THREE ESSAYS ON INCOME DISTRIBUTION IN THE U.S. ECONOMY

by

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ABSTRACT

The dissertation is composed of three papers that tackle income-distribution issues through three episodes of the U.S. economy. The first essay investigates the dynamics of income distribution, debt, and growth applying a post-Keynesian approach to the era leading to the Great Depression. It uses the single equation error correction model method to determine the demand regime of the 1900–1929 period. The second paper sets up a model that incorporates income distribution and the accelerator relationship to explain investment behavior in the 1960–2015 period. It uses time series techniques to explore the statistical causality among investment spending, profit share, and capacity utilization. The third essay investigates the drivers of the Farmers Protest Movement in the late 19th century. It investigates the trends of the farmers' consumption habits, income, and production prices, in addition to the dynamics of land market. It concludes that the farmers were worse off economically, which explains their protest movement in the late 19th century.

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CHAPTER 1

INTRODUCTION

This dissertation examines issues related to income distribution in the U.S. economy through three episodes from the late 19th century to the present. Although David Ricardo claimed income distribution to be the main problem of political economy, the prominence of the neoclassical marginal revolution since 1890s and the neoclassical synthesis in post–World War II relegated income distribution to unimportance in comparison to the study of exchange and production.

In these schools, distribution became endogenous to technical change and production and was seen as determined by the supply and demand of factors of production and their marginal productivity. In the meantime, Cambridge Keynesians and others, such as Michal Kalecki and Piero Sraffa, revived the importance of studying income distribution and its interrelationships growth. But their views were increasingly dismissed and excluded from mainstream journals since middle of 1970s.

The study of income distribution regained importance in the last decade with the drastic rise of income inequality, the 2008 crisis of the capitalist system, and the obvious failure of trickledown economics. However, the developmental literature of the World Bank and mainstream economics circles mainly focuses on the supply side effects of rising income inequality and poverty.

Recently within mainstream economics circles, there has been a stream of thought that exogeonized income distribution, such as the work of Acemoglu, Naidu, Restrepo, and Robinson (2013), that asserts political system structures affect income distribution either through property rights or through repressive measures against wages and labor unions. Yet there has been no formalized attempt to understand the effect of income distribution on growth from the demand side. This dissertation reviews post-Keynesian literature and offers two papers as an attempt to apply the post-Keynesian perspective to two different time periods.

The first paper, "On the Way to the Great Depression: The Demand Regime of the American Economy (1900–1929)," builds on the demand regime literature which links income distribution to growth through the channel of aggregate demand. The paper covers a period of time that has not been previously studied, and it applies a model based on Kaldor's late works (1970, 1988) to conceptualize two possibilities of the demand regime in a private closed-economy.

A demand regime could only be wage-led or debt-led, meaning that aggregate demand could be expanded to stimulate output only by increasing the wage share or the private debt level in the economy. Profit-led demand regimes are not considered possible because investment in this model is derived from demand and strongly responsive to the change in capacity utilization rather than profits. Based on a post-Keynesian model, I utilize available historical data to construct wage share, profit share, consumer debt, and investment debt time series for the relevant period.

Then, I use a single-equation error correction model to estimate the coefficient of wage share and debt for private consumption and investment in order to determine the

demand regime for the period.

I find private aggregate demand of the pre–Great Depression era to be wage-led, with an important role for private debt. Furthermore, the increase of income inequality during the Roaring Twenties led to the rise of destabilizing channels that sustained strong demand, while contributing to the fragility of the system on the path to the Great Depression.

In the second paper, coauthored with Matías Vernengo, we present a formalized version of the Kaldorian model in a closed economy. This model implies a demand regime in which government spending can propel up aggregate demand in a wage-led demand regime. In this model a wage-led growth strategy is the only feasibly sustainable growth strategy, as investment is mainly derived demand. Then, we use the Toda-Yamamoto (1995) Granger Causality test procedure to examine the Granger causality among investment share of output, capacity utilization, and profit share of output of U.S. nonfinancial corporates for the years, 1960–2015. We find that while capacity utilization does Granger-cause investment share of output, while profit share does not Granger-cause investment share of output.

In the third paper, I study the 19th century and examine the implications of the decline of price level on farmers, which constituted an important part of the economy in terms of production and labor force. The third paper tackles the question concerning income distribution in the late 19th century, specifically, the question of whether the farmers' Populist protest movement was due to worsening income level and economic conditions.

The paper is an attempt to refute the claim of Douglas North (1966) that the

farmers' economic condition was not deteriorating during the deflation wave (1873–1896), and their protest movement was rather driven by the decline in their status. I contest Douglas North's (1966) revisionist claim, and utilize T.M. Adams's (1944) detailed study of Vermont farmers' incomes and spending, and other historical price series to show that wholesale farm prices declined further than farmers' consumer goods prices, resulting in farmers being economically worse off during the whole period.

Finally, I examine the farmland market and demonstrate that North's use of land price increase as evidence of improving farmers' economic well-being is untenable. This paper revives the economic hardship thesis as an explanation of the farmers' populist movement.

CHAPTER 2

ON THE WAY TO THE GREAT DEPRESSION: THE DEMAND REGIME OF THE AMERICAN ECONOMY (1900–1929)

Abstract

This paper investigates the dynamics of income distribution and economic growth in the United States in the era before the Great Depression. Based on a post-Keynesian model, I estimate the effects of the wage share and private debt on aggregate demand for private domestic output. The model I used draws on Nikolas Kaldor's later work and Minsky to develop a model that captures the interplay among private debt, income distribution, and demand. I used the error correction model to determine the demand regime of the period. The results of the study show the demand regime was wage-led with private debt playing a considerable role in driving aggregate demand. I combine functional income distribution with personal income distribution to analyze the dynamics of distribution and demand in the Roaring Twenties. Furthermore, I argue that increased income inequality led to the rise of destabilizing channels that propped up demand which contributed to increasing economic fragility leading to the Great Depression.

Introduction

The paper employs a post-Keynesian framework to determine the demand regime of the United States in the pre–Great Depression era and finds the demand regime to be wage-led, with an important role played by private debt. Furthermore, it shows how the increase of income inequality during the Roaring Twenties led to the rise of destabilizing channels that propped up demand, while contributing to the fragility of the economy on the path to the Great Depression.

Following the pioneering models of Michal Kalecki and the Cambridge post-Keynesians, Bhaduri and Marglin (1990) theorized a framework to determine whether a demand regime is profit-led or wage-led. In a wage-led system, an increase in wages boosts demand for goods and services and thereby fosters greater economic growth. In a profit-led system, in contrast, higher profits drive higher demand for investment goods and productive capacity building, which leads to higher growth of output in the economy. Inspired by the framework of Bhaduri and Marglin, most studies of demand regimes have covered the post–World War II period. In spite of the claims of its similarities to current income distribution and growth dynamics, none have studied the era before the Great Depression. The demand regime of the pre-Great Depression era is a gap in the literature that this work attempts to fill.

While the majority of demand regime studies have been based on either neo-Kaleckian or Goodwin models, I draw on the later works of Nickolas Kaldor and Minkey to investigate the dynamics of aggregate demand, debt, and income distribution in the early 20th century. In a Kaldorian model, investment is derived demand and in a closed economy either wage-led or debt-led demand regimes are possible.

Utilizing available historical data and using statistical methods, I constructed time series of wage share, consumer debt, and investment debt for the relevant period. I then used a single-equation error correction model to estimate the elasticity coefficients of wage share and debt variables for private consumption and investment to determine the demand regime for the period.

In this paper, income distribution and demand dynamics are discussed for the period preceding the Great Depression, an era characterized as "the Roaring Twenties." I argue that the drop in demand that could have been caused by the rise of income inequality was compensated for by two destabilizing channels. The first was a real estate boom (1922–1926) financed by higher levels of mortgage debt. The second was a consumer debt boom that sustained aggregate demand in the second half of the Roaring Twenties, but was responsible for the drop in demand in the Great Depression.

The sections of the paper include: "Theoretical Background," "Historical Trends (1900–1920)," "The Empirical Model," "Estimation of Elasticity," "The Roaring Twenties," and "Conclusion."

Theoretical Background

This paper is framed within the classical Keynesian tradition. The model is classical in the sense that income distribution matters and exogenously determined. Prominent classical economist David Ricardo (1951) defined the main question that political economy pursues as an enquiry into the determinants of income distribution among classes. Karl Marx (1981) also underlined the importance of income distribution in his analysis of the contradictions of the capitalist system. With the marginalist

revolution of the late 19th century taking a microlevel approach to economic problems, income distribution was endogenized and became an outcome of relative scarcity of factors of production. The importance of investigating income distribution was recovered in the hands of Piero Sraffa, Michal Kalecki, and the Cambridge post-Keynesians. This revival underscored the importance of understanding the economy on a class base, and revitalized the role of class conflict and income distribution in explaining economic reality (De Vroey, 1975).

John Maynard Keynes did not address income distribution substantially, but he was the most significant advocate of a demand-driven theory of output and employment. Before Keynes the dominant theory in explaining the level of output was Say's law: "supply creates its own demand." Keynes (1936) strongly refuted this proposition and maintained that output and employment levels are determined rather by the level of aggregate demand in the economy. Michal Kalecki, who developed a demand- driven theory of output determination in Polish before Keynes, incorporated income distribution and demand theory in his 1942 article maintaining that, while income distribution is exogenously determined, aggregate demand is affected by income distribution and output adjusts to the change in aggregate demand (Palley, 2005).

Nickolas Kaldor, drawing upon Kalecki (1942) and Joan Robinson (1956), proposed that income distribution is determined by output (Kaldor, 1955). Starting from equality of savings to investment, and assuming that workers do not save out of their

wages and that capitalists' propensity to save is given and positive,[1]

$$\frac{P}{Y} = \frac{1}{Sp} \quad \frac{I}{Y} \tag{2.1}$$

where Y is output at full employment, P is profit, I is investment, and Sp is propensity to save out of profit.

This equation implies the profit share of income is determined by the investment share of full employment output. This equation is satisfied only in a full employment situation, however, a condition Keynes showed not normally to be the outcome of the dynamics of the capitalist system. Furthermore, the equation is based on equality between savings and an autonomous function of investment, which ignores the effect of investment on capacity of production Pérez Caldentey and Vernengo (2013).

Influenced by his engagement in policymaking and practical economic problems (Palumbo, 2009), in his later works (1970, 1988), Kaldor emphasized the role of demand in driving investment. Whereas Keynes maintained the importance of effective demand in the short run, Kaldor also expanded the role of demand in determining output in the long run. In 1988 he stated:

> Since under the stimulus of growing demand capacity of all sectors will be expanded through additional investment, there are no long-run limits to growth on account of supply constraints; such constraints, whether due to capacity shortage or to local labor shortage, are essentially short-run phenomena – at any one time, they are a heritage of the past. (Kaldor, 1988, p. 157)

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[1] Luigi Pasinetti (1962) reached the equation without assuming workers' propensity to save as zero, and reformulated it into what is known as the Cambridge equation.

Kaldor (1970, 1988) incorporated the super-multiplier concept of Hicks (1950) in explaining the effect of effective demand on output. The super-multiplier concept combines two processes. The first is the Keynesian multiplier, by which an increase in autonomous spending leads to an increase of output, and through a chain reaction, higher output induces higher spending, which leads to further output growth. The other process of the super-multiplier relation is the accelerator principle, whereby investment is mainly derived demand; where an increase of output and capacity utilization leads capitalists to invest to enhance production capacity, thus maintaining excess capacity to keep up with unforeseen demand. Although Kaldor talked about the foreign trade multiplier in which export is the only autonomous demand, Heinrich Bortis (1997) in his formulation of the super-multiplier considers both exports and government spending as the components of autonomous demand.

Following Bhaduri and Marglin (1990), three types of models have been used in determining the demand regime for different sets of countries:

1. Goodwin model: Based on Richard Goodwin's (1967) growth model, which adopts a common Marxist position of a positive relationship between profit and investment, Barbosa-Filho and Tylor (2006) framed the question in a predator–prey model and employed a vector auto regression (VAR) model to determine the type of demand system between 1948 and 2002. They found that it was profit-led. Rada and Kiefer (2016) studied the distributional dynamics of economic activity for a panel of countries in the Organization for Economic Co-operation and Development (OECD) in the last 4 decades and found that the demand regime for the group was weakly profit-led.

2. Neo-Kaleckian models: In these models, Stockhammer and Onaran (2013) adopt Kalecki's position on the possibly expansionist role of an increase in wage share and a wage-led system, although they also recognize the possibility of a profit-led system when investment is highly sensitive to profits. Naastepad and Storm (2006) studied the demand regimes in eight OECD countries between 1960 and 2000. Whereas in France, Germany, the Netherlands, Italy, Spain, and the United Kingdom, demand regimes were wage-led, they found the demand regimes in the US and Japan to be profit-led.

