Capital Account Liberalization and Economic Growth

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ABSTRACT

In my paper, I test whether capital account liberalization will lead to higher economic growth by panel cross-country regressions. After reviewing some of the previous literature, I extend the analysis by using three distinct of measures of capital account liberalization. In particular, I use pooled least squares and instrumental variables methods and obtain a positive relation. Furthermore, the designed sub-period and sub-sample tests help to answer three practical puzzles which the previous studies do not analyze systematically. The first is whether the effect of capital account liberalization differs among regions. The second is whether the effect is different during different periods. The last one is whether the level of development of a country is associated with the effect of financial liberalization. These questions help us understand the nature and implications of the financial crisis occurring in the 1990s, especially in the developing countries.

(Key Words: Capital Account Liberalization, growth)

I. Introduction

A series of crises in the 1990s, which followed in the wake of capital account liberalization, draw attention back to the question of whether the relaxation of capital controls is good or bad for the economy. In fact, the debates on this issue have never stopped since the end of World War II. Economists in different schools of thought are working from their own starting points to look into the issue of the effect of capital mobility. The different theoretical discussions have led to two divergent international economic policies, that is, the implementation of capital account controls and the liberalization of the capital account.

Originally, orthodox[1] theorists started their research from the point of view that the effects of free capital movement on economic growth were analogous to those of free trade[2]. For example, the benefit of free capital flows, described by neoclassical economists, was to help smooth a country's consumption or production paths and to enhance the country's social welfare[3]. Therefore, it was possible for the developing countries with little domestic capital to obtain the foreign financial resources to promote economic growth without significantly changing their domestic saving rates. Additionally, capital account liberalization also offered opportunities to investors to diversify portfolios so as to obtain potentially higher rates of return and reduce risk.

However, these orthodox ideas brought plenty of critics even from the neoclassical tradition itself. These economists argued against two main flaws found in

[1] Normally, the term, "orthodox", is synonymous to "neoclassical" economics and it denotes those authors who advocate "free market" view both with respect to trade and capital movements.
[2] It can be traced back to Fisher (1930).
[3] In perfect markets, the inter-temporal models suggest that both borrowers and lenders take advantages of the free international capital movement because inter-temporal investment between periods and between countries is analogous to inter-temporal trade which provides the possibility to improve the social welfare. See Singh (2003)

the orthodox inter-temporal approach to capital mobility. One is that free capital movement is different from free trade in the real world. The maintenance of full employment and macroeconomic stability consists of the main prerequisite for the implement of capital account liberalization. The other is that the empirical results and the severe practical lessons from the financial crises suggest that the capital account liberalization is inappropriate for developing countries (See, among others, Easterley et al. 2000; and Klein and Olivei 1999 on the effects of capital account liberalization in developing countries).

As early as just after World War II, Keynes put forward his objection to the desirability of free capital movements. In order to restore Britain's economy, Keynes put emphasis on the achievement of domestic full employment and his "euthanasia of the rentier"[4]. While, it was just Britain's integration in a free-trade international economic system including a free movement of capital that created obstacles to the achievement of such goal, Keynes proposed that "the stock of capital be increased through 'state management of investment' or 'state control of investment' to the point where it was no longer scarce, the interest rate would be zero and there would be no return to property ownership per se"[5]. Keynes and his followers also drew attention to investor behaviour and the significance of psychological factors in price formation for his analysis of the effect of capital mobility. These ideas can be seen in many papers written in the Keynesian tradition and relating to issues of capital flow volatility (such as Kindleberger, 1984, whose ideas are referred to by Singh 2003).

[4] See Keynes (1936), "the General Theory" for his hope that the pure interest rate could be driven to zero within one generation.
[5] See Crotty (1983), p. 59.

Orthodox economists also recognized the risks attached to capital account liberalization due to the efficient market assumption, especially in developing countries. Stiglitz is one of the fiercest critics of capital account liberalization in the developing countries, primarily the negative effects of short-term speculative capital flows (see Stiglitz 2000). He emphasized the close relationship between the sudden changes in short-term capital flows, especially speculative movements and their engendering of financial crises.

However, he favored the relaxation of control on long-term capital flows, particularly foreign direct investment (FDI), since he thought FDI to be a stable capital source for long-term economic development in developing countries. There are several other orthodox economists who stress limited terms for the implementing of capital account liberalization (such as Fisher, 1997) and even objections against capital account liberalization altogether (such as Bhagwati, 1998).

According to Singh (2003), post-Keynesian economists support the Keynesian view that "flexible exchange rates and free international capital mobility are incompatible with global full employment and rapid economic growth in an era of multilateral free trade"[6]. Combining with the consideration of asymmetric information, moral hazard and domestic policy distortion, they point to the potential danger of capital mobility in triggering economic and financial crises.

There is much evidence from studies on the relationship among capital account liberalization, banking and currency crisis to support the view of the

[6] See Singh (2003), p. 197.

anti-liberalization camp. However, due to the need for increased integration in the world economic and financial markets, the relaxation of capital controls and broader financial liberalization, together with the help of new telecommunications and computer technologies, become necessary and important. According to the current empirical analyses and studies on the issue of the effectiveness of capital account liberalization on economic growth, when and where the liberalization of capital account should be is obviously the central point of the discussions. Therefore, the effect of capital account liberalization on economic growth depends on the benefit and cost of liberalization[7]. And most studies suggest that the adoption of capital account liberalization is much more risky and sensitive for developing countries than industrial countries, partly due to the unstable economic and financial systems and lack of efficient macroeconomic policy instruments.

In this paper, I will focus on the relationship between capital account liberalization and long-term economic growth. The literature will be structured as follows: section 2 will give the description of different indicators of capital mobility which are frequently used for modeling the relationship of capital account liberalization and economic performance. In section 3, the literature giving the relationship between capital account liberalization and long-term economic growth will be reviewed and compared and the results will be classified and contrasted by the use of different indicators of capital account liberalization between developing countries and industrial countries. In section 4, I try to establish a regression model to

[7] For most developing countries, the instability caused by capital account liberalization outweighs the benefit from the faster long-term economic growth due to the greater availability of international capital sources. See Fischer (1997) and Summers (2000).

investigate the sensitivity of the estimated effect of capital account liberalization on economic growth for the set of countries and years used in the analysis by the use of econometric methods in order to answer some practical questions. The results of the empirical analysis will be then presented. The last section offers some concluding remarks.

II. Measures of Capital Account Liberalization

Substantial discussions on the role of capital account liberalization on economic growth are based on a mixed set of empirical results. Why is there no clearly identified effect of capital account liberalization suggested by economists of different schools of thoughts? The reasons can be roughly regrouped around three main points. The first is that it is hard to identify and qualify capital account liberalization in a consistent fashion across a wide set of countries. There is a great gap between industrial countries and developing countries in their reaction to capital account liberalization. Secondly, scholars choose different time series data to estimate the effect of capital account liberalization on economic growth. Thirdly, in the different literature on the effect of capital account liberalization on economic growth, there is no uniform measure applied to evaluate the degree and intensity of the liberalization. Currently, the approaches available are mostly based on statute or quantitative information. Two of the most frequently used data-based indicators for measuring capital account liberalization are established on the data from the yearly issues of IMF's Exchange Arrangements and Exchange Restrictions. In the following,

I will start from these two role-based indicators[8] and then proceed to alternative methods.

1. Basic IMF indicator

According to the information from the IMF's Annual Report on *Exchange Arrangement and Exchange Restrictions* (AREAER), in line E.2 named by "Restrictions on payments for capital transactions", a dummy variable valued as 0 (always under restriction on capital account liberalization), or 1 (no restriction) is available. Indeed, the IMF provides data from 1967 to 1995 for this measure. However, this indicator imposes significant limitations on empirical work. Briefly, the drawbacks can be summarized as the absence of information on the restrictions on capital transfers by nonresidents and lack of a measure of the intensity of capital controls[9].

2. SHARE

To overcome the shortcoming of the IMF indicator, an alternative indicator on the basis of AREAER is developed to measure the capital account liberalization. It is called SHARE[10] since it reflects the proportion of years within a certain period in which the country had liberalized its capital account. See table 1 (from Klein and Olivei 1999), for example, the value of SHARE for Denmark is 0.8, which means, according to AREAER, that the capital markets in the country opened for 8 years out

[8] Using the classification in Edison et al. (2002)
[9] It only captures the restrictions on capital outflows.
[10] Here, I use the notation in Edison et al. (2002). In Edwards (2001), it is denoted as NUYCO.

