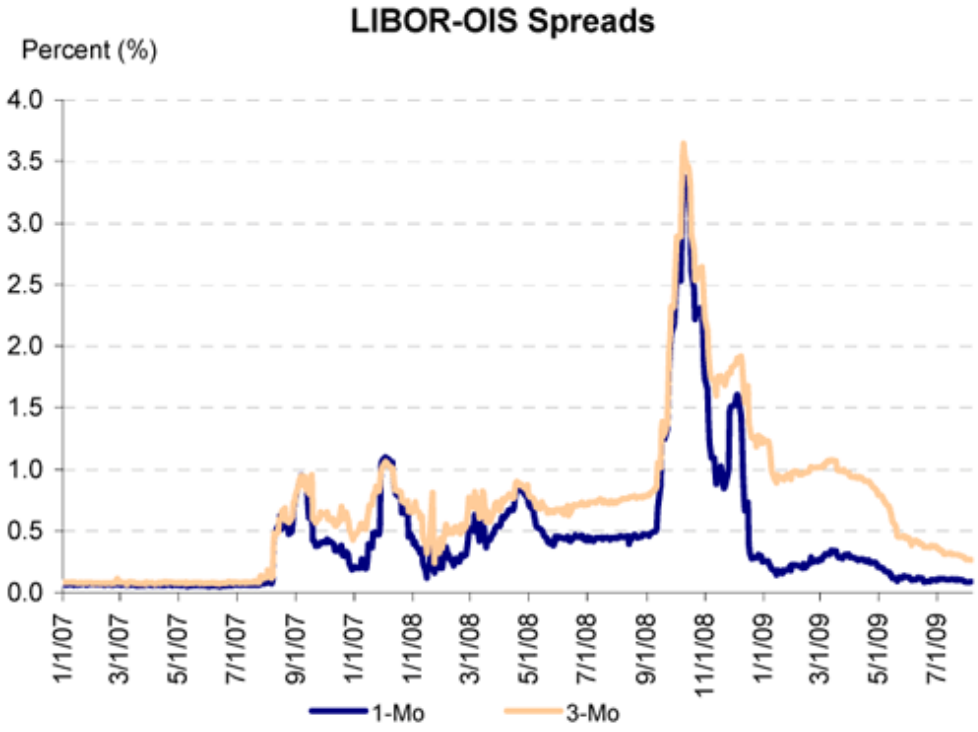

Figure 44. Libor-OIS spreads.

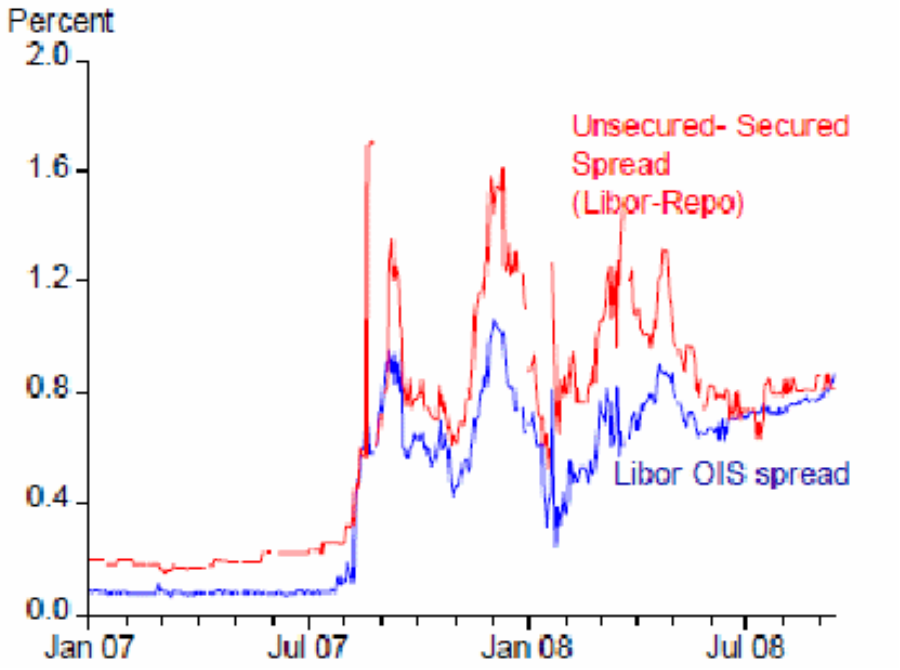

Figure 45. Libor-Repo spreads.

Three comments about the repo markets need be mentioned. First, Gorton says that banks had an incentive to keep most of their assets (loans), rather than sell them. This is a static representation of events. The fact that banks have an incentive to use loans as collateral in order to *borrow* more money presupposes that the banks couldn't *sell* those loans instead. In my opinion it is more fruitful to view this dynamically: for whatever reason, banks were simply not able to sell their loans at a *rate* equal to the *rate* at which they issued them. In the interim, that is, between issuing and selling loans, then, banks could use these loans as collateral to issue even more loans, thus maximizing their *return on equity* (ROE). This concentration of loans implies a corresponding concentration of market share among institutions trading securities.

The failure of the entire industry to engage in investment lending means both that short-term lending is more profitable than are long run investments and also that there was and has been a steadily declining ratio of productive investments to short run, inter-bank lending, or else the financial sector would have not accumulated such massive quantities of (essentially idle) funding in the short-term repo markets. In other words, the size of these financial markets suggests a need to explain the *lack* of long term, productive investments.

Second, the term “securities market" is a misnomer. These securities were not traded in markets, but negotiated in private transactions which were and are inherently non-transparent.

The *EMH*, whose exemplar is the stock market, therefore does not pertain in principle to the shadow banking *system*. James Crotty, for instance, estimates that 80 percent of world's $680 trillion worth of derivatives prior to 2007 was sold in *private deals*, not open markets, between investment bank and customers (2009: 566).

This line of reasoning is consistent, moreover, with models of "monopoly capitalism" in which above-equilibrium profits are attained by charging above-equilibrium prices for goods and services. This considered a form of *rent*, or transfer of wealth from consumers to firms. Currently, Foster and Magdoff, espousing Baran and Sweezy's arguments from *Monopoly Capital*, argue that surplus profits accumulate faster than their ability to be invested.

Finally, Gorton seems to imply that the banks did *not* take on too much risk. The only policy solution would be to have an explicit bailout guarantee for the too-big-to-fail financial firms. Deposit insurance for *individuals* who deposit in banks is not the same as a blank check for the banks themselves, much less a preemptive one. In short, Gorton attributes the banking panic to a psychological disposition, a *perceived* risk that is ultimately incorrect or at best a self-fulfilling prophecy that can be reserved. Gorton does not consider the possibility that the *perceived risk is in fact real*. Gorton thus never considers the possibility that the decision by profit-maximizing firms to incur more debt can generate systemic debt levels that are ultimately unsustainable.

Central Banks and Fiat Currency

Every dollar in circulation today is owed to someone with interest. Consequently, if all debts were paid off, there would be no money left in circulation. This implies that if growth targets are not met, systemic defaults are inevitable. Since Bretton Woods, most currencies are fiat currencies, the supply of which is controlled by central banks. Money is created by central banks that control the money supply by introducing or subtracting currency by means of monetary policies, depicted in Figure 46.

In the United States, the Federal Reserve generates money by purchasing US Treasury bills on the open market. The value of US dollars is backed exclusively by US Treasury bills. US Treasury bills are similar to IOU's issued by the US Treasury. US Treasury bills effectively exchange dollars in the present for more dollars in the future. In exchange for purchasing the US Treasury bills, the Fed credits new money to the seller's account in the Federal Reserve Bank.

I have again deliberately simplified this model to highlight its most important feature, namely, that *money is debt*.[21] I have depicted two stages to the process, but in reality, they can occur

[21] Consider this passage from the now out of print, "Modern Money Mechanics" from the Federal Reserve Bank of Chicago: "Suppose the Federal Reserve System, through its trading desk at the Federal Reserve Bank of New York, buys $10,000 of Treasury bills from a dealer in U. S. government securities.(3) In today's world of computerized financial transactions, the Federal Reserve Bank pays for the securities with an "telectronic" check drawn on itself.(4) Via its "Fedwire" transfer network, the Federal Reserve notifies the dealer's designated bank (Bank A) that payment for the securities should be credited to (deposited in) the dealer's account at Bank A. At the same time, Bank A's reserve account at the Federal Reserve is credited for the amount of the securities purchase. The Federal

independently and simultaneously. Step 1 depicts how the US Treasury can create new money. In this exchange, the Federal Reserve Bank "buys securities" from the Treasury, which means that in exchange for money now, the Treasury promises to pay back the Federal Reserve later, plus interest. If a bank requires funds, it can *go to the window* and "buy money." Again, this means that the Bank can acquire money now, with a promise to repay at a future date, plus interest. Usually this takes the form of a *sale and repurchase agreement*, or repo, as discussed above.

New money is not only created directly from Federal Reserve deposits. The bank, having received the deposits, now lends the new money it has borrowed. Because the newly circulated money also eventually ends up in a bank, the amount of money created from an initial deposit by the Fed is a multiple of the original amount. This is called the *money multiplier* process. The money multiplier is the *inverse of the reserve ratio*. If the reserve ratio is 10 percent, for instance, then the money multiplier will be 1/.10=10. This factor will be multiplied by the amount of money initially put into circulation to derive the total amount of money that is eventually generated from this amount. For example, a $10,000 loan from the Fed eventually generates $100,000 of new money.[22]

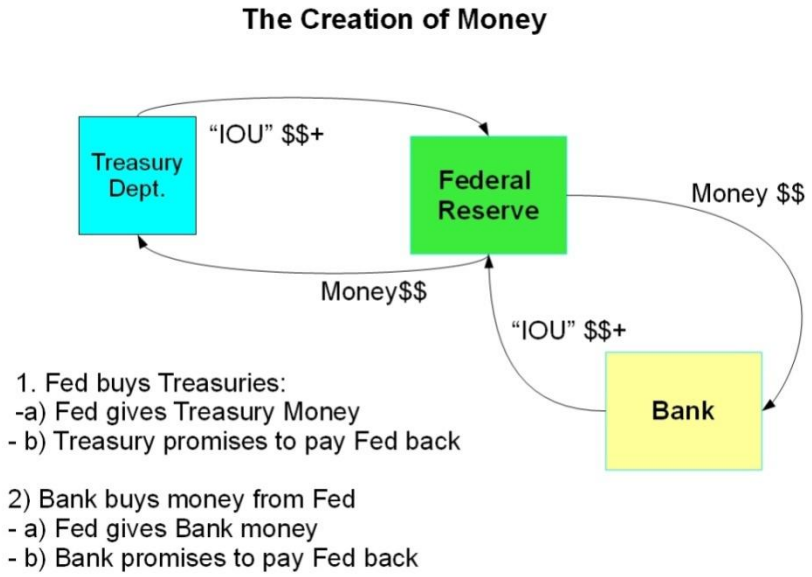

Figure 46. Creation of Money.

Reserve System has added $10,000 of securities to its assets, which it has paid for, in effect, ***by creating a liability*** on itself in the form of bank reserve balances. These reserves on Bank A's books are matched by $10,000 of the dealer's deposits that did not exist before" (6: my emphasis). In other words, money is created as a liability, or debt. http://www.rayservers.com/images/ModernMoneyMechanics.pdf

[22] If a bank receives $10,000 from the Fed, it will retain $1,000 and loan out the remaining $9,000. This $9,000 eventually finds its way into a bank, which then lends out 90% of the $9,000, or $8,100. The process repeats until the remainder is vanishingly small. After 50 iterations, the total money in circulation is $99,484.62. The amount of new money created approaches $100,000, or $10,000 x 10, as the number of iterations approaches infinity.

The fractional reserve system requires some form of state intervention and regulation. Consider, for example, that Bank A holds $1,000 and writes a check for $10,000. This approximates the amount of money that would be generated on the basis of a reserve ratio of 10 percent by the money multiplier process from the initial $1,000 deposit. Without any state regulation, the check would eventually end up in the hands of another bank, Bank B. Bank B has no incentive to keep the check, and seeks to cash it so that it can create its own money from the money multiplier process.

Murray Rothbard, a member of the school of Austrian economists founded by Ludwig von Mises, concludes:

> And so if, to make the case simple, the Rockwell Bank gets a $10,000 check on the Rothbard Bank, it is going to demand cash so that it can do some inflationary counterfeit pyramiding of its own. But, I, of course, can't pay the $10,000, so I'm finished. Bankrupt. Found out. By rights, I should be in jail as an embezzler, but at least my phoney checking deposits and I are out of the game, and out of the money supply. Hence, under free competition, and without government support and enforcement, there will only be limited scope for fractional-reserve counterfeiting. Banks could form cartels to prop each other up, but generally cartels on the market don't work well without government enforcement, without the government cracking down on competitors who insist on busting the cartel, in this case, forcing competing banks to pay up… Hence the drive by the bankers themselves to get the government to cartelize their industry by means of a central bank. (*The Case Against the Fed*)[23]

Because all money in the existing fractional reserve system is created as a liability, or debt. The money has to be paid back, plus interest. This means the following: *the total amount of money owed exceeds the total amount of money in circulation.* To repeat: there would be no money in circulation if all debts were paid off. The additional money required to pay back the interest can only be created by issuing more money, that is, more debt.[24] Debt is therefore built into the monetary system and can only be paid off, at the aggregate level, with more debt. Aggregate debt repayment, in turn, presupposes aggregate growth.

The money flows from the banks downward. The Federal Reserve ultimately "owns" the money, and the banks that make student loans, car loans, and mortgages, ultimately, owe the Federal Reserve. Considering the US monetary system as a closed system for simplicity (i.e. ignoring for the moment currency exchanges), a transfer of wealth is built-in to the monetary system, whose "core" and "periphery", to borrow terms from World Systems Theory, are the central banks and working poor, respectively.

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[23] Available at: http://www.lewrockwell.com/rothbard/rothbard202.html

[24] In the circular flow model, it is theoretically possible that the interest paid to the creditors is itself spent, or re-circulated into the economy. In this case, it would be possible to pay off all debts, plus interest, without issuing more debt. The question is whether or not this is empirically plausible. The answer is that it is not. Considering that debt is accumulated faster than it can be paid off, and also that creditors tend to retain a portion of their earnings, thus accumulating capital, dictates that further debt is inexorable.

The Federal Reserve System is a privately owned, for-profit, banking cartel. Although in principle, the federal and/or state governments could tax the Federal Reserve banks, in practice, Federal Reserve banks are exempt from paying all federal, state, or local taxes. Efforts at redistribution are therefore hindered *ab initio* as the new funds that would be created would be owed to the Fed, and any and all taxes currently collected are actually forms of debt-capture.

International Banking and the Bretton Woods Regime

Prior to the end of the end of the Second World War, the Allied Powers met in Bretton Woods, New Hampshire in 1944 and established the Bretton Woods System of International Trade and Finance. Under this system, the US dollar became the international reserve currency. Bretton Woods re-established the gold standard, which had been discontinued in 1933. This meant that every dollar could be converted into a specific quantity of gold upon demand. In addition, all other currencies were fixed to the dollar, and therefore also indirectly with gold. The Bretton Woods regime began to unravel, however, in the late 1960s (Hudson 2005).

US purchases abroad constitute an exchange of foreign goods for US dollars. For instance, if the United States (e.g. the Federal government or US firms) were to purchase $1 million of French goods and services, the French would receive in exchange 1 million USD, which could be converted back into gold upon demand. By 1968, however, the US had major trade deficits. Foreign countries held more US dollars than the US could redeem into gold.

Because the United States could no longer exchange dollars for gold without significantly depleting its reserves, the US began exchanging US dollars for Treasury bills instead.

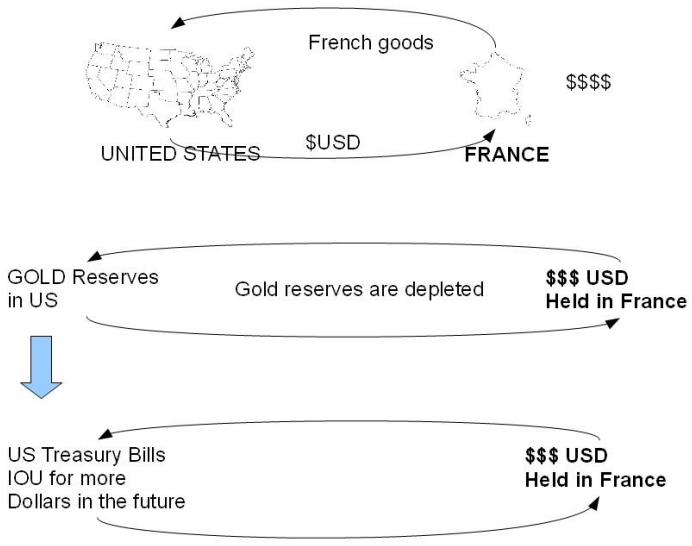

Figure 47. Bretton Woods Regime.

A Treasury bill is simply a promise to pay, or an "IOU." An exchange of dollars for T-bills is an exchange of dollars for an IOU for more dollars at a future date.

During the Nixon administration in 1971, the US officially ended the Bretton Woods regime, after which national currencies could be traded against each other in a floating exchange rate. This history is depicted in Figure 47, with France as a representative example.

The Federal Reserve in the current crisis

The policies of the Federal Reserve (and in Europe the policies of the European Central Bank) are frequently cited as a contributing factor to the economic downturn, by both those who argue that the crisis resulted from government intervention and from those who argue that the crisis resulted from a lack of adequate government intervention. Some have argued that the Federal Reserve should be disbanded (e.g. Woods 2009). The main criticism is that the Federal Reserve set interest rates too low after 2001 and thereby contributed to the credit boom and bust.
One of the most well known critics of Federal Reserve policy is John B. Taylor, professor at Stanford and former Federal Reserve employee. Taylor argues that the housing boom and bust was a result of the monetary policies of Federal Reserve. Taylor is regarded as a monetarist. As the name suggest, monetarism regards monetary policy as the most effective means for managing key economic variables such as inflation and unemployment. As a variant of neoclassical theory, monetarism becomes the prevailing regulatory philosophy after the global demise of Keynesian policies and the rise of neoliberalism in the late 1970s and early 1980s.

After the collapse of the "Dot Com" bubble, the Federal Reserve began lowering interest rates. When growth is sluggish, central banks often lower interest rates in order to increase borrowing and lending, and hence, economic activity. Taylor argues, however, that the interest rate cuts after 2001 were excessive. During the 1980s and 1990s, the US experienced a decline in both output and inflation volatility. Taylor calls this period of the Great Moderation. If the Fed had employed the kind of interest rate policy that had worked so well during this period, Taylor argues that the actual interest rate adopted by the Fed during the 2000s would have been considerably higher. The Federal Reserve departed from its previous guideline, known as the Taylor Rule, for calculating the target federal funds rate. The excessive credit found its way into the housing market, which generated a housing boom. No boom, no bust.

The bust was caused by the boom which was a result of "excessively loose" monetary policy. The problem is that the Fed loaned too much money, which was ultimately unsustainable, resulting in a subsequent contraction, much like a rubber band being pulled too wide will snap back suddenly when let go.

Taylor argues that the policies of the Federal government prolonged the crisis. Taylor argues that the Federal Reserve, headed by Bernanke since 2006, had treated the crisis as a liquidity crisis rather than a problem of uncertainty and counterparty risk. Bernanke, a scholar of the

Great Depression, began implementing policies designed to inject liquidity into the markets in the hope that inter-bank lending would begin to pick up, rejuvenating the flow of credit, and hence spending, in the overall economy. In December of 2007, for instance, the term auction facility (TAF) was introduced in an attempt to lower interest rates to encourage lending. The Federal Funds rate is not determined by the Fed directly, but is instead determined privately by banks who use their Fed credits to loan to other banks with a shortage of credits. The federal funds rate is established by the private banks. Ordinarily, the interest rate the Fed charges for 'going to its window' is higher than the privately negotiated Fed funds rate.

Figure 48 is a counterfactual calculated using time-series regression methods, of what would have happened in the housing market had the Federal Reserve adopted the Taylor Rule and kept interest rates much higher than they actually were.

TAF enabled banks to borrow directly from the Federal Reserve via auction. It also enabled banks to use more kinds of collateral against which they could borrow. The TAF rates were significantly lower than the discount rate, but inter-bank lending overall was not affected. According to Taylor, liquidity was therefore not the problem. Banks were not insolvent or without cash, they were instead hoarding it. In February Congress passed the Economic Stimulus Act of 2008, providing checks worth more than $100 billion to individuals and families in the US. The aim of this policy was to increase spending, but Taylor argues that the policy was mostly ineffective. Finally, Taylor discusses the initial interest rate cuts adopted by the Fed in the aftermath of the subprime mortgage crisis. According to the Taylor rule, the cut was again *too drastic*, and in his opinion, had little impact on interbank lending. He does, however, think that the interest rate cuts may have been responsible for the rise in oil prices beginning in 2007.

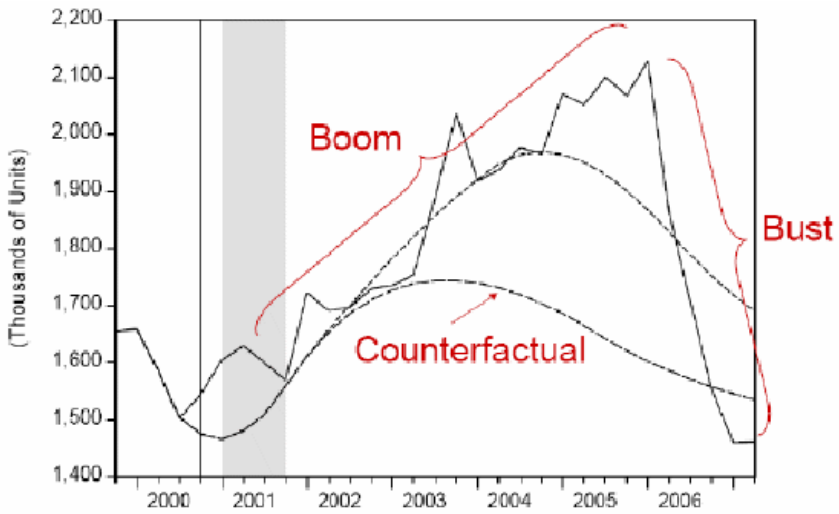

Figure 48. Taylor's Counterfactual.

Comments

Taylor's story regarding the origins of the crisis does not withstand scrutiny. First, the housing bubble began in 1997, prior to the Fed's significant departures from the Taylor rule beginning around 2002. Second, data from other countries suggests that monetary policy has little relation to housing price busts. For example, the United Kingdom had large house price increases and a high interest rate, whereas Canada and Germany had low real interest rates but no house price bubble (Jarsulic 2010: 142). The International Monetary Fund corroborates this analysis, concluding that "Overall, since 1985, monetary policy conditions are generally not a good leading indicator of house price busts" (IMF *World Economic Outlook* October 2009: 105). Finally, it must be emphasized that the monetary policy of the Federal Reserve is only one instrument of credit creation (i.e. debt) and by no means the most important one. Predominantly, credit during the boom was generated *privately* through leverage.

Conclusions

The Federal Reserve is a central component of what may be called the domestic and international banking systems. Like the ratings "agencies" and Fannie and Freddie Mac, the Federal Reserve seems to be both economic and political at the same time. Does a mismanagement of interest rates by the Federal Reserve constitute an economic or political failure? The question itself seems misplaced. The very distinction between the state and the market in this case, is inadequate. The monetary system bears no resemblance to the free and open markets posited by neoclassical theory, but nor can it be adequately described as a political entity obeying a logic of power. Both the sociology of markets and economic theory are therefore inadequate tools for grasping the fundamental characteristics of this system or the crisis that emanated from it.

In earlier periods of US history this capacity was distributed, but still codified as organizational decisions. The distinction between central and decentralized monetary creation, and between asset-backed (e.g. gold) and fiat currencies, however, is secondary in my analysis to the realization that in all cases the distribution of wealth via virtual assets (i.e. money) is secondary to the production of wealth itself. This latter process is conditioned by the material-energetic requirements of production and the extent to which social progress is viewed through the distorted lens of what Herman Daly calls "growthmania."

IV. MAINSTREAM ECONOMIC THEORIES AND EXPLANATIONS OF THE CRISIS

Economics, since its inception, has regarded the economy implicitly or explicitly, as a *system* of interdependent parts. In the classical tradition, perhaps the most famous exponents of the systems view are Léon Walras, the father of General Equilibrium Theory (GET) and Vilfredo Pareto, who also made important contributions to the systems theoretical tradition in sociology. Systems ideas, however, are also explicitly codified in the works of Ricardo, Malthus, Marx, and others. Economics as a discipline, however, has rarely reflected on the *relationships between the economy and society as a whole*. The economy, moreover, is usually regarded as independent of both the physical biosphere in which it is embedded. In most economic models (equilibrium or otherwise), the economy is depicted as a self-regulating and autonomous. The fact that economics does not depict or explain the boundary relations between economy and society is regarded as irrelevant to the study of economics, a result of a necessary abstraction from reality. This task, of representing the economy in its relation to society as a whole, is the task of sociology.

Below I review, in brief, some of the fundamental tenets of economic theory, including the relevant differences between classical, neoclassical, and Keynesian economics. I treat these as rough ideal-types, in the Weberian sense, whose specificity can be modulated depending on the theoretical task. I demonstrate that, despite their differences in emphasis and orientation, they are all inadequate to understanding the *social* significance of economic phenomena. Most importantly, economics treats the economy as if it were capable of perpetual motion. This makes traditional theory incapable of understanding the current crisis in its full significance, that is, of providing normative guidance for how best to mitigate the social impacts of increasing ecological scarcity.

Classical, Neoclassical, and Keynesian Theory

The neoclassical tradition can be traced back to the "marginalist" revolution and the writings of Alfred Marshall, who is credited with the technique of using supply and demand curves to calculate equilibrium prices, and Léon Walras, the founder of General Equilibrium Theory (GET). The term "neoclassical"[25] was originally introduced in 1900 by Thorstein Veblen in his *Preconceptions of Economic Science*. Neoclassical economic theory is distinguished from the writings of classical political-economists such as Adam Smith, David Ricardo, Thomas Malthus, Karl Marx and others. In a nutshell, neoclassical theory asserts that markets work (i.e. that markets are *efficient*).[26]

[25] The "neoclassical tradition" is the mainstream of economic theory, so I will use the terms "neoclassical", "mainstream economics" and "economics" interchangeably.

[26] That market equilibria are Pareto-efficient is the First Fundamental Theorem of Welfare Economics. The Second Theorem of Welfare Economics holds that every efficient allocation of resources will be an equilibrium allocation with non-zero prices.

The neoclassical approach differs from the classical tradition with respect to both 1) its theory of value and 2) its theory of price. In the classical tradition, value is regarded as a common substance, such as embodied labor, inhering in qualitatively distinct commodities. Value among the classical economists thus refers to an absolute, rather than a relative, frame of reference, and explains the equivalence of commodities from the point of view of an objective observer of the exchange. Adam Smith first distinguishes exchange-value and use-value, as two dimensions of commodity value.[27] In neoclassical economics , on the other hand, value is regarded as a relative attribution determined by the preferences of utility-maximizing consumers and producers. There is no concept of use-value in neoclassical theory.

With regard to price, classical theorists mostly calculate price as a function of *costs of production*. Marginal theorists, on the other hand, calculate price as the intersection of supply and demand curves. According to neoclassical theory, supply and demand curves are not random or chaotic, but instead exhibit law-like regularities, derived from the law of diminishing returns. The concept of diminishing marginal returns takes two forms in neoclassical theory: on the supply side, it manifests as diminishing marginal productivity, and on the demand side, diminishing marginal utility. Diminishing marginal productivity implies that the supply curve slopes upward, whereas diminishing marginal utility implies that the demand curve slopes downward. According to the laws of supply and demand, rising prices elicit greater quantities of supply and smaller quantities of demand.[28] Costs of production are thus determined primarily by capacity constraints. Figure 49 is a typical supply-demand curve. The vertical axis represents price, and the horizontal axis represents quantity.

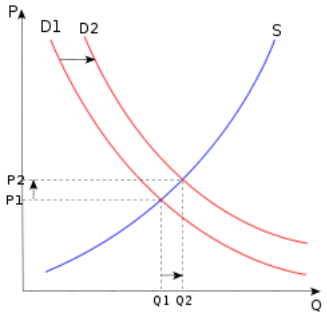

Figure 49. Supply and Demand.

[27] Marx later extends this duality to the commodity of labor, distinguishing between the use-value of labor (which generates value) and the exchange-value of labor-power (which is paid its fair value, the wage). In Marx's model, the discrepancy between the value created by labor and the value of labor-power constitutes the source of profit.

[28] A clear distinction should be made between supply and demand, and *quantity* supplied and *quantity* demanded. Supply refers to a *relationship* between quantity supplied and price *at every price*. Likewise, demand refers to a *relationship* between quantity demanded and price *at every price*. Supply and demand refer to lines, whereas "quantity supplied" and "quantity demanded" refer to points along supply and demand curves. The slope of supply and demand curves are known as the *elasticity of supply* and the *elasticity of demand*, respectively. Elasticity measures the percentage change in quantity divided by the percentage change in price. Goods with elasticity of less than 1 are said to be inelastic, because a percentage change in price corresponds to a small percentage change in quantity supplied or demanded. The demand curve for insulin for a person who is diabetic would be highly inelastic. In this case, the amount *actually* purchased depends primarily on a person's income rather than on the commodity's price.

These theories are not innocuous. They have important implications for how economists think about markets. For instance, classical theories espoused a view of profit as surplus (or *rent*), whereas in neoclassical theory, profit is understood as the payment made to investments (or *capital*).

It is therefore possible to formulate a theory of *exploitation* in the classical tradition, whereas in the neoclassical tradition, exploitation is only possible under monopolistic conditions in which monopolies can charge above-equilibrium prices. The best known classical approaches to economic theory today are Marxian and Sraffian schools.

The major area of disagreement between neoclassical and Keynesian theories is over the concept of inadequate effective demand.[29] Keynesians believe in contradiction to Say's Law, that recessions (and depressions) are *demand driven*.[30] Forty years ago, the economics profession was dominated by Keynesians. Since the 1970s, however, the profession has been dominated by neoclassicals.[31] Within Keynesian economics, two camps can be distinguished: New Keynesians and Structural Keynesians.[32] The prevailing form of Keynesianism within academic institutions is New (or neo-) Keynesianism[33]. The primary difference between difference between structural and neo-Keynesianism is that the latter emphasize the Keynes' notion of *fundamental uncertainty* and the irrationality of markets, and recognize the possibility of wage-squeeze and under-consumption as theories of economic stagnation (Palley 2010).

An important line of continuity between classical and neoclassical and Keynesian economics is the concept of equilibrium. Equilibrium is the point where supply and demand curves intersect.

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[29] This is also known as *under-consumption*, over-production, over-accumulation, and realization failure. One important distinction to keep in mind is that *under-production* sometimes refers only to a lack of adequate *consumer* demand. A lack of effective aggregate demand, however, incorporates all aspects of demand, which is usually decomposed into 1) consumer demand; 2) business investment; 3) government spending; and 4) net exports.

[30] The idea that crises are demand-driven is also held by many Marxian economists. Some Marxian economists, however, prefer to explain crises as driven not by demand, but by falling rates of profit (cf. Kliman 2007).

[31] There are a number of reasons for this. One primary reason was the phenomenon of stagflation, the coincidence of inflation with unemployment. Prior to the stagflation of the 1970s, economists had modeled an inverse relationship between inflation and unemployment, which until that time had been empirically corroborated. This relationship is known as the Phillip's Curve, after William Phillip's, a New Zealand economist who hypothesized the relationship in 1958. Because he was associated with the Keynesians, monetarists such as Milton Friedman began arguing that the empirical refutation of the Phillip's Curve in the 1970s meant that economists should once again presume market efficiency. This latter argument is of course a logical *non-sequitor*. The nomothetic aspirations of economic theory are clearly apparent in this historical ideological confrontation. It appeared as unacceptable, or perhaps even unthinkable, that relationships themselves between aggregate economic variables might themselves be in flux.

[32] New Keynesians are also referred to, by critics, as *bastard Keynesians* and/or *military Keynesians*. Foster and McChesney (2010) explain: " [Joan]Robinson termed **"bastard Keynsianism"** became the order of the day for mainstream economics and policymakers from Harry Truman to Richard Nixon. This sanitized version of Keynsianism dropped much of the concern with inequality and social spending, and regarded Keynes as providing a toolkit of government policies to manipulate the short-term business cycle and thereby avoid recession and inflation. In the United States, this meant, in practice, **"military Keynesianism.**"

[33]Paul Krugman describes the New Keynesians and neoclassicals respectively as *saltwater* and *freshwater* economists, the former so called because they are located along the East Coast (e.g. in Harvard, Princeton, and coastal universities), whereas the latter resided at inland schools, most notably the University of Chicago.

An equilibrium price for a commodity is that price at which *everything produced is purchased*. The idea that markets always clear is commonly referred to as Say's Law, after French economist Jean Baptiste Say, who argued in the 19th century that supply and demand, in the aggregate, are always equivalent because every product sold is by definition a product purchased.[34] There were numerous critics of this idea.[35] According to Say's Law, supply creates its own demand. An alternative to Say's Law is often formulated as Keynes' Law: the idea that demand creates its own supply. Neither Keynes nor Say actually proposed and defended these terse formulations, but they are useful for describing and summarizing two broad points of view.

Léon Walras is generally regarded as the father of General Equilibrium Theory (GET) in economics. Walras sought to determine the conditions under which exchange would be mutually motivated. According to Walras's "theorem of maximum utility," the utility, or pleasure, people derive from consumption is subject to the law of diminishing returns.[36] Extending the principle of diminishing marginal utility to exchange, Walras concluded that voluntary exchange between utility maximizing individuals will take place until all mutually advantageous exchanges have been exhausted.[37]

In the 1960s GET was extended to the stock market under the guise of the "efficient market hypothesis" (EMH), according to which asset bubbles cannot occur because of the presumption that changes in asset prices are statistically independent of each other, a necessary condition of a Gaussian distribution.[38] An offshoot of GET is the *rational expectations hypothesis*, later repacked as "new classical economics." This form of GET was invented by the 1975 Nobel Memorial Prize winner Robert Lucas, who extended the efficient market hypothesis to the entire

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[34] In fact, Say's argument is a bit more nuanced than this, because his argument pertains only to the economy *as a whole*. Say regarded as possible supply-demand mismatches between sectors.

[35] For example, Karl Marx wrote: "*In actual fact, supply and demand never coincide***,** or if they do so, it is only by chance and not to be taken into account for scientific purposes: it should be considered as not having happened. Why then does political economy assume that they do coincide? In order to treat the phenomena it deals with in their law-like form, the form that corresponds to their concept, i.e. to consider them independently of the appearance produced by the movement of demand and supply" (CIII:291: my emphasis)

[36] A frequently cited example of this phenomenon is eating ice cream. Eating ice cream will result in satiation at some point, after which continuing to eat more ice cream will generate less and less satisfaction. As the desire for ice cream diminishes, so does the utility, or happiness, derived from consuming it. At some point, continuing to eat more ice cream will generate displeasure and sickness, or negative utility. If the goal is to maximize utility from ice cream, then it would be rational to continue to eat ice cream until the utility derived from it is zero.

[37] Walras's method involved solving systems of paired equations representing supply and demand for different sectors of the economy. The unique solutions to these equations ostensibly represent market-clearing prices, which could in theory equilibrate supply and demand in every sector simultaneously.

[38] According to Eugene Fama, all asset price movements in financial markets follow a random, Gaussian distribution. Cooper (2009) explains that this conclusion follows from the following paradox: if an investor could reliably predict how prices would move, he could reliably make a profit. On the other hand, if this investor could reliably and with certainty make a profit, then the asset must not be correctly valued, for the profit of the investor is acquired by betting that the current price is over or under-valued, which means that the current price must be wrong. Consequently, asset prices cannot be accurately predicted, nor can profits be reliably acquired, at least not for individual assets. The stock market thus follows a "random walk." Moreover, as Cassidy (2009: 94) points out, the theory itself is based on an internal contradiction. If stock markets *already* reflect all relevant and available information, then there is no incentive for investors and market researchers to find that information, and if nobody finds and records the information, the markets cannot be efficient.[38]

economy. The gist of this theory is that the market, if left unregulated, is always optimally efficient at all times.

In addition, because the market is the sum total of mutually beneficial exchanges, the market is Pareto-efficient: at least one person is better off and no one is made worse off.[39] Because this equilibrium condition is also the condition towards which markets naturally gravitate and eventually settle. Markets, guided only by an invisible hand [40] yields the optimum, equilibrium condition. Markets necessarily yield the best of all possible worlds. Proponents of neoclassical theory has tended to adopt this conclusion in principle, whereas Keynesians are more inclined to argue that individually rational actions can lead to collectively irrational results, and therefore that market regulation is in some cases desirable.

Under-Consumption and Over-accumulation

Below I examine some conventional perspectives on the debt crisis, including 1) under-consumption theories (both Keynesian and Marxian varieties) and 2) theories of over-accumulation (including Baran and Sweezy's idea of Monopoly Capital as well as Ben Bernanke's concept of the "Global Savings Glut").

To over produce is tantamount to under-consuming. Because over-accumulation seems synonymous with over producing, it would seem that all three terms are synonymous. Wherein is the relevant distinction? To avoid confusion, the distinction between over-accumulation and under-consumption primarily pertains to the question of *who* accumulates *too much* and/or does not accumulate sufficiently. In theories of under-consumption, individuals (aka households, workers, consumers) do not *spend* sufficiently. According to theories of over-accumulation, on the other hand, businesses (aka firms) do not *invest* sufficiently. Whether or to what extent these distinctions correspond to real distinctions has been a subject of controversy since the issue was debated between David Ricardo and Thomas Malthus. We need not rehearse these arguments here. Instead, I review the theories with respect to a) what they attempt to explain, and b) the potential fruitfulness of adopting the explanatory frame of reference.

Keynesian Theories of Under-consumption

Aggregate demand includes four components: consumer demand, business investment, government spending, and net exports. This is a standard way of decomposing the GDP.

[39] The terms Pareto-efficient, Pareto-improvement, and Pareto-optimum, were of course not used by Walras himself, who wrote his treatise *Elements of Pure Economics* in 1874, before Pareto became widely known. Vilfredo Pareto and Walras both taught at the University of Lausanne, and in fact, Pareto took Walras's position upon his retirement in 1893.

[40] This term is of course borrowed from Adam Smith. The phrase, however, only appears once in *The Wealth of Nations* (1776).

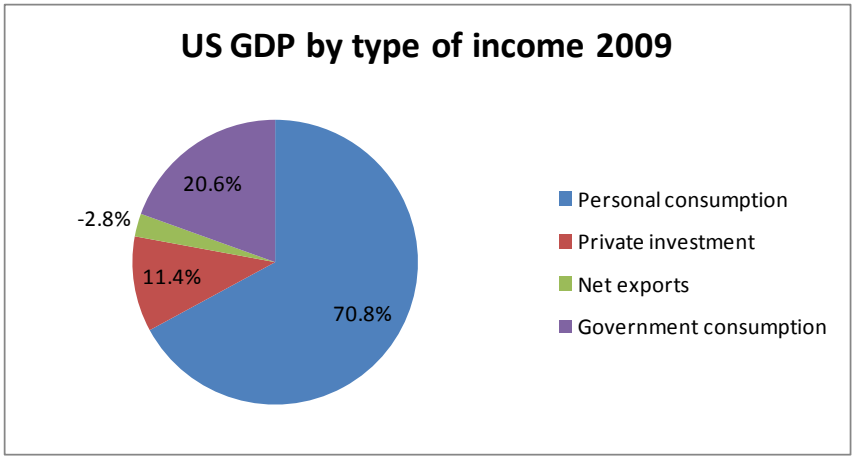

Figure 50. Components of GDP by type of income. United States (2009)

The distribution of US GDP for 2009 is provided in Figure 50. Consumption constitutes about 70 percent of GDP in the US and has remained relatively stable across time.

Under-consumption theories explain economic slumps (or "downturns") as *demand-driven*. The upshot is that economic slumps can be fixed by stimulating demand. This can be accomplished by monetary policy (i.e. by lowering interest rates) or by means of fiscal stimulus, or government spending. Krugman (2009), a self-described Keynesian, argues that the Great Depression ended as a result of the Second World War, which in his view acted as a massive public works program. The policies of the New Deal, on the other hand, were too small to generate any sufficiently strong stimulus. Krugman has argued that the government response to the current downturn has likewise been too small. Another noted Keynesian economist, Dean Baker, calculates that the US economy had lost roughly $1.2 trillion in demand by 2008, and that the stimulus programs replaced only about $300 billion (2009). This notion of demand-driven recessions is of course incompatible with neoclassical theory.

To say that economic recessions are generated by a decline in aggregate demand is, taken by itself, a tautology, for recessions are defined in terms of quarterly GDP growth, which can be decomposed as components of demand. What causes the slowdown in growth or decline in demand? Although under-consumption can refer to all of the aggregate components of demand, it is often used primarily to refer to a decline in *consumer* demand, specifically. This can occur for a number of reasons. One explanation is called the *paradox of thrift*, which occurs when consumers *en masse* begin to save more and therefore spend less. At the aggregate level, this generates a decline in business revenue, which then feeds back to generate a systemic downturn.

Thomas Palley, a self-described Structural Keynesian, argues that the current downturn is a consequence of the "neo-liberal growth model" which generated rising inequality and stagnating wages:

> The essence of the argument is that the post-1980 neoliberal growth model relied on rising debt and asset price inflation to fill the hole in aggregate demand created by wage stagnation and widened income inequality.

Contrasting his view with mainstream views of the crisis, he adds:

> The new Marxist-SSA-structural-Keynesian "financialization" interpretation of the crisis is far more pessimistic. Financial regulation is needed to ensure economic stability, but it does not address the ultimate causes of the crisis, nor will it restore growth with full employment. Indeed, paradoxically, financial reregulation could even slow growth because easy access to credit is a major engine of the neoliberal growth model. Taking away that engine while leaving the model unchanged, therefore promises even slower growth. (2010)

The *state variable* of this model is growth. The neoliberal model, which generates short-term growth at the cost of rising inequality and stagnating wages, is ultimately unsustainable. Growth of course would not matter if it did not feedback upon wages. The argument then be recast as having the following feedback structure:

1) Falling wages (in pursuit of short-term growth) → 2) inadequate demand (in the middle run) → 3) falling profits → 4) slower growth → 5) falling wages

Step 3 is not explicitly discussed, but it is not clear how slower growth could occur otherwise.

Notice that the ultimate explanation of growth is still neoclassical: a portion of profits are invested, and these investments generate future growth. Palley emphasizes the first step in this chain, whereas Foster and others (see below) emphasize the inability to invest. Next, I discuss some Marxian variants of this approach and evaluate the empirical evidence.

Marxian Theories of Under-Consumption

Some Marxian economists have attributed economic slumps (defined either as declining profit rates, or declining growth rates) to a mismatch between wage growth and productivity growth. A simple version is as follows: the profit-motive compels capitalists to cut wages as much as possible and/or lay off workers and to reinvest in production; over time declining wages means that workers are not able to purchase the commodities that they produce, thus generating market gluts. Therefore, income inequality is ultimately unsustainable for capitalism.

There is a long dispute within Marxian circles over whether "crises" can be attributed to distributional issues, or whether they must have some prior cause in the *sphere of production*. The latter is Marx's famous argument regarding the falling rate of profit (FRP), which occurs as a result of increased mechanization. Marx can be quoted to support both interpretations:

> It is a pure tautology to say that crises are caused by the scarcity of solvent consumers, or of a paying consumption. The capitalist system does not know any other modes of consumption but a paying one .

> . . . If any commodities are unsaleable, it means that no solvent purchasers have been found for them, in other words, consumers . . . . But if one were to attempt to clothe this tautology with a profounder justification by saying that the working class receive too small a portion of their own product, and the evil would be remedied by giving them a larger share of it, or raising their wages, we should reply that crises are precisely always preceded by a period in which wages rise generally and the working class actually get a larger share of the annual product intended for consumption. From the point of view of the advocates of 'simple' (!) common sense, such a period should rather remove a crisis. It seems, then, that the capitalist production comprises certain conditions which are independent of good or bad will and permit the working class to enjoy that relative prosperity only momentarily, and at that always as a harbinger of a coming crisis. (1933: 475-6, quoted in Sweezy 1970: 151).

Compare the quote above with the following:

> The last cause of all real crises always remains the poverty and restricted consumption of the masses as compared to the tendency of capitalist production to develop the productive forces in such a way that only the absolute power of consumption of the entire society would be their limit. (Marx 1933: 568, quoted in Sweezy 1970: 177).

One of the earliest proponents of this theory was J.A. Hobson of England. Regarded by Lenin as a liberal reformer, he argues that low wages at home created insufficient demand. Capitalism avoided a *crisis of overproduction*, however, by expanding abroad. Colonialism was then a means to prop up demand. He was regarded as a reformer (which for Marxists is a pejorative) as opposed to a radical because he believed overproduction could be obviated by implementing minimum wage laws and other domestic reforms. In short, capitalism need not be abolished.

Marxian economists Conrad Schmidt, Karl Kautsky, Louis B. Boudin, Rudolf Hilderding, and Rosa Luxembourg all emphasized realization failure in their crisis theories. Sweezy (1942) and Baran (1957) elaborated realization failure (RF) theories of crisis. Sweezy describes a crisis of over-production (under-consumption) as one that results from a decline in the ratio of the rate of growth of consumption to the rate of growth of the means of production (1970: 183). According to Sweezy, the production of consumer goods may lag behind the production of the means of production (factories, fixed capital, etc.) thereby generating a crisis of over-production.[41] Another way of thinking about this is that over-production occurs when profits (which are primarily reinvested into the means of production) grow at a faster rate than do wages.

Similarly, Analyzing the non-financial corporate business (NFCB) sector for the United States between 1949 and 1979, Weisskopf finds that the decline in profitability arises "almost entirely" from a "rise in the true share of wages, which indicates a rise in the strength of labor" (1979: 370).

More recently, Richard Wolff has argued that the current crisis can be attributed to stagnating wages resulting from exploitation. Beginning in the 1970s, he argues that wage growth fails to keep pace with rising productivity. He lists four additional factors contributing to the declining wage share, including: globalization, in which firms relocate abroad in pursuit of low wages;

[41] Marxian economists decompose the economy into three sectors: the sector for consumer goods, the sector for capital goods (means of production), and the sector for luxury goods, which represents the goods that capitalists purchase with their surpluses. Often the luxury sector is not included.

immigration; women entering the workforce; and new technologies. All of these, he insists, has a depressing impact on wages. He argues that the profit boom of the past 30 years has not been distributed as compensation and wages to workers. Prior to the 1970s, he asserts that: "The genius of U.S. capitalism before the 1970s consisted in the combination of rising real wages, surpluses rising faster, and surplus distributions that reacted back to reinforce the pattern of rising wages and faster-rising surpluses." (2010: 175). Beginning around the 1970s, the only way that consumption growth can be maintained, in lieu of wage-growth, is via credit: rather than receiving higher wages, workers received credit cards. Businesses profited from the wage cuts, the increased spending, and the interest payments. Wolff argues that this ultimately was unsustainable.

In my view that *declining* wages causes declining or stagnating growth is really a counterpart to the argument that *rising* wages share causes declining or stagnating growth. The latter is the neoclassical view, which attributes falling investments to a discrepancy between the *rates of growth* between the wages and productivity. This means that as the rate of growth of the economic pie gets larger or smaller, changes in the wages lag behind. This is known as the wage-lag hypothesis. Raffalovich, Leicht, and Wallace (1992), find evidence in favor of the *wage lag hypothesis*:

> Consistent with prior research and the 'wage lag' hypothesis, labor productivity- but not compensation- increases with increasing rates of capacity utilization. Output therefore increases faster (and decreases more slowly) than the total compensation of labor." (1992: 254).

If growth in wages exceeds that of productivity, then reinforcing feedback effects are plausible, since wage growth would cut further into investments necessary for future growth. Data for the wage share, calculated as the percentage of the Net Domestic Product, is provided in Figure 51, followed by three additional calculations of the wage share.

In this time-series, the wage share remains fairly stable, despite a decline in 2001. Notice that around 2005 it begins to rise. The coefficient of variation (the ratio of the standard deviation to the mean), is approximately 6 percent. The time sries is only descriptive. It does not indicate which comes first, a decline in investment or a decline in compensation. Although the wage share has remained fairly stable, it does not tell us anything about how income is distributed *among* wage earners. Figure 52 shows the percentage of total income earned by the top ten percent of income earners in the United States. The data include capital gains.

The wage share has declined in the past decade only slightly, but the growth in inequality has been dramatic, beginning around the 1970s. A rise in inequality is compatible with *demand-driven* hypotheses of the downturn. The top 10 percent of income earners by 2007 were receiving about half of the entire income in the US. Rising inequality coincided with rising debt and a dramatic growth in finance. It is not inequality that fuels debt, nor does the evidence suggest that a decline in personal consumption generated inequality. To the contrary, the inordinate rise in consumption created a latent form of debt-peonage, exacerbating inequalities.

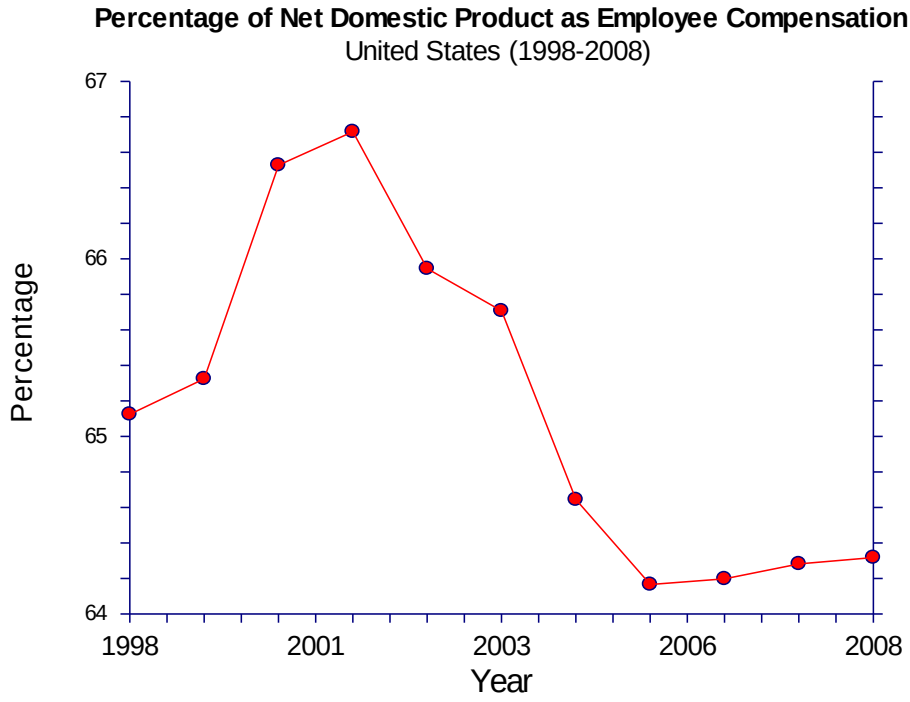

Figure 51. Wage Share. Percentage of NDP as Employee Compensation (1998-2008)

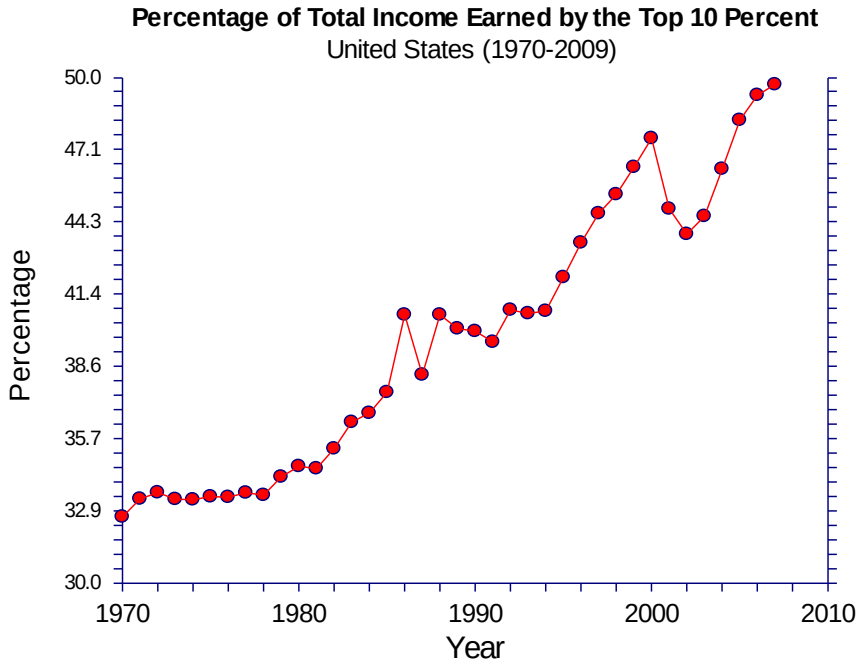

Figure 52. Income inequality. Share of income earned by top decile (1970-2009)

Theories of Over-Accumulation

Ben Bernanke and the Global Savings Glut

Ben Bernanke is not usually put in the same category as the Marxists Paul Baran and Paul Sweezy. However, their theories are homologous in the sense that they thematize the negative consequences of the stock-piling of capital (aka money). Ben Bernanke replaced Alan Greenspan as Chairman of the Federal Reserve in 2006. Since the financial crisis began to unravel in 2007, he has emphasized an international frame of reference for understanding the current crisis. In the popular media, his theory has been dubbed the "Global Savings Glut." In short, the idea is that the housing bubble arose as a consequence of *excess savings* by China and other countries. These savings then find their way the United States, which contributed to the housing bubble. National Public Radio has framed their reporting of the financial crisis similarly as the "Global Pool of Money." Figure 53 is a pictorial illustration of the argument.

Bernanke's conceptual time line is as follows:

1. $trade\ imbalances$
2. $\rightarrow\ global\ savings\ (outside\ of\ US)$
3. $\rightarrow\ savings\ end\ up\ in\ US$
4. $\rightarrow\ cheap\ credit\ in\ US\ markets$
5. $\rightarrow\ excess\ mortgage\ lending$
6. $\rightarrow\ housing\ bubble.$

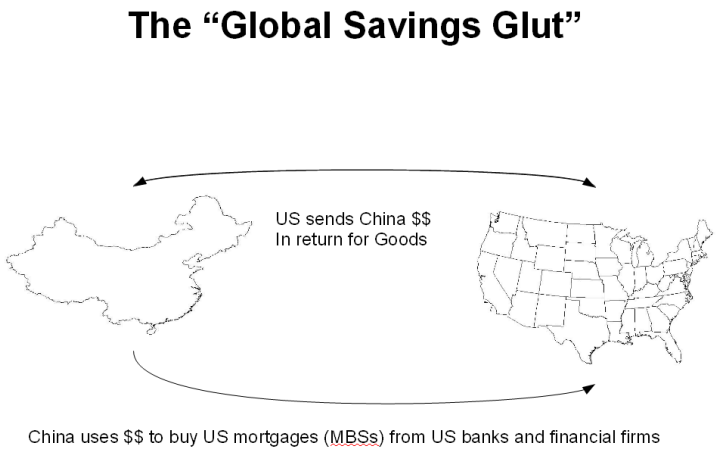

Figure 53. Bernanke's Global Savings Glut.

