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TWO ESSAYS ON INTERNATIONAL ECONOICS

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To myself, Rui, my advisor and mentor Kevin, my family, and my committee.

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ABSTRACT

The first chapter proposes three hypotheses about the effects of government stability and encompassing interest, which originated from Olson (1982) classic, *The Rise and Decline of Nations*, on cross-country economic growth. First, the government stability affects the average economic growth rate concavely. Second, encompassing interest has a convex effect on expected growth rate. Third, two nonlinear effects integrate into a polynomial W-shaped curve. The hypotheses are tested on two datasets: Cross National Time Series (1975) and World Handbook of Political and Social Indicators III (1986). A wide variety of government stability and encompassing interest measures provide solid statistical evidence for the two nonlinear effects as well as the polynomial effect

Developing countries in the past three decades embraced capital account liberalization as a way of attracting international capital flows in hope of boosting economic growth. But the outcomes of the policy across countries are contingent on the initial economic conditions, the pace of trade liberalization, and the features of other domestic structural reforms. The second chapter directly examines the rarely discussed optimal liberalization sequence among different capital account transactions and extends the literature on the subject along two dimensions. First, I create liberalization intensity indicators for three types of capital transactions: banking transactions, portfolio investment transactions, and direct investment transactions based on the IMF disaggregated restriction dummies for 12 subcategories of capital transactions in a sample of 33 countries, most of them OECD countries. Second, in a multiplicative interaction

model, I find the optimal sequence of liberalizing portfolio investment transactions 5 years earlier and direct investment transactions 1 year earlier than banking transactions is correlated with 0.6 percent higher annual economic growth rate in the 1990s.

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Chapter 1

A Tale of Two Olsons

I. Introduction

Over a span of nearly two decades, Mancur Olson's provocative research extensively explores the interaction between economic performance and governance structure. In his 1982 classic book, *The Rise and Decline of Nations*, Olson argues that entrenched interest groups in long lasting regimes engage in rent seeking activity at the cost of unorganized interests in society. Overall, the net negative effect imposed on society by special interests leads to slow economic growth in a stable polity. Olson suggests that periodic upheaval within political institutions can counteract the harmful influence of entrenched interest coalitions and keep the state governance efficient. Thus, a stable political institution cannot persistently promote economic growth.

Olson suggests that an 'encompassing interest' group that represents the interest of the majority of the public would solve problems in a rent seeking society. The group with 'an encompassing interest' once in power can be led by its own self-interest to improve overall social welfare, in terms of supplying public goods including both infrastructures and sound economic policies, to maximize their own economic interest in society. McGuire and Olson (1996) again promote the concept of "encompassing interest" in their analysis of autocracy and majority rule of democracy.

In this paper, I develop and test three refutable hypotheses from Olson's work. Eventually, I find two nonlinear effects and one polynomial effect, consistent with the predictions of three hypotheses, in cross-country economic growth data. First,

government stability has a concave effect. Second, encompassing interest has a convex effect on economic growth. Moreover, the evidence confirms that two entities could have polynomial effects, and together generate a polynomial W-shaped relationship with economic growth. Unlike previous empirical work, which tests Olson's theory mostly on the OECD countries, the statistical analysis here is conducted on a large number of countries over the period from 1960 to 1982 in two datasets made available by Inter-University Consortium for Political and Social Research (ICPSR): (1) Cross National Time Series (1976) has as many as 72 countries over the period of 1960 – 1973 upon the availability of data, (2) The World Handbook of Political and Social Indicators III (1986) covers up to 92 countries for 1960 – 1982.

The paper proceeds as follows. Section II outlines the hypotheses of the nonlinear effects as well as the polynomial effect by government stability and encompassing interests. Section III reviews previous empirical work on Olson's theory. Section IV and V present evidence for concave and convex effects. Section VI presents the polynomial effects of stability and encompassing interests, as well as the evidence for the W-curve. Section VII gives the conclusion.

II. Nonlinear Effects in Cross-Country Economic Growth

A. Concave Effects of Government Stability

To curb the net negative effects imposed on society by entrenched special interest coalitions, Olson argues that periodic upheaval within the political institution would counteract this harmful influence. Olson (1982) claims that the rapid economic recovery of Germany and Japan after World War II was mainly due to the comprehensive

bureaucratic meltdown during the war. In both cases, the economic growth patterns match the trend implied by Olson's theory.

In his later work, Olson balances the extreme view against special interest groups with a relatively realistic argument that the existence of incumbent coalitions within a society are necessary for achieving persistent economic growth, particularly for those eastern European countries trying to move from centrally planned economies to free market economies. Olson (1993) more explicitly and formally argues that the stability of a single autocrat or "stationary bandit" is superior to the competitive rent seeking of a large number of autocrats acting as "roving bandits."

Rose-Ackerman (2003) argues that Olson implied two types of stability in his work: the stability of fixed laws and practices (which she calls "framework stability"), and the stability of rigid power relationships between economic and political agents in society (which she calls "coalitional stability"). To facilitate voluntary economic transactions, individuals first need to agree upon at least a couple of fundamental rules, tacitly, to clarify the property rights. The framework stability ultimately comes from the consent among individuals on the delimitation of political, economic, and social rights through either peaceful negotiation or violent confrontation. As social conflicts get resolved smoothly, individuals will concentrate more on conducting long-term and sophisticated voluntary exchanges, and eventually the economy will grow accordingly.

Framework stability can promote economic growth but not indefinitely. Quite the contrary, the society, which is too "stable", will not experience persistent economic growth. The stagnancy of the economy comes from the entrenched interests or coalitional stability. The powerful narrow interest groups, such as insiders in government or rich

private business people, will constantly seek governmental discretion to strengthen their privileged position in society and enhance their advantage in rent seeking activities. Consequently, the more coalitional stability a society has, the more stable is the society and the slower economic growth it would expect.

I integrate two types of stability, framework and coalition stability, into one index of stability. Framework stability is the initial stage of stability that each government, regardless of the type of polity, seeks to achieve and maintain at certain established levels. Coalition stability is the secondary stage of stability closely embedded into the framework stability. Lacking framework stability, it is impossible for organized interest groups to entrench themselves into the governance institutions. Thus, the framework stability represents a low level of government stability, whereas the coalition stability reveals a high level of government stability.

A country usually has an accelerating economic growth if a new ruling group successfully consolidates its power quickly enough after coming into power. As the regime becomes more stable, the growth rate will stop climbing up and become stagnant thought at a relatively high level. Unfortunately, the growth momentum could reverse when entrenched interest groups growing out of the stable regime become active in rent seeking activities. Narrow interest groups favoring a small clique at the cost of general society will manipulate the public policy. If the stability level in the country continues to increase, the economic growth rate will fall. Thus, the relationship between growth and the degree of social stability can best be illustrated by a concave curve with the degree of stability on the horizontal axis and economic growth on the vertical axis. As Figure 1

shows, a country would have the most satisfactory economic performance after achieving the "optimal" degree of stability at point S, ceteris paribus.

B. Convex Effect of Encompassing Interests

The "encompassing interest" issue is first raised in Olson (1982) and then developed into "super encompassing interests" in McGuire and Olson (1996). In autocracy, the super- encompassing interest of a secure autocrat gives him incentives to take into account the interest of people living in his territory. The secure autocrat does not prefer confiscation of private assets through state power. To the contrary, the autocrat provides public goods that benefit the whole society from resources under his control in order to increase his share of national wealth in the form of taxes imposed on the private sector. In democracy, a society with super-encompassing interest is a "consensus democracy" having a distribution of endowments that enjoys unanimous support from the public, according to Olson and McGuire (1996). Extending the concept of super-encompassing interest to the extreme scenario, we would come to a society with one single interest group including all people that perfectly tallies gains and losses for efficient policy making. The idealized society with perfect social cooperation, as McGuire and Olson (1996) posits, is as follows: "[T] he consensus democracy can also be thought of as a perfectly benevolent and fair dictator." The opposite idealized society is the one having no encompassing interest at all. In this scenario, individuals voluntarily interact in a perfectly competitive free market. The consensus has been that the more competitive a country's economy is, the higher is the overall growth rate of the economy.

In the real world, however, encompassing interests' level is always between the two extremes. Hypothetically, all levels of encompassing interests can be arranged as an "Encompassing Interests" ("EI", hereafter) index in the Herfindahl form, the sum of squared population shares represented by all special interests groups in the society. On the one hand, the perfectly competitive society has an index close to 0. On the other hand, the super encompassing interest has an index of 10000. All other cases should have an "EI" index between 0 and 10000. The economic growth rates of those countries departing from the idealized societies are relatively lower, due to the rent seeking activities done by special interests, than the growth rates of the previously stated two polar cases. In this way, I propose that the overall pattern of relationship between economic growth rate and the level of encompassing interests is convex. As Figure 2 shows, encompassing interests first correlates with economic growth rate in a negative way, but the trend reverses after the index of encompassing interest passes a turning point, ceteris paribus.

C. Is There a W-shape Curve?

The idealized society in Olson's work is a society having a super encompassing interest, under which there never will be rent seeking activities. As Olson insightfully points out, common interest groups form slowly, large and scattered interests may never organize, and the encompassing interests in the real world usually take the form of entrenched interests, attempting to manipulate public policy in their own favor at the cost of unorganized interests in society. Coalitional interest groups accumulate over time but hardly ever become close to encompassing interest groups, and hence the country is trapped in special interest pitfalls.

Olson does not merely diagnose the problems behind slow growth but also provides ways in which countries can escape. Olson's suggestion is that periodic upheaval of special interest groups could increase economic growth rates. Geometrically, periodic upheaval among society's encompassing interests to sustain economic growth above a threshold rate can be described by a W-shaped curve as in Figure 3, where the bottom part of the convex curve is replaced by a concave curve as if it is being flipped over.

The far left downward slope of the W-shaped curve represents the situation of a declining growth rate as encompassing interests start to exist in a society. The middle concave part of the curve corresponds to the situation where encompassing interests take the form of special interests during its slow evolution. Since special interests choke off economic growth, periodic upheavals start to take place to counteract their influence. The shakeup of special interests, however, needs to be constrained by a certain degree of stability. As argued before, the degree of governmental stability has a concave effect on economic growth during the time when encompassing interests keep growing but still can't represent the majority of the public. The far right upward slope of the W-shaped curve represents an ever-increasing growth trend, as encompassing interests become a dominant force in shaping public policies. Basically, the W-shaped curve may portray the aggregate effects of government stability and encompassing interests on economic growth across countries.

III. Previous Work on Encompassing Interest, Stability and Economic Performance

Calmfors and Driffill (1988), Heitager (1987), and Summers, Gruber, and Vergara (1993) are cross-sectional studies of encompassing interest and economic performance.

They have all mainly used indices of corporatism as a measure of encompassing interest and relate it to macroeconomic performance. In addition, Grier and Grier (2000) have undertaken an important time series study on encompassing interest. They show in the case of Mexico that there is a significant 6-year presidential election cycle over the period 1970-96. Moreover, they find that growth slowdown and inflation uncertainty augment in the year after presidential elections, which are consistent with the prediction of their adapted McGuire and Olson 1996 model.

Murrell adds to the literature a series of papers on the formation and influence of interest groups in OECD countries. In Murrell (1982), the main measure of interest groups is the number of non-governmental organizations (NGOs). The number of NGOs is basically correlated to the number of industries, the number of political parties, and the size of populations in OECD countries. Murrell (1984) shows a very preliminary pattern of industrial growth in six industrialized countries – US, UK, Canada, Japan, Germany and Italy – to provide general support of Olson's theory. Murphy, Shleifer and Vishny (1991) argues that countries in which rent seeking benefits the ablest people more than organizing production would expect economic stagnation since the allocation of talent is distorted. Murphy et al. also present supporting empirical evidence that countries with a higher proportion of engineering majors grow faster than countries with a higher proportion of law majors.

The existing quantitative studies of political stability and economic growth have yielded contradictory findings. Alesina, Ozler, Roubini, and Swagel (1996) find that countries with a high propensity of government collapse have low economic growth, though they also find that low economic growth does not affect political instability.

Londregan and Poole (1990) do not find evidence of slow economic growth as a consequence of increased political instability; instead, they infer from their analysis that slow economic growth increases the probability of political instability. Specifically, they indicate that the probability that a government is overthrown by a coup d'état is substantially influenced by the rate of economic growth. From a different perspective, Posner (1997) presents empirical evidence derived from a large sample of the economic and political data of 89 countries in support of the claim that average incomes in a society, rather than the equality of income, increases political stability. Feng (1997) illustrates in a three-stage least square system that stability has a positive effect on economic growth but only when the country is democratic.

All previous works focus on the linear effect of encompassing interest or government stability on economic growth. In the next section, I present evidence of nonlinear effects on economic performance, as discussed above.

IV. Concave Effects of Stability on Economic Performance

A. Data and Empirical Model

The evidence of concave effects from stability is presented in this section, and the results of encompassing interests' convex effects in the following section. The baseline model is OLS cross-country growth regression model as follows:

$$Y_i = \beta_0 + \beta_1 (\text{Stability}_i) + \beta_2 (\text{Stability}_i)^2 + X_i' \gamma + \varepsilon_i \qquad (1)$$

stability measures are uncovered independently from Cross-National Time Series Dataset, CNTS hereafter [e.g. Banks(1976)]. As the version of CNTS utilized has coverage up to 1973, the analysis is first focused on the period of 1960-1973.

The dependent variable in the baseline model is the average growth rate of real output per worker over the period 1960-73 obtained from Penn World Table 6.1, PWT6.1 hereafter [e.g. Heston, Summers, & Aten (2002)]. The control variables (X_i) include: real GDP per capita of 1960, investment as share of GDP of 1960 as a proxy of physical capital, and secondary school attainment level in the population above age 25 in 1960 as a measure of human capital. The first two control variables are also obtained from PWT 6.1. The education attainment data are from Barro and Lee's Cross-Country Education Attainment Database 2000 [e.g. Barro and Lee (2000)].

B. Statistical Evidence

The first measure of stability is the age of currency. In CNTS, the age of a nation's currency is the number of months that have elapsed in each year since the introduction of a new monetary system or since an upward or downward revaluation of 5% or more[1]. I take the average of the number of months for each country over the 14-year sample period and name it "Currency" as stability measure in Equation 1.

Governments that are relatively unstable would behave as "roving bandits" and be likely to manipulate currency valuation frequently to collect enormous seigniorage tax. As a government becomes more stable, it will have more incentives to provide public goods. As a result, the government would want to establish a stable currency over a long horizon, which means less frequent revaluation, to facilitate economic growth. Thus, the longer the age of currency, the more stable will be the government.

Before jumping into the statistical evidence, a visual inspection of the raw data seems appropriate. Figure 4 shows the scattered chart between the age of currency and

[1] In cases of multiple revaluations totaling 5% or more during a given year, the count of months is from the last of such revaluation.

real output per worker growth rate with a fitted concave trend line that is generated by Microsoft Excel. A large group of countries with a currency age that is less than 80 months has an average growth rate below 2%: Nigeria, Senegal, Mali, Bangladesh, Cameroon, Rwanda, Central Africa Republic, Uruguay, Benin, Zaire, Uganda, Nepal, Zambia, Guyana, Bolivia and Chile. Half of the 14 countries that have an above 5% average growth rate fall into the range between 90 and 235: Spain (95), Cyprus (100), Iran (121), Austria (152), Greece (157), Japan (218) and Italy (235). The other half of the group includes Ghana (30), Congo (30), Israel (43), Korea (46), Singapore (58), Taiwan (74) and Portugal (324). Along the downward slope of the concave curve are countries whose currency age is between 250 and 400 months and growth rate is between 2% and 4%: Switzerland, US, El Salvador, Guatemala, and Panama. Haiti has the most stable currency – 512 months – and its economy grew only at 0.2% during the period of 1960-73.

The statistical results also support a concave relation between the age of currency and economic growth rates. In the first column of both Panel A and B of Table 1, the coefficient of the linear term of Currency is positive and significant at the 0.05 level, while that of the quadratic term in the Panel B is negative and also significant at the 0.05 level. The implied growth maximization currency age is 283 months. Almost all observed values, 80 out of 86, are smaller, suggesting that most countries in the sample are relatively instable in terms of the currency stability. The initial real output per work and investment share as real GDP in 1960 have the expected coefficient sign and are significant the 0.01 level.

