Into the Great Wide Open, Or Why Institutions Matter in an Era of Globalized Finance

Matthew J. Botsch

Faculty advisor: Professor Adam Honig

Submitted to the Department of Economics of Amherst College
in partial fulfillment of the requirements for the degree
of Bachelor of Arts with Distinction

May 6, 2005

Into the Great Wide Open, Or Why Institutions Matter in an Era of Globalized Finance

Senior Honors Thesis of Matthew J. Botsch '05
Department of Economics of Amherst College

Version No. 1.0
May 6, 2005

Abstract

Previous research has shown that the same level of investment contributes more to growth in the presence of good institutions. This paper investigates how the role of institutions changes as a country removes its capital account restrictions. I run an OLS regression of growth in 70 countries over the sample period 1960-2000. My key explanatory variable is the interaction between an institution bonus term and an index of capital account openness developed by Quinn (1997). Controlling for standard growth determinants, I find that the magnitude of the institution bonus rises as countries globalize their financial systems. When financial markets operate smoothly, investment is allocated more efficiently and growth rises. Because more is asked of financial markets post-liberalization, the benefits for having good supporting institutions are greater.

For my grandfather, Robert F. Sears

Acknowledgements

Throughout the years of education and months of research that culminate in the spring of 2005 with my submission of this thesis, I was aided and helped along by many people. Listing them all would not be possible in this limited space, but it would be amiss of me to not single out a few individuals whose roles, though perhaps small in their own eyes, were large in mine.

First of all, thanks to my faculty advisor, Professor Adam Honig. My habit of coming into his office late on Friday afternoons with long lists of questions must surely have tried his patience, but I thank him for always taking the time to hear me out. His probing queries have forced me to refine my arguments, and his suggestions have pointed me in illuminating directions. This collaboration has been a learning experience for both of us, and I sincerely hope that he has found the project as rewarding as I have.

I would also like to thank Professor Geoffrey Woglom, who taught my first course in economics. For better or for worse, he is the person most directly responsible for my decision to become a major. His oft-repeated credo has kept my eyes focused on the true goal of economics—happiness.

Thanks to my fellow thesis writers in the economics department. If art is but suffering and toiling, then we have all of us created masterpieces this semester. Your camaraderie has made the long hours seem shorter and the late nights a little less dark.

Several other individuals deserve recognition. Kevin Daly suggested the title to this paper. Kerry Harwin encouraged me to spend a year studying in France. Aaron Lee introduced me to the joy of hiking, and discovered alongside me the wonder of Belgian beer. In Paris as well as in Amherst, I had the opportunity to befriend many wonderful people—far too many to name individually. Thank you for the memories.

Thanks as well to the many incredible professors whose classes have inspired and challenged me.

My parents always believed that anything was possible—so much that I started believing it, too.

And Alison, thank you for everything.

I apologize to those whom I have left out or forgotten. This thesis would not have been possible without many people's assistance. Its merits are, in large part, due to their help. Any faults are entirely my own.

Table of Contents

Abstract **2**

Acknowledgements **3**

1. Introduction **5**

2. The Globalization of Finance 8
2-1. Classicists and contrarians, or, is speculation stabilizing? 8
2-2. Financial crises: does the punishment fit the crime? 11
2-3. Financial openness and growth. 13

3. Institutions and Growth
3-1. Governance and growth. 15
A side-note on measuring institutions. 17
3-2. Financial development and growth. 19

4. Methods and Data 21

5. Results
5-1. Replication of earlier growth equations. 24
5-2. Financial development and growth estimated. 26
5-3. The case for a capital account-institution bonus. 28
5-4. Robustness and sensitivity.
Alternate measures of institutional quality. 31
Measures of financial depth. 32
Sensitivity to outliers. 33
Sensitivity to sample period. 34

6. Conclusions **35**

Data Appendix **37**

Country Appendix **41**

References **42**

Tables and Figures **44**

1. Introduction

Globalization is one of the most hotly-contested topics of the day. Outside the economics profession, a critique of globalization might run as follows: Globalization is a euphemism for America's influence and interference in the daily lives of foreign nations and peoples. In the global world of the not-so-distant future, all political questions will be decided by the American president, all "peace-keeping" missions will be led by the American military, all cinemas will show American movies, all businessmen will speak standard American English, and every major city will have an American fast-food restaurant on every corner.

The debate within the profession of economics is more nuanced. Globalization is about the elimination of constraints which prevent the most efficient allocation of resources. This process entails the opening of borders, the liberalization of regimes, and the free mobility of factors of production. There is little debate that free trade is an efficiency-enhancing policy—even when income is reallocated from domestic producers to domestic consumers, the latter group's gains usually outweighs the former group's losses.[1] Ever since Ricardo, economists have pushed for the liberalization of trade regimes and the elimination of tariffs.

Over the last three decades, the processes of globalization have extended into the realm of finance. The watershed date was August 15, 1971, when President Nixon announced that the U. S. was abandoning the gold standard. Later financial developments converged to reduce the importance of state regulation and increase the role of institutional investment firms: the appearance of markets for Eurodollars and petrodollars, the growing convertibility of national currencies, the relaxation of laws restricting the flows of capital between countries, and the development of information technologies making communication among international

[1] Of course, under certain conditions the opposite can be true: international trade agreements might succeed in lowering the prices of certain countries' exports relative to their imports, provoking a decline in the terms of trade, a reallocation of income from consumers to producers, and a net loss of purchasing power.

investors less costly (Michalet 2004, pp. 86-93). But unlike the case for free trade, the case for the complete liberalization of capital accounts has not yet been made. Those who criticize the merits of financial activity count John Maynard Keynes and James Tobin among their more illustrious forebears. Because financial activity is so much faster than "real" economic exchange, the cost of any slight mistake or market imperfection is much greater.

Much debate has focused around what type of mistake or market imperfection was responsible for the Asian crisis of 1997-98. Current discussion centers on the importance of institution-building, because financial market inefficiencies are hypothesized to be more prevalent in countries with weak governmental or financial institutions. In the presence of these weak institutions, it is more likely that investment flows will be misallocated, due either to corruption in the official hierarchy or to informational failures. Therefore, countries that are interested in globalizing their financial markets should focus on sequencing: first build the support structure necessary to guarantee that capital inflows will be efficiently allocated, then remove external capital controls.

This paper explicitly tests the following hypothesis: countries with well-developed institutions benefit from financial openness more than countries with poor institutions. I construct my regressions working from a growth-accounting perspective. Using a modification of the specification developed in Levine and Renelt (1992), I interact the investment variable with a series of indices of institutional quality, using measures for the quality of governmental institutions and for the depth of financial markets. This replicates and expands upon the previous finding by Crafts and Kaiser (2004) that countries with well-developed institutions experience a bonus on their investment contribution to growth. To test my hypothesis that this bonus will become more important as a country opens its capital

accounts, I create an additional term interacting the institution bonus variable with an index of capital account restrictions derived from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*. This hypothesizes that the institution bonus to investment varies directly with financial openness.

To anticipate my results, I find limited but compelling evidence in support of my hypothesis. In cross-country regressions over the entire time-period, there is a significantly larger institution bonus for liberalized countries. This indicates that countries with better institutional outcomes are better able to integrate into the global financial system—their institutions do more for them because more is asked of them. The result is robust to choice of governance indicator (but not to measures of financial depth) and remains significant even when outlying countries are eliminated from the sample. But the limited historical availability of data remains a problem. When broken into two subsets along the years 1982-87 and 1988-96, my key explanatory variable only remains significant in the more recent period. Pooled regressions of the two periods are not any more hopeful; the results are dominated by the "lost decade" of growth in Latin America. I am unable to consider a longer timeframe of in-country variation (as is the practice in other studies) because institutional data are not available prior to 1982.

The rest of the paper proceeds as follows. Chapters 2 and 3 review the major literature in the field, exploring in particular the relationships among the globalization of finance, institutions, and growth. Chapter 4 describes the empirical specification I use in my regressions and discusses the strengths and limitations of my data. Chapter 5 presents an analysis of my results, and chapter 6 concludes.

2. The Globalization of Finance

Economic theory provides a strong rationale for why the globalization of finance should be a positive step forward: if constraints on capital mobility prevent savings from reaching international investment opportunities with higher marginal returns than are available domestically, then the elimination of these constraints should improve allocative efficiency and enhance growth in world GDP.

This view is, however, the subject of vigorous debate. The question revolves around one's basic theory of the efficiency and usefulness of financial markets.

2-1. Classicists and contrarians, or, is speculation stabilizing?

Any discussion of the globalization of finance runs straight into the long-running debate over the social utility of financial markets. The argument concerns the notion of functional efficiency: is there some purpose served by financial markets that is sufficiently important (and that is performed sufficiently well) to justify the resources consumed by their operation? For the purposes of this paper, the major feature of interest in financial markets is the role they play in transforming savings into investment—formally,

$$\varnothing(S + \textit{net capital inflows}) = I.$$

The coefficient $\varnothing$ represents the functional efficiency of a country's financial markets—for any value less than 1, some transaction costs are involved in converting domestic and foreign savings into investment. These costs, shown fractionally by $(1 - \varnothing)$, principally consist of the resources absorbed by the operation of financial intermediaries, such as brokerage fees and overhead.[2] Investment is, of course, the mechanism which causes a

[2] I will return to this model, under the simplifying assumption of a closed economy, in §3-2 below.

nation's capital stock to grow, and this growth is one of the major contributors to long-run rises in living standards.

A strong current of thought, both contemporary and historical, argues that financial markets function functional well without any outside assistance. Adherents to stronger forms of the Efficient Markets Hypothesis, for example, believe that the prices of assets perfectly reflect all (publicly-) available information about expected future returns. This is precisely because of the activities of short-term speculators. So the high volume and short duration of international financial flows should not be feared—such activities are indicative of healthy markets.