At a speech delivered at Morehouse College in Atlanta, GA on April 14, 2009, Bernanke asks the audience "How did we get here?" He answers:

> "[W]e need to consider how *global patterns of saving and investment* have evolved over the past decade or more, and how those changes affected credit markets in the United States and some other countries...
>
> "Indeed, the net inflow of foreign saving to the United States, which was about 1-1/2 percent of our national output in 1995, reached about 6 percent of national output in 2006, an amount equal to about $825 billion in today's dollars.
>
> "Financial institutions reacted to the *surplus of available funds* by competing aggressively for borrowers, and, in the years leading up to the crisis, credit to both households and businesses became relatively cheap and easy to obtain. One important consequence was a housing boom in the United States, a boom that was fueled in large part by a rapid expansion of mortgage lending. Unfortunately, much of this lending was poorly done, involving, for example, little or no down payment by the borrower or insufficient consideration by the lender of the borrower's ability to make the monthly payments." (my emphasis)

Bernanke advanced the same argument in an earlier 2005 paper entitled "The Global Saving Glut and the U.S. Current Account Deficit."[42] In this paper, Bernanke focuses on the persistent trade imbalance ("current accounts deficit") with the rest of the world. In his view, trade account deficits can also be understood in terms of savings and investment.

Whereas in a closed economy, all investment must come from savings, in an open economic system involving international trade, investment can exceed savings. This is the case in the United States, for example, as I have corroborated in Figure 54, using data from the BEA. Investment can only exceed savings in one country, however, if savings are borrowed from other countries. In Bernanke's view, the US and other industrial countries have become net importers of capital (i.e. savings) from the rest of the world. The key question is, why?

Bernanke writes:

> Why is the United States, with the world's largest economy, borrowing heavily on international capital markets--rather than lending, as would seem more natural?.... I will argue that over the past decade a combination of diverse forces has created a significant increase in the global supply of saving--*a global saving glut*--which helps to explain both the increase in the U.S. current account deficit and the relatively low level of long-term real interest rates in the world today. (2005; my emphasis)

[42] Available at: http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/#f7

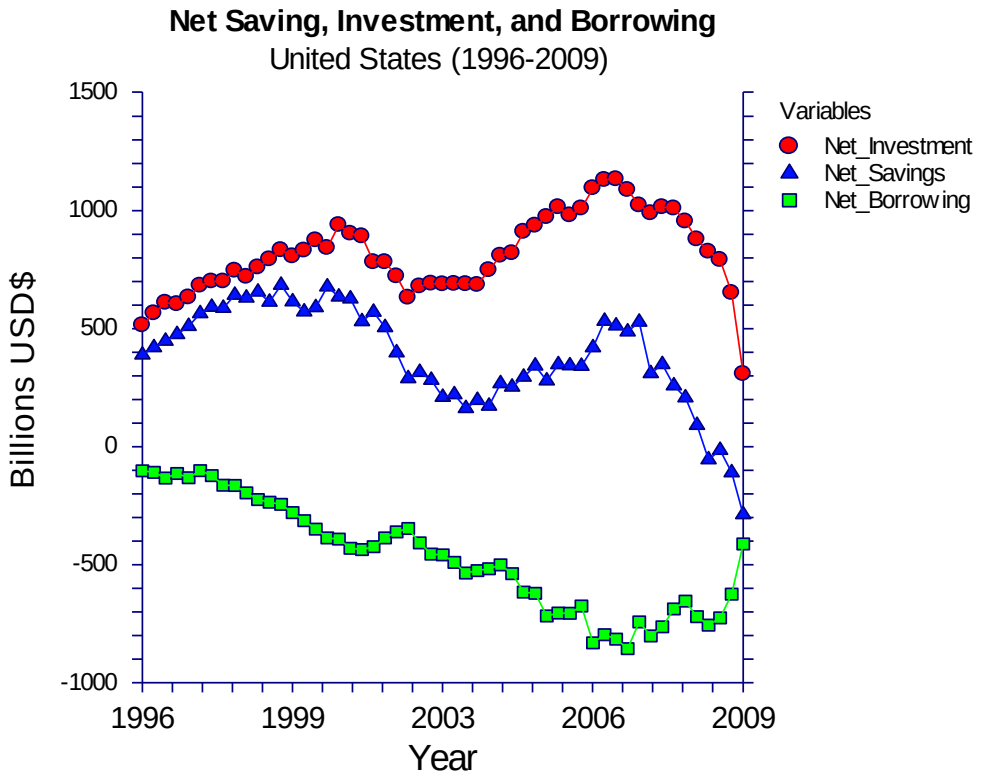

Figure 54. Net saving, investment, and borrowing. 1996-2009.

Bernanke dismisses the idea that the current accounts deficit is a result of government deficits, an argument he calls the *twin-deficit hypothesis*. He notes that the US had a trade deficit even when the federal government was operating at a surplus in the 1990s. In contrast, Germany and Japan have run fiscal deficits and trade surpluses during the same decade. Second, Bernanke considers population demographics. One explanation for the global savings glut may be that aging populations in Europe and Japan might be saving more, thus providing the excess savings for US investment. Bernanke points out, however, that Europe actually saved less in 2003 than it did a decade earlier, and although Japan has one of the largest current account surpluses in absolute terms, it cannot entirely account for the relative increase in savings. That leaves the developing countries, including the oil exporters and the Asian countries, most notably China. According to Bernanke's figures, developing countries collectively went from having a account deficit of -$87.5 Billion in 1996 to having a current accounts surplus of $205 Billion by 2003.

What accounts for this? Bernanke provides two reasons. First, Bernanke argues that many countries in Asia built up currency reserves after the 1997 Asian financial crises, stating that: "These "war chests" of foreign reserves have been used as a buffer against potential capital outflows." Second, Bernanke contends that international investment was attracted to the United States because of its "rising productivity" and other "long-standing advantages such as low political risk, strong property rights, and a good regulatory environment." The excess of savings resulted in an unusually low interest rate, as lenders competed against each other for borrowers. These low interest rates in turn generated the boom in credit creation, and ultimately, the housing bubble.

Comments

Bernanke does not provide a causal nexus between the current accounts deficits of the United States and the housing bubble. In other words, he does not specify *how* low interest rates generated decisions by individual firms to collectively borrow and lend more money than was ultimately sustainable. Presumably, the "savings glut" generated a lower interest rate, and the lower interest rate generated excess credit creation. This explanation, however, ignores the fact that there was no "savings glut" at the aggregate. John Taylor points out that Bernanke ignores simple arithmetic:

> To be sure, there was a gap of saving over investment in the world outside the United States during 2002-2004, and this may be the source of the term "saving glut." But the United States was saving less than it was investing during this period; it was running a current account deficit which implies that saving was less than investment. Thus the positive saving gap outside the United States was offset by an equal sized negative saving gap in the United States. No extra impact on world interest rates would be expected. As implied by simple global accounting, there is no global gap between saving and investment. (2008: 5).

Thus, the excess savings in Asia should not have caused a decline in the interest rate. Moreover, Bernanke cannot explain why developing countries did not invest more of their savings domestically. Bernanke ignore the political dimensions of China's trade policy with the United States that might account for these imbalances. Herman Schwartz makes this case:

> The blindness of neoclassical economics to the issue of power obscures the barriers that Asian states have erected in front of individuals' consumption. These barriers range from compulsory savings (the Singapore National Provident Fund automatically captures approximately 30 percent of wage income) to state oversight of capital goods purchases (the Chinese state must approve every purchase of imported civilian aircraft.... Asian states manipulate a key price- their exchange rates- to maintain export shares. (2009: 30).

Bernanke's explanation ultimately blames the crisis on the unwillingness of foreign countries to purchase more US goods. This argument, however, can be turned on its head. The crisis can also be understood as a predictable consequence of *insufficient domestic demand* arising from wage stagnation. Bernanke attributes the downward pressure on wages in part to technological advancements, but as pointed out by Turner (2008), this does not explain the explosion in debt that fueled the financial bubble. Attributing the unequal distribution of value-added towards capital at the expense of labor to technology also ignores the historical cases in which technological innovation did not have this effect. This is the classical *under-consumption* argument, which I will address below. Finally, Turner (2008: 14) also points out that US trade policies, and more generally, the lowering of trade barriers and the lifting of capital restrictions globally, have not maximized welfare according to the theory of *comparative advantages,* but have merely exploited a wage differential.

Over-accumulation and Monopoly Capitalism

Baran and Sweezy distinguished their theory from theories that focused exclusively on the role of *consumer* demand by calling their theory a theory of *accumulation crisis.* In their view, growth stagnation does not arise primarily from a decline in the wage share, although this may play a part. Instead, they attribute a stagnation of growth rates to monopoly conditions. In their 1966 book *Monopoly Capital*, they write that the crucial difference between competitive and monopoly capitalism is that "under competitive capitalism the individual enterprise is a 'price taker,' while under monopoly capitalism the big corporation is a 'price maker' (53-4). Furthermore, they argue that the "best theory of price formation is the one described by neoclassical theory under conditions of monopoly" (54).

Under monopoly conditions firms are engaged in a "tacit collusion" to avoid price wars, although in some situations they acknowledge in some sectors a "shake-down phase of development" may occur. Exactly how monopoly conditions generate stagnation is described in a recent article by Foster and McChesney:

> The contradictions displayed by today's economy in this perspective thus go far beyond neoliberal economic policy or a "super-Minsky cycle." As explained numerous times in *Monthly Review, the underlying problem of accumulation in the advanced economies today is one of a deep-seated stagnation tendency arising from a high degree of monopoly (oligopoly) and industrial maturity. More actual and potential economic surplus is generated than can be easily or profitably absorbed by consumption and investment, pulling the economy down into a slow growth state.* As a result, accumulation becomes increasingly dependent on special stimulative factors….
>
> The financialization of the capital accumulation process was a response to *a deep tendency to economic stagnation rooted in the development of the monopoly stage of capitalism.* Capital, faced with a shortfall of profitable investment opportunities, sought refuge increasingly in financial speculation made possible (as Minsky repeatedly noted) by the era of big government and big banks. Consequently, if stagnation was the chief contradiction of monopoly capital proper, this has now evolved into the twofold contradiction of stagnation-financialization under the phase of monopoly-finance capital. *No change in economic policy is possible under the system at this point.* In this view, neoliberalism would appear to be here with us more or less permanently, as long as the stagnation problem lasts, since it is itself a reflection of the stagnation-financialization trap that characterizes the age of monopoly-finance capital…. *The fault is in the system*. (Foster and McChesney 2010: my emphasis)

There is a strong tendency in this style of analysis, evident in the above passage, to reify the economic system. The concept of *stagnation* is also ill-defined. It might refer to GDP growth rates of a particular country or industry, or to profit rates of some unspecified set of firms. Furthermore, if monopoly capitalism is the problem, then why isn't the solution to simply break

up the monopolies? It is a logical *non sequitur* to argue that because monopoly conditions retard growth, that central planning should be implemented.

The big problem is that they fail to specify why accumulating *more profit* (because of higher-than-equilibrium prices) generates slow growth and therefore less profits in the long-run. It would seem that if growth is a function of investments and investments a function of profits, that more profits would generate higher investments and hence more growth. There may be exterior barriers to growth, such as market share, but these are not tied down in any logical way to monopoly conditions.

The claim that the United States or the global economy has become more monopolistic is difficult to evaluate. First, the economy of the United States or the world are not composed of single markets, so the claim that the US has become more monopolistic implies that markets, on average, have become more monopolistic. This is difficult, if not impossible, to measure, and it is not necessarily the case that trends in one market reflect trends in other markets or trends in all markets, on average. How a market is defined is often controversial, as evidenced by various anti-trust lawsuits that have appeared in US courts. For instance, in the 1990s, Microsoft had alleged that it was a small fish in a large sea of software, including video game systems, and under that definition, its market share was relatively low. Prosecutors, on the other hand, alleged that the proper definition of a market was the set of all computer operating systems, and under that definition it did possess a large degree of market share. There are various ways of measuring market share, such as the Herfindahl-Hirschman index, or H-index, but these measurements depend upon an a priori decision regarding what defines the market. Moreover, it is difficult to demonstrate that capitalism has ever been competitive in the sense envisioned by neoclassical theory

As explained in the previous section, Fligstein (2009) has shown that the mortgage securities markets were concentrated, but this is only one market. Moreover, market share in most markets often have a similar level of concentration. The market share in most markets is dominated by a half dozen firms (White 1981). In addition, there is evidence that *increased* international competition, beginning around the 1970s, has increasingly eroded the market-pricing power of US firms (Reich 2008, Wallerstein 2004; Brenner 2006).

Finally, it isn't clear whether over-accumulation refers to a phenomenon that can be empirically observed (e.g. as in a time-series) or whether over-accumulation refers to a particular theory about an observed phenomenon. In either case, a reference pattern would need to be identified. For the proponents of over-accumulation theory, this is capacity utilization.[43] Because of the introduction of just-in-time (JIT) production methods, firms rarely produce more than they can sell. Instead, they closely monitor market conditions and produce products as market conditions seem to warrant. Unsold inventories of goods are therefore not necessarily the best means of detecting stagnation trends. Rather, stagnation will result in a decline in the utilization of productive resources, that is, a decline in capacity utilization. There does not, however, seem to be a determinate downward trend for capacity utilization as indicated in Figure 55.

[43] That capacity utilization is the best indicator of stagnation arising from over-accumulation has been confirmed to me by Foster (2010: personal correspondence).

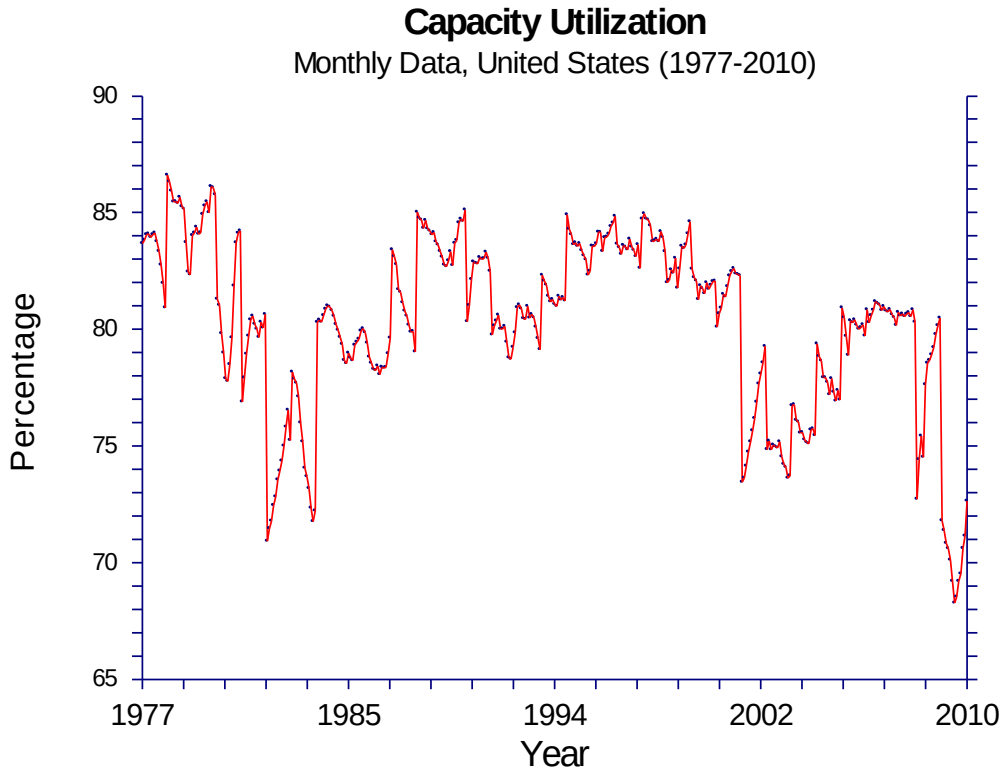

Figure 55. Capacity Utilization. (Source: EconStats.com)

In the time-series for capacity utilization, there appears to be an oscillatory pattern, but no clear identifiable trend. I conducted an analysis of autocorrelation to determine that the data points in the series correlated significantly with their prior values at a lag of one, (AR1). Regressing these data on lag, year, and month yields a very small negative coefficient for year of -.002, which is *not* statistically significant.[44]

Conclusions

I do not disregard these theories, but think they can be framed in a more fruitful manner in light of systems theories. In particular, theories of under-consumption misidentify the cause of the downturn as *lack of consumption.* Although personal spending did drop, this was after the housing bubble had crashed, and can be attributed to debt, or credit creation. The stock-piling of money, on the other hand, is a testament to the view offered above, namely, that the economic system should not be characterized as a system of exchange, much less market exchange. I disagree, however, with both Bernanke and the *monopoly capital* thesis as to the cause of these developments. In my view, the distinction competition/monopoly and the continuum of

[44] The estimated model is: 6.26+ .969*lag+ 6.0E-03*month-1.95E-03*year. The r-squared for this model is .97, all of which is accounted for by the lag variable.

comparison it establishes is not essential to an analysis of the dynamics of money accumulation, or second-order stockpiling of stockpiled exchange. This is because market competition has never been the driving force of economies, including in its present-day differentiated form. The comparison is therefore akin to a double counterfactual: on the one side, a pure market utopia is posited, while on the other, a pure socialist utopia. The empirical insights are thus muddled by its transcendental orientation. Instead, emphasis should be placed on how the relationship between merits and claims are codified within organizations, and how the power to purchase is distributed and funneled through systems of communications these organizations channel.

The causal locus of the systemic crisis cannot, moreover, be attributed to a center that exercises unilateral control over the entire system of which it is a part. The policies of the Federal Reserve played a role, but these policies did not determine the lending practices of private banks, but rather, remained parts of the relevant environmental stimuli that conditioned their operations. Above all, the case of the banking system foregrounds the deficiency of the state-economy (or society) distinction that permeates both economics and economic sociology. The banking system operates according to a logic that can be given the generic formula of paying/not-paying (Luhmann 1995). That it is an economic system, however, does not mean that it is a *market* system. Economics and markets should be sharply delineated. Markets are, in general, one kind of monetary encounter that proves to be the exception rather than the rule.

V. MARXIAN ECONOMICS AND VALUE THEORY

Marx's law of value asserts that *value* is determined by the expenditure of socially necessary labor time. Marx adopted the use-value, exchange-value distinction from Adam Smith and then applied it to labor. Labor has a use-value which he calls concrete labor; and labor has an exchange-value (or price), which he calls abstract *labor-power*. Concrete labor has no value, if by value we mean a price on the market. Concrete labor *produces value*. Labor-power, however, receives its full value on the market in the form of wages. This is just enough money to reproduce the worker's livelihood.

Marx writes: "what exclusively determines the magnitude of the value of any article is the amount of labour socially necessary or the labour-time socially necessary for its production" (1990: 129). He goes on to define socially necessary labor time as "the labour-time required to produce any use-value under conditions of production normal for a given society and with the average degree of skill and intensity of labour prevalent in that society" (1990: 129). This is one way of saying that less efficient producers do not generate more value simply by expending more labor time.

Two caveats need to be made. First, Marx is not saying that the wage is actually determined in this way. Rather, he is attempting to demonstrate that the origin of surplus is exploitative even when all commodities, including labor are exchanged at their fair value. In my view, Marx's premise on the origin of value should be treated like a counterfactual.

Second, Marx does not argue that labor is the only source of *material wealth, or use-values.*[45] Commentators frequently confuse the two.[46] Machines and nature produce physical wealth. Marx argues in *Capital* that use-values are the "combinations of two elements, the material provided by nature, and labour" (1990: 133). Consequently, there is always a "material substratum" that is "furnished by nature" (133). And again in the *Critique of the Gotha Program* he states emphatically that, "Labour is *not the source* of all wealth. *Nature* is just as much the source of use values (and it is surely of such that material wealth consists!)" (1978: 525).

I will next briefly discuss Marx's quantitative identities. For Marx, all *new* value is created solely by living labor, whereas machines merely transmit their existing values to the end product. Workers, however, receive only a portion of the value they produce, which is equivalent to the value of labor-power. Marx refers to the money advanced by capitalists to acquire labor-power as *variable capital (V)*. He refers to the money advanced to acquire machines and other non-labor inputs as *constant capital (C)*. The difference between the value of the output and the value of inputs (variable and constant capital) is called *surplus-value (S)*. Surplus-value is also the difference between the value produced by living labor and the value of labor-power, and the difference between necessary and surplus labor-time.

---

[45] These are not necessarily physical objects. Marx stresses that a use-value satisfies a need. Whether this need "arise[s] . . . from the stomach, or the imagination, makes no difference" (1990: 125).

[46] John Roemer, for instance, argues that "labour power as a commodity is not unique in its magical property of producing more surplus value than it embodies. Indeed, in an economy capable of producing surplus, any commodity has this magical property" (1989: 100).

The value of outputs equals the sum of these inputs:

1) $C + V + S = T$
2) $L=V+S$

In equation 2, *L* refers to living labor and *T* refers to total value, V to variable capital, and S to surplus-value. Constant capital (C), including machines transfers its pre-existing value, but *does not generate any new value*. Marx also distinguishes between *fixed* and *circulating* capital, the latter being similar to what we would call finance, with money having the highest degree of circulation (i.e. liquidity). Marx refers to the ratio of C to V as the *organic composition of capital*.[47] In modern terms, it is the capital to labor ratio. As the organic composition of capital rises, the relative portion of available surplus falls. The rate of exploitation *E* is given by the ratio S/V, and the Marxian rate of profit is the amount of surplus extracted over total investments (both constant and variable capital):

3) $E=S/(C+V)$

In keeping with Marx's famous circuit of capital M-C-M', the rate of profit can also be thought of as M/M', the ratio of the original money advanced to the money received (Sweezy 1970: 141).

Furthermore, Marx stipulates three aggregate equalities:

1. The (aggregate) value rate of profit equals the (aggregate) price rate of profit
2. Total profit equals total surplus-value
3. Total price of production equals total value

The price of production for Marx is simply the cost of inputs, which he calls cost-price, plus the average rate of profit. These aggregate equalities connect up price and value, which has a universal means of measurement. Individual commodities will tend to *diverge* from their values, as measured by the socially necessary labor time that goes into them.[48] However, these price changes can be regarded as *redistributions of the existing total stock of value, produced at each moment in time*.

In other words, Marx envisions the production process as taking place in discrete time: first, production, and then, exchange. Production determines the new total value, as determined by labor time. In the market, this total quantity of value gets redistributed according to the laws of

[47] The organic composition can also be thought of as c/(c+v), the ratio of constant capital to total capital (Sweezy 1970: 66).
[48] Marx acknowledges this specifically, stating: The possibility, therefore, of a quantitative incongruity between price and magnitude of value, i.e. the possibility that the price may diverge from the magnitude of value, is inherent in the price-form itself. This is not a defect, but, on the contrary, it makes this form the adequate one for a mode of production whose laws can only assert themselves as blindly operating averages between constant irregularities (1990: 198).

supply and demand.[49] In the next production cycle, total value will grow, and this new aggregate will again be redistributed in the market.

The only quantitative interpretation of Marx to have successfully deduced all three aggregate equalities while successfully demonstrating his falling rate of profit thesis is the so-called Temporal Single System Interpretation (TSSI). "Temporal" means that simultaneous linear equations are not used to model the economy in "equilibrium." In these models the outputs of a sector have to equal the inputs in order for the equation to be "solved." Rather, a dynamic discrete model is used in which the outputs of one period equal the inputs to a subsequent period. "Single-System" means that prices and values only equal each other at the aggregate level. Values do not equal prices for individual commodities.

TSSI's were first proposed by those working on the transformation problem (Perez 1980; Carchedi 1984) and subsequently used to defend (Ernst 1982) Marx's Law of the Tendential Fall in the Rate of Profit (LTFRP). It first became collectively and self-consciously articulated, however, with the publication of *Marx and Non-Equilibrium Economics* (1996), a collection of essays edited by Alan Freeman and Guglio Carchedi. More recently, Andrew Kliman (2007) defends and explicates the TSSI in his *Reclaiming Marx's Capital*. I will primarily refer to this interpretation below.

Most economists have dismissed Marx on the grounds that his theory is internally inconsistent, and that his falling rate of profit thesis has been disproved. I will address each in turn.

Defending Marx against charges of inconsistency

The charge of internal inconsistency presumably tries to show that if labor-time determines value that an equilibrium condition cannot result. In this case, "equilibrium" means a "steady-state" economy in which goods and services remain at constant levels because new production exactly equals depreciation. This has been shown to be incorrect (cf. Kliman 2007). Depending on how the theory is modeled, it can generate steady-state conditions, or not. More importantly, Marx never argued that capitalism should logically or historically be capable of existing in an equilibrium state. A steady state economy is only one possible dynamic among many.

Marx, instead, showed that capitalism is inherently compounding, exhibiting a reinforcing, or positive, feedback loop. This is Marx's circuit of capital, M-C-M'. The Marxian theory of growth depicts capitalism as a process of "valorizaton," or expansion of value. Marx's circuit of capital, when expanded, sketches a series of *discrete* temporal processes. The circuit of capital (*M-C-M'*) expanded is: *M-C(L,MP)...P...C'-M'*, or in words, money is used by a capitalist (firm or individual) to purchase labor and other means of production such as machines, which during the production process produce a surplus of commodities, which is then translated into a surplus of money on the market.

[49] Supply and demand was frequently mentioned by Marx, although he wrote prior to the marginalist revolution. One of the most important constraint on his model, widespread among all economists, is the belief in a tendency for profit rates to equalize across sectors of the economy. This is assumed in most models because above-average profits in a sector ostensibly attract more competition, thus driving down profits.

The argument that the determination of value by labor time cannot possibly generate steady-state conditions does not prove that the theory is "internally inconsistent" because the labor theory of value envisaged by Marx never asserts the possibility of the steady state as a premise. In fact, the logical impossibility of creating a steady-state economy under conditions of labor-time determination is not logically inconsistent with the premise that value is determined by the (socially necessary) expenditure of labor-time.

Defending Marx's Falling Rate of Profit Thesis

The premise that value is determined by labor time is sufficient to generate (i.e. simulate) the falling rate of profit thesis. Because labor is the source of *value*, an increased proportion of production due to machines generates relatively smaller *rates* of surplus (i.e. profit) over time. In short, a rising *organic composition of capital* (i.e. capital-labor ratio) would generate falling profit rates, by definition.[50] Most economists, including most Marxian economists, has disregarded Marx's FRP thesis because it was supposedly shown by Okisio (1961) that rising productivity would lead to a *rising* rate of profit. Improvements in productivity would therefore offset the decline in profit rates, even assuming Marx's premise that value is determined by labor time.

Okishio, however, used systems of simultaneous linear equations to model two separate equilibrium periods. Demonstrating this requires some accounting. For example, if corn inputs start out at 170, and you add 340 hours of labor to this (each of which is equal to one unit of corn), but only pay labor 170 in corn wages (i.e. rate of exploitation is equal to 50 percent), and total corn output is 510, the (simultaneist, physicalist) total profit (surplus value) is equal to: 510-170-170=170. The profit rate is equal to: 170/340-50%. The denominator 340 is the sum of corn inputs and corn wages, or total capital.

Now, imagine that productivity increases, so that the next period, total corn inputs are 340 (reinvested from the previous time period), labor still generates 340 of value but only gets paid 170 in corn wages, but that the total output goes up to 765. Strictly speaking, in value terms, the output cannot be more than the sum of constant capital (340 corn) and living labor (340), or 680. By measuring the rate of profit in physical terms, however, profit is: 765-170-340=255; and the new profit rate is: 255/510=50%. *The rate of profit has not changed, even though the capital-labor ratio has gone up from 170/340=.5, to 340/340=1.*

However, this presumes that the price per unit of corn remains constant. If instead, the total value produced is determined by the value contributed by the inputs (living labor and constant capital) in terms of labor-time, then the *physical quantity* of the output is irrelevant to its *value*. Consequently, the value rate of profit still falls, despite productivity increases. These two arguments are illustrated in Figure 5.

[50] This is evident when one considers that aggregate profit equals aggregate surplus, and surplus value is some fraction of labor, and furthermore, that the denominator of the profit rate is the numerator of the organic composition. A rise in K/L leads to a fall in S/K, where P=S<L.

Table 5. TSSI and physical profit rate calculations.

Year	Corn inputs (C)	Corn Wages (V) →	Physical Corn output	Physical Profit Rate	Total ***Value*** Output	TSSI Profit Rate
1	170	170 L=340	510	510-340=170. 170/340=50%	510	510-340=170. 170/340=50%
2	340	170 L=340	765	765-510=255. 255/510=50%	680	680-510=170. 170/510=33.33%

Falling Rate of Profits and the Current Crisis

The argument over whether the economy as a whole can experience excess supply (or have a deficit of "effective" demand) has cropped up repeatedly in economic theory. In the Marxian literature, the debate is between those who argue 1) that economic downturns (which Marx refers to as "crises") are caused by over-production (or equivalently, under-consumption), and 2) those who argue that because a lack of effective consumer demand can in principle be compensated and offset by an increase in business investment, an adequate explanation has to account for why businesses fail to invest.

Of course, these two theories aren't mutually exclusive, but Marxian scholars tend to take one side or the other. The two theories also point to different causal mechanisms of economic decline. Those who posit under-consumption identify stagnating wage growth and income inequality, and more generally, a distribution of value-added towards capital over labor, as the primary causes or necessary conditions of economic decline. According to Kliman (2007; 2010: personal correspondence), however, the fact that businesses purchase from each other means that, in principle, a fall in consumer demand cannot qualify as an adequate account of economic downturns because business investments could *potentially* increase, thereby obviating a decline in aggregate demand. He therefore asserts that falling profitability provides a better explanation of economic downturns because falling profits means businesses have less to invest. The causal arrow is reversed: because businesses have fewer profits, wages decline.

The dispute over which comes first, investment or consumption, in my view is a consequence of a misguided prejudice against circular causality. The fact that business investment *could* rise to offset consumer demand does not mean that it *will*. In addition, whether or not profits are invested depends on *expectations* of future market earnings, not on whether profit rates have diminished in the immediate or long-term past. Furthermore, investment not only comes from profit (i.e. the equity portion of a business's balance sheet); nowadays investment primarily comes from borrowings, that is, debt. Any adequate theory of the current downturn would therefore have to specify the mechanisms of contagion linking a decline in investments in the financial markets to non-financial production markets elsewhere.

The argument that sectors of the economy must balance each other is a reincarnated version of Walras's argument that the economy is like a giant see-saw, so that if one sector has an excess supply of investments, another will have an excess demand. At each moment of time, they will balance each other out in the aggregate, and in the long run, equilibrium will be attained in each sector as investments move from less profitable to more profitable industries.

Kliman (2010) thus overlooks the possibility of a feedback between consumer spending and business investment. Keynes for instance argues that a decline in consumer spending can cause investors to spend less. A decline in consumer spending in the aggregate will cause a general decline in demand across the entire economy. This in turn can cause business investments to fall, which in turn reinforces the tendency for consumers to spend less, and so on.

The question then becomes: what could cause a general decline in consumer spending? One plausible answer for the US market is the fall in housing prices, which considerably reduced the net worth of thousands, if not millions, of homeowners. The theory is sound if we presume that people, at least in part, determine their spending according to their net worth, and not exclusively according to their incomes (although for many trying to "flip" houses, a decline in home values constituted an immediate drop in income as well). One plausible link is that people determine their spending in part on expected future income or by an average income over many years. A drop in home values might indicate a drop in future income, for example, if homeowners had planned to eventually sell the house. This line of inquiry, however, doesn't specify what precipitated the decline in home values. Also, the reset of adjustable rate mortgages (ARMs) caused a spike in sub-prime mortgage defaults.

Empirical Analysis of the Falling Rate of Profit

Empirical measurements of the rate of profit are calculated as the ratio of profits to capital stock:

1) $R = P/K$

R is the rate of profit, P is profits earned in a given amount of time; and K is total capital stock. There is considerable disagreement about whether the empirically measured rate of profit can be used as a proxy for the Marxian value rate of profit, since the latter is measured in terms of socially necessary labor time rather than prices. Nevertheless, the empirically measured rate of profit is one means of evaluating the overall performance of an economy.

In Figure 56 I calculate the average rate of profit for US corporations from 1978 to 2008. Data for corporate profits are calculated as before taxes. The denominator measured as the current or historical cost of net private fixed assets.

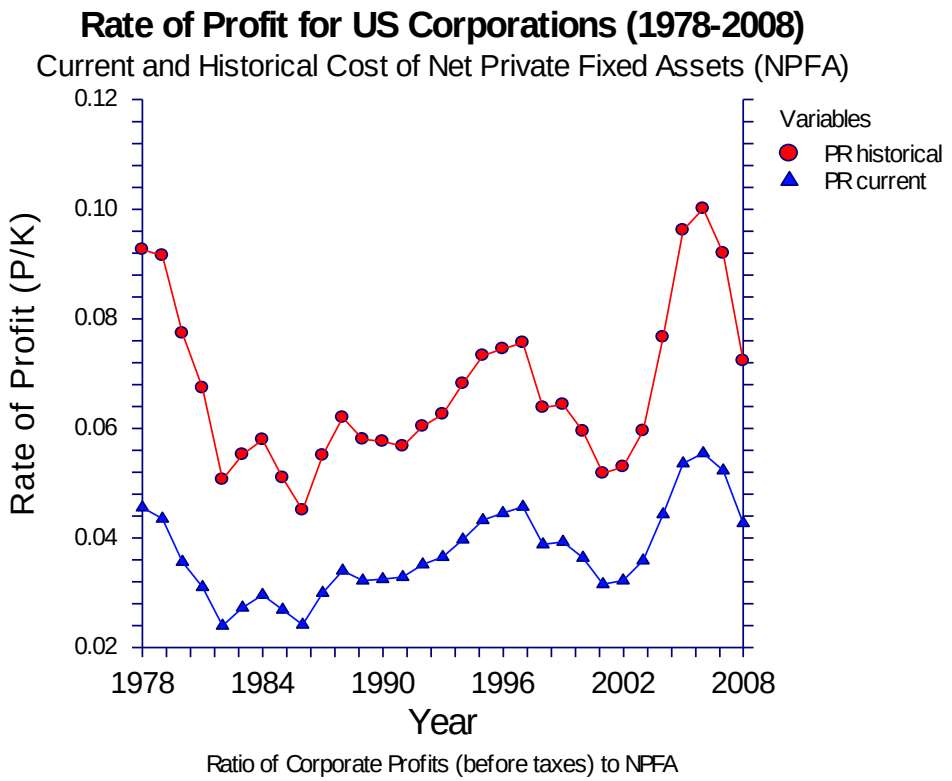

Figure 56. Corporate Profit Rates. United States (1978-2008)

The data show an overall decline in the rate of profit following its previous peak in 1978. The profit rate begins to climb after the recession of 2001, but much of this rise can be attributed to unsustainable borrowing and debt.

The rate of profit can be decomposed by dividing P and K by Y, or total income:

2) $P/K = (P/Y)(Y/K)$,

(P/Y) refers to the *profit share*, and (Y/K) refers to the *output-capital ratio (aka the maximum profit rate)*. Profits would equal Y is wages were zero. Y can be decomposed into a profits and wages:

3) $Y = P+W$,

W is the *wage share*. In other words,

4) $P/Y+W/Y=1$.

To test capacity utilization effects, the output-capital ratio itself can be decomposed:

5) $R= (P/Y)\ (Y/Z)\ (Z/K)$

Here (Y/Z) is the rate of capacity utilization, and (Z/K) is the capacity capital ratio.

What does the falling rate of profit thesis mean?

The profit rate itself can exhibit one of three logically possible trends. It can fall forever; it can rise forever; or it can oscillate. It should be pointed out that the FRP is a *relative* measure, whereas the circuit of capital is an *absolute* measure. Money can continue to grow absolutely, but at a relatively slower rate. Does this ever-slower rate, however, ever cross a tipping point whereby returns (in absolute terms) become negative or reach zero? Mathematically, *the FRP does not constrain growth in any absolute sense (i.e. does not constrain profit margins), but does constrain its rate of growth, which asymptotically approaches zero.* The profit rate would then constrain absolute growth so that it exhibits an S-curve trend over time, ceteris paribus.

More importantly, just because a model can be fitted to a theory does not make the theory right. Marx generates a system in which value' sole metric is labor-time. Marxian economics is then an alternative frame of reference to neoclassical theory. However, *there is no way to observe value categories*. Marxian economists use conventional GDP accounts, but these are not Marxian value categories, observed in terms of average, socially necessary labor hours.

The *only* explicit connection between the two reference frames of price and value is that at the aggregate, but the only available data that can be observed are in terms of price. Nor is it clear what sort of quantifiable impacts these identifies are supposed to engender. In other words, is the theory purely an accounting exercise, a "Transformation" of values into prices (at the aggregate level), or is there some determinate hypothesis arising from the theory that can be tested?

The implications of the FRP have been debated, but to date there are generally two views: either the FRP proves that profits will fall forever and capitalism will (somehow) destroy itself (Howard and King 1992[51]), or the FRP proves that the economy will exhibit periodic upturns and downturns (Kliman 2007).[52] The question then becomes whether other theories are more useful for the purpose of explaining business cycles.

The FRP assumes, among other things, competitive conditions, a society with two classes[53] and an entirely closed capitalist economy. The law, therefore, does not take into account military conquest, or other extra-economic influences that might affect the rate of profit. In addition, as Harvey notes, Marx himself identified several counteracting influences to the law, including: "(1) a rising rate of exploitation; (2) falling costs of constant capital (which checks the rise in

[51] Howard and King (1992) do not adopt this view themselves, however, but attribute it to Marx.
[52] There is also a third option: Marx makes no empirical predictions whatsoever with his FRP and that it expresses merely the abstract end of capitalism (Albritton 1999).
[53] Marx, however, frequently discusses other classes, such as the landowners, the peasants, the petty-bourgeoisie, and even the lumpen-proletariat. He thought, however, that capitalism increasingly split society into the two antagonistic classes mentioned above.

value composition); (3) depression of wages below the value of labor-power; and (4) an increase in the industrial reserve army (which preserves certain sectors from the ravages of technological progress by lessening the incentive to replace labour power by machines)" (1999: 178).

As already mentioned, economic data do not correspond to Marxian categories. Harvey (1999) points out that, for instance, that surplus-value, the numerator of Marx's value rate of profit, is distributed not only as profits, but as rents, interest, taxes, and so on. Nor does this law take into account the importance of turnover times in the determination of the profit rate.[54] Other authors (Moseley 1985, 1992; Shaikh and Tonak 1994) argue that surplus is distributed in the form of compensation to *unproductive labor*, or capitalistically employed labor that consumes rather than produces use-values.[55] Presumably, then, a Marxian profit rate would have to include the compensation paid to employees engaged in non-productive activities as part of its numerator. Because surplus-value is not exclusively distributed as profits, surplus-value can rise while profits fall, and vice-versa.

Social Relations and the Reification of Value

Finally, I will mention the tendency in Marxian circles to reify the concept of *value*. Value is not a thing. Instead, *the concept of value describes designates an object-attribution mediating a social relationship.* This insight is important to Marx, of course, but he succumbs to a reifying concept of value that treats value as a substance generated in linear proportion to labor time performed. The economic system is not determinate, however, and does not distribute *all* relations of power, but only those recursively identified as economic. Moreover, money is societal in the sense that cuts across organizations and interactions, but it is distributed primarily within organizations. It is therefore more informative to say that money facilitates the mediation not of persons, but the relationships between organized communications and interactional episodes.

From a sociological point of view, Adam Smith's dichotomy between use-value and exchange-value can be understood as a consequence of processes of social differentiation and abstraction. There is a direct connection between the ordinary meaning of "values" and the Marxian concept of value, although this connection has become increasingly attenuated over time. In capitalism, value spheres are no longer integrated into a mutually recognized value-hierarchy. The fragmentation of society coincided with the abstraction of the social nexus, which could moreover, be used in a variety of impersonal settings.

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[54] Harvey argues that, "without a common measure of turnover time, there can be no equalization of profit rates because there would be no standard against which to determine whether the profit rate was higher or lower than average, or even rising of falling" (1999: 187). He proposes that the credit system and the interest rate are necessary to provide the common standard of "socially necessary turnover time" (187).

[55] The distinction does not rely on whether a certain kind of labor is *necessary* or not. Non-productive labor may be necessary in that it produces socially necessary *outcomes*, but it does not produce *output*. Moreover, non-productive workers are exploited like other workers. Moseley (1985, 1992) argues that a falling productive labor to non-productive labor ratio is a primary cause of the falling rate of profit in the United States. David Harvie in his aptly entitled (2005) essay "All Labour Produces Value For Capital and We All Struggle Against Value", vehemently opposes this distinction, arguing that all abstract labor produces value.

Capitalism engendered processes that fractured the unified cosmology of the non-modern world. Whereas money and exchange once served social, determinate ends, in capitalism the accumulation of money itself becomes a means to a means (Postone 1992). This is discussed by Marx in terms of the subordination of use-value to exchange-value. Marxian analysis attempts to overcome the inherent circularity of the value-concept with reference to capitalism's own *objective* propensities. By the time of the marginalist revolution, however, economics no longer regarded the de-tautologization of the value concept as necessary or desirable. The history of economic thought thus recapitulates the history of economic development.

In my view, Marx's analysis is better read today as a counterfactual which asserts that capitalism, to the extent that it reduces labor to homogenous segments of time, makes value the determinant of labor time. It is a tendency or a specification of an expectation, not something real like a tree or a chair, and not a formula for figuring out how the economy "really" works beneath appearances. Marx's primary insight I think was to understand capital as an accumulation of time, i.e., as a possible *claim* on future labor. In this way, the tendency towards capital accumulation can be regarded above all as a means of mediating a power discrepancy while reifying and thus naturalizing the codified medium upon which the social recognition of this discrepancy rests.

Limits to Growth and the return of classical economics

My primary arguments against Marxian and mainstream (i.e. neoclassical and Keynesian) economics is that it a) fails to explain growth; and that b) it ignores the possibility that natural resources could both spur and constrain economic growth.

It is not clear why the profit rate matters or at least the reason is not made explicit. After the idea that falling profits will destroy capitalism is jettisoned, the FRP can become important only if it explain cyclical downturns in growth, which matters to workers only if it affects their livelihoods. A paradox also seems to arise because rising wages can cause a fall in profit rates, which then generates a fall in wages.[56] Kliman argues that falling profit rates ultimately translates into stagnating wages and/or cyclical recessions in which capital is devalued in order to restore profitability.

The surplus is necessarily a dynamic category: it refers to a comparison across time. Distributional issues are static: it refers to how a *prior* surplus is divided at each moment of time (e.g. between wages and profits). Proponents of the FRP attribute the *prior* declines in surplus (as reflected in declining GDP growth rates) to a decline in the *rate of profit*. Theorists of the FRP overlook that growth might be a determinant of the profit rate, rather than vice-versa. They

[56] This is referred to by Robert Brenner as the "contradictions of Keynesianism" thesis (2006: 16), according to which, the very policies that restored effective demand and established the conditions for the postwar boom by empowering labor vis-à-vis capital were ultimately self-undermining, leading to reduced profitability and stagnation. The premise of this argument is that declining productivity growth by itself cannot cause a fall in profitability unless wage growth fails to decline in tandem.

regard technology as the primary determinant of falling rates of surplus *value*, but do not account for it. The implicit presumption is that a decline in profit rates is prior to a fall in growth rates, because profits are the means by which investments are made, and investments are the means by which growth is attained.

A simple model might look like this:

Fall in profit *rates* → fall in investment → fall in growth rates

The distinction between under-consumption theories and falling rate of profit (FRP) theories is whether falling profits cause, or are caused by, falling or stagnating wages. Both *sets of theories regard profit rates as central to growth rates*, but *profit is regarded as an entirely distributional issue.* They do not explain where the *growing* surplus comes from. Even if a surplus theory of profit (e.g. Sraffian or Marxian) is favored over the neoclassical theory of profit, this contradiction between *present distribution* and *future growth* is still embedded in the theory, without any clear criteria for deciding which whether static or dynamic optimization is more important. In addition, most of the radical models are linear, posit uni-directional causality, and lack feedback relations. Furthermore, because our monetary system is based on debt, *under-consumption* occurs whenever consumption cannot sustain the ability of debtors to remain solvent.

More importantly *these theories overlook the possibility that economic growth over time can be constrained by exogenous, natural limits*. Classical political economists such as Smith, Ricardo, Malthus, and Mill had all predicted that capitalism would eventually slow down and lapse into a "stationary state with a zero rate of accumulation" (Harvey 1999: 177). With the exception of Smith, classical political economists had located the cause of the decline in factors *external* to the economic system. Ricardo, for instance, argued that declining productivity was the inevitable result of population growth because increasingly less fertile agricultural land would have to be utilized. Sraffa has also argued that the *law of diminishing* returns only applies to non-renewable resources, such as oil. Marx, however, was scathing in his critique of this idea, saying that Ricardo "flees from economics to seek refuge in organic chemistry" (1973: 754). This is unfortunate, because it has contributed to a widespread ignoring of the role natural limitations to growth, and energy production, play in economic processes.

VI. ENERGY AND LIMITS TO GROWTH

Towards the end of *The Protestant Ethic and The Spirit of Capitalism*, Max Weber wrote:

> The Puritan wanted to work in a calling; we are forced to do so. For when asceticism was carried out of monastic cells into everyday life, and began to dominate worldly morality, it did its part in building the tremendous cosmos of the modern economic order. This is order is now bound to the technical and economic conditions of machine production which today determine the lives of all individuals who are born into this mechanism, not only those directly concerned with economic acquisition, with irresistible force. Perhaps it will so determine them *until the last ton of fossilized coal is burnt*. (1958: 181).

Not only does this passage eloquently articulate the binding imperatives engendered by the "modern economic order", it also unambiguously contravenes the view that the classical theorists were unaware of the essential role that energy played in the creation and maintenance of that order. Thus far I have paid little attention to the role that the *natural* environment plays in the constitution of social systems. Thus far, the *theme* of ecology has remained a part of the environment of this communication.

Below I explicitly address the relationship between natural resources and the modern economic system. Specifically, I explain the relationship between energy use and economic growth, and the relationship between "peak oil" and the global debt crisis. My primary finding is that the economic *activity*, measured by GDP, has to some extent decoupled from energy expenditure, both in the US and globally, since the 1970s. This does not imply that energy use is not essential for economic activity. However, there is no one-to-one correspondence between geophysical systems and monetary/economic systems. I conclude with some plausible explanations for my findings.

Mainstream Economic Theory and Energy

Mainstream economic theory is blind to the realities of ecological scarcity and the laws of thermodynamics. Nothing illustrates this better than the contemporary, textbook depiction of the economy as a *circular flow*.

In this model, the economy is disaggregated into individuals (households) and businesses (firms).[57] The blue line represents the flow of money, and the green line represents the flow of goods and services. Neither the monetary nor physical origins of surplus are explained.

[57] The BEA's depiction has an added advantage of realism. In most economic textbooks (e.g. Mankiw 2010), *households* are depicted as providing *firms* not only labor, but also land and capital. Capital is an ambiguous term, but when distinguished from mere money, it means physical equipment, such as factories. Yet it is difficult to understand how households could provide firms with factors of production other than labor. It is necessary, however, in neoclassical theory to depict "capital" as a separate factor of production, so that profits are derived from the contribution of capital rather than from the exploitation of labor.

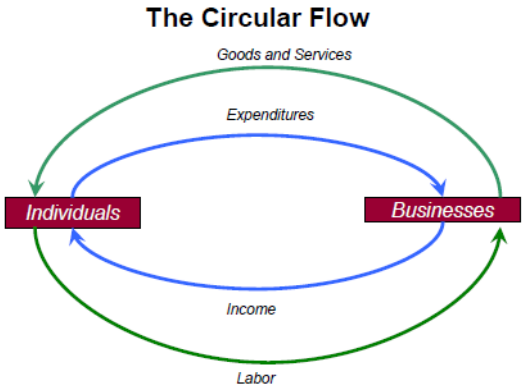

Figure 57. Circular Flow.

To account for the former (i.e. profit), neoclassical economic theory invokes the idea of *returns to factors of production*, labor and capital. In contrast to Marxian and Sraffian theory, neoclassical theory does not regard profit as a material surplus, but rather, as the price paid to the marginal contribution of capital, understood as an abstract quantity of money, which moreover is substitutable for labor. The system is a closed *perpetual motion machine*.

Figure 57 depicts the circular flow model from the Bureau of Economic Analysis (BEA). Importantly, in this model there are no *external* inputs to the production process, nor are there any waste products (aka "externalities"). It is a closed system. In reality, the production of material wealth transforms low entropy inputs into high entropy outputs, and thus requires an entropy gradient. As Herman Daly presciently observes: "The high-entropy output cannot be directly used again as an input for the same reason that organisms cannot eat their own excrement" (1991: 16).

Mainstream theory, including neoclassical and Keynesian, regards increased resource extraction as a *consequence rather than a cause of growth*. The equilibrium conditions posited by neoclassical theory pertain to *utility*, a concept derivative of the classical concept of *exchange-value*. It ignores use-value, or material wealth. For instance, in Walras's model of exchange, market outcomes can generate the best of all possible worlds *with respect to utility*, but *it presumes that the products from which utility is derived are already produced*. In other words, it cannot explain how growth occurs, or how efficiency of production is improved. Standard calculations show that about a quarter of productivity growth can be accounted for by so-called human capital (population increases, skill improvements, knowledge, etc.); another quarter can accounted for by capital stock accumulation (Mankiw 2002). This leaves about half of productivity growth unaccounted for in the standard growth models (e.g. the Cobb-Douglas function), sometimes known as the *Solow residual*, after the economist Robert Solow. Neoclassical theory attributes productivity growth to *technology*.

According to the mainstream models, growth derives from the investment of savings. Quantitatively, the growth-from-savings theory can be expressed in terms of a decomposition of

output *Y*. As stated above, the output of an economy *Y* can be decomposed into four components: personal consumption *(*C*)*, business investment (*I*), government spending (*G*), and net exports (*NX*). Assuming a closed economy for simplicity of exposition, national income can be written as:

$$Y=C+I+G.$$

Subtracting the money spend on consumption and government spending from both sides yields:

$$Y-C-G=I$$

The left side of the equation is also equal to national savings (*S*), so that:

$$S=Y-C-G=I$$

Savings can also be decomposed into private and public savings. Let *T* equal taxes. Savings is then equal to:

$$S=(Y-T-C) + (T-G)$$

The left hand side is private savings, which is equal to total income minus taxes and consumer spending. The right hand side is public savings, or the amount of tax revenue collected minus the amount the government spends as transfer payments. When *T* exceeds *G*, the government runs a budget surplus.

This theory is attractive because it links macro-economic growth to the time preferences of individual actors, modeled as utility maximizing monads. An individual will save when the expected utility of future returns exceeds the present utility of present consumption, taking into account the greater weight attached to present consumption, both because the future is risky, and because some sacrifice of present pleasure is required. Saving for the future, however, means delaying the gratification derived from consuming/spending in the present. The weighting factor which discounts the magnitude of expected utility is known as the "discount rate." The discount rate refers to the tendency, first described by Pigou (1920), for people to prefer present consumption over future consumption. Future consumption, therefore, has to be sufficiently attractive to compensate for the postponement of preferred consumption in the present. Sacrificing present consumption for future returns is another way of expressing Max Weber's notion of the "the Protestant Ethic."

If growth is assumed to be automatic, why save at all? Moreover, investment can also derive from credit (i.e. debt) in addition to savings. Through fractional reserve banking, banks create temporary money to create savings without investments. The amount of investment that can be generated is some function of the *money multiplier*, the amount of money the banking system generates with each dollar of reserves. *The money multiplier is the reciprocal of the reserve ratio* (Makiw 2002: 331). For instance, if the reserve requirement is 10 percent, or .10, then the money multiplier will is equal to 1/.01 = 10. In a fractional reserve system that requires 10

percent deposits, then, 10 times the amount of money originally deposited in a bank can be generated.

This means that, increasingly, investment is financed through *debt* rather than *equity* (i.e. savings). Debt has to be paid back, plus interest. Therefore, in order to remain solvent, individual firms and households in debt must generate more income than previously: *debt thus fuels the growth imperative*. Debt is generated by and generates growth, but it also compels growth, in the sense that debtors have to grow in order to remain solvent. Consequently, the notion that credit is created from savings (i.e. savers lend their money) does not imply a one to one correspondence between them.

According to mainstream economic theory, physical resource stocks place no limitations on economic growth. A typical mainstream view of the role that natural resources play in economic growth can be found in Greg Mankiw's economics textbook[58]:

> [M]ost economists are less concerned about such [environmental] limits to growth that one might guess. They argue that technological progress often yields ways to avoid these limits. If we compare the economy today to the economy of the past, we see various ways in which the use of natural resources has improved. Modern cars have better gas mileage…. More efficient oil rigs waste less oil in the process of extraction…..
>
> In a market economy, scarcity is reflected in market prices. If the world were running out of natural resources, then the prices of those resources would be rising over time. But, in fact, the opposite is nearly true. The prices of most natural resources (adjusted for overall inflation) are stable or falling. It appears that our ability to conserve these resources is growing more rapidly than their supplies are dwindling. Market prices give no reason to believe that natural resources are a limit to economic growth. (2002: 246-7).

The statement that "our ability to conserve these resources is growing more rapidly than their supplies are dwindling" does not at all mean that the absolute stock of resources is no longer declining. The fact that improved efficiency of extraction can coincide with increased rates of extraction is known as the Jevons Paradox.[59] Mankiw writes as if resources were infinitely substitutable, and moreover, that resources are renewable at any possible rate of extraction. Both of these assumptions are false.

Although the actual prices of most commodities, including energy, have fallen for most of the past century, this does not mean that they will continue to do so. There is ample evidence that we are approaching, or have already approached, the peak rates of oil supply (Deffeyes 2001; Simmons 2005; Heinberg 2007). Moreover, economic growth has always been coupled to

[58] According to Amazon.com, Mankiw's macroeconomics textbook is the " #1 bestselling intermediate macroeconomics text" in the United States, beating out Paul Krugman, who ranks 3rd.

[59] This is named after Alfred Jevons, who in the 1800s observed that efficiency improvements in energy extraction from coal coincided with greater absolute levels of coal extraction. A modern day example of the Jevons Paradox is fuel efficiency. Greater fuel efficiency for automobile has not diminished the demand for gasoline. On the contrary, people tend to drive their cars greater distances the more fuel efficient their cars are. In addition, more and more cars are being produced and increasingly more drivers are on the road due to population and economic growth.

increased energy expenditure (cf. McKillop 2005). Moreover, the costs of extraction are not taken into account by national accounting statistics. These include, for example, the recent BP oil spill disaster in the Gulf of Mexico.

What does GDP measure?