3. Kaldorian model: Unlike the neo-Kaleckian models whose investment function is partially autonomous, Pérez Caldentey and Vernengo (2013) argued for a model that is based on the later work of Kaldor (1970) in which investment is a derived demand; what drives a higher rate of investment is mainly the need to enhance production capacity to keep up with an increase in demand as reflected in an increased capacity utilization. The effect of output on investment is captured by the accelerator part of Hicks's (1950) super- multiplier relation. Freitas and Serrano (2015) developed a model of Sraffian multiplier in which investment is induced expenditure and income distribution is exogenous. The models are thus distinguished by both the investment function and the possible type of demand regime.[2]

The demand regime in both the neo-Kaleckian and Kaldorian models could be

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[2] For a recent review of the distinction between Kaleckian and Goodwin models, see Stockhammer and Stehrer (2011). For the Kaldorian models, see Setterfield (2011) and Pérez Caldentey and Vernengo (2013). For a comprehensive review, see (Blecker, 2016).

wage-led. Where they differ is in the investment function; the neo-Kaleckian investment function is partially autonomous and responds positively to profits. The Kaldorian investment function is derived demand and gives a prominent role to the accelerator effect of output growth. As output grows and production capacity is highly utilized, investors increase their spending to keep up with higher demand.

Another difference between the neo-Kaleckian models and the Kaldorian models is the case of repressed wage share, where declining wages cannot finance an increase in demand. Neo-Kaleckian models recognize positive effects of profits on investment and propose the possibility of a profit-led system. In Kaldorian models, in contrast, the profit-led system is not a possibility, as investment is mainly derived demand and an increase of demand in times of repressed wages could be financed only through an increase in debt. Another difference between these two models is that neo-Kaleckian models predict a "crisis of accumulation" in wage-led regimes in the long run, as investment responds negatively to a decline in profits (Bhaduri & Marglin, 1990), which means that demand adjusts to supply and not the opposite. Kaldorian models do not foresee this possibility as investment is derived demand and both output and capacity adjust to autonomous demand through the super-multiplier mechanism.

Debt enters the picture as it finances private consumption, when a decline in the wage share, in addition to social and institutional changes, could drive consumers to maintain high spending level sustained more borrowing (Cynamon & Fazzari, 2008). However, higher consumer debt also leads to increase in debt-income ratio which tends to constrain consumer spending (Pressman & Scott, 2009). Furthermore, investment debt interaction with private investment is characterized is a Miskyian cyclical pattern (Palley,

2005). Capital accumulation expands firms' need for external finance, and as companies financial position deteriorates their debt/income ratio rise, and the economy falls into a debt-burden regime (Nishi, 2012).

In conclusion, since the Kaldorian model eliminates the possibility of profit-led demand, in our model the increase of demand for goods and services in a private closed economy can only be actualized through the channels of higher wage share and private debt. Hence we can recognize either wage-led or debt-led demand regimes.

Historical Trends (1900–1929)

In the period from 1900 to 1929, the U.S. economy completed the full transformation into an industrial economy, with the deployment of the mass assembly line as the mode of production. By 1929, only 20% of the labor force was engaged in agriculture, compared with 40% at the beginning of the 20th century. The period was characterized by intense class warfare that increasingly emboldened the position of labor against capital in the first 2 decades. By 1921, however, employers, with significant help from the judicial system, succeeded in containing and undermining the labor movement (Dubofsky & Dulles, 2010). This brought an increase in income inequality, indicated by the increase in the share of income of the top 1% and the top 10% of income earners, who captured 23.9% and 49.3% of total income, respectively, in 1928 (Piketty, 2014). Also in an analogy with the trends of income distribution post-1980, there was rising wage inequality within the class of wage earners; the top 10% of wage earners obtained 29.2%

of the total wage bill in 1929.[3]

Furthermore, in manufacturing, which was the leading economic sector, the ratio of wages of white-collar workers to those of blue-collar workers was rising (Figure 2.1). Whereas the share of white- collar workers in value-added manufacturing output was steady at around 11% between 1919 and 1929, the wage share of blue-collar workers declined from 40 to 35% in the same period (Goldin & Katz, 1999).[4] Another important development was the rise of wage workers in relation to self-employed workers, accompanying the decline in the farming sector and the achievement of full- scale industrialization.

Output growth throughout the period increased annually by an average of 3.5% (Figure 2.2) (Tables 2.1, 2.2), but was also characterized by severe fluctuations due to the absence of the stabilizing influence of government and financial regulation, both of which were installed in the aftermath of the Great Depression. Meanwhile, the whole period was characterized by high nonfarm unemployment, averaging 7.7% (Figure 2.3).

The period from 1900 to 1929 witnessed growth in the importance of durable goods as consumption items. Many household items such as cars, radios, washing machines, and refrigerators were introduced in this period. Accompanying this trend was the rise of consumer credit arrangements and agencies such as installment finance companies, credit unions, and even commercial banks, which were willing to provide

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[3] The wage share of the top 10% of wage earners declined after World War II, not recovering the 1929 level until 1984 (Piketty, 2014, pp. 298–300).

[4] "The value added of an establishment was calculated by subtracting the cost of materials, supplies, containers, fuels, purchased electric energy, and contract work from the value of shipments for products manufactured plus miscellaneous receipts for services rendered" (Atack & Bateman, 2006).

credit for consumption purposes (Nugent, 1939) (Figure 2.4).

Corporate debt increased steadily throughout this period, from 110% of investment spending at the beginning of the period up to a six fold increase in investment spending in 1928 (Figure 2.5). Farm mortgage debt also rose noticeably; mortgage debt as a percentage of the value of land and buildings rose from 27% in 1910 to 40% in 1930 (Olmstead & Rhode, 2006) (Figure 2.6). Nonfarm mortgage debt was gradually increasing up to 1914, but starting in 1918, it increased significantly (Figure 2.7).

The overall private debt to output ratio increased from 1900 to World War I and resumed its acceleration tendency after the war and through the Roaring Twenties (Figure 2.8).

The Empirical Model

Drawing upon the later works of Kaldor (1970, 1988), the aim of this dissertation is to define the demand regime that best describes the dynamics of income distribution and aggregate demand in the United States during the pre-1929 period. As government spending and international trade were not significant relative to other private consumption and investment in this period, the model of a private closed economy is not a significantly distorting abstraction from the actual economy.[5]

The Keynesian private domestic equilibrium equation is:

$$Y = X = C + I \tag{2.1}$$

where Y is private output, X is aggregate demand, C is private consumption, and I is

[5] Exports of goods and services share of GDP were 5% on average through the whole period, while net exports on average were below 5%.

private investment.

Private consumption

In a Keynesian framework, consumption is a function of income. Although consumption comes from both profits and wages, consistent empirical tests show significantly higher marginal propensity to consume out of wages relative to profits (Stockhammer, Onaran, & Ederer, 2009). Furthermore, Cynamon and Fazzari (2008) showed that social and cultural norms interacting with a change in household finance could give a rise to debt-financed consumption spending. So, consumption is a function of income, wage share, and debt. The private consumption equation is:

$$C = \alpha + \beta Y + \tau W + \upsilon N \quad (2.2)$$

where Y is output, W is wage share and N is consumer debt; α is autonomous consumption, and β , τ, and υ are consumption spending coefficients for the independent variables.

Private investment

In the Kaldorian model, the main variables that are assumed to determine investment spending are capacity utilization, wage share, and debt.

$$I = \mu U + \varpi W + \varepsilon Z \quad (2.3)$$

where U is capacity utilization ratio, W is wage share, and Z is investment debt; μ, ϖ, and ε are coefficients of the independent variables.

Capacity utilization is the ratio of current output to potential output. It captures the accelerator effect, which is the effect of output on investment. Assuming a fixed ratio

of capital to potential output in the long run, current output to fixed capital ratio could stand for current capacity utilization. Wage share captures the income distribution effect. Furthermore, wage share rather than profit share was chosen as the distributive variable in the investment equation because in a Kaldorian model there is no place for a profit-led system; investment is derived demand. The debt variable included in the investment equation is investment debt, which equals the total of corporate debt and mortgage debt; it captures the effect of debt on investment. The driver of accumulating household debt to finance residential investment is the same motive of households to spend accumulate debt as maintained by Cynamon and Fazzari (2008), and Pressman and Scott (2009). The debt-business investment nexus is based on the Minskyian concept of a cycle with tranquil and turbulent phases. In the tranquil phase, investors' appetite for investment and borrowing is accommodated by the financial sector, leading to growth in investment spending accompanied with accumulation of business debt. This opens the door for financial fragility with the rising debt-income ratio and firms' worsening balance sheet position, ending in a bust or boom of debt financed investment spending (Palley, 1994).

Consolidating Equations 2.2 and 2.3, the model states that aggregate demand is a function of the exogenous variables of autonomous consumption, income distribution, and debt. Where wage share is the crucial distributional variable:

$$X = f(A, W, D) \tag{2.4}$$

where X is aggregate demand, A is autonomous consumption, W is wage share, and D is private debt level.

According to the dynamics of aggregate demand, wage share, and private debt, in the case of positive debt elasticity of aggregate demand, ED >0, we can recognize four

cases:

If the wage elasticity of aggregate demand is positive, $E_W > 0$, then:

(1) When $|E_W| > |E_D|$, we have wage-led demand.

(2) When $|E_W| < |E_D|$, we have debt-led demand.

If wage elasticity of aggregate demand is negative, $E_W < 0$, then:

(3) When $|E_W| > |E_D|$, we have a capital-strike position.

(4) When $|E_W| < |E_D|$, we have debt-led demand.

In the case of negative debt elasticity of aggregate demand, $E_D < 0$, we can recognize four cases:

If the wage elasticity of aggregate demand is positive, $E_W > 0$, then:

(5) When $|E_W| > |E_D|$, we have a wage-led demand.

(6) When $|E_W| < |E_D|$, we have debt-burdened demand (Nishi, 2012).

If the wage elasticity of aggregate demand is negative, $E_W < 0$, then:

(7) When $|E_W| > |E_D|$, we have a capital-strike position.

(8) $|E_W| < |E_D|$ is theoretically impossible.

Capital-strike position as used by Przeworski and Wallerstein (1988) is equivalent to the "revenge of the rentier" proposition. In Kalecki's thesis on the social and political implications of permanent full employment (Kalecki, 1943), an increase of the wage share accompanied by a decline in aggregate demand could take place if preceded by higher output growth and employment that caused increased bargaining power of the labor class. This would lead to higher inflation if the pace of the growth of wages was outstripping that of productivity, or would result in the increased ability of labor to control production. The response of the capitalist class would be a capital strike-cutting

production and thereby driving the economy into recession.

To determine the demand regime in a private closed economy, I next examine whether the growth of wage share or debt level is the biggest driver of the growth of aggregate demand.

Estimation of Elasticity

The testing strategy is to construct a single equation for each of the components of aggregate demand in a private closed economy; and estimate the wage share and debt elasticity of consumption and investment equations. I use a single equation error correction model (Banerjee, Dolado, & Mestre, 1998) which estimates the relationships of time series variables that are integrated to the first order.[6] This method has two advantages; it deals with autocorrelation in time series data, and it enables testing for both short-run and long-run relationships between the variables. The long-run elasticities of the independent variables are calculated by dividing the coefficients by the negation of the adjustment coefficient, where both coefficients have to be significant (Onaran & Galanis, 2013). Since the method is only applicable to cointegrated data series, I use the Augmented Dickey-Fuller test to test for stationarity of the series. All the variables will be transformed into a logarithmic form, and the series stationarity will be tested in log-level form and first-differenced log-level form to check the order of integration. Given the size of the sample, I implement the test with a model of one lag.

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[6] To test for the significance of the cointegration relationship between the variables. I use the t- distribution critical values reported in Banerjee et al. (1998) for the speed of adjustment term.

The error correction method works with variables that are stationary in the first order. As we can see from Table 2.3, all the variables are nonstationary at log-level and stationary when first-differenced, indicating that the tested time series are integrated of order (1).

From equation (2):

$$\Delta C = C0 + \Delta Y + \Delta W + \Delta N + lC + lW + lN \qquad (2.5)$$

where l stands for one time lag and Δ stands for difference.

I ran the regression of the consumption spending equation using Newey-West standard errors to overcome heteroskedasticity and autocorrelation problems. Consumption spending, income level, and consumer credit are annual data and in both real terms and logarithmic form.[7] I found the cointegration relationship and the coefficients of the independent variables to be significant.Table 2.4 includes the statistical results for the significant variables in the consumption equation.

The significant long-run coefficients show that an increase of 1% in wage share would be associated with an increase in consumption spending of 0.35%, which implies wage-led consumption spending. An increase of consumer debt by 1% would be associated with an increase in consumption spending of 0.20%. As will be discussed later in the chapter, the importance of consumer debt increased throughout the whole period and significantly during the Roaring Twenties.

The tested investment equation includes capacity utilization, wage share, and

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[7] On both theoretical and practical grounds, it is realistic not to include wealth, as wealth concentration was very high during this period. Saez and Zucman (2014) calculated the bottom 90% share of wealth to be around 20% in the period between 1917 and 1930.

investment debt as independent variables:

$$\Delta I = I0 + \Delta U + \Delta W + \Delta Z + lI + l\,U + lW + lZ \qquad (2.6)$$

where l stands for 1 year time lag and Δ stands for difference.