According to neo-classical thought, speculators cannot manipulate prices to the detriment of fundamentalist investors. We might consider two dimensions of this argument. (1) National equity markets: suppose that speculators choose to buy shares of a stock whenever the price exceeds the expected mean and sell whenever its price falls below that mean. Such activities might increase price swings, but because the mean price is driven by fundamentals, those speculators must be losing money by buying high and selling low (Telser 1981, pp. 9-10).[3] (2) The same argument can be applied to international financial markets, since holding a currency is analogous to investing in the issuing government. Rational speculators will demand the same rate of return for holding a currency as for holding any other asset with an equivalent systematic risk component. At equilibrium, they will provide the funds to assure a (floating) currency's smooth readjustment to changing internal or external fundamentals (Friedman 1953).

[3] This ignores the possibility that a rational speculative bubble might form, in which case speculators can successfully drive prices away from their fundamental values while realizing positive returns. See my discussion of financial crises, §2-2 below, and more generally, Frankel (1996).

Attacks on the neo-classical tradition—what I label the "contrarian" tradition—focus on the assumption that mean prices are driven by market fundamentals. British economist J. M. Keynes argued in his *General Theory* that asset prices do not reflect any fundamental-value estimation of future profitability, but rather "what average opinion believes average opinion to be." Some quotation at length is justified:

> Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. *When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done*. (1935, pp. 159, emphasis added)

For Keynes, financial markets dominated by short-term speculators were inherently unstable because speculation would move prices away from market fundamentals.

Some forty years later, James Tobin directed a similar critique against the internationalization of financial markets. Speaking out in the years after the collapse of Bretton Woods, Tobin wanted to refocus the debate away from fixed-vs.-floating exchange rates and towards what he labeled the "excessive international—or better, intercurrency—mobility of private financial capital" (Tobin 1978, p. 153). He saw two dangers in the international financial system that were unaffected by one's choice of exchange-rate regime. The first was the danger of contagion. Complete convertibility allows financial disturbances to spread from country to country, creating the possibility for one government's mistake to provoke enormous negative externalities in distant, blameless countries. The second danger was the disappearance of national policy autonomy. Tobin believed that even under ordinary circumstances, excessive convertibility would eliminate the possibility of wide interest rate differentials. In cases of international crisis, countries would have to abandon their macro-policy goals regarding unemployment or inflation in order to stabilize their currencies. The

solution which he famously proposed was a tax on short-term international capital flows; this might succeed in throwing "sand in the wheels of international finance" (Eichengreen, Tobin and Wyplosz 1995).[4]

The major currents of economic thought may be summarized, up until this point, as a faith in the correct operation of markets on the one hand, and as a distrust of short-term speculative movements on the other. Adherents to the former school would generally advocate more financial openness as a good thing, while adherents to the latter belief have urged caution. Since the trend of the last 30 to 50 years has been in the direction of increased openness, the debate has gradually shifted to focus on the new realities of a globalized financial system. Much attention has centered around the currency and banking crises that pop up around the world with some regularity. Here, too, economists have argued whether finance is to blame.

2-2. Financial crises: does the punishment fit the crime?

Authors sympathetic to real business cycle theory assert that financial crashes in the developing world are wholly-rational events: "crashes perform a useful function, allowing the market (brutally in some instances) to sort out truly profitable from merely illusory investments" (Osborne 2001). In this view of the world, financial crises are caused by statist governments that misallocate resources, run up large fiscal imbalances, and unsuccessfully attempt to deceive the global market. Short-term speculation is socially useful because it forces governments to abandon untenable exchange positions and punishes governments that pursue bad macroeconomic policies.

[4] The Tobin tax seemed dead-on-arrival almost from the moment of its conception. But as is noted in Haq (1996, p. 2), the idea attracts attention whenever some currency crisis is making headlines, if only to return to obscurity after the crisis has subsided.

Dani Rodrik (1998) suggests that we should focus less on whether there is a problem with fundamentals underlying every crisis, and more on whether that problem is sufficient to explain the scope of the preceding buildup and the following correction. He considers the example of Asia: South Korea, Indonesia, Malaysia, Thailand, and the Philippines were all net importers of capital in 1996, jointly receiving $93 billion net. In 1997 the five countries were all net exporters, jointly losing $12.1 billion net. "The simple fact is that commercial banks either got it terribly wrong in 1996 (and before) in showering Asian countries with loans, or they were terribly wrong in completely pulling out thereafter" (id., pp. 1-2, 5).

A recent examination of the relationship between market fundamentals and crises shows only weak evidence that expansionary monetary and fiscal policies tend to precede crises (summarized in Eichengreen and Wyplosz 1996, p. 19). The authors proffer three non-fundamental explanations for monetary crises: (1) asymmetries of information in global financial markets, (2) moral hazard among bankers who know they will be bailed out, and (3) the existence of multiple equilibria in foreign exchange markets. The first point provides a motivation for Keynes' critique that markets are subject to irrational swings in sentiment and herd behavior. The second and third explanations focus on the *rationality* of market participants, suggesting that in the presence of market distortions rational investors will go along with a trend, no matter how divorced from fundamental valuations (see footnote 3 above).

To summarize, the literature on financial crises has tended to focus either on mistakes committed by the afflicted governments or on the lack of an institutional framework necessary to successfully integrate into global financial markets. The second approach emphasizes the herd mentality of international investors *à la* Keynes. If such skepticism is well-founded, it

suggests that we should place an important qualifier on any assertion that financial openness is good for growth—good institutions are necessary to weather the storms of irrational exuberance and pessimism that seem to characterize international financial markets.

2-3. Financial openness and growth.[5]

Before looking at the literature on institutions and growth, it is appropriate to first consider how growth economists have understood and dealt with the assertion that financial openness is good for growth. Most of the research along these lines has asked whether, rather than under what circumstances (*i.e.*, under what institutional framework), it is a good idea for countries to "globalize" their financial markets by loosening or abandoning capital account restrictions.[6] Until recently, researchers were hampered by the lack of a good measure of capital account openness; even now, the best measure's limited availability continues to make empirical analysis difficult.

The simplest approach to this question is to run a standard growth regression, including a measure of financial openness as a right-hand side variable. Rodrik (1998) looks at average GDP growth per capita for 100 countries over the period 1975-89. Controlling for other standard determinants, he cannot reject the null hypothesis that the proportion of years free of capital controls is unrelated to growth.[7] Rodrik concludes: "There is no evidence in the data that countries without capital controls have grown faster, invested more, or experienced lower

---

[5] This section and the two that follow in the next chapter discuss channels by which certain variables might affect growth. As these sections rely only indirectly on growth-accounting, I delay providing a full account of the subject until chapter 4 ("Methods and Data") below. The interested reader is invited to skip ahead.

[6] This is the key point that separates my research from what has come before. I do not ask whether financial openness is directly good for growth; I ask how financial openness changes the magnitude of certain growth regressors. My specification (described in chapter 4, below) builds on a paper written about institutions rather than finance: Crafts and Kaiser (2004), described in §3-1, below.

[7] As a measure of capital account openness, Rodrik uses a binary indicator constructed from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*. Prior to 1996, the variable only lists a country as "open" when the IMF reports no restrictions on any capital-account category: anything less than 100% open is reported as 0. (See my data appendix for more information.)

inflation. Capital controls are essentially uncorrelated with long-term economic performance once other determinants are controlled for" (id., pp. 8-9).

Quinn (1997) suggests that the growth effects of capital-account liberalization are hidden by the coarseness of its standard measure. He develops a measure of overall financial openness comprising seven dimensions: two for capital-account payments and receipts, four for current-account payments and receipts (two representing goods, two representing services), and a seventh measuring adherence to international legal agreements (such as codes adopted by the OECD or the EU).[8] Using a Levine-Renelt specification and a long list of sensitivity checks, he reports a significant and robust relationship between change in capital-account regulation[9] and growth for a cross-sectional regression of 58 countries from 1960-89.

Arteta, Eichengreen, and Wyplosz (2001) replicate some of the earlier work, focusing specifically on a finding by Edwards (2001) that capital account openness has a larger and more significant growth effect on high-income countries. Working with cross-sample averages for 61 mixed-income countries, they consider three plausibly distinct time periods (1973-81, 1982-87, and 1988-92) and test for the significance of the Quinn index at the beginning of each period. They find that Edward's high-income growth effect is both highly-sensitive to instrumentation and dominated by the 1982-87 period, most likely showing the effects of Latin America's "lost decade." They also test for evidence of a variety of institutional and policy-sequencing preconditions, including financial depth, law and order, trade openness, and macroeconomic balance. While they find limited evidence that the growth effects of capital account openness is conditioned on law and order, their strongest results

[8] These measures all reflect statutory measures as they are recorded on the books of individual countries and reported to the IMF—they are therefore *ex ante* measures of financial openness. Cf. "A side-note on measuring institutions" in §3-1, below.
[9] Measured as $\Delta CAPITAL$ (1958-88).

indicate that the countries eliminating large macroeconomic imbalances benefit the most from financial openness.

To summarize, the evidence that capital-account openness is an important determinant of growth is less than overwhelming. While Quinn's more informative measure of openness often shows positive effects, the results are only consistent when preconditioned by the government's adoption of "responsible" macroeconomic polices. It is not at all clear that institutional or financial development has a significant effect on the financial openness-growth effect. Beginning in chapter 4, I turn this question around: what effect does financial openness have on the institution-growth effect?

3. Institutions and Growth

3-1. Governance and growth.

Recent work in the growth literature, perhaps inspired by the spectacular size of the 1997 Asian crisis, has focused on the importance of governmental institutions. Good political institutions are not necessarily a direct determinant of growth; but the operation of a successful market economy is impossible without them. Rodrik (2000) identifies five crucial roles that institutions play in a functioning market economy: (1) to guarantee private property rights, (2) to regulate fraudulent or anti-competitive behavior in goods, services, labor, and financial markets, (3) to stabilize aggregate demand through counter-cyclical fiscal and monetary policies, (4) to provide a social safety net, and (5) to provide a mechanism for managing social conflict among heterogeneous populations. In the presence of poor institutions, crony capitalism and corruption are likely to abound, resources will be misallocated, and growth will falter.