Growth is the desideratum of economic policy. What, however, does growth mean? What sort of growth is desirable, and how should growth be measured? Herman Daly refers to *growthmania* as the mindset which assumes that the answer to every problem is growth. The costs of growth, however, are not measured, and can even be counted as benefits.

Aggregate economic growth is not something that can be observed directly as can say, the growth of a population of fish, a crystal, or a pile of garbage. Economic growth can only be inferred through the use of constructed indicators such as Gross Domestic Product (GDP), the standard indicator of economic growth for a country. There are numerous indicators of national economic growth including Gross National Product (GNP), Net Domestic Product (NDP), Net National Product (NNP), Gross National Income (GNI), and Gross Domestic Income (GDI), among others. The GDP is calculated as the market value of all final goods and services made within the borders of a country in a given year. GDP can be calculated according to final products, expenditures, or income, all of which in theory should generate the same results. There are therefore a number of ways the composite measure can be decomposed.

Gross Domestic Product (GDP) is often used as a proxy for prosperity. Raising the per capita GDP has consequently been the focus and objective of developmental policies for virtually all governments and International Governmental Organizations (IGOs), such as the International Monetary Fund (IMF) and the World Bank (WB). Using GDP as a measure of prosperity, however, is misleading for several reasons. The economist Herman Daly (1973) refers to the belief that economic growth is the panacea for all social problems as "growthmania," which he compares to psychological delusion. First, average per capita GDP of a nation or region does not measure the inequality of incomes within and between nations or regions. Using the arithmetic mean of income is not a measure of the most common income level (measured by a mode or by a harmonic mean) or how the income is distributed. A nation with a GDP of $100 and 10 people where 1 person owns all of the wealth, has the same average per capita GDP as a nation where 10 people each possess $10. The per capita GDP is $10 in both cases. In addition, inequality within a nation or area itself can cause a decline in overall social well-being. To measure inequality, measurements of dispersion (e.g. the 'GINI' index, the Theil index, etc.) are more useful.

According to Amartya Sen, moreover, whether and to what extent increases in per capita GDP, relative either to the past or other regions, translates into more freedom and well-being is influenced significantly by five distinct sources of variation including: a) personal factors such as sickness and health; b) environmental factors such as climate, air and water pollution, natural resources, etc.; c) social climates (e.g. friendly, corrupt, violent); d) inter-societal income distribution; and e) inter-family income distribution (cf. Deb 2009: 78). Gross Domestic

Product does not take into account unpaid services and activities, such as domestic labor. Equally disturbing is the fact that natural and anthropogenic disasters can inflate the GDP. Efforts to clean up pollution or to rebuild after a calamity of some kind are counted as part of a country's expenditure and thus can raise the GDP, even when human well-being has clearly declined.[60]

Numerous cross national studies have also shown that, after about $30,000 or so, rising per capita GDP does not significantly contribute to happiness and well-being. Nations with higher average GDPs are relatively less happy than their less affluent counterparts. The last point I will mention is that the *relationship* between GDP and prosperity has not remained constant across time. Specifically, both the historic links between GDP growth and employment, and the link between GDP growth and rising wages, have been broken (Ayres and Warr 2009; Rifkin 1995). Because of these indexes other development indexes that have been devised. The United Nation's Human Development Index (HDI) and the Genuine Progress Indicator (GPI) are examples.

The most important point for purposes of this paper, however, is that GDP is theoretically incoherent. Herman Daly explains:

> The problem of [GDP] is that it adds together three very unlikely categories: throughput, additions to capital stock, and services rendered by the capital stock. Throughput (the entropic depletion-pollution flow) is the ultimate physical cost. Services rendered by physical and human capital represent a value estimate of the final benefit, or true psychic income, resulting from economic activity. Additions to capital stock represent an increased capacity for future service, the net cost of which (throughput) has been incurred in the present, but the net benefits of which accrue only in the future. These three distinct concepts should be kept in separate accounts. It makes no sense to add together costs, benefits, and changes in capital stock. It is as if a firm were to add up its receipts, its expenditures, and its change in net work. What sense could any accountant make of such a sum? (1991: 30)

An increase in GDP represents an increase in the capacity for making payments and nothing more. Moreover, the flow of economic activity is in part based upon the stocks of capital that have accumulated in prior years. A factory does not have to be built from scratch every year. Stocks can still generate a flow of goods that, if sold, can contribute to GDP. One should not expect, therefore, a point by point correlation between changes in the flow of energy and the flow of economic activity. Moreover, the accumulation of debt has mollified much of the international competition that would have inflated the prices for scarce resources such as petroleum even higher. The growth of finance has meant that the rate at which money is accumulated by lending institutions exceeds the rate at which this money is lent. Instead of using the money to make payments for productive resources, the money is instead stockpiled, thereby postponing the exchange of money for goods and services, all of which depend on energy extraction.

[60] For example, both the production of asbestos and the subsequent medical care required by victims of asbestosis, a lung disease resulting from asbestos exposure, positively affected GDP in the United States.

Finally, rising scarcity of raw materials (partially) reflected in declining rates of energy output and rising energy prices has engendered a process by which exchange in the economy is increasingly constituted by the exchange of already extant stocks (e.g. real estate). Thus unique historical dynamic has been translated into exploding debt, rising finance, and growing inequality.

The economy is ultimately a social construct, inseparable from how we measure it. Accordingly, GDP does not merely reflect an already existing economy, but steers policy decisions about how best to manage it, and in this sense, in part performs and constitutes that which it measures. The economy can be regarded as an *operationally closed* system in the sense that Norbert Weiner and Niklas Luhman have used the term, that is, as closed to information but open to the matter and energy. In this sense, it is not real, as are biophysical systems, but has presence only as codified communications. Whether or to what extent economic growth reflects underlying material flows and human welfare depends entirely upon how we measure and understand it. In short, the economy exists in the medium of ideology, broadly understood . The ultimate ends of the economy qua economic theory is provided a functional equivalent in the self-referencing operation of its abstract means of self-measurement.

Entropy and the Economic Process

In 1971, Georgescu-Roegen published his seminal work *The entropy law and the economic process*. This work represented a paradigm shift in thinking about economic processes and more generally, about the interrelation between natural resources and social order. The basic gist of his argument is that economic production obeys the Second Law of Thermodynamics, also known as the Entropy Law. The First Law of thermodynamics, also known as the Conservation Law, stipulates that the total quantity of matter and energy in the universe does not change, but only changes form. The Second Law of thermodynamics, or the Entropy Law, states that the reduction of entropy in one place is always accompanied by a greater magnitude of entropy in the overall environment.

The term entropy was first coined in 1868 by the German physicist Rudolf Clausius. The concept as used in thermodynamics can be understood in three ways: 1) as a transition from a more concentrated to a less concentrated state; 2) as a transformation from available energy (exergy) into unavailable energy; and 3) as a transition from order to disorder. In short, entropy can be thought of as an inverse measure of order, concentration, or available energy.[61] Available energy is also known as *exergy*.

[61] The concept of entropy has also been employed and given a different but related meaning in probability terms by Claude Shannon (1948) as a measure of *information*. Entropy is a measure of the likelihood or probability of a "message" given a set of possible messages. In this theoretical context, entropy is identified as the inverse of probability or certainty: the more surprising or unlikely something is, the greater its entropy, or *information value*.

Economics has generally disregarded or ignored the profound implications of the Entropy Law for economic growth and production. According to the Law of Entropy, all processes of production create more disorder (waste) than they do order. The universe is therefore in a state of continuous *qualitative degradation* (Rifkin 1980). Moreover, this process occurs automatically by itself, regardless of whether mechanical work is consciously performed. Mechanical work, however, does accelerate the entropy process. The more we produce, the faster the degradation. Georgescu-Roegen notes that:

> Economic processes materially consist of a transformation of low entropy into high entropy, i.e. into waste… [W]aste is an inevitable result of that process and ceteris paribus increases in greater proportion than the intensity of economic activity. (1972)

Herman Daly recapitulates this most fundamental point:

> That low entropy is the common denominator of all useful things is evident from the second law of thermodynamics. All states of matter and all forms of energy do not have equal potential for use. Though we neither create not destroy matter-energy in production and consumption, we do transform it. Specifically, we transform matter from organized, structured, concentrated, low-entropy states (raw materials) into still more highly structured commodities, and then through use into dispersed, randomized high-entropy states (waste)…. All life processes and all technological processes work on an entropy gradient. In all physical processes the matter-energy inputs in their totality are always of lower entropy than the matter-energy outputs in their totality. Organisms canot survive in a medium consisting of their own final outputs. Neither can economies. (1991: 22)

A continuum of ends and means, adapted from Daly (1991: 19) is given below.

Physics	Technology (man and nature's)	Economics	Ethics	Religion
<----------	----------	----------	----------	---------->
Ultimate Means (low-entropy matter-energy)	Intermediate Means (artifacts, labor)	Intermediate Ends (health, comfort, etc.)		Ultimate Ends (?)

Economics is exclusively concerned with the relation between intermediate means and intermediate ends, ignoring both ultimate means and ultimate ends. Daly argues that we will eventually run out of a) "worthwhile ends whose satisfactions depend on further conversionof ultimate into intermediate means", that is, the increasing depletion of resources, and b) ultimate means, or reach limits to the *rate* at which ultimate means can be used. *Systems, including economic systems and technologies, work by transforming available into unavailable energy, thus accelerating the entropy process.*

Information is the inverse of the probability: "the less probable a message is, the more meaning it carries" (Wiener 1950: 8 in Marcus 1997: 27)

In the past 200 years, humanity has become increasingly dependent upon nonrenewable minerals for its survival, including petroleum, coal, and other fossil fuels. Because these are nonrenewable, humanity is increasingly relying on a *phantom carrying capacity*. *Carrying capacity* refers to the population size of a species that the environment can sustain indefinitely. Likewise, phantom carrying capacity is described by William Catton Jr. as:

> Either the illusory or the extremely precarious capacity of an environment to support a given life form of a given way of living. It can be quantitatively expressed as that portion of a population that cannot be permanently supported when temporarily available resources become unavailable (1980).

Low entropy energy constitutes the ultimate means and exists in two forms: a terrestrial stock and a solar flow. Furthermore, the terrestrial stock takes two forms: "those renewable on a human time scale and those renewable only over geologic time and which, for human purposes, must be treated as nonrenewable" (Daly 1991: 21). Ultimately, the human economy is a subsystem of the steady-state ecosystem. Accordingly, the human economy must become a steady state either willingly or by extinction. Trends cannot continue indefinitely. A growing system will always come up against internal or external barriers (Wallerstein 2004; Meadows 2008).

Empirical findings: Growth and Energy

Economic growth has always been coupled with growth in energy extraction, production, and depletion. Figure 58 is a plot of US GDP (in constant dollars) against US energy use (kt oil equivalent), from 1960 to 2009. World estimates are provided in Figure 59and exhibit the same clearly identifiable relationship.

This relationship does not establish a causal relationship.[62] Growth and energy production are in a sense two ways of measuring a common phenomenon. Growth entails energy use and vice-versa. Neoclassical economics considers growth a cause of energy use. Certainly this is not incorrect. Petroleum by itself does not cause its extraction and refinement, for example. Neoclassical theory thus adopts the agency paradigm of causal attribution, regarding growth *qua* human agency as the efficient cause of energy consumption.

Although human agency *qua* intention can be regarded as an efficient cause of energy consumption, human agency cannot be regarded as a material cause. This is why the "production" of energy is actually a misnomer. Humans do not produce energy, rather, humans, using their endosomatic and exosomatic instruments, extract and deplete *exergy*.

[62] It should be mentioned that determining a causal relationship between economic growth and energy use by econometric means is not helpful. The two series vary concurrently. Granger tests are therefore not meaningful in this case (Wooldridge 2006).

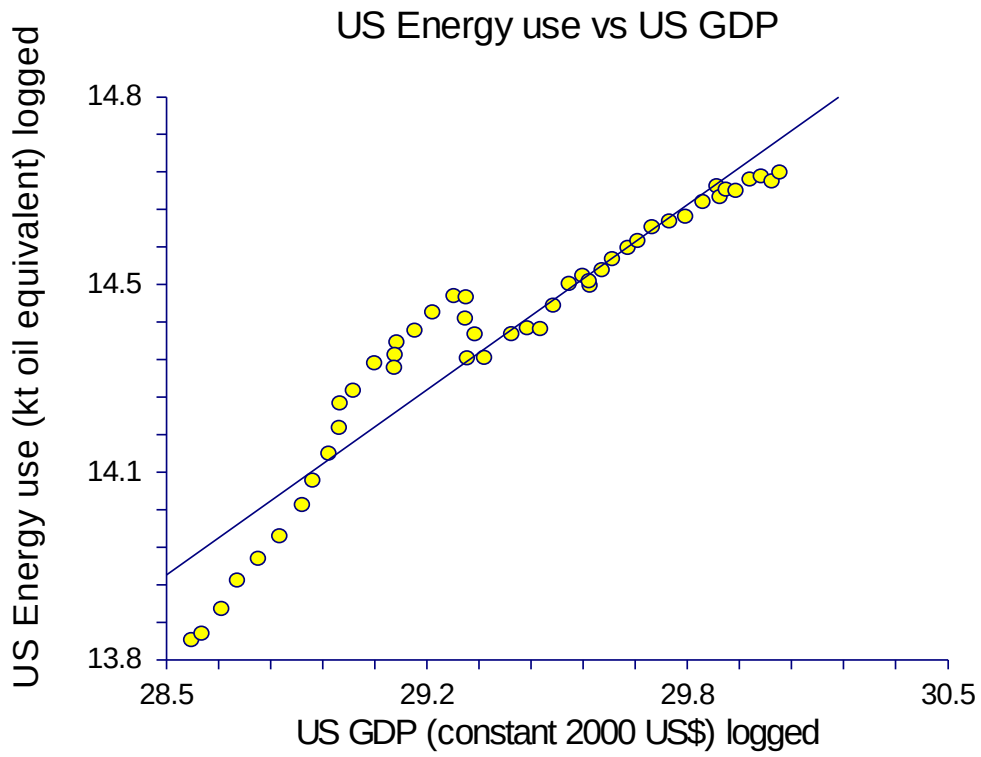

Figure 58. Energy use vs GDP. United States. 1960-2009. Source: World Bank.

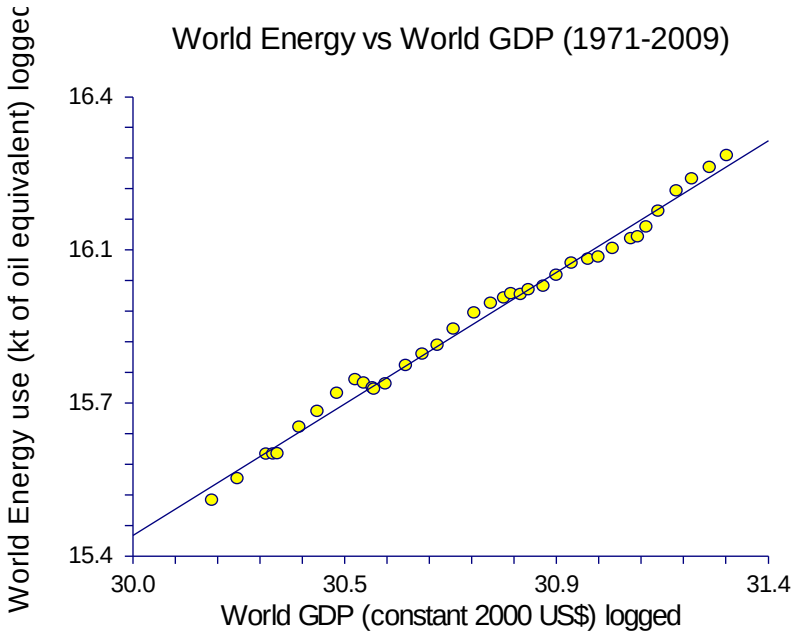

Figure 59. World GDP vs. World Energy Use. 1971-2009. Source: World Bank.

In addition, GDP and energy production are flow variables, as opposed to stock variables. To regard the extraction of resources as entirely determined by human agency is to assume that there are no exogenous constraints placed upon this agency and that there are no limits to growth. That GDP is a flow variable is also important, because conceptually it means that a "growing economy" only indirectly refers to the stocks that are accumulated and depleted via economic activity.

Peak Oil

Oil contributes to about 40 percent of energy production and supplies 90 percent of all transportation fuel (Korowicz 2010). It is therefore vitally important to the functioning of the global economic system. For most of the 20th century, high quality petroleum could be extracted at very little cost. A barrel of oil, which could be extracted for a dollar, would in turn generate 25,000 hours of labor. One dollar equals 25,000 hours of labor. This *is* essentially free energy, and it has fueled the economic growth of every nation on earth.

Up until the 1950s, the United States was the "Saudi Arabia of oil" in the sense that it was world's largest exporter. Its production, however, peaked in 1970 at 10.2 million barrels a day and subsequently declined. Ten years later, domestic oil production was still in decline, despite the fact that ten times more oil wells had been drilled. Currently the United States uses 25 percent of the world's oil but possesses only 2 percent of the world's known reserves.

Today, there are about 50 countries that are producing less oil today than in the past. Ironically, more efficient means of extraction petroleum has only expedited its depletion, acting as giant "super straws" sucking the last easy oil out of the ground at faster and faster rates, but without significantly increasing the amount of petroleum that would be produced from any given oil field. The last great oil discoveries of the 20th century, which effectively postponed the point of peak global production, were fields in Alaska, Siberia, and the North Sea, discovered in 1967, 1968, and 1969, respectively. Worldwide *discovery* of oil peaked in 1964.

Contrary to Mankiw's assertions, the price of crude oil is rising, not falling. Figure 60 is a time series depicting world crude oil production, measured as millions of barrels per day, and average oil prices for the US (measured as USD). Between 1960 and 1970 global petroleum production increased 118.6 percent. By contrast, between 1971 and 2009, global petroleum production increased only 52.1 percent.

Probably the most important fact, however, is that global petroleum production has remained nearly flat since 2005. In this year the Energy Information Administration (EIA) estimates that an average of 73.74 million barrels of oil was extracted daily. This declined slightly until 2008, when it increased to 73.78 million barrels of oil per day, an increase of only .054 percent over four years. The average annual percent change of production from 1960 to 1970 is 8.139 percent, whereas the average annual percent change of production from 1971 to 2009 is only 1.311 percent.

The rate of global oil production is declining, but the price of oil is rising. From 1999 to 2008, the average price for a barrel of oil in the US rose by a factor of 5, from $11.27 to $76.82. These are *annual averages*. Oil prices reached a high of $145/barrel on July 3, 2008, only to be followed by a dramatic decline.[63] A time-series of oil price data from 1960 to 2008 is depicted in Figure 61. In the late 1970s a series of events in the Middle East sent the price of oil over $40/barrel. By 1982, oil prices peaked at an annual average of $53.74. The two most important events disrupting supply were the Iranian revolution in 1978 and Iraq's invasion of Iran in 1980. In 1978, world oil production increased by 0.7 percent, a significant deceleration from its previous 1977 growth rate of 4 percent. By 1980, however, global petroleum extraction declined 4 percent, and continued to decline another 5.8 percent and 4.6 percent in 1981 and 1982, respectively.

Between 1960 and 1974, a stable relationship is exhibited between oil price and oil quantity. A supply curve is given by plotting price (y) and oil produced (x). This is illustrated in Figure 62. Notice the downward slope. As prices fall, so does the quantity of oil produced. This is in contradistinction to the standard supply curve in economic theory. The price elasticity of supply (PES) can also be inferred for this period. Calculating the percentage change in quantity over the percentage change in price yields a *negative* slope of approximately 13.[64]

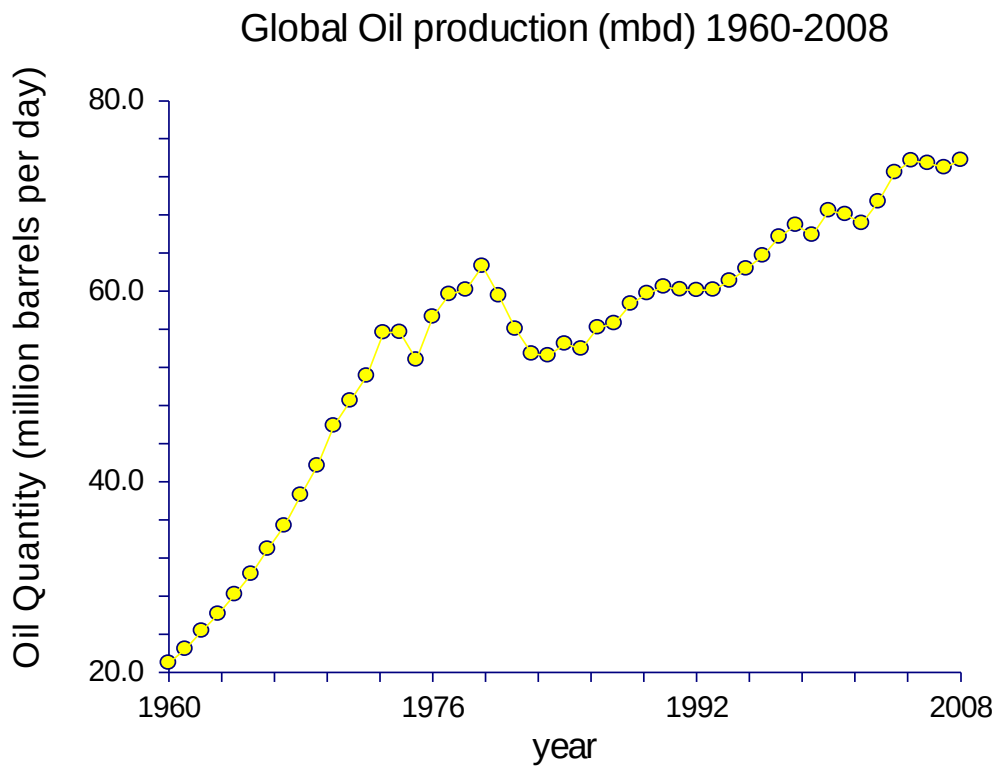

Figure 60. Global petroleum production 1960-2008. (Source: EIA)

[63] Note that these prices are in nominal dollars and do not take into account inflation.
[64] I calculate this as follows: ((Q1974-Q1960)/Q1960)/((P1974-P1960)/P1960), where Q and P are quantity and price, respectively, and where 1974 and 1960 numbers indicate the years.

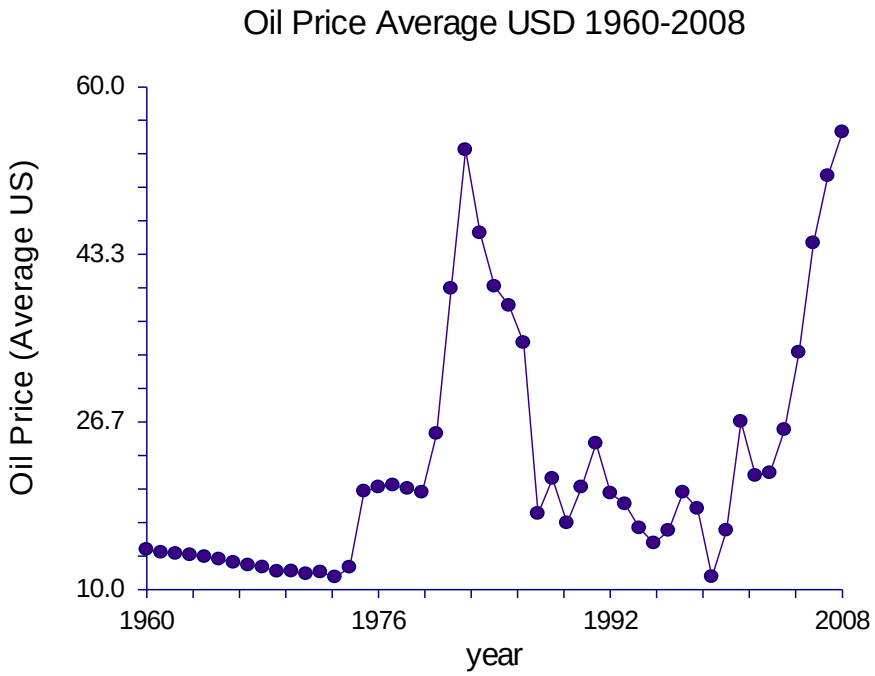

Figure 61. Oil price average USD 1960-2008. (Source: EIA)

According to the law of supply, supply curves should be positive, not negative. Note that this could be explained as the result of the interaction of a shifting supply curve and a stable or constant demand curve. In standard economic analysis, prices are at equilibrium, which is defined as the point where the (falling) demand curve and the (rising) supply curve meet. Assuming that prices are at equilibrium, this result can be obtained by assuming that technology or other factors make petroleum significantly less expensive to produce. When this occurs under conditions of relatively stable global demand, rising output can coincide with falling prices.

This relationship changes abruptly in the mid-1970s due to political events in the Mideast discussed above. Abstracting away from these events, and tracing the relationship between quantity supplied and prices for the years 1987 to 2008, yields the time series depicted in Figure 63. What is clear is that the relationship begins to break down, and the (linear) slope becomes positive. The relationship also becomes curvilinear or exponential.

A divergence in the relationship between petroleum and GDP is also exhibited. Plotting the ratio of oil price to oil quantity (P/Q) against real Gross Domestic Product for the period 1960 to 1974 yields the time series in Figure 64. The price of oil declines while total economic output rises. This relationship clearly changes during the period of 1987 to 2008 as depicted in Figure 65. Limits to growth are implied and the law of diminishing marginal returns is confirmed. As the price of oil rises relative to its quantity, GDP rises *but at a diminishing rate*. A similar relationship holds between petroleum price and production to world *per capita* GDP, as depicted in Figures 66 and 67. The relationship dramatically changes during the period of 1987 to 2008.

An important indicator of *net* energy production is a ratio known as Energy Returned on Energy Invested (EROEI). Although difficult to measure precisely, it is widely acknowledged that the EROEI is declining substantially for both gasoline and petroleum. In 1930, one barrel of oil was needed to produce 100 barrels of oil output, that is, the EROEI was 100:1 (Hagens 2008).[65] By 1970, the EROEI for oil in the United States had declined to an estimated 30:1, and by 2000 the EROEI for oil was estimated to be between 18:1 and 11:1.

Another important indicator is peak oil production per capita, which represents the largest amount of oil that can be used by each person on the planet if equally distributed. This has been in decline for the past half century, as indicated in the Figure 68.

Oil production for the United States peaked in 1970 and thereafter began its decline. For much of the 20th century, the United States was the largest oil exporter in the world. Petroleum, however, is a nonrenewable resource. The volume of petroleum that we are able to extract must eventually decline. The production of oil over time tends to follow a logistic distribution curve, first rising then peaking, and eventually declining. This has been the production pattern exhibited for individual oil fields and for individual countries.

There are two reasons why oil production exhibits a logistic growth pattern over time. First, global petroleum extraction tends to lag behind discoveries of oil reserves. M.K. Hubbert correctly predicted the year that petroleum production would peak in the United States. Peak oil production is therefore also known as Hubbert's peak.

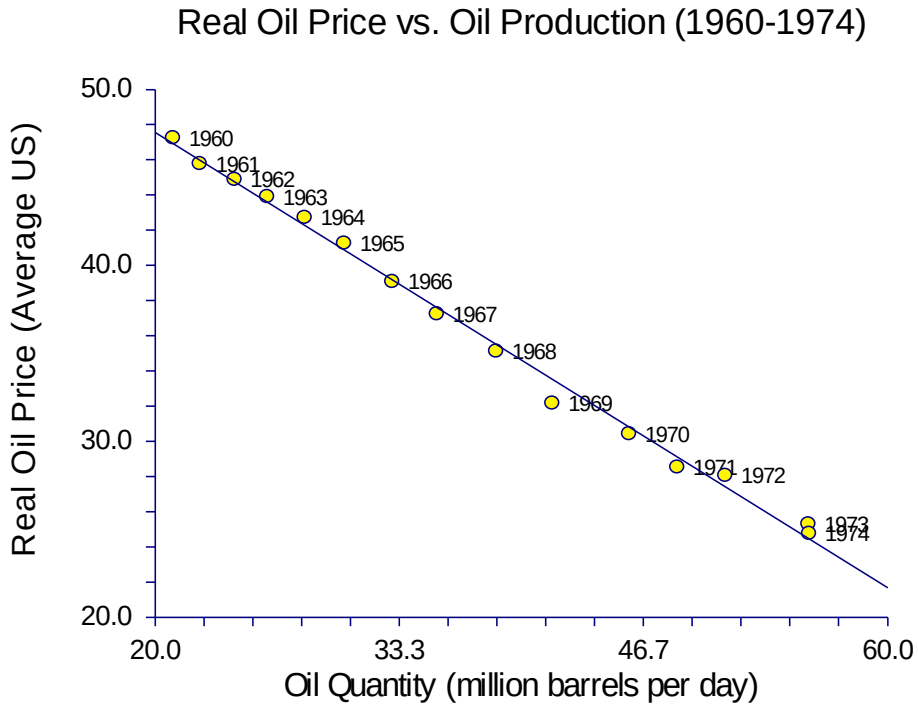

Figure 62. Oil Price and Quantity (1960-1974).

[65] Estimates available at http://www.theoildrum.com/node/3810

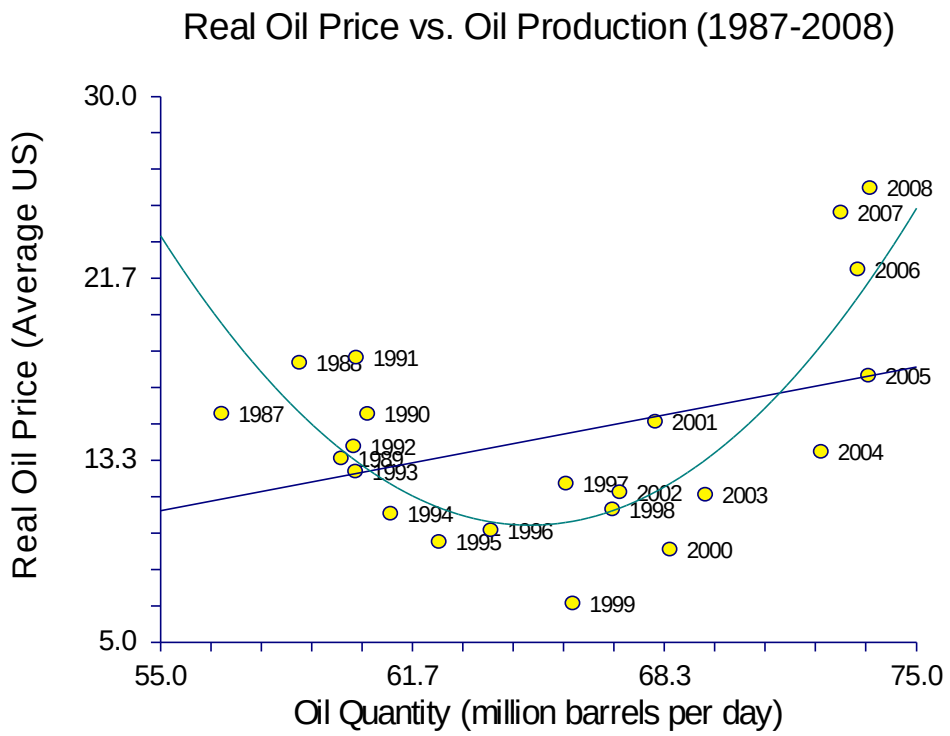

Figure 63. Oil Price and Quantity (1987-2008)

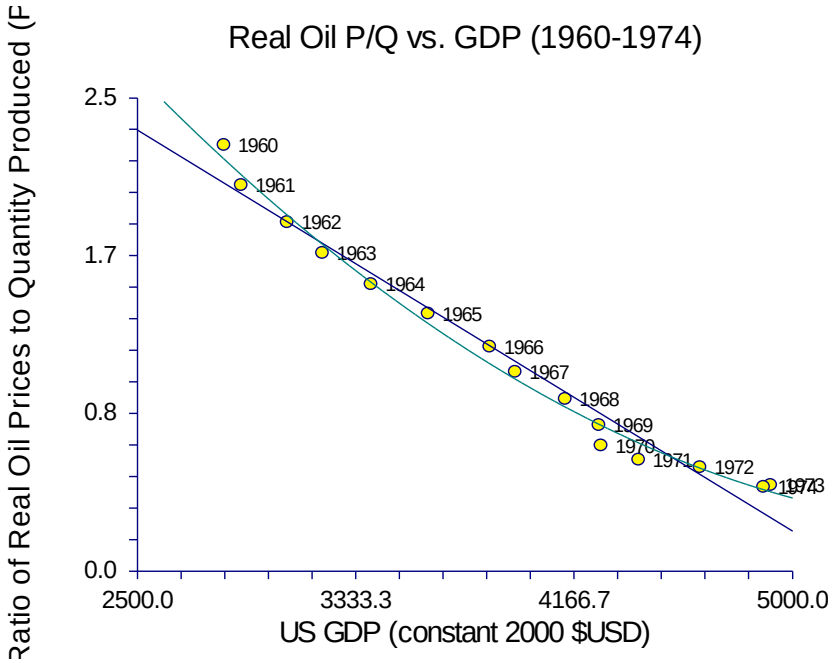

Figure 64. Oil Price-to-Quatity versus GDP (1960-1974)

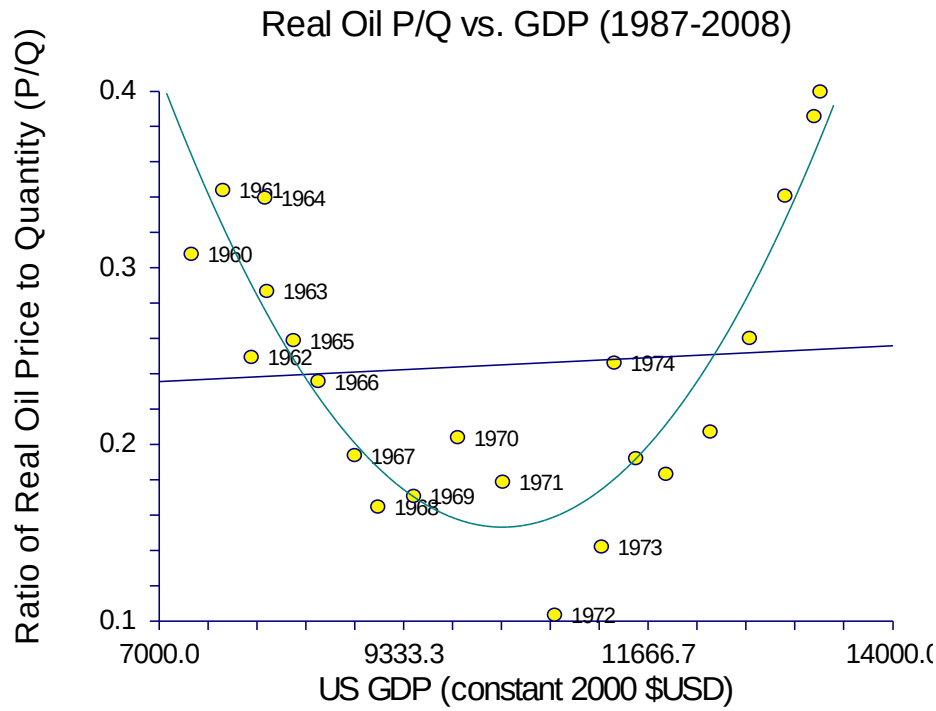

Figure 65. Oil Price-to-Quantity versus GDP (1987-2008)

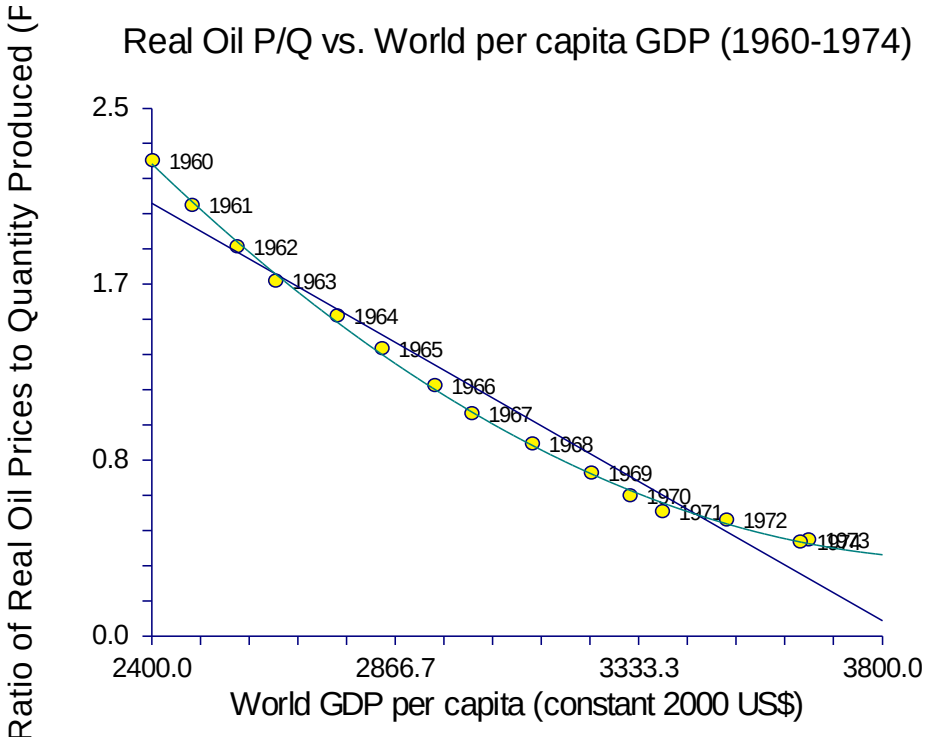

Figure 66. Oil price-to-quantity versus World per capita GDP (1960-1974)

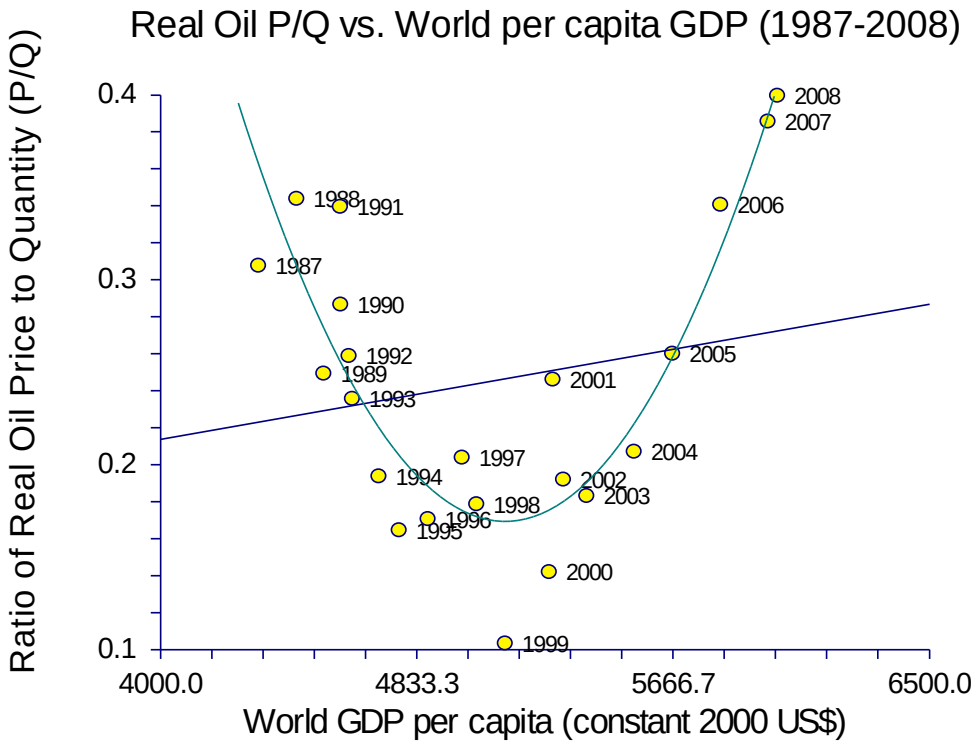

Figure 67. Oil price-to-quantity versus World per capita GDP (1987-2008)

Oil wells may still be being discovered, but their rate of discovery continues to decline. Second, oil extraction follows the principle of the lowest hanging fruit. The cheapest, most energy dense crude is extracted first, followed by oil that is increasingly less energy dense and more expensive to extract.[66] Moreover, the specific use-values of petroleum (from which plastics, fertilizers and pesticides, pharmaceuticals, and over 90 percent of transportation fuel, are derived) are non-substitutable.

Stagnating supply coupled with increasing global energy demands has translated into rising energy prices. Although US production peaked in 1970, world production continued to increase in large part because of new oil field discoveries including the oil reserves in the North Sea and Mexico's Cantarell Field, which was formerly the world's second largest producing field (Hamilton 2009: 11).

Both of these, and many others, are today in decline. Saudi Arabia is the largest exporter and its stagnation contributed greatly to global stagnation beginning in 2005. Figure 69 depicts quantity of petroleum production for the United States and Saudi Arabia from 1960 to 2008.

[66] Production of nonrenewable resources tends to follow more closely the cost of production curve depicted by neoclassical economic theory than do normal commodities, which, contrary to neoclassical theory, tend to have flat supply curves.

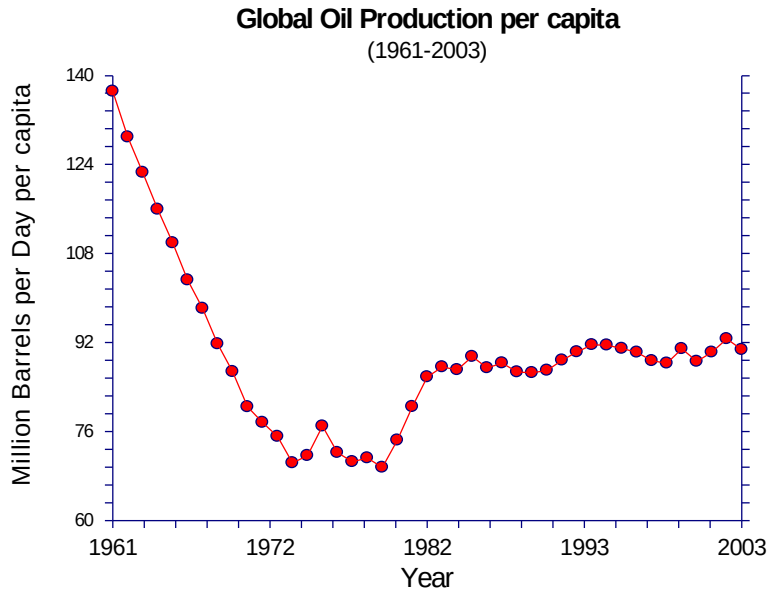

Figure 68. World oil production per capita. 1960-2003. Source: Energy Energy Information Administration (EIA). Population figures from Ecological Footprint Network.

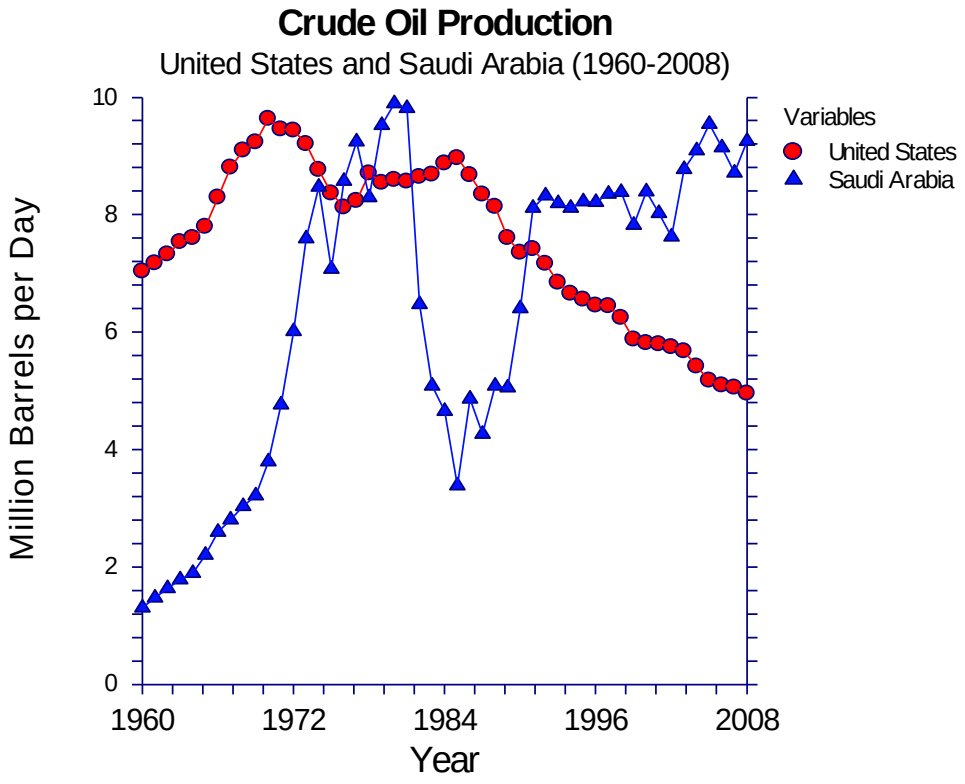

Figure 69. Oil Production for US and Saudi Arabia, 1960-2008. Source: Energy Information Administration.

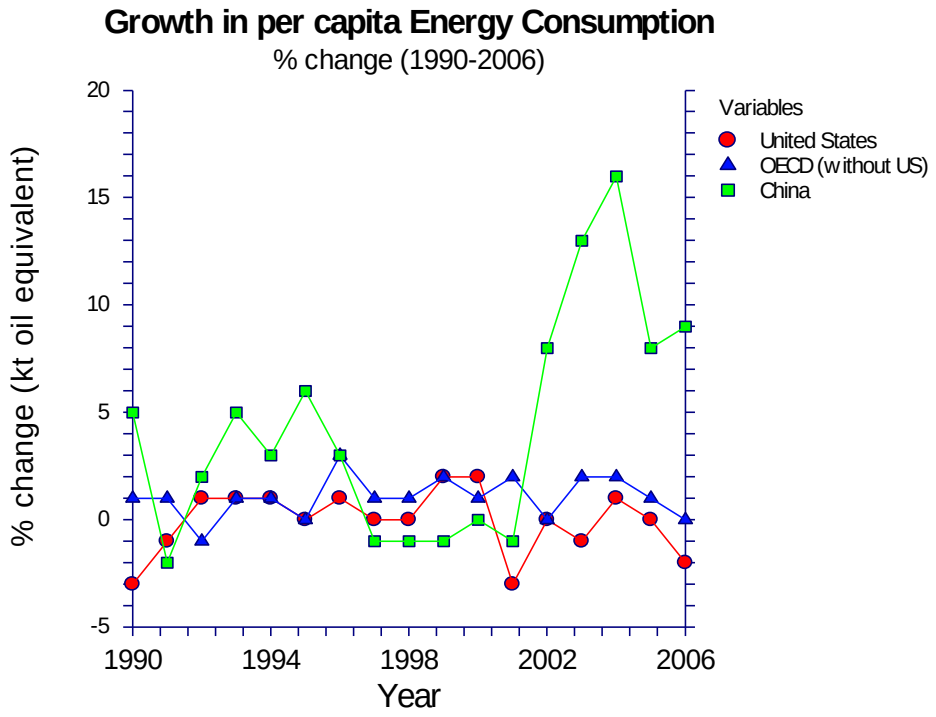

Figure 70. Growth in per capita Energy Consumption. US, OECD, China. 1990-2006. Source: World Bank.

The demand for oil has meanwhile accelerated. An important source of increased demand is from China, which saw a 16 percent increase in its energy consumption in 2004. Although still significantly smaller in terms of absolute numbers, its relative growth in oil consumption far outpaces that of the United States and the rest of the OECD countries, as indicated in Figure 70.

In a thorough review of the data and available studies, Hamilton concludes that: "had there been no oil shock, we would have described the U.S. economy in 2007:Q4-2008:Q3 as growing slowly, but not in a recession" (2009: 40). The primary reason being that oil price hikes had a significant impact on consumer spending.

Of course, *that* consumers are spending on something does mean that the money is going *somewhere*, and that therefore demand should equal supply in the aggregate, according to Say's Law. However, the problem is that much of this money ends up being invested in the capital required to obtain increasingly scarce energy resources, and is consequently concentrated in the hands of a few oil exporters, firms, and individuals.

Peak Coal

According to standard neoclassical theory, energy inputs are substitutable. Even if petroleum production might be stagnating for geophysical reasons, and not entirely because of speculation or political decisions on the part of OPEC, then some might conclude that other energy sources should be able to meet increases in global energy demand. One likely candidate is coal.

Today, the United States is the second largest producer of coal after China. However, because coal is nonrenewable, it too will peak. Although estimates vary regarding when this coal production will peak, the Energy Watch Group and the Uppsala Hydrocarbon Depletion Study Group both predict that coal production will peak by 2020 or 2025.[67] Moreover, the quality of coal, like petroleum, has been in steady decline as measured by the EROEI. Consequently, although coal production *per weight* has not yet peaked, the total amount of energy generated from coal in the United States already peaked in 1998 (Heinberg 2009).

Historically, coal mines only extract about 50 percent of their economically viable coal *reserves.*[68] For surface mining, this figure is 85 percent (cf. Heinberg 2009). Of course, economically viable reserves are tied to price and demand. Because of the inelasticity of energy goods, prices will tend to rise making marginal quality coal more profitable, rather than making it cost-prohibitive.

In addition, there are the unaccounted costs of coal extraction, including the costs to coal miners and the ecological devastation wrought by strip mining, including "Mountain Top Removal." Coal is also the most carbon intensive and polluting energy source. At best therefore, coal will remain a stop-gap measure to meet increased energy demands.

Energy and Income

Spending on fuel and other energy sources is primarily a function of income, *not price*. To see this, examine Figure 71, which depicts personal spending on gasoline (and other energy products) plotted against total income, from 1947-2009. Figure 71 is significant because it shows that energy spending rises with income, irrespective of price. The (absolute value of) price elasticity demand (PED) for petroleum is very low, or in other words, the demand for petroleum is highly inelastic.[69] Hamilton (2009) reports that the PED for oil is 0.07; the PED for gasoline is much higher at 0.26.

Figure 72 shows energy spending as a percentage of both total spending and income for the United States for the years 1947 to 2010. The price inelasticity of petroleum is significant because it means that higher prices can lead to a significant decline in demand for other goods with higher demand elasticities. Whereas in the late 1970s and 1980s, high energy prices can be attributed to exogenous political disturbances, the same cannot be said for the most recent oil price hike. As reported by Hamilton: "the big story has not been a dramatic reduction in supply … but a failure of production to increase between 2005 and 2007" (2009: 9). The question is, why has global oil production begun to stagnate?

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[67] Relevant reports are available at http://www.energywatchgroup.org/ and http://www.tsl.uu.se/uhdsg/

[68] Reserves are not equal to resources. Resources refer to the total amount of coal present, whereas reserves refer to the portion of the resource expected to be *profitably* extracted.

[69] Price elasticity of demand (PED) is calculated as the ratio of the percentage change in quantity to the percentage change in price: $\%\Delta Q/\%\Delta P$. A good is inelastic whenever its PED is below 1, which means that a 1 percent change in price is accompanied by a smaller percentage change (<1%) in the quantity demanded.

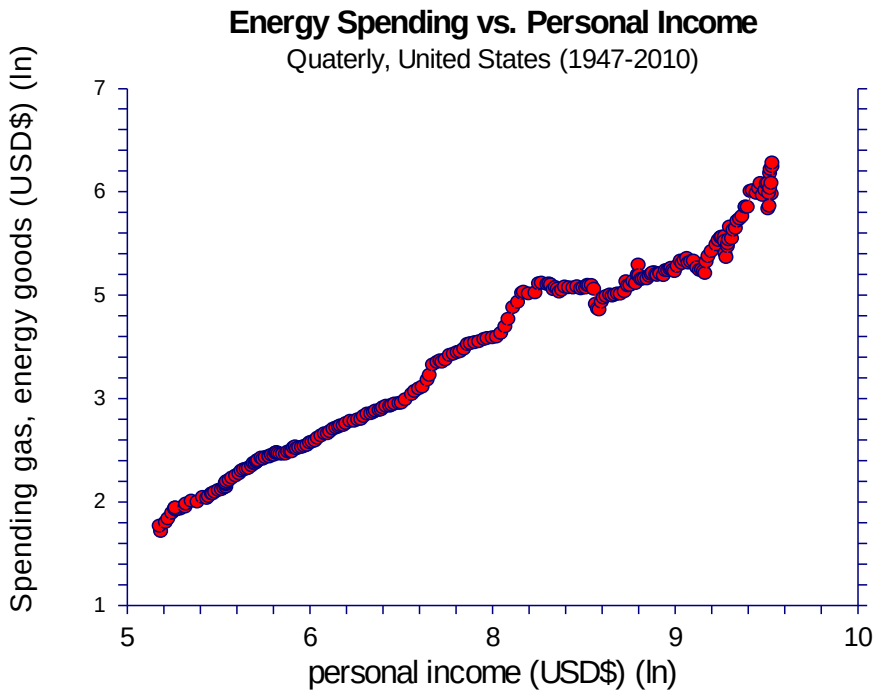

Figure 71. Energy spending vs. Income. Source: BEA NIPA tables 2.3.5 line 11 and Table 2.1 line 1.

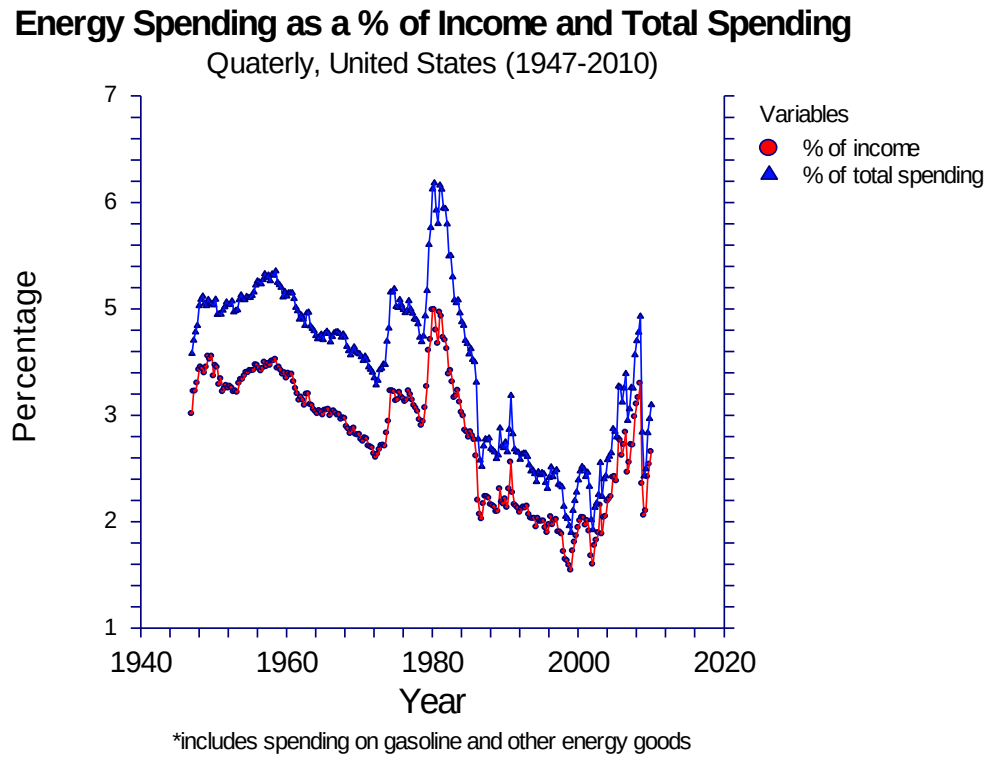

Figure 72. Energy spending as % of Income and Total Spending. Source: BEA NIPA Tables 2.3.5 and 2.1

Limits to Growth

Few scholars have linked the current economic crisis to geophysical constraints on energy production. One of the few is Ramon Lopez (2008), who attributes the financial crisis to three interrelated structural factors:

i) The incorporation of highly populated countries into growth process;
ii) The increasing scarcity of natural resources; and
iii) The unprecedented concentration of wealth and income in advanced economies in past 3 decades

Since the industrial revolution, the global "North" (i.e. the developed/'First world' countries) grew under conditions of constant or even declining commodity prices, including important raw materials and natural resources. In the 1990s, however, this changed. The NIGs (new industrial giants) including China, India, Russia, and Brazil experienced growth rates up to 3 times faster than the advanced countries. In fact, a 1/3 of total annual world growth is attributed to the NIGs. Because the NIGs represent over 50 percent of humanity, their industrialization has generated an increased demand for energy, food, and other raw materials accelerating their physical depletion and monetary inflation.