I ran the regression of the investment equation using Newey-West standard errors to overcome heteroskedasticity and autocorrelation problems. All variables are annual data series and they are arranged in both real terms and logarithmic form. Table 2.5 includes the statistical results for the significant variables in the investment equation. Investment spending shows a strong response to capacity utilization as a 1% increase in capacity utilization is associated with a 2.67% increase in investment, implying a Kaldorian investment function. A wage share increase of 1% is associated with an increased in investment spending of 1.5%, showing that in distributive terms, there was wage-led investment.

Furthermore, it must have been through the channel of consumption that the wage share had such an effect on capacity utilization, and hence, investment spending.[8] Investment debt was not statistically significant in the main model.

Using Kendrick's (1961) national account data throughout the period, consumption was on average 84% of total private output excluding trade, whereas investment was about 16% of total private output. Multiplying the wage share coefficients for consumption and investment by their respective weight in private spending, I find that a 1% increase in wage share is associated with an increase of 0.48%

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[8] The short-term—within a year—propensity to consume based on wage share was quite significant; a 0.55% increase of consumption was associated with a 1% increase in wage share.

in private output,[9] while a 1% increase in private debt is associated with a 0.17% increase in private output.[10] These results led me to conclude that the demand regime was wage-led, with private debt playing an important role in driving private aggregate demand. I show in the next section that the rise of the importance of debt in driving demand in the Roaring Twenties was partially responsible for the instability of the system. As spending financed by debt outpaces the spending of earned income, the economy becomes more vulnerable and prone to crisis (Charpe, Flaschel, & Proaño, 2012).

Furthermore, the investment equation test indicates a strongly demand-driven investment function which, given the wage-led demand regime, suggests that a Kaldorian model performs well in describing income distribution and demand dynamics in this period.

The Roaring Twenties

It might be puzzling that there is a wage-led demand regime for the early decades of the 20th century, whereas the Roaring Twenties (1922–1929) was characterized by both rising income inequality and decent economic growth—averaging 4.8%. First of all, the increase in income inequality manifested itself not only in the bigger share that top income earners were taking, but also in the increased inequality among wage earners themselves. Furthermore, as Palley (2017) pointed out, focusing on functional income distribution, ignores the effect of the distribution of wages. Even if the wage share did

[9] The change in private output from a 1% increase in wage share is calculated as: (0.35*0.84) + (1.5*0.16) = 0.53%.

[10] The change in private output from an increase of 1% in private debt is calculated as: (0.20*0.84) = 0.17%.

not decline after 1921, blue-collar workers were significantly disadvantaged in their wage share compared with white-collar workers. The wage inequality reinforced the absorption of income by the top income brackets.

Secondly, the drop in demand that could have been caused by the increase in income inequality (Keynes, 1936) was compensated for by two channels that sustained high levels of demand. The first was an increase in mortgage debt that financed a real estate boom, which drove the economy out of the 1920–1921 recession and then crashed in 1926. The real estate boom was financed by a significant increase in residential mortgage debt, which doubled in value during the boom (Table 2.6), whereas demand in this period was driven by investment spending, which was predominantly investment in residential construction.[11] White (2009), using a price index of newly built houses, maintained that the real estate bubble of the 1920s was a nationwide phenomenon and could be considered greater in magnitude than that of the 2000s. When using the Case–Shiller price index of both old and new houses, the 1920s real estate boom is comparable to the 1980s boom. The second channel by which a drop in demand was averted was the increase in consumer debt, which financed a consumption boom (1926–1929). Consumer debt increased in importance to finance consumption and reached its highest level of 12% of personal income in 1929. The increase in consumer debt fed into a consumption boom, which resulted in demand in 1926–1929, being driven mainly by strong consumption spending. In contrast, real investment was sluggish, registering a growth of only 2.18% for the last 4 years of the Roaring Twenties (Table 2.6).

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[11] The share of fixed investment in residential structures as an annual average was 35% from 1915 to 1929. During the boom (1922–1926) it reached an unprecedented 50% or greater (Table 2.7).

Martha Olney (1998, 1991), who extensively studied consumption and consumer credit in the 1920s, demonstrated the role of consumer credit in bringing about the collapse of consumption in 1930 (Olney, 1999). It was the fear of indebted households of defaulting on their debts that forced them to cut consumption spending. In 1930, as down payments were a significant part of household income (from autos to appliances, down payments ranged between 5% and 48% of household disposable income) this development accompanied an increase in layoffs and cuts in weekly hours in the early months of that year.

To avoid defaulting on their debts, the only option for indebted families with installment credit—estimated by Olney (1999) to be 25% of all families—was to cut their consumption to meet payments and avoid serious wealth loss, since in 1930 default had the legal consequences of repossession of assets by the sellers. Olney estimates the cut of consumption required to meet the payments at around 3%, and cites Temin's (1976) estimate of the autonomous drop of consumption at 3.8% in 1930, which implies that more than three-quarters of the decline in autonomous consumption was caused by fear of default on consumer debt.[12]

We can thus see how increasing income inequality combined with higher debt level were the main destabilizing developments in the Roaring Twenties era, which was ended by the Great Depression.

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[12] Romer (1993), using Kendrick's (1961) national account data, estimates the contribution of consumption in the decline of output in 1930 at 46%. The decline of consumption itself was 5.4%.

Conclusion

This paper highlights the importance of incorporating income distribution in analyzing the dynamics of demand and growth, and also the contributions of the later works of Kaldor on the role of effective demand in driving growth.

The first 3 decades of the 20th century witnessed significant changes in the U.S. economy. There was impressive economic growth, averaging 3.5% annually, and structural transformation of the labor force and economic sectors. Accompanying this transformation, the working class successfully mobilized and voiced its demands in the first 2 decades, to be crushed in the Roaring Twenties by more conservative governments, an antagonistic judicial system, and a successful campaign by employers that materialized in the "American Plan." All of this resulted in diminishing bargaining power and an increase in income inequality in the Roaring Twenties.

Kaldor's late views offer a consistent long-run demand theory of growth in which investment is a derived demand. Furthermore, in contrast to the neo-Kaleckian and Goodwin demand regime models, the Kaldorian model recognizes two possible demand regimes in a closed economy; wage-led and debt-led. Drawing on the Kaldorian model, I investigated the demand regime in the early 20th century and estimated both wage share and debt elasticities of aggregate demand. The results show that the demand regime was wage-led, with a role played by private debt. Furthermore, the decline in demand that resulted from the increase in income inequality in the Roaring Twenties was compensated for by a real estate boom in the first half of the era (1922–1925) that was financed by mortgage debt. Later the economy witnessed an increase in the importance of consumer debt, which sustained demand in the second half of the Roaring Twenties (1926–1929).

Consumer debt was a significant factor in the decline of consumption in 1930.

The importance of income distribution and income inequality in economic dynamics has been increasingly recognized in recent years, however, the dynamic of income distribution and demand as a driver of growth in a Keynesian fashion needs to be emphasized. Furthermore, given all the unstable tendencies of the capitalist system, past and recent experience indicates that the path to relatively stable and prosperous growth is only possible by adopting an equitable wage-led growth policy.

Appendix

Data description

National Accounts Data

Output is represented in Gross National Product data from Romer (1989). Consumption data are from Lebergott (1996), and investment data are from Kendrick (1961). Fixed investment data are from the U.S. Bureau of the Census (1966). Capacity utilization is expressed as a 1929-based index of the ratio of real private output to real capital stock as calculated by the Kendrick (1961) index and reported in Wright (2006).

Labor Force and Factor Shares Data

Labor force and unemployment data are from Weir (1992). In Weir's data, self-employment is added to salaried and establishment wage employment. All annual data on waged and self-employed workers are from Lebergott (1964). Data on manufacturing employees are from Lebergott (1964).

Following Gollin's (2002) treatment of self-employment earnings, the self-employed are counted as wage-earners, and the wage share is calculated as:

$$W = \frac{nominal\ average\ wage * employees}{Nominal\ output} \tag{2.7}$$

Operating surplus stands for profit share. It equals residual income after subtracting wage share. Earnings of manufacturing workers by skill are from Margo (2006b).

Debt Data

Consumer debt data from 1916 to 1929 are from the Bureau of Economic Analysis estimates in James and Sylla (2006). Data for the years 1909 to 1915 are from

Nugent's (1939) estimates. For the years 1900 to 1908, consumer credit data are extrapolated from bank loans data.

Investment debt data include both corporate debt and mortgage debt. Corporate debt from 1916 to 1929 are from the Bureau of Economic Analysis estimates in James and Sylla (2006). For the years 1900 to 1915, I extrapolated corporate debt data from outstanding private bonds and private bank loans, a procedure similar to that followed by the BEA in estimating pre-1929 corporate debt. For the same period (1900–1916) for mortgage debt, I extrapolated mortgage debt data on private bank real estate loans as both were strongly correlated for the period, 1917–1929.

Farm mortgage data are from Olmstead and Rhode (2006) and nonfarm household mortgage debt are from James and Sylla (2006). Private debt data from 1916 to 1929 are from the Bureau of Economic Analysis estimates in James and Sylla (2006). For the years 1900–1915, I extrapolated private debt data from outstanding private bank loans. Private bank loans data are from the Board of Governors of the Federal Reserve System report (1955).

Deflator Data

The deflator used for consumption spending, investment spending, consumer debt, and investment debt is Romer's (1989) GNP deflator, taking 1929 as the base year. The deflator used to deflate fixed investment and residential construction is from the U.S. Bureau of the Census (1966) fixed investment deflator series.

Miscellaneous Data

The value of the new construction of private residential buildings is from Snowden (2006). Manufacturing output data are from Atack and Bateman (2006) deflated using Romer's (1989) GNP deflator.

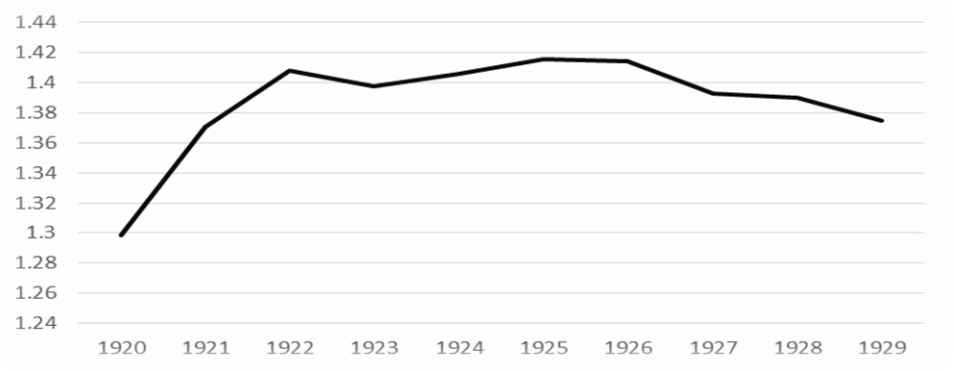

Figure 2.1 Ratio of skilled and semiskilled male workers to unskilled male workers, 1920–1929

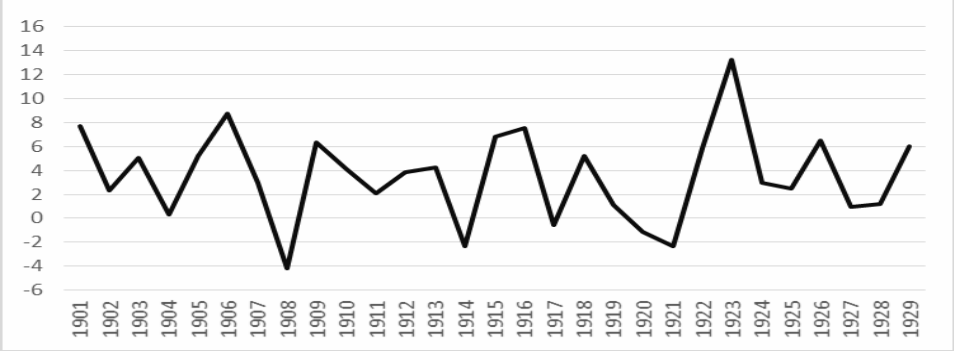

Figure 2.2 Output: annual growth rate (%), 1901–1929

Figure 2.3. Unemployment rate, 1900–1929 (%)

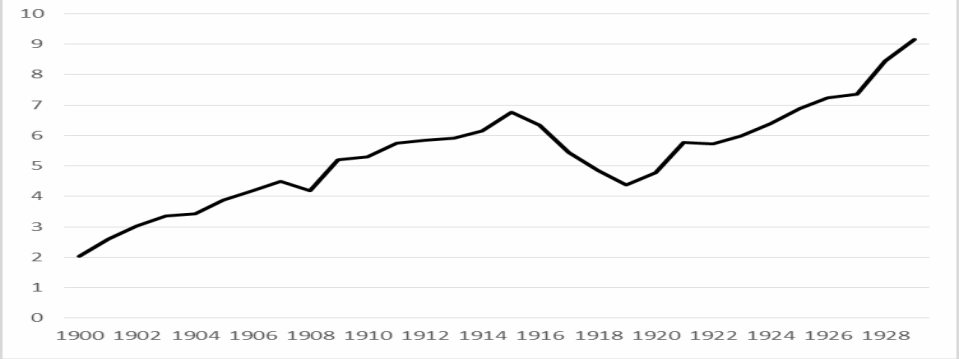

Figure 2.4. Consumer debt as percentage of private consumption spending, 1900–1929

