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Evaluating Growth Slowdowns: Does Middle-Income Trap Exist?

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Nusrat Farah

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2016

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Abstract

Growth theories suggest that the factors affecting growth at low-income and high-income countries can be different. If countries struggle to graduate to high-income growth strategies, they may find themselves "stuck" at some middle-income level. This phenomenon can be termed as "middle-income trap". Using a panel of 145 countries over a period of 55 years, this study attempts to identify the existence of "middle-income trap" and its determinants. The aim of this study is to inspect whether the countries really get "stuck" at middle-income levels and if so, then pinpoint the factors associated with growth slowdowns. By employing panel probit estimations, this study has found evidence of the existence of middle-income trap. Most of the middle-income countries are sticky to their income levels and failed to make the additional leap necessary to achieve a high-income status. The study has identified the crucial factors associated with growth slowdowns and compared whether these factors in middle-income countries are any different than the low and high income countries. The results were validated using Bayesian Models and the findings suggest that the determinants of growth at middle and high income levels differ and middle income countries do need to change growth strategies to move smoothly to the high-income status. The recent anxiety over the issue of "middle-income trap" is not unfounded and this study affirms that the existing policies that have enabled few low-income counties to grow to middle income countries are not sufficient for transitioning to a high-income level. Middle-income countries need growth policies that are aimed at strong and sustained growth to help them to graduate to high-income status eventually.

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Chapter 1

Introduction

The rapid growth of emerging economies is one of the celebrated storylines of our time and definitely the most influential economic development that has affected the lives of world's population during the first decade of 21st century. Rapid economic growth has elevated many low and middle income countries to middle and high income countries respectively. It has pulled millions of households out of poverty. In a tumultuous period, when advanced economies have been economically challenged and financially troubled, rapid growth of emerging economies has provided for the majority share of global growth. However, the question is how long the emerging economies can sustain this rapid growth.

The empirical growth literature has tacitly assumed economic growth to be a steady process, consistent with a broad array of theoretical models. Researchers have long been interested in the dynamics of growth and the gradual convergence of all economies in terms of per capita income. For instance, Mankiw, Romer and Weil (1992), Barro and Sala-i-Martin (1992) and Evans (1996) used cross-country data from the second half of the 20th century to examine the determinants of average GDP per capita growth over a decade or more. Their results showed that most countries seem to be converging at about the rate the augmented Solow (1956) model predicted.

On the other hand, Caselli, Esquivel and Lefort (1996) used panel data and generalized method of moments to prove that per capita incomes converge to their steady-state levels at a rate of approximately 10 percent per year as opposed to the general consensus of 2 percent. Also Islam (1995) used dynamic panels with country

effects to show that the estimated rates of conditional convergence prove to be higher. In either case, though, the estimation is focused on identifying a gradual convergence path, with a single convergence coefficient.

However, the growth dynamics in the real world are much more intricate than identifying fluctuations around a stable trend. The recent growth literature has underestimated the importance and failed to consider the implications of instability and volatility of growth rates as pointed out by Pritchett (1998). He called for more inspection of "the hills, plateaus, mountains and plains" evident in the growth documentation.

Analyses of growth records have given rise to a literature that attempts to track growth slowdowns and the middle-income trap. Growth slowdowns refers to prolonged periods of stagnation or recession and represents a substantial deviation from the previous growth for a country. The "middle-income trap" is a theorized situation, where a rapidly growing country will stagnate at middle-income levels and will fail to attain the status of high-income countries. From a policy maker's perspectives, factors related to growth slowdowns and middle-income trap is of particular importance as concerns about being stuck at a particular income level have been acute in emerging economies.

In middle-income economies, the consternation of a "middle-income trap" is growing. Since the 1950s rapid economic growth has allowed a significant number of countries to achieve the middle-income status but very few of these countries have been able to make the additional leap needed to reach the high-income status. Several Latin American countries would seem to be trapped in the middle-income group and these countries failed to graduate to high-income levels where as some East Asian countries have continued to grow rapidly after attaining middle-income status for some time. These

East Asian countries were cited as model for success as they managed to reach per capita income levels comparable to those of advanced countries but recent slower growth in China, India and Vietnam points to a reduction in trend growth and exhibits risk of being trapped in middle-income levels. Although Asia's expected growth remains higher than that of other regions, the slowdown has revived the debate middle-income trap.