CNTS reports the frequency of domestic conflicts: assassinations, general strikes, guerilla warfare, government crisis, purges, riots, revolutions, anti-government demonstration, coups d`etat, and constitutional changes. For each country, I sum up the number of each domestic conflict over the 14-year period. None but riots generate statistically significant concave results if serving as a unique stability measure. Next, I cluster the ten domestic conflicts into two groups as a dyad of stability measures: (a) violent conflicts including assassination, guerilla warfare, riots, revolutions, and coups d`etat; and (b) non-violent conflicts including general strikes, government crisis, purges, anti-government demonstration, and constitutional changes. I name two measures "Violence" and "Nonvio." The fewer occurrences of domestic conflicts, the more stable is that incumbent government.

In the top panel of Table 1, "Nonviolence" has a linear term only significant at the 0.1 level, while "Violence" has an insignificant coefficient for its linear term. The bottom panel presents the nonlinear results for the two measures. The US is an outlier in the sample having 252 nonviolent conflicts that are three times the second highest of 84 in Argentina, and 209 violent conflicts that are 50% more than the second highest of 140 in India. So the results are sensitive to the inclusion of US in the sample. However, adding the quadratic term into the equation allows the linear terms to become robustly statistically significant regardless of the influence of the outlier. "Nonviolence" has a quadratic term statistically significant at the 0.05 level with US in the sample. On the contrary, "Violence" can have the quadratic term of the same significance as "Nonvio" only after US is excluded from the sample. Thus, the column of "Nonviolence" has a sample of 75 and the column of "Violence" has 74. Given the coefficients of their

quadratic terms in the Panel B, "Nonviolence" has a maximal level of 140 and "Violence" has 64. If the US is excluded, the maximal level of "Nonviolence" for growth is 54. As two thirds of the sample have less conflicts of either type than the implied optimal level, it suggests that most countries can be thought as relatively stable in terms of the frequency of domestic conflicts.

Several empirical studies have looked at some aspects of the defense spending and economic development relationship, especially in less-developed countries. Benoit (1978), employing a single equation model, concludes that there is a positive and significant correlation between the amount of defense expenditure and economic growth in a sample of 44 less developed countries, LDCs hereafter, between 1950 and 1965. However, Lim (1983) claims that increased defense spending is associated with decreased economic growth in a bigger sample of 54 LDCs during the period of 1965-73 within the framework of the Harrod-Domar capital-driven growth model. Biswas and Ram (1985), with an augmented neoclassical growth model, finds that defense spending has no consistent, statistically significant impact on economic growth for the sample of 74 LDCs between 1960 and 1977. Neither the military sector generates any externality effects on the civilian sector, nor is the factor productivity differential between two sectors significant. They further conclude that whether one finds a positive or a negative correlation between defense spending and economic growth depends on the geographical coverage of the sample, the sample period, and model specification.

In this paper, I test the effect of defense burden on economic growth from the perspective of the relation between national defense expenditure and stability. According to Acemoglu (2005), "weak states" lack the power to tax and regulate the economy and to

withstand the political and social challenges from private sectors. Military power of central governments can represent the degree of their coercive power to regulate economy as well as society. In countries with a small size of military corps, incumbent governments are expected to be easily challenged by domestic political groups and then can be unstable. When a state is strong in military power, the ruler could take advantage of the stability built on the coercive power by interfering with the economy to benefit his own economic interests with no fear of significant oppositions.

I use variables in CNTS on national defense aspects as the third type of stability measures: per capita national defense expenditure, military size including only active-duty members of a nation's armed forces (army, navy, and air corps), and military size as a proportion of population, which are named as “DefCap”, “Milisize” and “Milipop" respectively. In columns 3, 4 and 5 of table 1, the linear coefficients of the measures in the 14-year average (1960-73) are positive and significant at the 0.05 level and the quadratic terms become negative and significant at the same level. Similarly, the control variables all have the expected sign and are significant at 0.05 levels.

The results for “DefCap” become significant only after taking out from the regression the outlier US, whose per capita defense expenditure is $284. The “DefCap” value for the maximal growth given the coefficients is $87, which is three times larger than the sample average $24. Among 57 countries in the sample, UK, Sweden and Israel have an average “DefCap” of more than $87. The implied optimal value of “Milipop” is 0.051 or 5.1%, far greater than most observed values, which are below 2%. Only Switzerland and Israel have a ratio above 5%, which are 6.4% and 10.3%. Regarding military size, US is again an outlier in the sample with approximately 2.8 million military

personnel, three times more than the size of India, the second largest military in the sample. The nonlinear effect of "Milisize" is robust to the outlier. But the implied optimal military size for growth changes substantially if the outlier is included: 1.5 million if US is counted and 414,000 otherwise. There are only seven countries besides US in the sample having a military size over 400,000: Switzerland (411,000), UK (428,000), Turkey (452,000), Taiwan (537,000), Korea (602,000), France (650,000) and India (876,000). Thus, the empirical results suggest that most countries of the sample in the 1960s until early 1970s were relatively unstable in terms of the size of military power possessed by governments.

Press freedom also can reveal government stability level. If an incumbent government is confident about its control over the economic and political system, it should be able to tolerate more freedom in mass media because debates and criticisms upon any economic and political issues will not significantly change property rights delineation within the territory. Thus, the outcome of the eventual economic policies will be predictable for the government. Thus it is reasonable to suggest that the level of press freedom is positively correlated with government stability. Besly and Case (2002) presents the results that state governments in India during the period of 1958-1992 are more alert to food shortage and crop flood damage by means of public food distribution and calamity relief programs where newspaper circulations are higher, since a more informed electorate strengthens incentives for politicians to be responsive to the public preference. Moreover, Besly and Prat (2004) develop a model of democratic politics in which the press freedom is endogenous even in the absence of censorship. They even provide evidence that press freedom in 1999, in terms of the index published by Freedom

House, is negatively correlated with political longevity, the length of time in office for the incumbent and the party who held power in 1997, after conditioning out region, real income per capita and population. Furthermore, the state ownership of news is positively correlated with corruption and political longevity but negatively with press freedom. So newspaper circulations can loosely approximate the general activeness of the press in a country. The more active the press is, the higher the degree of press freedom will be in that society, which implies higher level of government stability.

Similarly, book titles represent not only the press freedom but also the accessibility of advanced knowledge in the society. Cheung (1982) suggests that concrete knowledge about operations of alternative institutional arrangements is a necessary condition for a socialist economy to transform into a free market economy. The more informed people are about institutional knowledge, the higher the possibility that institutional reforms can be carried out to promote economic growth. When book title per capita passes a threshold in a country, the society as a whole can be expected to have a relatively stable institution in operation. This argument may explain that the level of press freedom usually lags behind that of economic development in transitional economies.

In CNTS, per capita newspaper circulation and per capita book titles published are selected as the operational stability measures for the above arguments, under the names of "News" and "Books" respectively. Figure 5 provides a visual evidence for the concave relationship between newspaper circulation per capita and economic growth rate. 29 countries out of 45, whose newspaper circulation per capita is less than 0.8, had an average growth rate no greater than 3% between 1960 and 1973: Central African Republic, Nigeria, Mali, Benin, Naples, Cameroon, Togo, Senegal, Zaire, Uganda, Haiti,

Gambia, Kenya, Zambia, Sierra Leone, Indonesia, Jordan, Algeria, Philippines, Honduras, Bolivia, Fiji, Paraguay, Sri Lanka, Nicaragua, South Africa, El Salvador, Colombia, and Mauritius. Many African countries above acquired independence in the 1960s and were still stabilizing the situation at the time. Within the range of newspaper circulation per capita between 0.08 and 0.28 are 10 countries growing at least at 5%: Taiwan, Korea, Greece, Barbados, Italy, Cyprus, Spain, Israel, Singapore and Austria. Except Uruguay, the countries that have at least 0.3 for "News" are OECD countries: The Netherlands, US, Finland, Denmark, Switzerland, Australia, New Zealand, Norway, Japan, Iceland, UK and Sweden. Other than Japan growing at 8%, most economies grew at below 4% annually during the period.

The last two columns in the top panel of Table 1 reports that "News" by having a linear term alone in Equation 1 has a coefficient barely significant at the 0.1 level and the coefficient of "Books" is not significant at all. Having a quadratic term and a linear one, however, the two measures have a concave effect with the positive linear coefficient and the negative quadratic coefficient statistically significant at the 0.01 level. The optimal level of newspaper circulation per capita is 0.33 and that of book titles is 0.0016. Nine countries have the value of "News" greater than the maximum level: Denmark, Switzerland, Australia, New Zealand, Norway, Israel, Japan, UK and Sweden. Only Iceland has a higher value for "Books" than the maximum level, 0.0032. Thus, most countries are relatively unstable given the values of "News" and "Books" are to the left side of the optimal levels.

To check the robustness of the above concave effects from each other, I place multiple stability measures into the regression. Table 2 shows statistical results for

concave effects from seven combinations of "News", "Books", "Milisize", "Milipop", "Currency", "Violence", and "Nonvio." More than half of the multiple concave effects are statistically significant at the 0.01 level and the rest at the 0.05 level. The goodness of fit of five columns is above 0.6. Especially, the one for the combination of "News", "Milisize" and "Currency" is as large as 0.702. Those R-squares are 50% higher than each of the individual concave effects in panel B of Table 1. In column 3, the proportion of the legislature seats held by the largest party, which is averaged over 1960-1973 and named "Seat", has a concave effect on economic growth in addition to "News", "Milipop" and "Currency". All these multiple concave effects prove that each of the four types of measures – press freedom, currency stability, domestic conflicts and defense expenditure – reveals a unique aspect of government stability.

The results shown above are favorable evidence for the hypothesis that the government stability has a concave influence on economic growth. However, Hudson (1973) claims that the first edition of CNTS, which at the time was named Cross-Polity Time Series Data (CPTSD), though a milestone on the road to fruitful quantitative comparative political analysis, suffers from minor data inaccuracy problems in various data series, such as urbanization and political conflicts. However, I concur with Gurr's (1974) suggestion that minor inaccuracies in political data are less likely to have significant impact on the general inferences drawn from cross-national studies. More troublesome is the possibility that errors are most likely to be gross and systematic within any individual dataset. My approach to this problem is to test the same hypothesis with multiple datasets. The aggregate dataset in *World Handbook of Political and Social Indicators III*: 1948 – 1982 (WHPSI hereafter) provides similar data series as CNTS [e.g.

Taylor & Jodice (1986)]. Though having more recent data by nine years, this aggregate dataset added entries at an interval of five years whereas CNTS did yearly. So it is reasonable to use the analysis in WHPSI to test robustness of the concave effects in CNTS. Next, I will present the evidence of concave effects from WHPSI over the period of 1960-1982.

I first confirm the concave effects of "Defcap", "Milipop" and "Milisize" in CNTS dataset with three similar measures in WHSPI: defense expenditure as a percentage of GNP ("Defexp"), military size ("Milisize2"), and military manpower per thousand working age population ("Milipop2"). As three variables are available in 1965, 1970 and 1975, the average of three data points is used in Equation 1. In the first 3 columns of table 3, the linear terms of those measures are positive and significant at the 0.01 level, while their quadratic terms have negative coefficients significant at the same level. Among control variables, only secondary school attainment is not significant but close to the 0.1 level.

Similarly, I select three measures of press freedom in WHSPI: news circulation per thousand people ("News2"), radios per thousand people ("Radio"), and TV sets per thousand people ("TV"). Each measure is recorded every five years in 1960, 1965, 1970 and 1975. I use the average of four observations in Equation 1. Three measures do have a concave effect on the growth rate because each has a positive linear term and a negative quadratic term as shown in Table 3. The coefficients are statistically significant at the 0.01 level for "News2" as well as for "TV", and at the 0.05 level for "Radio."

"Seat2" in Table 3 is the proportion of the legislature seats held by the largest party in 1975 recorded in WHSPI. In spite of one observation in each country for the

measure, the results of "Seat2" confirm the concave effects of "Seat" in Table 2 by having statistically significant linear and quadratic terms with the expected signs.

All measures that have been presented in this section are by and large coarse measures of government stability. Only statistical evidence of the coefficient of linear and quadratic terms is reported to prove the concave effects of each measure. The quantitative meaning of the coefficients has limited practical implication and thus remains untouched. Next, the paper will proceed to the statistical evidence for the convex effects.

V. Convex Effects of Encompassing Interests

In this section, I report the convex effects of encompassing interests. We still use the same regression model as Equation 1 to investigate the relationship between encompassing interest and economic performance by only replacing stability measures with measures of encompassing interests, which is as follows:

$$Y_i = \beta_0 + \beta_1 (EI_i) + \beta_2 (EI_i)^2 + X_i' \gamma + \varepsilon_i \qquad (2)$$

The subscript i represents countries and "EI" stands for encompassing interests. The measures of encompassing interests are also from Cross-National Time Series Dataset (CNTS hereafter) for the period 1960 – 73.

Three variables in CNTS have convex effects on economic growth for a sample of 33 countries given the data availability: voter as a percentage of population, cabinet changes and effective executive changes, which are named as "Cabinet", "Executive", and "Voter", respectively. Cabinet changes is defined as the number of times in a year that a new premier is named and (or) new ministers occupy at least 50% of the cabinet posts. The change in effective executive is the number of times in a year that effective

control of the executive power changes hands requiring that the new executive be independent of his predecessor. In Equation 2, I use as the EI measures the sum of "Cabinet" and "Executive", as well as the average of "Voter" over the 14-year sample period. A negative coefficient on the linear term and a positive on the nonlinear term are expected to serve as the evidence of the convex effects.

The cabinet is the most influential functional group on economic policies in government. A high turnover rate in a cabinet is normally expected to be detrimental to economic growth since the uncertainty about the orientation of economic policies will become severe. Lavar and Shepsle (1996 and 1999) present a provocative portfolio allocation (PA) model to explain government formation and survival in parliamentary democracy. The key insight of the PA model is that forecasts about the future policy orientation of candidate cabinet ministers drive the bargaining over the allocation of cabinet positions and a coalition agreement on policy. Thus, I propose that the turnover rate of cabinet members could imply an active refinement of economic and social policies in government. Like private investors constantly changing the composition of their portfolios in the hope of achieving higher expected investment returns, governments could intentionally reshuffle the allocation of political power internally to improve economic growth for the encompassing interests behind them. Regarding "Voter", the proportion of voters in the population indicates the overall sentiment of the whole population towards the political system as well as the quality of the government elected out of the system. Only above a certain threshold, the higher the percentage of the population willing to participate in a political system, the better the economic growth should be.

Table 4 reports the results for three measures. In column1, "Voter" as expected has a negative linear term and positive quadratic term that are both statistically significant at the 0.1 level. When the convex effect of "Voter" is taken into account, "Cabinet" and "Effective", as shown in column 2 and 3, have the significant convex effects at the 0.05 level. Moreover, all control variables are statistically significant at the 0.01 level across three specifications. Concerning the turning point of the convex effects, it is 0.31 for "Voter", 6 for "Cabinet", and 4 for "Executive".

VI. Polynomial Effects of Stability and Encompassing Interests

I propose in section 2 that government stability and encompassing interest might together have a polynomial influence on economy, which is illustrated as a W-shaped curve in figure 3. Before testing the W-curve, I first check whether government stability and encompassing interests have individual polynomial effects on economic growth. I include a cubic term of the stability measures previously used into Equation 1. The model changes as follows:

$$Y_i = \beta_0 + \beta_1 (\text{Stability}_i) + \beta_2 (\text{Stability}_i)^2 + \beta_2 (\text{Stability}_i)^3 + X_i' \gamma + \varepsilon_i \qquad (3)$$

β_1, β_2 and β_3 are expected to be positive, negative and positive, respectively. The concave polynomial effects of government stability connote that a high level of government stability, other than decreasing economic growth, might in the meantime help encompassing interests evolve and the latter eventually have a dominant effect on the economy. The net effect of two forces at a high degree of stability can be positive.

Similarly, I add to Equation 2 a cubic term of encompassing interest measures. The new model is as follows:

$$Y_i = \beta_0 + \beta_1 (EI_i) + \beta_2 (EI_i)^2 + \beta_2 (EI_i)^3 + X_i' \gamma + \varepsilon_i \qquad (4)$$

This time β_1, β_2 and β_3 are expected to be negative, positive and negative. The rationale behind the convex polynomial effects of encompassing interests is that once it has a positive effect on economic growth after exceeding a threshold level, the government stability is expected to be increasing along with growing encompassing interests. However, if encompassing interests continue to grow upon accomplishing a temporary maximal growth rate, the negative effect of the government stability as argued in section 2 can also become dominant. The net effect on the economy is going to be negative until the encompassing interests attain an even higher level to surmount the negative influence of excessive government stability as discussed above.