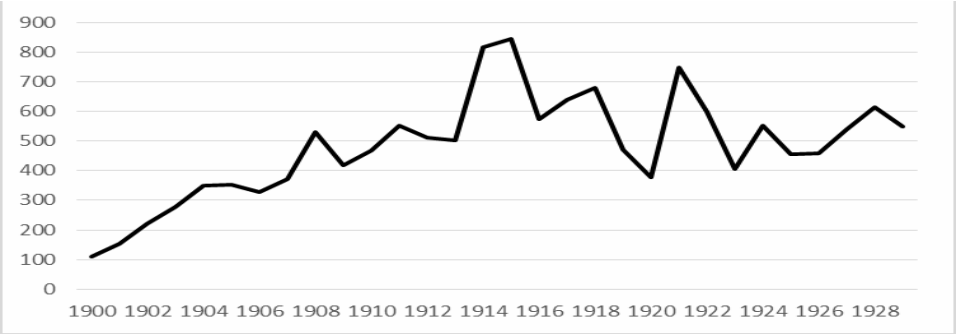

Figure 2.5. Corporate debt as percentage of private investment spending, 1900–1929

Figure 2.6. Farm mortgage debt, 1890–1930

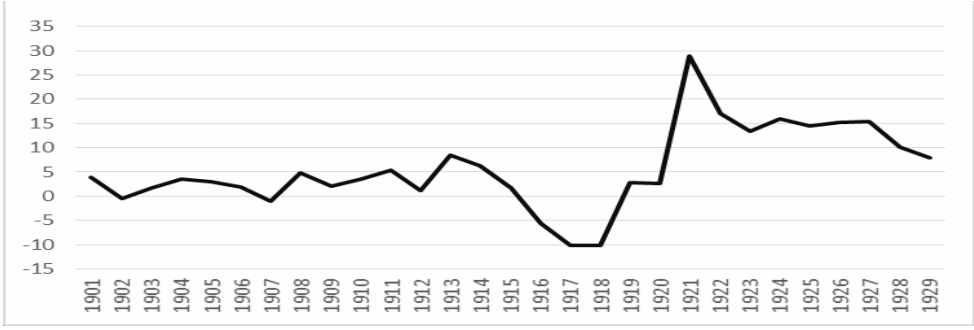

Figure 2.7. Growth of nonfarm real home mortgage debt (%), 1901–1929

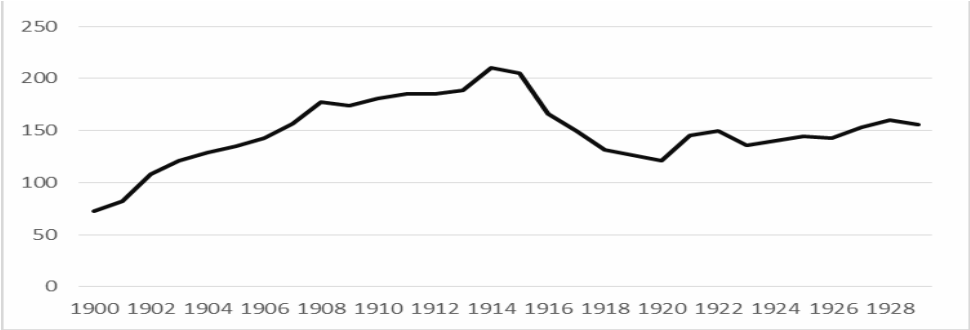

Figure 2.8. Private debt as percentage of output, 1900–1929

Table 2.1: Statistical summary of main variables

Variable	Obs.	Mean	Std Dev.	Min.	Max.
Real Output	30	66,45	18,714.81	38,73	103,90
Consumption	30	52,59	11,452.09	33,63	77,45
Investment	30	10,87	3,002.38	6,68	17,06
Consumer Debt	30	2,98	1,528.03	687.24	7,10
Investment Debt	30	69,26	29,920.89	13,94	129,70
Wage Share	30	59.83	3.71	49.48	64.20
Profit Share	30	40.16	3.71	35.79	50.51
Capacity Utilization	30	86.09	7.06	76.20	100

Note. Real output (GNP), real consumption, real investment, consumer debt, and investment debt are in millions of U.S. dollars.

Table 2.2: Decade geometric mean of output growth

Decade	Geometric mean of output growth
1901–1910	3.8%
1911–1920	2.6%
1921–1929	4.0%

Table 2.3: Variables stationarity tests

	Log-level form	1st Differenced log-level form
	ADF statistic	ADF statistic
Output	-0.144	-5.666
Consumption	-0.131	-4785
Investment	-1.016	-6.200
Consumer	-0.608	-2.687*
Investment	-2.377	-2.911*
Wage share	-2.362	-3.215
Profit share	-2.096	-3.236
Capacity	-1.125	-6.183

*significant at 0.1 level

Table 2.4: Consumption equation estimation

	1% change in	1% change in wage share	1% change in consumer debt
Change in consumption spending in the long run	0.36% (t = 2.55)(p = 0.019)	0.35% (t = 3.46) (p = 0.002)	0.20% (t = 3.55) (p = 0.002)
Note. N= 29, Autonomous consumption coefficient: 2.80, t = 3.01, p =0.007; Speed of adjustment coefficient: -0.74 with t = -4.57 and p =			

Table 2.5: Investment equation estimation

	1% change in capacity utilization	1% change in wage share	1% change in investment debt
Change in investment spending in the long run	2.67% (t = 3.22) (p = 0.004)	1.5% (t = 2.87) (p = 0.009)	0.01% (t = 1.19) (p = 0.246)
N= 29; Autonomous investment coefficient: -8.02 with t = -3.10, p = 0.005; Speed of adjustment coefficient: -0.8.27 with t = -3.71***; F (7, 21) = 16.05, Prop>F= 0.0000			

*** significant at T = 0.10.
** significant at T = 0.05.

Table 2.6: Residential investment and mortgage debt

Year	New residential structures investment/fixed investment	Nonfarm household mortgage debt (US$ billions)
1921	0.25	11.7
1922	0.43	12.8
1923	0.50	14.1
1924	0.51	16.3
1925	0.53	18.6
1926	0.52	21.3

Table 2.7: Growth rates of consumption, investment, output,

and consumer debt/consumption (%), 1922–1929

	Private consumption	Private investment	Total output	Consumer debt/consumption
1922	3.68	42.84	5.87	-0.96
1923	9.07	46.60	13.23	4.52
1924	7.41	-20.70	2.96	6.68
1925	-2.92	32.53	2.45	7.99
1922–25	31.09	72.18	24.25	18.23
1926	8.18	6.93	6.49	5.07
1927	2.24	-2.78	0.96	1.71
1928	2.26	-2.32	1.19	14.71
1929	5.53	0.36	6.03	8.54
1926–29	13.7	2.18	14.7	30.04

CHAPTER 3

THE ACCELERATOR AND THE ROLE OF INCOME DISTRIBUTION IN ECONOMIC GROWTH: THEORY AND U.S. EVIDENCE

Abstract

In this chapter, we set up a Kaldorian closed-economy model of demand regime that is wage-led and demand-driven. An important component of the model is the accelerator relationship which distinguishes between wage-led and profit-led demand regimes. Taking the U.S. economy (1960–2015) as case study, we explore the historical trends and investigate empirically the relationships between profit share and capacity utilization and investment. The econometric test is based on a vector autoregression (VAR) model that uses the Toda and Yamamoto (1995) procedure to establish Granger causality between the estimated variables. We find that profit share does not Granger-cause investment, while capacity utilization does Granger-cause investment, which strengthens the case for a wage-led demand regime as a fit description of the dynamics of income distribution and demand in the case of a closed economy.

Introduction

In this paper we contribute to the debate on the relationship between income distribution and growth by presenting a model that draws on the works of Nikolas Kaldor (1970, 1988) and the super-multiplier relationship developed by Franklin Serrano (1995) and Heinrich Bortis (1997). In order to shed light on the dynamics of income distribution and demand, we empirically investigate the profit share investment and capacity utilization of U.S. nonfinancial companies in the last 50 years. We find that the evidence supports a demand-driven investment where capacity utilization, rather than profit share, drives investment spending.

This chapter is part of the broader debate about the role of income distribution in economic growth within the family of models that emphasizes the role of demand in economic development. The chapter emphasizes the role of the accelerator in the determination of investment. It is suggested that the accelerator implies that investment is derived demand, and as such, it lends support to super-multiplier models of economic growth.

Understanding the dynamics of income distribution and growth has gained importance during the recent rise of income inequality. This problem has been tackled with the demand-regime literature pioneered by Bhaduri and Marglin's (1990) seminal paper. We can distinguish between three groups of these models: neo-Kaleckinan models: Bhaduri and Marglin (1990), Goodwinian models: Barbosa-Filho, and Taylor (2006), and Kaldorian models: Pérez Caldentey and Vernengo (2013).

Both the Goodwinian and Kaleckian models recognize the possibility of both wage-led and profit- led demand regimes. The Kaldorian model recognizes the

possibility of wage-led or debt-led demand regimes. The core difference between the Kaldorian model and the other two can be accounted by the relative assigned role of capacity utilization and profit share in stimulating investment. Both the Kaleckinan and the Kaldorian models perceive the possibility of profit-led regimes, in which higher profit stimulates investment. However, the Kaldorian model objects to the possibility of such regime on the basis of investment being stimulated mainly by capacity utilization. It also emphasizes the positive role played by higher wage share and capacity utilization through the accelerator relationship in stimulating investment.

Historically, nonfinancial corporates' trends of capacity utilization and investment share of output is downward sloping, while profits are upward sloping (Table 3.1). Furthermore, we implement an econometric test to investigate Granger causality between profit share and capacity utilization and investment spending.

Given the nonstationary or absence of cointegration in the tested variables, we employ the Toda and Yamamoto (1995) causality-test procedure. The econometric test finds that the capacity utilization does Granger-cause investment, while profit share does not Granger-cause investment which reinforces the view of investment as derived demand and provides some support for super-multiplier models of growth.

The remainder of the chapter is divided in four sections that review the literature, present the model, discuss the evidence, presents an empirical test of the accelerator, and discusses our conclusion.

Literature Review

Our model draws on the work of late Kaldor (1970, 1988) and the Sraffian super-multiplier literature of Franklin Serrano (1995), Frietas and Serrano (2015), and Heinrich Bortis (1997). We also recognize the role of government spending and asset prices in driving demand. In contrast with the other two groups of models, that is, the Kaleckians and Goodwinian models,[13] our model emphasizes the role of autonomous spending in driving growth and the role played by the accelerator relationship in channeling the growth of output growth into further capital accumulation.

Although the statement of variants of the accelerator could be attributed to economists before John M. Clark (Fiorito, 2007), such as Carver (1903) and Aftalion (1987), our literature review will start with Clark's (1917) treatment of the acceleration or accelerator principle.[14]

According to Clark, who analyzed data of the U.S. railroad industry, the level of demand of net new capital goods depends on the growth rate of the demand of final goods. Harrod (1936, 1939) incorporated the acceleration—naming it the accelerator—in his dynamic treatment of the trade cycle. In his model (1939), he defines a warranted rate of growth (G_W) as determined jointly by the propensity to save and amount of investment required by technological conditions and the producers' convention of the growth rate at

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[13] See the first and the third papers for a literature review of these different groups of models.

[14] As we will see bellow Kaldor (1957) distinguished between the acceleration principle, which is a relationship between investment level and the growth rate of output, and the accelerator, which is a relationship between level of capacity utilization and investment.

which markets would clear:

$$G_w = s/C \tag{3.1}$$

where s is the savings share of output, and C is ex-ante increase of capital amount required to produce the increased amount of output.

If the actual growth rate turned out to be bigger than the warranted growth rate, then the acceleration principle part of the equation would kick in leading to higher investment. This stimulative effect, in turn, would lead a lower warranted growth rate, which Harrod thinks should be lowered as long as it is above the natural rate of growth, which is determined by labor growth and technical progress.

Robert Samuelson (1939) crediting Lavin Hansen developed his own version of the acceleration relation as part of his multiplier—accelerator model. Starting from an initial increase of government spending, he introduced lags to the accelerator concept and tied the increase in investment to the increase in consumption caused by a precedent increase of income:

$$C_t = \alpha\, Y_{t-1} \tag{3.2}$$

while

$$I_t = \beta[C_t - C_{t-1}] = \alpha\beta Y_{t-1} - \alpha\beta Y_{t-2} \tag{3.3}$$

where α is marginal propensity to consume, and β is accelerator coefficient.