Distinguishing between correlation and causation is a persistent problem in the growth literature. Cross-country regressions over 1960-2000 consistently show a positive correlation between average growth rates and average institutional rankings. But such regressions cannot tell us whether institutional reform and democratization cause growth, or whether growth causes institutional reform and democratization. Econometrically, we might look at the problem in the following manner:

$$Y_i = \alpha IQ_i + \beta \boldsymbol{X}_i + u_i.$$

The above equation hypothesizes that the systematic portion of observed real per capita income in country i in 2000 is a function of institutional quality IQ_i and a vector of growth regressors $\boldsymbol{X}_i$. Accurate estimation of this equation is only possible if institutional quality is an exogenous variable, uncorrelated with the error term u. But as I have just mentioned, it is theoretically possible that institutional quality is endogenously determined by growth, or that

$$\text{cov}(IQ_i, u_i) > 0.$$

In an influential paper, Acemoglu, Johnson and Robinson (2001) suggest using early mortality rates M_i faced by European settlers as an instrument to predict the exogenous variation in current institutional outcomes.[10] Assuming that M_i does not affect current levels of per capita income except through its influence on institutions, then their regressions show a strong causal relationship between modern institutional quality and comparative levels of development across countries. Other authors, notably Glaeser, La Porta, Lopez-de-Siliane, and Shleifer (2004), argue that this assumption does not hold. They present regressions suggesting that settler mortality is a stronger predictor of modern human capital (and that human capital is the

[10] This technique proposes a striking historical link from early mortality rates, to patterns of European settlement, to early institutional frameworks, to modern institutions.

primary engine behind diverging growth rates); therefore, it is more likely that strong growth precedes and causes institutional reform than vice versa.

A side-note on measuring institutions.

[The relationship between institutions and growth depends to a large extent on what one means by "institutions." Acemoglu *et al.*'s argument suggests a long-term, historically-persistent definition of institutions, but they caution at the end of their paper that indices of modern institutional quality are at best a proxy measure, or an "equilibrium outcome, related to some more fundamental 'institutions'" (p. 1395) which cannot be directly observed. Rodrik (2000, p. 19) makes a similar argument, suggesting that certain "meta-institutions" (for example, democratic forms of government) encourage participation of elites and non-elites alike in the common endeavor to create the good institutional outcomes that underpin stable, well-functioning markets.

Glaeser *et al*. argue that the distinction between fundamental institutions, such as political constraints on the executive or an independent judiciary, and institutional outcomes is precisely the problem. Measures of the enforcement of contracts and of the respect for private property rights are *ex post* rather than *ex ante*, reflecting policy outcomes rather than durable institutional mechanisms. "It holds that even pro-market dictators can secure property rights" (p. 2). Their point is well-taken. Economic theory predicts that the respect of private property, the efficient enforcement of contracts, and other policy outcomes are important for growth, regardless of political regime. While I will continue to use the phrase "good institutions" in this paper,

readers should bear in mind that I am exploring the relationships among institutional *outcomes*, financial openness, and growth.]

One way to sidestep the issue of endogeneity is to model an indirect, rather than a direct, link between institutional quality and growth. Crafts and Kaiser (2004) are to my knowledge the first to explicitly test the hypothesis that investment's contribution to growth is contingent upon the presence of good governmental institutions. Using the Levine-Renelt specification (discussed in chapter 4 below), they construct a dummy variable that takes a value of 1 for countries whose institutions are ranked in the top-quartile of their sample.[11] Their interaction variable *IQ* * *INV* captures a significant portion of the investment contribution to growth, indicating that a country undertaking reforms necessary to raise its quality of governance to a top-quartile level will enjoy a significant investment bonus—the coefficient on investment increases from 11.999 to 18.212.

This provides striking evidence that investment is allocated and used more efficiently in countries with better governmental institutions. The finding is in accordance with the Keynes-Tobin criticism that financial markets are characterized by minor imperfections that occasionally provoke major crises. The presence of good institutions should enable countries to experience higher growth through the investment channel, even if the actual level of investment does not change.

My own analysis will confirm the Crafts and Kaiser result, and then take it one step further: does the importance of institutions vary with the level of capital account openness?

[11] N = 115 countries for 1960-1995. The researchers use the 2000 World Bank rule of law indicator constructed by Kaufman et al. (2003).

Before taking this step, I first look at the theoretical link between financial development and growth.

3-2. Financial development and growth.

Financial development—or the presence of financial intermediary services, or the depth of financial markets—refers to the quality of a nation's financial markets. The concept is highly related to the notion of institutional quality discussed in the previous section.[12] Whereas institutional quality is a measure of the quality of the framework supporting financial (and other) markets, financial depth is a direct measure of the quality of financial markets themselves. We should intuitively expect that financial markets of higher quality will function more efficiently and lead to a greater investment contribution to growth, *ceteris paribus*.

Pagano (1993) presents this idea more formally. Assuming a one-factor growth model in the form of $Y = AK$, a depreciation rate of δ per period in the capital stock, and a financial market that transforms savings into investment at the rate $øS = I$ where $0 \leq ø \leq 1$, then gross investment can be written as

$$I = (\%\Delta K + \delta)\, K.$$

By dividing both sides by Y, substituting for Y on the right hand side, and rearranging terms, we arrive at the steady-state growth rate of GDP and of the capital stock:

$$\%\Delta K = g = A^*I/Y - \delta = Aøs - \delta.$$

The model suggests three channels by which financial development might directly affect the growth rate: (1) $\Delta ø > 0$. A more-developed financial industry will lead to greater functional efficiency. Deeper financial markets will more-efficiently transform savings into investment by absorbing a smaller fraction of the savings rate s for their operation. For the same level of

[12] But not always highly correlated—see appendix table A-3.

savings a nation's investment rate I/Y will rise and g will increase. (2) $\Delta A > 0$. Financial development leads to greater allocative efficiency in financial markets. More-developed institutional investors will do a better job allocating savings to the highest net present value (NPV) investment opportunities; as the social marginal productivity of capital A rises, growth will increase. (3) Δs </=/> 0. Better financial intermediation will increase the availability of credit, reduce liquidity restraints, and improve private opportunities to diversify their portfolios. It is not clear whether the savings rate, and consequently growth, will rise or fall as a result.

The first two channels suggest mechanisms whereby financial development leads to greater growth, one due to an increase in the *level* of investment, the other due to an increase in the *productivity* of investment. Since the third channel might cause the level of investment to either rise or fall, the overall predictions of the model are unclear. But one specific prediction is very clear: financial development should cause the investment contribution to growth to rise. My results showing that this mechanism does exist will be presented in §5-2, below.

Empirical studies show a robust link from depth of financial intermediation to growth (a good review is provided by Levine 2003). One study suggests that financial depth is responsible for 20% of the difference between the slowest-growing quartile and the fastest-growing quartile of countries (King and Levine 1993). Similar results appear in cross-country OLS regressions, in panel regressions, and in instrumental and generalized method-of-moments regressions that attempt to correct for endogenous feedback from growth to financial development. Microeconomic studies show how depth of financial intermediation encourages growth by giving firms access to external capital, eliminating liquidity constraints and

allowing positive-NPV investment to take place. These results suggest that the net effect of increasing financial development is to cause the level of investment to rise.

This chapter has explored the theoretical relationships among governance, financial development, and growth. Researchers' interest in institutional quality and financial depth is motivated by the belief that markets cannot function in a vacuum. As argued in the previous chapter, financial markets are particularly susceptible to failure in the presence of weak institutions. If, as the Keynes-Tobin criticism suggests, the costs of financial market imperfections are greater in an open economy, then it seems reasonable to suggest that the benefits of smooth, well-functioning financial markets should also be greater in an open economy. In the rest of this paper, I will test if the Crafts-Kaiser result is magnified under conditions of financial openness—if institutions become a more important precondition on the investment coefficient as an economy liberalizes its capital account restrictions. The literature on financial openness has not previously explored this notion using this approach.

4. Methods and Data

My model derives from a modified version of the Solow growth model which uses three exogenous variables:

$$Y = A\, K^{\alpha} L^{\beta} H^{\gamma}. \tag{1}$$

Growth in real GDP $\%\Delta Y$ is a function of capital accumulation $\%\Delta K$, growth in the labor force $\%\Delta L$, investment in human capital $\%\Delta H$, and the residual "total factor productivity" term $\%\Delta A$. It has become standard practice to estimate the above equation using Levine and Renelt's (1992) econometric specification:

$$GYP_i = \beta_0 + \underset{[-]}{\beta_1} Y_{0i} + \underset{[-]}{\beta_2} GPOP_i + \underset{[+]}{\beta_3} SEC_i + \underset{[+]}{\beta_4} INV_i + u_i, \qquad (2)$$

where the dependent variable is growth in real GDP per capita and the independent variables (with expected signs indicated in square brackets) are real GDP in 1960 (measuring the scope for catch-up growth), the population growth rate (since the growth rate in *Y* per capita is approximately the growth rate in *Y* minus the population growth rate), the gross secondary school rate (representing investment in human capital), and investment as a share of GDP (representing investment in physical capital).

My tests for the presence of an institution bonus to investment follow Crafts and Kaiser's modification of the Levine-Renelt specification:

$$GYP_i = \beta_0 + \beta_1 Y_{0i} + \beta_2 GPOP_i + \beta_3 SEC_i + \beta_4 INV_i + \beta_5 INV_i{*}ROL_i + u_i, \qquad (3)$$

where Y_0 is defined as real GDP in 1960, *POP* is defined as the average population growth rate expressed as a percentage, *SEC* is the average secondary school rate expressed as a fraction from 0-1, *INV* is average investment as a 0-1 share of GDP, and *ROL* is a country's average score on the International Country Risk Guide's measure of rule of law expressed on a scale from 0-6.