Although global crude oil production rates are nearly 4 times what they were a century ago, increased global demand as well as deteriorating quality generates upward pressure on energy prices. Although rising prices can make oil that is more difficult to extract profitable and hence market viable, the extraction and production of energy requires energy. Once the EROEI for petroleum reaches 1 (i.e. whenever it takes one barrel of oil to produce a barrel of oil), petroleum will not be market viable, *regardless of how expensive it becomes and regardless of how much petroleum remains in the ground*.

Energy "De-Linking"

One of the most frequently cited arguments regarding energy use and economic growth is that economic growth relies increasingly less on energy consumption. The ratio of energy use to GDP is called *energy intensity*, and it measures how much energy is required to generate 1 unit of GDP. In Figure 73 I plot the inverse of this ratio, the GDP to Energy ratio, which measures the amount of GDP generated from 1 unit of energy, for the years 1976 to 2008.

Because GDP is a flow variable that includes expenditures acquired from borrowed income, I also include a measure of GDP that subtracts total dollars borrowed.[70] The trends are essentially the same. GDP per unit of energy steadily rises. In Figure 74, I control for both inflation and population by comparing the growth of per capita real GDP and per capita energy consumption.

[70] Gross domestic product data are in current (not constant) dollars. They represent total GDP rather than per capita figures, which will be used below. Data are taken from NIPA Table 1.1.5. The second series is calculated as: (GDP-Borrowing)/Energy. Borrowing data are collected from the Federal Reserve's Flow of Funds Accounts. Energy data are acquired from the World Bank and are measured as kt of oil equivalent.

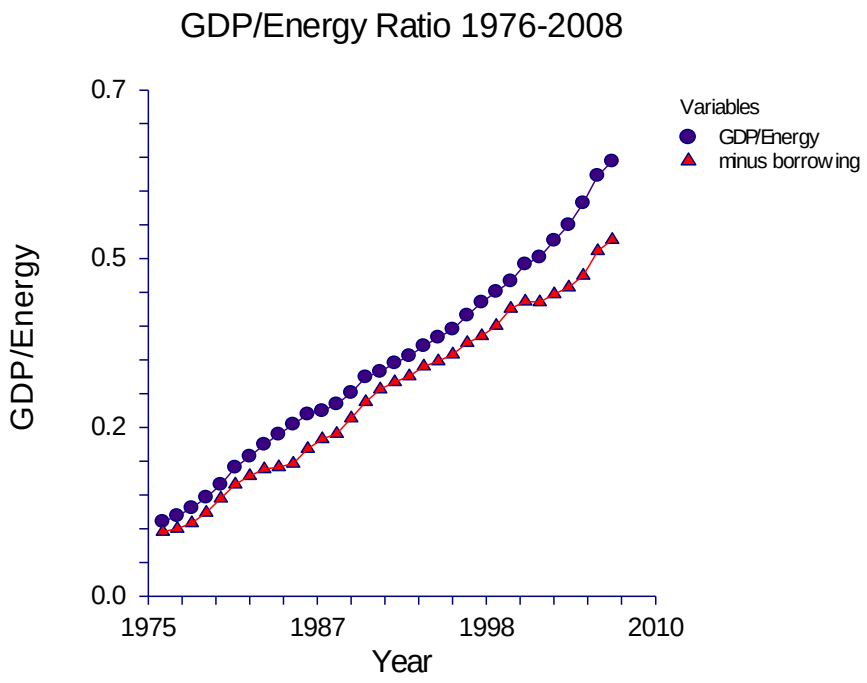

Figure 73. Ratio of GDP to Energy. 1976-2008

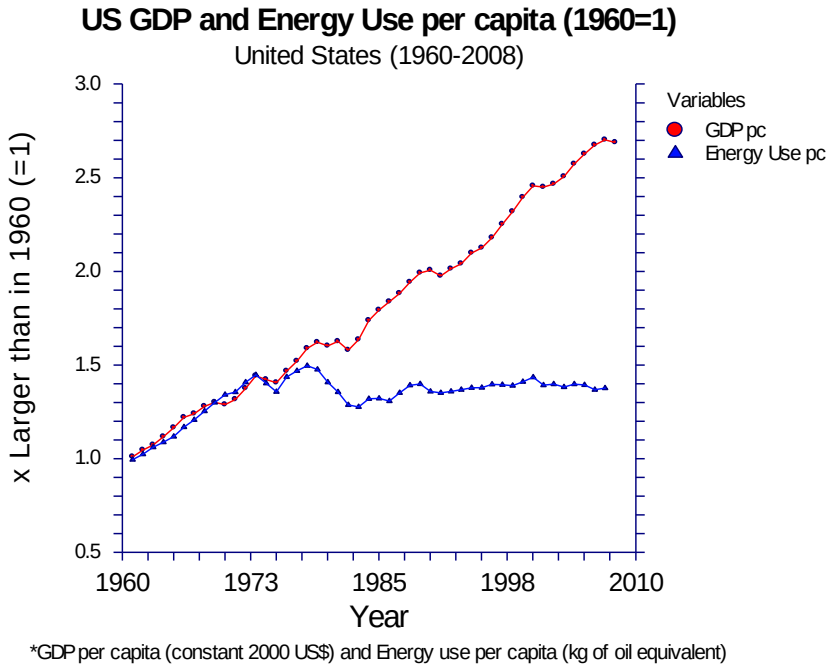

Figure 74. Per capita GDP and Energy Use. United States (1960-2008).[71]

[71] Data are taken from the World Bank's World Development Indicators (WDI) database. Gross Domestic Product is measured at constant 2000 US dollars. Energy use is measured as kg of oil equivalent per capita. The WDI database can be located online at: http://data.worldbank.org/data-catalog

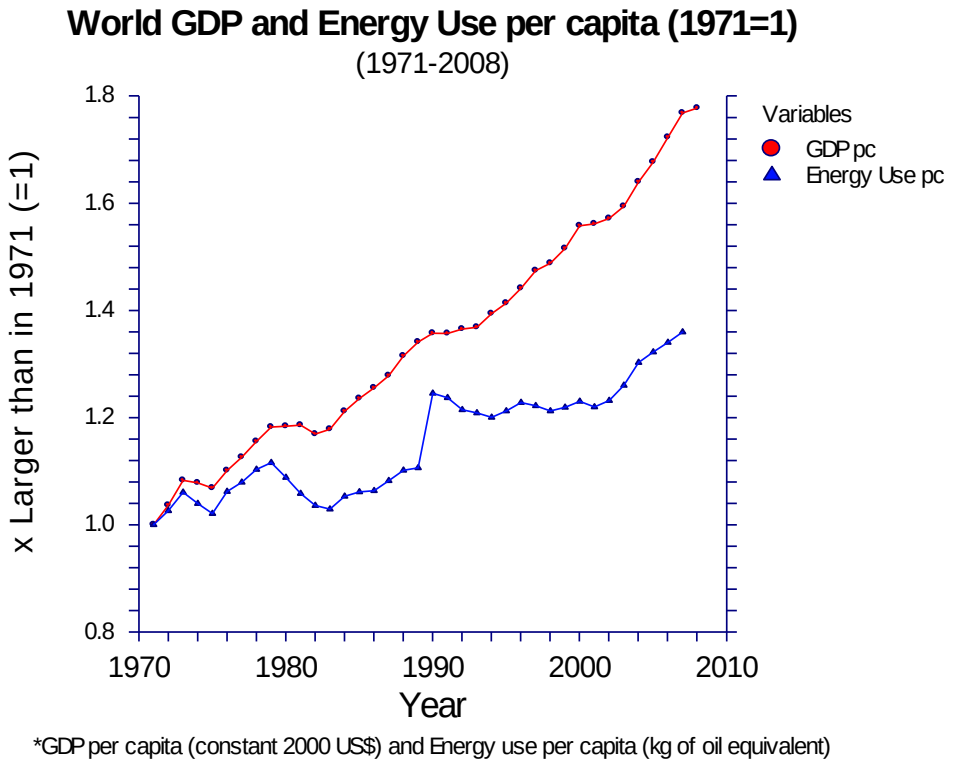

Figure 75. Global per capita GDP and energy use (1971-2008)

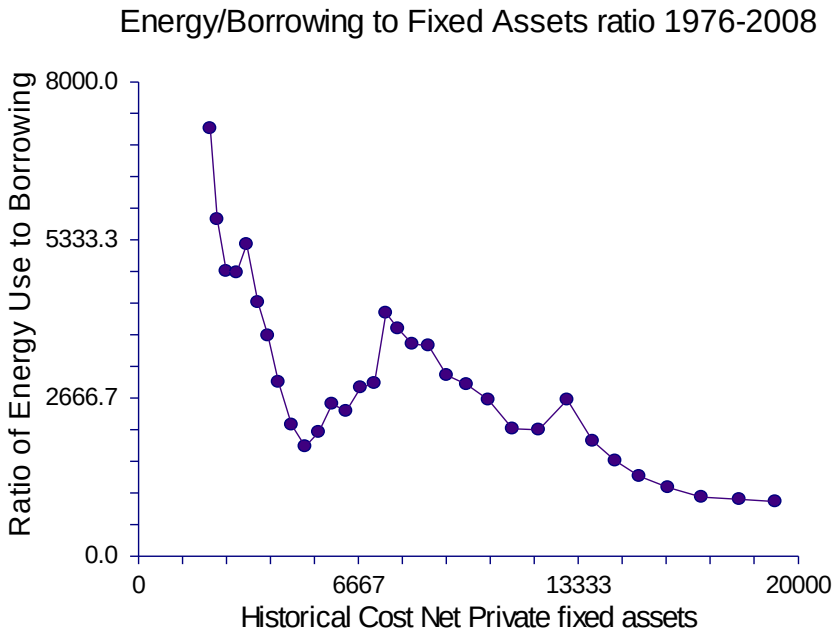

Figure 76. Energy/Borrowing to Fixed Assets. 1976-2008

Beginning in the mid-1970s the clear growth rates of GDP and energy use per capita begin to diverge. Indeed, the growth rate of use per capita seems to flat line. World per capita GDP and Energy use are less striking, but still indicate that GDP growth is outpacing the growth of per capita energy consumption, as depicted in Figure 75.

Finally, I use an unconventional measure, plotting the ratio of energy use to borrowing (Energy/Borrowing) against the historical cost of net fixed private assets. Private "fixed assets" is a stock variable that represents the accumulation of capital derived from investments. Because this variable represents the sum total of historical capital accumulation less depreciation, it is much larger than GDP. Figure 76 is intended to capture the relation between energy consumption and capital stock growth, holding borrowing constant. Again, the data show a declining amount of energy required to sustain a unit increase in fixed assets.

Efficiency improvements have undoubtedly contributed to the decoupling of economic growth and energy consumption. According to figures calculated by Ayres and Warr (2009), the ratio of useful to work to total exergy, or available energy, has risen from approximately 9 percent in 1960 to 13 percent by 2005. This represents an efficiency improvement of about 4 percent. Although this is significant, it does not explain the apparent de-coupling of growth rates for GDP and energy use per capita in the United States. In particular, after 2005, oil production is nearly flat, but world GDP continues to grow at nearly 3.2 percent per year until 2008.

Two additional factors, in my view, explain the apparent decoupling of US GDP and energy: imports and debt. First, the United States has *not* de-materialized its consumption. The United States and, more generally, the global North, has become dependent on the global South for commodities and manufactured goods. The growth of the North is therefore tied irrevocably to the South, and vice-versa.

Lopez (2009) observes that whereas for many decades the North could grow with constant or even declining commodity prices, this began to change in the 1970s. The growth of the new industrial giants, such as China, India, Russia, and Brazil has generated increased demands for energy, food and other raw materials, which has helped to inflate their respective prices. Off-shoring to China, for instance, has generated high growth rates in turn generating greater calls on global raw materials such as oil, cement, copper, steel, and petroleum (Schwartz 2009: 175). Increased demand for raw materials has helped put an end to the global disinflation that helped fuel the housing bubble during the "long 1990s", lasting approximately from 1996 to 2005 (Schwartz 2009).

Global demand for raw materials and energy eventually put an end to the disinflationary climate that prevailed from 1996 until 2005. Inflation provoked a tighter monetary policy, which in the US began in the third quarter of 2004, triggering the end of the boom. Lopez argues that stricter monetary policy reduces aggregate demand *because of a highly concentrated income distribution*. Lopez concludes that: ""The emergence of the NIG has meant that world economic growth has become more dependent on commodities at a time when commodity supply has become less elastic" (16).

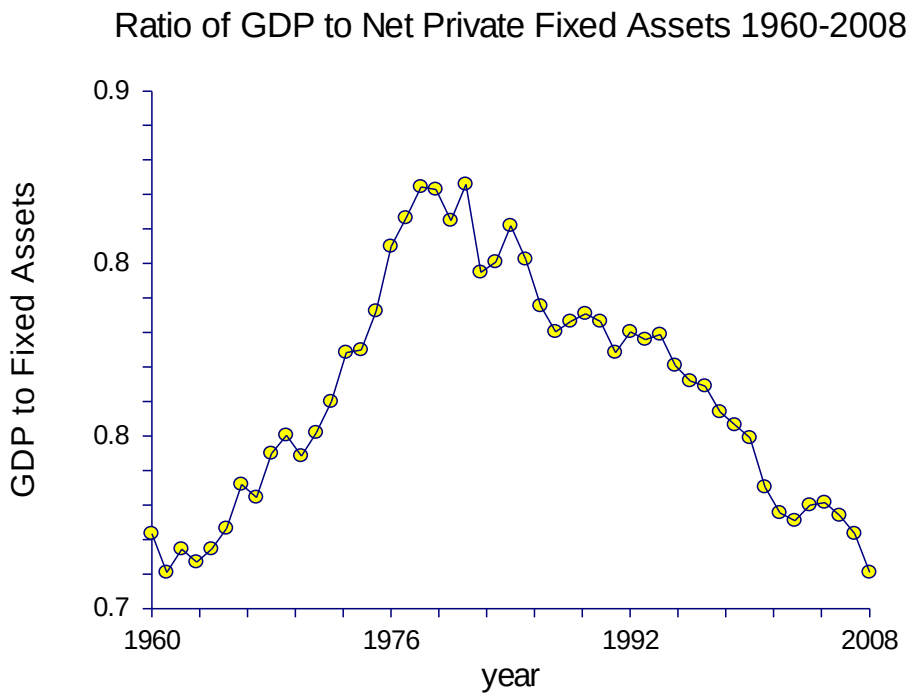

Figure 77. GDP to historical cost net private Fixed Assets. 1960-2008

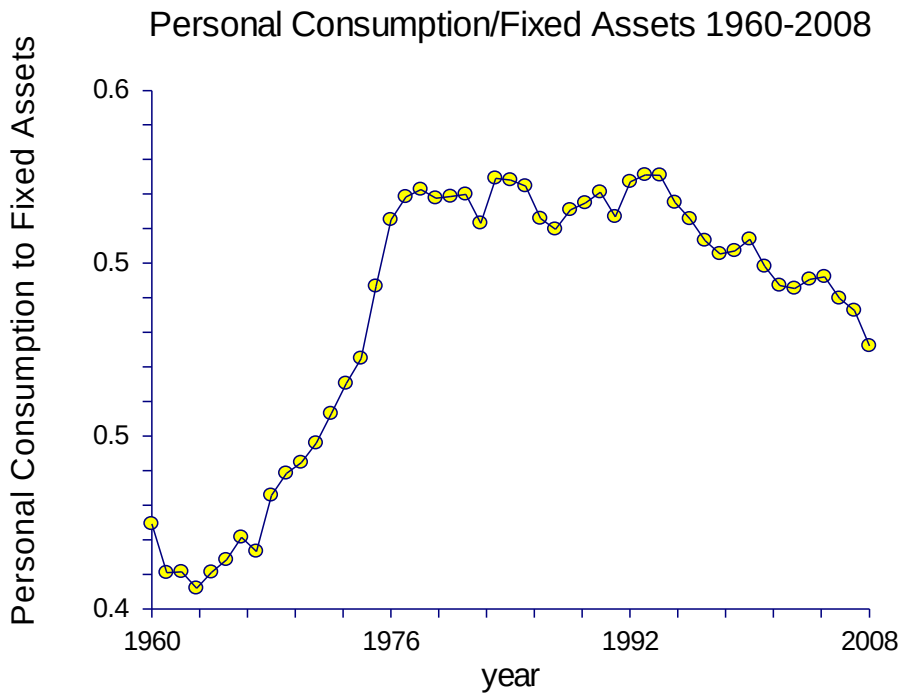

Figure 78. Ratio of personal consumption expenditure to historical cost net private fixed assets. 1960-2008

Because GDP is a flow variable in part dependent upon the accumulation of existing capital stock, it is useful to examine the relationship over time between the size of the flow relative to the capital stock that regulates it. Figures 77 and 78 present the ratios of US GDP and personal consumption, respectively, to the estimated historical net cost of fixed private assets. Data are estimated in billions of current dollars. Data for personal consumption are taken from NIPA Table 1.1.5, and fixed assets from Fixed Asset table 2.3.

These time series show a clear pattern of diminishing returns to fixed capital, which closely resembles the patterns for global oil production and the relationship between energy consumption and GDP explicated above. If GDP were directly proportional to the stock of fixed assets, it would exhibit a pattern of exponential growth. In the mid 1970s, however, this growth halts relative to capital stocks, and begins to reverse. These data indicate that US growth since the 1980s has depended upon a *drawing down* of resources and capital stocks and infrastructure previously accumulated.

Conclusions

Can rising energy prices and/or peak petroleum production account for the global economic downturn? The answer to this question depends on how the latter is defined. The major stumbling block for those looking for a clear and direct link between energy production and global economic growth is that economic growth *has*, to some extent, decoupled from energy use. This does not mean that growth does not require energy, for it clearly does, just as economic growth requires a suitable atmosphere to breath and solar radiation. A presupposition, however, is not necessarily an element of a system. The economic system operates according to the code: to pay or not to pay. This monetary code facilitates economic transactions and distinguishes what is relevant and irrelevant for the economic system. A component of this de-coupling comes from improvements in the energy efficiency of production, a de-materialization of production in the United States, borrowing, and above all, a drawdown of existing capital stocks.

The theoretically relevant comparison, moreover, is not between absolute levels of energy use, but the relative rates of growth between energy use, energy efficiency, and total debt. Figure 79 is a time-series illustrating the relative growth rates between total debt, the ratio of GDP to energy, and fixed assets. The data show that the growth rate of debt outpaced the growth of energy efficiency. A higher rate of delinking or a greater quantity of energy production (at prevailing prices) could have sustained this debt. An over-accumulation of debt is always relative to rates of growth. In order to demonstrate how a debt-crisis occurs, it is necessary to show both the run up of debt, representing anticipations of future growth, and also the factors that contributed to the negation of these anticipations.

That the modern economic system (aka capitalism) requires no one-to-one correlation between *commodity* production and *material* production can also be demonstrated with reference to its history. Contrary to what is generally thought, the first commodities to supplant subsistence activities were in fact services, not material goods.

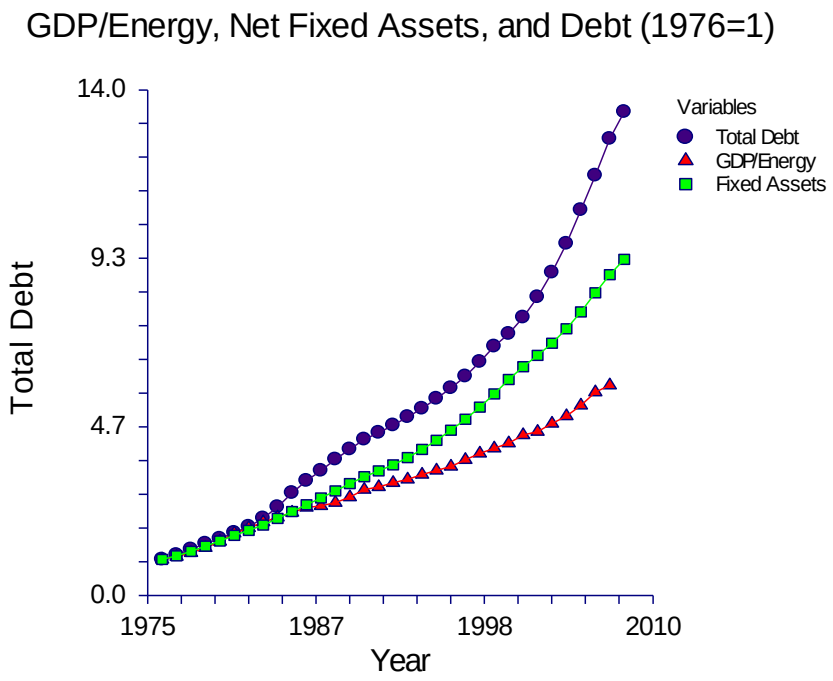

Figure 79. GDP/Energy, Fixed Assets, and Debt Growth (1976=1)

Ivan Illich details, for instance, the switch from un-taught vernacular languages to a single, national 'mother-tongue' in the late 15th century. According to Illich, "the switch from the vernacular to an officially taught mother tongue is perhaps the most significant- and, therefore, least researched- event in the coming of a commodity-intensive society [foreshadowing] the switch from . . . production for use to production for market" (1981: 44). The explicit purpose of this pedagogy, as detailed by the writings of Elio Antonio de Nebrija in Spain, was the creation of a *new type of dependence*. Contrary to the belief that a unified national language is necessary for literacy, the purpose of the proposed standardization of language, was instead to *suppress* untaught vernacular reading (1981: 40). This, according to Illich, was the first shot fired in the war against subsistence.[72]

In my view, the differentiation of *needs* co-occurs but does not necessarily co-relate to the differentiation of the codification of the means for distributing these needs. The monetary code, regulating the distribution of the desires (i.e. the meanings) of the *socius*, must therefore be analytically distinguished from the organizations that regulate and distribute its material and energetic flows. The lack of a direct correspondence between economic growth and energy, however, does not mean that there are no causal relations between them.

[72] While militating against a productivist, orthodox reading of Marx, Illich's views, I think, are consonant with the idea, that the process of commodification is one which "reproduces the needy individual" (Marx 1977: 719).

PART II. SOCIOLOGICAL REFLECTIONS ON SYSTEMS, SOCIAL ORDER, AND CRISIS

I. THE PROBLEMOF SOCIAL ORDER: THE SYSTEM CONCEPT IN SOCIOLOGY

Introduction

The meaning of the concept of system varies both between disciplines and between authors within disciplines. In some accounts, such as Giddens, system means a pattern generated by organizing or self-organizing (i.e. unintended) dynamics. In other accounts, such as Bunge, it is couched as a ontological worldview that is distinct from both methodological individual and wholism (i.e. bottom-up and top-down approaches). For Luhmann, the unity of the system is constituted as a *unity of a distinction* between system and environment.[73] This section will examine some key systems thinkers in sociology, paying attention to how the meaning of the concept of system changes according to theoretical context and purpose. Specifically, I will discuss Fararo's recent elaboration of the Parson's concept of the social action system; Mario Bunge's CESM model of systems; Anthony Giddens' theory of structuration; and Niklas Luhmann's concept of society as an autopoeitic communication system. I will also include a discussion of Jürgen Habermas's objection to Luhmann and his alternative concept of communication as developed in *The Theory of Communicative Action* (TCA) volumes 1 and 2.

Agency and System: intended and unintended outcomes

Two important reference frames for categorizing and understanding social phenomena are what I will provisionally call the perspectives of system and agency. By system, I basically mean patterns that arise via unintended consequences of action, and by agency, I mean those social outcomes that are intended. System and agency frames of reference correspond roughly to what Merton calls latent and manifest functions (1968). By reference frame, I mean a way of *coding* or *categorizing* observations so that they make sense. More formally, a frame of reference can be regarded as a nested set of distinctions, or a typology, that specifies what is being compared.[74]

These two perspectives are irreducible. The intentional frame of reference attributes social outcomes to the intentions of individuals qua their capacity as agents. In this framework, individuals are treated as causes or prime movers and individuals in their psychological capacities as persons are treated as the central unit of analysis. Motives are regarded as self-actualizing (albeit within constraints), and social conditions and outcomes are the (*ex* post)

[73] "Exaggerating slightly, we can even say that a system *is* its relation to its environment or that it *is* the difference between system and environment" (Luhmann 1982: 257).

[74] This bears some resemblance to various "standpoint" theories. The difference, as I see it, is that standpoint theories, in practice if not in theory, ultimately end up reducing perspectives to the biological and personal histories and experiences of the observer. In other words, the unit of reference is still an individual, with his or her own idiosyncratic *psychological* experiences.

consequence of (*ex* ante) intelligent design. Persons are subjects not objects, causes rather than effects; individuals are controlling rather than controlled variables.[75]

By contrast, the systems perspective reverses the causal arrow, treating individuals as the objects of social circumstances and conditions. In sociological theory, this framework finds expression early on in Durkheim's concept of society *sui generis* which imposes itself upon individuals, in Marx's notion of the class-in-itself, and later in Parson's systems-theoretical analysis of action-systems. Much of this theorizing has been rightly criticized for its obscurantism, its hierarchical model of control, and the lack of serious attempts to specify the mechanisms by which social order is maintained.

The question of which perspective to adopt is a chicken-egg dilemma: if an individual is a cause, then who or what causes the cause? The two are conjointly or reciprocally influenced. Marx's phrases it eloquently: *circumstances make men just as much as men make circumstances.* The system perspective can be formulated as a theory of emergent, unintended, self-organizing outcomes.[76] It treats agency as a dependent, rather than an independent variable (cf. Fuchs 2001).[77] Specifying exactly how intended consequences can generate unintended, self-organizing results has been the focus of considerable theorizing (e.g. Giddens 1980l Leydesdorff 2003). In this sense, system is synonymous with self-organized, or unintended. There is free will, but *history is not determined by these freely willed intentions*. The very term *subject* reflects this duality since it has two meanings: subject as the subject of history, and 2) subject as the subject of a king.

The idea that systems, rather than individual intentions, can generate social events and outcomes is discussed by Max Weber in terms of social selection (*auslese*), in which types of social actions are selected as better adapted to environmental conditions, but without anyone intending or directing the selection process. In addition to intentionally successful action, there are also actions that are successful (to the interests of those involved) because of pure luck or because of routine (Schwartz 2009: 12). In the latter case, the habitual response is intentional but cannot be regarded as truly strategic because no other alternatives were entertained. A *system,* in the sense of structural and institutional influences upon action, can then be regarded as generating successful or unsuccessful outcomes under determinate circumstances.

The system-intention distinction as I envision it can be understood as a continuum. At one end, there is non-alienated, self-actualizing individual agency. This is the realm of Habermas's counterfactual *ideal-speech situation,* or the *lifeworld*. In economic sociology, it is the society or

[75] I use the term "control" here in the cybernetic sense, which refers to efforts to keep some perception near a reference standard, or goal (cf. Fararo and McClelland 2006).

[76] Methodological individualism, the rational actor model, and the field of micro-economics are not necessarily agency theories. Insofar as they attribute outcomes to unintended consequences, they can be regarded as systems theorists. According to my definition then, Adam Smith can be regarded as an early systems theorist.

[77] In his (2001) article "Beyond Agency", Stephan Fuchs advocates that sociologists adopt the perspective of a second-order observer, that is, an observer who observers under what conditions others observe what they observe, or more simply, *how* others observe as opposed to *what* they observe. The debate over free will/agency and determinism, then, is not solvable as such, but can be evaluated from this second-order perspective, where agency itself becomes an attribution that varies. Agency and determinism then are seen as items along a continuum and as dependent variables and *not as constants*.

culture in which the economic system is *embedded*. This dimension of social life can be regarded as *organized* via human will and intention. Rather than viewing this perspective as the property of an observed system, however, I intend to view it as a property of observing systems, that is, as frameworks for making causal attributions.

At the other end of the spectrum belongs the notion of the *system*. In its colloquial usage, the concept of system often describes those social patterns that are neither a) a result of a conspiracy, nor b) the result of pure chance. Indeed, *any* attribution of causality, any attempt to explain a phenomenon, rules out the possibility of randomness. System-attribution occurs when an outcome is attributed to an agency that is regarded as non-local or distributed.

Although in many cases, the *notion of system is personified*,[78] the notion of system as pursued here is radically non-anthropomorphic. In a systems framework, the idea of *unilateral control is abandoned*.[79] Outcomes are thus unintended, or *self-organized*. The system is self-generative of its own dynamics.

Finally, note that this distinction is orthogonal to the distinction of evitable or inevitable. Charles Perrow (2010) has recently contrasted, for example, *normal accident* explanations with *agentic* explanations. Perrow argues that normal accidents are more appropriately called *system accidents*. System accidents occur "even where everyone tries as hard as they can to avoid system failures. They are built into the system, and though generally rare, *are inevitable*" (2-3: my emphasis). Perrow then goes on to argue that the financial crisis was caused by agents who knew about and intended the damage they ultimately created.

From another point of view, however, this argument can be regarded as a contingent mode of attribution, which can be contested. After all, did the CEO's of these companies intend to bring about the financial panic which ensued after the collapse of the housing bubble in the US? The fact that not all risks were avoided does not entail that the social outcomes were intended. Indeed, it is impossible to avoid all risks. Moreover, scarcity of natural resources has played a vital role in the global economic downturn, making recovery of the economic system, in its currently specified structure, unlikely. The upshot is that intended actions generated unintended outcomes.

Both Parsons and Luhmann can be regarded as systems theorists, primarily interested in systemic integration as opposed to social integration. They therefore bracket out questions of human agency, and limit the observation of actor relations to that of relations between social roles. I discuss their understanding of the economy and its relation to the social system below. I then examine how efforts to overcome this distinction (e.g. Giddens theory of structuration) either reintroduce the distinction or end up giving lop-sided accounts, emphasizing one side or the other. Lastly, I discuss how Luhmann and Habermas can be understood as complementary perspectives, one emphasizing systemic integration, the other social integration.

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[78] An everyday example of *system-attribution*, is the concept of the "*The Man.*"

[79] Luhmann (1995) writes, for instance that: "There may be hierarchies, asymmetries, or differences in influence, but no part of the system can control others without itself being subject to control. Under such circumstances it is possible … that any control must be exercised in anticipation of counter-control" (36).

Meta-Theoretical Reflection on the System-Agency distinction

From a perspective of second-order observing, the system-agency distinction is but one distinction among many, but one that has played a productive role within sociological theory. The technique of second-order observing, or the observing of observing, means to distinguish distinctions. Rather than observing *what* is observed, second-order observing entails observing *how* systems observe by observing the distinctions they employ and under what conditions. The concept of *observation* is taken from the logician George Spencer Brown, whose book *The Laws of Form*, provides an account of observing as the drawing of a distinction. His *calculus of indications* is used extensively by Niklas Luhmann in the latter half of his career. The concept of second-order observing, or the observing of observing, is borrowed from his friend and colleague, Heinz von Foerster, noted philosopher and cybernetician. An observation always conveys as much information about the observer as it does that which is observed, where "observer" here does not refer to a person, but to an observing system.

Distinctions establish a *unity of a difference*, or an identity. Observing presupposes that a distinction is drawn, in order to *indicate* one side of the distinction. Luhmann's meta-theoretical orientation is constructivist (Herting and Stein 2007). Distinctions do not belong to the world, but are employed by the observer in order to observe the world.[80] If the distinction is no longer drawn, the *dis*tinction becomes an *ex*tinction.

Moreover, the concept of observing is associated with an important epistemological insight that Luhmann formulates in terms of *blind spots:* one cannot distinguish the distinction one makes at the same time that one distinguishes. Or in other words, one cannot simultaneously observe *how* one observes *what* one observes. The seeing-eye is unseen, for every distinction replaces, and dis-places, another possible distinction, and hence retains the other possible distinction as a necessary blind spot. This epistemological acknowledgement is expressed ontologically as the *distinction between system and environment*. The unity of the world is necessarily the unity of a difference constituted in observation.

From the point of view of second-order observing, the system-agency distinction occludes from view other distinctions vital for understanding social reality. Most importantly, the concept of "Nature" is entirely missing. The concept of Nature, however, presupposes its own distinction (Nature-Society), which occludes other important insights drawn from other distinctions. The fact that there are geophysical limits to growth, insofar as growth entails the increased throughput of geophysical resources to increase the stock of exosomatic and endosomatic capital, constitutes one of the most fundamental, but ignored, facts pertaining to both the economy and more generally, society.

[80] The "world" for Luhmann is the unity of the distinction between system and environment.

Anthony Giddens: Structure and Function

Giddens and the (failed) attempt to transcend the agency-system distinction

There have been various attempts to "transcend" this distinction, the most famous of which has been Giddens' theory of structuration. Giddens is interested in how social *systems*, defined as reproduced relations between actors as organized social practices, are recursively reconstituted as the interaction of intended and unintended consequences of action. Specifically, he notes how the unintended consequences of action "may systematically feed back to be the unacknowledged conditions of further acts" (1984: 8). Social systems are "both *medium and outcome* of the practices they recursively organize" (25: my emphasis).

For Giddens, **structures** consist of "rules and resources" and exist outside of time and space and are hence virtual. They exist rather as memory traces. Giddens writes that structure is not external, but internal to individuals. Individuals are constrained and enabled in their actions, that is to say, individuals have capacities to act but cannot act in any way they can imagine. Not every action is possible. The repeated thesis of his structuration theory is that is not exclusively constraining, as is implied by the dualism of society versus the individual. Instead, structure is seen as a duality, which is both *enabling and constraining.* The *duality of structure* refers to the mutual constitution of agents and structures:

> The constitution of agents and structures are not two independently given sets of phenomena, a dualism, but represent a duality. According to the notion of the duality of structure, the structural properties of social systems are both medium and outcome of the practices they recursively organize. Structure is not 'external' to individuals: as memory traces, and as instantiated in social practices, it is in a certain sense more 'internal' than exterior to their activities in a Durkheimian sense. Structure is not to be equated with constraint but is always both constraining and enabling. (1984: 25)

Whereas **structures** exist virtually, that is, are only implied ("implicated"), **systems** are the patterned social practices of human agents distributed across space and time. From this perspective, structures do not "structure" action in the sense of determining the pattern or the system-ness that the system exhibits. *Structure enables and constrains, but does not determine, the system, understood as the aggregated outcomes of actions.*[81]

Patterns of social interaction arise from micro-level agencies which are latent from the perspective of the actors themselves. As Giddens observes: "human history is created by intentional activities but is not an intended project; it persistently eludes efforts to bring it under conscious direction" (1984: 279). The idea is similar to Marx's notion that: "Men make their own history, but they do not make it just as they please; they do not make it under circumstances

[81] Note: for Giddens "action" cannot be reduced to individual acts: "Action is not a combination of 'acts': acts are constituted only by a discursive moment of attention to the *duree* of lived-through experience" (in Giddens Reader 1993: 90; from *The Constitution of Society*).

chosen by themselves, but under circumstances directly encountered, given and transmitted from the past."

Giddens writes that social systems require human agency but that "it is not the case that actors create social systems; they reproduce or transform them, remaking what is already made in continuity of *praxis*" (1984: 171). Social systems do not arise *ex nihilo*, and so the question of how it all began (i.e. the question of the diachronic emergence of social systems) is not addressed. Aggregated actions constitute systems or patterns of interaction that are latent for the individual actors themselves. These patterns should be seen as the interaction of both intended and unintended consequences of actions.

Giddens claims that his theory overcomes subject-object dualism because for him, structure is not external to the actor. Structure is both 'medium and outcome of the conduct it recursively organizes'. As medium, structure furnishes rules and resources that enable and make social life possible; as outcome, its reproduction result in the instantiation of rules in action and interaction (i.e. system).

As Nicos Mouzelis (1995) observers, the *duality-of-structure* thesis implies a particular type of subject-object relationship that subjects adopt towards rules and resources that can be characterized as *natural-performative*. The natural-performative orientation to rules and resources is a practical, natural, taken for granted attitude. However, this view omits another orientation that can be described as *strategic-monitoring* of rules and resources . The same point about social *structure* can be made with respect to the *actual* rules and resources instantiated by actors, i.e. to social *systems*.

Table 6. Mouzelis and the points of view one can adopt towards rules and resources.

	System (syntagmatic, actor, actual)	**Structure** (paradigmatic, institutional, virtual)
Natural-performative attitude (rules and resources are "inside" the individual)	**Paradigmatic duality;** POV of subordinates in relations to *rules* initiated from above.	**Syntagmatic duality** POV of superiors in relation to games played at lower org. levels.
Strategic-monitoring attitude (individuals distance themselves, and observe rules and resources as a theme or topic)	**Paradigmatic dualism** POV of superiors in relation to *rules* at lower org. levels.	**Syntagmatic dualism;** POV of subordinates in relation to *games* played at higher org. levels.

This results in a fourfold typology specifying four broad perspectives or orientations can actors can adopt vis-a-vis rules and resources, depicted in Table 6.

For Giddens, the agency-structure **duality** refers to cases in which structure is *inside the individual*. However, for cases in which individuals belong to much larger, abstract systems in which he/she only participates minimally, the concept of a **dualism**(which Giddens rejects) is more appropriate. Mouzelis therefore distinguishes between a *syntagmatic duality* (ala Giddens) and a *syntagmatic dualism*. The term syntagmatic refers to institutional, or structural (as Giddens uses the term) rules and resources. The distinction bewteen dualism and duality is again recapiulated at the level of historically instantiated systems. Mouzelis therefore distinguishes between *paradigmatic dualism* and *paradigmatic duality*.

The point is that the distinction is just that, a distinction, which is more over useful for making certain kinds of observations. The fact that it does not describe social reality in its totality, or that it is not useful for all purposes, should not be surprising, since it is but one distinction among many. Attempts to ignore or transcend this distinction end up reintroducing it covertly. One must not transcend or replace distinctions, but rather, displace them, by means of other distinctions. To distinguish, however, is inexorable.

Anti-Functionalism

Giddens has called his theory an "anti-functionalist manifesto. By "functionalism" he means the tendency to explain social phenomena in terms of their functional consequences for the social system. Giddens objects to the use of functionalist language because it confuses the effects of such phenomena with their causes. Only actors have reasons and motives, not social systems as aggregates of action. In the language of functionalism, however, the unintended consequences generated by the intentional behavior of micro-level actors is explained instead as a result of the system, as a macro-level agent.

Although it is worthwhile pointing out that a discrepancy can exist between what people intend and what they achieve, the latter cannot, at the level of society, be a cause of itself. As Rueschemeyer (1986) has argued, in order to be valid, functional explanations must show *how the effects of a system bring about their own conditions through recursive feedback mechanisms.*[82] A social system cannot determine itself because it does not possess agency. Structure, on the other hand, does possess some agency, but it can determine the range of possibility given at any moment in time.

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[82] For example, in world systems analysis one might read that the semi-periphery exists because the world system "needs" it in order to diffuse tensions between the periphery and the core. For WST, this raises the thorny issue of whether the triadic structure is merely an epiphenomenon or contingent by-product resulting from the activities of nation-states or whether the world-system acts as a supra-national agent in its own right to generate conditions that further its own reproduction.

Summary and Comments

For Giddens, a pattern of relations (i.e. a "system") can be reconstituted across time, but he denies that the system itself does any constituting. At the same time, individuals interacting with others do not create system(s), but can only reproduce and perhaps modify it to some extent. Here is where I think Giddens' theory needs clarification. 1) First, the concept of system or structure should not be reified. I understand Giddens as saying that there *is* a singular system that exists, or perhaps a range of such systems. In contrast, I propose that social patterns are also models or hypotheses of social patterns. They are not given, but require interpretation, or a reference frame. The more reference frames available for the analysis, the more possible systems there are. A macro, social-system, in other words, exists always as a micro, individual expectation (mental map or model).

This may seem like a minor point, but confusing our hypotheses of the big picture or the "totality" for the real "big picture" is a common mistake and grave error. In a (second-order) model of models, which is capable of processing complexity (including mutually contradictory frames of reference), "system" is always "structurally coupled" to mental maps, in that a mind has to hypothesize a system. This requires that the model include some people, exclude others, and consider some relations, while excluding others. Social boundaries, however, are not physical boundaries, but boundaries of Meaning. Importantly, the *concept* of system as unintended consequences of action, or macro-pattern, is not itself a system. At this level of theorizing, moreover, social system is not specified.

Second, it is unclear how system reconstitutes itself across time. *What needs to be explained is how unintended consequences of people's actions "cause" or bring about actions that bring about those same unintended consequences.* Figure 80 is a model of Gidden's model of the feedback relation between individually motivated actions ("actions") and the unintended aggregate pattern of action ("system"). Notice, however, that in Giddens model individually motivated actions reproduce *the same* unintended, aggregate pattern of action. As a consequence, this is a circle rather than a spiral. The time dimension is left out. The aggregate pattern remains invariant and the actions variable.

Consider the example of the English language, which Giddens regards as the collective byproduct of speaking English. Giddens does not specify, however, how can an outcome be a medium, and vice-versa. A tidal wave does not create the medium of ocean water. In my opinion, English is not an invariant system in reality, but an invariant system *held constant for analytical purposes* by an observer. The effects and consequences of action have to be theoretically specified.

Speaking can be specified in a number of different ways, and speaking can be classified according to a specification (or deviate from that specification to variable degrees), but *the speaking does not generate the model according to which an observer classifies it.*

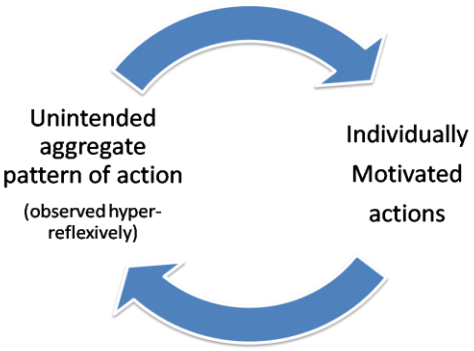
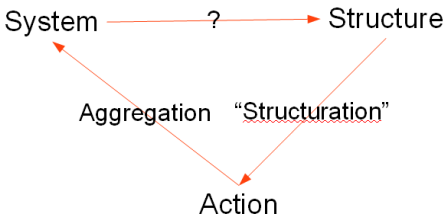
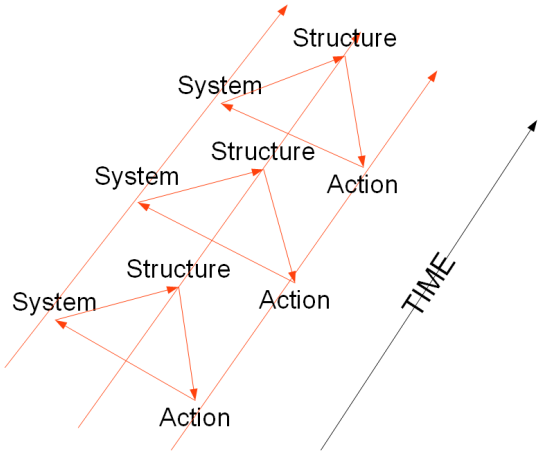


Figure 80. Giddens. Feedback between action and system.



Source: Leydesdorff (2003: 147)

Figure 81. Giddens Structuration theory.



Source: Leydesdorff (2003: 147)

Figure 82. Giddens dynamic depiction of structuration.

To specify, consider the following schematic depiction of Giddens' structuration model and compare it with a dynamic reinterpretation, both of which are reconstructed from Leydesdorff (2003). Notice that Giddens neglects to specify the relation between system and structure. In the dynamic version, structure is advanced ahead in the time axis to indicate that it is virtual and not present. The static depiction of Giddens and the dynamic reformulation by Leydesdorff are presented in Figures 81 and 82.

Third, enablement and constraint are better and more precisely formulated as variation and selection. *If structure is not identical to what actually happened (historical instantiations) but remains broader, then the concept when theoretically specified would necessarily refer to actions that were possible but nevertheless not actualized, i.e. to de-selected cases*. The "structure" then is better understood as a phase space of possibilities for action. *The theoretical problem, however, is when Giddens, rather than viewing systems and actors themselves as the generators of the constraint part of the formula "enable and constrain" (that is, as the selectors of possibilities), equates the social structure with forces of constraint as well, which means that the structure is a subset of the phase space of possible actions, distinguished from other actions that are both a) not instantiated and b) not possibly instantiated at time t.* The difference is one between actions that are *actually* possible and those that are only *theoretically* possible, or perhaps, conceivable. How does one distinguish between the two? One then wonders, why not just include in the phase space, only those actions that are *actually* possible? The model is incoherent: structure refers to both a set of possible actions that is larger than those actions that are historically actualized, and is at the same time a *constraint*, that is, a subset of some unspecified superset of possible actions.

Fourth, Giddens implicitly equates "structure" with a range or *distribution* of possibilities, but does not distinguish these distributions for individual actors as opposed to multiple actors, nor does he explicitly acknowledge that structure can only be made theoretically meaningful in the context of a theory (entertained by a theorist/analyst) that posits the distribution as a selection from other possible distributions. *A distribution is by definition a variation, but from another perspective, we can compare distributions, and understand the distributions themselves as selections.* To be enabled means to have possibilities, or "choices", and to be constrained means that these choices are not infinite, and probably unequally weighted in terms of their likelihood. Because Giddens' "social structure" is both enabling and constraining, it is by definition a distribution. The two properties of variation (enablement) and constraint (selection), moreover, *presuppose two alternative frames of reference*: in the former, a comparison is made between alternatives within the distribution, while in the latter a comparison is made between this distribution and other possible distributions, outside of it.

For example, when I speak English, I am instantiating, or selecting from certain words, but also producing a variation. This can be viewed as a selection from *within* the distribution, specified for example by a dictionary, of all the possible English words constituting "English" (as specified by a hyper-reflexive observer). Individual action, however, from this perspective, can only be understood as selection, or constraint, a subset. It can be viewed as variation *only from the perspective of the individual words*. *In speaking English I am not reproducing the structure*

as set, but only the system as subset. The structure has still to be specified as the unselected (but possible) cases.

Furthermore, the 'phase space of possibilities' for actors taken individually isn't the same for the phase space of possibilities for systems of actors, taken as an aggregate. Giddens wants to say that the actions of multiple individuals are structurated at the same time by the same structure, but *are the possibilities specified for systems the same possibilities specified for individuals (subsets) of that system? If not, then the structures are not identical.* In other words, they are different to the extent that we expect them to be. There is no causal mechanism to explain the simultaneous transmission, or 'action at a distance' between individuals. If the same structure exists to some extent "inside" different individuals at different places, how does this happen? If we observe similarity between individuals, then mustn't this be explained via causal mechanisms? The notion of a singular virtual structure structurating the actions of different individuals at the same time can only be done by an analyst who distinguishes his or her own observing from that of those being observed, and hence, places himself outside of, and external to the latent pattern manifested by those he observes.

How are these unselected, unrealized possibilities specified? One could make reference to multiple systems across time, mining for historical examples in order to expand the range of the possible, but in doing so, one has also specified an instantiated historical system, albeit one with broader temporal parameters. I do not generate English. The "structure" or the expanded super-set of English requires analytical specification, a gestalt-switch, between seeing a communication as one thing (a subset) in comparison to other possible things, or many things (the set): *because meaning itself is the distinction between the actual and the possible, any meaningful statement will always be considered as a subset of other possible meaningful statements.* To say that I reproduce English as the super-set is incorrect. It is to confuse the historical instantiation (singular "action" or plural "system") with its *meaning* (i.e. with the counter-factual hypotheses as to what *could have* occurred, but didn't).

In Giddens' model, ***system is the plural of action***. To reformulate my original query, does

$$a_{t-1} + b_{t-1} + c_{t-1} \rightarrow R_t$$

where R_t = "structure" and *a, b, c* designate motivated actions by different individuals? The answer is NO, because structure refers to the *possible* acts, that is, those actions not chosen or selected (i.e. not instantiated historically) as well as those that were and which can be reproduced. Formalize this as:

$$R_t = (A_{t-1} + B_{t-1} + C_{t-1})$$

where *A, B, and C* refer to the set of actual and possible actions. The problem can be clarified by specifying a distinction between system and environment. Ultimately, there is no outside to this model. *Society is a closed "system" consisting of action, structure, and system*.

In my view, it is more productive to regard structure as a *slowly changing parameter* or condition of social communication that either may or may not be included in society as communication. Whether or not this is part of society depends on whether society communicates about it. The two media of communication and the constraints themselves, however, should be kept analytically distinct.

Mario Bunge: Everything is either a system or a part of a system

Introduction

Mario Bunge is the foremost exponent of *systemism*. **Systemism** is the view that the world, or reality, is neither an unrelated aggregate of things nor an amorphous, undifferentiated blob. Systemism "is the view that every thing is a system or a component of one" (2003: 40). He adds: "only the universe is not connected to anything else- but it is a system rather than a mere aggregate" (2003: 40). We today speak of solar systems, cardiovascular systems, digestive systems, tributary systems, ecosystems, as well as social systems, but not prior to the 17th century were the components of these systems understood as relating to one another in a systemic way, that is, as generating emergent properties. Bunge even suggests that the concept of system marks the genesis of modern society.

System means emergence, and vice versa. I will therefore begin with an explication of the latter. Bunge provides several definitions of emergence. Emergence occurs whenever qualitative novelty appears, such as when a pattern arises out of a mosaic (2003: 9). Emergence refers to the appearance of a qualitatively new whole (2003: 16). Bunge also states that emergence refers to the creation of a new *global property* that the components do not possess. More specifically, Bunge defines *emergence* in the following way: "To say that P is an *emergent* property of systems of kind K is short for 'P is a global [or collective or non-distributive] property of a system of kind K, none of whose components or precursors possess P'" (2003: 15). He further clarifies his definition with the following explanation: "No things, no properties thereof. Hence, *to ask properly how properties emerge amounts to asking how things with emergent properties arise. In turn, this question boils down to the problem of emergence of mechanisms....*" (15: my emphasis). By contrast, *submergence* refers to the process by which emergent properties are lost.

The above definition makes use of the concept of **system.** Bunge subsequently defines "system" as "an object with a bonding structure" (2003: 20). A structure in terms refers to the relations among its components, which can be classified as either bonding or non-bonding, where bonding refers to "relations that make a difference to the relata" (20). According to Bunge, "new systems are characterized by new properties, [or] in other words, **emergence indicates system…**" (20). Importantly, **emergent properties are *global and not distributive*.** This means that wholes possess properties that their parts lack. The new property cannot be located within some parts or regions of parts and not others. For instance, the validity of an argument is a property possessed by the argument as a whole and is irreducible to its component parts.

Social Systems and the CESM Model

Bunge in a series of articles and books espouses a systemic view of society that combines micro and macro approaches, analysis and synthesis. He states that those who claim to be micro-individualists are rarely consistent with their ontological claims because they almost always have to make reference to social systems as unanalyzed wholes. Such wholes include "the market",

NGO's, the state, and so on. Bunge states that any system can be characterized according to the following quadruple, which he calls the CESM model: s=<C, E, S, M>, where:

> C = *Composition*: Collection of all the parts of s;
> E = *Environment*: Collection of items, other than those in s, that act on or are acted upon by some of all components of s;
> S = *Structure*: Collection or relations, in particular bonds, among components of s or among these and items in its environment E;
> M = *Mechanism*: Collection of processes in s that make it behave the way it does. (35)

Bunge devises this model as an alternative to the three definitions of systems that he cites as most prominent in the literature. These are:

> 1) A system is a set, or collection of items, that behaves as a whole
> 2) A system is a structured set or collection
> 3) A system is a binary relation on a set of items of some kind, such as the input-output pairs in a black box

The first is deficient because it does not point to the emergent propreties that make the system behave as a whole, and also because sets are not collections because the latter are concrete and can change over time whereas sets are concepts whose composition is fixed. The second is incomplete because it fails to specify the relations that hold the constituents together. The third is incomplete in part because internal stimuli are as important as external stimuli with respect to systemic changes. In practice, this model is unwieldy. Accordingly, it is usually sufficient to explore these different components of the system at a single level.

Bunge understands systemism as an alternative to both organicism, or holism, and micro-reductionism, or individualism. Bunge states that:

> Everything, save the universe, is connected to something else and embedded in something else. However, not everything is tied to everything else, and not all bonds are equally strong: this renders partial isolation possible, and enables us to study some individual things without taking into consideration the rest of the universe. This qualification distinguishes systemism from holism, or the block-universe doctrine (2003: 41).

It is not apparent, however, in what ways everything is a system or a component of one, since one can imagine that a thing can be related to another thing in a way that makes no difference to either, such as being related by physical proximity.

This view of reality is directly applicable to the study of society. Bunge sees his version of systemism as a compromise between top-down approaches and bottom-up approaches, that is, as a way of bridging the micro-macro divide. On the one hand, individualists hold that reference to individual actions is sufficient for explaining macro-level patterns, while on the other hand,

holists regard the pattern as primary and explain individual agency on the basis of an internalization of these patterns via processes of socialization.

Bunge illustrates the kind of micro-macro analysis-synthesis he proposes in terms of what he calls "Boudon-Coleman diagrams" such as the following:

$$\begin{array}{lcl} Macro-level: & Economic\ Growth & \rightarrow\ Population\ stagnation \\ & \downarrow \qquad\qquad\quad & \uparrow \\ Micro-level: & Old-age\ security & \rightarrow\ Decline\ in\ fertility \end{array}$$

Reference is made to both micro and macro phenomena, and of course, middle-range phenomena in between these levels may also be included. In the above example, economic growth, a macro-phenomenon, contributes directly both to old-age security as well as population stagnation. Old-age security, meanwhile, a micro-level phenomenon, contributes to a decline in fertility, which in turn contributes to population stagnation. This constitutes a path model of direct and indirect influences that are heterogenous in scale. In short, he advocates a multifactorial approach.