Table 1. SHARE indicator for measure of capital account liberalization during the period 1986 to 1995 (SHARE≠0)

The value of SHARE	Years Open	Industrial Countries	Development Countries
0.1	1995	Norway	Costa Rica, Niger
0.2	1994-95	Spain	
0.3	1993-95	Portugal, Sweden	
0.4	1992-95	Ireland	
0.5	1991-95	Finland, Austria	
0.6	1990-95 1988-92, 1995	France, Italy	 Ecuador
0.7	1989-95 1986-92		Guatemala Uruguay
0.8	1988-95	Denmark	
1.0	1986-95	Australia, Belgium, Canada, Japan, Netherlands, New Zealand, United Kingdom, United States	Bolivia, Indonesia Malaysia, Panama

Source: Klein and Olivei (1999) table 3: SHARE and years of open capital market.
Note: SHARE shows the value of proportions of years in which the country has an open capital account during the period 1986 to 1995.

of a 10-year period (from 1986 to 1995). However, the SHARE measure cannot distinguish the distribution of the years when a country had open capital markets. For instance, the value of SHARE is 0.5. But we cannot identify whether it had opened the capital account for the first five years of a decade, or for the last five years of a decade, or for every other year of a decade, and or for many other on-again, off-again patterns. Practical analysis shows that the value of SHARE measuring the openness of the capital account during this 10-year period often tells the last continuous years from the end of the decade during which the capital account is liberalized. In the above example, Denmark opened the capital account from 1988 to 1995 during the

decade. Examining the table, we find only two developing countries to be the exceptions. It should be mentioned to get this result that, for a longer period sample, more cases not following the rule have the on/off property, especially among developing countries. In spite of the existence of the problem, when we are facing an analysis relating the capital account liberalization to a measure of economic performance, like the growth of GDP over a given period of years, the SHARE indicator is often included in the group of regressors, such as is found in Klein & Olivei (1999), Grilli & Milesi-Ferretti (1995) and Rodrik (1998), among others.

3. Quinn indicator

From the above, the two indicators based on AREAER do not measure how the controls in the capital account are actually implemented, whether strongly or mildly. In Quinn's paper published in 1997, he extended these two indicators and found a new one to capture the intensity of enforcement of controls on the capital account.[11] He distinguished seven categories of role-based measures for 56 countries for the period 1950 to 1995 and for 8 more countries starting from 1954 and two categories out of these sevens were for capital account controls. He separated the controls on the receipts entering the capital account and the payments measured in the capital account. Then he coded them respectively on a 2-point scale (from 0, always under the controls, to 1, no restriction) to generate a 0-4 index for the restriction on the whole capital account in the cross-country sample. Quinn calculated the data for

[11] In this paper, Quinn also figured out the measure of the intensity of enforcement of controls on the current account. For details, see Quinn (1997) table A.

this indicator annually from 1950 to 1997 for 21 OECD countries. However, the information for developing countries is limited only to the years 1958, 1973, 1982, and 1988. In table 2, the IMF indicator and Quinn indicator are put in one (2 by 2) matrix to identify their correlations. We put a threshold of 2 in Quinn's scale in order to classify the capital accounts in the cross-sectional sample into closed or open. The elements on the main diagonal of the matrices show that both IMF indicator and Quinn indicator give the identical results

Table 2. Comparison of Quinn and IMF Indicators

Panel 1: Full Sample: Year 1973				
		IMF Indicator		Total
		0	1	
Quinn	0-2	36	0	36
Indicator	3-4	10	15	25
Total		46	15	61

Panel 2: Full Sample: Year 1982				
		IMF Indicator		Total
		0	1	
Quinn	0-2	38	4	42
Indicator	3-4	7	12	19
Total		45	16	61

Panel 3: Full Sample: Year 1988				
		IMF Indicator		Total
		0	1	
Quinn	0-2	32	0	32
Indicator	3-4	12	17	29
Total		44	17	61

Panel 4: Developing Countries Year 1973				
		IMF Indicator		Total
		0	1	
Quinn	0-2	26	0	26
Indicator	3-4	4	12	16
Total		30	12	42

Panel 5: Developing Countries Year 1982				
		IMF Indicator		Total
		0	1	
Quinn	0-2	32	4	36
Indicator	3-4	0	6	6
Total		32	10	42

Panel 6: Developing Countries Year 1988				
		IMF Indicator		Total
		0	1	
Quinn	0-2	32	0	32
Indicator	3-4	2	8	10
Total		34	8	42

Source: Edison et al. (2002) table 4 for Comparison of Quinn and IMF Indicators

Note: the data in each panel shows the number of countries for each combination of indicators.

for measuring the capital control. To our satisfaction, a higher correspondence between these two measures appears, especially for developing countries. In Quinn's

paper, Δ Quinn, a supplementary indicator constructed from the data of the Quinn indicator and representing the change in Quinn Indicators, is applied by Quinn and other economists (such as Edwards 2001, and Arteta, Eichengreen and Wyplosz 2001) to show the actual ranges for the capital account. Quinn gave the value of the indicator covering 20 industrial countries and 43 developing countries. In Quinn and Toyoda (2004), they modified the indicator by transforming the 0 to 4 value of Quinn indicators into a 0-100 scale measure by taking 100* (Quinn/4). [12] This methodologically distinct measure of capital account liberalization will also be used in my regression estimation. I name the new Quinn indicator as modified Quinn in my empirical models.

The contribution of the Quinn indicator to recent studies on the issues relating to capital account liberalization is significant. However, we may question whether the Quinn indicator has provided the complete and accurate measure for the liberalization of the capital account due to its veiled shortcomings. Though Quinn indicators attempted to separate the roles of controls on capital inflow and outflow, the different results of the studies are potentially influenced by the discrepancies among industrial countries and developing countries which Quinn did not address. There are some other on/off measures for specific groups of countries, such as OECD code of liberalization of capital movements[13], and the Montiel-Reinhart Intensity

[12] In Quinn (2004), he used five-year averages, calculated as: CAPITAL(s)=(Xt + Xt+1 + Xt+2 + Xt+3 + Xt+4)/5 ,where Xt = 100*(CAPITAl/4). CAPITAL, here, is denoted as modified Quinn in my paper.

[13] The OECD code measure offers the yearly information on the extent to which restrictions are contemporaneously applied on a range of types of international transactions, based on the source in various issues of the Code of Liberalization of Capital Movements published by OECD in specific dates.

Measure[14]. There are also some economists attempting to work with proxy measures relating the liberalization of controls on residents' selling and purchasing international equities to the liberalization of a country's capital account. And recently there are some attractive works by Levine and Zervos (1998), Henry (2000a, 2000b), Bekaert (1995) and Edison and Warnock (2001), which provide a measure of the liberalization of capital account through a mixed source on dating the opening of equity markets to foreign investors. For instance, in Bekaert (1995), a new proxy (one minus the ratio of the market capitalization of the International Finance Corporation's Investable and Global Index judged to be available to foreign investors) is applied as an indicator of capital account control, especially with regards to the restrictions on equity inflows.

4. Quantitative Measures

As I stated above, the rule-based measures are widely used in practice. However, in many existing studies, some quantitative measures have been invented to evaluate the extent and degree of capital account controls from the available data of economic variables. These variables are classified into three sets: national saving rate paired with national investment rates, interest rate differentials, and actual international capital flows.[15] However, the first two variables are seldom used as proxy indicators in the analysis of the effect of capital account liberalization on long-run economic growth.

In Kraay (1998), the quantitative information on the actual capital inflows

[14] It is another alternative measure of intensity of controls on international transactions based on annual information for 15 countries for 1990-96. See Montiel (1996), and Montiel and Reinhart (1999).
[15] See the summary by Edison et al. (2002) for the introduction to quantitative measures.

and outflows as a percentage of GDP was derived to be a long-run indicator of financial openness. Instead, an annual measure of portfolio and direct investment and assets and liabilities as a percentage of GDP was used as the proxy to gauge the extent of capital mobility in O'Donnell (2001). But what should be mentioned is that the actual capital inflows and outflows will be easily influenced by a specific range of policies and circumstances. Hence, the credibility of the measures is put into question in a practical study on capital account liberalization.

Some different attempts based on other quantitative information can be seen in the literature, such as Bekaert (1995). In his study, an alternative measure that showed the correlation of stock market returns across countries was brought to our attention as a measure of the interaction of securities markets whose theoretical origin was the same as other similar measures described in Bekaert's paper. However, like other quantitative measures, the cross-sectional correlation of stock market returns also has the problem of efficiency, which relies on the characteristics and conditions of the entities issuing the claims.

Both the rule-based measures and quantitative measures fail to offer complete and accurate information on the degree of the capital account liberalization or controls. Further efforts and studies are needed to develop more refined measures that would address their present shortcomings.

III. Review of the Literature on the Capital Account Liberalization and Economic Growth.

The development of measures of capital account liberalization is still in progress. Regardless of their mixed contributions or limitations, they generally give a consistent picture of the time-series and cross-sectional pattern of the effects of capital account liberalization. However, some substantial studies on the effect of capital account liberalization on the economy reach divergent results due mainly to three reasons as I have stated in the first section. Briefly speaking, they can be summarized as time, countries, and methods.

Established on the basis of a similar hypothesis that capital account liberalization has the positive and statistically significant effect on the economic growth, the arguments by researchers that can be derived from the empirical results can be divided into two groups: one is to offer the supporting evidence, such as Quinn (1997), Edwards (2001), and Klein and Olivei (1999); the other is to hold the opposite opinion that the capital account liberalization has no effect or even negative effect on economic growth, e.g. Stiglitz (2000). This section will thus be organized along these lines. Looking at the earlier literatures on how capital account openness affects economic growth, we will see some common independent variables as the determinants of economic growth in their models. A base set of variables used by Quinn (1997) were first defined in Levine and Renelt (1992). These variables include the level of schooling, investment, population growth, and the level of GDP in the initial year. In all of the available studies on economic growth and capital mobility, the approaches to measure the extent of the capital account openness may be varied, that is, either based on statutory or on the openness of the equity market to foreign

investors, and / or on other quantitative variables (for instance, the countries included in the sample may not be identical, and the different periods of years may be covered in different estimation), but the dependent variable for the study is quite similar, which is usually the growth rate of real GDP per capita.[16] In table 3, I will give a summary and comparison of the measures of capital mobility, the periods and countries included in the samples, the econometric methods applied and the brief results obtained in the different literature mentioned in my paper.