This paper aims to augment the understanding of growth slowdowns and the middle-income trap. It contributes to the existing literatures in a number of ways. First, it identifies the period of slowdowns by applying the augmented Solow model, which is a standard growth model, instead of simply identifying structural breaks in the time trend of economic growths. Second, after identifying the growth slowdowns, it proves that these incidences of slowdowns are disproportionately likely to occur in middle-income countries. Third, by identifying the middle-income trap, this paper empirically justifies the policy concerns about the middle-income trap. Fourth, it identifies the determinants of growth slowdowns in a systematic way by using panel probit estimations and validating the results using two variations of Bayesian model selection. Finally, it provides an idea about the world income distribution by using the mobility matrix. This paper is the most comprehensive and recent study involving growth slowdowns and middle-income trap.

The remainder of this paper is organized as follows: Chapter 2 provides a brief review of the existing literature on growth slowdowns. Chapter 3 discusses the theoretical and empirical models. Chapter 4 presents the results and discusses the key findings, and Chapter 5 provides concluding remarks.

Chapter 2

Literature Review

The term "middle-income trap" was apparently coined by Gill, Kharas, et al. (2007) describing a situation, in which, countries suffer from deceleration in growth, after experiencing a period of rapid growth in per capita income.

Much of the literature on middle-income trap focuses on the experience of Latin America, the Middle East and North Africa, and especially East Asia. Recent slowdown in economic growth in China has revitalized the debate over the causes of economic slowdown. The evidence on middle-income trap has been analyzed in terms of both descriptive terms and structured econometric models.

World Bank (2012) has conducted descriptive studies on middle-income traps using broad cross-country comparisons, while Hill et al. (2012), Flaaen et al. (2014), Agénor and El Aynaoui (2015), and Cherif and Hasanov (2015) have used more country-specific data. According to the World Bank (2012), there were 101 middle-income countries in 1960. Out of those 101 countries, merely 13 had become high income by 2008. These 13 countries are Equatorial Guinea, Greece, Hong Kong, Ireland, Israel, Japan, Mauritius, Portugal, Puerto Rico, Singapore, South Korea, Spain, and Taiwan. Among these countries, the four Asian tigers—Hong Kong, Singapore, South Korea, and Taiwan have experienced a transition in their output composition. Hong Kong and Singapore have moved to electronics assembly and then on to component manufacturing, from low-margin, labor-intensive goods such as clothing and toys, whereas South Korea and Taiwan have moved to advanced manufacturing, design and management. Unlike Asian countries, most countries in Latin America, as well as in the Middle East and North

Africa, reached middle-income status during the 1960s and 1970s, and have stayed there ever since. Also in Asia, Malaysia and Thailand are examples of the growth slowdown that typically characterizes a middle-income trap. Ohno (2009) and Garrett (2004) have also taken a descriptive approach to define middle-income trap and emphasized on the necessity for middle income countries to move up the value chain. They argued that the middle-income trap is the result of reliance on short-sighted and restricted growth startegies.

Eichengreen et al. (2013) have taken an econometric approach to ask whether middle-income countries are more likely than others to experience a growth slowdown. They defined middle-income trap as a decline of at least 2 percentage points relative to a 7-year moving average. They concluded that there appear to be two ranges of growth slowdowns: one between $10,000 and $11,000 and the other between $15,000 and $16,000. The implication is that countries may find themselves slowing down at lower income levels than previously believed and decelerate in steps, rather than smoothly or at a single point in time. They also emphasize the importance of moving up the technology ladder in order to avoid such a secular slowdown.

In a subsequent study, Eichengreen et al. (2014) searched for structural breaks by applying a Chow test to a sample of formerly fast growing middle-income countries. Their results showed that the likelihood of sudden slowdowns is bimodal, having its peaks in the range of $10,000-$11,000 in 2005 PPP US dollars at and in the higher interval of $15,000-$16,000 constant prices. This evidence seems to suggest therefore that a large group of middle-income countries is at risk of being caught up a trap.