The estimated coefficient b_5 from the above specification captures the presence of an "investment bonus" for countries with good institutions. I build on their specification to see how this effect varies under conditions of financial openness:

$$GYP_i = \beta_0 + \beta_{1\ldots} \boldsymbol{X}_i + \beta_5 INV_i{*}ROL_i + \beta_6 INV_i{*}ROL_i{*}CAPLIB_i + u_i, \qquad (4)$$

where the second interaction term measures the change in the first interaction term under different conditions of capital account openness. Capital account openness is measured using three different variables, described below.

I submit the above regressions to several tests for sensitivity and robustness. I use different measures of governmental quality and financial depth in place of *ROL* in equations 3 and 4. I test for the presence of outliers and eliminate countries that seem to have undue influence ("leverage") on the estimated coefficient b_6. I also consider the possibility that my results are driven by period-specific trends in the global business cycle.

Data for standard left- and right-hand side growth variables are obtained from the World Development Index published by the World Bank (2004). Institutional quality data come from the International Country Risk Guide, an annual guide published to provide investors with information on quality of governance in foreign countries. My baseline variable, *ROL*, measures the law and order tradition in a country. Five other variables measure the level of corruption, the risk of expropriation, the level of bureaucratic quality, the risk of repudiation on a contract, and the level of ethnic tension. In all cases, higher scores correspond to "better" institutions and less risk. I construct a seventh variable, *Q*, as a composite measure of governance, from five of the six ICRG variables (the omitted index is the level of ethnic tension). I use four different measures of financial depth: the stock market turnover ratio *STKTO*,[13] the ratio of M2 / GDP, the amount of domestic credit provided to the private sector divided by GDP (*PCRED*), and the amount of credit provided by the banking sector divided by GDP (*BCRED*).

To measure financial openness, I use three indices of capital account liberalization: the IMF binary dummy variable *CAPLIB*, Quinn's measure of capital account openness *CAPITAL*, and Miniane's (2004) extrapolation of the post-1996 IMF measure[14] for 30 representative

[13] Measured as the total value of shares traded during a year divided by the average market capitalization for that year.

[14] An unweighted average of capital account openness according to 13 dimensions, each dimension receiving a score of 0 or 1.

countries going back to 1983 (called *KLIB* in my regressions). Quinn's variable, the most useful of the three, is reported as a percentage between 0 and 100; to make the coefficients comparable with the IMF measure, I rescale the variable to take values between 0 and 1. Both of these variables have limited sample sizes: for *KLIB*, I have sufficient data to interact institutions and capital account openness for only 30 countries, and my *CAPITAL * RULEOFLAW* interaction sample drops from 84 to 70. Quinn only makes yearly data available for 22 OECD countries; the other 71 countries have observations in 1959, 1973, 1982, 1988, and 1997. This does not pose a serious problem for a cross-sample regression—the five observations are enough to construct an accurate measure of average capital account openness over the time period. Even when restricting the sample size to the last two years Quinn makes available, the correlation between *KLIB* and *CAPITAL* remains large (0.88) and highly significant (p-value less than 0.0001).[15]

A data appendix at the end of this paper summarizes the definitions and sources for all my variables, and the accompanying tables report summary statistics and pairwise correlations for variables measuring institutional quality, financial depth, and financial openness.

5. Results

5-1. Replication of earlier growth equations.

My initial results confirm earlier findings. As a benchmark, I report Levine and Renelt's (1992) estimation of equation 2 in table 1, column 1. All of their estimated coefficients take the expected signs and are highly significant: higher initial GDP is correlated with less opportunity for catch-up growth, higher population growth is negatively associated

[15] Quinn and Miniane provide observations for 33 common countries in 1988 and 1997, making for a total sample size of 66. Using all years for which there are common observations, the correlation statistic falls to 0.83 (N = 348) but remains significant at the same level.

with growth in GDP per capita, and investment in human and physical capital (*SEC* and *INV*) are positively and strongly associated with higher growth rates. Columns 2 and 3 present my re-estimation of this equation for cross-samples of 97 and 84 countries. My results are reassuringly similar. I find a smaller, but still significant, positive relationship between secondary school rates and growth. My estimate of the investment contribution to growth is very close to their own: 18.33 versus 17.49. The most important difference between the two regressions is that my estimate of the coefficient on population growth is insignificant at standard confidence levels.

The Crafts-Kaiser result that countries with better institutions benefit from larger coefficient on investment is also robustly confirmed. Table 1, column 4 presents Crafts and Kaiser's original estimation of equation 3. Their rule of law variable is constructed as a dummy, taking values of 1 for countries with top-quartile scores on the rule of law index, and 0 otherwise. Their results indicate that top-quartile institutions are responsible for approximately one-third of the investment contribution to growth. I re-estimate their equation in column 5, but my rule of law variable uses the full 0-6 ICRG index for rule of law. When I interact this variable with investment, the coefficient on investment alone drops from large and significant (t-statistic = 5.35 in column 3) to small and insignificant (t-statistic = 1.07 in column 5). The effect of investment's contribution to growth is entirely captured by the interaction term, with a reported coefficient of 3.076 (t-statistic = 5.04). It may seem surprising that for a country receiving 0-score on the ICRG rule of law index, investment does not contribute anything to growth. But the result is not unreasonable if we picture some country fallen into a state of anarchy, where the rule of law has collapsed and the government

is completely ineffective at maintaining even a minimal level of social order.[16] Under such conditions, corruption and misappropriation of funds are likely to proliferate; the allocative efficiency of financial markets will collapse, and income devoted to investment will be lost in the chaos, thereby contributing nothing to growth.

A country with better quality governmental institutions, as measured by higher scores on the rule of law index, will experience higher growth from the same level of GDP devoted to investment. A country receiving the best possible score (6) will enjoy 1.85 additional percentage points of growth for every additional ten percent of GDP spent on investment. Note that the calculated magnitude of the investment contribution to growth, conditional on receiving the best possible rule of law score, is very close to the point estimate reported on investment when rule of law is excluded in column 3: 18.456 versus 17.788.

5-2. Financial development and growth estimated.[17]

The effect of financial depth on the investment contribution to growth is similarly large and significant. Table 2 shows the results of interacting investment with four different measures of financial depth. As with the regressions in columns 2-3 of table 1, the point estimates on the coefficient of the population growth rate are sometimes positive rather than negative, but always small and insignificant. The coefficient on the secondary school rate hovers around 2, whereas the earlier Levine-Renelt and Crafts-Kaiser papers estimated a coefficient close to 3. However, the investment term is consistently positive, statistically significant, and economically large. For all but *BCRED*, the term interacting investment with a measure of financial depth is significant in each column at a five or one percent confidence

[16] For example, Somalia in 1993. There are only eight instances in the full dataset of countries receiving a rule of law score of 0.

[17] See §3-2 ("Financial development and growth"), above, for a theoretical motivation behind the growth channel which this section attempts to estimate.

level. Their coefficients may be interpreted as follows: a ten percent deepening of financial markets as measured by *M2/Y*, *STKTO*, or *PCRED*, will cause the coefficient on investment to increase by 0.76, 0.44, or 0.72, respectively.

The insignificant result in column 4 is partially due to the fact that *BCRED* is calculated using net rather than gross loans, so that it is the only financial depth variable to take negative values. The regression in column 5 omits Botswana, which is the only country in the sample to take a negative value (average *BCRED* = -29.17). The interaction term is still insignificant at standard confidence levels, but its *p*-value has improved from 0.84 to 0.28, and the point estimate is more in line with the coefficients in the first three columns.

The effect of deepening financial markets may be demonstrated by some simple back-of-the-envelope calculations. The total coefficient on investment for a country with the mean level of M2 / GDP is

$$b_{INV * (M2/Y)} * (M2/Y)_{it} + b_{INV}$$
$$0.07631 * (35.253) + 13.501 = 16.19.$$

If the country's level of financial depth improves by one standard deviation, the coefficient on investment will rise to

$$0.07631 * (66.282) + 13.501 = 18.56.$$

This means that the effect of spending an additional ten percent of GDP on investment will rise from 1.62 percentage points to 1.86 percentage points more per capita growth. This is an important improvement. The ratio of M2 to GDP in Bulgaria in 2000 was 31.274, slightly below the world mean. Using the estimated coefficients in table 2, column 1, one can predict that the approximately 18% share of GDP devoted to investment in 2000 contributed 2.86 percentage points to per capita growth.[18] If Bulgaria improved its financial depth to the level

[18] Which accounts for nearly one-half of Bulgaria's reported 6.48% per capita growth rate in 2000.

of Australia ($M2/Y_{2000}$ = 65.616), the same amount of investment would contribute 3.33 percentage points to per capita growth, or half a percentage point improvement. This is a significant difference (consider that Bulgaria's mean per capita growth rate over the period 1996-2000 was -1.84%).

The results reported in table 2 provide powerful evidence that financial development causes the investment contribution to growth to rise. According to Pagano's model, deeper financial markets might be more efficient in two ways: their functional ability to convert savings S into investment I at a rate of $0 \leq ø \leq 1$, and their allocative ability to channel funds to the highest net-present-value investment opportunities.[19] Interacting the investment term with a measure of financial depth specifically tests for the presence of the second effect. I do not attempt to model the effect of increasing financial depth on a country's saving rate (or on its net capital inflows), although I would hypothesize that the relationship is one of diminishing marginal returns (*i.e.*, a positive first partial derivative and a negative second partial derivative negative).[20] It is not clear whether, or at what level, increasing financial depth is accompanied by less savings. But if the effect on the savings rate is relatively small, or if it is partially offset by a change in net capital flows, then the *ceteris paribus* calculation I presented above linking financial development to higher growth should be a reasonable approximation.