1. Literature with supporting evidence

Quinn (1997) evaluated his own work on financial openness and economic growth as "the first systematic demonstration of a robust correlation between change in capital account regulation and long-run economic growth". In his work, as we stated above, the most conspicuous contribution to contemporary studies is the new indicator that seeks to incorporate a measure of the magnitude of a country's international capital payments by residents that is missing in the IMF indicator. He used data from 58-64 countries over time in the analysis.[17] Based on the time-series and cross-sectional data, Quinn developed models of the determinants of growth based on Levine and Renelt (1992) and obtained two growth models of the base variables and full variables (see table 1 in Quinn 1997). By OLS estimation, he got a positive and statistically significant relationship of the effect of capital account liberalization on economic growth. In order to make sure the results would be robust

[16] Also see table 6 in Edison et al. (2002).
[17] See appendix A in Quinn (1997), Data are available for 56 nations from 1950 to 1994, and for another eight nations from 1954-60 to 1994.

Table 3. Review of Literature on the Effects of Capital Account Liberalization

Literature	Countries	Measures of Liberalization	Data and Dependent Variable and Econometric Methods	Main Results for GDP Growth
Quinn 1997	58 to 64	Δ Quinn, between 1958 and 1988	1960-1989, growth in income per capita, cross section, OLS	Δ Quinn has a significantly positive coefficient in the growth regression.
Klein & Olivei 1999	67	SHARE	1976-1995, growth in income per capita, cross section, OLS & IV. Change in Financial Depth, Δ FD, as a function of Share and then per capita income growth as a function of instrumented value of Δ FD	Significant effect of SHARE on Δ FD, though results seem to be driven by OECD countries in sample. Significant effect of instrumented values of Δ FD and FD on growth.
Edwards 2001	55 to 62	$Quinn_{88}$ or Δ $Quinn_{73-88}$	1980-1989, growth in income per capita, cross section, WLS (1985 GDP as weight), IV. And interaction of Quinn in 1988 and log(GDP in 1980)	Quinn level has the same changing direction with GDP growth. But interaction suggests it is conditional on a country's development situation. Negative relation may be obtained for low GDP countries.
Arteta, Eichengreen and Wyplosz 2001	51 to 59	Quinn in initial year; or Δ Quinn over relevant period	1973-81, 1982-87, 1988-92, growth in income per capita for these 3 periods or pooled data. Follows Edwards (2001) but with OLS rather than with different instruments.	Quinn has significant coefficient for pooled results but not for shorter sub-samples. Δ Quinn has no significant coefficient. Significant effect of interaction of Quinn with either quality of law or openness.
Edison, Klein and Others 2002	89	$SHARE_{76-95}$, $Quinn_{82}$ or Δ $Quinn_{73-88}$, and BHL_{80-95}	1976-1995,Growth in log real per capita income, OLS and IV	Indicators SHARE, Quinn, and BHL have positive and significant coefficients except Δ Quinn which has a positive but insignificant effect on growth. But in developing countries, especially in East Asia, the effect is greater than in industrial countries.

Quinn 2004	83	SHARE, modified Quinn, and BHL for equity market openness	1947-1999, five-year average per capita ppp-adjusted economic growth, pooled time series and cross-sectional data, OLS and system-GMM estimator.	Positive coefficients for all indicators. Capital account liberalization has a direct effect on subsequent growth in both developed and emerging market nations.
Grilli and Milesi-Ferretti 1995	61	$SHARE_{75\text{-}95}$	Growth in income per capita for five non-overlapping periods during 1971-1994. IV estimation. Growth in income per capita over 1975-1995. Cross section, OLS.	No evidence of a significant effect of SHARE on growth of income per capita.
Rodrik 1998	About 100	$SHARE_{75\text{-}95}$	1975-1995, growth in income per capita, cross section, OLS	No evidence of a significant effect of SHARE on growth of income per capita
Kraay 1998	64, 94, or 117	SHARE; Quinn; or Volume	1985-1997, growth in income per capita. Cross section. OLS and IV. Samples of 117 (SHARE); 94 (Volume); or 64 (Quinn)	No evidence of a significant effect of SHARE or Quinn on growth, coefficient on Volume significant and positive.
Stiglitz 2000	-	-	-	Capital account liberalization produces instability not growth
Singh 2003	-	Basing on the comparison of macroeconomic variables	1950s to 1990s, basing on the analysis in Singh (1997a).	GDP growth decreases in the liberal regime of capital account relative to the "illiberal" golden age period.

Source: Edison et al. (2002) Table 6 and my own summary.

Notes: All the notations are in respect with the ones in Edison et al. (2002). Here, Volume is measure of volume of capital flows displaying on the balance of payment. Cross section refers to 1 observation per country.

enough, he followed Leamer's strategy of sensitivity analysis to test whether a change in the explanatory variables would affect the results. In table 2 of Quinn (1997), the coefficients of ΔCAPITAL are all positive and located beyond the 0.01 to 0.05 level, even if a combination of economic variables are added or subtracted from the models. This supports the argument on the growth effect of capital account liberalization that "higher growth is associated with liberalization". However, Quinn did not disaggregate the results on the basis of the impact of liberalization on developing countries and industrial countries, though he did attempt to test the existence of different coefficients of ΔCAPITAL for the countries in different regions, such as Latin America, OECD, East Asia, and other emerging markets, by recognizing the limited role of capital account liberalization on growth. While, the non-rejected-identical-coefficient result provides evidence in support of a positive relation between capital account liberalization and economic growth, it seems to deny the existence of a discrepancy across regions regarding the consequences of capital account liberalization. Moreover, he ignored some indirect effects on growth, such as the effects of financial development stated in subsequent literature by Klein and Olivei (1999). Accompanying the results, Quinn provided reasonable explanations originating from theories of neoclassical economics. He pointed to the potential influence of capital account liberalization in improving investment efficiency and the role of relative price signals in an economy. Additionally, he identified the possible negative response within the international equity market arising from a specific regulatory structure which would be traded off by the influence of international

financial deregulation on economic growth. In light of these concerns, in his recent work, Quinn (2004) extended his analysis by considering various contingent control variables corresponding to political institutional development and social-economic endowment which are associated with the effect of capital account liberalization, such as black market premium, equity market liberalization, and trade openness. He estimated the pooled, cross-section, time-series models using five-year averaged data from 1947 to 1999. He compared the results using different measures of capital account liberalization, i.e., modified Quinn[18], SHARE and EQUITY. Positive and significant effects of capital account openness on growth were obtained along the lines already found in Quinn (1997). Capital account liberalization had a direct effect on subsequent growth in both developed and emerging market economies.

The work of Klein and Olivei (1999) is famous for their analysis on the indirect effect of capital account liberalization on economic growth via financial depth. In most contemporary or earlier literature, financial development is empirically expressed as an increasing volume of bank intermediation and an increasing role for equity capital, and so on. With respect to Chinn (2002), "financial development is interpreted broadly as increasing the efficiency of allocating financial resources and monitoring capital prefects."[19] These explanations can also been seen in the neoclassical analysis of the effect of capital account openness as I argued in the first section. In this paper, the relationship between capital account liberalization and economic growth are divided into two procedures, one is the effect of capital account

[18] See footnote 10 that I have explained in the part for introduction of Quinn indicator.
[19] See abstract of Chinn (2002).

liberalization on financial development, and the other is the obvious positive role of financial development on economic growth. In the first part, Klein and Olivei addressed three important indicators as proxies of financial development in a certain country. They are: (1) the liquid liabilities indicator (LLY), showing the ratio of liquid liabilities to GDP; (2) the ratio of claims on the non-financial private sector to GDP (PRIVY); (3) the ratio of domestic bank deposit assets to the sum of domestic bank deposit assets and central bank domestic assets (BANK).[20] The second indicator reflects credit issued to the private sector from the overall banking sector including both private and governmental credit. Hence, the first two indicators would display closer correlations than those between either of these and BANK in their full sample (almost 100 countries for the period 1986 to 1995) and sub-samples (21 OECD-member countries and over 70 developing countries). These three indicators were used in all cases throughout the study. First of all, to obtain the significant relationship between capital account liberalization and financial deepness, Klein and Olivei tried to establish a cross-sectional regression specification which included the change of financial depth over the period 1986 to 1995 as the dependent variable and the initial level of financial depth, a country's stance in terms of capital account liberalization over the period 1986 to 1995, as well as other economic factors associated with controlling the trend of financial deepness as independent variables. There are three concerns in this estimation. The first is the use of the initial level of financial depth which, except for getting the accurate estimates of the effect of capital

[20] See Klein and Olivei (1999) part 2 for the introduction of indicators of financial depth.

liberalization on the change in financial depth, helps to obtain evidence of financial convergence by a significant and negative value of the coefficient of the initial level of financial depth since it is reckoned by some scholars that "financial convergence may be one channel for the convergence of per capita income across countries if...economic growth is linked to financial depth."[21] The second concern is the application of instrumental variables estimation for detecting the potential simultaneity bias in the measure of capital account liberalization. In their estimations, two instruments are used. One is a dummy variable indicating the stance for capital account liberalization (like IMF's AREAER), the other is regional dummy variables the subset of which were included in the set of control variables to identify the possibility of more open capital accounts with greater increases in financial depth over the sample period. The last concern is that the SHARE indicator over the period 1986 to 1995 is used as measure of capital account liberalization in all cases. By estimating several regressions, including tests for robustness of results and sub-sample stability, Klein and Olivei obtained three major results on the association between capital account liberalization and financial openness. From the results for the full cross-sectional sample, capital account liberalization has a positive and significant effect on financial depth. However, regional discrepancies exist from the regressions on sub-samples of industrial countries and developing countries. Klein and Olivei recognized that the general results were driven mostly by industrial countries. While, the positive effect is hardly seen in most developing countries, even in countries of

[21] This argument is shown by King and Levine, Loayza and Beck, quoted by Klein and Olivei (1999), p. 10.