Aiyar et al. (2013) took a similar approach, differing from Eichengreen in the counterfactual against which a growth slowdown is measured. Aiyar et al. used the predictions of a Solow growth model. They identified and examined 123 episodes of growth slowdowns since 1960 and found that indeed middle-income countries (defined as those with income levels between $2,000 and $15,000) have a greater frequency of slowdowns than either advanced or low-income countries. They also showed that some of the explanatory variables for growth slowdowns differ between middle-income countries and the remaining countries in the sample. Middle-income countries with low levels of infrastructure and limited regional integration are more likely to have slowdowns.

Felipe et al. (2012) applied an altogether different approach. They defined four income groups on the basis of absolute levels of GDP per capita during the period 1950-2010: low income economies are those with a GDP per capita below $2,000; lower middle-income economies are those with a GDP per capital between $2,000 and $7,250; upper middle-income economies are those with a GDP per capita between $7,250 and $11,750 and high income countries are those with a GDP per capita above $11,750. They alleged that if a country is stuck in the lower middle-income category for more than 28 years, or in the upper-middle income for more than 14 years, then the country is caught in a middle-income trap. The thresholds—28 years and 14 years were the median number of years that the sample countries spent in their respective income categories. Thus, to avoid the middle-income trap, a country needs to grow fast enough to be able to cross the lower middle-income group in at most 28 years, and the upper middle-income group in at most 14 years. Using this methodology, they found that, out of the 124 sampled countries, there were 52 middle-income countries in 2010; and out of that 52 countries, 35 countries

were caught in a middle-income trap, that is almost two-third of the countries were stuck at the middle-income level. The 35 countries consisted of 13 countries in Latin America, 11 countries in the Middle East and North Africa, and 3 countries in Asia. Moreover, using disaggregate trade data, they found that countries caught in that trap were all characterized by lower sophistication and diversification of their exports.

Im and Rosenblatt (2013) created a set of thresholds based on a country's GDP per capita relative to that of the United States, and inspected the probability of a country transitioning to a higher category. They found that the probability of countries with middle-incomes transitioning to a higher category is quite low; in other words, they found evidence of a middle-income trap when the country's income was compared with that of U.S.

Agenor and Canuto (2012) reached similar conclusions by graphing GDP per capita relative to the United States in 1960 against the 2008 GDP per capita relative to the United States to show that most middle-income countries were indeed stuck and there was no evidence of convergence with the U.S. over the period of 48 years.

Hawksworth (2014) also focused on convergence to design an ESCAPE index by combining 20 different indicators that are taken from cross-country regressions of growth and convergence, including economic, social, political, regulatory infrastructure and environmental sustainability variables. Based on this, he identified a fragile group of five countries that could get stuck because they do not display the policy and structural characteristics to sustain rapid growth. Hawksworth does not, however, attempt any statistical validation of his methodology.

But some researchers remained critical about the notion of middle income trap. Bulman et al. (2014) did not find any evidence for unusual stagnation at any middle-income levels. However, they did find evidence that the determinants of growth at low and high income levels differ. They suggested that middle-income countries may need to change growth strategies to transition smoothly to high-income growth strategies.

The Economist newspaper challenged the idea of the middle-income trap by diagramming the decadal growth rates against initial income for 160 countries, excluding oil exporters, between 1950 and 2010. The findings showed that per capita income growth in middle income countries was actually higher than in other countries. Following the Eichengreen et al. methodology, it further inspected the episodes of growth slowdowns and observed that the probability of a growth slowdown did not appear to increase at middle-income levels. Hence, it referred to the whole debate as futile.

A review of the literature reveals that researchers have applied different definitions and methodologies to identify middle-income trap and its determinants. There is an obvious lack of consensus among the researchers about the existence of middle-income trap. Also the amount of literature on growth slowdowns in middle-income countries is insufficient. This study bridges the gap between the theory and empirical analysis by applying a methodology that is more entrenched in theory. It also analyzes the determinants of growth slowdowns in a structured way by including a variety of potential explanatory variables.