5-3. The case for a capital account-institution bonus.

Estimated coefficients for equation 4 (which interacts the institution bonus variable with different measures of capital account liberalization) are reported in table 3, columns 2, 4, and 6 (for purposes of comparison, estimations of equation 3 with the same sample size are

[19] Presented in §3-2 above.
[20] A more in-depth empirical study, which is beyond the scope of this paper, might attempt to model the market for loanable funds using financial depth as an exogenous variable in the savings schedule.

reported to the left of each regression—columns 1, 3, and 5, respectively). I initially run into a number of problems. Column 2 uses the IMF dummy variable *CAPLIB*, which while available for the greatest number of years and for the widest cross-section of countries, is also the least useful measure of capital account openness.[21] Cross-sample regressions for the period 1960-2000, after controlling for standard determinants of growth, report no significant variation of the investment-rule of law interaction term when *CAPLIB* changes from 0 to 1. As in column 1, the coefficient on investment is statistically insignificant—investment's entire contribution to growth is captured by the first interaction term. The estimated coefficient on *INV* * *ROL* is 2.893 (significant at the one percent level). This indicates that a country with the best possible rule of law score (6) would receive a 1.74 percentage point gain to per capita GDP growth for every additional ten percent of GDP devoted to investment (similar to the results reported in table 1). The coefficient on *INV* * *ROL* * *CAPLIB* is not statistically distinct from zero at standard confidence intervals, though it does take the correct sign.

Since a large amount of the variation in capital account openness is masked by the crudeness of the IMF binary measure, I run the same regressions using two alternate measures: Miniane's backward extrapolation of IMF openness *KLIB* and Quinn's *CAPITAL* index. The new results are reported in columns 4 and 6. The coefficient on the capital account interaction term is insignificant at standard confidence levels in column 4, but the restrictiveness of the sample size may be partly to blame. Except for investment, every coefficient in column 3 (which uses the same 30-country sample to re-estimate the institution-bonus alone) is less significant than in column 1. Column 5 shows the effect of restricting the sample size to 70 countries available for a *CAPITAL* * *ROL* interaction—all of the coefficients are less significant than in column 1. But after including the capital account interaction term in

[21] Cf. §2-3, "Financial openness and growth."

column 6, the results improve dramatically. The adjusted R-squared (not shown in the table) improves from 0.577 to 0.591, and the coefficient on *SEC* becomes significant at the ten percent level. More importantly, using Quinn's nuanced measure of capital account openness to estimate equation 4, I find that the size of the institution bonus to investment is significantly affected by a country's degree of capital account liberalization—as predicted by my hypothesis.

What does this result mean? Compared to column 1, approximately one-third of the institution bonus to investment is dependent upon capital account openness. Consider two hypothetical countries *A* and *B*, the first with completely closed (*CAPITAL* = 0) and the second with completely open (*CAPITAL* = 1) capital accounts. The estimated coefficient on investment will take the following values for different rule of law scores:

Rule of Law	Country *A*	Country *B*
0	0	0
-1 S.D.	3.54	5.75
mean	6.78	11.01
+1 S.D.	10.02	16.28
6	11.86	19.27

11.86 is the largest possible coefficient a country with closed capital accounts such as *A* can receive. A hypothetical country *B*, identical to *A* except that its capital accounts are completely unrestricted, can receive a 19.27 coefficient on investment with a perfect score for rule of law. Having good institutions matter, but having them really matters when a country is financially open.

The result in table 3, column 6 lends conditional support to my hypothesis. This is arguably the "best" regression I have so far run: although Quinn's measure is of limited availability, it is the best available measure that allows me to obtain a reasonably-large *N*. *CAPLIB* has a broader *N* and a longer *T*, but it is widely considered too coarse to show any

useful effects. *KLIB* has the advantage of a longer *T* than does *CAPITAL*, but it is not yet available for a sufficiently-large cross-section of countries. The next section will explore the robustness of this result: how does the effect vary using alternative measures of institutions? Is the effect dominated by certain outliers in the data, or by one time-period?

5-4. Robustness and sensitivity.

Alternate measures of institutional quality.

Table 4 reports the results of regressing average growth in per capita income on alternate measures of institutional quality reported by the International Country Risk Guide. The measures are: level of corruption *CORR*, bureaucratic quality *BQ*, protection against the repudiation of contracts *REP*, protection against expropriation of property *EXP*, level of ethnic tensions *ETEN*, and a composite measure *Q* that includes rule of law but excludes ethnic tension and is scaled from 0 to 6 (summary statistics for these variables are reported in appendix table A-1). Columns 1, 2, 4, and 5 report the effect of interacting investment with a measure of institutional quality for all available countries and for the restricted subset of countries which also have *CAPITAL* data available. Columns 3 and 6 report the additional interaction of the institution bonus with *CAPITAL*. A vector of Levine-Renelt growth regressors $\boldsymbol{X}_i$ and a constant term are included but not reported.

In all but *ETEN*, the interaction term between institutional quality and investment takes the expected sign and is highly significant.[22] The coefficient on *INV* is significant in 12 of 18 regressions. Somewhat surprisingly, it takes a negative sign in the regressions including an interaction term with protection against expropriation of property *INV*EXP*—this would

[22] This result is not surprising for theoretical reasons. There is little reason to think that lower levels of ethnic tension should be correlated with a more-efficient allocation or use of investment. Of the institutional variables, *ETEN* is the candidate least likely to have an effect on the well-functioning of financial markets.

indicate that, absent any enforcement of contractual obligations, spending on investment actually detracts from per capita GDP growth at a rate of 1.35% for every ten percent of GDP spent there. That this effect would only show up with *EXP* is not entirely shocking—contracts are involved in all economic exchange where goods are not immediately traded. Total non-enforceability of contracts would lead to the complete shutdown of a nation's economy—indeed, no country in the dataset ever receives a 0 for this category.[23] The sign of the investment coefficient changes from negative to positive near *EXP* = 4, which is approximately 1.4 standard deviations below the mean expropriation ranking.

Measures of financial depth.

The theory presented earlier in this paper suggested that institutional quality and financial development have similar effects on the efficiency of financial markets. Both types of measures proxy for the good institutional outcomes that are associated with well-functioning markets. The first two sections of this chapter comfortingly reaffirmed that supposition, showing that the coefficient on investment rises with either better governmental institutions or deeper financial markets. I re-estimate equation 4 using measures of financial depth in place of $RULEOFLAW_i$. The results (not reported) do not suggest that the financial depth-bonus to investment increases as a country liberalizes its capital accounts. It may be that financial depth is not a particularly good proxy for the specific institutional outcome (the availability of financial intermediation) best associated with more stable markets.

[23] The lowest reported ranking is for Iraq, which received an 0.5 in 1991. The next lowest score is a 1.0, reported for Iraq in 1992-94 and for Iran in 1982.

Sensitivity to outliers.

An adjusted partial residual plot for my baseline regression (table 3, column 6) is reported in figure 1, mapping the correspondences between the *INV* * *Q* * *CAPITAL* interaction term and the dependent variable *GYP*.[24] Three outliers are immediately apparent: Hong Kong and Singapore, which have very high scores on the rule of law index, top-quintile rates of investment, and top-decile levels of capital account openness; and Iceland, which had a perfect rule of law score over the available time period, a top-third level of investment, but the next-to-lowest average level of capital account openness (0.1625). The same three countries appear as outliers in regressions using all measures of institutional quality reported in table 4.

I accordingly eliminate these three countries from my observations and report the new regression results in table 5.[25] Several things are apparent in comparing these results with tables 3 and 4. First of all, the explanatory power of the model falls slightly—R-squared values decline between four and seven percentage points. Second, the significance of key explanatory variables has declined in all cases. The interaction term between investment and institutional quality is significant in 14 of 21 regressions (as opposed to 17 of 21 previously), while the interaction term with capital account openness is significant in only 3 of 7 cases (in the broader sample, the coefficient was significant in all 7 regressions). However, the estimated coefficient always takes the correct sign, and it has a similar magnitude to the broad-sample estimates. In the three cases where it remains significant at standard confidence levels, the estimated coefficient has actually risen in size. After eliminating three countries with extreme levels of openness or closure, the remaining countries will experience a greater

[24] STATA command "avplot".
[25] Figure 2 shows a partial regression plot for the *Q* interaction term after eliminating the outliers.

estimated increase in the investment contribution to growth from liberalizing their capital accounts.

Sensitivity to sample period.

Indices of institutional quality are available from the mid 1980s though 1997. To consider the possibility that my findings are driven by period-specific results (*e.g.*, the "lost decade" of growth in Latin America), I break my data into subsets for 1982-1987 and 1988-1996 and run separate regressions for each time period.[26] A summary of the results is reported in table 6, showing only interactions using the composite governance term *Q* (results are similar for other measures of governmental quality, and similarly insignificant for measures of financial depth).

In the 1980s, higher institutional quality is consistently associated with a larger estimated coefficient for investment, but the interaction term with *CAPITAL* is negative and insignificant. Arteta *et al*. (2001, p. 19) suggest that the unusual effects of capital account openness during the debt crisis years may be due to a depressed level of capital flows. In the 1990s, the size of the institution bonus to investment is greater when included alone, but the coefficient becomes insignificant when I control for the interaction effect with *CAPITAL*. Indeed, treating the coefficients on investment and investment times *Q* as 0, column 4 implies that the maximum possible coefficient on investment is 13—well below the maximum implied coefficient in the previous column of 26.5.[27]

[26] I follow the breakpoints used by Arteta, Eichengreen, and Wyplosz (2001) in their examination of the direct contribution of capital account openness to growth. Unfortunately, the limited historical availability of institutional quality data prevents me from considering the earliest time period (1973-81) used by Arteta *et al*. (see §2-3, above, for a brief summary of their results).