Specifying the concept of Emergence

Next, I will review in some detail Bunge's theoretical efforts to specify the concept of emergence in an analytically rigorous manner. The comments that follow are not provided in any necessary order. In addition, my comments regarding specific passages placed in brackets {} so that the reader can more easily follow the logic of the overall exposition. Comments in brackets are excursions.

First, there is a difference between *ontological emergence* and *epistemological emergence*. Ontological emergence refers to the appearance of qualitative novelty (14), whereas epistemological emergence refers to our *inability to predict* the emergence of higher order novelty from lower levels. It is important not to confuse the two because the former need not imply the latter. In many cases, we can explain precisely the mechanisms by which emergence occurs; it need not be mysterious.

Second, there are no properties-in-themselves. Instead properties are all possessed by "some individual or n-tuple of individuals" (14). Third, there are no negative or disjunctive properties, such as saying that a person is *not* a smoker. Saying that someone possesses the property of being a non-smoker is, according to Bunge, the equivalent of saying that a person possesses the property of being a non-whale. *Properties must be distinguished from predicates*.

Fourth Bunge maintains that **only *events* cause anything: "the relation of efficient causation holds only among events" (2003: 14). Events are "changes of state" whereas processes are "sequences of state" (2003: 27).** Fifth, in addition, to objects or things, processes may also emerge and submerge. Sixth, there is no emergence *ex nihilo*. Finally, **evolutionary processes are continuous in some respects and discontinuous in others, making gradualism and**

saltationism one-sided (2003: 18).

The part-whole relation between two objects can be clarified as a condition in which there exist two objects, *a* and *b*, where *a* is a part if it "adds nothing to *b*" (2003: 10). For example, Bunge remarks that the number 1 is a part of any number because 1*b=b. Also, he states that adding a membrane to a cell (which already has a membrane) "results in the same cell" (2003: 10).[83] Moreover, Bunge distinguishes two ways in which objects may be "joined". These two means of joining or relating objects and their characteristics are presented in Table 7.

Synonyms for *association* include aggregates, juxtaposition, concatentation, clumping, and accretion (2003: 10). Associations are exemplified by crowds of people or the accretion of dust particles. Objects joined together by association do not exhibit strong cohesion, and possess a *modular* structure, as opposed to an *integral* structure. Furthermore, the relations they enter into do not change the nature of their components.

Accordingly, *combinations* are said to differ from associations in at least three respects. First, the original items are changed so that a distinction can be made between the original *precursors* and the resultant *constituents* of the new whole. Second, these combinations are more cohesive

Table 7. Mario Bunge. Combination and Association.

Association	**Combination**
Mixture	Fusion
Modular (structure)	Integral (structure)
weak cohesion	stronger cohesion
Components unchanged (precursors)	Components altered (precursors --> new constituents)
less energy/time required	more energy/time required
more probable	less probable
Non-Bonding structure	Bonding structure
Non-System	System
Non-Emergence combinatorial/quantitative novelty *(over time may lead to qualitative novelty)	Emergence qualitative novelty

[83] This explanation is somewhat questionable. For instance, we can add rather than multiply 1 to a number and it will result in a new number. We would then need to distinguish what we mean by "adds something to *b*." For instance, presumably adding a cell membrane to a cell would result in a cell with two cell membranes, a rather radical emergence of novelty. Similarly, we can "add" one person to society, and we are of course adding one person to the society, even though if we mean by "society" the "set of all persons" we are perhaps not altering its *definition.*

and therefore stable than mere aggregates. Third, combinations require more time and energy and are therefore less probable than aggregates.

> {{Bunge does not make explicit whether aggregation is synonymous with non-bonding relations between *relata*, although I presume this is the case, since a non-bonding relation is one that does not make a difference to the *relata*. This distinction is one between relations that do not make a difference and relations that do make a difference. Who decides, however, which relations do and do not make a difference? Presumably the former means that the *relata* or constituents are themselves changed. This relies, however, on the distinction between intrinsic and extrinsic properties, and also on the distinction between properties and things.
> For example, a cup that is "next to" a hat relates them in terms of spatial contiguity but makes no (real) difference to either. Of course, we can say there is a difference between a hat placed next to a cup and a hat placed next to a piano, but in this case, this would presumably not be a "difference that makes a difference" (using Bateson's formula for information) to the hat (or piano) itself. If this is the case, then aggregates are not systems, because systems are objects structured by bonding relations.}}

Emergence can be distinguished in other ways such as absolute/relative and natural/artificial. Absolute emergence refers to the first time a new emergent unity (with a global property) is exhibited, whereas relative emergence refers to the reproduction of unities of the same kind. Bunge gives the example of the invention of a car and its later manufacture by industry. The car's invention would be its absolute emergence, whereas newly manufactured cars would be considered relative emergents (13). In addition, artificial emergence is distinguished from "natural" emergence or self-organization (autopoiesis). Artificial organization is man-made emergence, or *emergence by design*. Natural and artificial processes of emergence can also combine, as when a seed becomes a tree that is used to produce paper. We can add other distinctions, such as the one between diachronic and synchronic emergence discussed by Kontopoulos (2006).

Finally, Bunge alludes to a distinction between association and combinations *as processes* and as (synchronic) *relations*, but he does not make this explicit. For instance, new "wholes" may come into being by association, but they only generate novelty of the "combinatorial" type; that is, the components are not themselves changed in the process, such as changing the location of the hat. Another example is a crowd of people joined together because of some external event. Associations or mixtures *lack structure*. Beyond certain thresholds, however, qualitative novelty can emerge.[84] Bunge gives the following example: Dust --> Pebbles --> Boulders --> Planetesimals --> Planets (27).

> {{First, Bunge does not render explicit how accretion changes the properties of the components. For instance, does becoming part of a planet change the dust particle that combined with other such particles to generate the planet? In what sense is this qualitative as opposed to quantitative? Notice also that Bunge in his more formal definition distinguishes properties from things, and defines emergence in terms of new

[84] Engels referred to this as the "transformation of quantity into quality."

properties, but seems at times to contravene this premise.

Bunge remarks that the *process* of accretion, for instance, can generate bonding structures or at least make them possible, as when two people meet in this crowd and fall in love, thereby "bonding." This presumably constitutes a new system in which each is transformed over time. But note that the mere repetition of accretion does not in itself generate a coupling or bonding relation. Placing two people in the same subway station repeatedly, say over a million times, will in all likelihood fail to generate this coupling relation, and might not generate any bonding relations whatsoever. It is therefore not sufficient to say that accretion is an efficient cause of emergence. Even if we take Bunge's admonition that only events (changes of states) cause anything, this amounts to saying that *differences (changes) co-relate with other differences (changes). Differences are transported or trans-formed across media.* The problem of infinite regress appears here, but I merely want to point out the important difference between saying that aggregation can cause emergence *or* make it possible, a difference that Bunge avoids specifying.

This example is also instructive because Bunge himself uses it and because it implies that relations or *interactions* between persons can generate new emergent properties, that is, inter-personal *systems*. In what ways, do these types of relations change the persons involved? What, exactly, is transformed? It is obvious that it isn't the body per se, although there are certainly corporeal and emotional effects (e.g. the physiological symptoms of a 'broken heart'). In addition, this new bonding isn't physical or material in the sense of their being a permanent or enduring co-presence. Two persons in love need not be physically interacting and certainly need not be physically interacting at all times. The same can be said of any social relation. In other words, *the social relation is irreducible to biophysiology, (i.e. to the minds and brains of individuals) and need not imply spatial contiguity.}*

Bunge distinguishes between *intrinsic* (global) and *relational* (contextual) emergence. The former refers to the global property of a new emergent unity, whereas the latter refers to the relational properties that components receive when they enter a new unity, that is, when they become components *parts* of an emergent unity. Examples of the latter include a person who becomes a worker and therefore enters into an employer-employee relation. Bunge writes that the relation is not intrinsic to the person because it is conceivable that he would maintain his identity after extricating himself from the relation and losing that particular relational property. This raises the question: what distinguishes an emergent *complex* unity from an emergent property acquired by a *simple* unity through its relation to another unity? *In other words, is there a single criterion for distinguishing simple and complex unities?* The distinction hinges on the location of the emergent property.

Contra Bunge, individuals entering into bonding relations can generate both global and relational emergent properties. They are global because they affect and make a difference to both components and are relational because in other respects, they do not change or alter the identity of these components. The most important ordering distinctions in this exposition appear

to be the ones between properties of things and the things themselves (property/thing), and also that between qualitative and quantitative appearances (qualitative/quantitative). These distinctions, along with the numerous others just mentioned, could be further elaborated and problematized but doing so would only reveal, to the extent than an inference can be secured from habit, the contingency of distinctions. The contingency of distinctions means ***there are no essential differences***, at least not from the perspective of observing different differences. This in turn implies that *this* observing is constituted by its own 'unity of a difference' that makes a difference (i.e. which matters), and which remains constant, for the time being. Bunge has offered the most comprehensive account of system and its relation to material emergence to date, and his exposition of social scientific methods suitable for the study of *social* systems is clearly insightful. It is my contention that his objectivist stance, however, overlooks the non-objectivist, or imaginary, dimensions of social life that are derivative of meaning. His approach could therefore be supplemented by a reading of Luhmann.

Talcott Parsons's theory of the social system

According to Fararo (1989), the systems idea became important to American theoretical sociology primarily through the influence of Parsons, who began to develop systems theoretical approaches to sociology in the early 1930s at Harvard.[85] Parsons inherited the system concept primarily through the influence of Wilfred Pareto.

Parsons states in *The Social System* (1951/1962) that the fundamental premise of his theory is that it is possible to treat the interaction of individual actors *as a system*. Accordingly, a social system is defined as:

> the system generated by any process of *interaction*, on the socio-cultural level, between two or more 'actors.' The actor is either a concrete human individual (a person) or a collectivity of which a plurality of persons are members. A person or a collectivity participates in a given system of interaction not usually with its whole individual or collective 'nature' or set of motives or interests, but only with that sector relevant to this specific interaction system. Sociologically we call such a sector a *role* (Parsons and Smelser 1954: 8)[86]

The elementary unit of analysis in the theory of social systems as conceptualized by Parsons is not the actor qua agent, but rather, actions. Fararo emphasizes that: "it is not enduring actors that are the elementary units of the action frame of reference, but acts. The *actor* is treated as one analytical aspect of the act, along with the *end* element" (2001: 88). Moreover, systems are **boundary-maintaining:** "*relative to its environment*, that is, to fluctuations in the factors of the environment, it maintains certain constancies of pattern, whether this constancy be static or moving" (Parsons 1951: 482).

Importantly, however, action "does not consist only of ad hoc 'responses' to a particular situational 'stimuli' but [rather] the actor develops a *system* of 'expectations' relative to the various objects of the situation" (1951: 5). For this reason, Parsons speaks of an integration of action expectations, or orientations.[87] Parsons distinguishes between passive expectations, which he calls "anticipations", and expectations which are actively pursued, which he calls "goals" (1951: 8). A *system* of orientations means that there is "*selective ordering* among the possibilities of orientation" (Parsons 1951: 7; my emphasis). For instance, one does not orient

[85] Also at Harvard during the 1930s, Homans devised alternative systems approaches via the influence of Henderson and Whitehead.

[86] That the entire personality is not incorporated into any given social role presages Niklas Luhmann's axiom that individuals remain parts of society's environment.

[87] Fararo retains this emphasis on the latent, unobservable states of mind in interaction, regarded as dynamically changing propensities of action: "In sum , EST [E-state structuralism, or expectations state structuralism] focuses on underlying or latent relational states that can be interpreted as *relational orientations* of actors in the sense of Parsons (1951)" (326).

oneself to one's boss in a work situation as one does to one's child in a domestic or family situation.[88]

Parsons model of functional differentiation

According to Parsons, any social system must solve or orient itself to four functional problems. The thesis of functional differentiation states that systems *tend* toward structural differentiation in accordance with these four functional problems. Parsons writes that: "our most general proposition is that total societies *tend* to differentiate into sub-systems (social structures) which are specialized in each of the four primary functions." (1956: 47). These four functional imperatives are:

> ***G*** -goal-attainment, which "realizes the primary orientation of the system in question";
> ***A***- adaptation; which "meets certain situational exigencies, either by adjusting in the face of inflexible reality demands or actively transforming the environmental features in question";
> ***I***- integration; which "regulates the inter-relationships between the already-differentiated adapative, goal-attainment and latency subsectors, mitigates the level of distinct differentiation of each that obtains, and in general promotes harmonious interaction"; and finally
> ***L***- latent pattern maintenance, which "renews the motivational and cultural patterns integral to the interaction of the system as a whole" (1956: 197)

Parsons identifies each of these four functional imperatives with a sub-system of society. The economy serves the adaptive function; the polity serves the goal-attainment function; an integrative sub-system serves the integration function; and a cultural-motivational system serves the function of latent pattern maintenance.

Importantly, these are analytical, rather than concrete distinctions. Parsons insists that "it is incorrect, as we have pointed out repeatedly, to identify any concrete class of organizations or their orientations exclusively with any one functionally differentiated sub-system" (Parsons and Smelser 1956: 61). Table 8 is a matrix identifying these four functions and their corresponding sub-systems, adapted from Parsons and Smelser (1956).

Whereas the *meaning* of these four system problems does not change across or within systems, their *content* does. For instance, whether or not these functions are performed by a single, concrete institution (or by a single *role* within an institution) or whether a single institution (or role) performs several functions simultaneously depends on the historical and cultural circumstances. This distinction is formulated as a distinction between *analytical sub-systems*, on the one hand, and *concrete structure*, on the other (1954: 54).

[88] Luhmann later picks up and amplifies this emphasis upon selection as the mechanism of complexity reduction that constitutes a necessary precondition for the autopoiesis of systems as they distinguish themselves from their environments.

Table 8. Parson's AGIL schema.

A Economy	***G*** Polity
L Latent Pattern-maintenance and Tension-Management Sub-System (Cultural-Motivational System) (e.g. household)	***I*** Integrative Sub-system

In modern society, however, functional imperatives *tend* to be handled by separate institutions. I will focus on the function performed by the polity and the economy, both of which have special importance for developing a systems-theoretical understanding of the recent debt crisis. The *polity* refers to the political sub-system in a broad sense. Parsons and Smelser label this functional sub-system the *polity* because it is not coterminous with governmental structure (1954: 47). Political goals and values, however, do tend to have "primacy over others in an organ of government", just as economic goals tend to have primacy in a business organization (1954: 48).

Three criticisms of Parsonian structural-functionalism

I will address a few criticisms that pertain specifically to Parsons's structural-functionalism, but which also pertain to Luhmann's theory as well. This list is not exhaustive. First, I will relay an observation made by Alvin Gouldner on Parsons's style of writing. In *The coming crisis of Western sociology* (1970), Gouldner argues that Parsons is above-all a metaphysician interested in showing, through his conceptualizing drive and rhetorical style, an image of the one-ness of the social world. He is therefore akin to Auguste Comte. Gouldner suggests that Parsons is basically not interested in being understood, not even among his colleagues, and that his obscure prose is more like a private memo than a publication. Gouldner argues the success of his obscure style of prose can be explained sociologically from the prestige of his Harvard affiliation from a break down in the social controls and norms within academia. Colleague's who don't understand his work are more likely to blame themselves, simply because they know that they are reading Parsons.

Second, Parsons conceptual schema is entirely formal (i.e. without content), and is laid out in advance. They are, as he emphasizes, merely *analytical* constructs. Empirical phenomena do not fit into mutually exclusive categories, nor does he adhere to standards of parsimony. Instead, empirical phenomena fit into numerous "analytical" categories. His criterion for conceptualization appears to be that empirical cases fit into *at least* one such analytical category.

As Gouldner explains, however, just because a concept or distinction can apply to numerous cases does not mean that it is useful or insightful. For example, one could say that people can be divided into the categories of having red hair or not having red hair, and then discover that the same category would apply to dogs or horses. Does this make it more meaningful or relevant, than say, balding or not-balding? Ultimately, Gouldner argues that Parsons's categories have not been demonstrated to be more suitable for explaining (the variation in) any empirical subject area, than any other set of categories. As argued by Nicos Mouzelis (1995), Parsonian general theory, like all general theory, runs the risk of being either trivial or wrong.

Third, in Parsons's model, the AGIL scheme recurs within each sub-system (and within each sub-sub-system). Within the economy, for instance, the AGIL functions are identified as: A_a investment subsystem; A_g production subsystem; A_I organizational subsystem; and $A_{L,}$ the economic commitments subsystem. Table 9 is a representation of this nested, recursive structure of the AGIL schema within the economic sub-system, adapted from Parsons and Smelser (1954: 196-204).

The fourfold AGIL schema is supposed to apply to *both concrete groups/collectivities* and *abstract institutional wholes* (e.g. economy, polity, kinship, etc). This presents a problem, for the economy is not in itself an actually existing *collectivity*, but rather, an *analytical* construct. As pointed out by Mouzelis, however, only collectivities must meet the functional imperatives described by the AGIL schema in order to survive. The mistake Parsons makes is then to move from the AGIL schema to the agil schema, in which each sub-system, as an analytical category, must meet the imperatives of reproduction. Mouzelis (1995) writes that the Achilles' heel of Parsonian functionalism is the application of the AGIL logic to social wholes or subwholes that are not collectivities" (89).

According to Mouzelis (1995):

> [I]t is perfectly legitimate to say that a car factory, as a relatively self-contained configuration of producers, has four basic reproduction requirements: AGIL. [But not an imperative to reproduce! Perhaps it is only an accident that it does so!] It is equally legitimate to conceptualize the factory's adaptation subsystem (A) as an analytic category, grouping under its heading all institutionalized norms dealing with the factory's resource-acquisition problem (norms about the recruitment of personnel, acquisition of raw materials, of financial capital, etc). But when Parsons goes a step further and subdivides the factory's adaptation subsystem into for sub-systems (A --> a, g, i, l), then **this is not acceptable. For the adaptation subsystem, in so far as it does not refer to a concrete subcollectivity, is simply an analytic category, and as such has no functional requirements that have to be met for it to survive**." (88).

In short, analytical systems do not possess requirements of survival because they exist only as analytical, rather than real, systems. Accordingly, their "survival" depends only on having imagined them into existence by a structural-functionalist.

Mouzelis proposes instead that each sub-system of society representing the AGIL schema be decomposed into three analytical sub-divided into the Marxian dimensions of technological relations ("forces of production"), appropriative relations ("relations of production") and ideological justifications/representations of these relations. The concept of forces of production refers to material tools, knowledge, "capital", and the technical rather than political division of labor. The concept of relations of production refers to appropriative, institutionalized rules that regulate the ways in which technologies are controlled (e.g. private property, markets, etc.) And ideology refers to normatively regulated processes which legitimate or distort the way this is done.

A summary of the recommended revisions to Parsonian theory are provided in Table 10 and is adapted from Mouzelis (1995). Mouzelis's view is useful because the technological component can also include the physico-material components of production, including geophysical limitations to material growth. This category can also accommodate the focus by Bruno Latour and Actor Network Theory (ANT) on nonhuman agency, and the generic concept of *actants.*

Table 9. Internal Structure of the Economy.

<table>
<tr>
<td>A(a)
Investment-Capitalization Sub-System

<table><tr><td>a
*guarantee of liquidity (e.g. stock exchange)</td><td>g
prod. of prod. capacity</td></tr><tr><td>l
*flow of credit and capital</td><td>i
long-term vs shor-term balance</td></tr></table></td>
<td>A(g)
Production Sub-System

<table><tr><td>a
financing</td><td>g
marketing</td></tr><tr><td>l
technical prod.</td><td>i
prod. coordination</td></tr></table></td>
</tr>
<tr>
<td>A(l)
Economic Commitments to…

<table><tr><td>a
long-term productivity</td><td>g
productivity</td></tr><tr><td>l
economic values (economic rationality)</td><td>i
planned allocation of resources</td></tr></table></td>
<td>A(i)
Entrepreneurial Sub-System

<table><tr><td>a
financing of innovation</td><td>g
new combinations of factors of prod.</td></tr><tr><td>l
flow of resources (mobility, flexibility)</td><td>i
opportunity for innovation</td></tr></table></td>
</tr>
</table>

Moreover, the ideological component need not refer exclusively to "false consciousness" but to the"medium through which men make their history as conscious actors" (Therborn 1980: 3); or "that aspect of the human condition under which human beings live their lives as conscious actors in a world that makes sense to them to varying degrees.(2)" Ideology is thus "the medium through which this consciousness and meaningfulness operate" (Therborn 1980: 2). According to this broad understanding then, Luhmann's analysis can be understood as occurring from within the dimension of ideology, that is, of *meaning*. Keeping this in mind, I discuss Luhmann's model of society as an autopoeitic system of communication below.

Table 10. Proposed revisions to Parsonian theory.

Parsonian theory	***Propsed restructuring***
1. AGIL subdivision applies to *all* social systems (collectivities and not)	AGIL subdivision makes sense only when applied to collectivities
2. Each institutional sub-system (A,G,I,L) can be further subdivided into four sub-subsystems: A →agil; G → agil, etc.	Each institutional subsytem must be conceptualized in terms of its technological, appropriative, and ideological dimension: A → t, a', i'; G → t, a', i', etc.
3. Incompatibilities between a, g, i, l do not lead to analysis in terms of 'strategic conduct'	... leads to strategic conduct analysis

Niklas Luhmann's theory of social systems

Whereas Parsons understands the social system as composed of actions, Luhmann regards social systems as constituted by communications. Whereas for Parsons, sub-systems are regarded as merely analytical constructs, for Luhmann they are real, albeit self-referential systems. Whereas for Parsons the environment of social sub-systems refer to the other components of society, for Luhmann the environment of a society, as the social system par excellence, is whatever is not social, i.e. not communication.

Society as the autopoeitic communication of meaning

According to Luhmann's theory, social systems are constituted as autopoeitic communicative events. Society, as the superset of all social systems (which include interactions, organizations, and societal sub-systems such as the economy) is "everything that is communication" (1995: 408). Rather than thinking of communication as a kind of action that an individual may pursue, Luhmann regards (social) action as an attribution performed by and within communication. Accordingly, he defines the *social system* as "communications and their *attributions as actions*" (1995: 174: my emphasis).

Persons are thus part of the *environment* of social systems. To put it succinctly, "society equally excludes all people" (Lee and Brosziewski 2009: 53). That human minds are part of the environment of society does not imply that there is no relation between them. Luhmann posits that they are joined ("structurally coupled") together because both psychic and social systems process *meaning*. Both psychic systems and communications systems process meaning, but with different aims. Following Husserl and the phenomenological tradition, Luhmann posits that meaning is constituted through the distinction between actual and possible.[89]

Both psychic and social systems process *meaning* through the use of *symbolic generalizations.* Meaning is *structurally determined and operationally closed.* Any characterization or description presupposes meaning. Meaning appears as a concept "devoid of difference" (1995: 60) because it cannot be negated. For example, the theme of "meaninglessness" is still meaningful within meaning. This does not mean that meaning is all there is, but meaning always processes the underlying reality according to its own internal structures.

Luhmann's theory specifies that social communication as autopoeitic. The term *autopoiesis* is derived from the Argentinian biologist Humberto Maturana, who introduced the term in his 1970 book *The Biology of Cognition*. Autopoiesis literally means self-creation and is synonymous with circularity, recursion, and self-referentiality (Luhmann 2000). Luhmann provides the following definition:

> [Autopoeisis] refers to (autopoietic) systems that reproduce all the elementary components out of which they arise by means of a network of these elements themselves

[89] Luhmann writes that **Meaning** "can be defined as a medium that is generated by a surplus of indications of others options. In the final instance all meaning thus resides in the distinction of actuality versus potentiality" (*Risk* 2005: 17). Accordingly, I would argue that semantic meaning is a special case of meaning in general.

> and in this way distinguish themselves from an environment- whether this takes the form of life, consciousness or (in the case of social systems) communication. Autopoiesis is the mode of reproduction of these systems. (1989: 143)

Maturana and Varela (1980) introduced the concept of autopoiesis as a criterion for distinguishing between life and non-life. Previous answers to this question included vitalism; cybernetics and control theory, which posited that living systems exhibited goal-directed behaviors via negative feedback; and classifications consisting of lists of necessary characteristics. Vitalism was rejected because of its perceived mysticism; negative feedback insufficiently distinguished life from machines; and finally, any list of essential characteristics presumed that which needed to be explained.

Maturana and Varela proposed instead that individual autonomy is an essential feature of life. Living systems are non-teleological, that is, they have as their purpose the creation and maintenance of themselves, rather than the production of something else. Organisms are bounded and self-defined. This focuses on living organisms, rather than say, the transmissions of genes. Note that it is possible for a cell to survive denucleation whereas no living cell can survive without its membrane, distinguishing its "self" from its surrounding environment.

Autopoietic systems are characterized by both *structural determinism* and *organizational closure*. The former refers to the idea that changes within a system are ultimately determined by the system itself, and not to external causes in its environment. Factors in the environment can only act as triggers of system-generating events, but how the system responds is up to the system alone. Mingers writes that, "What does or does not affect the organism and the nature of any effect is determined by its structure" (31). Berries, for instance, may be poisonous to humans, but they are not intrinsically poisonous. The concept of *organizational closure* means that all of the activities of a system must generate further activity only within itself. Nervous systems, immune systems, and social systems can be regarded as organizationally closed.

Organizationally closed systems can also be *interactively open*. For instance, a computer program is a structure-determined system that is interactively open and organizationally closed. The structure of the program determines the responses that it will generate, but these responses are sensitive to variations in the triggering signal that it receives. Furthermore, the concept of autopoiesis gives rise to a reformulation of the idea of adaptation, since the environment does not specify the adaptive changes will occur. Instead of adaptation, Maturana and Varela posit *structural coupling*, a term also borrowed by Luhmann. The concept of system employed by Luhmann therefore does not refer to *determinate* systems such as machines.[90]

In Figure 83 I present a useful typology of systems, derived from Mingers (1995: 13). For Maturana and Varela, the concept of *autopoeisis* refers exclusively to *living* systems. Niklas

[90] Luhmann writes that determinate systems (e.g. machines), "presuppose a unique environment which has been tailored to them, and lends them necessary support… They cannot survive in an indifferent or hostile environment (1982: 38). Elsewhere, Luhmann notes that the "minimal condition for communication (however poorly coded) to come about is, of course, that the part of ego be played by a system that is not completely determined by its own past and so can react to information as such" (1995: 143).

Luhmann, however, extends the concept of autopoiesis to include *meaning* systems consisting of nonphysical, temporal events such as communications and thoughts. Luhmann suggests that we view life only as a special type of autopoiesis.[91] Contra Maturana and Varela therefore, Luhmann uses the concept of autopoiesis to describe not only physical systems, but also psychic systems (qua thoughts) and social systems (qua communications). The elements of the social systems are consequently communicative events. In contrast to living systems, social systems "have to produce their own decay" (1990: 9). The basic elements of communication are *events* that "vanish as soon as they appear…. Events cannot be accumulated" (1990: 9).

What consequences are there for the application of the concept of autopoiesis to *communications*? The first immediate implication is that "society" as communication, cannot consist of physical productions, but must instead refer to *the production of communications by means of communications*. Autopoeitic systems are a subset of self-organizing systems. For Luhmann, autopoeitic systems are so defined because they *produce their own elements* that constitute them as distinct systems. Luhmann clarifies this point by saying that "everything that is used as a unit by the system is produced as a unit by the system itself" and that this applies to elements, processes, structures, boundaries, and the system as a whole (1990: 3).

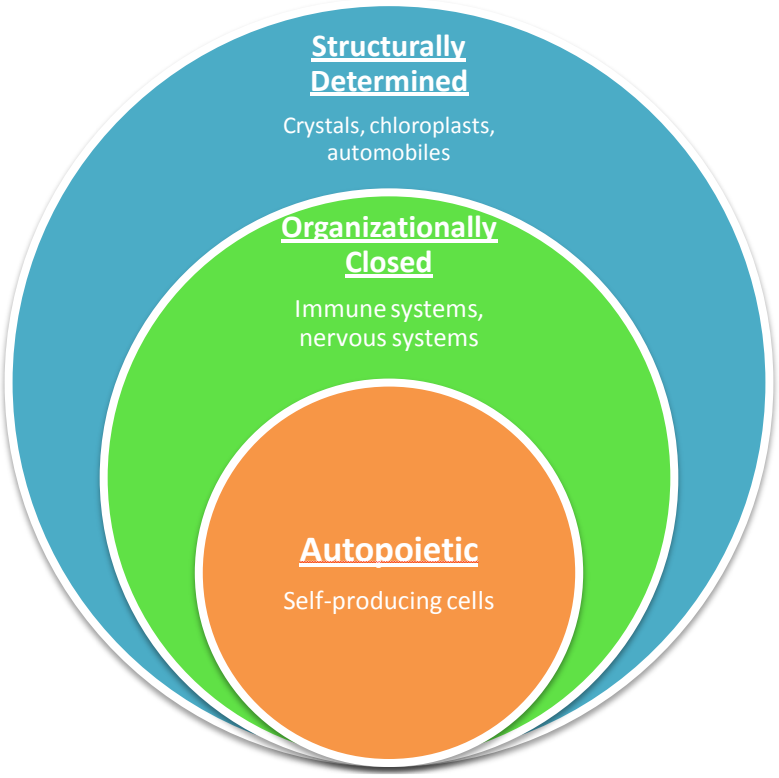


Figure 83. Autopoeitic, organizationally closed, and structurally determined systems.

[91] To arrive at a general theory of autopoiesis that would apply to non-living autopoietic systems, Luhmann writes that we would need to abstract from this special case and view autopoiesis as a general form "using self-referential closure" (1990: 2).

Autopoeitic systems are circular and self-referential. A part of a system is a part of a system because it is so defined and constituted by the system that defines the part and itself. Consequently, it is actually imprecise and misleading to say that Luhmann's theory is a theory *of* autopoeitic systems, for his theory *is* a self-referential system, predicated on a dynamically constituted distinction between itself and environment. His theory presupposes the existence of self-referential systems.[92] It is not a description *of* autopoeisis, but rather, its self-inclusive theoretical demonstration.[93] A pictorial illustration of the concept can be found in M.C. Escher's "Drawing Hands" (1948), depicted in Figure 84.

The "reproduction" of autopoeitic systems does not refer to the generation of copies or offspring: an organism that cannot reproduce in this sense, such as a mule, is still alive. Rather, autopoeitic systems are self-constituting in the sense that a biological cell consists of dynamic processes that create both the cell and its component parts simultaneously *via* distinction and selection. The function of an autopoieitic system is the production of the conditions for its own reconstitution.[94]

Autopoeisis means both the autonomy of existence, (i.e. it has no other higher purpose than its existence as a process of existing), and the existence of autonomy (by virtue of the fact that it exists). Systems that are subordinated to something else are *allopoeitic* (Mingers 1995). For example, biological life is auto-poeitic whereas a factory is allo-poeitic. One can imagine, however, a factory operating as an autopoietic entity, if it were to continuously repair itself from the damages incurred during its activity of self-reparation, and in addition, if this were its highest purpose.

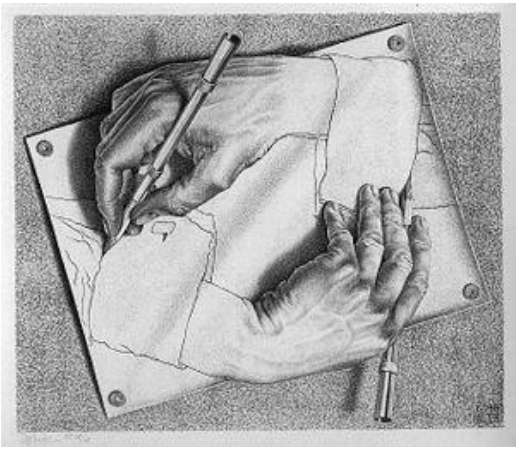


Figure 84. M.C. Escher's "Drawing Hands" as a depiction of Autopoeisis.

[92] The opening line of *Social Systems*, chapter 1 reads: "The following considerations assume that there are systems" (1995: 12); on the next page he adds: "Our thesis, namely, that there are systems, can now be narrowed down to: there are self-referential systems" (13).

[93] Moreover, Luhmann is well aware that, according to Kurt Gödel's incompleteness theorem, his own theory can be either complete and inconsistent (paradoxical), or consistent and incomplete.

[94] Luhmann has a similar, dynamic formulation: "the only function of the system's structure is to make the perpetual changing and regaining of [selective] coordinations probable" (1995: 138).

Luhmann's adoption of the concept of autopoeisis as a description of *social* systems, and not just living systems, is controversial and raises a number of problems. Luhmann's theory is in many ways a means of processing and solving these problems from within in a way that doesn't lead to a theoretical dead end. The first obvious problem is addressing in what way society produces or creates the elements which constitute it? This makes no sense if we regard society as people. Society does not *produce* people in any more than a metaphorical sense. For Luhmann, however, society consists of *communications*, or more precisely, *communicative events* that vanish as soon as they appear. But if communications autopoeitically reproduce each other, it ultimately means that humans don't communicate! On the contrary, "only communication can communicate" (2002: 156). The mind only "participates in communication as structurally determined system and as a medium" (2002: 176).[95] Furthermore, if communication is autopoeitic, it means that communication has no inherent *telos*, no goal, and no purpose, other than to communicate, which it either accomplishes or fails to accomplish. Societal autopoeisis is the "on-going self renewal" of social communication (1995: 434).

Communication is an emergent unity that arises, for Luhmann, as a synthesis of three selections: information, utterance, and understanding (or misunderstanding). An exceptionally clear and succinct summary of how communication emerges is provided by Luhmann (2002):

> Like life and consciousness, communication is also an emergent reality, a self-generated state of affairs. It comes about through the synthesis of three different selections, namely, the selection of *information*, the selection of the *utterance* of this information, and selective *understanding or misunderstanding* of this utterance and its information.
>
> None of these components can appear on its own. Only together do they generate communication. Only together: that means, only when their selectivity can be brought to congruence. *Communication therefore takes place only when a difference of utterance and information is first understood. This distinguishes it from a mere perception of others' behavior. By understanding, communication grasps a difference between the information value of its content and the reasons for which the content is being uttered* (157: my emphasis).

The use of the term "understanding" [*verstehen*] means that a communication is understood *as a communication*, or in other words, that it is *recognized* as a communication. First, it must be distinguished from other perceptions. It must be noticed. Second, what is noticed has to be *recognized* as two concurrent selections: *what* the message is (information), and *how* this message is expressed (utterance). Both are regarded as *motivated* selections that are necessarily contingent, in the sense that they could have been otherwise. When we observe any communication, we can choose to focus on or respond to, either the message itself or its means

[95] Consider for example how we choose to join in already ongoing conversations or discourses about already established themes and topics, and how, moreover, once initiating, a conversation can seem to steer itself.

of expression. Consequently, c*ommunicating about something is always also a way of communicating about oneself and about the others that one addresses*[96].

The elementary unit of analysis, communication, is therefore inherently social, unlike action. Luhmann compares the traditional view of the boundaries of social systems (e.g. Simmel) to a game of tennis, where a line separates actors. In the view of social systems, however, different boundaries emerge.

If expressions aren't *observed* as being motivated (i.e. selected), then they are not observed as communications and hence, don't communicate. Luhmann thus underscores the importance of the observer of communication.[97] Communication is therefore not a transmission of anything, but an interpretation of a sequence of events.[98] Communication does not occur except insofar as it is observed, i.e. inferred to exist. It cannot be observed directly. Moreover, communication occurs *even when no communication is intended*, or vice versa: communication is not guaranteed even when it is attempted. Thus, whether or not communication happens or not is achieved not by the intentions or actions of the sender of the communication, but is rather *a consequence of the inference made by an observer who is open to the possibility of communicating.*

For example, a cough, for instance, can signify ill health, and is therefore meaningful, but this is not communication. A cough can become a communication, however, if it is interpreted as a selected behavior that indicates a message, as for example a cough chosen to indicate annoyance or one's physical presence. It can even be misread as a communication, when in fact it was not intended as such, and even this misunderstanding might generate subsequent communication. Once communication has been understood, moreover, even the attempt not to communicate can be regarded as communication, so long as the one who initiated the communication expects a response.[99] Within the context of an interaction:

> If alter perceives that alter is being perceived and that this perception of being perceived is perceived, alter must assume that alter's behavior is interpreted as communication whether this suits alter or not, and this forces alter to control the behavior as communication. Even the communication of not wanting to communicate is communication…. In practice, one *cannot not communicate* in an interaction system; one must withdraw if one wants to avoid communication (1995: 413).

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[96] This theme is developed by Bateson (1972) who distinguishes between information and meta-information. The latter is roughly synonymous with "utterance" in Luhmann's theory. Meta-information is the information about the relationship that one is attempting to establish with the audience while communication. This takes the form of an implied command. For interactions involving physical co-presence, much of this information is conveyed via body language. See also Watzlawick (et al. 1967), who formulates this distinction as one between digital and analogic communication.

[97] Luhmann states that "communication emerges only to the extent that this suggestion is picked up, that its stimulation is processed" (1995: 139).

[98] Heinz von Foerster defines communication between persons as "an (internal) representation of a relation between (an internal representation of) oneself with somebody else" (1984[2003]: 268). Communication must therefore be posited, or inferred, and from the standpoint of an observer. Von Foerster's rendering of the concept of communication bears a striking resemblance to Luhmann's later formulation.

[99] This paradox is discussed at length in Watzlawick (et al. 1967).

Communication is an emergent unity.[100] It is constituted as the unity of three selections, information, utterance, and the selection of the distinction of unity/utterance (i.e. understanding). All communication furthermore presupposes the possibility of negation. Otherwise communication has not taken place. Negation is a presupposition of communication, and carries a high probability as discussed below.

Luhmann writes that the emergent social order arises out of the experience of double contingency and the perception of being perceived.[101] Perception becomes social "when one perceives that one is perceived" (1995: 412). Explicit communication can then link up to this reflexive perceiving, which is the experience of double contingency.

Below is a Venn-diagram depiction of Luhmann's metaphor of communication as a synthesis of three selections. Rather than a transmission from person A to person B, communication is an emergent phenomenon that occurs whenever the distinction between information and utterance is selected, or "understood." In Figure 85, communication is located at the interface of all three circles. It is possible, moreover, to select (i.e. understand) information by itself, or utterance by itself, but these do not constitute communication. In my view, the overlap between utterance and information represents attempted but failed communication, which can of course only be hypothesized.

Unfortunately, the Venn diagram depicts communication as a static object rather than as a dynamic process. Viewed dynamically, Luhmann contends that the "unity of an individual communication is merely its connectivity" (1995: 148). The communication must become a unity so that it can again become difference in another form, namely that between acceptance and rejection. Luhmann identifies *acceptance* as a fourth selection, which is necessary for social functioning but is nevertheless *inherently improbable:* "the *possibility* of rejection is *necessarily* built into the communication process" (1995: 154). That communications, once perceived as a unity, must be accepted or rejected, also implies that the elementary unit of communication is the smallest unit that can be negated (1995: 154).

Specifically, *acceptance* of communication means that one accepts it as the premise for one's own behavior. This is unlikely. Specifically, Luhmann mentions three "threshold of discouragement" (1995: 158), which I will discuss in the next section. In order for communication and to succeed, therefore, techniques must be invented in order to overcome these barriers to acceptance.

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[100] Luhmann writes: "We don't have to analyze the causes of this circle any further: what comes into being is always new and always the same, namely, a circularly closed unity. In this unity the determination of every element depends on that of another, and the unity consists precisely in this" (1995: 117)

[101] Luhmann notes: "Whatever contributes to solving the problem of double contingency belongs in the system" (1995: 126). Luhmann contrasts the meta-perspective compelled by this experience to that of "autistic behavior." Stephan Fuchs (2001) states that social encounters are often just the perception of being perceived, and the difference this makes *is* the encounter.

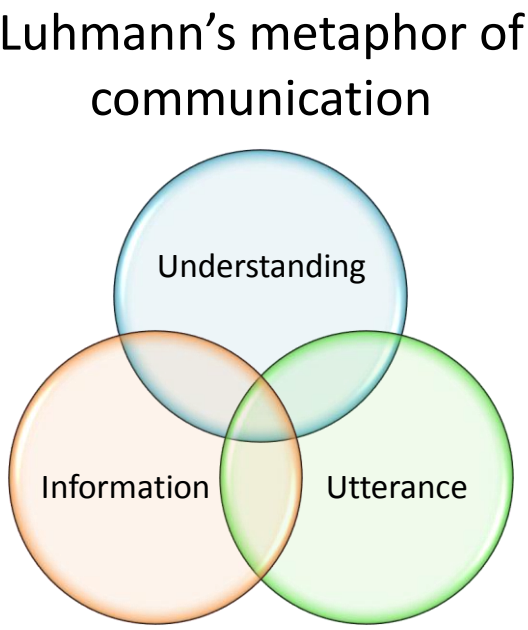

Figure 85. Luhmann. Communication as 3 selections.

Without acceptance of communication, social order within interactions, organizations, and society at large would be become impossible. That social order exists is a testament to the existence of these techniques for overcoming the improbability of successful communication. Below I discuss these techniques, which Luhmann refers to as success media in more detail.

Before concluding this section, I will mention two points. First, communication is *not* coterminous with language. For example, laughing can occur in the form of communication, as can gestures and facial expressions.[102] Other examples include gun shots and physical violence. The concept of communication thus does not imply invariance with respect to moral connotation, and does not imply that communication is inherently cooperative as opposed to conflictual. For Luhmann, language enables the differentiation of communication out of a perceptual context (1995: 152). The evolutionary achievement of language helps facilitate communication by distinguishing communication from perception, and it does this by attracting perception, that is, by being noticeable.

Finally, because communication is not something given, it can, in my view, be modeled as an expectation. The unity of the communication is not given, but observed indirectly or inferred. Communication can therefore be modeled as a Venn Diagram with a hole in the middle. The unity of the communication is given only an expectation, which is represented by Figure 86.

[102] These may fall under the category of analogical communication, or body language, which I discuss in more detail below.

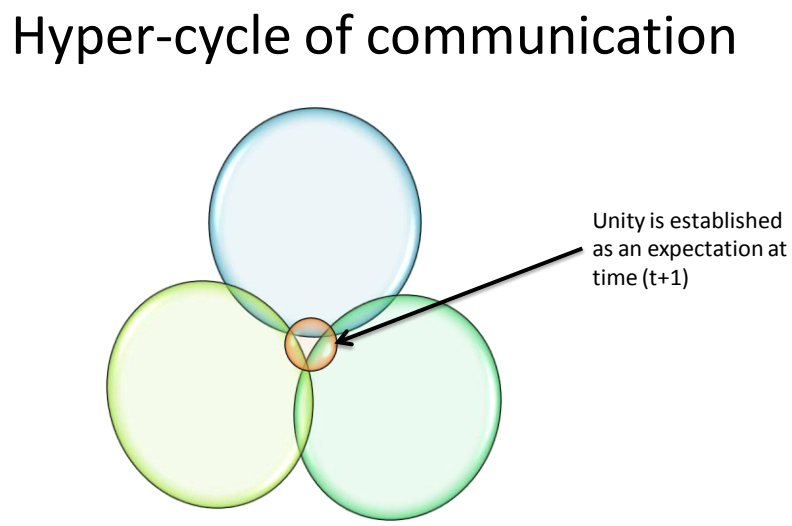

Figure 86. Communication as emergent hyper-cycle.

Media of communication

The success of communication is unlikely for at least three reasons. Luhmann refers to these as thresholds of discouragement. First, it is improbable that ego "understands" what alter means; second, it is improbable that a message reaches more persons than are physically present; and third, it is unlikely that the communication will be *accepted*. These barriers to communication are overcome via *symbolically generalized media*.

Parsons first coined the term symbolically generalized media to refer to the use of shared symbols to overcome the basal problem of double contingency. He writes:

> Because of this double contingency, communication, which is the precondition of cultural patterns, could not exist without both generalization from the particularity of the specific situations (which are never identical for ego and alter) and *stability* of meaning which are can only be assured by "conventions" observed by both parties. (1951: 16)

Symbolically generalized media (including love, money, truth, and power) are cultural conventions that are used to overcome contingency by focusing expectations onto a limited range of alternatives while eliminating all other possibilities. Because symbolically generalized media improve the odds that communication can succeed, they are also referred to as *success media*. Success, however, does not refer to whether or not individuals attain their stated goals. Instead,

it refers exclusively to the success that communication has been understood or recognized as communication.

Luhmann calls ***media*** "the evolutionary achievements that … serve in a functionally adequate way to transform what is improbable into what is probable" (1995: 160). Three media can be identified that correspond to the three thresholds of discouragement mentioned above. *Language* helps overcome the barrier that a communication will be *understood* (i.e. noticed or recognized as communication); *media of dissemination*, such as writing, "overcome the improbability that information will reach an audience" (Lee and Brosziewski 2009: 129);[103] and *success media* improve the odds that a communication will be accepted as the premise for another's subsequent behavior.

These are not media, however, in the sense that they mediate symbols and reality or because they mediate between individuals in communication. Luhmann's notion of media refers to the works of Fritz Heider (1926) who posits the conditions of possibility of perception as distance, or a medium-form distinction. The medium/form distinction is grounded in the distinction between loose/tight coupling. Luhmann (2006) refers to media as "loosely coupled substrates" and forms as "strictly coupled substrates." Media are loosely coupled and forms are tight couplings of a given medium. For example, air is the medium for sound, and when walking on a beach, the sand is the medium for the footprints.

To formulate it differently, media constitute a field of possibilities within which contingent actualizations (tight couplings) occur. Recall that meaning occurs as the distinction between that which is possible and that which is actual such that every actualization connects to a new horizon of virtual possibilities. Success media therefore work by relating a plurality of contingent forms to a common background medium. Lee and Brosziewski (2009) explain the performance of success media as follows:

> Alter and ego know that any given strict coupling could have been different. The price of a new pair of shoes could be higher or lower than what the price tag declares. The awareness that every form is a contingency is why alter and ego can both understand that it is meaningful when one form of a medium appears rather than another. Forms are selective arrangements of elements, tight couplings, that refer observers to other observers who make conditioned decisions about actualizing a medium's possibilities. (131).

How do success media work, when they work, with respect to human communication? Success media increase the odds that a communication will be accepted (i.e. taken as the premise for further communication), by *rendering the motivation of communication intelligible*. A *motive* refers to an attribution of causality pertaining to persons. As opposed to things, persons do not act because they are manipulated externally, or at least this is not how social systems describe actions. Persons act on the basis of motivations. Notice, however, that this presupposes that

[103] Writing and printing have, moreover, reinforced the difference between information and utterance, making possible the dissemination and suspicion of "ideology" or ideological observation (cf. Gouldner 1976; Fuchs 2001).

"communication has already raised reciprocal expectations of personhood" (Lee and Brosziewski 2009: 136).

Thus, success media have evolved that link certain *forms* of communication (i.e. specific, contingent actualizations of communication) to the *reasons* for why the communication was uttered. Note that this is *not* already presupposed in the elementary, reduced concept of communication as the synthesis of three selections: information, utterance, and understanding. One can, for example, understand that information has been uttered without having any idea why! The fact that motivated communication is the norm presupposes the existence of success media.

The four most prominent success media of communication are truth, love, money, and power. Love and truth select experiences, whereas money and power select out actions (Luhmann 1982). Actions refer to selections attributed to systems, whereas experiences refer to selections attributed to the environment of systems. Later, Luhmann creates a matrix depicting how success media "causally connect the experience or behavior of one person (ego) with the experience or behavior of another person (alter): an experience causes behavior, behavior causes an experience, an experience causes an experience, or a behavior causes a behavior" (Lee and Brosziewski 2009: 135). Table 11, adapted from Lee and Brosziewski (2009: 135), depicts these causal relationships between experience and behavior (i.e. action).

It is useful to remember that for Luhmann, ego refers to the observer of communication and alter to the initiator, although this distinction is expected to oscillate back and forth. In the context of truth, an experience is communicated in such a way that it elicits when successful, an *experience* that something is true or is not true. Power motivates actions. Experience is irrelevant. In relations of power, one is not interested in what one believes, but in what one says, not in what one thinks, but in what one does. Truth selects experiences, rather than actions, because truth is attributed to the world rather than the communicators. The communication of love, if believed, motivates behavior on the part of ego to validate and prove that alter is in fact the beloved. Finally, money elicits the experience of ego with respect to alter's behavior. What does this mean? In Luhmann's theory, one necessary condition for the exchanges involving money is that third parties, outside of the exchange, not intervene. What is most significant about money, then, from this point of view, is not that money is a store of value or that it more easily facilitates exchange than barter, but rather, that "under the condition of scarcity, those who do *not* participate in the exchange accept the fact that they do not receive the goods or services exchanged" (Luhmann 1995: 422).

This list is not exhaustive. Luhmann identifies other media such as law, politics, and art. Success media can also become differentiated and thus self-referential: love refers to love, and power to power. One can read a communication differently and interpret a gesture of love as one motivated by interests of power, and vice-versa, but this only indicates that one is distinguishing from *within* the self-referential medium of power, which is irreducible and orthogonal to the reference frame of love. A full elaboration, or defense, of this conceptual schema need not be undertaken here. Below I discuss in more detail the relation between success media and functional differentiation with respect to the economy.

Table 11. Matrix of causal relationships between experience and behavior within success media.

		Ego	
		Experience	**Behavior**
Alter	**Experience**	Alter's experience motivates Ego's experience *Truth*	Alter's experience motivates Ego's behavior *Love*
	Behavior	Alter's behavior motivates Ego's experience *Money*	Alter's behavior motivates Ego's behavior *Power*

Sub-systems, Codes, and Programs

Success media render more probable the acceptance of communication by making intelligible the motives for communication. In the transition from a stratified to a functionally differentiated society, Luhmann proposes that these media attach themselves to functional subsystems of society that operate according to binary distinctions or *codes*. The medium of money attaches itself to the functional subsystem of economy. A few remarks concerning functional differentiation and binary coding is warranted.

Sub-systems of society, also known as *societal systems*, can be regarded as channels of societal communication. These subsystems, or channels, operate at the level of society, and are thus not confined to organizations or interactions. Functional subsystems operate by means of binary coding. Table 12 is a short list of societal systems identifying the success media they articulate and their corresponding functional codes and possible programs (adapted from Lee and Brosziewski 2009: 147). Functional differentiation entails decomposing society's system-environment distinction of communication vs. non-communication into a more specific distinction. One can say that the subsystem observes the entirety of society through the lens of its own distinction for which it claims universality and exclusivity.

Luhmann writes:

> Every function system, together with *its* environment, reconstructs *society*. There, every function system can plausibly presume to be society *for itself*, if and insofar as it is open to its *own* environment. (1989: 107)

The functional subsystem is and is not society at the same time. Codes are totalizing constructions, but are only valid *insofar as communication chooses its domain of application*.

Table 12. Subsystems, codes, and programs.

Societal System	Success Medium	Functional Distinction or Code	Conditioning Programs
Politics	Power	In Power/ In Opposition	Democracy, Monarchy, Political Party
Economy	Property/Money	Payment/No Payment	Budgets, Investment, Plans
Science	Truth	True/Not True	Theories, Methods
Religion	Faith	Transcendence/Immanent	Judaism, Islam, Christianity
Protest	Anxiety, Discontent	Protest/Acceptance	Feminism, Environmentalism, "Tea Parties"

Luhmann writes, that "after all, not every situation is a matter of truth or justice or property" (1989: 38). They are totalizing in the sense that everything can be observed through the lens of the binary distinction, but they are exclusive because all other possible distinctions are latent. For example, science may observe according to the distinction between true and false, but *not* according to the distinction between beautiful and ugly (Luhmann 1989: 45).

Codes do *not* serve as the *criteria of selection*. The latter are facilitated by *programs*[104]. Programs, moreover, *are implemented exclusively by organizations, not societal systems*. For example, the distinction payment/non-payment does not in itself indicate how payments are made, or with respect to what goal (e.g. for profit, for charity, for consumption). Observing the distinction between truth and non-truth does not indicate what is true or false, or the methods by which this distinction should be employed. Applying the code recursively to itself, moreover, can generate paradoxes. Is the distinction between true and false itself true? On what basis is the legal system legal? The differentiation of the code and the criteria of selection is one way of avoiding, or concealing, these types of paradoxes or contradictions which would interrupt the systems functioning.

Functional differentiation does *not* refer to separation or segregation of society, but entails an increasing interdependence between societal systems, because each has to presume that other societal systems are performing their necessary functions elsewhere. Luhmann writes that:

> Operations can therefore switch from the legal to the political or from the scientific to the economic code. This possibility does not deny system differentiation. Instead it is attainable only on the basis of it. (1989: 43)

[104] The concept of "program" is preferable to the older (Hegelian) term, "logic." Whereas a program emphasizes its contingency, the term logic, as used in Marxist circles for instance, lends itself more easily to reification.

It is important to emphasize that these are semantic codes. They do not exist *out there*, but as expectations, or as hypotheses about how society processes and organizes its various communications. These codes should therefore not be reified. Moreover, Luhmann acknowledges that societal self-descriptions do not necessarily refer to observed realities:

> Of course, *the market is not a real one* (as it could be seen to be from the cousin's corner window) and democracy no longer means that the people rule. This is a matter of a semantic coding of an ultimately paradoxical state of affairs. It explains the meaning and the illusionary components of these concepts, explains the weakness of the corresponding theories and explains why, since the beginning of the eighteenth century, a kind of self-critique has accompanied this. (1989: 108; my emphasis)

In my view, this discrepancy is a result of triple (or higher-order) contingencies arising concurrently with the emergence of the public, a concomitant to functional differentiation.

Critiques of Luhmann

Habermas has criticized Luhmann for not being sufficiently critical. In Habermas's view, Luhmann provides no perspective from which the whole can be accurately observed (1987: 374). Habermas has thus referred to Luhmann's approach as a move from meta-physics to meta-biology. Consequently, Habemas argues we "are without any point of reference for a critique of modernity" (1987: 374). Habermas argue that the public sphere is where this critique *could* take place in which a "consciousness of the total society can be articulated" (1987: 376) *over and above the subsystems*. In the public sphere, society can gain a critical distance from itself and therefore conceive of the whole, or totality, and construct a rational identity that can perceive *systemic crises*.

Other critics have made similar points. For example, Østerberg (2000) argues that for Durkheim and Parsons, the concept of differentiation is always tied up with integration, as in calculus. Differentiation requires the subordination or coordination of all the parts to a whole through such mechanisms as socialization processes that internalize dominant values. Weber rarely talks about his competing value spheres in terms of differentiation.

In fact, Østerberg points out that Habermas first mistakenly imputed this notion to Weber, and that Luhmann makes the same mistake. For Østerberg, differentiation and *autonomization* should be considered as opposite, where autonomization lacks any counteracting integrating force. Luhmann conflates the two, sometimes using differentiation in a traditional Parsonian way, and other times using it in a way that is synomous with autonomization. Østerberg adds that, contra Luhmann: the world is not acentric, it has one or more centers; world society does not become increasingly differentiated functionally and that, for example, the world economy is not autonomous or 'autopoeitic' as a subsystem; class distinctions are not replaced by more important distinctions of inclusion and exclusion; and that the notion of progress is not obsolete.