Latin America in which capital account liberalization was popularly implemented during the period 1986 to 1995. Accordingly, the effect of capital account liberalization on economic growth has mostly to do with the importance of financial depth as reflected in regional discrepancies. This argument is supported by Chinn (2002).

Edwards (2001) got results similar to the ones by Klein and Olivei (1999). In addition to that, Edward figured that the greater effect of capital account liberalization would be seen in high-income countries, though such conclusions were questioned by Arteta, Eichengreen and Wyplosz (2001) who obtained little evidence for the view that "capital account liberalization has more favorable effects in high- and middle-income emerging markets that in poorer developing countries"[22]. Edward also recognized the shortcomings of the IMF's indicators[23] by comparing it with Quinn indicators as measures of the extent of capital mobility. By stating two channels, foreign savings and efficiency and productivity growth, he offers the potential explanations to the positive effect of capital account liberalization on economic growth. Although the coefficients of the capital account openness variables were positive in every regression and significant in all but one of them, the results were fragile like the ones from other studies on this issue by estimating the reversed regressions for robustness tests. Generally, Edwards supports Klein and Olivei's opinion that the positive relationship between capital account liberalization and economic growth can be obtained only if the country achieves a certain degree of

[22] See Edison et al. (2002), p. 23, and Edwards (2001), p. 16, and Arteta, Eichengreen and Wyplosz (2001), p. 26.
[23] Hence, they applied Quinn indicators (including ΔQuinn) in the estimation models to identify a semi-open (or liberalized) capital account.

development in financial and economic institutions.

The contribution of Arteta, Eichengreen and Wyplosz (2001) is not restricted to a mere criticism of the work by Edwards (2001), though they also agreed that the effect of capital account liberalization was conditioned by a country's stage of financial and institutional development. Departing from Edwards' model[24], they assessed their own work as "the first systematic, cross-country statistical evidence that the sequencing of reforms shapes the effects of capital account liberalization"[25]. Besides this, another contribution of their analysis was to suggest a period-specific result since their empirical findings were more robust for the 1980s than for the 1970s or 1990s. Like Klein and Olivei (1999), they also attempted to trace the positive correlation between the effect of capital mobility and financial depth which was believed to be one of the channels connecting capital account liberalization and economic growth. But their hypothesis was weakly supported.

Based on the standard economic growth model, Edison et al. (2002) deepened the analyses of the effect of capital account liberalization on economic growth in a broader sample of countries and years comparing with the one in Klein and Olivei (1999). They used four indicators for capital account liberalization in the regressions in order to obtain robust results, which were $SHARE_{76\text{-}95}$, $Quinn_{82}$, $\Delta\, Quinn_{73\text{-}88}$, and $BHL_{80\text{-}95}$[26]. In order to gauge whether there is upward bias due to the concern of reverse causality on the coefficients of the liberalization measures by

[24] Arteta, Eichengreen and Wyplosz (2001) adopted the basic model and econometric methods for estimation found in Edwards (2001) and developed different sets of instrumental variables for testing the sensitivity of the results. They also respected the measure of Quinn for 1973 and 1988, while, recognizing the shortcoming of this measure in Edwards' results.

[25] See Arteta, Eichengreen, and Wyplosz (2001), p. 27.

[26] I maintain the notation for indicator by Bekaert, Harvey & lundblad (2001) in Edison et al. (2002).

OLS estimation, instrumental variables estimation was used. The instruments reflect the initial level of government consumption, import, and regional conditions. Additionally, different measures of the original level of liberalization are considered[27]. However, the larger coefficients for capital account liberalization indicators in IV dealt with the concern about the existence of upward bias in OLS estimation. According to the team led by Edison and Klein, capital account liberalization measured by various indicators except Δ Quinn$_{73\text{-}88}$ (which only has a positive coefficient but not statistically significant) positively affected economic growth. In contrast with the results of sub-sample stability, the Edison and Klein group inferred that the effects of capital account liberalization on growth were greater in developing countries, especially in East Asian countries, than those in industrial countries. They believed that this came from the possibility that the capital account was really a proxy for the quality of government, though more empirical results didn't offer much supporting evidence.

There is also some literature considering measures of liberalization of a country's equity market to identify the effect of financial liberalization on economic growth. For example, in Bekaert, Harvey and Lundblad (2001), it was found that financial liberalization did increase economic growth, especially shortly after the liberalization, by a series of empirical analysis and the results were statistically robust and significant over a five-year period. In spite of this, they still concluded that this was not a definitive result. They emphasized that the liberalization effect they studied

[27] Quinn's 0-4 measure in 1973 is for Quinn$_{82}$, IMF's AREAER 0/1 in 1973 is for SHARE$_{76\text{-}95}$ and BHL$_{80\text{-}85}$.

was only an average effect and the country-specific conditions would lead to a consequence of capital account liberalization which would differ widely from the average, even entailing a crisis.

Briefly, we can see in table 3 that the recent literature offering supporting evidence on the positive growth effect of capital account liberalization mostly agree on the importance of a country's initial level of development in terms of its financial system and social institutions. Hence, on the basis of the sub-sample tests in cross-country analyses (with the exception of Edison et al. 2002), scholars found a greater effect of capital account liberalization on economic growth in industrial countries than in the developing countries, though different results were given due to the number of countries and years included in the sample, and due to the various econometric methods being adopted for the estimations.

2. Literature with non-supporting evidence

Not all the literature provides the evidence supporting the hypothesis that there exists a positive consequence of capital account liberalization for economic growth, illuminated by the fact that there are more frequent and severe crises following liberalization which is shown by studies of the 1997 Asian financial crises, though we cannot confirm whether the liberalization of financial markets is the only direct cause of the crises. Some argued that there was neither a positive nor a negative relation between capital account liberalization and long-run economic growth if other determinants of growth were controlled for, such as Grilli & Milesi-Ferretti (1995),

Rodrik (1998) and Kraay (1998), O'Donnell (2001). Instead, others, like Stiglitz (2000) and Singh (2003), recognized the higher costs of liberalization on the economy.

Actually, even before Quinn's study on the relationship between capital account openness and economic growth, Grilli and Milesi-Ferretti (1995) had made an effort to explore the evidence. They undertook a study of five non-overlapping five-year periods and average growth per capita income for 61 countries. As other popular studies on such issue, they departed from the basic growth determinant model but added the variable measuring capital account liberalization, SHARE in this literature, and other variables that could explain economic growth. They applied the OLS estimation in the regression and instrumental variables method for estimating the capital account liberalization to eliminate the potential reverse causality problem. However, there is no obvious correlation suggested from the empirical results because no identical signs were found for the coefficients of variables indicating capital account openness.

Compared with Quinn (1997), Rodrik (1998) is an important alternative most frequently cited in the following literature. First, he highlighted the cases of crises happening around 1997 in East Asia and South America. Rodrik included more developing countries in his cross-country sample to estimate a similar model (though Quinn had more independent variables included). This avoided the problem that more industrial countries with higher incomes led to a bias of positive average effect of capital account liberalization suggested in Quinn's study, especially if we agree with

Edwards (2001)'s opinion that high-income countries are characterized by a larger probability of capital account liberalization to impact positively on growth. The most obvious difference in the literature is to be found in Rodrik who used "the smaller proportion of years in Quinn's study representing the 'lost decade' of the 1980s and differences in the capital account indicator"[28]. In contrast, Quinn started his study earlier.[29] However, what explains the contrast is still not clear because the real world is undoubtedly more complex than that represented in the respective model. But Rodrik, like most other contemporary scholars devoted to studying this issue, criticized the neoclassical explanation on the effect of capital account liberalization. He argued that financial liberalization was not the same thing as trade liberalization, a view also held by Stiglitz. As additional literature with supporting evidence, Rodrik's work pointed to the possibility that significant effects only exist in countries with strong financial and economic institutions, though he didn't obtain the evidence to support it. In addition, he argued that while appropriate macroeconomic policies could reduce the risks relating to the intrinsic features of financial markets, like herding, panics, contagion, and boom-and-bust cycles, they could not eliminate them. He also admitted the same shortcoming as Quinn (1997) that they didn't distinguish the regionally-specific situations in industrial countries and developing countries respectively. In the same year, Kraay used two different indicators of capital account liberalization to obtain the coefficients with identical signs in a shorter period (see table 3) but similar results were derived for SHARE and Quinn indicators. Only the

[28] See Edison & Klein (2002) and Eichengreen (2001)
[29] Eichengreen (2001) "With an earlier start, his sample may include more observations in which countries liberalized inflows of foreign direct investment, with positive effects on growth." See p. 351.

variable on Volume[30] suggested a positive and significant effect on growth.