I use a 'horizontal' method to test the W-curve based on the polynomial effects of stability and encompassing interests. According to the arguments of the individual polynomial effects, the two concepts actually are just the two sides of the same token over a specific range of the degree of stability and of the level of encompassing interests. Thus, the polynomial curve of stability and that of encompassing interests, overlapping at the concave part of the two, comprise a W-shaped curve. The empirical test needs to use three "Stability" terms as in Equation 3 and the three "EI" terms as in Equation 4 in the same cross section regression, which has the form as follows:

$$Y_i = \beta_0 + \beta_1 (\text{Stability}_i) + \beta_2 (\text{Stability}_i)^2 + \beta_3 (\text{Stability}_i)^3 + \beta_4 (\text{EI}_i) + \beta_5 (\text{EI}_i)^2 + \beta_5 (\text{EI}_i)^3 + X_i' \gamma + \varepsilon_i \quad (5)$$

Then the W-curve will be proved when β_1, β_3 as well as β_5 are positive, and β_2, β_4, plus β_6 are negative. In general, the polynomial effects explain economic growth rate more thoroughly than the simple concave and convex effects. The goodness of fit of the

regression also improves substantially. The results for the polynomial effects and the W-curve are presented for both types of measure from CNTS.

In Table 5, four stability measures – "News", "Book", "Milisize", and "Milipop" – have the linear, quadratic and cubic terms that are significant at the 0.01 level. The terms of "Seat" are significant at the 0.05 level. The R-squares of the five specifications are above 0.4, about 50% higher than those of their concave effects in the panel b of Table 1. The last column of Table 5 presents the results of the variable named as "MCS," the mean cabinet size between 1960 and 1973 across countries. Its linear and cubic terms are negative and quadratic term is positive. All three terms are statistically significant at the 0.01 level. The "MCS" is a new measure of encompassing interests discovered by the polynomial effect test. The results for the nonlinear effect of "MCS" are not significant.

Table 6 confirms that the polynomial effects of stability measures are robust to each other. Each pair of the stability measures generates two sets of statistically significant polynomial coefficients, and more than half of them are at the 0.01 level. The goodness of fit of the specifications continues to improve with an average value of 0.5, 25% more than the average 0.4 in table 5.

The evidence of the W-curve from CNTS is in table 7. The last three columns of the table are the results of the "horizontal" method. "News", "Milisize" and "Seat", when paired with "MCS", generate six polynomial terms significant at the 0.01 level, of which three are positive and the rest are negative.

VII. Conclusion

The paper develops three hypotheses for how government stability and encompassing interests influence economic growth across countries. I provide statistical

evidence of the concave effects by government stability as well as the convex effects by encompassing interest on economic growth. Meanwhile, I develop the rationale for a variety of government stability and encompassing interest measures. Furthermore, I extend the arguments for the nonlinear effects to imply the polynomial effects and prove that eventually the concave and convex effects together comprise a W-curve in the economic development trend across countries.

Those nonlinear and polynomial effects of cross-country economic performance have two implications. First, economic development is a complicated process of multiple dimensions so that the time is right to abandon the simple single-dimensional as well as linear growth models, especially the 'AK' model. Second, our knowledge about institutional characteristics across countries is still very limited. The research on the driving force behind the formation of encompassing interests and also the maintenance of government stability should be promising.

Figure 1: The Concave Relationship between Economic Growth and Stability

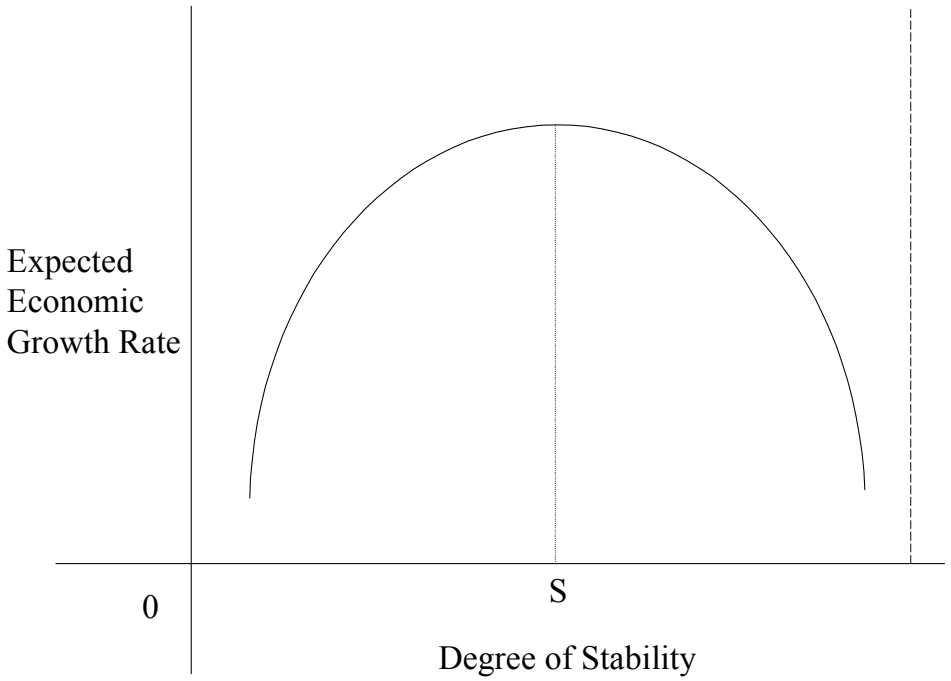

Figure 2: The Convex Relationship between Economic Growth and Encompassing Interest

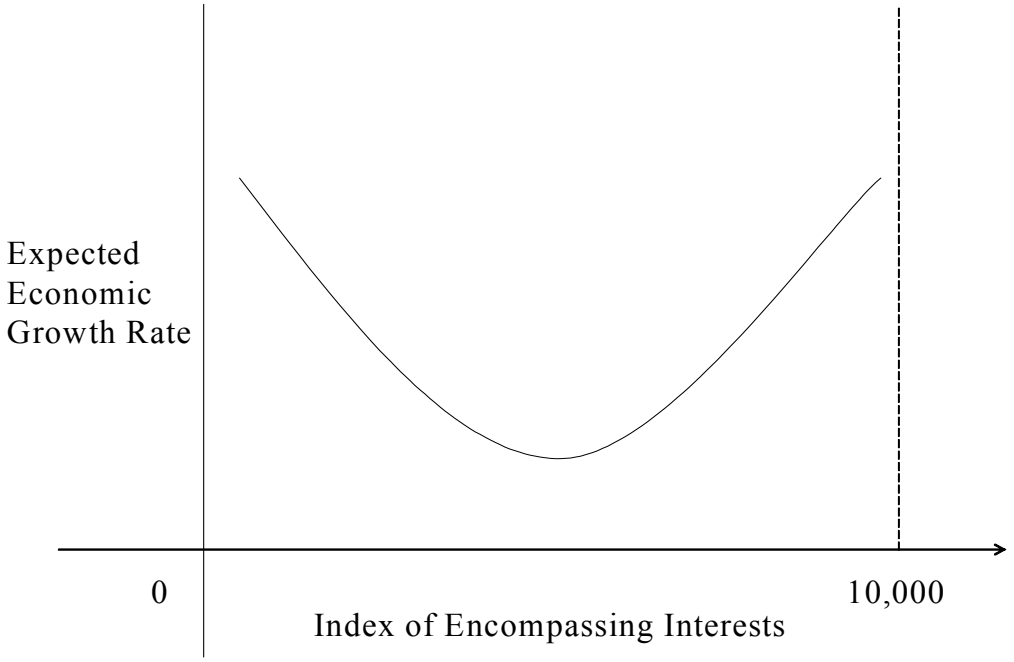

Figure 3: The Level of Optimal Stability under the Constraint of Encompassing Interests

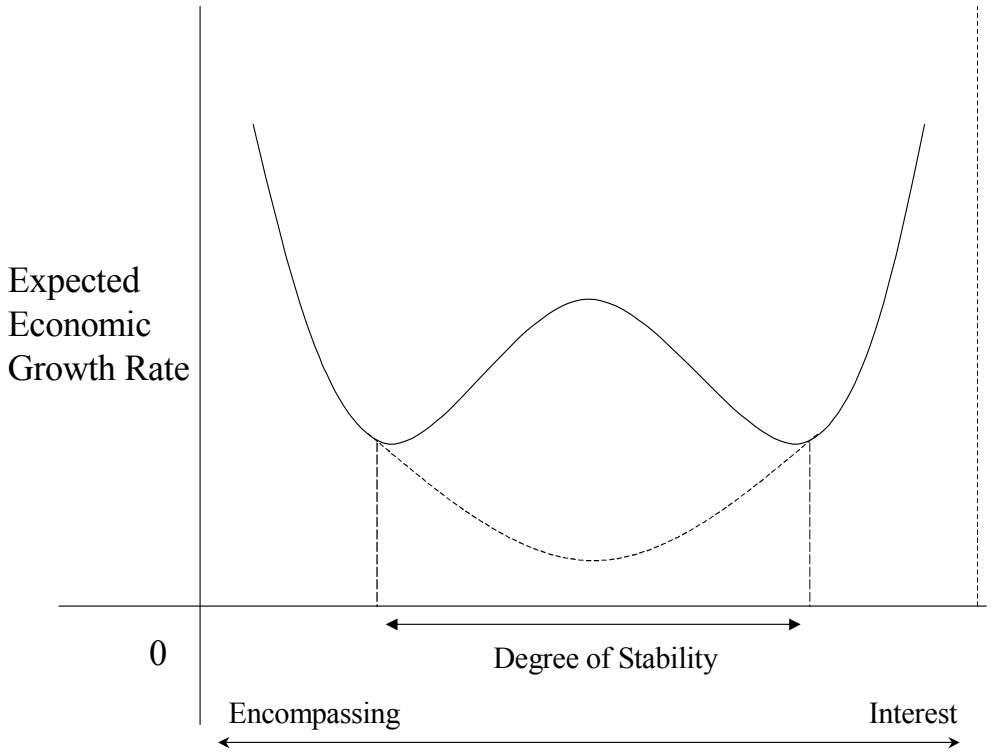

Figure 4: The Concave Effect of the Average Currency Age

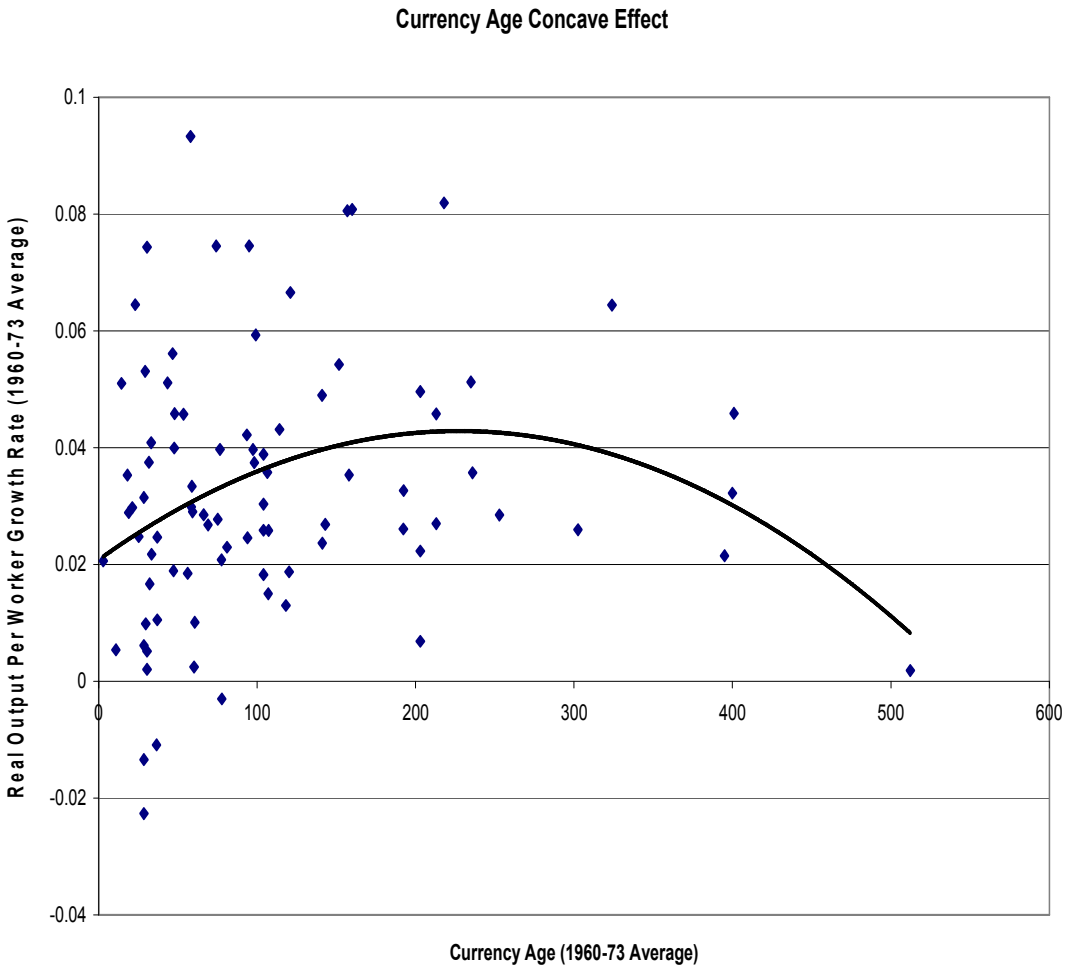

Figure 5: The Concave Effect of Newspaper Circulation Per Capita

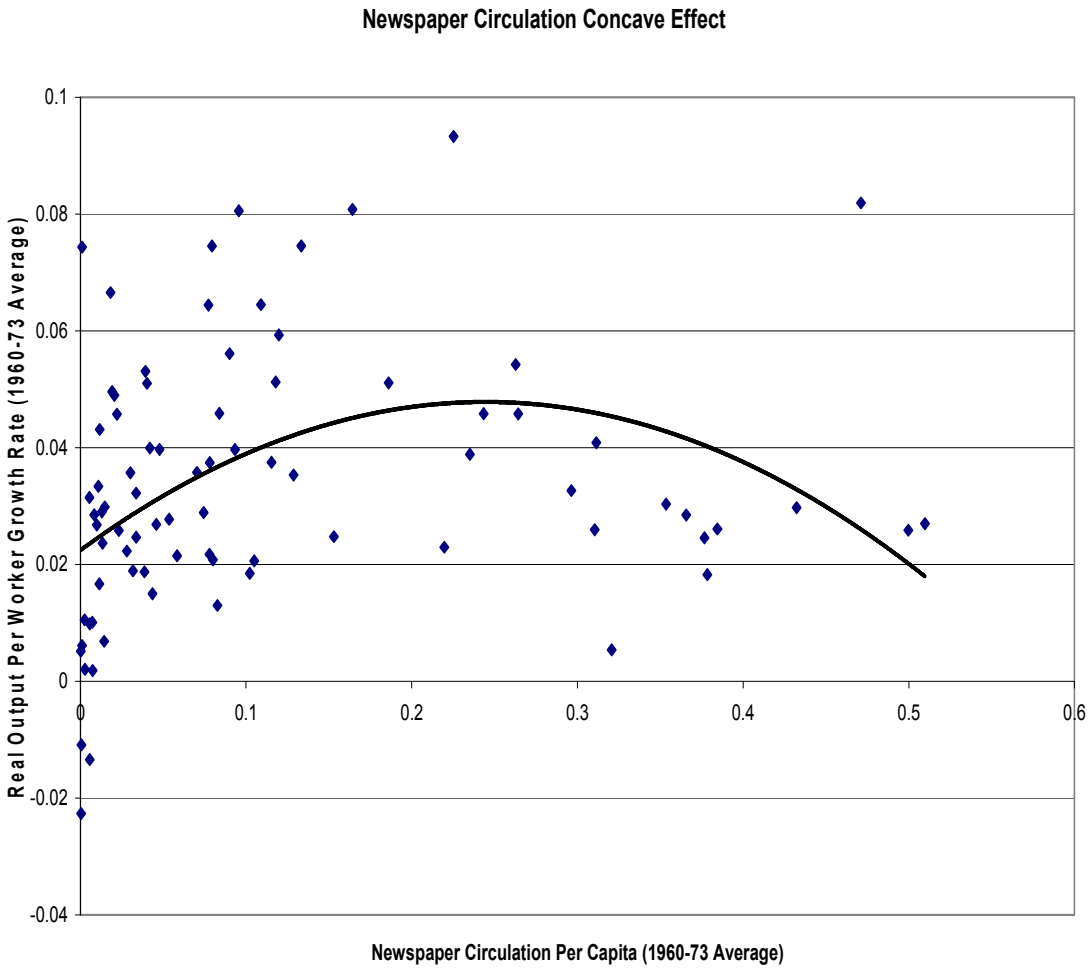

Table 1

Cross-Country OLS Estimation for Stability Effects: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