[27] But if one considers just the point estimates in the two columns, column 4 implies a maximum investment coefficient of 37.1 versus column 3's 31.8.

The results in the pooled sample (using country fixed-effects) reflect the dissimilarities between the two subperiods' results: the interaction term *INV* * *Q* is large and significant in both regressions, while the capital account openness interaction is small and insignificant. The R-squared also drops significantly from the first four columns—the explanatory power of the pooled model is much smaller, perhaps due to the limited in-country variation between the two time subperiods.

6. Conclusions

This paper has explored whether, and under what circumstances, it is a good idea for countries to liberalize the restrictions on their capital accounts and join the global financial markets. Much of the debate hinged on an earlier debate over the basic social utility of financial markets—neo-classicists from Friedman forward argue that unfettered markets will always clear, while contrarians recall the dissents of Keynes and Tobin in sounding a more cautionary tone. The recent and burgeoning literature on institutional quality attempts to elucidate the contrarian critique by investigating the support structures implicitly assumed to underlie any successful market economy. There is no consensus over just how durable this institutional framework is, but most writers agree on the foundational quality of enforceable contracts (which enable economic exchange), private property rights (which provide incentives for economic activity), and the need for a government able to ensure that these "institutions" operate with some regularity. The lesson from this literature is that, semantics aside, institutions do matter, at least in so far as they assure the smooth operation of markets.

My findings expand the literature by exploring how the role played by institutions evolves when countries enter the "great wide open" of the international financial system.

Within the limits of my data, I find that institutions become increasingly important as countries globalize their financial systems. This has two important ramifications. (1) A country that already has good institutions will integrate more successfully into global financial markets than will a country with poor institutions—good institutions provide protection from the dangers, such as imperfect information, characteristic of international finance. (2) An open country has more to gain from improving its domestic institutions than does a closed country—simply put, open financial markets rely more on good institutional underpinnings than do closed markets.

It seems appropriate to end this paper as so many others in the field do: on a cautionary note. If the last fifteen years have taught us anything, it is that there is no panacea to cure all woes and raise all countries to Western levels of income and health. But the current literature at least suggests where to start. We have good theoretical and empirical backing to suspect that the best long-run policy is globalization. Constraints imposed by national borders, when they are binding, are welfare-reducing because they prevent people from undertaking utility-maximizing projects. But in the short-run, at least in the case of finance, the best policy appears to be making certain that you are ready. Financial openness without well-developed financial markets able to disseminate information and efficiently allocate savings to high-NPV investment opportunities is a recipe for disaster. The lesson of Icarus is still true today—you may fly on wings cobbled together from bird feathers and candle wax, but beware the damp of the ocean and the heat of the sun.

Data Appendix

Variable Name	Definition	Sample Range	Source
	Financial Openness		
CAPLIB	0-1 binary indicator of capital account liberalization	varies by country and year	Column E2 of the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, via personal correspondance with Kim (1996)
KLIB	0-1 scale of capital account liberalizaiton--higher values indicate increasing degrees of liberalization. Defined as *(1 - Kcontrols)*, as reported in Miniane's summary index of capital account restrictions	1983-2000 for 34 countries (I omit Luxembourg, which is aggregated with Belgium prior to 1996)	Miniane (2004); constructed by the author from IMF *AREAER* 1984-2001
CAPITAL	0-4 scale of capital account liberalization (in half-point increments), reported as a percentage of 100	Five years (1959, 1973, 1982, 1988, 1997) publicly available for 71 countries. 1950-99 available for 22 OECD countries	personal correspondance with Dennis Quinn
	Institutional Quality		
CORR	Corruption in Government, scale of 0-6 (higher values indicate better ratings)	1982-1997 for 132 existing and 3 former countries (availability varies by country)	International Country Risk Guide - IRIS III Dataset
ROL	Rule of Law: measures law and order tradition, scale of 0-6		
BQ	Bureaucratic Quality, scale of 0-6		
ETEN	Ethnic Tensions, scale of 0-6 (higher values indicate less tension)		
REP	Repudiation of Contracts, scale of 0-10 (higher values indicate less risk)		
EXP	Risk of Expropriation, scale of 0-10 (higher values indicate less risk)		
	Depth of Financial Markets		
M2/Y	Money and quasi money (M2) as % of GDP: comprises the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.	Varies by country and year	FM.LBL.MQMY.GD.ZS - World Bank (2002)

Variable Name	Definition	Sample Range	Source
STKTO	Stocks traded, turnover ratio (%): the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period.	Varies by country and year	CM.MKT.TRNR - World Bank (2002)
PCRED	Domestic credit to private sector (% of GDP): refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.	Varies by country and year	FS.AST.PRVT.GD.ZS - World Bank (2002)
BCRED	Domestic credit provided by banking sector (% of GDP): includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available	Varies by country and year	FS.AST.DOMS.GD.ZS - World Bank (2002)
	Growth Regressors		
GYP	GDP per capita growth (annual %)	Varies by country and year	World Development Indicators online - World Bank (2002)
Y	GDP per capita (constant 1995 US$)	Varies by country and year	
GPOP	Population growth (annual %)	Varies by country and year	
SEC	School enrollment, secondary (% gross/100)	Varies by country and year	
INV	Gross capital formation (% of GDP/100): formerly gross investment	Varies by country and year	

Table A-1 - Summary statistics for measures of institutional quality, financial depth, and capital account openness

Variable	**Obs**	**Mean**	**S.D.**	**Min**	**Max**
CORR	1918	3.35	1.46	0	6
ROL	1918	3.43	1.64	0	6
BQ	1918	3.24	1.57	0	6
ETEN	1918	3.78	1.61	0	6
REP	1878	6.41	2.31	0.5	10
EXP	1878	7.10	2.27	0.5	10
Q	1878	3.59	1.29	.6	6
M2/Y	4470	35.25	31.03	0.00	668.10
STKTO	672	42.73	52.03	0.02	475.46
PCRED	5038	33.57	31.14	0.01	243.37
BCRED	5050	47.31	51.73	-77.38	1255.16
CAPLIB	5728	0.21	0.39	0	1
KLIB	594	0.47	0.32	0	0.92
CAPITAL	1418	0.62	0.28	0	1

Table A-2 - Pairwise Correlation Coefficients Between Different Measures of Capital Account Liberalization

	CAPLIB	*KLIB*	*CAPITAL*
CAPLIB	**1**		
	5728		
KLIB	**0.7038**	**1**	
	561	594	
CAPITAL	**0.6693**	**0.8312**	**1**
	1310	348	1418

Notes: Number of observations reported below each correlation coefficient.
All coefficients are significant at the one percent level.

Table A-3 - Pairwise Correlation Cofficients Between Measures of Institutions

	CORR	*ROL*	*BQ*	*ETEN*	*REP*	*EXP*	*Q*	*STKTO*	*M2/Y*	*PCRED*	*BCRED*
CORR	**1**										
	1918										
ROL	**0.7247**	**1**									
	1918	1918									
BQ	**0.7708**	**0.7681**	**1**								
	1918	1918	1918								
ETEN	**0.4641**	**0.604**	**0.4503**	**1**							
	1918	1918	1918	1918							
REP	**0.6111**	**0.7617**	**0.7294**	**0.5522**	**1**						
	1878	1878	1878	1878	1878						
EXP	**0.596**	**0.7866**	**0.6821**	**0.5189**	**0.873**	**1**					
	1878	1878	1878	1878	1878	1878					
Q	**0.8327**	**0.9134**	**0.8913**	**0.5788**	**0.8947**	**0.886**	**1**				
	1878	1878	1878	1878	1878	1878	1878				
STKTO	**0.2099**	**0.3372**	**0.3119**	**0.1545**	**0.3753**	**0.319**	**0.3646**	**1**			
	389	389	389	389	389	389	389	672			
M2/Y	**0.1571**	**0.2004**	**0.1979**	**0.0737**	**0.1809**	**0.159**	**0.2067**	**0.2001**	**1**		
	1518	1518	1518	1518	1500	1500	1500	579	4470		
PCRED	**0.5185**	**0.5431**	**0.6221**	**0.3447**	**0.5526**	**0.4767**	**0.6131**	**0.3029**	**0.6586**	**1**	
	1699	1699	1699	1699	1659	1659	1659	660	4398	5038	
BCRED	**0.1699**	**0.1676**	**0.2058**	**0.0888**	**0.1518**	**0.1241**	**0.1822**	**0.266**	**0.7704**	**0.688**	**1**
	1725	1725	1725	1725	1685	1685	1685	665	4417	5003	5050

Notes: Number of observations reported below each correlation coefficient.
All coefficients are significant at the one percent level.

Country Appendix

(a)

Country Name and World Bank Code					
Algeria	DZA	Guatemala	GTM	Paraguay	PRY
Argentina	ARG	Haiti	HTI	Peru	PER
Australia	AUS	Honduras	HND	Philippines	PHL
Austria	AUT	Hong Kong	HKG	Portugal	PRT
Bahamas, The	BHS	Hungary	HUN	Senegal	SEN
Belgium	BEL	Iceland	ISL	Sierra Leone	SLE
Bolivia	BOL	India	IND	Singapore	SGP
Botswana	BWA	Indonesia	IDN	South Africa	ZAF
Brazil	BRA	Ireland	IRL	Spain	ESP
Chile	CHL	Israel	ISR	Sri Lanka	LKA
China	CHN	Italy	ITA	Sudan	SDN
Colombia	COL	Jamaica	JAM	Sweden	SWE
Congo, Rep. Of	COG	Japan	JPN	Switzerland	CHE
Costa Rica	CRI	Kenya	KEN	Syria	SYR
Cote d'Ivoire	CIV	Korea	KOR	Thailand	THA
Denmark	DNK	Malaysia	MYS	Trinidad and Tobago	TTO
Dominican Republic	DOM	Mexico	MEX	United Kingdom	GBR
Ecuador	ECU	Morocco	MAR	United States	USA
Egypt	EGY	Netherlands	NLD	Uruguay	URY
El Salvador	SLV	New Zealand	NZL	Venezuela	VEN
Finland	FIN	Nicaragua	NIC		
France	FRA	Nigeria	NGA		
Gabon	GAB	Norway	NOR		
Ghana	GHA	Pakistan	PAK		
Greece	GRC	Panama	PAN		

(b)

Country Name and World Bank Code			
Bangladesh	BGD	Malta	MLT
Burkina Faso	BFA	Niger	NER
Cameroon	CMR	Oman	OMN
Congo, Dem. Rep. Of	ZAR	Papua New Guinea	PNG
Guyana	GUY	Togo	TGO
Madagascar	MDG	Zambia	ZMB
Malawi	MWI	Zimbabwe	ZWE

(a) + (b) designate the 84 sample countries used in table 3, column 1.