Not giving the empirical results from the growth regression model on measures of capital account liberalization, Stiglitz (2000) scrutinized the cases of crises occurring recently and found no evidence to support orthodox theories on the positive effects of capital account liberalization. He examined the effect of capital account liberalization by length of time. Explaining the great costs resulting from short-run capital mobility, Stiglitz concluded that only long-run capital inflows (foreign direct investments) were helpful to growth. On the other hand, in developing economies, even free movements of FDI may contribute to financial fragility. Hence, Stiglitz believed that financial crises were one of the consequences of the liberalization of capital controls. Stiglitz put forward the proposal that controls on short-run capital movements were desirable in all of the countries and some specific regulations on FDI flows were also necessary in most of the developing countries.

The starting point in Singh (2003) is the broad brush approach adopted by Singh (1997a). He attempted to compare GDP growth and productivity growth of OECD countries under a liberal regime (1980s and 1990s) when economies should have been expected to grow even more than in the regulated "golden age" of the early postwar years. Instead, a worse situation had occurred during the 1980s and 1990s when they had no such problems that the "golden age" had to face, such as the exhaustion of technological opportunities, labor market imperfections and economic shocks. Singh (1997a) and Singh (2003) ascribed the poor performance, including

[30] Volume is also a measure of capital account openness, but it is a quantitative one indicating the information on capital flow.

lower GDP growth and productivity, and high unemployment of industrial countries in the 1980s and 1990s, to the intrinsic features of the liberalization of the capital account. As stated by Stiglitz (2000), Singh agreed that the liberalization of capital controls didn't produce the growth but rather the instability. Capital account liberalization was thus responsible for the recent financial crises all over the world.

Almost all of the scholars standing in the opposite position to the neoclassical literature start from empirical analyses of financial crises in economic history. They offer more weight on the short-term capital flows, which, compared to the benefits of long-run capital flows (such as foreign direct investments), suggest greater costs to the economy when they evaluate the effect of capital account liberalization. Some base themselves on the critics of orthodox theories[31] and others attempt to offer closer models to the real economic world. However, the gap between what we can do and what the world actually is like is huge. No matter where they start their studies, some macroeconomic policies entailing financial interventions are recommended. For example, Stiglitz emphasized the need for intervention on capital inflows and outflows respectively in order to ensure the attainment of desirable macroeconomic goals, relating to the level of employment, inflation, and interest rates, etc.

IV. Empirical Analysis

1. Model, Data and Method.

My research is designed to test whether capital account liberalization will

[31] For example, in neoclassical theories, capital account liberalization is thought to be exogenous, but in fact, policy choices regarding the capital account are endogenous, and to some extent depend on economic conditions themselves.

result in higher economic growth, when controlled for various political and economic variables. I try to obtain robust results from pooled time series and cross-sectional regression model. I will use three different indicators of capital account liberalization for the empirical estimation, namely the IMF indicator, SHARE and the modified Quinn indicator, in order to ascertain the influence of the measures on the estimated effect of capital account liberalization. To test the robustness of the results, I run the regressions on two successive and non-overlapping 10-year periods from 1976 to 1995 and find whether the effects of capital account openness on growth are the same in these two separate periods. I will regress the model for industrial countries and developing countries respectively in order to find whether the impact of capital account liberalization differs between industrial countries and developing countries. I also regress the model for different regions in developing countries in order to provide a reasonable explanation of the recent financial crisis in some developing countries following their liberalization of the capital account. I introduce an additional variable into the model to identify the interaction of a country's development and the influence of capital account liberalization on long-run economic growth which is also empirically tested by Quinn & Toyoda (2004) and Edwards (2001).

As I have described in the previous section on the literature survey, most of the models of economic growth are established on the basis of the standard economic growth model developed by Barro and Sala-i-Martin (1995) and Levine and Renelt (1992), based on some deterministic macroeconomic indicators, the level of GDP in the initial year, the education level, and investment. I depart from the model of

determinants of economic growth by Barro (1997) and augment it. And the model is expressed as:

$$\ln GDP_i = \alpha_0 + \alpha_1 \ln GDP_{76} + \alpha_2 CAPOP_i + \alpha_3 INV_i + \alpha_4 POP_i + \alpha_5 INF_i + \alpha_6 EXP_i + \varepsilon_i$$

Where, α_0 indicates the constant term and ε is disturbance term.

The dependent variable is the log of real GDP per capita. I add the variables indicating the capital account liberalization to the model. I will use IMF, SHARE and modified Quinn[32] indicators respectively to test the growth effect and strengthen my results. IMF is the indicator based on information from line E.2 of the IMF's AREAER; SHARE, based on IMF's AREAER, represents the proportion of years in the period 1976 to 1995 that a country had open capital accounts. What I should mention here is that, in the regression, I use the average value of the modified Quinn indicator over the sample period for all-counties estimation and developing countries estimation because the data of modified Quinn indicator is only available for developing countries beginning in 1958 (it is too early to apply in my empirical study), 1973, 1982, 1988, and 1997. Other control variables as determinants of economic growth also need to be considered. The first is the initial value of log GDP per capita in 1976. According to the neoclassical endogenous growth theory which has been exploited seriously as an empirical hypothesis recently (see Chapter 1 in Romer 1996 and chapter 1 in Barro and Sala-i-Martin 1995), one must also take into consideration the force of convergence across countries. A country with a high starting level of per capita GDP in relation to its long-run position should grow slower than others with

[32] These indicators have been described in the previous part of the paper.

relatively a low starting level of per capita GDP.[33] Since all the coefficients for the initial log GDP in Table 4 are significantly negative, this substantiates the convergence hypothesis. The second control variable in my model is the change of the ratio of investment to GDP. This variable supposedly reflects the saving rate in an economy in accordance with neoclassical theory (see the part on the Solow Model in Romer 1996). For a given starting value of GDP, "a higher saving rate raises the steady-state level of output per effective labor and thereby the growth rate of GDP."[34] Regardless of the theoretical framework, there exists many empirical studies, including my work (see row 2 in Table 4), which provide a significantly positive effect of the investment ratio on economic growth at the 99% level of confidence. The third independent variable in the model is growth of population. According to many neoclassical studies, growing population suggests that more investment in the economy will go towards providing capital for new workers instead of being used to raise capital per worker. Hence, Barro (1997) argues that "a higher rate of population growth has a negative effect on the steady-state level of output per effective worker"[35]. Examining the coefficients, the coefficients for growth of population in Table 4 suggest a significantly positive effect of population increase on economic growth. The fourth independent variable is the inflation rate which is not only of concern to consumers but also to central bankers. Generally, businesses and households are thought to perform poorly when inflation is high and unpredictable. The empirical

[33] This property derives from the assumption of diminishing returns to capital.
[34] See Barro (1997), p. 32. However, the investment ratio reflects the saving rate in the neoclassical model, which is not necessarily true for a open economy.
[35] See Barro (1997), p. 22.

studies on the effect of inflation have been done by many scholars. Among these studies, some empirical results suggest that inflation is harmful to economic growth. However, from the financial crisis in the 1990s, the lessons do suggest a potential influence of the sudden depreciation of a currency on the economy in Latin America and East Asia, although, in my empirical work, the coefficients of the inflation rate fail to substantiate this hypothesis. (There was no significant relation between inflation and economic growth.) Another important control variable which was included as explanatory variable for determining economic growth was export as a proportion of GDP [36]which was designed to represent trade openness. According to trade theory, in an open economy, the react to the change in the terms of trade will raise real domestic income.[37] While that may be so on the basis of international trade theory, not all the coefficients are significantly positive at 1% confidence level in Table 4. (Model 1 and 2 give the significant results at 5 % or the 1%, but model 3 does not.)

In my paper, I use 61 countries for the pooled, cross-section, time-series models, including 21 industrial countries and 40 developing countries.[38] The data from 1976 to 1995 was used in the estimations. I use Pooled Least Squares method with White Heteroskedasticity and Consistent Standard Errors & Covariance. An alternative investigation strategy in this study is to estimate standard instrumental

[36] It should be mentioned that this variable is not the best one to show the trade openness. Because of the data limitation, it is just a reasonable variable included in the model.
[37] See Obstfeld and Rogoff (1996), the inter-temporal approach to current account offers the explanation on how an open economy achieves a higher welfare, real domestic income, consumption (possibly) by an improvement of the terms of trade.
[38] The country list is found in the appendix. The classification of the countries is in respect with the definitions by the International Monetary Fund.

variable (IV) regressions due to the possible reverse causality problem for the effect of capital account liberalization. In extending the previous works, I was able to provide the independent analyses of the robustness of the results based on different periods and regions. I also try to use more indicators to measure the capital account liberalization included in the regressions in order to confirm the results.