Panel A:	1	2	3	4	5	6	7
	Currency	Nonviol	Violence	DefCap	Milipop	Milisize	News
Intercept	**0.015**	**0.019**	**0.019**	**0.025**	**0.022**	**0.022**	**0.025**
	3.23	4.58	3.97	4.69	5.42	5.15	5.83
Real GDP Per Capita (1960)	**-2.56E-06**	**-2.40E-06**	**-2.17E-06**	**-3.26E-06**	**-2.45E-06**	**-2.62E-06**	**-4.02E-06**
	-3.67	-3.34	-2.92	-3.23	-3.32	-3.49	-3.32
Invest/GDP (1960)	**0.0012**	**0.001**	**0.001**	**0.0013**	**0.001**	**0.001**	**0.001**
	4.63	4.33	4.39	3.36	4.15	3.98	4.54
Secondary School	*0.0005*	0.00052	*0.00055*	0.0004	0.0005	0.0005	0.0003
In the Pop Over Age 25	1.71	1.56	1.65	1.09	1.54	1.53	1.17
Stability	**5.82E-05**	*0.0001*	9.60E-05	6.57E-05	0.182	*1.04E-05*	***0.06****
	3.06	1.72	1.09	0.69	1.15	1.66	1.88
R-Square	0.362	0.324	0.313	0.262	0.32	0.335	0.335
Number of Countries	75	75	74	57	69	69	72

Panel B:	1	2	3	4	5	6	7
	Currency	Nonvio	Violence	DefCap	Milipop	Milisize	News
Intercept	**0.011**	**0.016**	**0.016**	**0.024**	**0.018**	**0.019**	**0.02**
	1.92	3.51	3.09	4.58	4.65	4.91	5.44
Real GDP Per Capita (1960)	**-2.68E-06**	**-2.29E-06**	**-2.18E-06**	**-5.21E-06**	**-3.54E-06**	**-2.76E-06**	**-5.34E-06**
	-3.88	-3.12	-2.85	-3.65	-4.1	-3.88	-4.13
Invest/GDP (1960)	**0.0012**	**0.001**	**0.0011**	**0.0013**	**0.001**	**0.001**	**0.00087**
	4.81	4.56	4.34	3.3	4.25	4.56	5.67
Secondary School	0.0005	*0.0006*	*0.0006*	0.0005	*0.0007*	*0.0007*	5.75E-05
In the Pop Over Age 25	1.49	1.87	1.78	1.49	2.26	2.25	0.188
Stability	**0.00016**	**0.00035**	**0.0004**	*0.00067*	**1.773**	**5.03E-05**	**0.284**
	2.54	2.24	2.19	2.08	2.61	2.62	3.44
Stability^2	*-2.83E-07*	*-1.25E-06*	**-3.26E-06**	**-3.83E-06**	**-17.4**	**-1.65E-08**	**-0.433**
	-1.95	-1.99	-2.44	-2.2	-2.66	-2.59	-3.38
R-Square	0.384	0.355	0.344	0.347	0.432	0.409	0.447
Number of Countries	75	75	74	57	69	69	72

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 2

Cross-Country OLS Estimation for Stability Effects: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

	1	2	3	4	5	6
Measure 1 (M1)	News	News	News	News	News	News
Measure 2 (M2)	MilitaryPop	Currency	MilitaryPop	MilitaryPop	Currency	Currency
Measure 3 (M3)	Currency	Nonvio	Currency	Currency	Milisize	Violence
Measure 4 (M4)			Seat	Nonvio		
Intercept	0.008	0.003	-0.001	-0.003	0.0066	0.004
	1.55	0.587	-0.16	-0.359	1.41	0.66
Real GDP Per Capita (1960)	**-6.68E-06**	**-6.33E-06**	**-6.10E-06**	**-6.40E-06**	**-6.48E-06**	**-6.22E-06**
	-6.28	-5.38	-5.58	-5.71	-6.32	-5.51
Invest/GDP (1960)	**0.0009**	**0.0009**	**0.001**	**0.001**	**0.0009**	**0.001**
	6.53	6.62	6.24	6.46	7.45	6.56
Secondary School Attainment	0.0001	-1.17E-06	-0.0001	-6.13E-06	0.0002	-4.19E-05
In the Pop Over Age 25	0.435	-0.004	-0.39	-0.019	0.97	-0.165
M1	**0.267**	**0.3**	**0.256**	**0.257**	**0.261**	**0.303**
	3.55	3.95	3.22	3.05	3.43	3.89
$M1^2$	**-0.393**	**-0.453**	**-0.374**	**-0.366**	**-0.398**	**-0.456**
	-3.23	-4.01	-3.01	-2.83	-3.45	-3.94
M2	**1.162**	**0.0002**	**1.477**	**1.175**	**0.00015**	**2.00E-04**
	2.03	3.13	3.31	2.33	2.87	3.02
$M2^2$	**-11.19**	**-3.63E-07**	**-13.58**	**-10.56**	**-2.49E-07**	**-3.90E-07**
	-2.04	-2.62	-3.22	-2.2	-2.11	-2.65
M3	**1.50E-04**	**3.00E-04**	**0.00014**	**1.60E-04**	**0.00012**	*4.00E-04*
	2.49	2.73	2.35	2.63	5.35	2.35
$M3^2$	**-2.72E-07**	**-1.10E-06**	**-2.63E-07**	**-2.98E-07**	**-1.48E-07**	**-3.90E-07**
	-1.99	-2.35	-1.93	-2.18	-5.21	-2.65
M4			*1.30E-04*	*2.00E-04*		
			1.77	1.86		
$M4^2$			**-4.22E-07**	*-9.00E-07*		
			-2.33	-1.84		
R-Square	0.614	0.602	0.642	0.66	0.705	0.585
Number of Countries	67	72	67	67	66	71

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 3

Cross-Country OLS Estimation for Stability Effects: Growth = Real GDP Growth per Worker

Data Source: World Handbook of Political and Social Indicator (1960 – 1982)

	1 DefExp	2 Milisize2	3 MiliPop2	4 News2	5 TV	6 Radio	7 Seat2
Intercept	**0.017**	**0.019**	**0.015**	**0.024**	**0.032**	**0.025**	**0.018**
	4.92	6.59	4.87	3.64	7.65	5.37	4.096
Real GDP Per Capita (1960)	**-2.01E-06**	**-2.00E-06**	**-2.39E-06**	**-3.95E-06**	**-6.33E-06**	**-4.46E-06**	**-2.53E-06**
	-4.3	-4.55	-5.03	-4.39	-3.69	-4.56	-4.3
Invest/GDP (1960)	**0.0006**	**0.0006**	**0.0006**	*0.00036*	**0.00041**	**0.00071**	**0.00056**
	5.38	6.1	6.18	1.69	3.58	3.82	4.18
Secondary School Attainment	0.0004	**0.0005**	0.00038	0.00016	0.0003	*0.00043*	*0.00049*
In the Pop Over Age 25	1.56	2.29	1.44	0.797	1.46	2.01	1.82
Stability	**0.003**	**4.06E-05**	**0.0015**	**0.0002**	**0.0003**	**7.18E-05**	*0.042*
	2.96	2.84	4.73	3.38	3.8	2.62	1.97
Stability^2	**-0.0001**	**-1.51E-08**	**-1.91E-05**	**-2.94E-07**	**-5.78E-07**	**-3.78E-08**	*-0.034*
	-2.73	-3.17	-3.9	-2.99	-3.24	-2.39	-1.65
R-Square	0.34	0.398	0.475	0.253	0.491	0.367	0.251
Number of Countries	69	70	70	50	59	62	70

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 4

Cross-Country OLS Estimation for Encompassing Interest Effects: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

	1	2	3
Intercept	**0.039**	**0.043**	**0.04**
	4.44	4.35	4.05
Real GDP Per Capita (1960)	**-3.34E-06**	**-3.13E-06**	**-3.19E-06**
	-3.43	-4.23	-3.57
Invest/GDP (1960)	**0.001**	**0.0007**	**0.0009**
	3.3	2.65	3.05
Secondary School Attainment	0.0002	**0.0005**	**0.0005**
In the Pop Over Age 25	0.83	2.22	2.4
Voter	*-0.089*	-0.042	-0.049
	-1.67	-0.84	-0.99
Voter^2	*0.142*	0.076	0.088
	1.93	1.19	1.28
Cabinet		*-0.004*	
		-1.95	
Cabinet^2		**0.00036**	
		3.31	
Executive			*-0.004*
			-1.71
Executive^2			**0.0005**
			2.5
R-Square	0.5	0.064	0.59
Number of Countries	33	33	33

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 5

Cross-Country OLS Estimation for W-Curve: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

	1 News	2 Book	3 DefCap	4 Milisize	5 Seat	6 Milipop	7 MSC
Intercept	**0.0155** 3.15	**0.016** 3.34	**0.022** 4.04	**0.0178** 4.66	0.007 0.777	**0.015** 4.02	**0.129** 3.64
Real GDP Per Capita (1960)	**-4.92E-06** -3.64	**-4.26E-06** -5.02	**-5.21E-06** -3.77	**-3.32E-06** -5.55	**-1.82E-06** -2.07	**-3.21E-06** -3.9	**-2.97E-06** -4.11
Invest/GDP (1960)	**0.0009** 6.24	**0.0011** 3.83	**0.0012** 3.27	**0.001** 5.29	**0.001** 4.15	**0.001** 4.61	**0.001** 4.99
Secondary School Attainment In the Pop Over Age 25 (1960)	0.0002 0.596	-4.64E-05 -0.16	0.0005 1.40	**0.0008** 2.89	0.0006 1.56	**0.0006** 1.7	**0.0008** 2.23
Linear Term	**0.461** 4.29	**184.3** 5.38	**0.0011** 2.47	**0.0002** 5.04	**0.0003** 2	**2.74** 3.29	**-0.02** -3.28
Quadratic Term	**-1.565** -2.95	**-2.13-E05** -4.79	**-1.05E-05** -2.66	**-2.69E-07** -4.81	**-2.13E-06** -2.04	**-59.28** -3.51	**0.001** 3.32
Cubic Term	**1.64** 2.21	**48635135** 4.55	**2.48E-08** 2.77	**7.42E-11** 4.75	**3.46E-09** 1.96	**327.7** 3.16	**-1.88E-05** -3.19
R-Square Number of Countries	0.485 72	0.512 65	0.381 61	0.523 69	0.337 75	0.466 69	0.419 75

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 6

Cross-Country OLS Estimation for W-Curve: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

	1	2	3	4	5	6
Stability Measure 1 (stab1)	News	News	News	Seat	Seat	Seat
Stability Measure 2 (stab2)	Milisize	Seat	Defcap	Milisize	Milipop	Defcap
Intercept	**0.0135**	0.011	**0.016**	0.005	-0.009	-0.0004
	3.15	1.26	2.78	0.63	-0.877	-0.041
Real GDP Per Capita (1960)	**-5.80E-06**	**-4.69E-06**	**-7.16E-06**	**-3.02E-06**	**-3.45E-06**	**-6.21E-06**
	-4.73	-3.44	-5.86	-3.71	-4.01	-5.63
Invest/GDP (1960)	**0.00085**	**0.0008**	**0.0008**	**0.00097**	**0.0011**	**0.001**
	6.81	6.63	2.58	4.98	4.57	2.62
Secondary School Attainment	0.0003	0.0004	0.00000351	**0.0008**	*0.0006*	**0.0007**
In the Pop Over Age 25 (1960)	1.2	1.21	0.01	2.71	1.73	2.029
stab1	**0.376**	**0.532**	**0.469**	**0.0003**	**0.0005**	**0.0006**
	3.45	5.27	3.02	1.96	2.41	3.11
$stab1^2$	**-1.15**	**-1.85**	**-1.55**	*-1.98-E06*	**-2.83E-06**	**-3.4E-06**
	-2.39	-3.66	-2.09	-1.92	-2.13	-3.19
$stab1^3$	*1.11*	**1.99**	*1.66*	*3.22E-09*	*4.44E-09*	**5.58E-09**
	1.71	2.71	1.72	1.78	1.89	3.14
stab2	**0.0001**	*0.0003*	**0.0009**	**0.0002**	**3.25**	**0.0014**
	5.92	1.71	2.39	5.21	5.13	4.72
$stab2^2$	**-2.23E-07**	**-2.33E-06**	**-9.41E-06**	**-2.76E-07**	**-73.69**	**-1.25E-05**
	-5.59	-2.79	-2.77	-5.03	-3.98	-4.21
$stab2^3$	**6.2E-11**	**4.49E-09**	**2.34E-08**	**7.64E-11**	**424.92**	**2.85E-08**
	5.54	3.2	2.95	4.97	3.04	3.96
R-Square	0.652	0.553	0.574	0.554	0.54	0.47
Number of Countries	67	72	59	69	69	61

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 7

Cross-Country OLS Estimation for W-Curve: Growth = Real GDP Growth per Worker

Data Source: Cross-National Time Series (1960 – 1973)

	1	2	3
Stability (stab)	Seat	Milisize	News
Encompassing Interests (EI)	MCS	MCS	MCS
Intercept	**0.118**	**0.111**	**0.118**
	3.47	3.49	4.12
Real GDP Per Capita (1960)	**-2.94E-06**	**-3.90E-06**	**-5.51E-06**
	-3.4	-5.65	-3.76
Invest/GDP (1960)	**0.0011**	**0.0009**	**0.0008**
	4.69	5.42	6.91
Secondary School Attainment	**0.0009**	**0.0009**	0.0004
In the Pop Over Age 25 (1960)	2.46	2.89	1.299
stab	**0.0004**	**0.0002**	**0.408**
	3.04	4.49	3.81
$stab^2$	**-2.48E-06**	**-2.39E-07**	**-1.345**
	-2.8	-4.54	-3.05
$stab^3$	**4.19E-09**	**6.63E-11**	**1.379**
	2.61	4.58	2.31
EI	**-0.021**	**-0.017**	**-0.019**
	-3.42	-3.07	-3.877
EI^2	**0.0012**	**9.00E-04**	**0.001**
	3.44	3.13	4.06
EI^3	**-1.96E-05**	**-1.59E-05**	**-1.82E-05**
	-3.3	-3.08	-4.001
R-Square	0.462	0.591	0.577
Number of Countries	75	69	72

Note: In each case t-test based on White heteroskedasticity-consistent standard errors is given below. **Bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

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Chapter 2

Finding an Optimal Sequence of Capital Account Liberalization

I. Introduction

Capital account liberalization has been a popular economic policy embraced by developing countries over the last two decades and will likely continue to be in this century. Most developing countries that liberalized capital accounts in the 1980s and 1990s experienced at early stages of liberalization a large volume of capital inflows and temporary economic boom. The downside of these policies was that, due to a loss of confidence by international investors and lack of sound domestic policies towards foreign investment, capital inflows can transform into capital flight quickly and leave behind countries in either balance-of-payment crises or full-scale financial crises. To maximize the benefits while minimizing the risks of capital account liberalization, sequencing the liberalization, which is relaxing restrictions on capital accounts transaction step by step over a certain period of time, has been actively considered by countries and international financial institutions. Existing empirical results on the optimal sequence of capital account liberalization are mainly case studies for individual countries (Johnson, Darbar and Echeverria, 1997). One reason for the lack of systematic analysis across countries may be absence of operational indicators that incorporate the intensity for different components of capital account liberalization.

This paper contributes to the extant literature on sequencing capital account liberalizations in two areas. First, I construct liberalization intensity indicators for three major types of capital account transactions – banking transactions, portfolio investment transactions, and direct investment transactions by using recently available IMF disaggregated restriction measures for specific capital account transactions.