Chapter 3

Research Methodology

3.1 Theoretical Framework

The standard Solow (1956) neoclassical growth model takes the rates of savings, population growth, depreciation and technological change across countries as exogenous and predicts that poor countries will grow faster than rich countries and gradually converge to their steady states.

However, conditional convergence framework states that there are some other variables, in addition to these parameters, that can influence the steady state. Because of differences in these other variables across countries, different economies can converge to different steady states. This study identifies growth slowdowns by operationalizing on these strong predictions from the theory and describes growth slowdowns in terms of sudden and sustained deviations from the predicted growth path.

The output can be modelled as a function of inputs and technology using the following aggregate production function:

$$Y = AK^{\alpha}L^{\beta} \dots\dots\dots (1)$$

Here, Y represents output that is GDP per capita, K is physical capital, L is labor or human capital and A is the total factor productivity (TFP). Equation (1) is the Cobb-Douglas production function where α and β are the output elasticities of physical and human capital respectively and $\beta = 1 - \alpha$. The values of α and β are constants that are determined by the available technology.

An equation for the log of output in country *i* at time *t* can be derived by taking logs of the aggregate production function:

$$y_{it} = a_{it} + \alpha k_{it} + \beta l_{it} \ldots\ldots\ldots (2)$$

Here, y_{it} , k_{it} and l_{it} are the logs of output, physical capital and human capital respectively. However, a_{it}, the level of total factor productivity (TFP) in country *i* at time *t*, is not observed and when the equation is estimated, a_{it} appears as an error term. So, equation (2) can be rewritten as follows:

$$y_{it} = a^*_{it} + \alpha k_{it} + \beta l_{it} + v_{it} \ldots\ldots\ldots (3)$$

Here, a^*_{it} is country *i*'s long-run, steady-state level of total factor productivity (TFP) at time *t* and v_{it} is represents country *i*'s deviation from the world's common level of technology at time *t.* Mankiw, Romer and Weil (1992) propounded that $a^*_{it}$is the same for every country, so a^*_{it}=a^*_t.

For estimation, it is useful to turn equation (3) into a growth equation. By differencing equation (3):

$$\Delta y_{it} = \Delta a_t + \alpha \Delta k_{it} + \beta \Delta l_{it} + v_{it} \ldots\ldots\ldots (4)$$

Estimating equation (4) will yield a predicted rate of growth for each country *i* at time *t*. The residuals will show whether a country is growing faster or slower than the expected growth. The growth slowdowns here can be characterized as total factor productivity (TFP) slowdowns due to the keen focus on total factor productivity (TFP).

The brief discussion on different aspects of the Solow model has established the theoretical framework for the issues related to growth slowdowns. The Solow model argues for a balanced growth path and the low-income countries should catch up with the high-income countries and converge towards the level of high-income countries.

3.2 Empirical Model

3.2.1 Identifying Growth Slowdowns

This study uses annual data on per capita income in constant 2011 international dollars to compute five-year rolling geometric averages of GDP per capita growth rates. The sample covers 145 countries over 11 five-year periods (1960-2014). The specification used in the study is:

$$\widehat{Growth}_{it} = \alpha_{i,t} + \beta_1 GNI_{i,t-1} + \beta_2 \Delta K_{it} + \beta_3 \Delta H_{it} + \upsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where for country i in time period t, $Growth_{it}$ is the five-year panel of per capita GDP growth, $GNI_{i,t-1}$ is lagged income level, ΔK_{it} is change in the rate of physical capital and ΔH_{it} is the change in the rate of human capital. So, the five-year panel of per capita GDP growth is regressed on the lagged income level and change in the standard measures of physical and human capital using random effects generalized least square estimation.

The random effects generalized least square estimation is used because there are differences across countries that have some influence on the per capita GDP growth. Also, Hausman test results support that the model should be random effects model. The rate of investment in physical capital is taken from the Penn World Table 8.1. Stock of human capital has been used as a proxy for human capital. This panel regression predicted an estimated growth rate, conditional on its level of income and factor endowments.