Hicks (1950), also incorporated time lags in his acceleration principle, but differed from Samuelson in that he made induced investment a function of output rather than consumption. Furthermore, he maintained that autonomous investment as autonomous spending provides a floor for the decline of output during recession in a trade cycle; meanwhile, autonomous investment growth at the trough of a recession

provides a stimulus for output growth which stimulates induced investment through the accelerator effect. Hicks names this combination of effects—autonomous investment effect on output and output effect on induced investment—the "super multiplier." As output grows, induced investment share of output becomes larger than the magnitude of autonomous investment share of output (Hicks, 1950)

Kaldor (1940) in his theory of trade cycle based the investment behavior on the assumption "that an increase in the current level of profits increases investment demand." (Kaldor, 1957) commenting on Hicks model expressed the accelerator principle as "the dependence of investment on income through the associated changes in profit expectation." Furthermore, he pointed out a difference between Kalecki and his model versus the other models of Harrod, Samuelson, and Hicks, which is the difference between the acceleration and the accelerator principles. The acceleration principle is a relationship between investment level and output growth rate, while in his model "investment is assumed to be an increasing function of the level of output, and a decreasing function of the stock of capital." So, while the acceleration principle for the other group is based on investment being a function of output growth, for Kaldor, it is a function of capacity utilization as output per unit of fixed capital.[15]

Goodwin's (1951) nonlinear accelerator is similar to Kaldor's in that investment is a function of capacity utilization, which is cyclical. Both Kaldor and Goodwin

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[15] Kaldor (1957) maintains that: "It is not correct therefore to suppose that the mere slowing-down or the cessation of the increase in output will necessarily reduce investment demand. It would be more correct to say that investment will be checked through the gradual emergence of excess capacity which occurs when available capacity increases more rapidly than output. These two conditions are clearly not equivalent to each other."

maintained that the problem of the acceleration group of models is that it "regards the ratio output/capital as determined by technical factors, which cannot undergo any significant alteration, even in the short period" (Kaldor, 1957, p. 836)

In his late works, Kaldor (1970, 1988) seems to detach income distribution's mediating role between investment and output in the accelerator relationship, affirming that higher income per capital stock raises producers' expectations of higher profit, which, in turn, stimulates their demand for capital goods.

Furthermore, Kaldor incorporated the autonomous spending component of Hicks super multiplier with foreign trade serving as the autonomous spending activity, stating that, "For the growth of exports, via the 'accelerator,' will govern the rate of growth of industrial capacity, as well as the rate of growth of consumption" (1970). Kaldor's later works emphasized investment spending as derived demand.

Kaldor also employed the accelerator principle in a long-run demand-driven growth theory in which "there are no long-run limits to growth on account of supply constraints; such constraints, whether due to capacity shortage or to local labor shortage, are essentially short-run phenomena" (Kaldor, 1988, p. 157). The acceleration principle and Hicks super multiplier was adopted in part in the Sraffian super multiplier of Serrano (1995) and Bortis (1997). According to Frietas and Serrano (2015), the rate of growth of output is determined by growth of autonomous noncapacity creating expenditures—such as autonomous consumption.[16] It is also determined by the rate of change of the super multiplier, which depends on the growth rate of the marginal propensities to save and

[16] In Bortis (1997) formulation, autonomous spending components were government spending and exports.

invest, and in which "the process of inter-capitalist competition leads to a tendency for the growth rate of aggregate investment to be higher than the rate of growth of demand (and hence of output) whenever the actual degree of capacity utilization is above its normal or planned level and *vice-versa*."

The Model[17]

The closed-economy model is based on two identities (balance sheet identity and income- expenditure) and a relationship between stock and flow variables. The financial balance identity is a balance sheet identity between stocks. It states that total financial assets (FA) held by the nonbank private sector equal the sum of government debt (GD), private debt (PD) (Godley, 1983; Godley & Cripps, 1983).

The income expenditure identity establishes a relationship between flows: the flow of income (Y) equals to the flow of total expenditure. It states that income (Y) is equal to private expenditure of the household and firm sectors (PE), the government expenditure (G). Formally,

$$FA \equiv GD+PD \tag{3.4}$$

$$Y \equiv PE+G \tag{3.5}$$

The third pillar of the model establishes a relationship between stocks and flows, that is, between identities (1) and (2). Following Godley (1983) and Godley and Cripps (1983), it states that the stock of financial assets is an endogenous variable that adjusts to income flows and more precisely to private expenditure (PE) with a given parameter (say,

[17] The model is a variation of the one presented in Pérez Caldentey and Vernengo (2013).

λ):

$$FA = \lambda PE \tag{3.6}$$

Substitution of (1) into (3) and (3) into (2) yields, that the level of income is a function of private and government debt. That is,

$$Y = (GD+PD)/\lambda+G \Leftrightarrow Y= 1/\lambda(PD+GD)+G \tag{3.7}$$

Specifying functional relations for GD, PD we can obtain a more developed formulation for the rate of growth of income.

Private debt (PD) is equal to income (Y) minus government income (i.e., tax revenue, (Γ), and private expenditure, that is, private consumption (C_pr) and investment (I_pr) expenditures:

$$PD = \Gamma+C\_pr+I\_pr- Y \tag{3.8}$$

In turn, private sector consumption is a function of income (Y). By dividing *Y* into profits (Π) and the wage bill (WN), and multiplying and dividing both variables by *Y*, we can express aggregate consumption as a function of income (Y) weighted by the wage and profit shares (WN/Y,Π/Y) and associated propensities to consume (α_1= marginal propensity consume out of wages and α_2= marginal propensities to consume out of profits):

$$C\_pr = \alpha\_1\ WN+\alpha\_2\ \Pi = \alpha\_1\ \ WN/Y\ Y+\alpha\_2\ \ \Pi/Y\ Y =$$

$$(\alpha\_1\ \omega+\alpha\_2\ \pi)Y \tag{3.9}$$

and

$$0<\alpha\_1,\alpha\_2<1\ \text{ and } \alpha\_1>\alpha\_2 \tag{3.10}$$

For its part, investment is modelled as depending on the relation between capital and output (Y-κ), availability of internal finance (IF) and the price of capital assets *q*.

$$I\_pr = \alpha\_3 (Y-\kappa)+\alpha\_4 IF+\alpha\_5 q \quad (3.11)$$

where $0<\alpha\_3,\alpha\_4,\alpha\_5<1$ and α_3 is the acceleration coefficient.

The first term of equation 3.7 ($\alpha\_3 (Y-\kappa)$) reflects the assumption that if output (y) is below the capital stock of equilibrium (k), then there is less investment and the rate of output growth slowdown accordingly, and vice versa when output is above the optimal capital level. The idea is that there is a normal capital to output ratio that firms try to maintain, and that would be equivalent to a normal level of capacity utilization. In this sense, the first part of equation 3.7 corresponds to the accelerator principle. The accelerator says that if capacity is low there is more investment, and vice versa when *z* is high. In other words, firms would try to adjust capacity to demand. If that were the case, one would expect that a normal relation between capacity and demand would be established in the long run (in the neoclassical view, demand adjusts to capacity—that is, Say's Law). Investment is determined by the adjustment of capacity to exogenous demand in order to reach the normal capacity utilization, and it is essentially derived demand (the accelerator principle). As it will be made clear, by joining the accelerator and the multiplier (derived from equation 3.9), we obtain a dynamic version of the so-called super multiplier. In other words, the level of output determined above is the fully adjusted long-term level of output, once the capacity effect of investment is taken into account. In the super multiplier models, the accelerator is not instrumental in determining the normal level of capacity utilization, which must be determined by the exogenous components of demand (Serrano, 1995; Bortis, 1997).

The other two terms of equation 3.11 are based on the Gatti, Gallegati, and Minsky (1994) framework, and capture the financial aspects of investment. *q* "can be

conceived as the ratio of the price to capital assets to the current supply price of investment output, that is an ´an average q´ in Tobin´s terminology." The availability of internal finance (IF) can in turn be defined as the difference between realized profits (Π) and service debt commitments (r_t D_t). That is,

$$IF = \alpha_6 \Pi - r_t D_t \tag{3.12}$$

where r_t is the rate of interest and $0<\alpha_6<1$. Since α_6 is the proportion of profits that are reinvested and α_2 in equation 3.9 are the proportion of profits that are consumed, $\alpha_6+\alpha_2=1$. In line with the formulation of equation 3.8 in terms of profit and wage share, equation 3.8 can also be expressed as a function of income and the profit share (πY) and debt commitments (r_t D_t):

$$IF = \alpha_6 \Pi - r_t D_{PRIV} = \alpha_6 \ \Pi/Y \ Y - r_t D_{PRIV}$$

$$= \alpha_6 \pi Y - r_t D_{PRIV} \tag{3.13}$$

Substitution of equation 3.13 into 3.11 and of 3.11 and 3.9 into 3.8 then yields,

$$PD = Y(\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6)+ \alpha_7 Y + \alpha_3$$

$$(Y-\kappa) -r_t D_{PRIV}+\alpha_5 q -Y \tag{3.14}$$

where α_7 Y = Γ (government revenue) and α_7 is the tax to income ratio.

Further substitution of equation 3.14 into equation 3.7 with some manipulation yields the aggregate demand equation:

$$Y= \ (\alpha_3 \ (Y-\kappa)+ G(\lambda+1)+ r_t (D_G-\alpha_4 D_{PRIV})$$

$$+\alpha_5 q/(\lambda-(\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6))+1) \tag{3.11}$$

In this formulation we can consider *G* as the autonomous demand expenditure so that equation 3.11 can expressed as:

$$Y = \ (\alpha_3 \ (Y-\kappa)+ r_t (D_G-\alpha_4 D_{PRIV})$$

$$+\alpha_5 q+ G(\lambda+1))/(\lambda-(\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6))+1) \quad (3.12)$$

The term $1/(\lambda-(\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6))+1)$ is the expenditure multiplier. A well-behaved multipler requires that $0<\lambda-(\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6))+1<1$. The left-hand side of the inequality requires $1+\lambda>\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6)$, which is fulfilled since $\lambda>0$ and $\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6)<1$. The right hand of the inequality requires that $\alpha_1 \omega+\pi(\alpha_2+\alpha_4 \alpha_6)>\lambda$. This second inequality can be fulfilled as long as the adjustment of expenditure flows to stocks is not instantaneous (that is, $\lambda<1$). The condition that is $\lambda<1$ is meant to capture the fact that the multiplier makes sense only as a dynamic adjustment process in time.

Also the specification of the multiplier is such that multiplier works faster and is more potent the greater the weight of the parameters associated with wages rather than profits. In this sense, the aggregate demand specification is wage led. Table 3.2 shows the multiplier for different values of the parameters under the assumptions that the stock-flow norm (λ) equals 0.5 and 0.4, respectively, and that the leverage ratio (α_4) is equal to 0.7 and a scenario where the parameters associated with wages (the wage share ω, and the marginal propensity to consume out of wages α_1) take on increasing importance. As can be clearly seen from Table 3.2, in the case where $\lambda=0.5$ and starting with a wage share (ω) and marginal propensity to consume out of wages (α_1) of 0.2 and increasing in a step-wise fashion, both their values to 0.8 and 1, respectively, increases the value of the multiplier. In the case where the wage share (ω) and marginal propensity to consume out of wages (α_1) are equal to 0.2, the value of the multiplier is 0.74. That is, it is a divisor rather than a multiplier. The multiplier reaches 1 when the wage share is 0.5 and the marginal propensity to consume out of wages is above 0.5 (i.e., 0.6). The multiplier

reached values above 1.5 when both variables when the wage share is 0.7 and the marginal propensity to consume out of wages approaches 1.

Note that the accelerator term, $\alpha_3 (Y-\kappa)$, the price of capital assets ($\alpha_5 q$) and autonomous demand $G(\lambda+1)$ have a positive impact on aggregate demand (Y). Also the debt service on government debt ($r_t D_G$), which is part of the government deficit (nonprimary government deficit) has a positive effect on aggregate demand whereas debt servicing of the private sector ($\alpha_4 r_t D_{PRIV}$) has the opposite effect. This can be rationalized on the grounds that an increase in private debt service is a leakage from private sector demand: it detracts from the availability of internal finance for investment (equation 8), so that the increased private debt service means less investment, and also, it does not increase consumption. In contrast, for a given interest rate, public sector debt service corresponds to the financing of greater expenditure by the government, and hence, increased income. This assumes that government debt is sustainable.

In summary, in this model, government expenditures as autonomous spending propel up a wage-led aggregate demand, while investment is mainly derived demand for which higher capacity utilization leads to higher investment. According to our model, a wage-led growth policy is sustainable because the accelerator relationship is prominent in explaining investment spending.

Capacity Utilization, Investment, and Profit Shares

Long-Run Trends and an Empirical Test

When we examine the trend of capacity utilization since 1960, we find that there has been a secular decline that started in 1974. Furthermore, we notice that capacity

utilization was above average in the 1960s and the 1970s, then it declined in the 1980s and recovered in the 1990s. In the last 16 years, it returned to its long-run declining trend while maintaining cyclical fluctuations through the whole period (Figure 3.1).

Nonfinancial corporates' net fixed-investment share of output followed a similar trend; after picking up in 1966, and again in the first quarter of 1980, in the last 35 years it followed a declining trend (Figure 3.2).

The profit share of the nonfinancial corporates after a moderate increase peaked in 1966. It significantly declined thereafter, reaching a historic trough at 1970, then recovered from another trough in 1974. It witnessed a secular increase characterized by cyclical fluctuations that did not restrain the robust increase in profit share, which reached unprecedented levels after 2004 (Figure 3.3).