Minianes (2004) compiles a set of dummies corresponding to the on/off status of restrictions on 12 subcategories of capital account transactions in 33 countries over the period of 1984 to 2000, based on the record of the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER hereafter). I collapse 12 subcategory transactions into three major ones: banking, portfolio investment, and direct investment; and then average the value of dummies in each group as their restriction intensity measure. The annual change of the restriction measure is the intensity indicator of liberalization in each area.

Second, my paper is a step towards testing the optimal liberalization sequence more directly. By using these liberalization intensity indices, I find in a multiplicative interaction model that the optimal capital account liberalization sequence is to liberalize portfolio investment transactions 5 years and direct investment transactions one year before banking transactions. As shown in a traditional Solow-style growth regression model, the optimal sequence is correlated with an annual 0.6 percentage point higher growth rate in the 1990s.

The paper proceeds as follows. Section II gives an overview of the related literature. Section III introduces liberalization indicators for three types of capital account liberalizations. Section IV presents the empirical test and the discussion of the results. Section V concludes the study.

II. An Overview of Related Literature

Depending upon the choice of the liberalization indicators and the specification of the empirical models, the existing literature provides conflicting results on the growth effect of capital account liberalization. Quinn (1997), Edwards (2004), Klein and Olivei (2006), Chanda (2005), Arteta, Eichengreen and Wyplosz

(2001), Henry (2001) and Bekaert, Harvey, and Lundblad (2004) provide supporting evidence. Rodrik (1998) is the widely cited paper finding no significant effect. Quinn (1997) is one of the first attempts to construct the indicator catching the intensity of capital controls and it has been widely used since. Quinn's indicator of capital account openness ranges between the cardinal number of 0 and 4 with an increment of 0.5, where 0 indicates full-scale control and 4 represents free of restrictions. The indicator is available for 21 OECD countries from 1950 to 1997 and for 43 developing countries for the years 1958, 1973, and 1988. Quinn (1997) continues to show that the change of Quinn's indicator between 1958 and 1988, as an intensity measure of capital account liberalization, is positively correlated with the growth rate of real GDP per capita over the same span of time in a sample of 58 countries. Edison, Klein, Ricci, and Sløk (2004) tabulate Quinn's measure collapsed in two groups at the value of 2 with the on/off indicator of capital controls on the IMF AREAER and find that the two indicators show the same trend of liberalization across countries from the 1950s to the 1990s.

Klein and Olivei (2006) find in a sample of 95 countries that countries doing capital account liberalization between 1975 and 1995 observed more financial depth first, which leads to faster growth. The financial depth measures used in their study are the ratio of liquidity liabilities to GDP and the ratio of private credit to GDP. The liberalization indicator is the proportion of years in which countries have free capital mobility based on the on/off indicator in IMF AREAER. However, the results are mainly driven by the presence of 21 OECD countries in the sample.

Edwards (2001), in a sample of 60 countries, find that the level of Quinn's indicator in the 1980s and the change of the indicator from the 1970s to 1980s are strongly associated with the growth of real per capita income. Furthermore, he tests

the variation of growth effect of the liberalization across countries of different per capita income levels by adding an interactive term between Quinn's index and the logarithm of income per capita of 1980. The term has a positive coefficient, implying that the marginal growth effect of capital account is an increasing function of the strength of an economy in 1980. Thus, the liberalization unleashes solid economic growth in rich industrial countries as well as middle-income countries but not to the same degree in poor countries. Arteta, Eichengreen, and Wyplosz (2001) argue that the difference in the effect of capital account liberalization across countries is determined by the degree of macroeconomic stability, which is measured by the black market premium. Chanda (2005) suggests that the impact of opening the capital account may fluctuate with the number of entrenched interest groups in a country approximated by the level of ethnic and linguistic heterogeneity.

On the other hand, in a sample of almost 100 countries, Rodrik (1998) finds no relationship between the liberalization and the growth rate of real income per capita between 1975 and1989 after including an indicator of governmental institutions. Capital account liberalization only signals institution quality. One potential drawback to his empirical analysis is that the average investment rate over the period, a key variable in most cross-sectional growth regressions, is missing with no explicit explanation.

In addition to the work on the effect of the overall capital account liberalization, a separate line of literature finds a clear-cut growth effect of equity market liberalization. Bekaert, Harvey, and Lundblad (2004) examine the impact of stock market liberalization on economic growth by using the official equity market liberalization date for 95 countries between 1980 and 1997. The liberalization date indicator equals one if there is convincing evidence that foreigners can directly

engage in the local equity market and zero otherwise. This indicator incorporates no intensity of liberalization. The three signs used in the study are: a launching of a country fund, an American Depositary Receipt (ADR) announcement, and an official liberalization declaration. The equity market liberalization on average leads to 1 percent increase in annual per capita GDP growth over a five-year post-liberalization period. In addition, Henry (2000) finds stock market liberalization leads to temporary investment booms in a sample of 11 developing countries.

The conventional view of sequencing capital account liberalization emphasizes the importance of preconditions for the reform. Developing countries should take in account as well the stability of the overall economy and the strength of domestic financial institutions before implementing any liberalization policy. Furthermore, those countries should liberalize the current account and domestic financial system before seriously considering opening capital accounts (McKinnon 1973, 1982; Frenkel 1982). The capital flows' contribution to economic growth is contingent on the depth and strength of the domestic financial market.

However, governments usually have incentives to repress the domestic financial market through capital controls rather than to improve domestic financial institutions to facilitate capital account liberalization. For instance, the restrictions on capital flows make the domestic interest rate lower than the world market rate and allow the domestic public debt to be financed at a lower cost. Edwards and Tabellini (1991) find that governments turn to an inflation tax on domestic capital when tax evasion is widespread and the collection cost is high. In a panel of twenty OECD and seventy-one non-OECD countries over the period 1967-1992, Leblang (1997) shows that countries, in the middle of either financial repression, fixed exchange rate regime, or balance-of-payments crisis, usually have in place tight capital controls.

Furthermore, achieving the preconditions according to the conventional view for a successful outcome from capital account liberalization, transparent domestic financial market and efficient financial institutions, is a very challenging task even for industrial countries. The banking crises during the early 1990s in the United States, Scandinavia, and Japan, which are noted for relatively high quality institutions in their economic systems, illustrate that designing an adequate set of prudential and regulatory controls on domestic financial systems is always easier said than done (Stiglitz, 2000).

An alternative view of sequencing favors early capital account liberalization as a catalyst for broader economic reforms and a means of overcoming vested interests' opposition to comprehensive financial reforms. Bartolini and Drazen (1997a) argue that governments less dependent on inflation and seinoirage tax collection strategies can differentiate themselves easily from financially repressive governments by opening capital account early as a signal of future efficient investment policies. In addition, Bartolini and Drazen (1997b) claim that developing countries would expect capital inflows and consequently seek capital account convertibility when the world interest rate is low. In the time of rising world rates, however, only sufficiently committed countries will stick to capital account liberalization and expect uninterrupted capital inflows. Capital account liberalization can break the vicious circle of domestic financial repression and initiate a virtuous cycle for a comprehensive financial liberalization that is both credible and sustainable.

I share the second sequencing view on early capital account liberalization. A large number of countries have had strong entrenched interests in their domestic financial markets during the twentieth century (Rajan and Zingales 2003). Given the widespread current account liberalization in a large number of economies, the

effectiveness of capital account restriction gradually declines and capital controls become less lucrative to the special interests. And capital inflows after the breakdown of the control bring in competition to domestic financial markets and improve their efficiency. As a result, capital account liberalization can be an integral breakthrough for a comprehensive financial reform. The main empirical result in this paper is to identify an optimal liberalization sequence among different types of capital transactions that would promote, or at least does not undermine, growth.

III. The Liberalization Indicators of Three Types of Capital Transactions

I construct the liberalization intensity measures for various types of capital account transactions from a recently available set of measures on capital account restrictions in Miniane (2004). Since its 1996 edition, the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) provides dummies on 13 subcategories of capital account transactions:

1. Capital market securities: shares or other securities of a participating nature, and bond and other securities with an original maturity of more than one year.
2. Money market instruments: securities with an original maturity of one year or less, such as certificates of deposit, Treasury bills, and so forth.
3. Collective investment securities: share certificates or any evidence of investor interest in an institution for collective investment, such as mutual funds.
4. Derivatives and other instruments: refers to operations in other negotiable instruments and nonsecuritized claims not covered under the previous three items.
5. Commercial credits: covers operations directly linked to international trade transaction.
6. Financial credits: credits other than commercial credits.
7. Guarantees, sureties, and financial backup facilities; securities pledged for payment of a contract, such as warrants, letters of credit, and so on.
8. Direct investment.
9. Repatriation of profits or liquidation of direct investment.
10. Real estate transactions.

11. Provision specific to commercial banks and other credit institutions: regulations that are specific to these institutions, such as monetary and prudential controls.
12. Provisions specific to institutional investors: one common example is a limit on the share of the institution's portfolio that may be held in foreign assets
13. Multiple exchange rate arrangement. (Miniane 2004, p.282).

The dummy for each subcategory equals 1 if the transaction is regulated. The indices account for restrictions on both inflows and outflows without explicitly discriminating between the two.

Miniane (2004) uses the text in the pre-1996 editions of AREAER to fill out the dummies for the 13 subcategories back to 1983. Due to a lack of consistent information on personal capital movement, however, he replaces the dummy for the subcategory 11 with a dummy for multiple exchange rate arrangements also tracked by the IMF AREAER. In the end, the dataset provides a rule-based measure of 13 subcategory capital account restrictions for 33 countries, 23 of which are OECD countries and 10 of which are developing countries, from 1983 to 2000.The average of 13 dummies can serve as a measure of intensity of capital controls with an increase of 0.0769 (1 / 13 = 0.0769). For a few countries in some years, the increase is not uniformly 0.076 due to one or two missing dummies. A value being close to 1 means there are restrictions on most of the 13 subcategory transactions. The overall restriction indicator focuses the extent of controls across different transactions rather than on the relative importance of a particular subcategory control.

Table 1 gives summary statistics of the restriction measure for all 33 countries. The18-year mean ranges from as low as 0.0769 (UK) to as high as 0.97 (Brazil). Columns 2 to 4 report the standard deviation ranging from 0 (Malaysia) to 0.363 (Greece), the maximum value of indicator being1, representing full-scale controls (Brazil, Chile, and Colombia), and the minimum is 0.0769, meaning capital controls on just one subcategory transaction (Switzerland, Denmark, UK, Germany, Greece,

Hong Kong, and the Netherlands). The last column gives the percentage change between the maximum and the minimum of capital account restrictions. Greece and Denmark have the two largest swings in the intensity of capital control. The former had a 91% change and the latter an 88% change. UK and Malaysia have the most tranquil trend among 33 countries with a 0% and a 0.69% change between the two extreme scenarios, which means the level of capital controls does not change in the sample period.

Figure 1 plots the variation of the average of dummies as the overall restriction level over the sample period in Argentina, Belgium, Brazil, France, Greece, and Japan. A wide variation of capital controls exists across countries. Argentina and Greece both began in 1983 with a value above 0.9, which means nearly full-scale control, but lifted many restrictions during the next eighteen years to reach a low level of 0.4 and 0.1 respectively in 2000. Brazil had a full-scale capital control until 1996 and the indicator only decreased slightly to 0.846 in 2000. Belgium, France and Japan had an average indicator at 0.7 in 1983, and then the value slowly dropped to 0.15, 0.3 and 0.15, respectively.

To find the optimal sequence of capital account liberalization, I need liberalization intensity measures of different types of transactions. Obviously, the breakdown of the aggregate capital account transaction dummy into 13 subcategory dummy in Miniane (2004) is too specific and makes the sequencing test literally impossible as the permutation of 13 individual transactions is an astronomical number. So I cluster the 12 subcategories, excluding the multiple exchange rate arrangement since it is not a specific transaction, into three major types of capital transactions: banking transactions, portfolio investment transactions, and direct investment transactions. Thus, the total number of potential sequencing paths goes

down to 6 among three major transactions. Specifically, I label subcategory transaction 2, 5, 6, 7, and 11 mentioned earlier as banking transactions. Portfolio investment transactions cover subcategories 1, 3, 4, and 12. Transactions 8, 9 and 10 are belonging to direct investment transactions.

The three types of transactions encompass the 6 different categories created in Johnston (1998, p.21): "Capital and Money Market, Credit Operations, Direct Investment and Real Estate Transactions, Provisions Specific to Commercial Banks, Personal Capital Movement, and Provision Specific to Institution Investors." The total permutation of potential liberalization sequences is still quite large, 720 out of 6 transaction categories. Three major transactions only expect 6 different major sequences of liberalizations regardless of liberalization timing. So my three-way solution of grouping 12 subcategory transactions significantly lessens the amount of empirical work without losing much generalizability of the results.

Next I average the restrictions by group. The level of capital controls for each type of transactions is between 0 and 1. The value of 1 represents full-scale capital controls and zero means no controls at all. Figure 2 illustrates that the restriction level of the three types of capital transactions also declined over the period at different paces. For instance, from Figure 2, we can see that Japan had two major rounds of liberalizations across the three types of transactions. The first round began in 1984, when they lifted restrictions on banking transactions and direct investment transactions, followed by the liberalization of security investment transactions in 1987. In the second round between 1995 and 1999, however, the liberalization sequence went from banking transactions to portfolio investment transactions, and then direct investment transactions.

It could be argued that my indicator measures just the extent of capital account liberalization as the IMF only tracks the existence of different types of capital controls. Given that different capital account transactions are rarely good substitutes for each another, however, countries can tighten up capital controls by imposing multiple layers of restrictions on different capital transactions to prevent the private sector circumventing the policy. Thus, the extensity index of capital controls is a reasonable proxy to the intensity of capital controls (Chinn and Ito 2006).

The annual change of the restriction level for each type of transaction captures liberalization intensity. A negative change of the level means lifted control, while a positive change implies more restrictions. To have an ascending indicator for the liberalization intensity, I continue to subtract from zero the original value of level change. For example, an initial annual change of -0.5 for the restriction level, meaning a halfway liberalization, becomes 0.5 after the transformation. Thus, a higher value of the indicator implies more liberalization in each type of transactions.

Table 2 presents all the nonzero values of the converted liberalization indicator for each area for 27 out of 33 countries. Some countries followed clear-cut paths. For instance, Italy had a comprehensive liberalization across all three groups in both 1988 and 1990. Argentina, however, liberalized some banking and portfolio investment transactions in 1987 and then two years later, relaxed restrictions on direct investment transactions. In 1996, Argentina initiated another dramatic shift towards more openness in banking transactions, but tightened up restrictions in portfolio and direct investment transactions. France started its sequence by liberalizing banking transactions at the same magnitude in two consecutive years from 1988 to 1989, continued the momentum to direct investment transactions in 1994, and concluded with fewer restrictions in security investment transactions in 1998.

A brief look at the graphical pattern of liberalization intensity indicators shows that most countries pursued the sequencing reform strategy among three types of capital account transactions, banking, portfolio investment, and direct investment, in the sample period. The next section provides the result of the empirical test for identifying the optimal liberalization sequence based on the growth effects of different sequences.

IV. A Simple Test on the Optimal Liberalization Sequence

I first check my liberalization indicators in cross-sectional growth regressions to see how effective they are able to capture the growth effect of the liberalization policy across countries. The capital account liberalization should have a theoretically temporary growth effect according to the Solow model. In a closed economy at the steady state where the capital stock and the labor force are growing at the same rate, capital account liberalization decreases the real interest rate if there are capital inflows. As a result, some negative net present value (NPV) projects would turn into positive NPV projects. The physical investment will go up until the marginal return of capital equals the lowering cost of capital. The growth rate of capital stock then will go down to the previous steady state level (Henry 2000). From the perspective of institutional economics, capital account liberalization would bring into developing countries more transparent financial markets and more efficient domestic financial institutions, which also directly increase economic growth besides the investment effect. So I augment a standard growth regression with my liberalization indicators, which is as follows:

$$Y_i = \beta_0 + \beta_1 \Delta K_{,i} + \beta_2 \Delta Quinn_i + \beta_3 BHL_i + X_i^{'} \gamma + \varepsilon_i \qquad (1)$$

where Y_i is the average growth rate of the logarithm of real GDP per capita from 1983 to 2000. The overall capital account liberalization indicator I use is the change of the average of 13 dummies between 1983 and 2000 in Miniane (2004), "ΔK", for all 33 countries. In addition, I include two more liberalization indicators used in the literature: (1) "ΔQuinn", the change of Quinn's 0-4 intensity indicator of capital account openness between 1973 and 1988 (Quinn, 1997), and (2) "BHL," the proportion of years in the period from 1983 to 2000 since the formal stock market liberalization is officially enforced according to the date in Bekaert, Harvey, and Lundblad (2004), which measures the length of the horizon during which foreign investors had a reliable access to domestic stock markets. "ΔQuinn", though overlapping part of my sample span, is still an acceptable benchmark to see whether my indicators can reveal new developments of the reform in the 1990s, since this is the most widely used liberalization indicator in the literature. Same logic applies to "BHL" since it would reveal to some extent the timing effect of stock market liberalization that is different from my indicators. The low correlation coefficients among the three indicators, 0.16 for "ΔK" and "ΔQuinn" and 0.25 for "ΔK" and "BHL", confirm that each indicator captures a separate dynamic of capital account liberalization in my sample.