(a) designates the 70 sample countries used in table 3, column 6.

References

Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001): "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91(5), 1369-401.

Arteta, Carlos, Barry Eichengreen, and Charles Wyplosz (2001): "When Does Capital Account Liberalization Help More than it Hurts?," National Bureau of Economic Research Working Paper: 8414.

Crafts, Nicholas, and Kai Kaiser (2004): "Long-Term Growth Prospects in Transition Economies: A Reappraisal," *Structural Change and Economic Dynamics*, 15(1), 101-18.

Edwards, Sebastian (2001): "Capital Flows and Economic Performance: Are Emerging Economies Different?," National Bureau of Economic Research Working Paper: 8076.

Eichengreen, Barry, James Tobin, and Charles Wyplosz (1995): "Two Cases for Sand in the Wheels of International Finance," *The Economic Journal*, 105(428), 162-72.

—, and Charles Wyplosz (1996): "Taxing International Financial Transactions to Enhance the Operation of the International Monetary System," in *The Tobin Tax : Coping With Financial Volatility*, ed. by M. ul Haq, I. Kaul, and I. Grunberg. New York: Oxford University Press, 15-39.

Frankel, Jeffery (1996): "How Well Do Foreign Exchange Markets Function: Might a Tobin Tax Help?," in *The Tobin Tax : Coping With Financial Volatility*, ed. by M. ul Haq, I. Kaul, and I. Grunberg. New York: Oxford University Press, 41-81.

Friedman, Milton (1953): "The Case for Flexible Exchange Rates," in *Essays in Positive Economics*. Chicago: University of Chicago Press, 157-203.

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-De-Silane, and Andrei Shleifer (2004): "Do Institutions Cause Growth?," National Bureau of Economic Research, Inc, NBER Working Papers: 10568.

Haq, Mahbub ul, Inge Kaul, and Isabelle Grunberg, eds. (1996): *The Tobin Tax : Coping with Financial Volatility*. New York: Oxford University Press.

International Country Risk Guide (2001): *IRIS III Dataset*. Syracuse, NY: The PRS Group.

Kaufmann, Daniel, and Massimo Mastruzzi (2003): "Governance Matters III: Governance Indicators for 1996-2002," The World Bank, Policy Research Working Paper Series: 3106.

Keynes, John Maynard (1935): *The General Theory of Employment, Interest and Money*. New York: Harcourt Brace.

King, Robert G., and Ross Levine (1993): "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics*, 108(3), 717-37.

Levine, Ross (2003): "More on Finance and Growth: More Finance, More Growth?," *Federal Reserve Bank of St. Louis Review*, 85(4), 31-46.

—, and David Renelt (1992): "A Sensitivity Analysis of Cross-Country Growth Regressions," *The American Economic Review*, 82(4), 942-63.

Michalet, Charles-Albert (2004): *Qu'est-ce que la mondialisation?* (What is Globalization?). Paris: Editions La Découverte.

Miniane, Jacques (2004): "A New Set of Measures on Capital Account Restrictions," *IMF Staff Papers*, 51(2), 276-308.

Osborne, Evan (2001): "Financial Crashes in the Globalization Era.," *Independent Review*, 6(2), 165.

Pagano, Marco (1993): "Financial Markets and Growth: An Overview," *European Economic Review*, 37(2-3), 613-22.

Quinn, Dennis (1997): "The Correlates of Change in International Financial Regulation," *American Political Science Review*, 91(3), 531-51.

Rodrik, Dani (1998): "Who Needs Capital-Account Convertibility?," Princeton: Princeton University, Department of Economics, International Finance Section, 55-65.

— (2000): "Institutions for High-Quality Growth: What They Are and How to Acquire Them," National Bureau of Economic Research Working Paper: 7540.

Telser, Lester G. (1981): "Why There Are Organized Futures Markets," *Journal of Law and Economics*, 24(1), 1-22.

Tobin, James (1978): "A Proposal for International Monetary Reform," *Eastern Economic Journal*, 15(3-4), 153-59.

World Bank International Economics Dept. Development Data Group (2004): *WDI Online*. Washington, DC: World Bank.

Table 1 - Cross-Country Growth Regressions
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1[a]	2[b]	3[b]	4[c]	5[b]
Y1960[d]	**-0.35**	**-0.011**	**-0.011**	**-0.354**	**-0.023**
	(2.5)**	(2.49)**	(2.30)**	(4.73)***	(4.75)***
Population Growth (GPOP)	**-0.38**	**-0.13**	**0.024**	**0.216**	**0.219**
	(1.7)*	(0.58)	(0.09)	(1.37)	(0.97)
Secondary School Enrollment (SEC)	**3.17**	**1.839**	**2.408**	**2.923**	**2.171**
	(2.46)**	(2.25)**	(2.43)**	(3.98)***	(2.50)**
Investment Rate (INV)	**17.49**	**18.327**	**17.788**	**11.999**	**4.22**
	(6.53)***	(6.32)***	(5.35)***	(5.74)***	(1.07)
Investment * Rule of Law (INV*ROL)[e]				**6.213**	**3.076**
				(4.58)***	(5.04)***
Constant	**-0.83**	**-2.393**	**-2.948**	**-2.210**	**-2.288**
	(0.98)	(2.89)***	(2.96)***	(3.68)***	(2.60)**
Observations	**101**	**97**	**84**	**115**	**84**
R-squared	0.46	0.53	0.49	0.597[f]	0.62

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

a. Source: Levine-Renelt (1992), Table 5, column i. Variables are calculated as averages over 1960-1989.
b. Source: Author's own regressions. Variables are calculated as averages over 1960-2000.
c. Source: Crafts-Kaiser (2004), Table 5, column 2. Variables are calculated as averages over 1960-1995.
d. For column 1, variable equals real GDP per capita in 1960. For all other columns, variable equals real GDP in 1960. In all columns, variable is scaled x/1000.
e. For column 4, investment is interacted with a dummy variable taking a value of 1 for countries receiving top-quartile Rule of Law scores.
f. Authors only report adujsted R-squared

Table 2 - Cross-Country Regressions with Financial Depth Interaction Terms
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1	2	3	4	5
Y1960[a]	**-0.013**	**-0.014**	**-0.017**	**-0.011**	**-0.012**
	(2.70)***	(3.09)***	(3.63)***	(2.46)**	(2.76)***
GPOP	**0.064**	**0.128**	**-0.071**	**-0.123**	**-0.186**
	(0.26)	(0.49)	(0.33)	(0.54)	(0.85)
SEC	**1.708**	**1.987**	**1.922**	**1.826**	**1.723**
	(1.95)*	(1.82)*	(2.46)**	(2.21)**	**(2.16)****
INV	**13.501**	**18.093**	**13.374**	**18.055**	**15.596**
	(3.82)***	(4.20)***	(4.23)***	(5.65)***	(4.87)***
INV * (M2/Y)[b]	**7.631**				
	(3.10)***				
INV * STKTOb		**4.447**			
		(2.64)**			
INV * PCREDb			**7.156**		
			(3.23)***		
INV * BCREDb				**0.399**	**2.14**
				(0.21)	(1.10)
Constant	**-2.31**	**-3.041**	**-1.919**	**-2.379**	**-1.87**
	(2.62)**	(2.53)**	(2.39)**	(2.84)***	(2.26)**
Observations	**85**	**67**	**97**	**97**	**96**
R-squared	0.57	0.55	0.58	0.53	0.54

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

a. Variable is scaled x/1000.
b. Variable is scaled x/100.

Table 3 - Interactions Between Rule of Law and Capital Account Openness Indices
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1[a]	2	3	4	5	6
Y1960[b]	**-0.023**	**-0.023**	**-0.012**	**-0.014**	**-0.02**	**-0.023**
	(4.75)***	(4.75)***	(2.94)***	(3.07)***	(4.40)***	(4.83)***
GPOP	**0.219**	**0.163**	**-0.256**	**-0.267**	**0.067**	**0.014**
	(0.97)	(0.69)	(0.79)	(0.82)	(0.29)	(0.06)
SEC	**2.171**	**2.05**	**-0.706**	**-0.672**	**1.339**	**1.486**
	(2.50)**	(2.32)**	(0.59)	(0.56)	(1.49)	(1.67)*
INV	**4.22**	**4.743**	**14.225**	**14.587**	**4.032**	**4.924**
	(1.07)	(1.18)	(1.95)*	(1.99)*	(1.01)	(1.25)
INV*ROL	**3.076**	**2.893**	**1.561**	**0.99**	**2.799**	**1.977**
	(5.04)***	(4.42)***	(1.73)*	(0.90)	(4.65)***	(2.64)**
INV*ROL*CAPLIB		**0.411**				
		(0.79)				
INV*ROL* KLIB				**0.701**		
				(0.92)		
INV*ROL*CAPITAL						**1.234**
						(1.80)*
Constant	**-2.288**	**-2.157**	**-0.541**	**-0.328**	**-1.29**	**-1.273**
	(2.60)**	(2.40)**	(0.33)	(0.19)	(1.40)	(1.41)
Observations	**84**	**84**	**30**	**30**	**70**	**70**
R-squared	0.62	0.62	0.69	0.7	0.61	0.63

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

a. Result is repeated from table 1, column 5.
b. Variable is scaled x/1000.