The panel regression also provided residuals which is defined as actual growth rate minus estimated growth rate. A positive residual means that the country is growing faster than expected growth whereas a negative residual means that the country is lagging

behind and growing slower than the expected growth. Thus, growth slowdown periods for a country *i* can be identified if—

$$res_t^i - res_{t-1}^i < p(0.20) \ldots\ldots\ldots\ldots \text{(a)}$$

$$res_{t+1}^i - res_{t-1}^i < p(0.20) \ldots\ldots\ldots\ldots \text{(b)}$$

Here p (.20) = the 20th percentile of the distribution of *differences* in residuals from one-time period to another. Conditions (a) and (b) make intuitive sense because condition (a) states that between period *t-1* and *t*, the residual of a particular country becomes much smaller. That means, the country's performance relative to the expected growth pattern has declined substantially and this decline has placed the country-period observation in the bottom quintile of changes in the residual between consecutive time periods.

Condition (b) is used to ignore slowdown episodes where growth slows down in the current period only to go back up in the next period. This condition inspects the differences in residuals between period *t-1* and period *t+1,* which is over a ten-year period. These conditions suggest that slowdowns cannot be identified for the sample's initial period (1960-1964) and final period (2010-2014) as there are no prior and subsequent periods for comparison. Conditions (a) and (b) together precisely identify the *relative* nature of growth slowdowns.

Table A.3.1 (in Appendix A) provides the list of all country-periods identified as slowdowns by the conditions. A second variant of the specification has been constructed using the absolute convergence framework, in which the initial random effects panel regression excludes physical capital and human capital as regressors, retaining only the initial level of income. Table A.3.2 (in Appendix A) provides the list of country-periods

slowdowns identified by using the conditional convergence and absolute convergence framework.

It is worth noting that the slowdown episodes identified by using the conditional and absolute convergence frameworks are rather similar. This demonstrates that for sustained shifts away from the convergence path, growth slowdowns are almost synonymous with Total Factor Productivity (TFP) Slowdowns. But both the conditional and absolute convergence frameworks contradict from the EPS. This could be due to the fact that EPS study mainly focused on developed and oil exporting countries. But this study focuses on slowdowns at all income levels relative to the predicted growth and identifies the presence of slowdown episodes in middle-income countries.

Table 1 shows the distribution of slowdown variable, which has been created using the conditions (a) and (b), by region. Out of the 1305 observations collected in the dataset, the algorithm in conditions (a)-(b) selects 195 slowdowns, that is, almost 15 percent of the overall sample. Table 1 and 2 highlights important facts about the frequency of slowdown episodes by region and time period.

Table 1. Distribution of Slowdown Episodes by Region

Slowdown Variable	Advanced	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	Total
0	211	112	171	161	121	55	279	1,110
1	23	23	36	37	23	8	45	195
Total	234	135	207	198	144	63	324	1,305
Slowdown Frequency (%)	9.83	17.04	17.39	18.69	15.97	12.70	13.89	14.94

Table 1 highlights two important facts. First, the regional frequency of past slowdown episodes— measured as the ratio of slowdown episodes to overall number of observations in the region—was significantly higher in developing regions, in particular Latin America, Middle East, North Africa, Europe and Central Asia, and East Asia. But the slowdown frequency is lower for the advanced economies.

3.2.2 Identifying Middle-Income Trap

After generating the slowdown variable, this study inspects the existence of middle-income trap—whether countries that have achieved middle-income status are more likely to experience growth slowdowns than low-income and high-income countries. There is no generally accepted definition of middle-income status, so this study tries to identify middle-income countries using a range of possible lower and upper thresholds for middle-income status. Following Abdon, Felipe and Kumar (2012) and Aiyer, Duval, et al. (2013), the income status is defined using sets of GDP per capita (in 2011 PPP $) thresholds. Each set i consists of two thresholds $th_{1,i}$ and $th_{2,i}$, where $th_{1,i} < th_{2,i}$. Here, $th_{1,i}$ and $th_{2,i}$ are the thresholds that separate low-income countries from middle-income countries and middle-income countries from high-income countries respectively.