The secular decline in capacity utilization that took place since the middle of the 1970s was parallel to the dominance in academic mainstream economists' and policymakers' circles of the nonaccelerating inflation rates of unemployment theory (NAIRU) of Modigliani and Papademos (1975) which originated in the concept of natural rate of unemployment of Milton Friedman (1968). The policy implication of the theory of the nonaccelerating inflation rate of unemployment is that there should be "tight limits on the rate of economic growth, lest inflation accelerate beyond control" (Galbraith, 1997).

This shift in policy and the associated decline in capacity utilization could be explained by Kalecki's (1943) thesis that capitalists tend to be afraid of full employment as it might result in increased workers' bargaining power, loss of control of the

production process as a system of capitalist accumulation,[18] and the decline in the real income of the financial rentier class as inflation devalues their fixed-income returns. The decline of capacity utilization accompanying the upward march of the profit since 1975 is not a coincidence.

The NAIRU policy paradigm, in association with sustained attack on labor unions and pursued procapital economic policy, brought about the observed increase in the profit share at the cost of lower-capacity utilization and investment, and put into question the argument for profit-led growth policy.

The econometric strategy tests whether the change in investment was driven by change in profit share or capacity utilization or both.

The tested relation is:

$$I = \frac{Y}{K} + \frac{P}{Y}$$

where I is nonfinancial corporates net fixed investment, Y is nonfinancial corporates output level, K is nonfinancial corporates fixed capital, and P is nonfinancial corporate profit measured as gross added value minus (employee's compensation, taxes on production and imports less subsidies). Given the different order of integration of the

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[18] One example of increased workers' bargaining power leading to proworkers transformation of the capitalist accumulation process is the Swedish wage earner fund project proposal which was pushed by the Sweden LO labor union confederation. The proposal aimed to enable workers through their union wage fund to buy controlling shares of private companies' capital stocks. The head of the proposal committee, the economist Rudolf Meidner, who was one of the designers of the Swedish welfare system, maintained that "the recommended rate of growth of the funds' assets implied that they would control about half of the value of Swedish companies' shares within 20 years" (Viktorov, 2009). The proposal was diluted and modified after the Employers' Confederation counterattack in the 1970s and 1980s.

three variables, Granger noncausality test suggested by Toda and Yamamoto (1995) is employed. The method is based on estimating a level VAR with the ability to be implemented for variables of different degrees of integration as long as "the order of integration of the process does not exceed the true lag length of the model."

First, we use the augmented Dicky-Fuller unit root test to determine degree of integration. We find that investment share of output is stationary, while profit-share and capacity-utilization variables are integrated at the first order (Table 3.3). Next we determine the appropriate lag length for the VAR test. We find that both Akaike's information criterion (AIC) and final prediction error (DPE) indicate the choice of two lags. The estimated VAR model is stable and there is no serial correlation in the residuals (Tables 3.4, 3.5, 3.6, and 3.7).

When the Toda-Yamamoto modified-Wald test is implemented we find that we can reject the null hypothesis that capacity utilization does not Granger-cause investment, while we cannot reject the null hypothesis that profit share does not Granger-cause investment (Table 3.8).

Conclusion

This chapter was an attempt to present a Kaldorian model in which investment is derived demand, and hence, there could be only wage-led or debt-led demand regimes. The data and the econometric test showed that capacity utilization Granger-caused investment share of output, while profit share did not Granger-cause investment share of output. The models and the data imply that a policy based on profit-led growth strategy should be reconsidered. Furthermore, a panel-data study of different sets of developed

and developing countries at corporate level should expand our understanding of the dynamics of growth and income distribution.

Table 3.1: Historical averages of the main variables (1960 Q1–2015 Q3)

Period	Capacity Utilization	Profit Share of Output	Net Investment Share of Output
1960 Q1–2015 Q3	0.567355	28.74757	5.428864
1960s	0.609187	28.16226	6.790491
1970s	0.580813	27.09548	6.726668
1980s	0.513271	28.12897	5.614147
1990s	0.631452	27.85686	5.328979
2000–2015	0.55553	31.12643	3.686114
2009 Q3–2015 Q3	0.538636	33.60581	3.238649

Table 3.2: Multiplier simulations with different parameter values

Multiplier	λ	ω	π	α_1	α_2	α_4	α_6
Scenario with $\lambda = 0.5$							
0.74	0.5	0.2	0.8	0.2	0.8	0.7	0.2
0.84	0.5	0.2	0.8	0.4	0.6	0.7	0.4
0.96	0.5	0.2	0.8	0.6	0.4	0.7	0.6
0.99	0.5	0.4	0.6	0.6	0.4	0.7	0.6
1.00	0.5	0.5	0.6	0.6	0.4	0.7	0.6
1.03	0.5	0.6	0.4	0.6	0.4	0.7	0.6
1.26	0.5	0.6	0.4	0.8	0.2	0.7	0.8
1.41	0.5	0.6	0.4	0.9	0.1	0.7	0.9
1.47	0.5	0.7	0.3	0.9	0.1	0.7	0.9
1.69	0.5	0.7	0.3	1	0	0.7	1
1.79	0.5	0.8	0.2	1	0	0.7	1
Scenario with $\lambda = 0.4$							
0.80	0.4	0.2	0.8	0.2	0.8	0.7	0.2
0.91	0.4	0.2	0.8	0.4	0.6	0.7	0.4
1.06	0.4	0.2	0.8	0.6	0.4	0.7	0.6
1.10	0.4	0.4	0.6	0.6	0.4	0.7	0.6
1.15	0.4	0.6	0.4	0.6	0.4	0.7	0.6

Table 3.2 continued

Multiplier	λ	ω	π	α_1	α_2	α_4	α_6
1.44	0.4	0.6	0.4	0.8	0.2	0.7	0.8
1.64	0.4	0.6	0.4	0.9	0.1	0.7	0.9
1.92	0.4	0.6	0.3	1	0	0.7	1
2.04	0.4	0.7	0.2	1	0	0.7	1
Scenario with $\lambda = 0.4$ and with half of the profit not consumed reinvested							
0.77	0.4	0.2	0.8	0.2	0.8	0.7	0.1
0.83	0.4	0.2	0.8	0.4	0.6	0.7	0.2
0.90	0.4	0.2	0.8	0.6	0.4	0.7	0.3
0.97	0.4	0.4	0.6	0.6	0.4	0.7	0.3
1.05	0.4	0.6	0.4	0.6	0.4	0.7	0.3
1.24	0.4	0.6	0.4	0.8	0.2	0.7	0.4
1.36	0.4	0.6	0.4	0.9	0.1	0.7	0.45
1.36	0.4	0.6	0.3	1	0	0.7	0.45
1.52	0.4	0.7	0.3	1	0	0.7	0.5
1.68	0.4	0.7	0.3	1	0	0.7	0.5

Table 3.3: Variables: stationarity tests

The Variable	Level Form	1st Differenced Level Form
Investment Share of output	-3.594	-
Profit share of output	-1.300	-7.625
Capacity utilization	-1.676	-6.952

Table 3.4: Selection-order criteria

Sample: 1961q1 - 2015q3 Number of obs = 219

lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-622.09				.060506	5.70862	5.72	5.75
1	278.21	1800.6	9	0.000	.000018	-2.4	-2.35*	-2.24*
2	290.95	25.486	9	0.002	.000017*	-2.46*	-2.33	-2.14
3	298.73	15.56	9	0.077	0.00017	-2.45	-2.26	-1.98
4	307.27	17.09*	9	0.047	.000017	-2.45	-2.20	-1.84
Endogenous Variables: Investment share of output, Capacity Utilization, profit share								
Exogenous: _cons								

Table 3.5: VAR model test results tables

Equation	Parms	RMSE	R-sq	chi2	P>chi2
ciy	7	.946349	0.8062	919.5779	0.0000
cyk	7	.009264	0.9736	8141.21	0.0000
cps	7	.477252	0.9574	4963.631	0.0000

Note: ciy: Investment share of output for nonfinancial corporates.

cyk: Capacity utilization for nonfinancial corporates.

cps: Profit share for nonfinancial corporates

Vector Autoregression

Sample: 1960q3 - 2015q3 No. of obs = 221

Log likelihood = 292.379 AIC = -2.455919

FPE = .0000172 HQIC = -2.325537

Det(Sigma_ml) = .0000142 SBIC = -2.133017

Table 3.5 continued

Coef.	Std. Err.	z	P>z	[95% Conf.	Interval	
ciy						
L1.	.7580312	.0680608	11.14	0.000	.6246345	.8914279
L2.	.1630566	.0728957	2.24	0.025	.0201836	.3059296
cyk						
L1.	17.56057	6.856709	2.56	0.010	4.121665	30.99947
L2.	-14.72567	6.94376	-2.12	0.034	-28.33519	-1.116153
cps						
L1.	.1750636	.1379638	1.27	0.204	-.0953405	.4454677
L2.	-.1376115	.1361469	-1.01	0.312	-.4044545	.1292316
_cons	-2.259419	1.232962	-1.83	0.067	-4.675981	.1571429
cyk						
ciy						
L1.	-.0017225	.0006663	-2.59	0.010	-.0030284	-.0004166
L2.	.0002011	.0007136	0.28	0.778	-.0011976	.0015997
cyk						
L1.	1.283306	.0671251	19.12	0.000	1.151743	1.414868
L2.	-.2907832	.0679773	-4.28	0.000	-.4240162	-.1575501
cps						
L1.	-.0023367	.0013506	-1.73	0.084	-.0049839	.0003105
L2.	.001556	.0013328	1.17	0.243	-.0010563	.0041683
_cons	.0347221	.0120703	2.88	0.004	.0110647	.0583795
cps						
ciy						
L1.	-.0963128	.0343237	-2.81	0.005	-.163586	-.0290396
L2.	.009471	.036762	0.26	0.797	-.0625811	.0815232
cyk						
L1.	2.790677	3.457902	0.81	0.420	-3.986686	9.56804
L2.	-2.864981	3.501802	-0.82	0.413	-9.728387	3.998426
cps						
L1.	.9020788	.0695764	12.97	0.000	.7657116	1.038446
*	Std. Err.	z	P>z	[95% Conf.	Interval	
L2.	.0558655	.0686602	0.81	0.416	-.0787059	.1904369
_cons	1.752514	.6217943	2.82	0.005	.53382	2.971209

Table 3.6: Eigenvalue stability condition

Eigenvalue	Modulus
.9969537	.9969537 .996954
.9207626 + .07200663i .	.923574
.9207626 - .07200663i	.923574
.2950681	.295068
-.09506567 + .00469898i	.095182
-.09506567 - .00469898i	.095182

Note: All the eigenvalues lie inside the unit circle. VAR satisfies stability condition.

Table 3.7: Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	10.8789 9	9	0.28410
2	13.5875	9	0.13777
3	14.6668	9	0.10051
4	14.0396	9	0.12093
5	15.8488	9	0.07011
6	11.3476	9	0.25263

Note: H0: no autocorrelation at lag order

Table 3.8: Toda-Yamamoto modified Granger noncausality Wald-test

Dependent variable: Corporate investment share of output			
Excluded	Chi-sq	df	Prob.
Corporate profit share	2.149983	2	0.34
Corporate capacity Utilization	12.40325	2	0.0020
All	16.50828	4	0.0024