Table 4 - Cross-Country Regressions with Alternate Measures of Institutional Quality.
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1	2	3		4	5	6
INV	**-1.488**	**-2.406**	**-1.154**	INV	**-8.373**	**-6.789**	**-4.784**
	(0.30)	(0.48)	(0.23)		(1.48)	(1.20)	(0.84)
INV*Q	**4.237**	**4.133**	**3.177**	INV*REP	**3.161**	**2.831**	**2.296**
	(4.81)***	(4.66)***	(3.28)***		(5.36)***	(4.85)***	(3.48)***
INV*Q*CAPITAL			**1.425**	INV*REP*CAPITAL			**0.631**
			(2.17)**				(1.67)*
R-squared	0.61	0.61	0.64	R-squared	0.63	0.62	0.63
INV	**12.099**	**12.162**	**12.767**	INV	**-13.529**	**-14.959**	**-13.009**
	(2.84)***	(2.81)***	(3.08)***		(2.11)**	(2.43)**	(2.12)**
INV*CORR	**1.425**	**1.192**	**0.121**	INV*EXP	**3.499**	**3.537**	**3.031**
	(2.08)**	(1.70)*	(0.15)		(5.44)***	(5.77)***	(4.59)***
INV*CORR*CAPITAL			**1.978**	INV*EXP*CAPITAL			**0.628**
			(2.60)**				(1.87)*
R-squared	0.52	0.5	0.55	R-squared	0.63	0.65	0.67
INV	**8.981**	**7.775**	**7.55**	INV	**14.17**	**16.512**	**17.832**
	(2.18)**	(1.88)*	(1.91)*		(3.27)***	(3.81)***	(4.15)***
INV*BQ	**2.205**	**2.209**	**1.266**	INV*ETEN	**0.75**	**0.13**	**-0.76**
	(3.30)***	(3.30)***	(1.72)*		(1.30)	(0.23)	(1.05)
INV*BQ*CAPITAL			**1.931**	INV*ETEN*CAPITAL			**1.404**
			(2.61)**				(1.92)*
R-squared	0.56	0.55	0.6	R-squared	0.51	0.48	0.5
Observations	**84**	**70**	**70**		**84**	**70**	**70**

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: A constant term and the following variables are included but not reported in all regressions: Y1960, GPOP, SEC.

Table 5 - Cross-Country Regressions with Alternate Measures of Institutional Quality.
Three outlying countries omitted.
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1	2	3
INV	**4.271**	**4.235**	**5.279**
	(1.06)	(1.05)	(1.29)
INV*ROL	**2.984**	**2.565**	**1.868**
	(4.51)***	(3.91)***	(2.15)**
INV*ROL*CAPITAL			**1.307**
			(1.22)
R-squared	0.58	0.56	0.57
Observations	**81**	**67**	**67**

					4	5	6
INV	**-1.349**	**-1.784**	**-0.871**	INV	**-7.893**	**-5.528**	**-4.234**
	(0.26)	(0.34)	(0.17)		(1.35)	(0.94)	(0.71)
INV*Q	**4.155**	**3.864**	**3.067**	INV*REP	**3.08**	**2.593**	**2.215**
	(4.28)***	(3.89)***	(2.88)***		(4.77)***	(4.01)***	(3.13)***
INV*Q*CAPITAL			**1.866**	INV*REP*CAPITAL			**0.698**
			(1.85)*				(1.28)
R-squared	0.57	0.56	0.58	R-squared	0.59	0.56	0.57
INV	**11.981**	**12.217**	**13.427**	INV	**-13.337**	**-14.404**	**-13.134**
	(2.79)***	(2.84)***	(3.14)***		(2.04)**	(2.30)**	(2.09)**
INV*CORR	**1.103**	**0.698**	**-0.247**	INV*EXP	**3.441**	**3.409**	**3.062**
	(1.51)	(0.94)	(0.28)		(5.03)***	(5.20)***	(4.39)***
INV*CORR*CAPITAL			**2.237**	INV*EXP*CAPITAL			**0.653**
			(1.82)*				(1.38)
R-squared	0.48	0.45	0.48	R-squared	0.6	0.62	0.63
INV	**8.638**	**7.452**	**7.889**	INV	**12.879**	**14.796**	**16.249**
	(2.09)**	(1.82)*	(1.97)*		(2.96)***	(3.46)***	(3.56)***
INV*BQ	**2.043**	**1.951**	**0.979**	INV*ETEN	**0.665**	**0.005**	**-0.572**
	(2.90)***	(2.78)***	(1.19)		(1.14)	(0.01)	(0.67)
INV*BQ*CAPITAL			**2.547**	INV*ETEN*CAPITAL			**0.921**
			(2.12)**				(0.92)
R-squared	0.52	0.51	0.54	R-squared	0.48	0.45	0.45
Observations	**81**	**67**	**67**		**81**	**67**	**67**

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: A constant term and the following variables are included but not reported in all regressions: Y1960, GPOP, SEC.

Table 6 - Panel Regressions for Time Subperiods
(Dependent Variable: Growth Rate of Real Per Capita GDP)

	1 1982-87	2 1982-87	3 1988-96	4 1988-96	5 Pooled	6 Pooled
Y0[a]	**-0.01**	**-0.009**	**-0.01**	**-0.012**	**-0.015**	**-0.016**
	(1.47)	(1.32)	(2.04)**	(2.59)**	(0.86)	(0.88)
GPOP	**-1.175**	**-1.131**	**-0.531**	**-0.646**	**-1.255**	**-1.246**
	(3.57)***	(3.36)***	(1.71)*	(2.09)**	(2.08)**	(2.05)**
SEC	**-2.123**	**-2.114**	**-0.805**	**-0.844**	**-0.636**	**-0.771**
	(1.22)	(1.21)	(0.57)	(0.62)	(0.24)	(0.28)
INV	**5.683**	**4.655**	**5.309**	**9.05**	**-14.114**	**-14.037**
	(0.65)	(0.53)	(0.52)	(0.89)	(1.40)	(1.39)
INV*Q	**3.668**	**4.444**	**4.412**	**2.508**	**4.519**	**4.248**
	(2.26)**	(2.26)**	(2.14)**	(1.12)	(2.37)**	(1.90)*
INV*Q*CAPITAL		**-0.892**		**2.173**		**0.539**
		(0.71)		(2.00)**		(0.24)
Constant	**0.816**	**0.66**	**-1.366**	**-1.154**	**4.354**	**4.453**
	(0.58)	(0.46)	(0.91)	(0.78)	(1.96)*	(1.96)*
Observations	**70**	**70**	**72**	**72**	**142**	**142**
Number of countries					74	74
R-squared	0.42	0.42	0.46	0.49	0.25	0.25

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

a. Y0 equals (real GDP in first year of sample time period) / 1000.

Figure 1

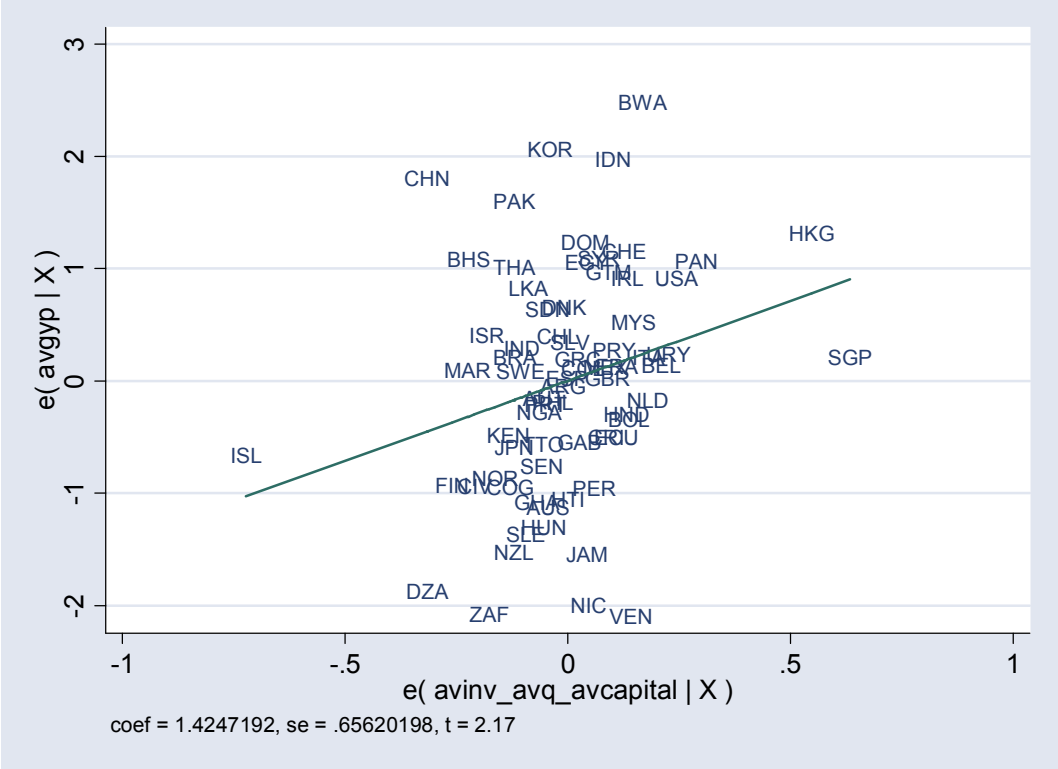

Figure 2