2. Basic Empirical Results for the Impact of Capital Account Liberalization

In Table 4, the results are shown for testing whether the liberalization of the capital account will bring higher economic growth among all countries in the sample. I regress the designed models by using three kinds of indicators of capital account liberalization for the period 1976 to 1995. I attempt to evaluate empirically whether the different indicators employed will provide a great difference in the results or, alternatively, results with similar property. See Row 7, in Table 4. Models 1 to 3 correspond to the IMF indicator, SHARE and the modified Quinn indicators, respectively. After controlling for other independent variables, all the liberalization indicators have significantly positive coefficients at the 99% level of confidence, that is, equal to 0.36, 0.53, and 0.01. Generally, these results suggest fewer restrictions in the capital account will improve real GDP per capita. The use of different measures of capital account liberalization shows little effect on the sign and significance of the impact of liberalization. As to the value of the coefficients, SHARE shows the highest estimated effect. These differences are probably due to the properties of the measures

themselves as were described previously.

A question that has been often raised in the literature (See Edison al et. 2002, Edwards 2001, and Arteta, Eichengreen, and Wyplosz 2001) is whether there is an upward bias on the coefficients of the liberalization variable because of reverse causality. For example, perhaps the countries that are most likely to have liberalized their capital accounts are the ones that grew most quickly during the relevant period. Some scholars have used the instrumental variables method to solve this problem, via the use of reverse regressions. To deal with these difficulties by a relatively reasonable method, I choose a set of instruments for the measures of capital account liberalization which are used in Edison et al. (2002). These instruments are the government share of GDP in 1976, imports as proportion of GDP, a dummy variable for Latin American countries and another dummy variable for East Asian countries. Additionally, the conditions of capital account liberalization in 1973 are included. For SHARE and IMF indicator, we use the 0 or 1 value of the IMF indicator in 1973 as an instrument; for the modified Quinn indicator, the instrument is the value of the modified Quinn in 1973.[39] Table 5 presents the results for the 2-stage OLS regressions. In model 1 and 3, if we suppose other variables are controlled, though the values become somewhat smaller, the coefficients of IMF and modified Quinn indicators do not show a change both in sign and significance. Only SHARE shows a reduction in significance. (In Table 4, SHARE is significant at 1%; in contrast, in Table 5, it is significant at 10%.) This difference possibly results from the use of

[39] The reason for choosing the value of indicators of capital account liberalization in 1973 is that only the data in 1973 is available for developing countries around 1976.

instruments.[40] In spite of this, generally speaking, our results confirm the positive impact of capital account liberalization on economic growth.

To test the robustness of the results from my models, I use the methodology of adding more contingent variables into the model in Quinn (1997) and Quinn & Toyoda (2004). Here, I include three dummy variables for the Asian countries, Latin American countries and the African countries respectively. But I only use the IMF indicator to test the hypothesis. The results are presented in Table 6. A higher value is obtained for R^2. Compared with Row 7 and Column 1 in Tables 4 and 5, the coefficient of IMF indicator for capital account openness is 0.165 and the standard error is 0.041, which suggests that the effect of liberalization is still significantly positive at the 99% level of confidence after more regional variables are included. Hence, the term "robustness" can best describe the strength of the estimated relationships.[41] And the coefficients of the regional dummy variables shown in Table 6 are all significantly negative. In Barro (1997), he observed a surprisingly low level of economic growth in Africa and Latin America for the period 1975 to 1985, which is compatible with what our results suggest. However, according to his research, a surprisingly high economic growth also accompanied the East Asian countries, which is opposite to our results. This difference comes from the countries that I include in the estimations. I do not separate the industrial countries and developing countries to do the test. However, when pitted against the growth rates of industrial countries, the

[40] For SHARE, the initial level of IMF applies as instrument because of the definition of SHARE.
[41] Quinn (1997), p. 539: note of Table 2 says "'Robust' means the estimated coefficient of a variable is always significant at 5% or beyond when the 'conditioning information' changes (i.e., other independent variables)", is "fragile", otherwise.

growth rates of many Asian countries would, nevertheless, show relatively low growth in comparison.

3. Does the effect of capital account liberalization differ between industrial countries and developing countries?

Though we admit that growth can display strong regional differences, does the effect of capital account liberalization on growth also show such regional discrimination? This problem has been investigated in several articles, such as Edwards (2001), and Edison et al. (2002). In this paper, I attempt to regress the models for industrial countries and developing countries separately. Table 7 presents the results of our three different measures of capital account liberalization in industrial countries and developing countries. With the IMF indicator, both types of countries generate significantly positive coefficients at the 99% level of confidence. And the value for industrial countries is somewhat larger than that for developing countries. For the modified Quinn indicator, the same result is obtained. Only SHARE gives the opposite result. But the results are significant at the 95 % level or lower, which are less robust than those of the other indicators. Summarily, these results suggest an argument that, for industrial countries, the effect of capital account openness on economic growth is significant, which is similar to the ones put forward by scholars supporting the conditional liberalization of capital account by taking into consideration a country's stage of financial and institutional development.

Then I deepen my research by exploring regional heterogeneity. In Table 8,

I find interesting results whereby the coefficients are significantly negative for Quinn indicators and negative but insignificant for other indicators in the case of the Asian countries and Latin American countries. Moreover, these results are similar to the ones found by Arteta, Eichengreen and Wyplosz (2001). These specific phenomena can be understood only in light of the history of capital controls in these two regions. Both of the regions imposed capital account restrictions around the time of the debt crisis, especially in the case of the Latin American countries. A clear acceleration of the liberalization process happened in the late 1980s and early 1990s for these countries. But as we have seen, following the prevalence of capital account openness (though it occurred gradually), the financial crises attacked these two regions greatly. Recognizing these facts, many writers, such as Arteta, Eichengreen and Wyplosz (2001), provide possible explanations of the slow growth:

> *"Countries with significant trade distortions and large black market premium grew more slowly if they ill advisedly opened their capital accounts. That this effect is most evident in the debt-crisis years 1982-1987 may be telling us that countries that poorly sequenced capital account liberalization suffered the most devastating effect of the curtailment of capital flows; they suffered a severe debt overhang and an intractable transfer problem when the debt crisis struck."*[42]

They argued that the effect of capital account openness is contingent on the absence of a large black market premium, that is to say, on the absence of macroeconomic imbalances. Hence, in Eichengreen et al. (1998), it is suggested that:

> *"as a part of an overall approach to economic and structural reform, liberalizing the capital account should be implemented after the establishment of current account convertibility and the completion of financial sector reforms. These reforms include*

[42] See Arteta, Eichengreen and Wyplosz (2001), pp. 25-26.

freeing interest rates on loans and deposits, developing indirect monetary instruments such as treasury bills and abolishing credit ceilings."[43]

4. Are the results period-specific?

Imitating the studies of Arteta, Eichengreen and Wyplosz (2001), I test whether the positive effect of capital account liberalization on growth is applicable only for certain specific periods. I analyze two sub-periods. One is from 1976 to 1985. During this period, some developing countries experienced a debt crisis. The other is from 1986 to 1995. Most of countries, including industrial countries and developing countries, removed their restrictions on capital account transactions. Table 9 presents the results of regressions for all countries, as well as industrial countries and developing countries separately over the period 1976 to 1985. Table 10 provides the corresponding results for these regressions over the period 1986 to 1995. For the estimation of the growth effect of capital account liberalization in all countries, the empirical findings suggest significant positive coefficients for both sub-periods. However, the impact of liberalization seems to be higher during 1976 to 1986 than during 1986 to 1995 except for the one measured by modified Quinn indicator which has the positive coefficient, 0.008, in the first 10-year period and the coefficient, 0.010, in the second 10-year period. However, if we just rely on the IMF-based measure to consider the problem, we may conclude that the difference between these two sub-periods can be ascribed to the absence of a large black market premium in the

[43] See Eichengreen (1998), p. 38.

early 1980s.[44] If the relationship between the elimination of large market premium and economic growth is significant, this would then explain why the effect of capital account liberalization on growth is larger during the 1976 to 1985 period. The specific situations for industrial countries and developing countries are more complex. In Table 9, model 6 and Table 10, model 5, we can see insignificant negative coefficients for the effect of capital account liberalization. Indeed, in terms of significance, the results for the second 10-year period have less power to explain the relationship between capital account openness and economic growth than those for the first 10-year period. (In the period from 1976 to 1985, 5 out of the 6 models give the significant coefficients at the 99% level of confidence; in contrast, during the period from 1986 to 1995, 3 out of 6 models provide significant coefficients at the 95% or higher level of confidence.) Largely because of the lack of robust evidence for the positive effect of capital account openness, many contemporary scholars, like Stiglitz (2000), Summers (2000)[45] departed from the mainstream view, especially on the basis of evidence from the recent severe crisis occurring in some developing countries, to argue that the opening of the capital account just provides the instability and not the growth. Hence, certain capital account controls should be implemented not only on short-run capital flows but also long-run capital flows in the future.