The famous debates that occurred between Luhmann and Habermas during the 1970s, very little of which is available in English, cannot be recounted here. Prior to his death, however, Luhmann write eloquently and derisively about Habermas and critical theory, in a short piece entitled "Not in Frankfurt." Luhmann recapitulates his argument that unity cannot be anything but the unity of a difference, and that therefore, the complexity of the social system could not be comprehended, steered or guided, from within the social system. The key difference between a theory of self-referential, autopoeitic systems and critical theory is that the former is self-inclusive: it sees that it cannot see what it cannot see. Luhmann protests the inability of the "Marx/Freud-syndrome" to "endure this insight into its own blindness" (2002: 190). Below are his closing remarks:

> [Critical] theory sides with the human to join the latter in battle against enemy forces. But isn't this human merely an invention of this theory, merely a veiling of this theory's self-reference? If he or she were meant as an empirical object (with the name of subject), the theory would have to declare who, then, is meant, for obviously it cannot send five billion humans, who at the same time are living and acting, on a discursive search for good grounds. Not only the length of this process of searching, and the conditions of 'bounded rationality,' but already the sheer simultaneity of behavior would doom such a project. One cannot idealize sociality without taking account of time.
>
> These are rough arguments whose details certainly need fine-tuning. But a rough survey of the possible positions suffices if one is interested in the question of whether, and how, modern society at the end of this century can achieve a representation of itself in itself (where else?). And, all things considered, my verdict is: not in Frankfurt" (2002: 193)

Evincing eloquently a mood of resignation, Luhmann further propounds:

> The distinction, above all, between affirmative and critical, a distinction so beloved in Frankfurt, misses the connection to what offers itself to observation. It is a specific case of blindness, for it excludes the possibility that what has become realized as society gives cause *for the worst fears, but cannot be rejected*…. (2002: 193).

That Luhmann occludes from his analysis normative judgment and moral exhortation does not oblige the reader of Luhmann to do so. These criticisms illuminate potential blind spots in systems perspectives, but do not invalidate it. I propose here that the concept of system be regarded as a perspective, or hypothesis, that one holds open and regards as a matter of degree.

In many ways, the concepts of media and communication as employed by both Habermas and Luhmann are similar, particularly with regard to their concept of money. Habermas, however, intends to hold open the possibility that functional sub-systems could be normatively regulated via free and unfettered communication. Whether or to what extent collective normative control can actually be accomplished, or even whether this accomplishment is a historical possibility, also depends, however, upon factual and systemic conditions.

Habermas and the Agentic Understanding of Communication

The primary difference between a Luhmannian and Habermasian understanding of communication is that for Habermas, the essence of the meaning of communication is the (circular) intention of understanding intent. For Luhmann, on the other hand, communication is theorized exclusively with regard to its unintended consequences or "latent functions" (Merton 1968). Luhmann therefore abdicates any responsibility for evaluating the validity claims ostensibly implied in any and all communications.

For Habermas, there are also 3 dimensions or functions of signs. Following Karl Bühler's "organon model", Habermas distinguishes:

1) cognitive function- of representing a state of affairs
2) expressive function- of making known experiences of the speaker
3) appellative function- of directing requests to addressees

These correspond to the three distinct *worlds* or spheres of experience:

- Objective; The external world → Truth
- Subjective; The internal world → Sincerity
- Normative; The social world → Rightness (morality)

In *The Theory of Communicative Action* (TCA), Habermas attempts to generalize the concept of truth, which only pertains to the first dimension, that of representing a state of objective affairs. The concept of *validity* refers to this more general notion of truth, which also pertains to the internal and social worlds. For Habermas, every communication implies a claim to validity in these three dimensions: truth, sincerity, and rightness. All statements are embedded in these three dimensions simultaneously. The problem is how does one derive criteria for determining whether or not something is valid? Habermas attempts to ground universal rules of validity in what he calls a universal pragmatics.[105] The three dimensions are depicted in Table 13.

Table 13. Habermas. Types of Action.

Action Orientation → Action Situation	*Oriented to Success*	*Oriented to Reaching Understanding*
Nonsocial	*Instrumental action*	--
Social	*Strategic action*	*Communicative Action*

[105] Habermas writes that his theory "Seeks to ***generalize the concept of validity beyond the truth of propositions and identify validity conditions... [also] on the pragmatic level of utterances*** (277); and that his "reflections on *universal pragmatics*, intends to systematically ground both the appellative and expressive functions of language..." (TCA 1: 277).

For Habermas, all actions can be categorized as those actions that either oriented to success, or oriented to reaching understanding.

But what does "reaching understanding" mean? As stated above, Habermas regards it as the inherent goal built in to all of our efforts to communicate. This seems on the face of it to be counter-factual rather than empirical. Habermas is not explicit about the criterion of validity for this statement. Habermas specifies what he means by "reaching understanding" stating that reaching understanding is a process of reaching agreement, but, that it is not equivalent to a collective like-mindedness, or *de facto* accord (1984: 286). Habermas writes:

> Coming to an understanding [*Verständigung]* means that participants in communication **reach an agreement** [*Einigung*] concerning the validity of an utterance; agreement [*Einverständnis*] is the **intersubjective recognition** of the validity claim the speaker raises for it (TCA 2: 120).

Furthermore, any understanding presupposes some shared definition or a situation, or context of relevance. He defines communicative action, the goal of which is to reach understanding as action in which "participants pursue their plans cooperatively on the basis of a shared definition of the situation" (TCA 2: 126).

Habermas then, in order to devise a universal criterion of validity for all three spheres of communication, argues that reaching understanding is the *primary* and *original* mode of *language use* from which the other modes (instrumental and strategic uses) are *derived*. Habermas makes this point clearly:

> **[T]he use of language with an orientation to reaching understanding is the *original mode* of language use, upon which indirect understanding, giving something to understand or letting something be understood, and the instrumental use of language in general, are parasitic (288)**

Furthermore, Habermas claims he can *prove* that this is true, by examining Austin's well-known typology of speech acts into locutionary, illocutionary, and perlocutionary kinds:

1) locutionary- expresses states of affairs
2) illocutionary *speech-acts*- performs an action in saying something (promises, commands, avowals)
3) perlocutionary- speaker produces an effect upon the hearer
    a. Perlocutionary effects *in a trivial sense* = unintended side-effects
    b. Perlocutionary effects in a *non-trivial sense* = occurs when speakers *instrumentalize* speech acts.

In a move that isn't entirely explicit, Habermas equates the intention to "reach understanding" as belonging to the illocutionary dimension of communication.[106] He then goes on to give an exhaustive account of why the perlocutionary and illocutionary can be rigorously distinguished. In addition, he distinguishes two subsets of perlocutionary speech which he calls *trivial* and *non-trivial*. Trivial perlocutionary effects are unintended side-effects of consequences of speech, whereas non-trivial perlocutionary effects occur when speakers *use* language as a way of getting something they want (i.e. they use language as an "instrument" or tool).

Importantly, Habermas de-emphasizes the *unintended consequences* of communication, calling them "trivial." Yet, this is precisely the dimension which I am calling the *systems frame of reference*, which can be operationalized as the simultaneous interaction effects between actors in communication. Because these interaction effects are simultaneous, they can only be partially recovered *ex post*. The upshot of this idea is that the society can be regarded as self-organizing.

Habermas's key argument is that whenever someone instrumentalizes language, they presuppose using language in a way that the person they are instrumentalizing understands. He writes:

> Naturally, speech acts can serve this *nonillocutionary aim of influencing hearers* only if they are suited to achieve illocutionary aims. If the hearer failed to understand what the speaker was saying, a strategically acting speaker would not be able to bring the hearer, by means of communicative acts, to behave in the desired way. To this extent, what we initially designated as "the use of language with an orientation to consequences," **is not an original use of language** but the **subsumption of speech acts that serve illocutionary aims under conditions of action oriented to success**. (293)

Communicative action means using language to reach understanding; understanding means an effort to reach an agreement; and any other intention of language presupposes an intention to reach understanding. **Communicative action** is: "interaction in which *all* participants harmonize their individual plans of action with one another and thus pursue their illocutionary aims *without reservation* 'communicative action'" (TCA 1: 294).

Furthermore, Habermas argues that to understand a speech-act means to understand its grounds of validity, that is, to be able to make an argument for or against it (i.e. to either affirm or negate it). He writes: w***e understand a speech act when we know what makes it acceptable*** (297), and also that: "**To understand an assertion is to know when a speaker has good grounds to undertake a warrant that the conditions for the truth of the asserted sentences are satisfied"** (318).

In summary, Habermas argues that all language use is oriented towards understanding, which means that *communicative action* oriented towards an *ideal speech situation* is presupposed in all forms of instrumental and strategic action as well. Understanding a speech act means knowing

[106] Habermas writes: "Thus I count as communicative action those linguistically mediated interactions in which all participants pursue illocutionary aims, and ***only*** **illocutionary aims**, with their mediating acts of communication" (TCA 1: 295).

its conditions of validity, or being able to argue or give reasons for or against it regarding its truth, rightness, or sincerity.

The proof for a concept of universal validity is now complete:

1) Communication has three dimensions
2) All communication implies an effort at understanding, or reaching an agreement
3) Understanding means understanding the reasons for or against the *validity* of a statement
4) Therefore, all dimensions of communication can be evaluated as to its validity

It is is difficult to discern the validity of Habermas's claim that understanding is more central or important than misunderstanding; he merely asserts it. The fact that one must be "understood" in order to use language in a manipulative way seems to presuppose a definition of understanding that renders mis-understanding impossible. Furthermore, why does understanding imply an agreement, and is it not possible to communicate openly without having to decide beforehand that an agreement must be reached?[107] From a sociological point of view, however, what is more interesting is whether or to what extent social conditions facilitate or hinder the realization of the possibility of open communication and consensual steering ostensibly inherent in every communicative act. To understand this, it is necessary to examine Habermas's notion of media and communicative relief.

Habermas's Concept of Steering Media and Communicative Relief

In Luhmann's model of communication, only communication communicates and communication has no goal (telos) other than communication. This is in contrast to Habermas, for whom "Reaching understanding is the inherent telos of human speech (TCA vol. 1- Section 3; 1984: 287). For Luhmann, the *acceptance* of communication is facilitated entirely by symbolically generalized media (aka success media), which ostensibly expedite the process of linking communication to motives. Luhmann does introduce the concept as a substitute for this process, but this only foregrounds the disembodied style of his writing.

Conspicuously absent are the means of determining which messages *should* be accepted. There is no mention of the process of evaluation according to which actual people can and should assess the validity claims implied in any communication. Indeed, there is no mention of actors at all. Communication is depicted as a selection process devoid of actors. In many ways, Luhmann's theory is the obverse side of the agentic view depicted by Habermas as the lifeworld.

Habermas recognizes that communication oriented towards mutual understanding and agreement through the discussion of validity claims imposes severe burdens on the task of coordinating social actions. Modern society cannot exist exclusively on the basis of rational discussion.[108]

[107] The physicist David Bohm (2003) has proposed a concept of "dialogue", the point of which is not to reach consensus but dialogue itself.

[108] Imagine, for instance, a super-market in which the prices of each commodity are deliberately negotiated by all participants in the global production chain, and each potential customer, for every possible exchange.

Specifically, Habermas identifies two risks of communicative action: communication failure, which occurs when communication blocks the achievement of social action, and misunderstanding, which occurs whenever communication exacerbates disagreements (Hove 2009).

To explain how modern society overcomes the formidable barriers to social coordination presented by communicative action, Habermas introduces the concept of *communication relief*, which occurs whenever social coordination of action occurs by means *other than* linguistic agreement achieved by means of rational discourse. In communication relief, people are *relieved* of the demands of linguistically achieved agreement. For Habermas, communication relief takes two forms: steering media and generalized communications. In both cases, social action is uncoupled from consensus formation.

Following Parsons (1951), *media* for Habermas are means of coordinating social actions. Habermas distinguishes basic media forms: 1) communicative actions that strive to facilitate agreement based on understanding achieved via open discussion of validity claims; 2) steering media such as money and power which *bypass communication*, motivating and coordinating actions on the basis of rewards and punishments; and 3) generalized communications, which do not bypass communications, but instead *reference* validity claims, without actually engaging in a rational discourse about them. Instead, in generalized communications, people *trust* that the (cognitive or normative) claims being made are valid based on the *authority* of the persons making them. They are often facilitated by trust in authority. Examples of such authority include experts in relation to lay persons, churches, the legal system, public interest groups and moral leaders.

Whereas steering media promote *system* integration and are associated with the rise of functional subsystems of economy, politics, law, and so on, communicative actions and generalized communications facilitate *social* integration, identified with the *lifeworld*. As pointed out by Hove (2009), in his later works Habermas does not regard the steering media of money and power as exclusively colonizing forces, but also attempts to describe how, in modern society, the efficient coordination of social actions via steering media are necessary and can even promote conditions for communicative understanding. Steering media are therefore *inherently ambivalent* with respect to social coordination, for it is possible that they can be *put to communicative uses*.

Fararo's Synthesis of Parsons, Control Theory, and State-Space Modeling

One of the most important theorists in the sociological tradition is certainly Talcott Parsons. Regarded as one of the "grand theorists" of the 20th century, his efforts to devise a general conceptual vocabulary for linking together and synthesizing insights drawn from the fractured discipline of sociology and other social sciences has not always been appreciated or made clear. His works today are not widely read. Recently, Thomas Fararo has attempted to synthesize Parsons insights about social systems with the mathematical concept of dynamical systems and the cybernetic concept of control.

What follows is a brief sketch of Parson's vision of society as an action system; an explication of the **state space (or "phase space") approach** to dynamical systems modeling as spelled out by Fararo (1992) and its application to the four types of theorems derivable from this approach; and the efforts by Fararo to combine these theories with the insights drawn from control theory and cybernetics. Later, I will offer some comments on Fararo's project.

State-Space Modeling

Fararo's abiding concern is with developing *general* theoretical models, and seeks to develop dynamic state space models of action systems. Fararo organizes action systems into the following typology (1989: 155):

I. Unit Act
   A. Individual Actor
   B. Collective Actor
II. Action System
   A. Single-actor model
      1. Individual actor
      2. Collective actor
   B. Interaction model: at least two distinct actors
      1. Multiple individual actors
      2. Multiple collective actors
      3. Individual actors and collective actors

Central to Fararo's approach is the action frame of reference centered and the concept of voluntarism. In his view, and in the view of Parsons, social systems are systems of human action. Because human beings are creative, active, and evaluating organisms, Parsons contends that social systems cannot be understood apart from the concept of human *agency*. Human behavior is a process in which the actor's intentions or expectations regarding future states of affairs make some difference to the future.

Fararo attempts to elaborate Parsons's theory by translating it into the mathematical technique of state-space modeling, also known as phase-space modeling. The object that is modeled in a state-space model is called the ***behavior manifold,*** a system of interrelated components. The

components and/or relations between them are potentially in different *states* over time. In the state space approach, we are interested in the "generic set of states and corresponding variables that are utilized to describe the dynamics of any *such* system" (1989: 70). The variables are called ***state variables***, each of which possesses a range of possible values. In addition, we can combine these state variables, "treating them symbolically in terms of vector notation in which one boldface letter stands for a whole list of entities" (70). The ***state vector*** refers to the composite list of state variables. All of the possible values of all of the variables used to describe the system is called the *state space*, "the set of possible values of the state vector" (70).

Geometrically, each variable constitutes a separate dimension of the state space. The state vector defines a single point in the state space, whose Cartesian coordinates depicts its *actual* states in each of the specified dimensions (variables). The number of state variables, or dimensions, of the state space specifies its **d*egrees of freedom*.** For instance, consider the simple case of a pendulum, or a swing. Abstracting somewhat, we can consider a swing in terms of its position (e.g. height) and acceleration. Assuming the position can be depicted as a single number, we would then have a simple two dimensional state space. **In *dynamical systems modeling*, we are interested in how state vectors change over time.** This can be accomplished by simply tracing the points defining state vectors as they move across time. This "motion" or tracing of the state vectors is called a ***trajectory*.**

Importantly, a state space depicting the possible states of a system, usually presupposes some ***condition* that remains constant**. These conditions may include presuppositions. Nevertheless, the conditions might have been different, and we could have studied another system with the same state space under these different conditions. It is also possible that these underlying conditions can change over time. Using the same method outlined above for state variables, a number of variables can be included in the model (the behavior manifold) that depicts aspects of the environment of the system as depicted by the state space. Each variable is called a ***parameter***, the composite variable representing the values of the set of these parameters the ***parameter vector,*** and the set of all possible values of the parameter vector the ***parameter space*.** Fararo explains that:

> [T]he parameter space represents the various conditions of the system, either the same concrete system or different concrete systems considered to be in the same category for theoretical purposes. A particular value of the parameter vector defines a point in parameter space. It is important to note that the conditions may shift or change smoothly in the referent concrete system, so that parameter change is not ruled out in the study of dynamics by means of this model object. But at least in the initial study of a family of theoretical models, the parameter vector may be treated as fixed while the vector in state space traces out a trajectory. Then, at another phase in the analysis of the model, the element of parameter change is treated" (1989: 71).

In summary:

> a space is a set of possibilities for a system. Two spaces have been defined: the state space and the parameter space. The two taken together (formally, their Cartesian product)

> is called the *behavior manifold*. The basic model object of dynamical systems theory is the behavior manifold together with some representation of time in terms of some discrete or continuous space of possible time" (1989: 71)....

Importantly, for Fararo, **the purpose of *theory* is to explain the trajectories exhibited over time by concrete systems by means of equations that *generate* the observed trajectories, as a function of the initial state (the starting point representing the state vector) and the parameters.** For Fararo, the "explanation" is the equation that generates the trajectories. A single trajectory should be derivable for each combination of initial conditions and parameter conditions. Fararo contends that "the appropriate mathematical form is a difference equation or system of such equations if the state space is multidimensional" (72).

> A theoretical model, given this model object, consists in some postulated or derived *generator* of changes of state. If the trajectories are considered as simply "given," we have no theoretical model. They must be derived (1989: 71).

For example, consider a dynamical ecological system such as a predator-prey relationship, taken in conceptual isolation from other interactions the two **predators and prey** entertain with other species. The states to be considered are their population sizes, which vary dynamically with each other. This system has been represented in the following form:

$$\frac{dx}{dt} = ax - bxy$$
$$\frac{dy}{dt} = cxy - py$$

where *x* is the population size of the prey, and *y* is the population size of the predator. If $y = 0$, then the population of prey would grow exponentially with the "growth rate per individual given by parameter *a*" (73). The term *xy* represents the total possible interactions between the two species and the coefficient *b* represents the probability of a kill. These kills subtract from the prey population, represented in the first equation. If, on the other hand, there are no prey the predator population (*y*) would die out. The four parameters (*a, b, c, p*) "'condition' or 'control' the dynamics of the interdependent population changes" (73). **They can be regarded as either constant or time-varying.** The system of differential equations represents the **mutual dependency** of the two species. The vector notations can be written as follows. The state vector can be indicated by writing $\mathbf{x} = (x,y)$, and the parameter vector by $\mathbf{c} = (a, b, c, p)$. In general, for any behavior manifold, a dynamical system may be represented in the form (74):

$$\frac{d\boldsymbol{x}}{dt} = \boldsymbol{f}(x, c)$$

where *dx/dt* is the derivative, or rate of change, of the state vector. In general, there are as many functions as there are components of the state vector. In the ecological example above, for instance, there are two functions, given by the two equations. Importantly, the equation, when combined with an initial state, or initial condition, of the system is said to *generate* the system's

trajectory. Since the trajectory depends on the initial state, the specific trajectory or behavior of a system can be written as:

$$\{\boldsymbol{x}(t)\} = \boldsymbol{g}(\boldsymbol{x}0, \boldsymbol{c})$$

where $\mathbf{x}_0$ is the initial condition of the state vector. Importantly, this system exhibits *recursive generativity*, in the sense that the previous state of the system goes into the next state. The entire trajectory therefore depends on the initial conditions and the parameter values. This will become important later. This can be illustrated more clearly using a discrete time version of the equation above (cite). So for instance, the next two states of the system can be depicted as:

$$\boldsymbol{x}' = \boldsymbol{f}(\boldsymbol{x}0, \boldsymbol{c})$$
$$\boldsymbol{x}'' = \boldsymbol{f}(\boldsymbol{x}', \boldsymbol{c}) = \boldsymbol{f}\{\boldsymbol{f}(\boldsymbol{x}0, \boldsymbol{c}), \boldsymbol{c}\}$$

and so on.

Consider also a system in which the rate of change is zero. This would mean that the generator would satisfy the equation:

$$\boldsymbol{f}(\boldsymbol{x}, \boldsymbol{c}) = 0$$

Fararo calls this the *equilibrium state* of the dynamical system. It is important to emphasize, however, that in the state space approach to dynamical modeling, equilibrium does *not* necessarily mean no change. It depends on the meaning of the state variables. For instance, the state variables could be defined as growth rates. In the ecological system of equations above, the equilibrium state of the system would then refer to invariant rates of growth. In addition, the *equilibrium state depends on the parametric conditions*. If the these conditions change, so will the equilibrium states. Fararo prefers to interpret the **equilibrium state as an "adjustment of the state variables to each other and to the parametric conditions" (77)**. Finally, the discovery of an equilibrium state via state space modeling does not mean that the system will actually exhibit an equilibrium state. Instead, the **existence of an equilibrium state means that "*if* the system is ever in a particular equilibrium condition, *then* it will remain in that state under the given conditions (value of c)" (77).** Accordingly, **equilibria can either be *stable* or *unstable*.** The former are called ***attractors*.** This means that if the state of the system is near the equilibrium condition, it will remain close to it. Unstable equilibria are called ***repellors*.** Systems whose vector states are a small distance away from the repellor will move increasingly farther away from the repellor over time. Fararo recapitulates this distinction in relation to the concept of equilibrium state: "**To reiterate ... the term *equilibirum* does not mean 'no process'; rather, it means an attractor of process in the case of a stable equilibrium and a repellor of process in the case of unstable equilibrium" (85).**

Using the dynamical systems approach, Fararo suggests that four core sets of problems emerge for general theoretical sociology: theories regarding the *emergence, maintenance, comparison and transformation* of social structure (94). More specifically, he argues that this approach points to a logic of investigation in which "operationally meaningful theorems" (87) can be deduced from the premises of the model. These theorems regard:

1) the conditions under which equilibrium states exist;
2) the classification of these equilibrium states as repellors or attractors (i.e. their stability);
3) how the equilibrium states vary with changes in the underlying parameters; and
4) **the way that system trajectories can feedback upon the parametric conditions.**

The last theorem-type is sometimes called **catastrophe analysis**. It investigates how the parametric conditions themselves can change over time, and how the system states can cause slower changes in its parametric conditions. The crucial difference between the state vector and the parameter vector then becomes the rate at which they change, with the parameter vector changing slowly. If a feedback link is posited between the state space and the parameters, then the *system can change its own conditions*. In other words, the trajectory of the system across time can cause slow changes in the parametric conditions. If a certain threshold is crossed, the changes in the parametric conditions can generate radical transformations in the behavior of the system, such as generating new equilibrium states.

Control Theory

The most important aspect of action is what Fararo refers to as the "control principle of action" (1989: 159), where "control" is used in the cybernetic sense and which means to keep some perceptual input near some reference value. Formally, Fararo defines the control principle of action in the following way: "The actor in a situation is a negative-feedback system, and a unit act is an episode of negative-feedback control" (1989: 166). Action is the *control of perception* (Powers 1973). Cybernetics is the study of goal-seeking systems that operate via negative feedback. The control principle of action states that actors act so as to minimize the difference between their perceptions (input) and their internal reference standards ("goals"). The negative feedback process can be analytically decomposed into three sub-processes:

1. A perception function (detection, input)
2. A comparison function (compares the perception to a reference standard)
3. A behavior function (output)

The ideas of values and norms are particular instantiations of the general idea of a reference standard. Notice also that no anthropomorphism is intended. Machines such as the heating a cooling system controlled by a thermostat operates according to the control principle of action.

According to Fararo, the control principle of action is essential in giving any realistic account of how social order emerges. Cybernetic control also foregrounds the problem of social order as a central problem for general theoretical sociology, because competing control systems suggest that disorder and conflict, rather than order and cooperation, are to be expected (1989: 177). Fararo seeks to answer the general question: how is social order really possible? How are shared goals, expectations, and orientations accomplished so as to coordinate actions? Can it be derived from the control principle of action at the micro-individual level?

Fararo regards the classical tradition (Marx, Mead, Durkheim, and Weber) as in large part presupposing a given social order. This orientation is shared by Parsons, who regards a common moral value system as the precondition of social order. Fararo treats Parsons as a cybernetic theorist. Parsons (1951) develops a model of society in terms of a cybernetic control hierarchy, but largely restricts his analysis to the problem of *institutional pattern* maintenance, rather than to generative/causal mechanisms of pattern maintenance.[109] Consequently, Fararo writes that his theory fails to "show how, in detail, the human organism was 'under control' in the sense of a hierarchy of feedback mechanisms that included such entities as values, norms, and roles" (2006: 5).

Although the actions of individual humans can be regarded as cybernetic control mechanisms, the same attribute cannot simply be imputed to supra-individual actors. Instead, Fararo's ultimate ambition is to logically derive collective control processes from the (horizontal) coupling of individual (hierarchical) control systems (i.e. individual agents). Social order then entails control systems attempting to control each other. Unlike machines or individual organisms, then, social cybernetic control mechanisms are not hard-wired, but rather distributed, and thus uncertain and unstable. Fararo acknowledges that the sheer complexity of interactions, even in the simplest case of a triadic actor network, renders this potentially impossible.

Following Parsons, Fararo selects four variables to define the state space of social relations, considered generally. These correspond to the AGIL schema. According to Fararo, four problems are said to confront any social group: "*adapation (A)* to the environment, group *goal attainment (G)*, social *integration (I)* of the participants, and *latent pattern maintenance (L)*, a fusion of cultural and motivational problems of group process" (179). The generic formula for the state space interpretation of this model of human interaction can be written as:

$$d\boldsymbol{s}/dt \;=\; \boldsymbol{f}(\boldsymbol{s}, \boldsymbol{b})$$

where **s** = (**L, I, G, A**). This formula can also be elaborated in terms of a system of four interdependent equations. Fararo also decomposes the AGIL relational categories. Fararo (1992: 181) decomposes the AGIL dimensions further into the following sub-states, where indenting indicates levels in the hierarchy, where lower levels are constrained by higher levels:

L: action pattern maintenance = cultural dimension
  LI: cultural integration = value dimension
    LII: value integration = moral value dimension
I: action integration = social dimension
  IL: social pattern maintenance = fiduciary dimension
  II: social integration = communal dimension
  IG: social goal attainment = political dimension
  IA: social adaptation = economic dimension

[109] According to Parsons, the shared norms underlying institutional patterns must satisfy two conditions: 1) the norm must be widely shared and considered desirable, and 2) the norm must not be considered utopian, that is, ordinary people expect themselves and others to be able to live up to it. An *institutionally-integrated social system* integrates moral sentiments and self-interest sentiments.

G: action goal attainment = motivational dimension
GI: motivational integration = conscience dimension
A: action adaptation = cognitive dimension
AI: cognitive integration = mental model dimension

The obvious question is then in what way are the AGIL scheme and the control principle of action related? The immediate answer is that there is no direct relation. Fararo does, however, suggest a partial, indirect linkage, specifying that:

> dimensional states of the AGIL scheme can each be interpreted as lists of *pairs* of states: (actual, ideal). Also, the ideal term can be in a latent state, saved in memory, or in the active state, retrieved from memory..... The general correspondence that is suggested, then, is that a state variable in the AGIL scheme describes the *state of a normative control mechanism with all its component cybernetic functions of input, output, comparison, and memory* (1989: 185).

Fararo interprets the AGIL dimensions as components of a cybernetic control hierarchy. Parsons hierarchy runs from values to norms to goals to operations. How do these map on to the AGIL scheme? Fararo interprets the four dimensions of AGIL as a hieararchy rather than a heterarchy. Fararo suggests that moral values might be identified with **LII**. The next level down, norms, would correspond with **I**, "involving control of social expectations through norms" (185), and functionally differentiated norms corresponding to the four sub-states of **I**. Fararo identifies the goal level with **GI**, and finally, the lowest operative level with **AI**.

The details of this are a little unclear, perhaps because of its sheer complexity. Each dimension is interpreted as a kind of relation, or role. Individuals thus inhabit four generic role types, that can be switched on or off. Importantly, Fararo interprets the AGIL dimensions, originally conceived of as a four preconditions for *social* integration, as a four level control hierarchy characterizing the *individual*. Below is an adaptation of Fararo's visual depiction of a horizontal coupling of individuals as cybernetic control systems:

$$[\boldsymbol{L} \rightarrow \boldsymbol{I}\ (IL, II, IG, IA)\ \rightarrow \boldsymbol{G}\ \rightarrow \boldsymbol{A}] \rightarrow\leftarrow [\boldsymbol{A} \leftarrow \boldsymbol{G} \leftarrow \boldsymbol{I}\ (IL, II, IG, IA) \leftarrow \boldsymbol{L}]$$

The arrows indicate top-down control, and the backward, bottom-up arrows are omitted for simplicity. In this model, the interface between the two individuals occurs at the bottom-level of action. Values constrain norms, which constrain goals, which constrain actions. Actions can be regarded as the output of the control system. In this depiction of horizontal coupling, the output of another individual becomes part of the input of another. In other words, they mutually disturb one another, activating further control efforts. Exactly how this occurs, however, is not explained. If action is the control of perceptions, then one's actions, as well as other non-controllable environmental disturbances, such as another's actions, will influence the perceptual input, and therefore the subsequent behavioral output, in an ongoing feedback loop. The kind of interaction is left unspecified. For instance, are the two actors mutually observing one another, or mutually aware that they are mutually observing one another, or engaging in a common activity, or observing the same perceptual object, or observing different perceptual objects but

interacting nevertheless in other dimensions via their perceiving, or attempting to manipulate common or related objects in the environment, or attempting to manipulate each other?

Fararo interprets this general schema in terms of networks of actors relating to each other via various roles. The categories of AGIL represent then, situations, or relational types, or roles that can switch on and off. For instance, a married couple who also entertain a professional, working relationship can be said to entertain a multiplex tie. Given two individuals in interaction, the model specifies that they will relate to one another in four dimensions, or in four relational (or "tie") types. The relation itself can be modeled as an input-output matrix. Each person then, insofar as they relate to another in each of the four dimensions, will be simultaneously controlling four different reference signals, and generating four different types of output, and the outputs of one actor will become part of the input of the other actor. *Processes of collective control are multi-dimensional.*

Comments on Fararo's project

It is possible that a person may enter into both cooperative and conflictual relations with another or within himself at the same time. Society then consists of a four dimensional space, representing the AGIL functions, and a set of points or locations in this space representing the individual actors in relation to one another, at a given moment in time? One would expect that these would constitute different sorts of processes. Furthermore, it isn't clear how this describes collective control processes. In this depiction, all that necessarily happens is that each actor in some way perturbs some aspect of the environment of the other, which ostensibly, should enter into the other's (conscious or unconscious) perceptions. The problem is that a pebble on the ground would do the same thing, meaning that the model is too broad to depict any kind of structural, or as Leydesdorff (2003) prefers, "operational coupling." This is complicated enough, but also, people relate to *representations* of actors directly, in terms of their perceptions of the other four levels. This is especially the case when dealing with impersonal, public, anonymous, or otherwise non-intimate relationships. This suggests that we are affected not only by the actions of others, but also by what these others and their actions, *mean*.

Fararo, committed to the idea of a modeling social relation as networks, tries to synthesize the state space approach with the network approach in terms of cybernetic control theory. This model is already exceedingly complex and unwieldy in conceptual design. It is difficult to comprehend the interaction of two actors, much less larger aggregates of actors and/or collective actors. Numerous questions arise. What is the relationship between the four components A, G, I, and L? Within the individual, do they constitute a hierarchy or a heterarchy? Might the importance attached to each component vary according to time and interaction setting? Are the behavioral outputs of individuals classifiable into these relational types, or is there a single output, that can be regarded from the reference frame specified by these dimensions? Moreover, how is collective control actually engendered?

Whereas Parsons conceives of the AGIL scheme as a description of society, Fararo internalizes this schema in the individual. The former aggregate pattern, however, cannot be deduced from

the latter, unless commonality of reference signals (in each of the dimensions) is presupposed.[110] In other words, social order can only be explained by reference to social order and to the extent that social order is already presupposed or given factually as the correspondence of reference signals. In what way, then, can this model become a *generator* of social order, in the sense specified by Fararo?

I do not think that these questions have apodictic answers. The theoretical thrust of Fararo's version of general theoretical sociology is the derivation of theorems by logical deduction, given the premises of the model. I would counter that the *interpretation* of such logical derivations (the rules of which strictly speaking refer to abstract symbols) cannot be deduced. This does not mean, in my opinion, that the state space framework cannot be a useful way of looking at social phenomena, but this framework simply cannot attain the level of "scientific" rigor to which it aspires. In particular, the contingency of the approach with respect to its model specification and interpretation introduce irreducible uncertainty into the analysis, even if confined to the "general" case.

Fararo conceptualizes the integration of "society" and its functional sub-systems as the inter-relation of individual actors. To the extent that individuals interact, they can constitute a social structure, or fail to. The differentiation of society, on the other hand, is conceptualized as the proliferation of roles that one may adopt vis-a-vis another. In this model, then, the index of social (dis)integration consists in the number of ways a person can relate to another. On the other hand, adopting the situation, rather than the individual, as the unit of analysis, social (dis)integration can be measured by the number and similarity of types of situation in the social universe, or some subset, however defined or demarcated.

The **economy**, for instance, can be regarded as a kind of relational tie, among many, in a vast web of multiplex relations, or as a kind of subset of general role orientations specifying a generalized expectation or comportment towards a generalized other. In this way, the economy can be regarded as being "embedded" (cf. Granovetter 1985) in a larger social context.

The unity of society is provided by the similarity of the highest normative principles governing the cybernetic control hierarchies within each individual. Society, then, is *in* the individual. This can be understood as the result of an ongoing process of the internalization of societal norms and values. For society, *in general*, to be possible, there must be an overlapping between individuals of their highest, most general, normative references, as in a Venn Diagram. The boundaries of society would then be coterminous with the shared norms (conceived of as the mutual information or coupling of the actors). This level of generality, however, really does not get us very far. For instance, what distinguishes societies integrated by means of mechanical or organic solidarity in the Durkheimian sense, or societies characterized as segmented, stratified,

[110] It might be possible, however, to generate social patterns as the unintended outcome of cooperative-conflictual efforts to control some common object in a shared perceptual environment. It may even be possible to generate unintended interaction effects via the externalities generated by means of the control strategies of individuals aimed at controlling separate objects in a common environment. Furthermore, what is the object corresponding to the perceptual object of control? Is it another person, an inanimate object? Powers (1998) warns that efforts to control other control systems are bound to fail, by their very nature. None of this is discussed or elaborated.

or functionally differentiated, in the Luhmannian sense? How does it become possible that an actor coordinates with another at a far greater level of specificity so as to make increasing societal complexity and differentiation possible? This highest, most abstract principle is precisely the one that holds society together, which implies an attenuation of social bonds, generally speaking, but which does not preclude the possibility that tighter couplings can be generated via "involutions" in the network (cf. Fuchs 2001).

This cannot be broached by a theory which takes as its starting point, the actor, qua consciousness or even one delimited by the principle of cybernetic control. The problem is not only that Fararo seeks to bridge the micro-macro divide (cf. Alexander 1987). The problem Fararo sets out to solve is even more intractable: the problem of linking in a systematic way mind and society, via the concept of control. The coordination or lack thereof between control mechanisms remains to be specified. At most, shared norms, taken as a cultural given (which unlike biological parameters would then have to be explained via *generators* represented by systems of differential equations), might prevent such things as conflict, but this isn't necessarily the case.

The problem, as I see it, is that the stability and endurance of social structures, which exhibit collective control, cannot be grasped analytically by following the individual actors. In other words, in order to derive analytically and then measure the relative endurance of a network structure, one must specify first the network structure itself, and then determine what individuals and to what extent participate in the maintenance of this network structure identified as pattern. In network theory, this has been referred to by the terms *regular equivalence*. Two different bullies can be identified as such by their common relations with the bullied, even when those who are bullied are not the same persons. The pattern of relations remains analytically independent of the persons occupying the positions specified by the relational structure. Although networks presuppose actors, structure and agency can be regarded as *coupled* yet analytically distinct.

The problem lies in the irreducible gap between the incomprehensible complexity of the system of possible relational ties and the complexity of the theoretical system of ties conceivable by psychological theory. The theory of rational choice, and the commitment to methodological individualism, is both too narrow and too general for purposes of analyzing distributed control, that is, society as a self-organizing system. To posit as a presupposition of theory that "*change of action is in the direction of increasing utility*" (222) is too broad in the sense that such a principle can specify neither the means nor the ends of action, and is too narrow because as Luhmann has written, it is certainly not a general case that action seeks to maximize utility, unless utility is taken in the very broad sense of corresponding to any and all control efforts (constituting a decline in the discrepancy of perceptions and internal references, provided that control efforts are relatively successful). *The difficulty lies not in the state space approach per se, which is especially useful for conceptualizing possibilities, but rather, the range of the theory is delimited by the action interpretation ascribed to it*. What from inside the theory is an enabling space or horizon can be seen from without as a constraining limitation. The capacity of reflexive consciousness ensures that these perspectives will oscillate.

Although social structure can be regarded as the results of unintended consequences of rationally adaptive action, the former cannot be substantively theorized from the perspective of the latter. In other words, from the perspective of the individual actor, shit happens. Collectively generated consequences can be regarded by an individual in so many ways (i.e. be provided with various meanings, from karma, to personal failings, to more sociologically imaginative understandings), but they are all basically residue, or noise, or a stochastic error term, from the perspective of individual actors. Using the language of statistics, it is the latent patterns in the error terms that generate the manifest patterns of unintended consequences. Using the language of cybernetics, the stochastic noise of a control system are those environmental disturbances that make control efforts necessary by placing perceptions in flux.

II. MARKET ORDER, DISORDER, AND EMBEDDEDNESS

How do we define an economy, and how might economic processes relate to non-economic processes, i.e. the rest of society? How is market order engendered? Granovetter uses the spatial metaphor of an economy being 'embedded' within society; Parsons and other systems theorists also use analytical distinctions to write about the economy as if it were a part of a larger whole, using the language of sub-systems and systems. What if, however, the economy is not a thing at all but an expectation, differentiated from other expectations with the aid of codified communication? What if the economy did not consist of parts and relations, but instead was composed of temporalized events that either happen or don't? Moreover, how would such a system relate to other societal systems? Below I first discuss the empirical data regarding the recent financial panic of 2007-8, including empirical indicators of market uncertainty. Next, I discuss sociological approaches to the problem of how *market* order is facilitated or not. Specifically, I discuss Granovetter and the concept of embeddedness, Parson's theory of the unstructured situation, and Luhmann's account of the economy as a system of autopoietic payments.

Economic Sociology and the Problem of Embeddedness

Economic sociology can be defined as the field of inquiry pertaining to the social or non-economic conditions of the economy, encompassing economic processes and actions within their social setting (Zafirovski and Levine 1997). Economic sociology connects the economy with society *as a whole*, examining the social construction of the economy and its embeddedness in non-economic social relations. From the perspective of economists, economic sociologists study influences and preconditions that are exogenous to their model of markets. These exogenous factors include: technological changes, the determination of desires and preferences, the family and other socializing institutions that provide labor for the labor market, trust and other mechanisms of social cohesion that are necessary for market coordination and cohesion, and so on.

Economic theory begins with the premises of individual utility maximization and rational choice in order to explain how markets generate Pareto-optimal results, that is, the best of all possible worlds, or the most efficient allocation of resources. Economic sociology (e.g. Beckert 2006) has shown, however, that there are circumstances in which Pareto-optimum results cannot even be *logically* deduced from the premises of the rational actor model and utility maximization, much less empirically warranted. More specifically, the model of *homo oeconomicus* cannot explain the emergence of the **shared norms** that are required for cooperation to take place, which presents a fundamental limitation of economic theory to the extent that such cooperation is

necessary for production and exchange to occur at all. ***In short, nonmarket mechanisms of coordination have to be invoked to explain how markets work.***

Jens Beckert (2002) provides a comprehensive overview of the contributions that classical sociological theorists (Durkheim, Marx, Weber) and modern theorists (e.g. Parsons, Luhmann) to the field of economic sociology, and its relation to economic theory. Beckert carefully formulates an internal criticism of economic theory that does not begin by examining empirically-observed discrepancies, but rather shows, "why the normative claims of the theory are untenable" (2002: 9), *given its own premises*. In other words, Beckert intends to show that if the core axioms of economic theory are taken for granted, they do not, by themselves, generate the kinds of efficiency outcomes that are frequently attributed to them and that provide justification for markets.

What are the axioms of economic theory, what Beckert also refers to as the rational-actor model? He identifies two:

> 1) Actors maximize their utility; and
> 2) decentralized processes exist (or strive towards) an equilibrium in which actors can achieve an optimum realization of their plans.

The second axiom is said to derive from the first. If actors are free to maximize their individual utilities, they will generate Pareto-optimal outcomes, in which no actor can be made better off without making at least one other actor worse off. It follows that the best of all possible worlds is achieved in a perfectly free market. The rational-actor model thus recapitulates mathematically Adam Smith's well known theorem of an invisible hand.

Rational-actor theory has often been subjected to two kinds of criticisms, both of which Beckert contends are misplaced. First, economic theory assumes that preferences are given and does not examine how they emerge as does, for example, Parsons (1951 chapter 3). Beckert argues, however, that this does not indicate that economic theory is wrong, only that it is incomplete. The second criticism is that actors are not empirically rational. But if actors do not follow rational calculations for making decisions, how are decisions made, and how can rationality be distinguished from irrationality?

Robert Frank (1988) distinguishes between *irrationality with regret* and *irrationality without regret*. The former occurs whenever an actor makes a suboptimum decision and when provided with a superior alternative revises his previous decision, whereas in irrationality *without* regret he does not. Beckert argues that *irrationality with regret* demonstrates that economic theory does not represent "the empirical diversity of economic action" (12), since actors, because of a lack of information or other reasons, often fail to adopt the strategies of action prescribed/predicted by economic theory. This may be so, but Beckert points out that this hardly affects economic theory because economic theory doesn't claim that the model of *homo oeconomicus* describes the actual behavior of actors. Instead, the presumption of rational action can be defended as a heuristic apparatus.

The question then arises: what justifies this concept of rationality, and not some other? Three answers can be provided:

1. Businesses require optimization decisions under conditions of competition
2. "efficient use of resources is one of the most basic conditions of fulfillment of adaptive functions in all societies" (2002: 14)
3. In modern societies, action geared towards self-interest is legitimized in market contexts

In short, there is a justification for emphasizing the role of "purposive rationality" in analyses of economic processes. Furthermore, deviations from this standard of rationality in the form of *irrationality with regret* indicates, from the perspective of economic theory that actors should be made more aware of their action alternatives. Economic theory is normative, its function consisting of "informing actors about optimal strategies" (2002: 14). For these reasons, pointing out the discrepancies between the predictions of economic theory and the empirical existence of irrational behavior with regret is not an adequate "starting point for a sociological criticism of economic theory" (2002: 14).

But what about *irrationality without regret*? Do action strategies that *deliberately and knowingly* lead to suboptimal results provide a sufficient starting point for a critique of economic theory? Certain examples of this sort of behavior include altruistic acts such as returning a wallet or leaving a tip at a restaurant that you do not plan on visiting again. One way of addressing the problem of altruism has been to expand the concept of rationality so as to include the utility derived from pursuing morally right actions. It is therefore possible to act in one's own best interest while pursuing altruistic acts because of the utility or satisfaction obtained from acting altruistically, which would outweigh its costs. So long as the preferences are consistent, a Pareto-optimal equilibrium arising from individual utility maximization can still be deduced.

Altruistic acts can be considered as selfish acts, and vice-versa. As Beckert notes, however, this makes the concept of rationality a tautology and merely "defines the problem away" (2002: 16). Beckert maintains that pointing out the existence of *irrationality without regret* is not an adequate starting point for a sociological critique of economic theory. He provides two reasons. First, business decisions, even if they are not determined by the market, are never intentionally irrational or altruistic. Even when their decisions do not lead to an optimal maximization of profits, they regret having made these bad decisions in hindsight. Second, empirically it can be shown or at least argued that actors *in economic contexts* are almost always "oriented toward their own self-interest" (2002: 16). In short, irrational behavior with regret is a marginal phenomenon within economic contexts, and therefore a sociological critique of economic theory based solely on these exceptions would limit itself to so-called deviant cases (2002: 17).

Instead Beckert proposes that economic sociology should begin "not in a criticism of the action model of *homo oeconomicus* per se but rather in the critical question behind both assumptions of economic theory- that, by action following the premises of the theory, actors, can, in principle, achieve efficient equilibria; and that, even in extremely contingent action situations, actors can derive optimizing decisions from their preference order" (2002: 17). Irrational action, he

argues, can sometimes be regarded as a means of solving these problems, and also points to the "*embeddedness* of economic action as a foundation of economic efficiency" (2002: 18: my emphasis).

Beckert's main point is that efficiency cannot always be generated from the premises of the rational-actor model. Rather than criticizing the theory on the grounds that the premises are empirically invalid, Beckert takes them for granted, but argues that, by themselves, they are insufficient conditions for demonstrating that markets generates Pareto-optimum outcomes. To secure theoretically optimal outcomes, rational actor theory must be supplemented with additional insights imported from economic sociology.

As he phrases it, sociology is needed to explain why *market failure* does *not* occur. The problem, however, is that his use of the term "market failure" exhibits a tendentious ambiguity. If by market failure he simply means that markets do not reach some theoretical optimum, than it is by no means certain that the markets ever avoids "market failure" in this restricted sense. Moreover, in light of recent events, the orientation of this research agenda seems grossly out of synch with market realities.

Beckert's research agenda, in my opinion, is oriented towards proving what economics already presumes: the efficiency of markets. Economic sociology points out that economic theory has not proven markets are optimal means of allocating goods and services, but takes for granted that they are, in fact, optimal means of allocating goods and services. The purpose of economic sociology, according to Beckert, is ultimately to provide the argumentative resources necessary to render even more convincing the economic justification for markets. Sociology becomes the handmaiden of economics, safeguarding for it the claim that rational actions are the road that leads to the best of all possible worlds.

Political and Economic Order: Granovetter and Embedded Markets

In a review of the field of economic sociology, a useful place to begin is Granovetter's 1985 article "Economic Action and Social Structure: The Problem of Embeddedness", which according to Fligstein and Dauter (2007) is the most cited paper in sociology in the postwar period. As Jens Beckert (2002) notes, the term embededdness because of its "illusiveness" does not directly lead to an operationalization of the research process. Sociologists since Karl Polanyi have used the term to mean different things, but in general, what the term **embeddedness** denotes is the idea that in order to understand individual economic action, it is necessary to investigate the **social context** in which this action takes place.

Granovetter's main concern is in finding a way of talking about the economy and economic action in a way that does justice to **the problems of social order**, namely, to develop an approach that would provide an adequate account of how social order is possible both within and between macro-actors such as firms that compete in a market. He argues that most accounts of economic actions are either under-socialized or over-socialized, and that both rely on a view of atomized actors. Under-socialized accounts conceive of economic actors as atomized, utility

maximizers without morals, relationships, feelings, or any of the other recognizable features that make us human, apart from those that can be modeled by differential optimization problems. This approach is characteristic of micro-economics and rational choice theory. On the other hand, over-socialized accounts treat behavioral patterns as the result of unproblematic socialization processes in which individuals unquestionably internalize the values and norms bequeathed to them by society at large. This approach is characteristic of Durkheimian sociology and Parson's structural-functionalism.

Granovetter writes that in the over-socialized accounts:

> Social influence ... is an external force that, like the deists' God, sets things in motion and has no further effects- a force that insinuates itself into the minds and bodies of individuals (as in the movie *Invasion of the Body Snatchers*), altering their way of making decisions. Once we know in just what way an individual has been affected, ongoing social relations and structures are irrelevant. Social influences are all contained inside an individual's head, so, in actual decision situations, he or she can be atomized as any *Homo economicus*, though perhaps with different rules for decisions." (486)

The behavior of individuals, in other words, is the determined outcome of social role positions that are already established *ex ante*. The socialization process, often not well defined, is no longer in process. Social relations are frozen, so that agency becomes a mere epiphenomenon of a hypostasized social structure. Economic actors are atomized because their actions are functions of a previous process of socialization that is uninfluenced by extant relationships and social contexts. The process of decision making is still determined and contained within an individual, only the algorithm that determines the decisions has changed.

One issue that has been addressed within economic sociology primarily from under and over-socialized perspectives has been that of trust in economic relationships. Thomas Hobbes had pointed out that there is nothing in the notion of self-interest that excludes force or fraud. If economic actors are really individual utility-maximizers without regard for others, then what prevents them from reneging on their contractual obligations or from stealing? In other words, under the restrictive assumptions of the relentless pursuit of personal pleasure, is a market even possible?

A contemporary under-socialized account, the new institutional economics, which seeks to explain social institutions from a neoclassical economics perspective, argues that institutional arrangements avert anti-social behavior by making it too costly for the individual actors to engage in it. This retains the premises of atomized individualism, while obviating the barriers to trust that such premises engender, by positing functional substitutes for it. Granovetter argues that such accounts ignore the obligations inherent in concrete personal relations (489). Furthermore, dismissing the reality of personal obligations by substituting organizational sanctions against anti-social behavior results in a "Hobbesian situation, in which any rational individual would be motivated to develop clever ways to evade them; it is then hard to imagine that everyday economic life would not be poisoned by ever more ingenious attempts at deceit" (489). The "problem" of trust, which is a precondition for the possibility of markets, cannot be

solved with this approach.

For Hobbes the guarantor of order is the state. Durkheim posited the existence of a pre-contractual solidarity that acts as a kind of social glue, binding people together in a moral community. This pre-contractual solidarity had its basis in shared experiences and feelings of belonging or togetherness, primarily generated through participatory rituals and other symbolic acts. The problem, for Granovetter, of explaining trust on the basis of some generalized morality is that it has "the oversocialized characteristic of calling on a generalized and automatic response, even though moral action in economic life is hardly automatic or universal..." (489). Moreover, he points out that a generalized morality, is only applicable to specific and marginal cases, such as when an economist tips at a restaurant that (s)he is unlike to visit again in the future (489). Granovetter contests the explanatory power of a general morality that is internalized within economic actors. In short, Granovetter argues that "social relations, rather than institutional arrangements or generalized morality, are mainly responsible for the production of trust in economic life" (491).

To avoid the perceived risk of being overly "optimistic" (491) about securing a harmonious social order (an accusation frequently directed towards Parsons), Granovetter suggests two caveats. First, he points out that embededdness is a matter of degree, and does not totally remove instances of distrust and disorder. Second, he insists that social relations are necessary but insufficient for eliminating malfeasance. He notes that trust between actors itself presents "enhanced opportunities for malfeasance" (492); that force and fraud can be carried out by cooperative teams; and finally, that the extent of disorder resulting from fraud or force varies according to the structure of network relations.

Disorder, in other words, is not necessarily coterminous with violations of trust, and there is no point-for-point correspondence between them. For example, a large scale war actually presupposes networks of social relations, because otherwise conflicts are merely episodic and transient.[111] To illustrate how his approach differs from previous attempts to understand the relationship between markets and social relations, Granovetter engages in a detailed critique Oliver Williamson's *Markets and Hierarchies* (1975).

Williamson's study addresses the differences between economic activities within and between hierarchical firms. Williamson posits a co-relation of disorder *between* firms and an alternative co-relation of order *within* firms, and attributes the states of disorder and order to the absence or presence of structures of governance, respectively, which serves as a substitute for trust. Granovetter calls this a Hobbesian argument that exaggerates the efficacy of firms to generate internal order, while under playing the social order between firms generated by social relations. Granovetter argues that the first account of order within firms is over-socialized, and the second account of order between firms is under-socialized.[112] Granovetter specifically takes issue with

[111] Note, however, that Granovetter equates war with disorder, and then says that they depend on a kind of "order". He does not adequately distinguish disorder from violations of trust. In my view, violations of trust are orthogonal to the issue of order.

[112] In brief, Williamson argues that transactions that are uncertain in outcome and recur frequently are internalized within firms because the authority structures of firms are more efficient at taming the enhanced risks of opportunism

Williamson's assertions that "complex market transactions approximate a Hobbesian state of nature that can only be resolved by internalization within a hierarchical structure" (495). It is important to note that Granovetter is not disputing the claim that transactions within firms might be denser or endure longer than relations between firms. He is only pointing out that transactions across firms and organizations are also embedded in social relations, and that these relations exhibit order to a degree unexpected in Williamson's theory. Granovetter mentions the existence of interlocking directorates and subcontracting as examples of the overlap between business and social relations that exist between firms in the market, suggesting that these social relations develop because of the benefits associated with them.

Granovetter's explication here is unconvincing. It is unclear whether he is providing a refutation based on the premises of the theory he claims to be criticizing, or providing a criticism of those premises. Here, he appears to be doing the former: explaining why it is rational for individuals to generate social relations. Another problem is that he never clearly distinguishes social from business or economic relations. Can we really consider sub-contracting a social relation and not a business relation?

Specifically, he argues contra Williamson that hierarchies do not emerge to solve the problem of order, because "long-term relations of contractors and subcontractors, as well as the embeddedness of those relations in a community of construction personnel, generate standards of expected behavior that not only obviate the need for *but are superior to pure authority relations* in discouraging malfeasance." (498: my emphasis). Williamson argues that hierarchies solve information and communication problems particularly for labor markets where firms can rely on internal promotions, but Granovetter counters this by arguing that information about employees also spans across firms and that social networks link actors within different firms.

Summary

Granovetter rejects the assumptions that order reigns *within* firms, and Hobbesian disorder reigns *between* firms, arguing that disorder can be found *within* firms and order *between* them. On the one hand, power relations within firms are far less successful in quelling conflict than empirical studies indicate. On the other hand, asymmetrical power relations between firms often quell potential conflicts, since weaker firms are "apt to capitulate early so as to cut its losses" (502).

Granovetter proposes that levels of order and disorder have less to do with organizational form than Williamson expects, and "more to do with structures of [social] relations" (503). Granovetter fails, however, to explain the difference between social relations and organizational form. By "structure" of social relations, does he mean "organizational form" of social relations, as opposed to "organizational form" of economic relations?

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and other disorderly acts that arise in these situations. It presupposes that there are "sets" of transactions that exist prior to being located within or between firms. He argues that transactions that are uncertain in outcome and frequent, become internalized, as if external relations between individuals were an *a priori* condition, and that internalization is a process of controlling these contingencies, or of reducing complexity. If this is true, however, then these sets of transactions cease to be uncertain in outcome, which renders the argument a hypothetical reconstruction of what these sets of transactions must have been before being internalized, that is, as different kinds of transactions altogether!