The control variable matrix, X_i includes: the logarithm of the level of real per capita income in 1983, both the average investment rate of GDP and the average population growth rate from 1983 to 2000, and the logarithm of the secondary school attainment rate in 1980. The standard growth model, as stated in Mankiw, Romer, and Weil (1992), only has the initial GDP per capita, the average investment rate, and the initial education attainment rate. I augment the regression even more with the population growth rate and the institution quality measure introduced below. The

economic growth rate and investment rate are from the Penn World Table 6.1 (Heston, Summers, & Aten, 2002). The education attainment data are from Barro and Lee's Cross-Country Education Attainment Database 2000 (Center for International Development Center, 2002).

We can see from the first column in Table 3 that the overall liberalization indicator is negatively associated with economic growth and its coefficient is statistically significant at the 0.05 level. The statistical relationship remains the same in column 2, in addition two widely utilized liberalization indicators in the literature: "ΔQuinn" and "BHL", whose estimated coefficients are insignificant. Surprisingly, my overall liberalization suppressing other liberalization indicators is negatively correlated with economic growth in the sample. The reason could be that most countries are OECD countries and already have a mature and highly developed financial system. So the financial liberalization is not necessarily an economic policy of significant economic consequences to developed countries as it's been claimed to developing countries.

In the columns 3 and 4 of table 3, I test my indicator against the argument in Rodrik (1998) that capital account liberalization is a signal of the domestic institutional quality to the world market. I add to the regression two institutional quality indexes from *International Country Risk Guide* (ICRG) 1996. The first index is government repudiation of contract index on the assessment of the risk of a modification in a contract ("GovRep"). The second index is the rule of law index on the degree of the law and order tradition ("Law"). In the model, both variables are the average of the months of April and October of the monthly index between 1982 and 1995, available from La Porta, Lopez-de-Silanes, and Shleifer (2002). They were also used in Knack and Keefer (1995) but for different years. The coefficient on "ΔK_i"

maintains its statistical significance at the 0.05 level along with "Law" in column 4 but not with "GovRep" in column 3. Thus, the results of no significant growth effect of the liberalization in Rodrik (1998) may be due to the different choice of institution quality measures.

Among control variables, the negative coefficient of initial level of income shows conditional convergence among the countries in my sample. The positive coefficient of the average investment rate confirms the growth enhancing effect of physical capital in the sample period. This is consistent with the findings in Fagerberg (1994) and Levine and Renelt (1992) that only those two variables have robust, statistically significant coefficients in the current economic growth literature. The coefficient of the average secondary education attainment rate is highly insignificant..

Though the overall liberalization indicator has a negative growth effect, I continue to test whether the three group liberalization indicators for banking transactions ("Bk"), portfolio investment transactions ("Eq"), and direct investment transactions ("Di") might be positively correlated with the growth rate in separate cases. As we can see in columns 1, 2, and 3 of table 4, the coefficients of "Bk" and "Di" are negative and statistically significant and the coefficient of "Eq" is just insignificant. The liberalization of each group of transactions actually either causes a slowdown of economic growth or has no effect at all. The remaining three columns in table 4 show that the negative growth effects of *Bi* and *Di* remain unchanged after the inclusion of "ΔQuinn" and "BHL".

Neither the overall liberalization indicator nor the group indicator is positively correlated with economic growth. But the conditional growth effects from the liberalization sequence tested are positive, which might shed some lights on how to operate capital account liberalization program.

I use multiplicative interaction models to capture the optimal liberalization sequence among three types of capital transactions. The specifications of the basic models are as follows:

$$Y_{it} = \beta_0 + \beta_1 Eq_{i,t-j} Bk_{i,t} + \beta_2 Di_{i,t-k} Bk_{i,t} + \beta_3 Bk_{i,t} + \beta_4 Eq_{i,t-j} + \beta_5 Di_{i,t-k} + X'_{i,t}\gamma + \varepsilon_{i,t} \quad (2)$$

$$Y_{it} = \beta_0 + \beta_1 Bk_{i,t-h} Eq_{i,t} + \beta_2 Di_{i,t-k} Eq_{i,t} + \beta_3 Bk_{i,t-h} + \beta_4 Eq_{i,t} + \beta_5 Di_{i,t-k} + X'_{i,t}\gamma + \varepsilon_{i,t} \quad (3)$$

$$Y_{it} = \beta_0 + \beta_1 Bk_{i,t-h} Di_{i,t} + \beta_2 Eq_{i,t-j} Di_{i,t} + \beta_3 Bk_{i,t-h} + \beta_4 Eq_{i,t-j} + \beta_5 Di_{i,t} + X'_{i,t}\gamma + \varepsilon_{i,t} \quad (4)$$

The dependent variable is the annual growth rate of real income per capita. Bk_{it} stands for the liberalization indicator of banking transactions, Eq_{it} for portfolio investment transactions, and Di_{it} for direct investment transactions. The country index is i and the time index is t. The subscripts – h, j, and k – are the number of time lags of each indicator.

The explanation of how interaction terms capture the liberalization sequence with the best growth effect is as follows. Among three types of capital account transactions – 1 standing for banking transactions ("Bk"), 2 for portfolio transactions ("Eq"), and 3 for direct investment transactions ("Di") – there are six permutations of the general liberalization sequence: 321, 231, 312, 132, 123, and 213, regardless of specific liberalization timings. For instance, "321" is the sequence of "Di", "Eq", and "Bk", and "231" is for "Eq", "Di", and "Bk". In both cases, banking transactions are the last group to liberalize.

Thus, Equation 2 interacts "Bk_{it}" with both the lagged indicator of portfolio transactions, "$Eq_{i,t-j}$," and the lagged direct investment indicator, "$Di_{i,t-k}$," to test the effect of the sequences of liberalizing both portfolio investment and direct investment transactions before banking transactions. The subscripts "j" for "$Eq_{i,t-j}$" and "k" for "$Di_{i,t-k}$" are changed to count for the liberalization timing of the transactions of

portfolio investment and of direct investment relative to when banking transactions are opened. When there is no early change of the liberalization indicators of portfolio investment and direct investment transactions, then the effect of the banking liberalization indicator (Bk_{it}) on economic growth is simply the coefficient β_3. That $Eq_{i,t-j}$ and $Di_{i,t-k}$ are equal to zero makes the two interaction terms on the right hand side of the equation disappear.

Alternatively, when there are earlier liberalizations in the areas of portfolio investment and direct investment than in banking transactions, $Eq_{i,t-j}$ and $Di_{i,t-k}$ are non-zero. The conditional effect of Bk_{it} on economic growth becomes $\beta_3 + \beta_1 * Eq_{i,t-j} + \beta_2 * Di_{i,t-k}$ since three terms on the right hand side of Equation 2, including two interaction terms, contain Bk_{it}. For instance, that "k" equals 5 and "j" is 1 represents liberalizing portfolio investment five years early and direct investment one year early before opening banking transactions, and the lag between "$Eq_{i,t-j}$" and "$Di_{i,t-k}$" is four years. Similarly, Equation 3 estimates the growth effect of all possible sequences that open direct investment and banking transaction years before lifting restrictions on portfolio investment transactions, i.e. the permutations "132" and "312." The specifications of the Equation 4 tests the growth effect of the last two general liberalization sequences, the permutations "123" and "213," of which the liberalization of banking and portfolio investment transactions are years before that of direct investment transactions.

I investigate up to 6 lags for lagged indicators in each of the three equations, which means the three subscripts – k, h, and j – range from one to six. Each equation is estimated 42 times due to the combinations of two lagged indicators in the interaction terms. To compare the growth effects across different sequences, the number of observations for all estimations must be the same. I have to truncate the

first six years of the sample, as the group liberalization indicators are available from 1984, in order to test up to 6 lags in each equation. Thus, the final sample for the optimal liberalization sequence test has 363 observations of 33 countries over a span of 11 years from 1990 to 2000. Brambor, Clark and Golder (2005) suggest that all constitutive terms, the linear elements consisting of interaction terms, should be in the estimation to prevent biased estimates of β_1 and β_2, which are the coefficients of two interaction terms that intend to capture the conditional growth effect of the specific liberalization sequences among three groups.

The matrix of control variables, X_{it}, includes: the natural logarithm of real GDP per capita of 1983, initial investment rate of 1983, and the logarithm of secondary education attainment level among population over age 25 of 1980, which are all fixed in the sample. Because country fixed effects generate a near singular matrix, I instead use continent dummies: Africa, Europe, North America, and South America with Asia dummy omitted. The period fixed effects are included in the model to control for the effects of the major global financial crises covered in the sample period.

In Table 5, I report the results of five different sequences, which have both interaction terms statistically significant at the 0.05 level, out of 126 specifications for the three equations. Only the first two sequences in coloumn1 and 2, where banking transactions are the last liberalized group, have a positive coefficient for the two interaction terms. The other three sequences in columns 3, 4, and 5, where either portfolio investment or direct investment were the latest group to be liberalized, have a positive coefficient on one interaction term and a negative coefficient on the other. So the overall growth effects of the last three sequences are either negative or close to zero. Among control variables, the coefficient of the initial income is negative and

that of physical investment rate is positive as expected. Both are statistically significant at the 0.05 level. The Africa dummy is the only statistically significant continent dummy.

The sum of the coefficients for the two interaction terms is higher in column 1 than in column 2. I also compare the Akaike Information Criterion (AIC) values of the two specifications. The basic idea for using AIC is to examine the complexity as well as goodness of fit of the model to the sample data. A model with many parameters will provide a good fit to the data, but will have few degrees of freedom, which dampens the power of the model's references. So the AIC approach constrains overfitting. The lower the AIC value, the better fit to the data is the specification given the same number of parameters. The first sequence where j=5 and k=1 has an AIC value of -4.131, less than -4.113 of the second sequence where j=5 and k=3. Consistent with the sequenced selected based on the sign and the size of coefficients of interaction terms, the AIC value also identify that the same sequence, in which the 5-year lagged Eq_{it} and the one-year lagged Di_{it} are included in the interaction terms, fits the sample the best. The optimal capital account liberalization is to liberalize portfolio investment transactions 5 years ahead and direct investment transactions 1 year ahead of banking transactions.

The conditional effect of Bk_{it} on annual economic growth would be as large as 0.549 percent (0.269*1+0.304*1-0.024), when portfolio investment transactions and direct investment transactions were completely liberalized precisely at 5 years and at 1 year before banking transactions was opened, i.e. both Eq_{t-5} and Di_{t-1} being equal to 1. The lower bound of Bk_{it}'s marginal effect is as small as 0.144 percent (0.269*0.25+0.304*0.33-0.024), where the restriction is lifted for only one of the four portfolio investment transactions, Eq_{t-5} being 0.25, and one of the three direct

investment transactions, Di_{t-1} being 0.33. liberalizing banking transactions alone is negatively correlated with economic growth. The conditional marginal effect of Bk_{it} on economic growth, when $Eq_{i,t-k}$ and $Di_{i,t-j}$ are zero, is negative 0.023 percent, which is statistically significant at the 0.05 level.

Though β_1, β_2, and β_3 are all statistically significant, it is still possible for the conditional marginal effect of $Bk_{i,t}$ to be insignificant for substantively relevant values of Eq_{t-5} and Di_{t-1} if all three covariance terms between β_1, β_2 and β_3 are positive. According to Brambor et al. (2005), as $\text{cov}(\hat{\beta}_1 \hat{\beta}_3)$, $\text{cov}(\hat{\beta}_1 \hat{\beta}_2)$, and $\text{cov}(\hat{\beta}_2 \hat{\beta}_3)$ are not usually reported from the standard statistics packages, a graphical illustration of how the marginal effect of Bk_t changes across all the relevant values of $Equity_{t-5}$ and $Direct_{t-1}$ would help address the concern. Each point on the solid line is $\frac{\partial Y_{it}}{\partial Bank_{it}} = \beta_1 + \beta_2 Di_{it-1} + \beta_3 Eq_{it-5}$. The 95% confidence interval around each point tells that the positive marginal effect is statistically significant from 0 for 10 out of 12 combinations between four different values of Eq_{t-5} (0.25, 0.5, 0.75, and 1) and three different values of Di_{t-1} (0.33, 0.67, and 1) when both the upper and lower bounds of the interval are above the zero line. The exceptions are when Di_{t-1} is 0.33 or Eq_{t-5} is either 0.25 or 0.5. Thus, at least 3 portfolio investment transactions and/or at least 2 direct investment transactions need to be liberalized to guarantee that the sequencing strategy has a statistically positive correlation with economic growth.

In Table 2, we can find that several countries at least partially did the optimal sequence. The US liberalized 2 portfolio investment transactions in 1984, where $Eq_{i,t}$ is 0.5, and one banking transaction five years later in 1989, $Bk_{i,t}$ being 0.2. Turkey and Finland, by coincidence, opened one direct investment transaction, $Di_{i,t}$ being 0.33, at the same time in 1989 and two banking transactions the year after 1990,

where $Bk_{i,t}$ is 0.4. And $Eq_{i,t}$ of 1986 is 0.25 and 0.5 for Spain and Portugal respectively, and $Bk_{i,t}$ is 0.2 in both countries in 1991.

The only other paper in the literature discussing the liberalization sequence between the banking market and equity market is Chinn and Ito (2006). However, their paper did not directly test sequencing capital account liberalization. In a sample of 108 countries over the period from 1980 to 2000, Chinn and Ito (2002) control the overall quality of various institutions and legal systems and the intensity index of capital account liberalization. Their evidence shows that the development of the banking market, in terms of private credit from deposit money banks as a ratio of GDP, is a precondition for the development of the equity market in three measures of either stock market capitalization and total value of stock traded as a ratio of GDP, as well as stock market turnover ratio. However, in the earlier sections of the paper, they only establish the connection between equity market development and financial openness, but no connection between banking market development and financial liberalization, when the institutional and legal system quality are above a certain threshold level. Their sequence of financial development only suggests a hypothetically optimal liberalization sequence of the same order that opens the banking market before the equity market.

Differing from Chinn and Ito (2006), my paper attempts to test more directly the capital account liberalization sequence leading to higher growth rate of real per capita GDP by using the liberalization intensity indicators in three areas of capital account transactions. In addition, my empirical model specification does not restrict the sequencing timing to exactly 5 years apart between different areas, but from one to up to six years. Chinn and Ito (2006), however, conduct their analysis in a 5-year non-overlapping panel so that the precondition sequence between the equity market

and banking market has to be five years with no other possibilities. Basically, their paper has no intent of capturing the timing issue between different steps of the liberalization process.