[44] See Quinn and Toyoda (2004), and Barnett (1999). They pointed to the possible relationship between the growth and the existence of a black market premium.

[45] Summers (2000) saw sound financial systems could contribute enormously to economic development around the world, and the flow of capital across international borders can confer enormous benefits. He figured out the influence of an Okun gap. He said that "remembering Jim Tobin's admonition, that it takes a heap of Harberger triangles to fill an Okun gap, conclude that the game is not worth the candle and so the flow of capital should systematically be discouraged, I think the right lesson is the more optimistic one, that with good sense and hard work, and a great deal of creative thought, the Okun gaps can be avoided, and the gains from capital flows can translate into what is most important for any economy: namely, changes in its long-term growth rate." See p. 14.

5. Does the level of a country's development matter when addressing the effect of capital account liberalization?

A question raised by many scholars (See Edwards 2001, Quinn & Toyoda 2004, and Alfaro 2004) is whether the effect of capital account openness on growth depends on the country's level of development. To test this possibility, I add an interactive independent variable in the estimation of the basic model for the all countries sample. This variable is expressed as $CAPOP*lnGDP_{76}$, the product of our measure of capital account liberalization, here using the IMF to measure, and the level of development variable captured by the log of real GDP per capita in 1976. All the coefficients for the log of GDP in 1976, IMF indicator, and the interactive term are statistically significant at the 99% level of confidence. Hence, the liberalization's effect is contingent on the development variable. And the corresponding values of the coefficients are -0.127, 0.672, and -0.055. Since the interaction between the two contingent variables has a significantly negative effect on growth, while capital account liberalization has a positive effect on economic growth, we can say that a negative coefficient of the interactive term means that the effect of a more open capital account increases with the initial level of development of the country.

V. Concluding Remarks

The effect of capital account liberalization is possibly influenced by a complex set of factors. The controversy on this issue shows that there are two competing views.

People on one side maintain that those countries with more liberalized capital account will set the stage for more rapid development. However, people on the other side of the debate see the lesson of the crises in 1990s and question the advantages conferred by capital account liberalization. In contrast to the mainstream view, they argue that countries become more vulnerable to financial disruptions when their governments relinquish controls over capital account transactions.

In my paper, I surveyed the recent literature with both supporting and non-supporting evidence for the hypothesis that capital account liberalization will have a positive impact on economic growth. From my own empirical study, I was able to find supporting evidence for this positive relation over the all-country estimations regardless of what measure of capital account liberalization is used. However, the situation for developing countries is more complicated due to substantial regional differences and specific period reasons relating to their particular levels of development. Among the developing countries, especially in Asia and Latin America, there is some evidence of a negative effect of liberalization arising as a consequence of the financial crisis occurring in these regions, though I do not get direct empirical support in the work and there may be some other reasons to explain the consequence of the crises instead of capital account liberalization. In this case, the measures of capital account liberalization do matter both in terms of statistical significance and with regards to the sign of the coefficients. Through the analysis of regional heterogeneity and the sub-period studies, my evidence recognizes the stimulating impact of capital account liberalization on economic growth; but, for the countries

without complete and sound economic and institutional foundations, the progress should be gradual and based on the reasonable macroeconomic policy reforms appropriate to their particular level of development. The empirical evidence shows that the development of a country does matter when analyzing the effect of capital account liberalization on growth. Hence, the industrial countries with a higher level of development acquire a little more benefit from the liberalization of the capital account than the developing countries.

However, in this paper, I do not attempt to trace the possibility of whether there are other political and economic independent variables affecting the impact of capital account liberalization on growth, such as financial development, government consumption and so on. And I also do not use additional variables to raise the explanatory power of the models because of the limitations of the data source. Though I recognize the obvious harm of short-run capital mobility, I have only put emphasis on the long-run investigation of the effect of capital account liberalization. However, these regrets offer me good topics for future studies. Perhaps the former could constitute a good topic of future research.

APPENDIX A: Tables with Empirical Results

Table 4. Basic Regression of Growth of real GDP per capita for all countries in the sample and for the period 1976 to 1995

Independent variable	Model 1	Model 2	Model 3
Initial log real GDP per capita (lnY1976)	-0.149***	-0.144***	-0.124***
	(0.007)	(0.007)	(0.008)
investment ratio	0.041***	0.040***	0.042***
	(0.003)	(0.003)	(0.003)
The growth of population	-0.075***	-0.088***	-0.098***
	(0.015)	(0.015)	(0.015)
Inflation	0.130	0.120	0.084
	(0.103)	(0.102)	(0.101)
Trade openness (export as a proportion of GDP)	0.004***	0.002**	0.002**
	(0.001)	(0.001)	(0.001)
Measures of capital account openness			
IMF	**0.360*** **		
	(0.047)		
SHARE		**0.531*** **	
		(0.060)	
Quinn			**0.010*** **
			(0.001)
Constant	9.404***	9.499***	8.968***
	(0.160)	(0.160)	(0.156)
R^2	0.54	0.55	0.56
Country number	61	61	61

OLS regression, t-statistics derived using robust standard errors in parentheses.

Significance at 10%, 5%, and 1% by *, **, *** respectively.

Table 5. Regressions of Growth of Real GDP per capita with IV for capital account liberalization measures

Independent variable	Model 1	Model 2	Model 3
Initial log real GDP per capita (lnY1976)	-0.150***	-0.149***	-0.140***
	(0.007)	(0.007)	(0.007)
investment ratio	0.050***	0.050***	0.051***
	(0.002)	(0.002)	(0.002)
The growth of population	-0.070***	-0.068***	-0.078***
	(0.014)	(0.014)	(0.014)
Inflation	0.064	0.069	0.051
	(0.094)	(0.094)	(0.093)
Trade openness (export as a proportion of GDP)	0.002***	0.003**	0.001
	(0.001)	(0.001)	(0.001)
Measures of capital account openness			
IMF	**0.208*** **		
	(0.074)		
SHARE		**0.155***	
		(0.079)	
Quinn			**0.005*** **
			(0.0008)
Constant	9.335***	9.312***	9.163***
	(0.148)	(0.149)	(0.144)
R^2	0.59	0.59	0.60
Country number	61	61	61

Note: OLS regression, t-statistics derived using robust standard errors in parentheses. Significance at 10%, 5%, and 1% by *, **, *** respectively.

The instruments for measures of the capital account liberalization are the government share of GDP in 1976, imports as proportion of GDP in 1976, a dummy variable for Latin American countries and another dummy variable for Asian countries. For SHARE and IMF indicators, we use the IMF for 1973 from the IMF's AREAER as an instrument, while, for the modified Quinn, we use the 1973 value of Quinn as an instrument.

Table 6 Robustness Test for adding regional dummy variable into the regression on growth (using IMF indicator)

Independent variable	Coefficients	Standard Error	P-value
Initial log real GDP per capita (lnY1976)	-0.059	0.011	0.0000
investment ratio	0.032	0.002	0.0000
The growth of population	0.019	0.015	0.1915
Inflation	0.059	0.083	0.4787
Trade openness (export as a proportion of GDP)	0.012	0.001	0.0000
IMF	0.165	0.041	0.0001
Latin American	-0.361	0.072	0.0000
Asia	-1.140	0.076	0.0000
Africa	-1.294	0.070	0.0000
Constant	8.382	0.166	0.0000
R^2	0.70		
Country number	61		

Table 7. Regression of Growth of Real GDP per capita for the industrial countries and developing countries respectively for the period 1976 to 1995

Independent Variable	Industrial Countries			Developing Countries		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Initial Log Real GDP per capita (lnY1976)	7.211*** (0.338)	7.754*** (0.377)	7.151*** (0.331)	0.817*** (0.021)	0.817*** (0.021)	0.817*** (0.021)
Investment ratio	0.010*** (0.002)	0.008*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.003)
The Growth of Population	-0.006 (0.006)	-0.007 (0.007)	-0.024*** (0.007)	-0.009 (0.014)	-0.010 (0.015)	-0.011 (0.015)
Inflation	0.098* (0.058)	0.112* (0.059)	0.037 (0.057)	-0.056 (0.059)	-0.058 (0.059)	-0.061 (0.059)
Trade Openness (export as a proportion of GDP)	0.0006 (0.0006)	0.002** (0.001)	-1.50E-05 (0.0005)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.0008)
Measures of Capital Account Openness						
IMF	**0.125*** (0.016)**			**0.076*** (0.025)**		
SHARE		**0.046* (0.027)**			**0.080** (0.036)**	
Quinn			**0.004*** (0.0004)**			**0.002*** (0.0006)**
Constant	-6.767*** (0.762)	-8.084*** (0.851)	-6.776*** (0.723)	1.305*** (0.246)	1.2317*** (0.253)	1.256*** (0.240)
R^2	0.71	0.76	0.81	0.81	0.81	0.81
Country number	21	21	21	40	40	40

Note: OLS regression, t-statistics derived using robust standard errors in parentheses. Significance at 10%, 5%, and 1% by *, **, *** respectively.