Granovetter offers a twofold hypothesis: that we should expect a) the absence personal or social relationships *between* transacting firms to occur under conditions in which social relations result in conflict and disorder (a tautology), and/or b) the absence of such personal relations to generate pressures towards vertical integration, or internalization of transactions *within* firms. As he puts it:

> Other things being equal, for example, we should expect pressure toward vertical integration in a market where transacting firms lack a network of personal relations that connects them *or where such a network eventuates in conflict, disorder*, opportunism, or malfeasance. On the other hand, where a stable network of relations mediates complex transactions and generates standards of behavior between firms, such pressures should be absent (503: my emphasis).

His hypothesis as formulated gives equal weight to the probability of social relations generating either order or disorder, which appears to contravene his earlier argument that social relations generate order more efficiently than relations of authority, which marks a distinction between social and authoritative relationships. He also reintroduces here the distinction between order and conflict, whereas earlier in this article he stated explicitly that sustained conflict presupposes order. Putting these objections aside, Granovetter seems to imply functionally equivalent solutions to the problem of social order in markets: social or personal relationships can provide functional equivalents to codified relations of authority. Where the former are lacking, there exist pressures for the emergence of the latter.

Comments

There are a number of theoretical problems with this formulation. For one, it is merely assumed and stipulated that there are pressures toward order rather than entropy. Second, the hypothesis should also run the other way: if there are functionally equivalent solutions with equal probability of success, then assuming pressures toward order, a lack of organizational forms of authority within firms should result in pressures toward appropriately friendly social relations between firms. When formulated this way, however, the idea that there are such "pressures" appears implausible. The theory leaves unspecified the initial pressures that determine the presence or absence of these order-generating mechanisms, and why a lack of one such mechanism should result in a higher probability of the other such order-generating mechanism from emerging. This emergence is especially implausible given that order, when distinguished from either entropy or noise, is by definition more improbable.

Stated more simply, Granovetter's hypothesis boils down to the claim that both the *absence* of order-securing social relations and the *presence* of order-disturbing social relations, result in alternative relations that secure order. Heads: the presence of order; tails: the absence of disorder. Despite his own acknowledgement of the risks of being too "optimistic" regarding the probability of social order, his theoretically derived hypothesis is blind to the likelihood of disorder, or alternatively, fails to specify means by which inherently improbable outcomes of

order are rendered probable.

The central problem with Granovetter's formulation, as I see it, is his failure to distinguish clearly his main concept of social relations. I can discern the following alternative sets of distinctions that provide alternative meanings to this concept: social as personal relationships, distinguished from impersonal ones; social as distinct from economic transactions; and social as distinct from relations of authority or governance. It is clear that the social is *not* distinct from either order or malfeasance, since social relations can generate trust or distrust, order or disorder. If the social is associated with personal, and non-social with impersonal, then only one side of the distinction is marked, to use the terminology of G. Spencer Brown. In other words, the social marks the "personal" sphere, but the non-personal sphere is undefined. What counts as non-personal? Does this distinction cut across other system categories such as law and politics? If the social is also distinct from economic relations, does the economy fall into the category of the impersonal? Furthermore, why are authorial or economic relations necessarily impersonal?

Finally, the notion of embeddedness, as Beckert (2002) points out, is also not well defined. The metaphor of embeddedness implies a relation of enclosure which can be depicted as two concentric circles with different radii. This entails both the primacy of society in relation to the economy and the primacy of the *distinction* between economy and society. Neither society nor the economy, however, is systematically defined in relation to the other. One receives the impression that society refers to the *lifeworld*, or to a sphere of communication that is more personal and/or amenable to direct human communication than is the economy, which is subordinated to these social imperatives. This assumption, however, is unwarranted without empirical corroboration. Without further clarity of semantics, Granovetter's main concepts of embeddedness and social relations generate a degree of conceptual noise than might be useful for further theoretical development.

As we shall see in the case of the global debt crisis, what might be construed as social imperatives, guided by the visible hand of communication free from domination (cf. Habermas 1987), are increasingly steered according to codified economic media of money and debt. Furthermore, the concept of the economy should not be conflated with that of the market. By implicitly counter posing markets and society, Grannovetter and other economic sociologists have neglected the fact that most aspects of the economic sub-system bear little or no resemblance to markets as understood by classical and neoclassical economics.

In my view, alternatives to the metaphor of embeddedness can be formulated using concepts derived from systems theories, especially those of Parsons and Luhmann, to be discussed below. More recently, Leydesdorff has proposed the triple-helix model , depicted in figure 87, as a heuristic visual device for understanding the complex dynamics generated by three (or more) relating sub-systems. Leydesdorff (2006) has also, however, has also used this metaphor as a heuristic for empirical research, and has used non-parametric entropy statistics as a way of devising *and testing* hypotheses regarding the system-ness of three or more hypothesized sub-systems (e.g. government, industry, and university relations). The dynamics represented by the triple helix can also be a useful way to understand the asynchronous interactions between other types of systems (e.g. interactions, organizations, and societal systems). Although it is outside

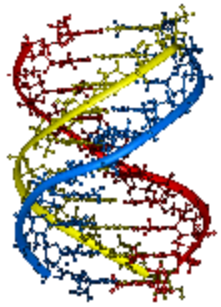

Figure 87. Triple Helix depiction of interacting sub-dynamics.

the scope of this essay to review these developments here, in my view, the triple helix model is one example of how systems theories can be used to develop an alternative to the static metaphor of embededdness.

In summary, Granovetter's theory of embeddedness can be understood as an attempt to address the issue of the primacy of politics (via power) or economics (via money), broadly understood. Granovetter formulates the issue of market order, however, as a distinction between order within and between firms, focalizes only the power side of the distinction. The type of order he refers to implicitly refers only to power, a concept moreover that is under-specified. He thus ignores the role that money plays in the facilitation of market order, either in lieu of, or with the presumption of, political power. More importantly, he neglects the specific *ecological conditions* that either facilitate or deteriorate the trust necessary for successful economic communications.

Parsons' Economic System

As depicted by Parsons, action systems consist of finite, means-ends chains, linking ultimate means with empirical ends (although there are also non-empirical ends that serve as motivations for actions, such as going to Heaven). Each act can serve as a means to several different ends, and conversely, different acts can be used to reach a given end. The theory of action systems proposes a three-level cybernetic control hierarchy:

1) the realm of ultimate values (sociology);
2) the realm of intermediate means-ends (politics and economics); and
3) the realm of ultimate means and conditions.

Corresponding to the first two levels of action are three analytically distinct theories of action: 1) Sociological theory, pertaining to the emergent property of *common-value integration* in the sphere of ultimate values/ends; 2) Political theory, pertaining to the emergent property of *coercive rationality* in the sphere of intermediate means; 3) and **economic theory**, pertaining to the emergent property of *economic rationality* also in the intermediate sphere.

Non-rational actions refer to the actions oriented towards the ultimate ends and values that are not means to other ends. Non-rational actions are governed by values, and society at some level of abstraction constitutes a *common value system.* This is roughly synonymous with Durkheim's notion of the *collective conscience*.[113] For Parsons, some degree of commonness of values is a necessary precondition for the existence of social order.[114]

For Parsons, the economy is a sub-system of society but does is a *collectivity*, in the Parsonian sense, that is, the economy is not capable of "action in concert" (Parsons and Smelser 1954: 15). This *action in concert* entails: "the mobilization of the collectivity's resources to attain specific and usually explicit goals" and the formalization of a decision-making process for the collectivity as a whole (Parsons and Smelser 1954: 15). As Parsons suggests, no economic system is a collectivity in this regard. Imporantly, whereas a collectivity is *always multifunctional* (i.e. it can accomplish many tasks while retaining its unity as collectivity), an economic sub-system is always *unifunctional*.

That the economy is not a self-regulating, autonomous system has been generally acknowledged (cf. Beckert 2006; Granovetter 1985; Polanyi 1944). If the economy is neither an exhaustive description of social reality nor self-sustaining, then how should economic relations be related to the society as a whole? According to Parsons, economic theory pertains to a special case of social systems, which is empirically conceivable as a sub-system within a more comprehensive social system, or society (1954: 7). Parsons theory of social systems aims to accomplish the following: 1) to establish the relationships between the economic and the non-economic aspects or dimensions of society; 2) to show how economic theory can be derived from the general theory of action systems; 3) to show how economic theory is a special case of this general theory; 4) and finally, how identifying the relations between the economy and society illuminate the boundaries of the former (Parsons and Smelser 1954: 7).

Parsons regards the distinction between supply and demand as a special case of the distinction between *performance* and *sanction*. A performance is an act observed with respect to its contribution to system maintenance, as in a role-performance; whereas a sanction is an act observed with respect to its effect on the state of the actor. This is an analytical distinction. Parsons insists that every concrete act contains both aspects. The basic logic of performances and sanctions is that of rewards: "the amount of performance contribution is a function of the expectation (and in the long run, receipt) of sanction" (1954: 10). Likewise, in economics, a supply curve slops upward indicating that a greater market *performance* by suppliers requires a greater possibility of *sanction* (i.e. reward) in the form of higher prices.

[113] Fararo (1998) suggests that common value system might be better labeled a *commonness of values* variable.
[114] Fararo labels this thesis the s*ociologistic theorem*: "A necessary condition for social order is that the ultimate ends of action of the various actors form, to some degree, a common value system" (1998: 97). He cites two interpretations of this theorem: 1) a derived threshold theorem which states that social order requires the existence of at least one attractor in social state space (which would require a specification of the state variables that constitute the state space and the specification of parameters that define the parameter space); and 2) rational choice theory, game theory, and economic theory, which define social order as an equilibrium condition in which no actor has an incentive to change action given the actions of all others

In Parsons' theory, the goal of the economy is the *maximization* of production of income or wealth.[115] A *goal* is defined as a "satisfactory *relation* between the state of a system and relevant objects in an external situation" (Parsons and Smelser 1954: 20). The goal of the economy, understood from a systems-theoretical point of view, is not to maximize the utility of individuals, for the goals of economic output are defined as *socially structured* goals.

The goal of the polity, meanwhile, is to "maximize the *capacity* of the society to attain system goals, i.e. collective goals" (1954: 48; my emphasis). They define this "capacity" as *power*, which they define as "the generalized capacity to mobilize the resources of the society, including wealth and other ingredients … to attain particular and more or less immediate collective goals of the system" (1954: 49).

The polity is said to *produce* power as an output for the rest of society. The polity itself is not powerful; rather, *society* is powerful or not as a result of the power produced by the polity. Likewise, the economy *produces wealth for society*, but is not itself wealthy or poor. Instead, the economy can be more accurately described as *productive* or non-productive. The environment or situation of each subsystem consists of the other three. The economy, for instance, is embedded in a context (or "primary social situation") consisting of the polity, the integrative system, and the pattern-maintenance system (1954: 52). Moreover, the boundaries of these sub-systems can be thought of as input-output relations, in which each sub-system provides a necessary input for other sub-systems. Parsons and Smelser argue that these inputs are *specialized inputs* originating from specific sub-systems.

For instance, the economy provides a specific input to the pattern-maintenance sub-system (e.g. the household), namely, income for consumers; whereas the household provides to the economy necessary training and institutionalization of economic values (e.g. the Protestant work ethic).[116] I will discuss below in more detail the boundary relation between the economy and polity, which Parsons suggests is the *creation of credit*. As a general rule, a sub-system interchanges with another "primarily at one boundary only" (1954: 206).

The Creation of Credit

Following Parsons, credit creation is primarily a *political* operation which distributes a power relation. *Money does not primarily facilitate exchange but confers power.* The power of the monetary code is power in the sense that both Foucault and Parsons use the term: power as capacity. The state, qua its political function, should not be confused with the "government", which refers to specific *organizational* forms. Governments are organizations that regulate the

[115] Wealth is the aggregate *stock* of economic value of commodities at any given time, whereas income is the *flow* of "*command* over such values per unit of time" (Parsons and Smelser 1954: 21; my emphasis). That income is a flow of *command* should be emphasized since the accumulation of money generates the capacity to spend.

[116] This bears some resemblance to the well-known circular flow diagram in economics, in which households provide to firms capital and labor, and firms provide to household income.

societal, and hence global, system of economic communications.[117] Importantly, social communication does not terminate at the border. The polity is instead made up of what we might call an *ecology or constellation of organizations*.

The political input into the economy is the *creation of credit*. Parsons and Smelser write:

> In our technical sense, the creation of credit is primarily an *exercise of power* in that facilities necessary for the pursuit of goals are restricted by mean of the imposition of situational controls over the access to these facilities. The decision to create credit is in the first instance a decision to make available facilities for the pursuit of economic goals; the decision not to create credit (or to reduce the volume outstanding) is a decision to restrict these facilities by direct control of the situation. Hence generalizing purchasing power, introduced into the economy as capital through credit, is a form of *power* in our technical sense. (1954: 57)

The power to create credit is, in this sense, analogous to the power to tax. The power to create credit is a *political function*, even though in our society it is most commonly associated with banks, which are thought to reside in the economic, rather than political, sphere. Again, the distinction Parsons and Smelser draw is analytical rather than concrete, but I think it is particularly useful for understanding the recent credit crisis.

Within the investment-capitalism sub-system of the economy, the adaptation and latent-pattern maintenance sectors are especially relevant with respect to credit. Parsons and Smelser write that the most salient mechanism by which the "adaptive function of the investment-capitalization sub-system is maximized" is the "*guarantee of the liquidity of securities*" (1954: 202). This enables adaptation in the sense that businesses can re-allocate funds to various firms, drop or adopt new investment commitments, and so on.

Credit works by supplying a "level of rewards associated with a higher level of goal-attainment than is in fact being realized at the time the credit is extended" (1954: 63). This temporary guarantee of income (reward), however, is always *conditional* on repayment. Default occurs whenever expectations of growth are not obtained. This becomes a societal wide disturbance, however, when it involves societal sub-systems. Parsons and Smelser provide an example of the relationship between the adaptive sub-system of the economy (A_a), the goal of which is to increase productivity, and the relevant latency sub-system of the (L_g) , the goal of which is to maintain or enhance a *style of life* in accordance with increasing income. Parsons and Smelser observe that:

> [T]he greater the amount of credit creation, the higher the rate of growth of capital productivity required to meet the expected goal. If this requisite rate is not met, either because of the limitations of the investment process itself or because of higher requirements demanded by the relevant political authority, then the familiar

[117] That the monetary system is global implies a global sub-system of political power. This sub-system of political power, however, is latent, and is not codified in organizational form. This hypothesis is elaborated by Deleuze and Guattari (1987) and later by Hardt and Negri (2000).

> consequences of economic disturbance appear: inflation, withdrawal of funds, business failure, hoarding, speculation, etc. (1954: 64)

An examination of the systems theories and anthropological literature suggests that monetary power presupposes and is derived from state power, specifically, the power to tax.[118] The economy, in its most elementary forms,, is thus a derivation of taxation. Both are the index of expression of a more fundamental process. **The money form is therefore a precondition of the economic code, and not a consequence**. Some *nexus of communication,* which constitutes the universal equivalent form of money, *must be presupposed* in order for individuals to enter into commodity production.[119]

Deleuze and Guattari explain the political derivation of money in the Greek city of Corinth:

> In effect, money is a correlate of the stock; it is a subset of the stock in that it can be constituted by any object that can be preserved over the long term. In the case of Corinth, metal money was first distributed to the 'poor' (in their capacity as producers) who used it to by [sic] land rights; it thus passed into the hands of the 'rich', on the condition that it not stop there, that everyone, rich and poor, pay a tax, the poor in goods or services, the rich in money, such that an equivalence money-goods and services was established…
>
> [M]oney is always distributed by an apparatus of power under conditions of conservation, circulation, and turnover, so that an equivalence goods-services-money can be established. We therefore do not believe in a succession according to which labor rent would come first, followed by rent in kind, followed by money rent. It is directly in taxation that the equivalence and simultaneity of the three develop. As a general rule, it is taxation that monetarizes [sic] the economy; it is taxation that creates money… (1987: 443).

The creation of money is an effect of what Deleuze and Guattari call an *apparatus of capture*, which they identify with the state as an emergent *abstract machine* (1987). Their thesis is that an apparatus of capture *constitutes that which it captures.* For example, legal violence presupposes and constitutes the object of illegality. Likewise, money is constituted at the same time that it is appropriated. This is why the state appears pre-accomplished, as presupposing itself.

The apparatus of capture is therefore a mechanism of *time-binding*. Liquidity is introduced as debt, so that generalized purchasing power is not dissipated outward indefinitely, but periodically returned to its originator. The originator in this case is *analytically* distinguished by Parsons as the polity, which is moreover concretely instantiated in a system of public and private lending

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[118] Moreover, this concept of money as debt traces a direct line of continuity between non-modern and modern forms of social mediation, enabling us to draw more insightful comparisons and historical delineations.

[119] Nor should the distinction of organization and interaction be conflated with the distinction of macro and micro. A single individual can participate in organizational communication to the extent that the communication is processed as a decision within organized networks. Nicos P. Mouzelis (1968) points out that, macro-interactions can occur between individuals, such as the communications that occur between CEOs representing corporations, or heads of state representing nations.

institutions, most notably central and private banks. These institutions constitute *organizations*, in Luhmann's sense.

The apparatus of capture (i.e. the state) is an *emergent tendency*. Whenever it is not historically actualized, it is warded off by anticipation-prevention mechanisms. The emergent process of state coexists alongside processes of non-state and anti-state mechanisms. There is the cyclical, ritualized "primitive" violence operating according to the limit, in the form of gang violence which concurs with state violence in the form of the police, just as money-taxation concurs alongside the flows that escape economic codification. In Luhmann's terms, we might say that there exists *noise* that both escapes and makes possible the *code* of the economic system. This apparatus establishes the code of equivalence that makes possible the *abstract, circular flow* that it appropriates. This flow is emergent: it does not exist prior to being appropriated, and exists only as a *global* property of a system (Bunge 2003). The societal subsystem of economy is a code of social mediation that is seemingly pre-accomplished and everywhere simultaneously.

An important distinction from Latour will clarify the non-local, emergent property of the economic subsystem. Latour (1988) distinguishes between *relativism*, which posits that there is no independent observer, and *relativity*, which posits that there is no privileged point of view. Latour writes:

> [I]f relativism is right, each one of [the perspectives] will benefit as much as any other. If relativity is right, only *one* of them (that is, the enunciator, Einstein or some other physicist) will be able to accumulate in one place (his laboratory, his office) the documents, reports and measurements sent back by all his delegates (23).

Latour points out, however, that "it is not his privileged point of view that gives a centre a superiority over other locations, but its **rejection of any privilege to any local point of view** including its own, thus permitting the gathering in one point of all the super-imposable traces" (23-4). The quantitative comparison of commodities facilitates the capacity for generalized exchange and appropriation, engendering an emergent power or "privileged point of view" of the economy (qua subsystem) by denying any privilege to local points of view. It operates non-locally. All economic communications occur as (necessarily) collective payments that presuppose anticipations of future repayment elsewhere; each economic communication presupposes and anticipates a *circular flow* and thus operates non-locally (in time and space). The creation of money via debt illustrates this concept.

Parsons on Investment and the unstructured situation

In Parsons's theory of the social system, the primary relationship between the capitalization sub-system and the production sub-system within the economy is the flow of investment, whose sanctions are "primarily dividends or interest payments on securities" (1954: 210). Parsons and Smelser define *investment* as the "intra-economic allocation of *already-earmarked monetary facilities to already-demanded production*" (1954: 212).

Table 14. Investment as Boundary Relation within and between Economic sub-system.

Polity	Economy	Culture
$G_a \leftarrow$	$\leftarrow [A(a)_a - A(g)_a] \rightarrow$	$\leftarrow L_g$

Investment is *internal* to the economy, yet it also coordinates the boundary interchanges between the economy and two other societal sub-systems. Parsons and Smelser write that investment "is the adaptive cross-tie within the economy which articulates the sets of decisions occurring at the A_g-L_g and A_a-G_a boundaries" (1954: 234). This is depicted in Table 14.

Because of its unique tripartite boundary position, Parsons and Smelser suggest that the investment process "should be the locus of an *elaborate system of signs* concerning the condition and success of the economy's functioning," and that therefore, "risk and uncertainty" should be "most extensively institutionalized in the investment market" (1954: 134; my emphasis).

Furthermore, the *investment* situation is one which can be characterized as *unstructured*. All situations can be characterized along a continuum of structured-unstructured. In a highly structured situation, "there are a minimum of possible responses other than the ones required by the norms of the situation; adaptation is carefully defined: and usually the situation is not very confusing psychologically" (1954: 236). Parsons and Smelser continue to write that:

> The investment market fails to adhere to any of these characteristics of a structured situation: the range of adaptive responses (i.e. speculation) is not limited in a formal sense; there is a great deal of maneuver, as the daily quotations on the stock market show; and the loose definition of the appropriate adaptations (i.e .moves all made on the basis of 'hunches', 'tips', 'shrewdness', etc.) produces a great deal of psychological confusion and strain. *The investment market is a prototype of the unstructured situation. It thereby allows for the wide and rapid fluctuation of the investment function*. (1954: 136)

Luhmann and the economy as autopoieisis of payments

Luhmann disregards two prior approaches to the economy:

1. Natural law theory, which views the economy as a practical or moral institution required for the satisfaction of human needs; and
2. Materialist theory, which relates the economy to material fundamental needs, which deduce "from their natural primacy over other needs the social primacy of the economy" (1982: 193).

Luhmann defines the economy as operationally-closed communication system whose elements consist of payments, or transactions. The economy is an autopoietic and self-referential societal system of monetary communicative events, which is continually reconstituted via the repeated deployment of its genetic distinction (pay/not-pay), to the exclusion of other possible distinctions. Luhmann writes:

> By the economy we mean all those operations transacted through the payment of money. Whenever money is involved, directly or indirectly, the economy is involved regardless of who makes the payment and whose needs are affected. This occurs, for example, in the collection of taxes or government expenditure for public goods. (1989: 51).

Originally, the economy was coded through the code of *property*, to own or not to own. Importantly, the distinction of owning/not-owning primarily *excludes* others from using a good or service. This provided a basis of private property. This pre-monetary code was insufficient for the functional differentiation of the economy as occurs in modern society. In Luhmann's terminology, money and credit introduce a "technically superior secondary coding" of payment/non-payment that replaces, within the context of the economy, the property code of having/non-having property (1989: 64). Money facilitates the emergence of a new, self-consistent field of *generalized exchange*, which results from the projection of a "new, more abstract sort of tie" (White 2008: 76).

For Luhmann, the *function* of the economy is to preserve a sufficiently generalized capacity (i.e. liquidity) to extend the temporal horizon of need satisfaction (i.e. to a guarantee satisfaction of future needs). The economy thus enables society to *gain time by enabling participants to postpone decisions.* Luhmann posits that: "we can specify needs and the means for satisfying them only to the extent that we can defer some of these needs and guarantee their satisfaction in the future" (1982: 194). In short, the economy enables society to *defer decisions.*

The *primary* function of the economy is therefore *not* the allocation of resources, efficiently or otherwise, or the abolition of scarcity, because to understand a resource as scarce implies:

> "an abstract point of comparison whereby needs can be treated independently of situations. By means of the idea of scarcity, needs can remain expressed over time, and by reference to the mechanism of money equivalences are set up among them. Money is chronically scarce, and thus it is appropriate as a *continuous expression of the abstract necessity of guaranteeing in the present the satisfaction of future needs"* (1982: 195).

Importantly, the economic system is not coterminous with a "market." Regarding markets, Luhmann writes that:

> I have not been able to understand and to translate into a sociological language what economists understand by the 'market.' The crucial systems-theoretical insight is that the market is not a 'subsystem' of the economic system but its system-internal environment or section of this environment viewed from the perspective of the individual subsystems. (1989: 163fn.)

He continues:

> An adequate market theory does not exist, even in economics. What is noticeable is a great amount of differentiation among contexts of competition, exchange and co-operation. (1989: 54)

The *code* of the economic sub-system, the primary distinction that distinguishes the monetary medium from other media, is the binary distinction: paying/not-paying. This code, however, does not specify any concrete instructions or criteria to determine whether payment or non-payment is selected. In addition to codes, there are *programs* that function to overcome the meaning emptiness of codes, that is, to specify criteria and preferences, and to indicate reasons for making payments. This requires introjecting into this operationally closed system values and norms and so on from the environment of the system (Beckert 2006).[120]

Summary and Evaluation of Parsons and Luhmann

The approaches adopted by both Luhmann and Parsons to understand the economic system have considerable advantages over traditional economic theory. First, and most importantly, they do not conflate the economy with markets. In Parsons's model, the economy serves the purpose of *maximizing* wealth for society through processes of production. In Luhmann's account, the differentiated economy primarily *defers decisions,* thus enabling other sorts of communications to occur in the meantime. For Luhmann, any monetary transaction is economic, regardless of the motive or effect. At this level of generality, the economy does not necessarily refer to any particular economic model. Luhmann even regards market equilibrium as unlikely. These theories are especially fruitful for understanding systemic crises, such as the global debt crisis, which in my view cannot be understood primarily as a market phenomenon.

The primary difference between the two theories lies in their respective understanding of the concept of system and sub-system. Each perspective illuminates some features of society while overlooking others. For example, Parsons emphasizes the linkages between different sub-systems within society, including the linkages between various sectors and sub-sectors between these sub-systems. Parsons, however, has no concept of system *environment*. The social system is entirely self-contained, and society as a whole constitutes the environments for each of its parts. From this point of view, there are no blind spots, nothing that isn't taken into account. This is in stark contrast to Luhmann's model.

Luhmann's account of society's sub-systems, on the other hand, seems to make communication between society's sub-systems impossible. Rather than a series of interconnected parts, a better metaphor for Luhmannian systems would be that of a field of simultaneously transmitting communications. The sub-systems of society are less like organic parts than channels of communication, which can only be detected (or not) with a suitable transmitter. In his system-environment schema, the societal sub-systems all constitute the environments for the others, but this is *not* the same meaning of environment as discussed by Parsons. In Luhmann's theory, societal sub-systems are autopoeitic and operationally closed. Consequently, societal *sub-*

[120] Morever, Beckert argues that this does not violate the premise of operational closure, however, because this only pertains to codes, not programs, and in addition, these programs still have to be translated into monetary terms. Morality and politics can still influence the economy, but the economy still must "formulate the conditions for their articulation" if they are to be translated into something other than noise for the economy (2006: 235).

systems are not *subordinate* systems as they are for Parsons. For Luhmann, these systems are not embedded. They tend to operate autonomously. It is as if by an accident of history and evolution that society is capable of continuing in this manner and to process this much complexity.

How, if at all, do these societal systems interact? Luhmann introduces the concept of *resonance* to describe the relationship between a system and its environment. Although societal sub-systems such as the economy are closed, they do expose themselves to their environments in exceptional cases. A useful analogy helps describe what he means:

> One can imagine a dictionary that would define nearly all the concepts that it uses by referring to other definitions and would allow reference to undefined concepts only in exceptional cases. An editorial committee could then be formed which would supervise whether language changes the meaning of those undefined concepts or, through the formation of new ones, disturbs the closure of the lexical universe without determining how changes in the entries are to be handled when this disturbance occurs. The richer the dictionary, the more it is kept going by the development of language, i.e., the more resonance it will be able to produce. (1989: 15)

Another important question concerns how these sub-systems relate to the social systems of interactions and organizations, respectively. How does money, for instance, condition the decision-making procedures of organized communication? How do the programs decided upon by organizations impact the self-organizing dynamics of the economic system? One important link is that money is distributed through the channels of organizations, which are necessarily exclusive of the broader public. In order to generate linear, historical time, moreover, organizations are necessary.

The concept of the *competitive market* describes one possible (and often counterfactual) environmental condition as seen from the perspective of the individual firms. The economy exceeds markets to the extent that the steering media of money, which both motivates according to rewards and punishments and makes this motivation intelligible, operates in non-market settings. A clear example of non-market economic communication is the regulation of *performances* that occurs within firms via the anticipated *sanction* of monetary reward (cf. Granovetter 1985). Moreover, money has no reserve to back it, other than the anticipation of future repayment.[121] Without this collective faith, individual decisions regarding the satisfaction of needs could not be deferred into the future, and the time-binding function of abstract value could not be secured. Society would have to reinvent itself from one momentary interaction to the next.

Synthesizing Parsons and Luhmann: Money-Credit-Money'

[121] The existence of commodity money, or money that is backed by some commodity such as gold, does not change this fundamental condition, for gold is itself, qua currency, is valuable primarily as a means for future exchange.

Synthesizing the analytical distinctions utilized by Parsons with the self-referential systems of Luhmann can prove fruitful to an analysis of the current global debt crisis. Specifically, the function of the economy, delineated analytically, according to Parsons is the production of *material wealth*. Strictly speaking, the production of material wealth does not require monetary codes, taxation, or the differentiation of an economic sub-system. Moreover, according to Parsons it is the *polity* that provides the economic sub-system with credit, to better facilitate its adaptive function of producing wealth. For Luhmann, on the other hand, the code of monetary payment communicates meaning (i.e. the distinction of what is possible from what is actual) so as to secure the future satisfaction of needs, or to put it another way, to *mollify present anxiety regarding the security of future purchasing power*. Payments are temporalized events whose connectivity is contained within each payment as the *anticipation* of future repayment. The *threshold* of this anticipation is the horizon beyond which payments are no longer obligatory as debt repayment.[122]

It is clear then, that the function that the polity introduces to the economy as a system of payments is a third-order coding of the distinction between *paying now* and *paying later*. In Luhmannian terms, *credit* is the *program* introduced by the polity *in order to facilitate the autopoeisis of anticipated future payments.* Recall that adaptation to circumstances can occur either by changing expectations to meet circumstances or by actively trying to change the circumstances themselves to meet expectations.

The expectation (or "goal") of modern (global) society has been, since the industrial age, that the future would be better than the present. This belief has been socially codified as the imperative of economic growth, which is *built into the economic infrastructure as interest.* More specifically, this refers to the components of the interest rate that can be analytically distinguished as the compensation for expected inflation, and the discount rate. This socially codified expectation of future growth has, moreover, coincided with an epochal reversal of social values in the most industrialized countries: *rather than sacrificing the future* (described by Weber as the Protestant Ethic), individuals increasingly *sacrifice the future for the present*. This sacrifice is not necessarily consciously understood, in large part because the belief in the automaticity of future growth renders sacrifice in this sense impossible. After all, if growth is automatic, why save? Savings, however, according to conventional theory, are the requisites of growth. The belief that past trends will continue indefinitely into the future thus facilitates social conditions that renders this expectation increasingly unlikely.

Because money is chronically scarce (i.e. the aggregate purchasing power is zero sum at any given moment), the application of interest generates a temporal condition akin to that of the

[122] An important distinction can be made between thresholds and limits. A limit marks the end point after which an operation repeats itself. For example, an alcoholic reaches the limit of the *last drink*, after which one can go to sleep, and repeat the process in the morning. Another example is the *last word* in a domestic squabble. A threshold on the other hand marks the establishment of a different order, or a new assemblage. This occurs when the alcoholic, for example, takes one drink too many, and ends up dead or in a hospital. A limit wards off the crossing of its threshold; it is a mechanism of *anticipation-prevention*. Regarding exchange, the stockpile begins only after the threshold of exchange has been crossed. Deleuze and Guattari convincingly argue that stockpiling begins *only after an exchange ceases* and an *independent interest* in stockpiling has developed, which takes precedence over the interest in drawing down these stocks, such as in potlatch ceremonies (1987: 442-7).

game of musical chairs. As the former CEO of Citigroup, Chuck Prince, famously observed in the summer of 2007:

> When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing.

Debt-plus-interest at the same moment presupposes growth to secure repayment, and serves as a means of adaptation to secure growth. It is this latter condition that I regard as historically novel. A fundamental break has thus occurred reversing the direction of dependency between the autopoeisis of payment via credit and the facilitation of the social imperative of growth: instead of growth facilitating credit, credit now facilitates growth. In addition, the introduction of credit-plus-interest as the primary means of growth, at the aggregate level makes growth necessary and impossible, since all growth that occurs via debt is inherently unsustainable. The current economic system is like that of a snake eating its own tail. Marx's circuit of capital can now be reformulated as: Money-*Credit*-Money'.

The introduction of credit-plus-interest has been the primary means of economic adaptation to the *growth imperative, in response to the progressive decoupling of economic growth from the production of material wealth*. As stated earlier, monetary flows (representing the future success of present economic communications) do not necessarily have any one-to-one correspondence with the flows of energy and material wealth. In fact, the increasing scarcity of the latter has made decoupling of economy and energy necessary adaptations of the economy, insofar as these adaptations are possible. The program of credit is introduced by the polity (i.e. the "state") into the economy as a means of adapting to the growth imperative while simultaneously reinforcing and exacerbating this imperative.

The crisis that occurs in the financial sector necessarily affects and influences all other sectors or subsystems of society. It is not, however, primarily a crisis of finance. In other words, the crisis of solvency affecting our financial organizations (institutions) conceals the more fundamental crisis that is occurring between the growth, increasingly facilitated by debt, and the growth-imperative, increasingly facilitated by debt. Yet, *this* crisis is not directly attributable to the depletion of natural resources. Instead, the more fundamental contradiction arises as a result of the continued coupling of purchasing power to the expenditure of labor time.

For Marx, a precondition of commodity production is the separation of the workers from the "means of production." This fact is widely acknowledged and treated at length in Part Eight of Marx's *Capital* entitled "So-called Primitive Accumulation." Translated into Luhmannian terms, the autopoeisis of (the anticipation of) payments is accomplished in modern society as the coupling of purchasing power (income) to participation within organizations qua labor-time, (and potentially as a *career*). The *performances* of worker are necessarily organizational performances, contributing to the autopoeisis of organizational decisions regarding membership, programs, and channels of communication. The dependence of workers facilitated by the coupling of income and the expenditure of labor-time regulated within and between organizations generates the conditions necessary for the capture of monetary surplus facilitated by the generalized quantitative comparison of the monetary code.

In my view, Deleuze and Guattari's concept of an *apparatus of capture* refers to the material (i.e. real, rather than merely analytical) distinctions facilitating comparisons that irrevocably bind the indicated side of the distinction to the form of the distinction, that is, to its other side. This entails a twofold process of *comparison* and *appropriation*. For example, labor, as the quantitative comparison of activity, is distinguished from surplus-labor, but exists only in relation to it. Without the process of distinction (in Spencer-Brown's sense) that makes possible this comparison, *exploitable* labor in the Marxian sense could not exist. Likewise, the unmarked space of the distinction labor/surplus-labor is *activity* "in continuous variation" (1987: 442), which is bound and subordinated to the temporal rhythm of the work day once the former distinction is socially codified. The important point, however, is that this binding effect does not occur as a result of a distinction between labor and activity, but occurs surreptitiously, as the blind spot of the observation which is accomplished in the distinction between labor and surplus-labor.

The obligation to labor that is reconstituted despite and in conjunction with productivity increases is but one manifestation of the apparatus of capture. A society in which work is *collectively voluntary* is unthinkable, and would negate the anticipations required for the autopoeisis of the economic subsystem, *in its current form*. In Postone's (1992) account, capitalism is dominating ostensibly because its endogenously generated productivity gains are not translated into more free time, a concern shared by more mainstream sociologists as well (cf. Schor 1992). Importantly, this domination is not domination *of* labor, but domination *through* labor.[123] It is imperative, from a social systems-theoretical point of view, to indicate the mechanisms by which this "domination" is maintained, i.e. the means through which societal complexity is both processed and abated through the dynamic and asynchronous interactions of social systems, which secure the promise, if not the guarantee, that social order in its present specificity, will continue.

Summary and Conclusions

Whereas for Luhmann, the economy constitutes an expectation, for Parsons, the economy constitutes a machine producing material wealth. Luhmann and Parsons view the economy from the twin perspectives of exchange value and material wealth, respectively, in many ways analogous to the perspectives of neoclassical and Sraffian theory within economics. The task is to relate these perspectives in a systemic, or dialectical, manner. Moreover, they both constitute *systemic* perspectives, and therefore downplay or totally ignore (in the case of Luhmann) agentic explanations for social outcomes.

With respect to the possibility of market failures, Parson emphasizes that acute market failure can result from a lack of normative control, or more specifically, from an absence of adequately specified norms. Luhmann, on the other hand, conceptualizes the monetary medium as

[123] Postone's account is convincing in its own right, but unfortunately Postone makes the argument not as an original theory, but as a reinterpretation of Marx's work. This has the disadvantage of turning away both those not already interested in Marx and those readers who disagree with the book for exegetical reasons.

autopoeitic communications that work to the extent that they secure anticipations of subsequent (communications of) payment. Luhmann's theory thus implies that market failures can occur when the expectation of future communications are *not* secured, that is, when there is a break down in *trust*. What needs to be addressed, however, in an empirical analysis is *under what conditions trust is secured and under what conditions is it not*.

I argue that in the present crisis, trust was secured via the habitual expectation of future growth, facilitated primarily by an accelerating material-energetic throughput. The expectation of future payment could no longer be secured when the expectation of future income growth became untenable. The underlying ecological conditions effecting this outcome, however, remain peripheral to economic theorizing. As Luhmann puts it (1989), only society (qua communication) can expose itself to ecological dangers. Thematizing these conditions is increasingly improbable. One reason is that the system-agency distinction foregrounds social outcomes that arise from *decisions*, or actions. The distinction then divides all social outcomes arising from decisions as either intended or unintended. In the language of Luhmann, risk is emphasized over dangers. This is the primary concern of Giddens in his critique of functionalism, for example. Adopting a second-order, meta-theoretical perspective, enables us to conclude that one of the blind spots of this mode of theorizing are all of those conditions that are not directly attributable to decisions, of either individuals or organizations.

III. ANTICIPATORY SYSTEMS, RISK, AND SELF-REFERENCE

A typology of Systems: Reflection, Representation, and Anticipation

A useful typology of systems is provided by Fenzl and Hofkirchner (1997). They distinguish three points of reference for the analysis of any system, each of which is related to an aspect of semiosis. This typology is depicted by Table 15 and Figure 88.

The three system types are nested levels exhibiting progressively higher degrees of internal differentiation and freedom. Self-organizing is the first necessary and sufficient condition for system emergence. Self-organization refers to spontaneous pattern formation. At this level of organization, a system first distinguishes itself from its environment by exhibiting a structure of relationships between its elements. Its micro-structure exhibits a self-organizing pattern. A snowflake is an example of a primitive self-organizing system. It can also be regarded as exhibiting the property of *reflection*, in the sense that it *selects* one option from among several possibilities, and thereby produces a self, or system, in relation to an "other", or environment. Note that it does *not* relate to its environment in terms of linear cause and effect, or input and output. A snowflake is its own cause. One can trigger a snowflake into existence, but its emergence is not determined at the level of its elements.

The second system type is self-reproducing or "autopoeitic." Self-reproducing systems have a differentiated internal structure, selecting both a pattern of related elements and a system state or condition. The system in a sense has a new capacity to "choose" from among several possible states or conditions that are global conditions. This constitutes an added degree of freedom for the system relative to the self-organizing system, the state of which is completely determined. Self-reproducing systems exhibit a capacity for *representation*: they generate internal representations of the outer world, distinguishing between *sensors* and *effectors*. All living systems are self-reproducing systems. They distinguish themselves from an environment, and can represent this environment by entertaining a "model" of it. This capacity is exhibited by the smallest and most primitive of organisms (cf. Rosen 1985). Unlike a snowflake, an amoeba can observe and respond to its environment.

Table 15. Typology of Systems

Level	System Type	Relationship to Enviroment	Semiotic Level
1. Micro-structure	Self-Organizing	Reflection/ Perceiving	Perceiving
2. Meso-state	Self-Reproducing (Autopoeitic)	Representation/ Interpreting	Semantics
3. Macro-behavior	Self-Recreating	Anticipation/ Decision-Making	Pragmatics

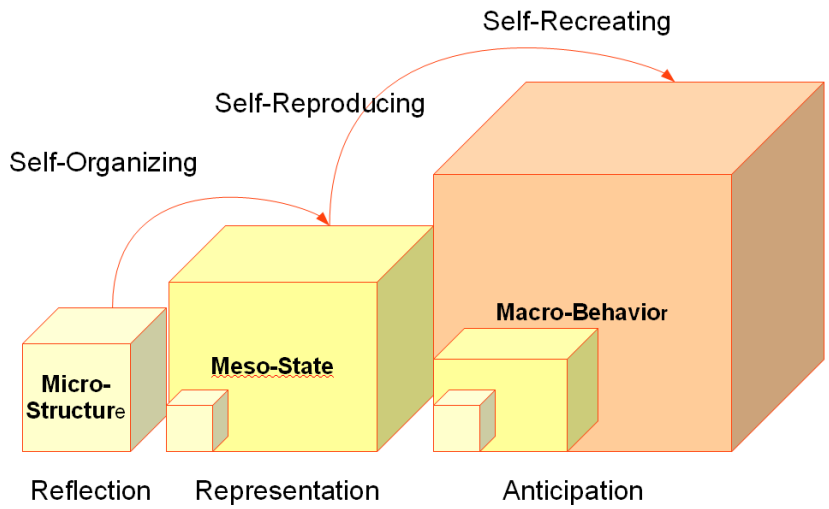

Figure 88. Reflection, Representation, Anticipation.

The last system-type is the self-creating, anticipatory system. The mathematical biologist Rosen (1985) coined the term "anticipatory systems" to designate those organisms that not only react to environmental stimuli, but also posit models that enable them to anticipate consequences of their actions in order to guide their re-actions in the present. To accomplish anticipation, an organism must generate a model or representation of the (relevant aspects of its) environment whose internal clock ticks at a faster rate than the environment itself, while at the same time, dealing with its on-going environmental interactions, which it may then use to modify the anticipatory model.

An anticipatory model provides something like choice or an extra degree of freedom to the system that possesses it. Its reactions are no longer hard-wired, but can be changed depending on its anticipations, which are available for reconstruction. Yet another way to say this is that multiple models of reality are available for the organism in order to make sense of its surroundings. This type of system can not only react to its environment, but can proactively adapt to it. This is accomplished by its ability to entertain a more complex model of its self relating to its environment. These inner models enable the system to anticipate the results of their own actions. Anticipation can be regarded as a recursive model of the system's modeling, or a meta-model, depicted in Figure 89.

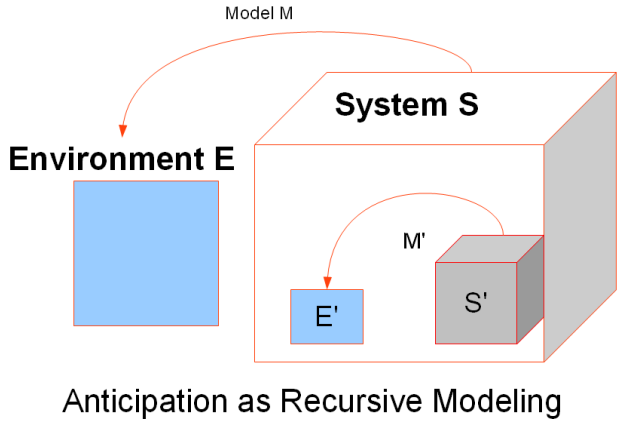

Figure 89. System Anticipation

In this illustration, E stands for environment, S for system and M for model. The letters with a prime suffix indicate that these are mental models, or anticipations. Notice, however, that this representation also indicates the presence of ***self-reference***. The system entertains a model of itself, and that, moreover, *this* model excludes other possible models: in other words, the model has its own environment, a space of all possible models. With sufficient degrees of freedom, a system can entertain the notion that its own anticipation is but one of many possible anticipation, and can regard the model itself as a *selection*.

To refer is closely related to the operation of observation.[124] To observe means to draw a distinction in order to indicate one side of a distinction. Observation occurs when this indication is made with the purpose of acquiring information about that which is distinguished. Reference is a weak form of observation, which does not necessarily entail the processing of information. Following Luhmann, (1995: 440), if a system orients itself towards the *unity of the difference* established by this distinction, we say that it the system has gained *distance* from itself. A system that gains distance from itself operates simultaneously at a basal and meta-level of distinguishing and distinguishing its distinctions from other possible distinctions. Such amplification of selectivity facilitates system differentiation, as for instance, when exchange becomes the exchange of exchange, as in a financial system. Self-reference, thus does not pertain merely to theories of the world, but describes systems within the world, including and especially functional sub-systems such as the economy, and arguably, finance.[125]

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[124] In the sense that George Spencer Brown uses the term.

[125] System does not mean a mere model or analytical construct. Systems are ultimately constructed, but they are constructed by themselves. This distinction is often confused. System can be distinguished from system-reference, where the latter means a model or concept of system. The two only overlap in special cases. To refer to a self

When dealing with systems that process *meaning*, i.e. systems constituted with the distinction between what is and what is possible, moreover, *system differentiation takes place via the reduction of uncertainty in its anticipation of the future*. Differentiation proceeds at the *cost* of a presumed certainty in its modeling. For example, one can observe the use of money and be certain that an exchange is at least formally voluntary (i.e. that one is not observing a relation of coercion); and in the time dimension, one can be certain that the receipt of money will enable a future payment, thus enabling one to postpone decisions regarding one's immediate needs. What is possible is thus constrained, but at the same time open. Explicating how expectations are coordinated between anticipatory systems has been a central focus of sociological systems theory (e.g. Parsons 1951).

The approach taken here is that the *financial and economic systems are anticipatory, self-referential social systems*. This statement deserves some clarification. Traditionally, the concept of self-reference has been regarded as a property exclusively belonging to consciousness. Reference to the ego established the Cartesian dualism between subject and object. Self-reference is an alternative to the concept of the subject, both as consciousness and in its grammatical meaning, as in the subject of a sentence. According to Luhmann, self-referentiality "is a condition that occurs when a system is operationally closed, i.e. when in their communication processes the system's constitutive elements refer exclusively to other elements of the same system and never to anything beyond the universe constructed by this system" (Blühdorn 2007: 13).

Whatever is meaningless from the perspective of a model (subsystem) can be considered as noise, or error (Rosen 1985). However, this "noise" is a necessary precondition for meaning. Order requires not only disorder but noise.[126] Without the noise as background, meaning could not be distinguished. All systems, including meaning-processing systems exist only under "ecological conditions" (Von Foerster 1985). By 'meaningless noise' I do not mean a message that "this is meaningless" (e.g. a observer's reaction to modern art), but rather, the unseen environment of meaning, for which the distinction of actual and possible is not registered.

Responses are geared towards expectations. Unexpected or surprising events may occur, but whether or not events are unexpected depends on the expectation. Much like Thomas Kuhn's paradigms, expectations are, in general, recalcitrant against disturbances (cf. Heise 1979). Even a reluctant and belated gestalt-switch that appears to be generated exogenously is in fact engendered by the system that generates the expectation: the anomalous data are only triggers or signals for systems with the requisite degrees of freedom to reorganize themselves, that is, to make selections. Anything that changes the state of a system does so only by determining the system to determine itself (Luhmann 1995; Fenzl and Hofkirchner 1997). Once adopted, new

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means to distinguish and indicate a self, but this self can be an element, a process, or a system. Only when the self is distinguished according to the distinction of system-environment do system and system reference overlap.

[126] This is taken from von Foerster's "Order from Noise" principle. (Cf. von Foerster 2003). Luhmann writes that "social systems come into being on the basis of the noise that psychic systems create in their attempts to communicate" (214). Misunderstanding then would be a requisite of social systems.

expectations (of the situation) can steer and orient different sets of control efforts and engender a switch in the context of relevance. In this sense, a new situation may emerge in which novelties are recorded and provided meaning against new background assumptions.

In my view, this distinction is a relative one, a matter of degree. This has important implications, for that which is regarded as more meaningful by a system is that which is regarded as potentially otherwise and hence not constant. *Conditions that are relatively constant (i.e. slow to change) become part of the background of meaningful events.* This also follows from the fact that communication systems, in order to continue, must continually process events as meaningful. In order to detect events, a distinction between a before and after is necessary. A condition with values are slowly changing, however, cannot be registered with respect to the difference between before and after. A stock variable such as debt can also be regarded as something that would be less relevant to a system detecting only variations in flows.

The Meaning of Uncertainty

The environment of a system can also be registered, or observed, according to two different reference frames. The system's relation to its environment can be described as one of *dependency*, whenever the environment is interpreted as a *resource*, or as *uncertainty*, whenever the environment is viewed as *information*, although these are not mutually exclusive (184). Table 16 and Figure 90 depict the two modes of observing systems and environments and an illustration. These are necessarily static representations of underlying dynamic processes.

Importantly, information and resources can be regarded as two ways of observing the environment, rather than inherent characteristics of an environment. Strictly speaking, the environment is not a thing, but the outside of a boundary drawn by an observing system. *Importantly, economics regards the environment of the economy primarily in terms of uncertainty regarding the future and/or uncertainty between market participants (e.g. as in a bank run or panic), rather than in terms of dependency upon natural or social resources.*

The environment of a system can be observed in terms of information or as a resource. The latter reference frame is adopted when a system entertains a (modeled) relation of uncertainty and the former when the system entertains a (modeled) relation of dependence. These relations constitute system distinctions facilitating selection.

Table 16. Decomposition of System and Environment

System	**Type of Decomposition**	**Type of Theory**
	1. Elements/Relations	Complexity
	2. Subsystem/Environment	Differentiation
Environment	**Type of Relation**	**Observed as**
	1. Dependency	Resource
	2. Uncertainty	Information

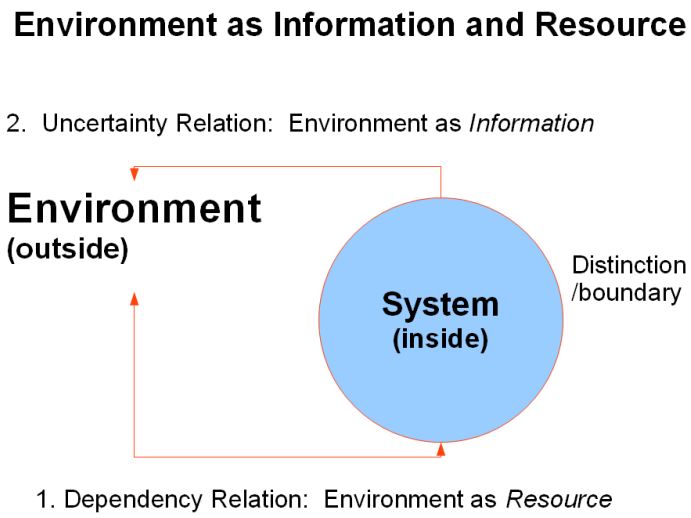

Figure 90. Environment as Resource or Information

The non-selected parts of the environment will be interpreted as meaningless *noise* or as background *conditions.* Just as background, or unobserved, conditions can be regarded as necessary presuppositions of system observation, so too can noise, which can be regarded as the fuel or "resource" of information-processing.

Luhmann's conceptual model of the distinction between information and meaning is not that of an outcome of a recursive selection of uncertainty. Instead, meaning is distinct from information because a piece of information that is repeated is no longer informative (i.e. no longer possesses value as information), but nevertheless retains its meaning. Luhmann defines *information* as "an *event that selects system states*" (1995: 67), and writes that *"all information has meaning*" (67, my emphasis). Luhmann thus presupposes information that has been selected and made meaningful by a system that observes it. Accordingly, Luhmann's information refers to Bateson-type information rather than Shannon-type information.

What counts as information is always determined by a system that distinguishes signal and noise, or what is informative from what is not, and the system's reaction to this information is always determined by the system itself, for only a system can change its own state. Luhmann thus speaks of information as appearing to systems as a "determination for self-determination" (68). Information constraints entropy in that the system's response is not entirely random, or in other words, the system's possible reactions to information are not equally probable, because this would indicate the changes in the system are entirely stochastic and thus not influenced at all by the processing of information. Importantly, however, information processing never entirely "[pins] down the system" (68); information never entirely determines the system's behavior.

Social systems cannot be entirely certain as can individuals. Social systems are, according to Luhmann, "inherently restless" (1990: 9). This has interesting consequences for the idea of

system maintenance. Rather than being a process of simple reproduction of the same patterns, it is primarily the "production of next elements" *which have to be different from the previous ones in order to be recognized as events* (1990: 10). In a passage reminiscent of Schumpeter's idea of creative destruction, Luhmann states that system "stability is based on instability" (1990: 10). In other words, in order for the system to continue, it must neither be totally certain (i.e. fixed) or totally uncertain, or random, in which case it would no longer exhibit the property of a system. An illustration of how knowledge, meaning, and information can be regarded as processes of uncertainty reduction is provided below. Note that uncertainty (i.e. surprise, novelty, variation, difference, or noise) is a necessary precondition for the processing of information, meaning, and knowledge.

Crisis of Expectations

One way to frame uncertainty and complexity is in terms of *crisis*. The word "crisis" comes from the Greek which means "to separate or divide" and also "to sift, to decide." In ancient Greece, crises signified "*moments of truth* when the significance of men and events were brought to light" (O'Connor 1987: 54: my emphasis). During the course of an illness, crises were regarded as revelations or as turning points when fate decides whether or not an individual will recover. The word "crisis" was not used to describe general market disequilibria until the late 17th century. The term crisis, in its original meanings, connotes both uncertainty and the necessity of deciding (i.e. selecting) that this uncertainty compels. When the unity of the group is threatened, the unity of a decision is required in order to cancel out the possibilities engendered by fragmentation.

Sociologically, crisis can be understood, not in terms of a so-called crisis of representation, a philosophical preoccupation which, moreover, does not prevent this crisis from being represented, but rather, in terms of the complexity of society's self-representation qua communication. Sociology today, more than any other discipline, can be regarded as a "science in crisis" (Leydesdorff 2003: 35; Gouldner 1970). It is only fitting that sociology, as a science that is not itself unified, make efforts to comprehend the complexity of a society that is likewise. Sociology, as a meta-reflection, can observe the crisis without reifying it.

A system is complex when it has more possibilities that it can actualize at any given moment. This surfeit of possibility for *social* systems can be regarded as the differentiation of communication "channels", each of which posits its own expectation of what society is and/or should be. Indeed, from a sociological point of view, society's apparent militancy against the realization of its immanent possibilities (e.g. Postone 1992) can be regarded as the predictable form of observation in a society whose possibilities are neither fixed nor observer-invariant.

For a theme of communication to continue as something other than catechism, participant-observers within thematic channels[127] require some degree of uncertainty, reflected in the combination and recombination of meanings that are never pinned down once and for all as a final answer (which would dissolve the discourse). One resource for uncertainty, and also, for the updating of a communicative theme, can be provided by observed events, observed and made relevant by an observing system that uses these events as an occasion for its continuation. The world is in crisis, but even this presupposes that society as communication about crisis continues. Crisis discourse adds itself to a growing list of potential self-descriptions of communication.

Much of this crisis-talk takes the form of protest, as "communications addressed *to others* calling on *their* sense of responsibility (Luhmann 2005: 125). Markets are irresponsible, as are governments, neoclassical or "utopian" economics (Cassidy 2009), lenders, borrowers, the credit ratings agencies, the government sponsored enterprises (e.g. "Fannie and Freddie"), China, and capitalists. Sociology need not conduct a judicial review. Each of these discourses has found its own communication niche, within which the whole can be bounded and observed. Each is a means for the self-simplification of self-observation.