Note: Sample: 1960Q1 2015Q3. Included observations: 220

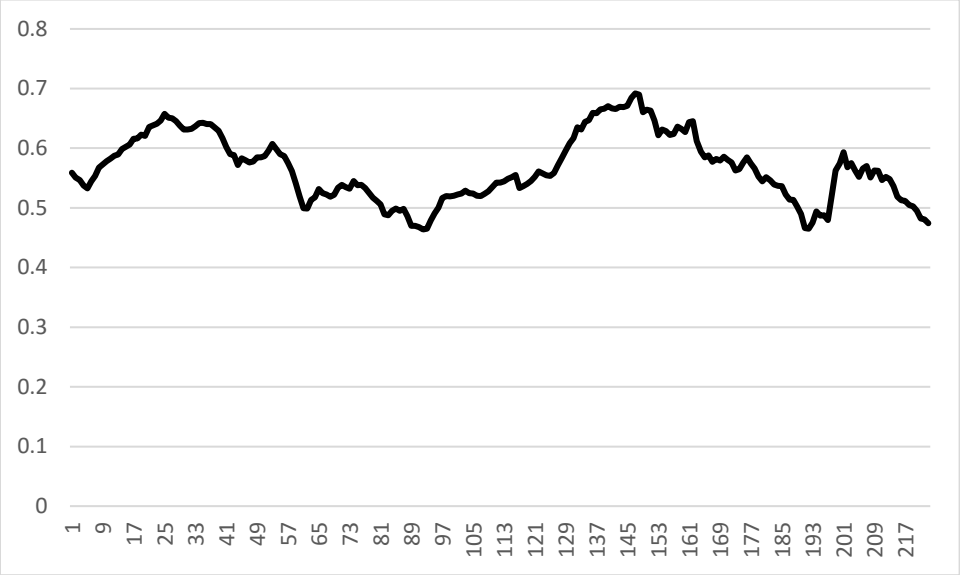

Figure 3.1. Nonfinancial corporate capacity utilization

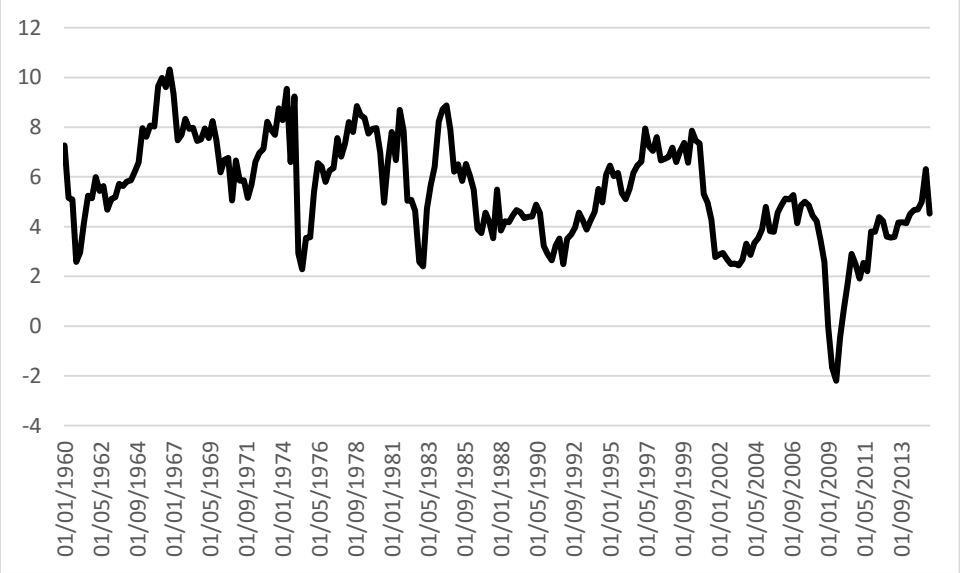

Figure 3.2. Nonfinancial corporate investment share of output

Figure 3.3 Nonfinancial corporate profit share of output

CHAPTER 4

INCOME DISTRIBUTION IN THE US IN LATE 19TH CENTURY: THE CASE OF THE FARMERS' PROTEST MOVEMENT

Abstract

This chapter explores an important episode of income distribution conflict in the U.S. economic history through the case of the farmers' protest movement in late 19th century. It reexamines Douglas North's claim that the driver of the Farmers Populist Movement in the late 19th century was not worsening economic conditions and that farmers were not suffering economically. North uses wholesale prices for farms and all products, in addition to farmland prices to conclude that farm products' terms of trade were improving; therefore, he argues, there is no base for farmers' populist claims.

I argue that urban consumption weights are not a good representative of farmers' consumption habits. I construct a rural consumer price index by using Adams' (1944) detailed study of Vermont farmers' incomes and other historical price series. When I compare farmers' consumer price index to wholesale farm prices, I find that wholesale farm prices declined more than farmers' consumer prices index. Furthermore, I explore land market dynamics to show that the increase in land prices is not necessarily an indication of improved farming income as North argued. Refuting Douglas thesis

reinforces the economic hardship thesis as an explanation of the farmers' protest movement.

Introduction

The last quarter of the 19th century witnessed massive industrialization of the U.S. economy. The manufacturing sector employed more than 20% of the total labor force.[19] The available data on income distribution in outside of the farm sector for the period is limited, yet suggestive of decreasing workers' wage share after 1879 (Table 4.1). In this sector, workers wage share of added value increased in the 1870s to decline in the 1880s and decline further in the 1890s (Edwards, 1943). The average growth of real wages in nonfarm sector employees was 0.9%,[20] far lower than average output growth rate for the period.

The farming sector, measured by output or by its share of labor force, was an important economic sector for the U.S. economy in late 19th century (Tables 4.2, 4.3, and 4.4). Farmers were mainly middle class businessmen, and although farm wage labor was an established class by 1900, outside the West, where production was highly mechanized and done at large scale, farm laborers comprised fewer than 13% of total farm workers (Wright, 1988). U.S. history in the late 19th century was marked by farmers' discontent as manifested in social and political movements and by a period of prolonged price deflation (1873–1896). The reasons behind the protest movement of farmers in the late

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[19] Calculated by dividing production workers wages by the added value. See Censuses, 1971 and 1995.

[20] Employees earnings and inflation data are from Margo (2006a) and David and Solar (1977), Table 1, pp. 16–17.

19th century are still debated among economic historians and historians themselves (McMath et al., 2008; Whaples, 1995). In the field of economic history, the explanation of the populist movement used to be based on John Hicks's thesis in his 1931 book, *The Populist Revolt*, which sought explanation of the movement in the economic hardship of farmers in terms of declining crop prices, strenuous borrowing conditions, and appreciating debt due to deflation.

In this era, the greatest price level decline happened between 1873 and 1896. Farmers blamed this decline on the gold standard and advocated using abundant silver to increase money supply and the price level. Farmers also complained about railroad companies' freight fares and the rent they enjoyed with middlemen by taking over processing, transporting, and distributing crops to the final users. Farmers also called for a bigger role of government in stabilizing market prices, and regulating the finance industry and the railroad industry (Hicks, 1931).

Economic historians unanimously accepted Hicks's view until the rise of the Cliometricians, and their prominent figure Douglas North. North (1966) questioned the farmers' grievances regarding their economic conditions during that period, arguing that the available data did not back up their complaints. Douglas North looked for the causes in mainly sociological or psychological reasons, such as uncertainty, risk, and change in status. Although the causes North gave were justified given the structural change of the U.S. economy, the declining importance of the agriculture sector, and the sector's integration to the world crops market, I argue that all of these changes were of secondary importance to the deterioration of farmers' income and economic conditions. For it was only the increase in crop prices and incomes that brought an end the farmers' protest

movement after its culmination in 1896. This becomes evident when we take into consideration the stagnation of productivity per acre (Table 4.5) that this era witnessed, which meant lower prices for the same amount of products produced within an acre of land.

Literature Review

Bowman and Keehn (1974) used state-level data of the prices farmers received for their products to examine farmers' terms of trade between 1870 and 1900 and found that there was no secular decline of terms of trade or the purchasing power of farmers. But there was significant fluctuation of purchasing power, which justified the timing of farmers protest waves. However, the authors used Hoover's urban price index for the period, 1870–1900, to estimate the purchasing power of farmers' income, which is not realistic since farmers did not live in the cities but in rural areas in farms, where primary commodities were traded for manufactured goods, a shortcoming I try to overcome in this chapter.

Others such as Mayhew (1972) adopted North's revisionist stand and speculated that the increased commercialization brought to an end the self-sufficiency of farmers by the late 19th century and subjected them to market prices. McGuire (1981) attempted to reinforce North's argument of instability as a source of protest rather than deteriorating economic conditions, by showing that variance in income and prices in the data of 14 states was significantly correlated with the intensity of protesting activity.

Stock (1984), using state-level data in North Dakota, attributed farmers' discontent in that era to fear of foreclosure on farm mortgages. Even though Stock

blamed economic distress as a reason for the protest movement, he still accepted North's thesis of improved farm income and economic conditions.

Persson and Sharp (2013) investigated wheat prices and claimed the basis of farmers' discontent was in perceived large transportation costs deducted from the market prices of their products, especially grain prices.

North Explained

According to North, although prices were declining through this period (Figure 4.1), using the Warren-Pearson index of wholesale prices shows that agricultural terms of trade during this period—till 1890—were upward trending, so farm prices did not decline as much as other commodities. This meant that farmers were "really getting more for their money" as the prices of other manufacturing goods were declining more than farm product prices. (Figure 4.2)

Secondly, North used the increase in the value of land as an indicator of increased farm income through the period. Then, to further debunk farmers economic distress claims, he referred to the decreased prices of railroad fares, and the insignificance of appreciating real debt costs.

Contesting North's thesis, I maintain that measuring farmers real relative income by comparing wholesale prices of farm products to nonfarm product wholesale prices ignores the fact that farmers are consumers themselves and that consumer price trends and levels do not necessarily coincide with wholesale prices. Adams's (1944) detailed study of Vermont farmer prices and incomes for the period from 1870 to 1940 shows a considerable spread both between retail and wholesale prices, and also in the

trends of a group of consumption items. Furthermore, when I calculate the price of deflation for Adams's basket of consumption goods for the whole deflationary period (1873–1896), I find that while wholesale basket cost showed a decline of 76%, retail basket cost showed a decline of only 55%, which means the price trend in wholesale prices was not the same as in retail prices for this basket, and there was a steeper decline on wholesale prices than in retail prices. And I claim the same trends apply to farmers' income and prices at the national level.

Adam attributes the spread between wholesale and consumer price indices to the wage bill of employees in the distribution chain to final consumers, and the extent of monopoly of distribution chains. This idea is reinforced by the narrative offered in Chandler (1977) regarding the rise of the mass retailers in the post–Civil War era. My calculations show a correlation of 0.46 between the spread between wholesale price index change and the farm consumer price index change and the change in wages of all annual nonfarm employees, which suggests a moderate positive relationship (Table 4.5).

In an attempt to examine the effects of price deflation on farmers' economic status, I construct a consumer price index for farmers. I find that the decline in farm product prices was much higher than the decline in consumer product prices, hence, the farmers did not get more for their money as North argued; second, I argue against North's use of farm land price increase as an indication of improved income and economic conditions of farmers.

Farmers Consumption Price Index

In constructing the farmers price index, I made use of the year 1885 weights of items consumed by a farmer family as reported in Adams's (1944) study of the prices and income of Vermont farmers, (Table 4.6). The main sources of Adams's data were sales records of stores, farm account books, diaries, and U.S. Department of Agriculture records. The series covers the prices and wages paid and received by Vermont farmers from 1780 to 1940. Adams presented weights assigned to groups of consumption items at 20-year intervals. For the price data series of consumed products, I used Hoover's (1960) consumer price indices for the period 1873–1880, which were collected from the *Weeks Report*, in which prices were gathered from 40 cities in 16 states between 1850 and 1880.

There are no retail price data available for the period from 1881 to 1889, so this period is not included in this section. For price indices of the rest of the deflationary period of (1890–1896), I relied on Rees's (1961) price data series which was collected from Douglas's (1930) food index, main retail stores catalogues, newspapers, and the Bureau of Labor statistics data. If we compare the weights of consumption items, we see similarity between Rees's and Hoover's weights as they both represent consumption habits of urban areas dwellers, while Adams's weights stand apart to represent rural farmers' consumption habits. A close look at the three biggest items shows that while food weights were similar for Adams and Rees, the other two items weights (clothing and rent) are considerably divergent (Tables 4.7, 4.8, and 4.9).

Hoover (1960) collected urban price indices for the following items: food, clothing, rent, fuel, and light, and "other"—which included medical care, newspapers,

soap, and starch. The price index constructed includes food, clothing, and rent from Hoover's series, and to account for the difference between rents in urban and rural areas, I replaced the rent price index in Hoover with wholesale construction price material as calculated in the Warren-Pearson wholesale price index. I justified the replacement by Lindert (1988) who maintained that rental income in farms was correlated with wholesale construction materials prices. For medical care, I used Adams's series, which Hoover also used for his index. Due to the lack of other consistent price series, 10% of the rural farmers' consumption basket is not available, so I accounted for that residual of 10% by multiplying the 90% part of the basket by 1.1111.

So, the farmers' consumption price index is:

$$CPIfarmers = \sum 1.111 * (0.43 * cpifood + 0.32 * cpicloth + 0.1 * cpiconstruction + 0.05\, cpimedical\, care) \quad (4.1)$$

If we compare the price deflation between the urban areas and rural areas, we find that for the period of 1873–1880, the decline in consumer prices index was more in the rural areas than in the urban areas, and for the period of 1890-1896, we find that the decline was almost equal in both rural and urban areas.

However, in contesting North's thesis, we are concerned with how farm prices fared in comparison to farmers' consumption basket prices. Upon calculating the decline in the prices, I found that while farm wholesale prices declined by 26.7% for the period, 1873–1880, and 15% for the period, 1891–1896, the consumer price index for rural farmers declined by 22.9% for the period, 1873–1880, and 7.7% for the period, 1891–1896. This indicates that the decline in consumer product prices was less than the decline in farm product prices (Tables 4.10, 4.11, 4.12, and 4.13).

Even for the years between 1881–1889, for which retail price data is missed, we find that the terms of trade of farm products were downward trending (Figure 4.3).

Farmland Prices Issue

Douglas North (1966), contesting the previous consensus of deteriorating farmers' income and economic conditions as an explanation of the Populist Movement, maintained the increase in the value of land this era reflects improved income derived from land owned by the farmers.