Table 8. Regression of Growth of Real GDP per capita
for the analysis whether the impact of capital account liberalization differs among regions in the developing countries over the period 1976 to 1995

Independent Variable	Asian Countries			Latin American Countries			Other Developing Countries		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Initial Log Real GDP per capita (lnY1976)	0.826***	0.8310***	1.095***	0.926***	0.927***	0.926***	0.799***	0.798***	0.798***
	(0.071)	(0.072)	(0.077)	(0.019)	(0.019)	(0.019)	(0.036)	(0.037)	(0.036)
Investment ratio	0.013***	0.013***	0.010***	0.012***	0.012***	0.013***	0.008**	0.009**	0.009***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.003)
The Growth of Population	0.092***	0.093***	0.284***	0.010	0.009	0.008	-0.124***	-0.124***	-0.124***
	(0.021)	(0.021)	(0.025)	(0.014)	(0.014)	(0.014)	(0.027)	(0.027)	(0.027)
Inflation	0.647	0.638	0.296	-0.059	-0.058	-0.061	-0.081	-0.080	-0.077
	(0.246)	(0.244)	(0.222)	(0.040)	(0.039)	(0.039)	(0.169)	(0.169)	(0.169)
Trade Openness (export as a proportion of GDP)	0.007	0.007	0.012	0.008***	0.008***	0.008***	-0.0005	-0.0004**	-0.0003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Capital Account Openness									
IMF	**-0.040**			**-0.009**			**0.118**		
	(0.049)			**(0.022)**			**(0.340)**		
SHARE		**-0.056**			**-0.0003**			0.077	
		(0.048)			**(0.0005)**			**(0.873)**	
Quinn			-0.009***			**-0.086*** **			**-0.001**
			(0.001)			**(0.031)**			(0.003)
Constant	0.233	0.189	-3.550***	0.235	0.251	0.253	2.597***	2.594***	2.631***
	(0.674)	(0.678)	(0.774)	(0.175)	(0.175)	(0.166)	(0.332)	(0.344)	(0.354)
R^2	0.94	0.94	0.96	0.86	0.87	0.87	0.73	0.73	0.73
Country number	8	8	8	18	18	18	14	14	14

Note: OLS regression, t-statistics derived using robust standard errors in parentheses. Significance at 10%, 5%, and 1% by *, **, *** respectively.

Table 9. Regression of Growth of Real GDP per capita for the period 1976 to 1985 and for all countries, industrial countries and developing countries

Independent Variable	All Countries			Industrial Countries			Developing Countries		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Initial Log Real GDP per capita (lnY1976)	-0.164*** (0.010)	-0.164*** (0.010)	-0.142*** (0.011)	8.303*** (0.220)	8.322*** (0.231)	8.784*** (0.263)	0.835*** (0.027)	0.833*** (0.028)	0.844*** (0.027)
Investment ratio	0.033*** (0.004)	0.034*** (0.004)	0.034*** (0.004)	0.005*** (0.001)	0.005*** (0.001)	0.004** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.003)
The Growth of Population	-0.075*** (0.023)	-0.088*** (0.024)	-0.085*** (0.024)	-0.011** (0.006)	-0.010 (0.006)	0.004 (0.007)	-0.027 (0.017)	-0.028 (0.018)	-0.028 (0.018)
Inflation	-0.179 (0.250)	-0.262 (0.248)	-0.257 (0.250)	-0.191*** (0.056)	-0.241*** (0.059)	-0.212*** (0.061)	-0.167 (0.140)	-0.166 (0.141)	-0.177 (0.141)
Trade Openness (export as a proportion of GDP)	0.003* (0.002)	0.007 (0.002)	0.003 (0.002)	0.001* (0.0005)	-0.001 (0.005)	0.0003 (0.0005)	0.003*** (0.001)	0.003*** (0.001)	0.003** (0.001)
Capital Account Openness									
IMF	**0.376*** (0.069)**			**0.066*** (0.014)**			**0.109*** (0.028)**		
SHARE		**0.512*** (0.081)**			**0.061*** (0.019)**			**0.119*** (0.038)**	
Quinn			**0.008*** (0.001)**			**-0.0004 (0.0005)**			**0.002*** (0.0006)**
Constant	9.550*** (0.259)	9.660*** (0.259)	9.220*** (0.249)	-9.095*** (0.497)	-9.148*** (0.531)	-10.287*** (0.576)	1.411*** (0.313)	1.430*** (0.324)	1.294** (0.300)
R^2	0.51	0.52	0.51	0.89	0.89	0.88	0.86	0.86	0.86
Country number	61	61	61	21	21	21	40	40	40

Note: OLS regression, t-statistics derived using robust standard errors in parentheses. Significance at 10%, 5%, and 1% by *, **, *** respectively.

Table 10. Regression of Growth of Real GDP per capita for the period 1986 to 1995 and for all countries, industrial countries and developing countries

Independent Variable	All Countries			Industrial Countries			Developing Countries		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Initial Log Real GDP per capita (lnY1976)	-0.123*** (0.011)	-0.120*** (0.011)	-0.130*** (0.011)	7.066*** (0.345)	7.781*** (0.370)	7.461*** (0.384)	0.795*** (0.031)	0.794*** (0.031)	0.794*** (0.032)
Investment ratio	0.054*** (0.004)	0.054*** (0.004)	0.056*** (0.004)	0.014*** (0.002)	0.013*** (0.002)	0.013** (0.002)	0.026*** (0.004)	0.026*** (0.004)	0.026*** (0.004)
The Growth of Population	-0.111*** (0.020)	-0.113*** (0.020)	-0.132*** (0.020)	0.006 (0.008)	0.020 (0.007)	0.014* (0.008)	-0.030 (0.023)	-0.030*** (0.023)	-0.030 (0.024)
Inflation	0.105 (0.111)	0.097 (0.111)	0.086 (0.109)	-0.288*** (0.058)	-0.295*** (0.060)	-0.299*** (0.062)	-0.076 (0.065)	-0.075 (0.065)	-0.078 (0.066)
Trade Openness (export as a proportion of GDP)	0.0015 (0.0014)	0.001 (0.001)	0.001 (0.001)	0.002*** (0.0006)	0.003 (0.006)	0.003 (0.0006)	0.003** (0.001)	0.003** (0.001)	0.004*** (0.001)
Capital Account Openness									
IMF	**0.363*** (0.065)**			**0.053*** (0.016)**			**0.082** (0.040)**		
SHARE		**0.440*** (0.076)**			**-0.039 (0.024)**			**0.105** (0.047)**	
Quinn			**0.010*** (0.001)**			**1.61E-05 (0.0006)**			**0.0006 (0.0008)**
Constant	9.502*** (0.205)	9.501*** (0.205)	8.993*** (0.209)	-6.573*** (0.782)	-8.276*** (0.843)	-7.510*** (0.854)	1.608*** (0.374)	1.618*** (0.375)	1.582*** (0.375)
R^2	0.60	0.60	0.61	0.78	0.78	0.77	0.81	0.81	0.80
Country number	61	61	61	21	21	21	40	40	40

Note: OLS regression, t-statistics derived using robust standard errors in parentheses. Significance at 10%, 5%, and 1% by *, **, *** respectively.

APPENDIX B: DATA SOURCE

-Growth of Real GDP per capita (constant price: Lasperyres), Growth of Population, the Ratios of Investment to GDP, Government Share of GDP, are from Penn World Table 6.1.

-Export as a Proportion of GDP and Import as a Proportion of GDP are from World Development Indicator 2004(CD-ROM) published by the World Bank.

-Consumer Price Inflation is from IFS (International Financial Statistics) Browser.

-IMF's 0 or 1 indicator and SHARE indicator are from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), Line E.2 and my own calculations.

-Quinn indicator is obtained from my private communication with Denis Quinn.

APPENDIX C: COUNTRY LIST

Note: Countries are grouped according to the classification by the IMF (Africa, Asia, Middle Asia and Western Hemisphere).

INDUSTRIAL COUNTRIES:

AUSTRALIA, AUSTRIA, BELGIUM, CANADA, DENMARK, FINLAND, FRANCE, GREECE, ICELAND, IRELAND, ITALY, JAPAN, LUXEMBOURG, NETHERLANDS, NEW ZEALAND, NORWAY, PORTUGAL, SPAIN, SWEDEN, UNITED KINGDOM, UNITED STATES

DEVELOPING COUNTRIES:

AFRICA:

CONGO, GABON, MAURITANIA, MOROCCO, NIGERIA, RWANDA, SENEGAL, SIERRA LEONE, SOUTH AFRICA, TANZANIA

ASIA:

HONG KONG, INDIA, INDONESIA, KOREA, MALAYSIA, NEPAL, PHILIPPINES, SINGAPORE, SRI LANKA, THAILAND

WESTERN HEMISPHERE:

ARGENTINA, BARBADOS, BOLIVIA, BRAZIL, CHILE, COLOMBIA, COSTA RICA, DOMINICAN REPUBLIC, ECUADOR, EL SALVADOR, GUATEMALA, HAITI, HONDURAS, JAMAICA, MEXICO, NICARAGUA, PANAMA, PARAGUAY, PERU, TRINIDAD & TOBAGO, URUGUAY, VENEZUELA

MIDDLE EAST: EGYPT, IRAN, ISRAEL, JORDAN

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