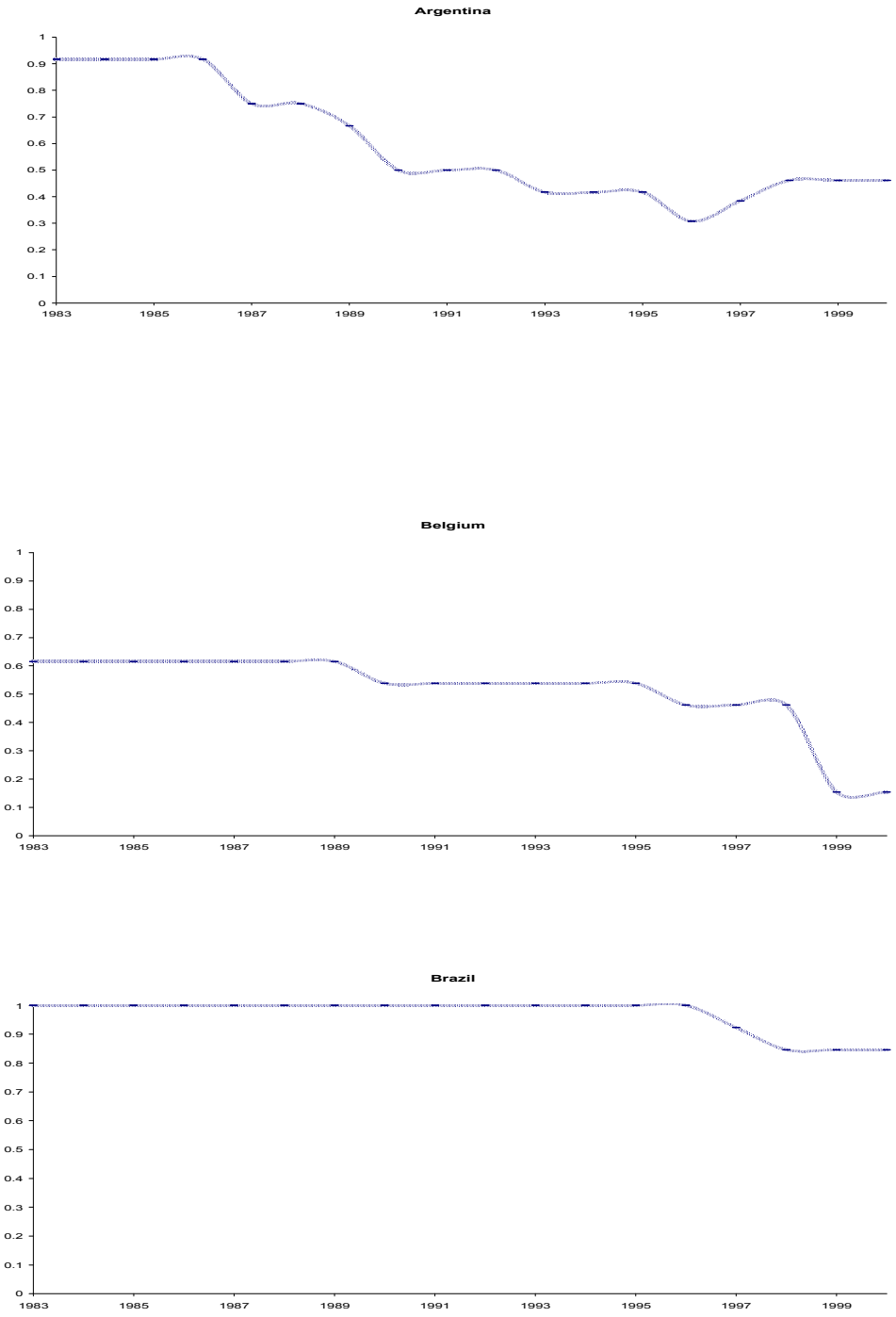
V. Concluding Remarks

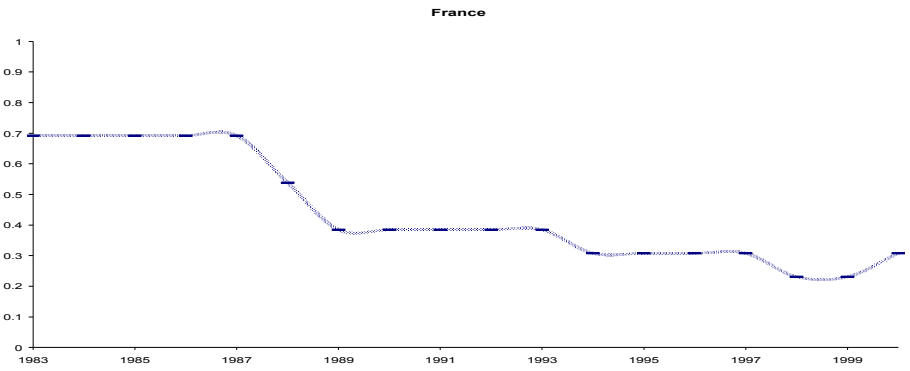
The debate on the role of capital account liberalization in promoting economic growth has been an active research area over the last two decades. But little direct evidence is available for an optimal sequence of capital account liberalization. This paper is a step toward conducting an explicit test on growth effects of liberalization sequences among different types of capital account transactions. I create three separate liberalization intensity indicators for banking transactions, equity investment transactions, and direct investment transactions. The sequence of the liberalization that enhances economic growth of per capita income, in the sample of 21 developed countries and 11 emerging market countries, is in the order of lifting restrictions of equity investment transactions five years earlier and those of the direct investment transactions one year earlier than opening banking transactions.

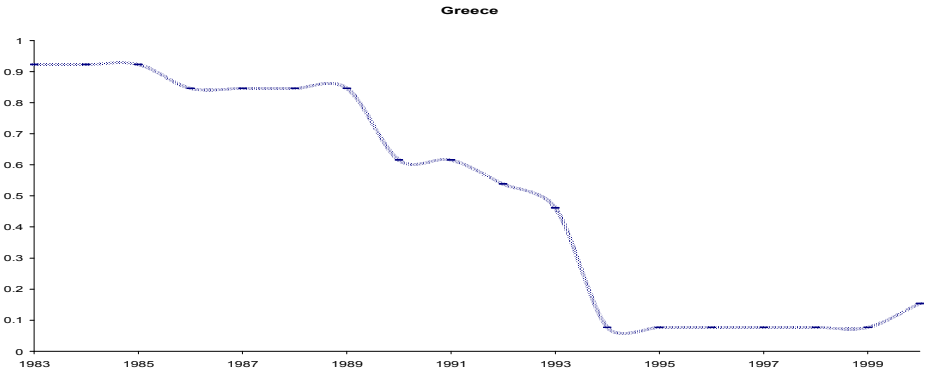
Furthermore, I want to give some ideas for future research. First of all, the disaggregated restriction binary variables for capital account transactions, as constructed in Miniane (2004), need to be expanded for more developing countries since the policy discussed here is more crucial for economic development in those countries than in developed countries. Secondly, researchers could use the first principal component of binary variables in each of the three groups as the liberalization intensity indicator like the capital account opening indicator in Chinn and Ito (2006). Thirdly, researchers can study from the political economy perspective to explain why some countries opened banking transactions early while others liberalized equity market transactions as the first step of domestic financial reform. It

could be that entrenched interests are unevenly distributed across different financial markets, so that the competition for the rights to make certain cross-border financial transactions would help break legal restrictions in the areas with least resistance from incumbent interests.

Figure 1: The Average of Dummies on the 13 subcategory Capital Account Restrictions




France
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1983
1985
1987
1989
1991
1993
1995
1997
1999


Greece
1
0.9
0.8
0.7
0.6
0.5
0.4
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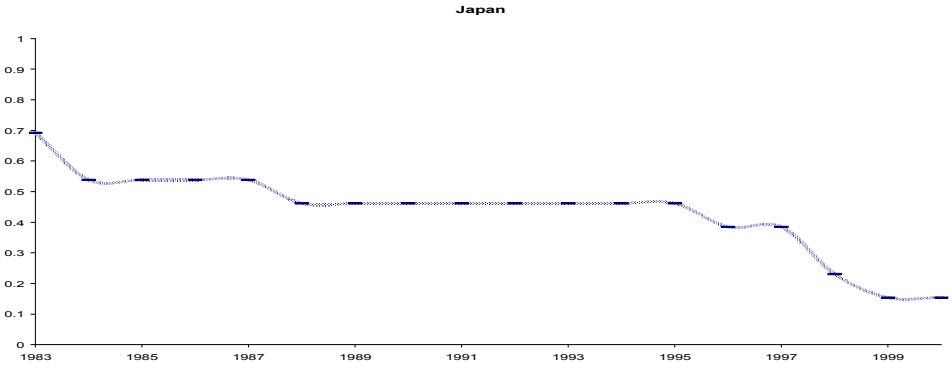
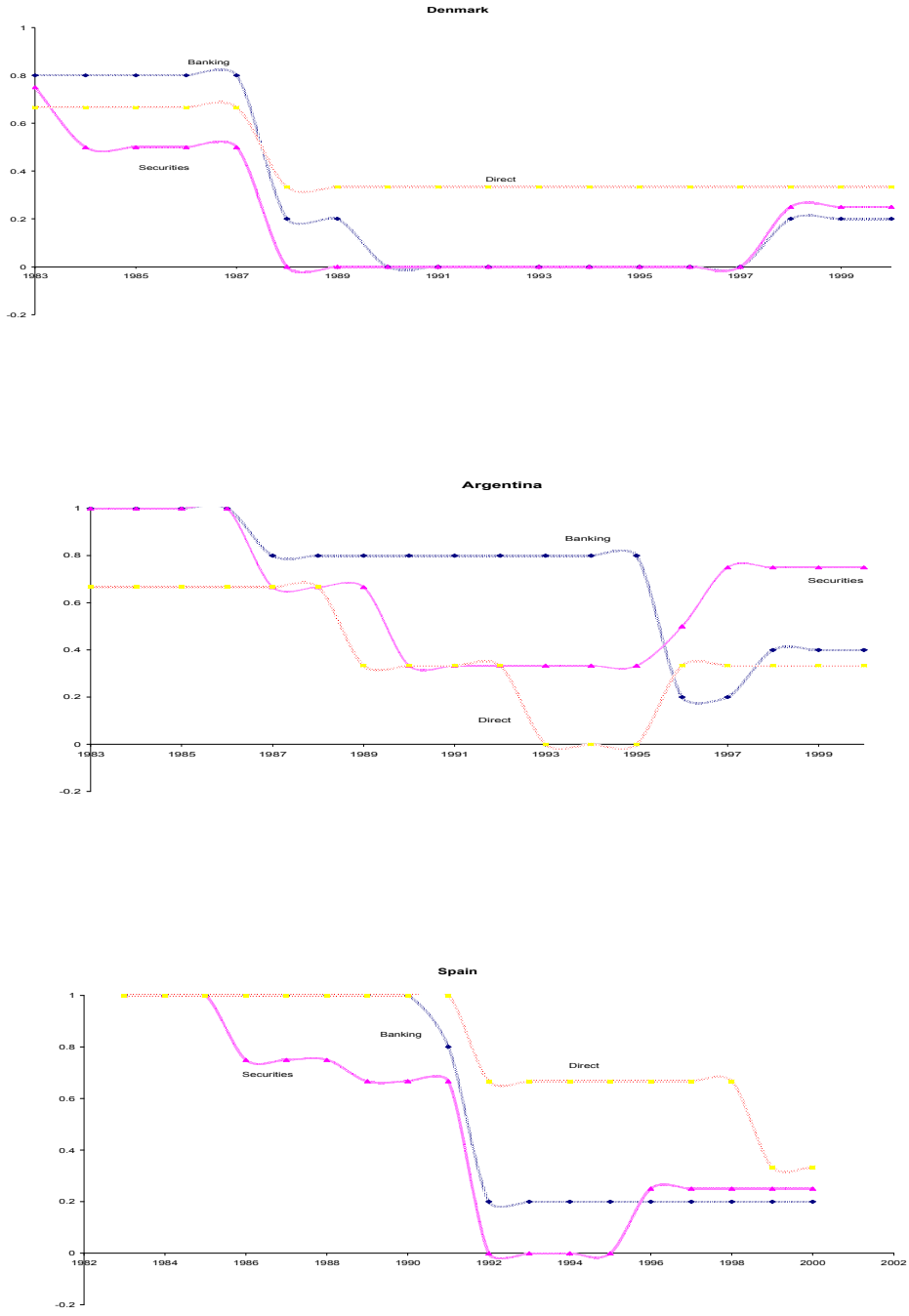
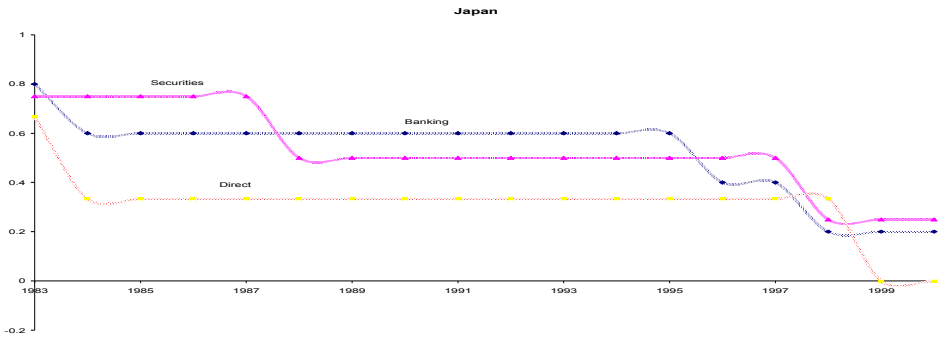
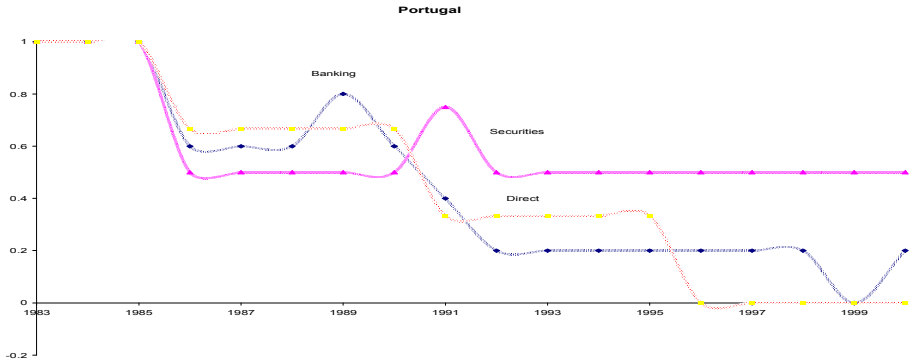
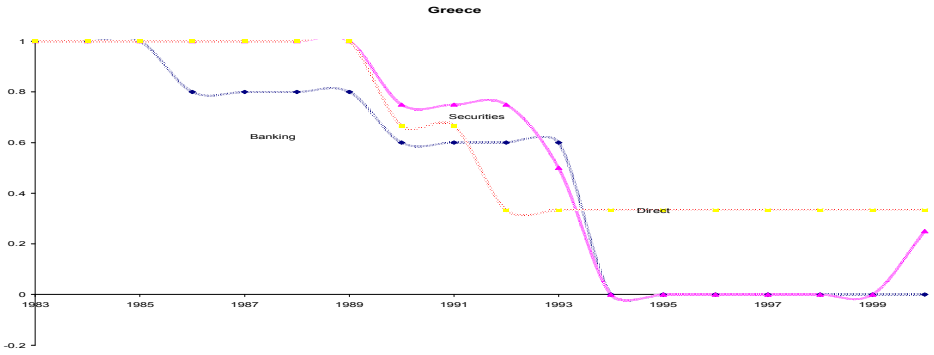

Japan
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1983
1985
1987
1989
1991
1993
1995
1997
1999

Figure 2: The Liberalization Indicators for Three Types of Capital Transactions




Japan
Securities
Banking
Direct
1
0.8
0.6
0.4
0.2
0
-0.2
1983
1985
1987
1989
1991
1993
1995
1997
1999


Portugal
Banking
Securities
Direct
1
0.8
0.6
0.4
0.2
0
-0.2
1983
1985
1987
1989
1991
1993
1995
1997
1999


Greece
Securities
Banking
Direct
1
0.8
0.6
0.4
0.2
0
-0.2
1983
1985
1987
1989
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1993
1995
1997
1999

Figure 3: The marginal effect of the liberalization indicator of banking transactions on economic growth