However, the increase of land prices should be, firstly, attributed to the expansion of agriculture in lower-quality land, which drove up the prices of the higher-quality land (Lindert, 1988). Secondly, land public policy that followed the Civil War encouraged western settlement, accompanying the expansion of railroads to the western frontier (Hicks, 1931). Public land policies such as the 1862 Homestead Acts, the right of pre-emption starting in 1841, and the 1873 Timber Culture Act expanded land in farms between 1860 and the end of the decade by threefold in the North Central area and by sevenfold in the West (Table 4.14). It also provided farmers with land tracts either for free or at very low prices. There was nowhere for land prices to go but up. Furthermore, part of the increase in the prices could have been generated by the speculators who accompanied the expansion of the railroads. Either way, the increase was not driven by higher farm income. Finally, land prices at national level declined after the Civil War—the South being the biggest farmland area through the whole period. It is not surprising that values plummeted during the war and began to rise in the postwar years.

Conclusion and Suggestions for Further Research

Now that income distribution and class conflict is gaining more currency in mainstream economic circles, there is an increased need to put distribution and class relations in the spotlight. This article illuminates farming-sector economic conditions in response to North's thesis denying the role of economic conditions as a cause of the political struggle of the farmers, who were 30%-40% of the total labor force through this period. I argued that it is not enough to look at the relative wholesale farm prices to deduce the conditions of farmers, as they were consumers themselves. While some researchers did take retail prices into consideration (Hoover, 1960; Bowman & Keehn, 1974), they applied urban consumers weights to rural farmers, a mistake I overcame by instead using farmers' consumption weights as reported by Adams (1944). This allowed me to more accurately explore price change effects on farmers' economic well-being. I also extended the analysis to the period, 1890–1896, which was an important part of the Populist Movement and was not covered by North's analysis.

After looking at retail and farm prices, consumption patterns, and the changes in the land market, I find that farmers' protests during the deflationary period had a legitimate economic base, especially when we count in the importance of farm credit and its duration: 4–5 years (Eichengreen, 1984).

For future research, in order to obtain a microlevel insight to the economic conditions of the protesting farmers in the late 19th century, it would be useful to elaborate this analysis by looking at state-level data series for both prices of farm products and retail prices of consumption in rural areas of a single state.

Table 4.1: Workers share of manufacturing added value

Year	Workers wage share of Manufacturing added value
1869	44.51
1879	48.04
1889	44.39
1899	40.31

Table 4.2: Percent distribution, of the share of the agricultural sector of gainful workers, 10 years old and over, for the United States: 1870 to 1900

Occupation	1900	1890	1880	1870
Agriculture Sector Share of Labor Force	37.5	42.6	49.4	53.0

Note. Data from U.S. Census Bureau (1975).

Table 4.3: Farm sector share of output in millions of U.S. dollars

Year	Farm Sector output*	Gross National Product^	Farm sector share of output
1870	2774	8410	33%
1880	3263	1106	29.50%
1890	4298	1344	25.27%
1900	5780	1858	18.51%

Note. Farm gross output data from Gardner (2006), Gross national product from Balke and Gordon (1989).

Table 4.4: Decade average yield of selected crops

	Wheat	Corn	Barley	Cotton	Tobacco
	Bushels per acre	Bushels per acre	Bushels per acre	Pounds per acre	Pounds per acre
1871–1880	12.57	26.36	21.08	172.5	739.7
1881–1890	13.03	25.41	23.28	172.7	714.7
1891–1900	13.72	26.46	23.92	192.1	756.5

Note. Data from Alston and Pardey (2006).

Table 4.5: Nonfarm workers' wages versus the farmers' wholesale and retail prices spread

Year	Wholesale Price Index Change	Farmers Consumer Price Index Change	1st Column-2ND Column	Annual Non Farm Emolyees Annual Earnings Growth
1873	-2.15686	-1.25517	-0.90169	-4.11523
1874	-5.27722	-3.16091	-2.11632	-5.79399
1875	-5.50071	-5.96935	0.468642	-3.64465
1876	-6.71642	-3.54859	-3.16783	-4.72813
1877	-3.76	-1.66259	-2.09741	-3.47395
1878	-14.8795	-7.49545	-7.38402	-2.57069
1879	-1.46484	-1.33713	-0.12771	-1.58311
1880	11.19921	1.568162	9.631045	3.485255
1891	1.464435	-1.26667	2.731107	1.052632
1892	-6.59794	0.424809	-7.02275	0.416667
1893	2.538631	-1.15059	3.689224	-4.97925
1894	-10.8719	-2.9442	-7.92771	-8.29694
1895	-1.08696	-1.88713	0.800169	4.285714
1896	-4.884	-0.88082	-4.00319	0.228311

Note: Earnings data from Margo (2006a)

Table 4.6: Adams' farmers consumption basket

Farm Family Living	1865	1885	1905
Building Materials	10	10	10
Clothing	28	32	27
Fire Insurance	3	1	1
Food	43	43	44
Medical Care	8	5	6
Taxes	3	4	5
Transportation	2	2	4
Others	3	3	3
Total	100	100	100

Note. Numbers from Adams (1944).

Table 4.7: Food, clothing, and rent weights in the three series

	Food	Clothing	Rent
Hoover 1875	57%	15.2%	17.7%
Rees 1901	44.1%	17%	22.3%
Adams 1885	43%	32%	10%*

Note: Adams (1944) used building materials to depict the cost of accommodation; according to Lindert (1988) building materials are correlated to the rental spending of farmers.

Table 4.8:Hoover weights from 1960

Group	Value	% of Total
All commodities and services	726.70	100.0
Food	417.36	57.4
All items other than food	309.34	42.6
Clothing	110.40	15.2
Rent	128.47	17.7
Fuel and light	51.34	7.0
Others	19.13	2.7

Table 4.9: Rees weights for the cost of living index in 1901

	Food	Clothing	Home Furnishing	Rent	Feul and Light	Liquor And Tobacco
Consumption Basket Weights	44.1	17.9	4.5	22.3	7.2	4.0

Table 4.10: Comparison of consumer price changes

Time Period	Urban Consumer prices Change (Hoover Series)	Urban Consumer prices Change (Rees Series)	Farmers Consumer Price Change(1885 weights)
1873-1880	-20.1%	-	-22.9%
1890-1896	-	-7.9%	-7.7%

Table 4.11: Rural consumer price index (1873–1880)

Year	Rural Consumer Price Index 1873-1880 (base year 1860)	Rural Price Index Annual Change
1873	135.6144	-1.25517
1874	131.3278	-3.16091
1875	123.4883	-5.96935
1876	119.1062	-3.54859
1877	117.126	-1.66259
1878	108.3469	-7.49545
1879	106.8981	-1.33713
1880	108.5745	1.568162

Table 4.12: Rural consumer price index (1890–1896)

Year	Rural Consumer Price Index 1890-1896 (base year 1914)	Rural Consumer Price Index Annual Change
1890	132.4554	-
1891	130.7776	-1.26667%
1892	131.3332	0.424809%
1893	129.8221	-1.15059%
1894	125.9999	-2.9442%
1895	123.6221	-1.88713%
1896	122.5332	-0.88082%

Table 4.13: Total price changes

Time Period	All Products Wholesale Price Change	Farm Product Wholesale Price Change	Farmers Consumer Price Change (1885 weights)
1873-1880	-28.6%	-26.7%	-22.9%
1891-1896	-15%	-21.6%	-7.7%

Table 4.14: Land in farms, by region and state by thousand acres: 1860–1900

Year	United States	Northeast	North Central	South	West
1860	407213	61082	107900	225514	12718
1870	407735	62744	139215	189556	16219
1880	536082	67986	206982	234920	26194
1890	623219	62744	256587	256606	47282
1900	841202	65409	317349	362036	96407

Note. Data from Olmstead and Rhode (2006)

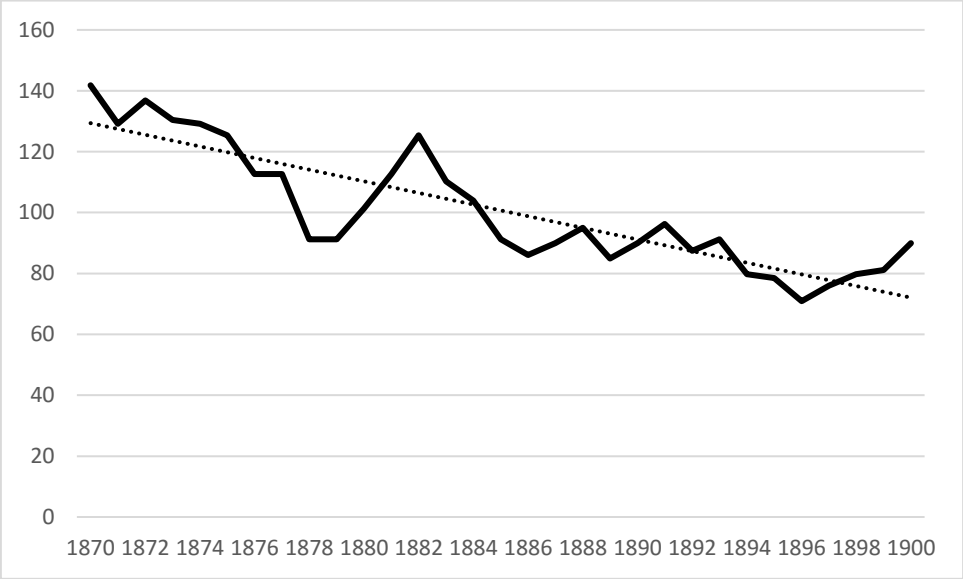

Figure 4.1. Wholesale price index for farm products

Note: Wholesale price index data from Hanes (2006)

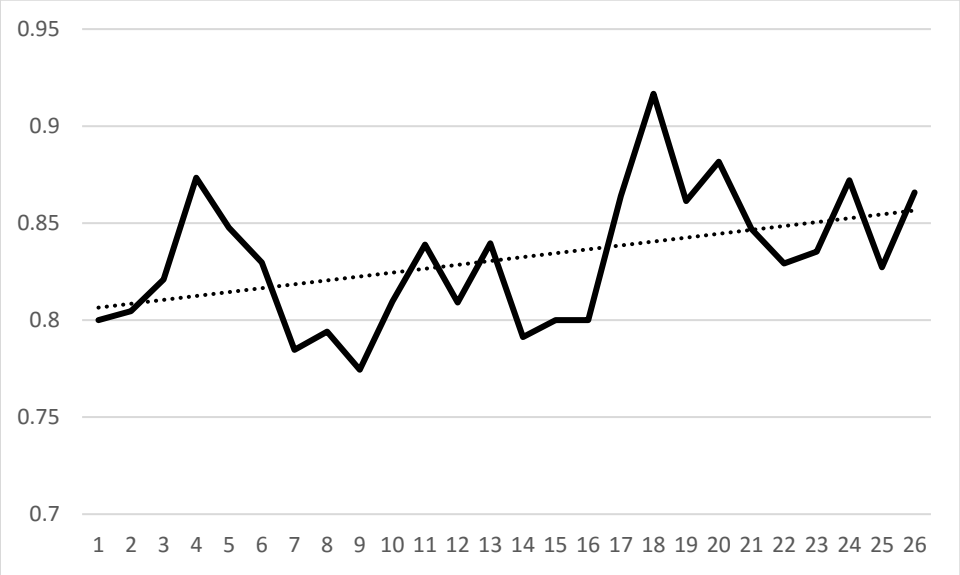

Figure 4.2. Agricultural terms of trade 1865–1890 ratio of wholesale farm prices to all wholesale price

Note: Wholesale price index data from Hanes (2006)

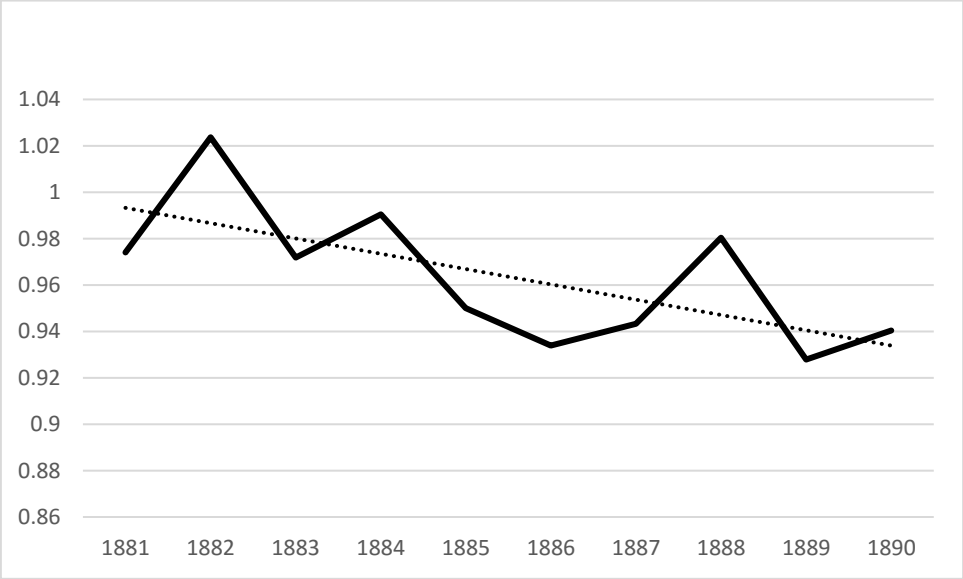

Figure 4. 3. Wholesale farm prices/wholesale all prices, 1881–1889

Note. Wholesale price index data from Hanes (2006)

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