Sociologically, we cannot take these incompatible (or at least discrepant) attributions for granted. *How* is it possible that social selection processes have not reduced the uncertainty of the crisis, both with respect to its causes and with respect to its probable or possible resolutions, into a canonical explanation and meaning? Moreover, how is something as complex and ambiguous as the concept of "crisis" capable of being observed and communicated about in the first place? What does a housing bubble have to do, in principle, with the recent bailout of Greece? The capacity to formulate the crisis as a singular problem must be problematized, or in other words, regarded as improbable. The ability to sustain multiple, and often incompatible, forms of protest communication presupposes that the observed crisis is also observed as a contingent state of affairs, and hence, could also be otherwise.

What is important from a sociological point of view, in my opinion, is to develop a *sociological concept* of crisis. By concept, I mean a distinction in which both sides are indicated: hot/cold; just/unjust; payment/non-payment; enemy/friend; etc. Thus, concepts are distinguished from *things*, (e.g. chair), for which the other side of the distinction is "everything else."[128] From what is the concept of crisis distinguished? For economics, "crisis" as an object generally refers to those phenomena associated with loss, or expected future loss (unemployment, loss of anticipated economic growth, debt defaults, and so on), so becomes a variant of the distinction between desirable/undesirable, or equilibrium/non-equilibrium. For sociology, possible distinctions include normality/abnormality; unity/fragmentation; reversible/irreversible; intended/unintended; organized/self-organized (or dis-organized); preventable/inevitable; attributed to system/attributed to environment. Yet another possibility is that crisis can be formulated as the distinction between anticipated and unanticipated. A crisis is, in some

[127] I prefer the term "channel" over "discourse" because the latter seems to exclude quantitative or semantically meaningless communication. When I purchase gas with my ATM, this can, in a sense, be regarded as communication, even when I speak to no one.

[128] The (concept of) concept, incidentally, is the conceptual distinction of: (thing/concept).

respects, unanticipated, although this does not account for all of those who did anticipate, and those who did not, but in retrospect should have.

In my view, a system *experiences*[129] *a crisis when it observers a persistent discrepancy between its perceptions and its expectations*. This can also be formulated in terms of control theory: a crisis arises whenever a system observes that it cannot any longer control essential *control variables.* [130] Specifically, what is called the ongoing *economic* crisis can best be regarded as a *societal crisis of communication*.

Observing Risk

The distinction between risk and uncertainty was first introduced by Frank Knight (1921). Georgescu-Roegen provides a succinct description:

> Risk describes situations where the exact outcome it not known but the outcome does not represent a novelty. **Uncertainty** applies to cases where the reason why we cannot predict the outcome is that the same event has never been observed in the past and, hence, it may involve a novelty (1971: 122)

Accordingly, the term "'calculated risk' if taken literally is a mere parade of mathematical terms" (1971: 83). Risk refers to events that are unknown but not novel; risk can be characterized as arising from *imperfect knowledge* (e.g. such as *intrinsic randomness)*. Uncertainty, on the other hand, refers to those events that are totally unanticipated, and hence novel. Uncertainty arises from *incomplete knowledge*. The fundamental principle of uncertainty is important to the work of John Maynard Keynes, who regarded many economic events as unpredictable in principle.[131] For Nassim Nicholas Taleb (2007), all important events in history as Black Swan Events, which he characterizes as possessing: rarity, extreme impact, and retrospective (though not prospective) predictability.[132]

The etymology of the term risk is generally not known. Its first widespread appearance in Europe occurs in the 16th century. Luhmann suggests that the emergence of the concept of risk, and that of rational calculation, is the compensatory counterpart to an increased perception of control of circumstances: "Both concepts appear to be able to guarantee that even if things do go wrong, one can have acted correctly. They immunize decision making against failure, provided

[129] I use this word suggestively, for Luhmann distinguishes between experience and action, where the former is attributed to environment and latter to system. We *undergo* experiences, but *commit* actions.
[130] I use the term "control" in its cybernetic sense, to indicate a process by which perceptions (aka input signals) are kept near some reference level (aka goals, reference signals, standards) through processes of negative feedback, involving the variation of system behavior (aka output). Essential refers to those variables defined in terms of distinctions constitutive of the system itself.
[131] See for instance Robert Skidelsky's *Keynes: The Return of the Master* (2009). Skidelsky pinpoints three neoclassical concepts that led academics and policymakers astray: the rational expectations hypothesis, the real business cycle theory, and the efficient financial market theory. For a review and interview, see Lawler (2009): http://spectator.org/archives/2009/10/06/keynes-uncertainty-principle
[132] http://www.nytimes.com/2007/04/22/books/chapters/0422-1st-tale.html?_r=1

one learns to avoid error" (2005: 13). In other words, the concept of risk presupposes identifying a decision without which the loss would not have occurred (16).

Following George Spencer Brown's calculus of indications, Luhmann devises a *concept* of risk. Luhmann distinguishes between *objects* and *concepts*: the former specifies something as distinct from everything else, without specifying the other side of the distinction, whereas the latter indicates both side of the distinction (e.g. hot/cold; women/men; justice/injustice). What does the concept of risk indicate? What is its negation? Luhmann considers the pair risk/security, and argues that this distinction is not theoretically fruitful because security is something we desire, so the distinction risk/security becomes another variant of desirable/undesirable. Moreover, it conforms to a mode of first-order observing of facts, rather than a mode of second-order observing of how facts are constituted through observation.

Luhmann then proposes that risk be distinguished from danger: {Risk\Danger}. Both Risk and Danger presuppose that uncertainty exists in relation to future loss. This gives rise to two possibilities: either loss is a consequence of a decision, and is therefore attributed to system; or b) the loss is caused externally and is therefore attributed to environment. Security constitutes the *unmarked space* or blind spot of the distinction: Security {Risk\Danger}, where attention is focused within the brackets {}. The advantage of this distinction is that it focuses on attributions, which can be empirically observed.

Elsewhere, Luhmann (1995) distinguishes between *action* and *experience*, which corresponds to system-attribution and environment-attribution, respectively. The term "experience" is somewhat confusing, so I will use the term *passive experience* to indicate an experience that is attributed to a system's environment. Risk and Danger can thus be regarded as the active and passive experiences of future loss. System and environment means roughly "self and other" where these concepts do not refer necessarily to psychological or biological selves. Luhmann argues that up until the 18th century, danger has been emphasized over risk. Social losses were not primarily those attributed to decisions. Prevention can be used to avoid future losses perceived as danger and risk. Preventing future losses as a result of danger involves preparing for future losses that are not the result of your own decisions, such as a natural disaster or foreign invasion. The prevention of risk, however, becomes significantly more complicated because the prevention strategies influence the willingness to take risks (e.g. moral hazard). Moreover, the prevention itself will also incur risks. Luhmann notes that the terrorism can be regarded as either a risk or danger, which impacts heavily how it is handled politically.

Luhmann posits that modern society communicates more and more in terms of risk, which means future losses are anticipated and evaluated (*ex post*) as arising from decisions. The attribution to decisions *reinforces the difference between past and future*, causing a shortening of the perceived duration of the (durationless) present. *The reinforcement of the distinction between past and future refers to qualitative novelty*. Why is this? To attribute an outcome to a decision means to mark a distinction between the actual and possible (counter-factual) event. This presupposes marking the event as a loss relative to some reference standard. In other words, loss presupposes the active observing of past or anticipated losses, and thus, presupposes a socially enhanced capacity for communication to codify and stabilize discursive observations of loss. The

attribution of losses to decision reinforces and amplifies the experience of decision, and hence, the monitoring of action.

Decisions also reinforce the distinction between past and future in a more direct sense. Decisions are related to observation. Both distinguish in order to select one side of the distinction for indication. Unlike observation, however, decisions *remember what is not selected as that which is excluded*. The memory of past decisions generates a linear, historical sense of time and necessitates the production of codified self-descriptions. Individuals have, for much of recorded history at least, made conscious decisions and have related these conscious decisions to themselves and others in the form of self-descriptions and historical reports. However, in modern societies a new societal system emerges which operates exclusively via the distinction of decision/non-decision, namely, the organization. Organized communication thus enhances the capacity of society to relate to itself in the form of histories of decisions, each of which marks the irrevocable distinction of a before and after.

The attribution to decision simultaneously mollifies anticipated risks and amplifies the impact of unknown uncertainties. I call this the **paradox of control**, namely, that *for systems capable of experiencing qualitative novelty*, (cybernetic) *control presupposes and reproduces the absence of control*. This occurs when control efforts are not only oriented towards some observed objects, but towards observed controlled efforts themselves. The observation of control means that control efforts are reflexively observed as a process of decisions, which implies that *things could have been otherwise*. Control is transformed from a necessary (first-order) action into a contingent (second-order) experience. Furthermore, systems cannot attain certain knowledge about social conditions because their decisions are based not only on information from the past, but on the anticipations and expectations of others about the future, generating an irreducible element of uncertainty.[133]

One hypothesis, derived from the preceding considerations, is that a co-relation exists between a) an increase in the ratio of system-decision attribution (risk) to environment-accident attribution (danger), and b) the a*cceleration of historical time*. For example, the speeding up (acceleration) of monetary transactions via financial media is a shortening of the distance between past and future. The metaphor of speed is perhaps more appropriate than size to describe "large" monetary transactions: a single $1 million dollar payment can be regarded as one million separate, sequential $1 payments. According to Rosen (1985), the frequency of the update will determine whether the global optima of the system or the local optima of the sub-system will tend to prevail: the faster sub-system will prevail in the short-run but ultimately, the slower dynamics of the embedding system are decisive. This insight can generate interesting hypotheses regarding the rise of (fast) finance at the expense of the (slow) overall economy and its (even slower) social and biophysical support systems.

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[133] George Soros (2008) formulates this as the concept of *reflexivity*. Fundamental uncertainty is a necessary outcome of the simultaneous efforts of participant-observers to both observe and participate in social situations. Soros refers to the former effort as the cognitive function and the latter as the manipulative function. Because they aren't sequential but simultaneous, each function deprives the other of its independent variable.

What becomes apparent when examining how systems observe risk is the extent to which they are not equipped to observe risk in any other terms except that provided by their operational codes. The financial system examines risk as a "strictly money-economy problem" (Luhmann 2008: 175, Risk). And how could it observe otherwise, since the function of the financing system is precisely to avoid the *central risk* of *insolvency* (176). In the risk/danger schema proposed by Luhmann, *economic* risk belongs exclusively to investment and credit risk, that is, to the risk of not being paid back, that is, to future disappointments directly attributable to decisions by individuals or institutions (i.e. to the system), rather than to outside and uncontrollable circumstances (i.e. to the environment). The latter are more properly called *dangers*. Luhmann also observers the tendency for financial institutions to resort to 'second-order observing', that is, the observing of their peers in order assess risk, a phenomena White (2002) also introduces as a fundamental process in his theory of price formation. *This means that risk, is increasingly assessed by means of observing how others assess risk, in part because the future is inherently unobservable and because the future can be expected to be increasingly unlike the past, to the extent that events in the world are increasingly attributed to decisions (and thus processed as risks rather than dangers).*

Is it more desirable (rational) to generate more profits now at the expense of increased risk of loss in the unspecified future, or is it more desirable to generate less profits now, with the expectation that prudence will pay off in the unspecified future? This appears to be not an outcome entirely determined by decision, as outsider onlookers, (e.g. investors) will 'vote with the feet.' In other words, *the market entails also, and importantly, a relative coordination of the time-horizon that is relevant for assessing risk.* The relevant time-frame is bound because as Keynes said, in the long-run we are all dead. Death for economic actors essentially means insolvency.

The carrot of above-average growth, coupled with the stick of bankruptcy, suffices to constrain economic behavior within bounds. For example, only monopolies can run at a loss for extended periods of time, and wise investment firms, must still find money to invest, and this means attracting potential investors in the present. *The calculation of future risk therefore is constrained as a periodically updating collective assessment.* It is this periodicity, or frequency, of the decision-making that tends to speed up in times of chaotic market behavior, which introduces the possibility of multiple futures, or *second-order uncertainty* with respect to anticipatory models.[134]

[134] This has been simulated by Leydesdorff (2006).

IV. SOCIAL COMPLEXITY, CONTINGENCY, AND THE POSSIBILITY OF NORMATIVE CONTROL

The Critical Tradition of Sociology and the Structural-Functionalism of Parsons and Luhmann

Since its inception, sociology as the study of modern society has had an abiding interest in using Reason to illuminate the latent dimensions of social life, in order to fundamentally improve the human condition, or at least an interest in *claiming* to do so. The systematic investigation of how society fails to live up to its own promises and self-description, can be regarded as one unifying orientation of the classical sociological tradition. The promise of sociology as conceived broadly, if not always explicitly, in the classical tradition, has been that "a science of man" could not only investigate and uncover hidden "laws" of the social world, but that this science could be used to bring about a better society. The purpose of social research, broadly stated, was to use Reason to transcend common sense, with the aim of examining the discrepancy between social structures as they are intended or believed to be, and structures as they actually are. For instance, Marx sought to uncover the hidden laws of the market, which operated behind the backs of those who constituted and sustained it, and which generated impersonal forces of domination, most notably in the sphere of production, that stood in contradiction to the appearance of individual freedom manifested in the sphere of exchange.

Classical sociology was not only concerned with analyzing the differentiation of society, but more fundamentally, it concerned itself with synthesizing the knowledge gained from analysis into a comprehensive, integrative understanding of social life viewed as an ongoing, unified process or movement in history. In other words, it was understood that the emerging dimensions of social life, such as career and family, or of the state and the private sector, were in principle connected, not only by their common evolutionary and historical origins, but also interrelated in the present through a web-like, but opaque, network of inter-dependencies. Moreover, the social could be conceived of, not only in terms of an empirical or factual totality, but also as a normative totality, subordinating the various functional sub-systems of society to the latent, but common interests of concrete, historical, and above all, human, agents. In addition, the classical tradition emphasized the *Totality*, i.e. relating the personal and fragmented daily life to society, as a whole. The distinction between surface appearances and underlying deep structure was therefore coterminous with the distinctions between plurality and singularity, fragmentation and unity, or subject and object. Penetrating the veil of Maya entailed ascending to the Archimedean point of reflection from which the social totality, in its singularity, can be apprehended. This apprehension of the totality would, furthermore, be a necessary precondition for the evaluation of efforts to improve society. The totality of modern society, however, is necessarily latent.

I do not mean to imply that classical theorists were at all Pollyannaish in their estimations of the future, or even that they were optimistic about the likelihood of the promise of sociology, or more generally social science, ever being fulfilled. Max Weber, in particular, regarded the narrow understanding of human reason in terms of instrumental rationality as potentially facilitating invisible barriers to human development and freedom that were 'as hard as steel.' In

addition, the thesis that the advancement of human Reason (or perhaps more accurately, "rationality") at some point ceased to coincide with the advancement of human freedom, has a long tradition in sociological theory. Horkheimer and Adorno, for instance, regarded the technological mastery of nature facilitated by human reason, which became focalized and amplified during the period of the Enlightenment but whose trajectory could be discerned in the very origins of human history, as the simultaneous colonization of inner human nature and experience. In contrast to Adorno and Horkheimer, Jürgen Habermas, as the central member of the second generation of critical theorists, adopting a more sanguine view of the relation between human freedom and Reason, has regarded the development of the productive forces as a necessary but *insufficient* precondition for the progressive emancipation of humanity. For Habermas the emancipation of humanity requires the cultivation of both productive and reflective knowledge.

The link between the distinction of the totality and its parts, and between the surface manifestations and latent structure has been broken by recent developments in systems theories. Rather than the relationship between totality and its parts, the relation between system and environment remains central. Rather than the distinction between surface appearances and deep structure, observations are made possible by unobservable blind spots. Rather than social science revealing a singular, but latent totality, what observing systems observe becomes a function of how observing systems observe. In short, whereas classical sociology has posited unity as its guiding orientation, new second-order systems theory has been guided instead by the unity of difference. As such, systems theoretical perspectives constitute a radical paradigm shift that cannot be easily integrated into the classical tradition.

A common presupposition of sociological theory has been its humanist orientation. Human beings are at the center of social theory. This too, has been rejected most radically, by Niklas Luhmann, who presupposes instead that human beings, more specifically their minds and bodies, relate to the social system as part of its environment. Communications, not persons, constitute society, and only communications, not persons, can communicate. The implication is the fact that though we may feel or think personally, this has no impact sociologically, except only insofar as it is communicated. Communication, or inter-action, thus constitutes an alternative frame of reference for observing the social world.

The transition to modernity entailed the increasing generalization and abstraction of the concept of the common good. The increasing abstraction of the categories used to observe social life can be regarded as compensatory efforts to make sense of an increasingly abstract world, that is, as efforts to provide meaning to a reality whose meaning, as a whole, could not be specified. The unity of the social world cannot be taken for granted for it no longer possesses a unified identify or "self." The complexity of the world forces observers to adopt (i.e. select) coordinating frames of reference in order to provide social life with some semblance of coherence and meaning. That this adoption is a selection is an empirical fact. This was, in my opinion, one of the central insights of early sociological theory, which generated sufficient theoretical complexity in its own

right, to observe society as a complex, and hence, uncertain, unity. I will regard the notion of "society" hereafter as fundamentally uncertain: *social order is a hypothesis*[135].

Social Complexity and the paradoxical foundations of modernity

William Rasch (2000) has defines modernity as "the name we have given to this *necessarily contingent* world" (20: italics mine). This *necessary contingency* refers to the certainty of uncertainty that Rasch believes provides the paradoxical foundations of modern society. Rasch states that "were we ever to lose our 'faith' in contingency, we would lose our faith in the legitimacy of modernity" (Rasch 2000: 23).

What does he mean by this, and in what way is modern society characterized as contingent? He means in part that there is no necessary relation between an object and its description, simply because there are always multiple ways of describing the same object. The logician Willard van Oman Quine takes up this idea and espouses an ontological relativism. But, what is the status of this relativist assertion? On the one hand, the statement that "there are objects" is rendered untenable. Yet, its counterpart, "there are no objects, just descriptions" can neither be affirmed exclusively because the tenet of relativist ontology asserts that the former statement must also be 'true' (or acceptable relative to some criterion) as well! Quine, in response to the question about whether there are is a single, necessary accurate description of the world, attempts to take the middle ground between yes and no, but implicitly sides with the No in excluding exclusivity. And yet, at the same time, this position is not coextensive with the negative answer either.[136]

For purposes of this essay, the referent is society itself, the sum total of such descriptions. To say that society, as object, cannot be unambiguously distinguished from its referents, is to suggest that references cannot distinguish references from the object of reference. Another way to say this is that modern society is complex.

I will provide two reference frames for understanding the concept of complexity. First, a system becomes ***complex*** *whenever it is no longer possible to relate every element to every other element in every conceivable way at the same time.* In other words, *a system is complex when there are available at any given moment more possibilities that it can actualize.* This means that

[135] The British neuropsychologist Richard L. Gregory, author of a textbook on sight, *Eye and Brain* (1966), when asked what reality is, replied: "Reality is a hypothesis." And when subsequently asked whether reality could be described as a *simulation*, Gregory replied: "Oh, that's probably a better way of putting it" (1989 in NØrretranders 1999: 191).

[136] Translated into system-theoretic terms, Quine demonstrated that the analytic-synthetic distinction is itself analytic, and not synthetic. What I mean is this: the distinction exists empirically, but cannot be attributed to the 'world'; there is no empirical criterion which would demarcate between the two. The prime example is that synonymy (when things mean the same) can only be empirically examined (and hence is not *logically* necessary- we can always discover discordant usages). We can stipulate that things mean the same thing, but there is no logical criterion (i.e. analytic!) that enables us to make the distinction before we've made it. Interchangeability fails because of sentences like "Every creature with a heart is a creature with kidneys", which is unlike "all unmarried men are bachelors"; in the latter case, we presume that bachelors = unmarried man because of intentional (!) meanings, whereas "creature with a heart" = "creature with a kidney" is true by accident, but we can nevertheless interchange them. I prefer Luhmann's use of the distinctions self and hetero-reference, action and experience, etc.

complexity forces a system to make a decision, or to select, from among available options, but every choice cannot be realized at the same time. Because systems are always less complex than their environments, systems exist by creating boundaries to distinguish them from their environments

In a second formulation, a system is ***complex*** to the extent that we can *observe it in non-equivalent ways, that is, observe it through multiple frames of reference.* In other words, if there are multiple ways of "seeing" or "understanding" something, it is complex. As a corollary, it follows that *a system is complex to the extent that we can discern many distinct subsystems of it* (Rosen 1985)**.** We can consider a mental model or abstraction of a system a "sub-system", or partial perspective, of the system as a whole, since to abstract literally mean to "cut-out." A system is complex if we can entertain different models of it, which is equivalent to saying that we can observe it in non-equivalent ways, or discern many sub-systems of it.[137]

The Necker Cube, depicted in Figure 91, provides a geometrical representation of complexity. In the Necker Cube, the image can be viewed from two apparently contradictory perspectives, but *not at the same time*. It therefore possesses more possibilities that it can actualize at any given moment. According to the criteria above, it is complex in the sense that we can entertain more than one mental image (or "model") of it, and because we cannot see all images simultaneously. At best, we can oscillate back and forth between several perspectives across time.

Complexity necessitates *selection*, that is, decisions that cut off from possibility some choices while realizing others, and selection constitutes an "experience of contingency" (Luhmann 1995: 184). Because the complexity of the environment always exceeds the complexity of system, the latter can only exist as an effort to abate this complexity. Yet, is it complex in the sense that its elements cannot all be related at the same time? This depends on how *element* is defined and distinguished from *relations*.

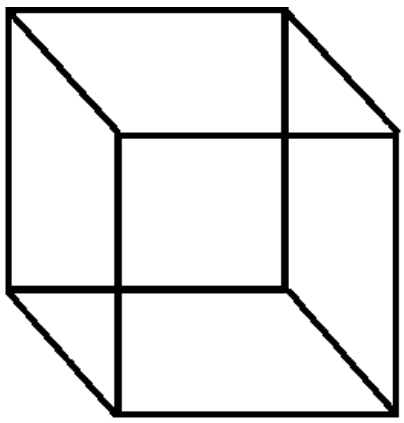

Figure 91. Necker Cube

[137] The concept of complexity as I have formulated it here is roughly the same as Niels Bohr's *Principle of Complementarity* in physics, according to which a phenomenon may exhibit apparently contradictory properties, all of which cannot be simultaneously observed by a single observational lens. Other formulation s of this idea include David Bohm's notion of the *qualitative infinity of nature* and the concept of the over-determination of social events.

We can regard its lines (or alternatively its imagined planes) as its elements related, for example, by contiguity, in which case not all lines (or planes) can be connected to every other line without transforming the cube.[138]

The property of complexity is not an innate property of the object, but arises from how we interact with or observe it. Accordingly, complexity is not an intrinsic property of *observed systems*, but is instead an emergent property arising from how observed systems interact with *observing systems* (cf. von Foerster 1984; Rasch 2000). Systems can be complex or not depending on how they are projected and the relative invariance of their distinguished features. Moreover, the concept of complexity is itself complex if we regard the distinctions just mentioned as distinguishable and hence non-equivalent.

The Necker cube provides a useful analogy for social complexity. This complexity is attested to by the many attempts within sociological theory to grasp the unity of society without unifying, in practice, these theoretical reflections themselves. Sociology, as a meta-reflection on society considered in its totality, can moreover no longer be regarded as an essential contribution to society's *self*-understanding, above all because the unity constituting such a self remains elusive. Society has no self, or to state it differently, society, from the perspective of a theory adequate to apprehending it as a complex object, consists of multiple models of what society is and should be. Societal reference frames are distributed.

Rasch describes the modern mode of observation in the following way: "What we see, in other words, is not a single elephant described variously by different blind men but various elephants made visible by different blind spots; and this modern 'loss' of objectivity cannot be compensated for by the 'rational' demand to see what one cannot see" (33). He has in mind here, Habermas's 'rational demand' that a participant in discourse be "bound to a universal community by way of a cooperative quest for truth" (Habermas 1987: 347, in Rasch 2000: 32).

An important consequence of social complexity concerns the regulation of social relations via morality. Morality, as the generalized medium of communication pertaining to the question of "whether and under what conditions human beings esteem or disdain one another" (1995: 235), becomes insufficient for guaranteeing social order in complex societies. This is because the differentiation of communication requires the differentiation of communicative media to motivate and make intelligible social communication and a corresponding degree of *indifference* to communications elsewhere. For example, one does not need to esteem or disdain a check-out counter clerk in order to purchase a bag of chips, nor must one esteem or disdain all

[138] On the other hand, if we not interested in geometrical equivalence but rather in the weaker form of topological equivalence (based on isotopy), the cube can be pushed into an equivalent sphere, in which case all lines are related by contiguity. We could also specify a relation or set of relations other than contiguity which meet the requirement that all elements be related (e.g. all imagined planes in one of the imagined 3D projections are either orthogonal or parallel).

communications that can be observed. For society to become complex, increasingly more communications must become orthogonal to morality. In this way, society exceeds the boundaries of morality, becoming multidimensional. Luhmann writes that "a complex society needs so many different kinds of expectations for its autopoeisis … that is it impossible for it to sanction all these expectations via the acquisition, maintenance, and loss of esteem" (1995: 253).

Habermas, Complexity and the Problem of Order

For Habermas, communication is always oriented towards a consensus of understanding, even strategically oriented communication, which entails redefining a situation so that consensus can be achieved. For Luhmann, on the other hand, communication has no *telos*. It either contributes to the autopoiesis of communication, or does not. For Luhmann, misunderstanding is just as important as understanding. Luhmann begins by describing a world without communication, and then proceeds to explain *how* communication systems constitute and reconstitute themselves. Any consensus must be an improbable and unstable outcome of these selectively coordinating processes. Habermas, on the other hand, begins and ends with consensus.

Another way of putting this is that Luhmann assumes variation and heterogeneity and then proceeds to generate provisionally stable communications as an outcome of selection processes. The *noise* of communication can be expected to intrude in any and all communications, because of the inherent variation and interference of communication channels that are not biologically or technically hard-wired. Habermas, on the other hand, in a move similar to Chomsky's, reduces variation to constancy, and difference to identity, positing a latent, but universal and singular, motivation to language.

Habermas' aim is to reduce the complexity of the system, or at least shepherd it, so that differentiation does not slide into irrational deviation. Reflection, "in the form of reconstruction, has become the reductionist move that allows Habermas to ground complexity in, and judge complexity by, underlying simplicity" (Rasch 2000: 43). The force of the better argument is intended to be binding, but such binding implies that all participants end up thinking alike and coming to the same conclusions. This of course, makes heterogeneity and pluralism superfluous. Habermas' project, then, can be seen as an attempt to reduce such complexity, which can only be accomplished only by prohibiting (by force of argument or otherwise) the possibilities of observational selection.

For Luhmann, however, there can be no final, Archimedian point of view from which to reduce the complexity inherent in observation. And yet, in stating this, the impression has been created that a universal statement has been made: "An observing system observes itself failing to observe itself fully. There is always a blind spot, and each illumination of a previous blind spot creates a new one. The system acknowledges this and thereby gives the paradoxical impression of having at last fully observed itself as a system that cannot be fully observed" (Rasch 2000: 47).

If one says that one wants to "ground" a discourse, it means simply that one desires that one's statements have more authority. Habermas wants to make *his* statements more authoritative, but without relying on force. He implicitly wants people to agree with him. Yet there is no empirical connection between intent and effect, which is precisely the point of the concept of communication as *system*. To speak of "Grounds" or conditions of validity is also a way of appealing to authority. Habermas argues that his concept of communication is universal and self-inclusive, but to do this, he has to argue that his concept of communication was really there all along, latent in all communication. Everyone really possesses this concept, they just don't know it. Habermas's argument can be boiled down to the following: the force of the better argument *should* win out because the argument that the force of the better argument *should* win out is the better argument, and if you read this you know this to be true because you are agreeing with it. The problem is that we can't seem to agree on much else, but this is admittedly a descriptive rather than normative statement.

One wonders, what is the purpose of trying to prove that all language use can be evaluated according to universal rules of validity? The sociological implication is that society could be regulated (i.e. "steered") *rationally*. Habermas, it should be noted, gives an exhaustive account of social theories and categories of rationality, but never really defines what *comprehensive* rationality is. He equates it, however, with communicative action, and implicitly, with the *common good*. For Habermas, the *public* is the space in which, at least potentially, this universal and free discourse can take place that would advance the common good.[139]

Habermas and Human Emancipation

In volume 1 of *TCA*, Habermas remarks that of all the academic disciplines, only sociology is capable of retaining a focus on society *as a whole*. What is the relation between the "parts" of society and the "whole" of society? Are the parts individuals, or sectoral sub-systems, such as economy and law? Can all of these be regarded as subordinated to a single *common good?* If so, how would this common good be defined?

Habermas's project has a clear political component. In many ways, his project in *TCA* is a direct extension of his earlier work, including *Knowledge and Human Interests (KHI).* In *KHI,* Habermas argues that the emancipation of humanity requires both productive and reflective knowledge. Productive knowledge is essential because its development facilitates the emancipation of society from nature, and by extension, makes possible the further emancipation from social domination. The development of productive forces is therefore a necessary precondition for the emancipation from social domination and the reduction of necessary labor time. Capitalism, because of its dynamic tendency to revolutionize the forces of production, possesses the capacity to overcome the historic problem of scarcity. Only after the problem of fundamental scarcity is solved can the class struggle be transcended. Class antagonism and

[139] Habermas writes: "Citizens act as a public when they deal with matters of **general interest** without being subject to coercions; thus with the guarantee that they may assemble and unite freely, and express and publicize their opinions freely" (1989: 231).

social domination do not automatically vanish, however, once technological production has overcome the problem of scarcity. Instead, once domination is rendered unnecessary,

> it now stems . . . only from the masochistic gratification of a form of domination that impedes taming the struggle for existence, which is objectively possible, and puts off uncoercive interaction on the basis of communication free from domination. This domination is then reproduced for its own sake. (Habermas 1971: 314)

The goal of self-reflection and its emancipatory interest is the realization of the collective self-conscious control of society and the overcoming of the existing imperatives of automatic regulation. Social development is viewed as "a supersession of constraint" in order to achieve "the organization of society linked to decision-making processes on the basis of discussion free from domination." (1971: 54).

If self-reflection is a motive force in history, then how does it operate collectively to emancipate the disadvantaged from domination? Habermas remains reticent on this issue, but does point to psychoanalysis as "the only tangible example of a science incorporating methodical self-reflection." (1971: 214). Presumably the possibility of incorporating self-reflection into a *collective* social science remains as of yet unrealized and only anticipated in *Knowledge and Human Interests*. Psychoanalysis, however, provides a working model for self-reflection at the *individual* level, in which blockages to free communication experienced in resistances are overcome. To resist, Habermas says, is to keep from consciousness, i.e. to remove from public communication. It is this process of resistance at the individual level which he takes as the model for resistance at the institutional level which blocks collective self-reflection and impedes the realization of humanity's further emancipation.

Viewed in the context of its inaugural emancipatory agenda, Habermas's *TCA*, according to Gouldner, is best read as a new critique of censorship.[140] Habermas' project, however, is necessarily ambiguous because he is reluctant to establish the conditions upon which free and unfettered communication could be implemented.

Moreover, his thesis regarding the *uncoupling of system and lifeworld* due to the expansion of *instrumental or purposive* rationality embodied in *potentially* emancipatory technological domination of nature contains a fundamental ambiguity.[141] If progress in science and technology are necessarily tied to the growth of instrumental reason, it isn't clear how it is possible for the

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[140] Gouldner (1976) points out many possible problems with practically implementing his ideal speech situation. For example, doesn't violence sometimes create conditions under which communicative intent is made explicit? Wouldn't exposing the non-rational aspects of another's communication potentially inflict *symbolic* violence upon them? After all, a revelation that one's beliefs or modes of communicating are irrational can be quite traumatic. In addition, what level of competency is entailed in his notion of universal pragmatics? Must a more competent speaker stoop to the level of the least competent? Finally, aren't some limitations necessary for communication to take place? For Habermas, free and unfettered speech constitutes the inherent telos of communication, but making the reality of communication approximate its own goal remains practically problematic.

[141] Habermas's thesis is that: "The rationalization of the lifeworld makes possible the emergence and growth of subsystems whose independent imperatives turn back destructively upon the lifeworld itself" (TCA 2: 186)

life-world to resist the colonizing power of instrumental reason. If, however, it can resist this power, then it isn't clear how it has succumbed to it in the first place (cf. Postone 1992: 241).

The political point is one familiar to critical theory, namely that the rational pursuit of self-interest can generate socially irrational results. Habermas wants a way of deciding apodictically not only whether the means of any given action are rational, but also whether the *ends* themselves are rational. Is economic growth, for example, collectively rational in the long run? For example, what does it mean to optimize utility, and how can people come to some sort of agreement about what is *socially* optimal? These are important questions which have considerable bearing on social policies, including economic and environmental policies. The paradox is that modernity inaugurates the possibility for collective normative regulation with the emergence of what Habermas calls the public sphere, but at the same time the complexity and differentiation that this transition entails makes the unification of a public sphere as collective consensus increasingly improbable.

Social Differentiation, Triple Contingency, and the Emergence of a Hyper-Reflexive Public

Differentiation can be analytically distinguished from complexity. Differentiation and complexity correspond to two methods of decomposing systems and thus to two reference frames for observing systems: first, according to a theory of system *differentiation*, systems can be decomposed into subsystems based on internal system/environment distinctions; second, according to a theory of system *complexity*[142], systems can be decomposed into its elements and relations.[143] Differentiation and complexity are therefore distinct, although a growth in one almost always entails a growth in the other.

To elaborate the historical genesis of the model of functional differentiation, it is necessary to discuss the theoretical development of the related concept of the public. According to Piet Strydom (1999) who introduced the concept of 'Triple Contingency' into social theory, "the emergence of modern society, including the social sciences, sociology in particular, coincided with the appearance, as it were, of the absent, unknown, faceless collective third person, the public" (5).

Beginning around the 18th century, the public became a constituent component of communication. Beginning with the collapse of the religious worldview, scholars began to appeal to the public and to vie for public attention. Communications begin to refer to a public that is physically absent. It is generated as an anticipation of an anonymous opinion or observer. *Talk* emerges as a new degree of freedom for communication encounters. *Gatherings*, meetings, and assemblies begin to take place "drawing a self-selecting membership" in which relevance is

[142] This is similar to what DeLanda (2002) refers to as a "meshwork" and what Latour (2005) refers to as a net-work, that is, the process by which heterogenous elements constitute a unity and co-relate.

[143] This distinction is taken from Luhmann, who writes that the distinction between part and element is "equally constitutive difference" of systems: "just as there are no systems without environments or environments without systems, there are no elements without relational connections or relations without elements" (1995: 20).

circumscribed by theme and topic (4). Achievements such as the abolition of censorship, freedom of speech, freedom of the press, and the emergence of the mass media mark the milestones of the emergence of the public. The proper role of the public in sociological theory, however, is lacking. How does this anonymous public arise? One answer is in the exponential growth of communications that raise the frequency of impersonal and anonymous speech.

Ivan Illich observes that:

> Fifty years ago, most of the words heard by an American were personally spoken to him as an individual, or to somebody standing nearby. Only occasionally did words reach him as the undifferentiated member of a crowd- in the classroom or church, at a rally or a circus. Words were mostly like handwritten, sealed letters, and not like the junk that now pollutes our mail. Today, words that are directed to one person's attention have become rare. (1996[1978]: 17)

My argument is that this notion of a public *created and was created by* the functional differentiation of communication. The birth of the public marked the transition to a society that not only provided the media by which communication perspectives could be entertained, but more importantly, marked the emergence of a second-order perspective that also entertained models of these communication perspectives. This has consequences for how "social order" is resolved.

Three stages (which can be conceptualized diachronically or synchronically) of social order can be identified:

1. Social order is fixed, natural and immutable;
2. Social order is unnatural, artificial, and contingent;
3) Social order is anticipated, emergent, self-organized.

These perspectives can be thought to vary along a continuum of lesser to greater uncertainty. The emergence of the public marks the last stage, which then orders social relations in that participants in interaction orient themselves towards an *unobserved observer*, the public, which, however, unlike god, is uncertain.

For Habermas, the public arises whenever citizens can express their opinions regarding the general interest freely. Historically, a public arises in Europe during the 1700s whenever the rise of the market economy extends the reproduction of life beyond the private domestic sphere (233). Early on, Habermas gives the public a normative interpretation, which he later conceives of more abstractly as domination-free discourse, or the ideal speech situation, which can be regarded counterfactually as the anticipated result that would have occurred in the absence of external restraint (Strydom 1999: 13). Still later, Habermas would identify this third perspective with the moral point of view adopted by social movements. But as Strydom points out, however, Habermas equivocates between two understandings of the third perspective, one of which is a context independent moral point of view presupposed by everyone, and the other is a specific point of view embodied in social movements. Furthermore, ***by identifying the moral point of***

view with social movements, Habermas renders any critique of these social movements impossible (Strydom 1999: 20).

Double contingency refers to a socially undetermined situation in which two actors confront one another, but base their actions on the actions of the other. If I want what you want, and you want what I want, how is it determined who wants what? Nevertheless, *situations of double contingency are resolved*, that is, determined. The situation is thus a hypothetical which poses a question about the conditions of possibility of inter-relating between any two individuals. The concept of double contingency has built within it the concept of *anticipation*: actors do not simply react to perceived environmental disturbances and respond; rather, they *anticipate* and thus act on the basis of predictions of others behaviors in relation to one's own.[144] One must act, but in anticipation of the others responses to one's actions, and vice-versa. The situation is undetermined and both are *equally uncertain*.

Whereas Parsons defines contingency as dependence, Luhmann also underscores the modal meaning of contingency as something that is otherwise possible, or not necessary: that which is contingent is neither necessary nor impossible. Luhmann's "solution" is that determinacy in a social situation can arise from stochastic disturbances, a principle he calls *order from noise*, following Heinz von Foerster. The idea is that random or unlikely occurrences, once they occur, can set in motion self-reinforcing processes that stabilize interaction patterns through path dependency. For instance, a chance encounter can generate a life-long marriage. The necessary ingredient of these path dependent processes is unexpected, and thus become meaningful only in hindsight.

Strydom goes on to argue that the emergence of the public introduces a third contingency, but in my view, this can provide the necessary background, or noise, which can stochastically order expectations. Thus, although what can be observed in any encounter can be, depending on one's observational schema, unpredictable (akin to the 3 body problem in astronomy), order of some kind is generated. Double contingency is solved *once subsets of possibilities select upon each other to render more probable hitherto improbable events* (Baecker 2001: 60). The public can be regarded as yet another selection mechanism that serves to coordinate expectations.

The significance of double contingency can be understood from two perspectives: that of the participant-observers themselves, and that of the third super-observer, or what I am calling the *unobserved observer*. The distinction corresponds to what Leydesdorff calls the distinction between infra-reflexivity and hyper-reflexivity, respectively. From the perspective of the two actors facing double contingency, the third observer, or the public, becomes uncertain. It is possible to anticipate public reaction, and in fact this anticipation is often experienced as a non-contingent necessity, but it becomes in principle impossible to predict public reaction with certainty. This is why, for instance, it is necessary to constantly poll public opinion, which

[144] As Parsons puts it: "Part of ego's expectations, in many cases the most crucial part, consists in the probable *re*action of alter to ego's possible action, a reaction which comes to be anticipated in advance and thus to affect ego's own choices" (1951: 5). See also Bigelow, Rosenblueth, Wiener (1943); Fenzl and Hofkirchner (1997); and Rosen (1985)

becomes distributed across orthogonal semantic dimensions (which is another way of saying that people can be expected to disagree or hold varying views across multiple topics and themes).

A caveat, however, is in order here, for there is a danger of misunderstanding this third-person perspective as something other than an anticipation. In fact, what is argued here is that the infra-reflexive and hyper-reflexive perspectives are not perspectives *belonging* to different types of persons, but rather, they constitute distinguishable types of perspectives capable of being adopted by any person in any given situation. In short, one can be expected to oscillate between the perspective of an actor embedded in a situation, and hence participating and observing within it, and also, of a disembedded observer of a situation.[145]

In non-modern societies, contingency is absorbed by processes of group identity integration. A god-king centralizes and coordinates the perspective of the super-observer, and banishes other possibilities for meaningful reflection onto an outside environment inhabited by an alien other (e.g. the barbarians to the Greeks). This all still occurs today (cults being the limit case), but functional (sub)systems no longer provide means of integrating identities.

Parsons's solution to the problem of double contingency is to invoke culture, as an already available shared system of meaning. Socialization is the means by which actors can assent to a stable definition of the situation. Both Habermas and Luhmann have criticized Parsons for reifying culture, but implicitly accept the concept of double contingency. We should not reify social order. Norms do not exist outside us at the top of a control hierarchy. Control, *only* and *always* occurs within persons. Control, however, can be influenced or conditioned via communication.

The knowledge that one is being observed changes one's behavior: e.g. Hawthorne experiments. The observation or feeling of being observed is not itself a communication, but the knowledge that a judgment will be issued, *is a communication that hasn't happened*. In other words, *double contingency is the anticipation of communication, which can remain latent***.** Double contingency changes the dynamic of interaction: specifically, it alters the conditions under which co-action occurs.[146] *Co-action becomes inter-action or trans-action as soon as one recognizes this condition: the condition exists as an expectation. The experience of double contingency presupposes, rather than makes possible, communication*. *What is communicated here is presence, if nothing more.*

It is also possible that *one observes without observing that one is also being observed*, but I exclude that complication from consideration here. The mere perception that one is being perceived also counts as communication, in the sense of the strict definition, because one's being watched changes the dynamic (i.e. decision rule) for one's behavior, *as a result of the*

[145] Logically, this condition is possible because of what Gunther calls poly-contexturality, in which no context or super-set of situations embeds all others *from the point of view of all others*. Linguistically, it is my hypothesis that triple contingency can be generated via the capacity for human language to communicate digitally (in addition to analogically).

[146] I propose that double contingency can be modeled as the introduction of a new parameter value in a state space model. As a condition, it does not necessarily change the selected actions but changes the probability (or frequency) distribution of actions. In other words, it changes the decision-rules by which actions are determined.

anticipation of a communication. For example, a boss is watching me, and I act in anticipation of the communication of some judgment from him.

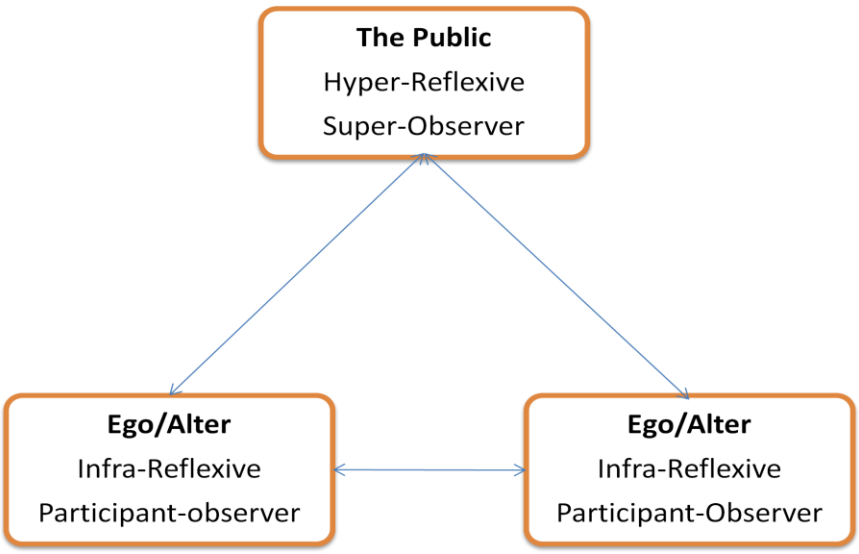

Figure 92. Triple Contingency and the Public.

Triple Contingency arises concurrently with the hyper-reflexive observation of communication. It is asymmetrical because the two communicants (participant-observers) do not *expect* communication from the hyper-reflexive observer. This means, the hyper-reflexive orthogonal reference frame is more akin to voyeurism than supervising: *one observes without being watched*. In the former case, the communicants are not aware of being observed. If they were, they would then sense a third contingency, for example, a feeling or sense of being observed. This alone is sufficient to communicate one's presence. These relationships are depicted in Figure 92.

Implications of Triple Contingency for Markets

Sociological and economic theory rely on dyadic models of action (or inter-action) and exchange, respectively. The concept of system, as I envision it, requires taking into account triads. In economics, this has been thematized in terms of *externalities*. This concept can be generalized to account for the (unintended) consequences arising from all *indirect* communication. Moreover, the concept of the triad does not necessarily relate to third persons, but rather, to third perspectives, the internalization of which presupposes a degree of (internal) differentiation.

These third perspectives account for social systems as (*ex ante*) hypotheses. In sociology, the model of double contingency accounts for two persons, whereas in economics this duality is reconstructed as the duality of buyers and sellers, two categories containing a potentially infinite set of members. The contingency of each is reduced via utility maximization axioms. What both models have in common is an exclusion of *indirect* communication or influence, which can

also be regarded as the uncertainties generated from recursive reporting of reporting, and modeling of modeling. In the ideal case of the market, such complexities do not arise because all participants connect to all others immediately via a common center. In economics, this condition is framed as a problem of *asymmetrical information*.

The market thus resembles Habermas's *ideal speech situation* in which communication occurs in a common forum, mutually accessible to all. One does not need to report on what a counterparty has said, because that counterparty is present to say it. Accordingly, representation does not occur: the system equilibrium is a case of *reflection*, whose outcome is determined, rather than selected, by the outcomes of individual actors. They are not influenced by general (meso-level) *conditions* of the market that could be otherwise, because they have no capacity to report or reflect on the general condition of the market itself as a system. Finally, the model of the market cannot conceptualize the sphere of economic relations (of buying and selling) as one possible sphere or system in interaction with other systems, whether biophysical natural systems or other human systems such as moral and political systems.

CONCLUSIONS

The *real* crisis, in its vernacular sense, is the human alienation and anomie that arises from the insecurity produced by the uncertainty about future solvency and employment. However, there is no logical necessity to the coupling of purchasing power and organizational membership, in the form of "work." Nor is it necessary that purchasing power be distributed exclusively through organizations (e.g., banks) rather than individuals, and *in the form of debt*. One potential policy recommendation is the so-called universal basic income (UBI) or universal grant, provided unconditionally and universally. It is far outside the scope of this essay to detail the long history and extensive literature regarding this radical reform. However, a few rough calculations are worth mentioning.

According to the US Census, there are approximately 307 million residents presently in the U.S. About 230 million are over the age of 18. A basic grant of $500 per month to every man, woman, and child would cost $500*307 million * 12 (months) = $1,842,000 MILLION, or $1.8 TRILLION. Receipts for the US government in 2010 totaled $2.381 TRILLION, the budget itself was $3.55 TRILLION, the difference constituting the deficit for 2010. The US GDP for 2008 was $14.441 TRILLION. Therefore, a basic income grant would equal 75 percent of total government receipts and about 12 percent of total US GDP in 2008. However, this neglects the fact that all of this purchasing power would reenter the economy, thus boosting economic growth and tax receipts. This is in accordance with the principle that the state (i.e., polity) constitutes the aggregate demand that it captures in the form of taxation. Moreover, consider that in 2007, estimates for the value of Credit Default Swaps (CDS's) alone range from $45 TRILLION to $62 TRILLION! More fundamentally, this policy would abolish the anachronistic severance of economic rights from political rights, and would generate the necessary conditions for a society motivated by the "rational" imperatives of communicative action.

A systems-theoretical account of communicative events provides one useful framing device for generating new and imaginative understandings of the how our society is in the process of reconstituting itself. This study has attempted to provide new venues for future research by applying systems-theoretical perspectives to a particular case study: the global debt crisis, which today is *a crisis of anticipations*. One area of future investigation will be to examine specifically how organizations (i.e., organized communications) interact with societal subsystems such as money, to generate programs and to devise histories on the basis of organizational decisions. In modern society, organizations mediate and distribute flows of money and credit to individuals. Because organizations are predicated on the distinction of decisions-within-networks/not-decisions-within-networks, a distinction which establishes a distinction of membership and non-membership, as well as temporality, inequality is built into the very infrastructure of modern society. The relationship between organized communication and the specificity of the monetary societal system still is an important area of future research that could potentially illuminate both how social systems interact and how they adapt to change in modern society.

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APPENDIX: The Credit Crisis: Timeline of Events 2007-2008

2007

February: First noted increase in subprime mortgage defaults

June-July: Difficulties over how to value MBS's à market dries up
**IKB (small German Bank) requires 3.5 billion euro rescue package
August
6th- **American Home Mortgage Investment Corp. declares bankruptcy
9th- **French bank **BNP Paribas** is unable to value structured products à cuts financing to 3 large investment funds
17th- Fed reduces 'discount rate' to 5.75; broadens collateral banks can use

September
18th- Fed lowers interest rates to 4.75; discount rate to 5.25%
****Northern Rock-** First bank in UK to fall victim to a bank run in over a century

December
11th- Fed cutes 'federal funds rate' by .25 percentage points
12th- Fed announces creation of Term Auction Facility (TAF)

2008[147]

Week of September 7

- The U.S. government seized control of Fannie Mae and Freddie Mac, institutions that own or guarantee about one-half of all mortgage assets in the United States.

Week of September 14

- The U.S. investment bank Lehman Brothers filed for bankruptcy and Merrill Lynch was taken over by the Bank of America for $50 billion.
- The U.S. government seized control of American International Group Inc., providing an $85 billion emergency loan and taking a 79.9 percent equity stake in the firm.
- Britain's largest mortgage lender, HBOS, agreed to be purchased by Lloyds TSB in an $18.9 billion deal.
- The Russian government pledged to provide $120 billion to support financial markets and banks (the amount was increased by $50 billion on October 7).
- U.S. Treasury Secretary Henry Paulson introduced the Troubled Asset Relief Program, a key element of which enables the government to buy up to $700 billion of mortgage-backed securities. An amended version was signed into law on October 4th.
- AIG (invested heavily in CDS's) ; stock prices fall 90% on Sept 16th.

Week of September 21

- Goldman-Sachs and Morgan Stanley became bank holding companies.
- The U.K. government nationalized the mortgage bank Bradford and Bingley (a loan portfolio of $90 billion).

Week of September 28

- Washington Mutual became the largest bank failure in U.S. history, with assets valued at $328 billion.
- The Belgian, Dutch, and Luxembourg governments each took a 49.9 percent equity stake in the operations of the banking and insurance company Fortis within their respective borders, each injecting $16.4 billion in capital.
- One week later, the Dutch government took full control of the company's operations in the Netherlands. Fortis' operations in the BENELUX countries were later sold to the French commercial bank, BNP Paribas.
- The German government, together with commercial banks and federal regulators, provided $50 billion in credit guarantees to Hypo Real Estate.

[147] Time line for 2008 is compiled from World Bank's *World Economic Outlook* 2009 (20-21).

- Citigroup agreed to buy the banking operations of Wachovia.
- France, Belgium, and Luxembourg injected $9.2 billion into the French-Belgian bank Dexia.
- The Icelandic government took a 75 percent equity stake in Glitnir, the country's third-largest bank.
- The Swedish central bank announced that it would lend up to $700 million to the Swedish unit of the Icelandic bank Kaupthing.
- Ireland announced unlimited guarantees on retail, commercial, and interbank bank deposits. Similar measures were adopted in Austria, Denmark, Germany, Greece, Iceland, Italy, and Portugal.
- Sweden, the United Kingdom, and the United States raised limits on deposit guarantees. On October 3, European finance ministers agreed to raise the minimum guarantee on bank deposits to 50,000 across all EU member states.

Week of October 5

- The Icelandic government loaned $683 million to Kaupthing, and seized control of Landsbanki, and sought a $5.5 billion loan from Russia.
- The Spanish government established a $40 to $68 billion emergency fund to purchase assets held by Spanish banks.
- The U.S. Federal Reserve intervened in the commercial paper market for the first time since the Great Depression.
- The British government made available $87 billion in emergency loans to the banking system and offered to purchase capital in eight of the largest banks. The package includes guarantees of £250 million for new debt and the same for liquidity provisions.
- The central banks of the United States, the Euro Zone, Canada, Sweden, and Switzerland each cut their benchmark rates by half a percentage point in an unprecedented coordinated effort. Separately, China's central bank lowered its key one-year lending rate by 27 basis points, the second reduction in three weeks.
- The Icelandic government placed Glitnir into receivership, seized control of Kaupthing Bank, and abandoned its attempt to peg the krona at 131 per euro, established one day earlier, after it touched 340 against the euro.
- California, the most populous U.S. state, asked federal authorities for a $7 billion emergency loan as it was unable to obtain financing in the wake of the bankruptcy of Lehman Brothers.
- The British government announced a $685 billion plan to restore confidence in financial institutions, which included insuring up to $438 billion in new debt issued by banks, along with providing as much as $88 billion in equity capital.
- The National Bank of Ukraine seized control of Prominvestbank, the country's sixth-largest bank.

Week of October 12

- European governments announced financing packages totaling over $2.5 trillion. The packages include recapitalizing the banking sectors, credit guarantees on interbank lending, and direct loans.
- The British government injected $60 billion in equity capital into the country's three largest banks.
- The United States announced that it would commit $250 billion of the $700 billion rescue package to recapitalize the banking sector.

Week of October 19

- The IMF agreed with Iceland on an economic recovery program supported by a two-year loan of $2.1 billion.
- The Belarusian authorities requested financial assistance from the IMF under a program that could be supported by a Stand-By Arrangement.
- The Pakistani authorities requested discussions with the IMF on an economic program supported by financial assistance from the IMF.

Week of October 26

- IMF staff agreed with the Hungarian and Ukrainian authorities' economic programs supporting loans of $15.7 and $16.7 billion, respectively.

- The European Union stood ready to provide a loan of $8.1 billion to Hungary and the World Bank agreed to provide $1.3 billion.
- The IMF announced the Short-Term Liquidity Facility designed to channel funds quickly to emerging markets that have a strong track record, but that need rapid help during the current financial crisis to get them through temporary liquidity problems.

Week of November 9

- The Leaders of the Group of Twenty agreed to a plan of action to restore global growth and achieve needed reforms of the world's financial systems.

- IMF staff and Pakistani authorities reached agreement on an economic program supported by a $7.6 billion loan. The Executive Board of the IMF was expected to discuss the program shortly under the IMF's Emergency Financing Mechanism procedures.

Week of November 16

- IMF staff and Serbian authorities agreed on an economic program supported by a $0.5 billion loan.

VITA

In 2005 he accepted a graduate teaching assistantship at the University of Tennessee and was awarded his Masters of Arts in Sociology in 2007 after completing his thesis entitled "The Falling Rate of Profit Thesis Reassessed: Toward a Sociology of Marx's Value Theory." In 2008 he passed his last comprehensive examination in the content area of environmental sociology and in 2009 officially became a doctoral candidate. John Hamilton Bradford was awarded his Ph.D. in Sociology in August 2010. John has an abiding interest in sociological theory, economic sociology, and environmental sociology. He is currently serving as a lecturer at the University of Tennessee. Outside of academia, he enjoys spending time with his son Eli and playing the Brazilian martial art of capoeira.