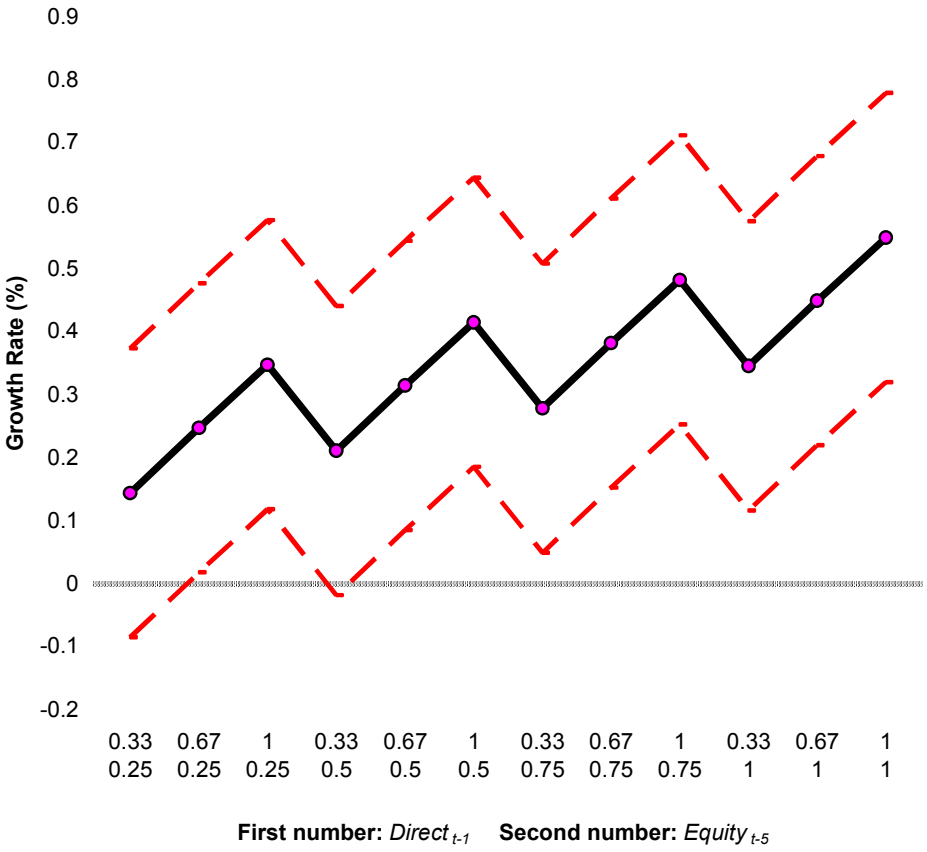

Table 1 Summary Statistics of Capital Account Restrictions Measure

Country	Mean	STD	Max.	Min.	%Change of Max. vs. Min.
Argentina	0.5922	0.2128	0.9167	0.3077	66.43%
Australia	0.4936	0.0147	0.5000	0.4615	7.69%
Austria	0.4615	0.1828	0.6923	0.3077	55.56%
Belgium	0.5128	0.1421	0.6154	0.1538	75.00%
Brazil	0.9701	0.0598	1.0000	0.8462	15.38%
Canada	0.1880	0.0658	0.2308	0.0769	66.67%
Switzerland	0.2179	0.0544	0.3077	0.1538	50.00%
Chile	0.9915	0.0249	1.0000	0.9231	7.69%
Colombia	0.9558	0.0733	1.0000	0.8333	16.67%
Denmark	0.2650	0.2407	0.6923	0.0769	88.89%
Ecuador	0.5812	0.1402	0.8462	0.3846	54.55%
Spain	0.5616	0.3086	0.9231	0.2308	75.00%
Finland	0.5171	0.3377	0.9231	0.1538	83.33%
France	0.4402	0.1746	0.6923	0.2308	66.67%
UK	0.0769	0.0000	0.0769	0.0769	0.00%
Germany	0.2222	0.0583	0.3077	0.0769	75.00%
Greece	0.5000	0.3630	0.9231	0.0769	91.67%
Hong Kong	0.1026	0.0590	0.2308	0.0769	66.67%
India	0.9181	0.0027	0.9231	0.9167	0.69%
Italy	0.4060	0.2430	0.7692	0.2308	70.00%
Japan	0.4359	0.1371	0.6923	0.1538	77.78%
Korea	0.8333	0.0295	0.8462	0.7692	9.09%
Mexico	0.8775	0.0422	0.9231	0.8333	9.72%
Malaysia	0.8462	0.0000	0.8462	0.8462	0.00%
Netherlands	0.1410	0.1475	0.4615	0.0769	83.33%
Norway	0.3889	0.2307	0.7692	0.2308	70.00%
Philippines	0.8846	0.0396	0.9231	0.8462	8.33%
Portugal	0.4615	0.2531	0.9231	0.1538	83.33%
Singapore	0.2650	0.0709	0.4615	0.2308	50.00%
Sweden	0.4957	0.2258	0.8462	0.3077	63.64%
Turkey	0.7682	0.1310	0.9231	0.6154	33.33%
US	0.2650	0.0603	0.4615	0.2308	50.00%
South Africa	0.8590	0.0476	0.9231	0.7692	16.67%

Table 2 Summary of Liberalization Indicators for Three Groups

COUNTRY	YEAR	BANK	PORTFOLIO	DIRECT
Argentina	1987	0.2000	0.3333	-
	1989	-	-	0.3333
	1990	-	0.3333	-
	1993	-	-	0.3333
	1996	0.6000	-0.1667	-0.3333
	1997	-	-0.2500	-
	1998	-0.2000	-	-
	1998	-	0.1667	-
Austria	1989	0.2000	0.2500	-
	1991	0.6000	-	-
Belgium	1996	0.2000	-	-
	1999	0.2000	0.5000	0.3333
Brazil	1997	-	-	0.3333
Canada	1995	0.2000	0.2500	-
	1999	-0.2000	-	-
Colombia	1996	-	-	0.3333
Denmark	1984	-	0.2500	-
	1988	0.6000	0.5000	0.3333
	1990	0.2000	-	-
	1998	-0.2000	-0.2500	-
Ecuador	1986	-	0.5000	-
	1988	-	-	0.3333
	1991	-	-	0.3333
	1994	-	-	0.3333
	1998	-0.2000	-	-
	2000	0.2000	-	-
Finland	1989	-	-	0.3333
	1990	0.4000	0.2500	-
	1991	0.4000	0.2500	0.3333
	1992	-	0.2500	-
	2000	-	-	0.3333
France	1988	0.4000	-	-
	1989	0.4000	-	-
	1994	-	-	0.3333
	1998	-	0.2500	-
	2000	-	-0.2500	-
Germany	1984	-0.2000	-	-
	1985	0.2000	-	-
	1997	-	-0.2500	-
	1998	0.2000	-	-
	1999	0.2000	0.2500	-
Greece	1986	0.2000	-	-
	1990	0.2000	0.2500	0.3333
	1992	-	-	0.3333
	1993	-	0.2500	-
	1994	0.6000	0.5000	-

	2000	-	-0.2500	-

COUNTRY	YEAR	BANK	PORTFOLIO	DIRECT
Hong Kong	1998	-	-0.5000	-
Italy	1988	0.4000	0.2500	0.3333
	1990	0.2000	0.2500	0.3333
Japan	1984	0.2000	-	0.3333
	1988	-	0.2500	-
	1996	0.2000	-	-
	1998	0.2000	0.2500	-
	1999	-	-	0.3333
Korea	1998	-	0.2500	-
Netherlands	1986	0.6000	0.5000	-
Norway	1984	-	-	0.3333
	1989	0.8000	0.5000	-
Philippines	1992	-	-	0.3333
Portugal	1986	0.4000	0.5000	0.3333
	1989	-0.2000	-	-
	1990	0.2000	-	-
	1991	0.2000	-0.2500	0.3333
	1992	0.2000	0.2500	-
	1996	-	-	0.3333
	1999	0.2000	-	-
	2000	-0.2000	-	-
Singapore	1997	-	-0.2500	-
	1998	-	-0.2500	-
	2000	-0.2000	-	-
South Africa	1989	-	-	-0.3333
Spain	1986	-	0.2500	-
	1989	-	0.0833	-
	1991	0.2000	-	-
	1992	0.6000	0.6667	0.3333
	1996	-	-0.2500	-
	1999	-	-	0.3333
Sweden	1984	0.2000	-	-
	1986	-0.2000	-	-
	1987	0.2000	-	-
	1989	0.6000	0.2500	-
	1992	-	0.5000	-
Switzerland	1986	0.2000	-	-
	1995	-	0.2500	-
Turkey	1989	-	-	0.3333
	1990	0.4000	0.2500	-
	1996	-0.4000	-	-
United States	1984	-	0.5000	-
	1989	0.2000	-	-

Table 3 Cross-country Growth Regressions, Average Growth Rate of Real Per Capita GDP as Dependent Variable, 1983-2000

	1	2	3	4
Intercept	**0.144**	**0.172**	**0.167**	**0.182**
(t-stat)	4.71	4.95	4.41	5.98
ln (initial inc.)	**-0.015**	**-0.02**	**-0.02**	**-0.021**
(t-stat)	-4.71	-4.62	-5.02	-5.71
Average $Inv._{83-00}$	**0.0017**	**0.0016**	**0.0015**	**0.0015**
(t-stat)	10.9	7.35	7.05	7.002
ln (initial Educ.)	0.0009	0.001	0.0007	0.0007
(t-stat)	0.35	0.395	0.23	0.25
Δpop_{83-00}	**-0.07**	**-0.057**	-0.045	**-0.055**
(t-stat)	-2.98	-2.2	-1.41	-2.01
ΔK_{83-00}	**-0.025**	**-0.022**	-0.018	**-0.022**
(t-stat)	-2.72	-2.4	-1.59	-2.3
$\Delta Quinn_{73-88}$		0.0023	0.0023	0.0025
(t-stat)		1.25	1.26	1.52
BHL_{83-00}		0.015	0.013	0.001
(t-stat)		1.3	1.06	0.58
GovRep			0.0017	
(t-stat)			0.56	
Law				0.002
(t-stat)				0.57
R-square	0.672	0.703	0.708	0.71
No. of observations	33	33	33	33

Notes: all estimates using OLS with White robust standard errors; ln(initial inc.) = ln real per capita income in the first year of sample, 1983; ln(initial Educ.) = ln (secondary-school attainment rate in the pop over age 25) in 1980; Average $Inv._{83-00}$= investment to GDP ratio averaged between 1983 and 2000. Δpop_{83-00} = average population growth over sample period; Africa dummy = dummy variable for African countries; ΔK_{83-00} = the change in the average of 13 subcategory transaction dummies between 1983 and 2000 from Miniane (2004); $\Delta Quinn_{73-88}$ = change of capital account openness between 1973 and 1988 from Quinn (1997); BHL_{83-00} = Proportion of years between 1983 and 2000 with liberalized stock market, using dates of stock market liberalization from Bekaert, Harvey, and Lundblad (2001). Govrep = An index of International Country Risk Guide's (ICRG) assessment on the degree to which governments do not repudiate contracts; range is 1-10; and larger values indicate government less likely to repudiate contract; Law = An ICRG index of the law and order tradition of a country; it ranges from 10, strong law and order tradition, to 1, weal law and order tradition; Govrep and Law are available from La Porta, Lopez-de-Silanes, and Shleifer (2002) **bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

Table 4. Cross-Sectional Results for Three Sub-group Liberalization Indicators, Growth Rate of Real GDP Per Capita as Dependent Variables, 1983-2000

	1	2	3	4	5	6
Intercept	**0.122**	**0.127**	**0.15**	**0.165**	**0.16**	**0.184**
(t-stat)	3.22	3.18	5.03	4.24	3.84	6.14
ln (initial inc.)	**-0.014**	**-0.015**	**-0.016**	**-0.02**	**-0.02**	**-0.022**
(t-stat)	-3.3	-3.35	-5.27	-4.04	-3.94	-5.85
Average $Inv._{83-00}$	**0.0018**	**0.0017**	**0.0019**	**0.0016**	**0.0016**	**0.0017**
(t-stat)	10.27	8.68	12.03	6.69	5.47	8.23
ln (initial Educ.)	0.0018	0.0024	-0.0011	0.0018	0.0023	-0.0009
(t-stat)	0.68	0.84	-0.38	0.7	0.77	-0.31
Δpop_{83-00}	**-0.056**	**-0.05**	**-0.056**	*-0.043*	-0.037	**-0.044**
(t-stat)	-2.72	-2.06	-3.16	-1.83	-1.45	-2.36
Bk_{83-00}	**-0.013**			**-0.012**		
(t-stat)	-2.43			-2.05		
Eq_{83-00}		-0.014			-0.011	
(t-stat)		-1.65			-1.45	
Di_{83-00}			**-0.018**			**-0.016**
(t-stat)			-2.85			-2.97
$\Delta Qinn_{73-88}$				0.0029	0.0027	0.0024
(t-stat)				1.64	1.52	1.44
BHL_{83-00}				0.02	0.016	*0.019*
(t-stat)				1.41	1.14	1.88
R-square	0.602	0.613	0.691	0.659	0.654	0.734
No. of observations	33	33	33	33	33	33

Notes: See Table 3 for definition of variables. All estimates using OLS with White robust standard errors; **bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level. Bk_{83-00} = change in the average of banking transaction dummies between 1983 and 2000; Eq_{83-00} = change in the average of portfolio investment transaction dummies between 1983 and 2000; Di_{83-00} = change in the average of direct investment dummies between 1983 and 2000.

Table 5. Liberalization Sequence Test, Annual Growth Rate of Real GDP per Capita as Dependent Variable

	1	2	3	4	5
Interaction Term 1	Bk_{t-h}* Eq_{t-j}	Bk_{t-h} * Eq_{t-j}	Eq_{t-j} * Bk_{t-h}	Eq_{t-j} * Bk_{t-h}	FDI_{t-k} * Bk_{t-h}
Interaction Term 2	Bk_{t-h} * Di_{t-k}	Bk_{t-h} * Di_{t-k}	Eq_{t-j} * Di_{t-k}	Eq_{t-j} * Di_{t-k}	FDI_{t-k} * Eq_{t-j}
	h=0	h=0	h=4	h=4	h=3
	j=5	j=5	j=0	j=0	j=1
	k=1	k=3	k=5	k=3	k=0
Intercept	**0.089**	**0.084**	**0.097**	**0.093**	**0.098**
(s.e.)	(0.025)	(0.027)	(0.026)	(0.024)	(0.027)
ln (initial inc.)$_{83}$	**-0.0083**	**-0.008**	**-0.009**	**-0.0088**	**-0.011**
(s.e.)	(0.0034)	(0.0037)	(0.0034)	(0.0032)	(0.0037)
Initial Inv. $_{83}$	**0.0012**	**0.0011**	**0.0012**	**0.0012**	**0.0012**
(s.e.)	(0.0002)	(0.00024)	(0.0002)	(0.0002)	(0.0003)
ln (initial Educ.)	-0.0023	-0.0015	-0.0023	-0.002	0.0028
(s.e.)	(0.0024)	(0.002)	(0.002)	(0.0021)	(0.0035)
Δpop_t	*-0.372*	-0.307	**-0.515**	**-0.463**	*-0.391*
(s.e.)	(0.198)	(0.193)	(0.178)	(0.193)	(0.239)
Interaction Term 1	**0.269**	**0.31**	**0.401**	**0.372**	**0.509**
(s.e.)	(0.083)	(0.076)	(0.153)	(0.151)	(0.204)
Interaction Term 2	**0.304**	**0.215**	**-0.378**	**-0.462**	**-0.913**
(s.e.)	(0.05)	(0.096)	(0.103)	(0.189)	(0.256)
Bk_{t-h}	**-0.023**	**-0.027**	-0.015	-0.017	-0.0037
(s.e.)	(0.012)	(0.012)	(0.012)	(0.014)	(0.013)
Eq_{t-j}	0.0138	0.015	**-0.05**	**-0.044**	-0.022
(s.e.)	(0.0158)	(0.0148)	(0.015)	(0.176)	(0.019)
Di_{t-k}	**-0.0595**	0.009	*-0.037*	0.024	0.012
(s.e.)	(0.0196)	(0.019)	(0.021)	(0.023)	(0.034)
Africa Dummy	**-0.019**	**-0.018**	**-0.018**	**-0.016**	-0.017
(s.e.)	(0.0068)	(0.0062)	(0.0064)	(0.0054)	(0.0062)
R-square	0.187	0.172	0.195	0.198	0.187
AIC	-4.131	-4.113	-4.141	-4.145	-4.132
No. of observations	363	363	363	363	363

Notes: all estimates using OLS with White robust standard errors; ln(initial inc.) = ln real per capita income in the first year of sample, 1983; ln(initial Educ.) = ln (secondary-school attainment rate in the pop over age 25) in 1980; Initial Inv.= investment to GDP ratio in 1983. Δpop_t = annual population growth over sample period; Bk_t, Eq_t and Di_t are the annual difference in the average of dummies for three types of capital account transactions from 1984 to 2000. Europe dummy = dummy variable for European countries; North America dummy = dummy variable for North American countries; South America dummy = dummy variable for South American countries; All estimates using the period fixed effect panel data analysis with White robust standard errors; **bold** denotes coefficients are significant at the 0.05 level or less; *italic* denotes coefficients are significant between the 0.05 level and the 0.1 level.

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