The study assumed that $th_{1,i}$ can take three values—2000, 3000 and 4000 (2011 PPP $) while values for $th_{2,i}$ range from 12,000 up to 16,000 (in increments of 1,000). Using this assumption, the values generates 15 classifications (3 × 5) to identify middle income countries in the dataset. For instance, 2/12 refers to a low income threshold of $2000 and a high income threshold of $12000 (in 2011 PPP $). Figure 1 summarizes the results by plotting, within each income class, the ratio of slowdowns to total observations.

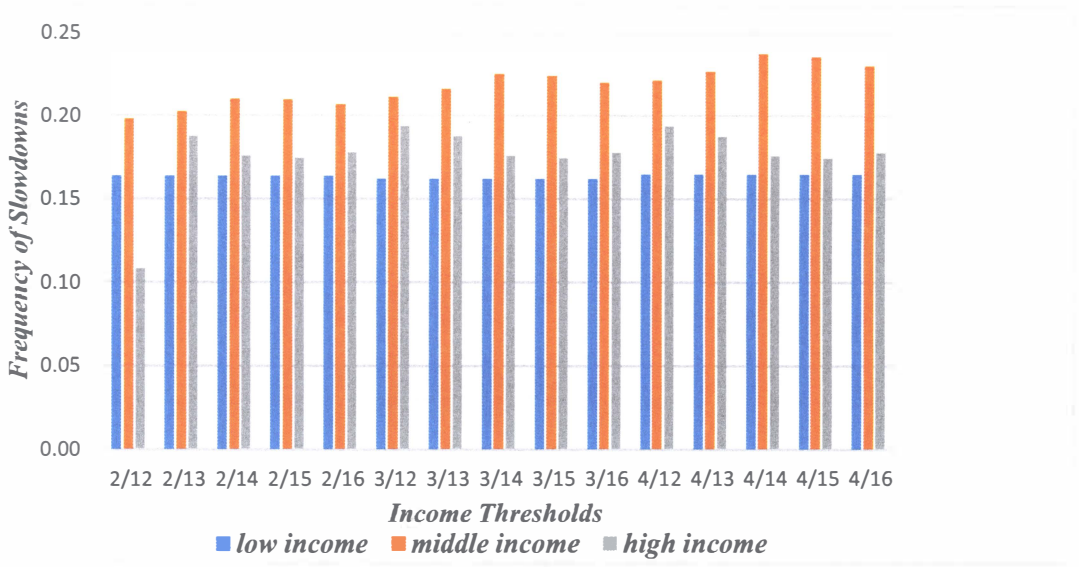

Figure 1. Identifying Middle-Income Traps

Figure 1 makes it clear that the middle-income countries are more likely to experience growth slowdowns, and the growth slowdown occurs disproportionately in the middle-income countries. This result is robust to the extensive range of income thresholds used for defining the middle-income class.

The graph makes it clear that in the sample, the relative frequency of slowdown episodes for the middle-income category is always significantly higher than for the low-income and high-income categories. For the remainder of the paper, income category will refer to the 2/15 definition— a low income threshold of $2000 and a high income threshold of $15000 (in 2011 PPP $) as the classification generated by this threshold points is immensely close to the GNI per capita (Atlas method) classification developed by the World Bank.

3.2.3 Identifying the Determinants of Growth Slowdowns

After identifying growth slowdowns, this study focuses on studying their determinants. To study the determinants of growth slowdowns, it estimates the impact of various

determinants on the probability of a country undergoing a slowdown in a particular period by using the panel probit model. The challenge is that growth slowdowns can be affected by a number of potential determinants. Just like growth itself, growth slowdowns could occur due to a host of factors.

Growth can be accelerated due to favorable demographics, thereby reducing the probability of a slowdown. Institutions can also play important role—lack of good institutions or deficiency in existing institutions could hinder growth by deterring innovation, hampering the efficient allocation of resources and reducing the returns to entrepreneurship. Structural characteristics of the economy, infrastructure, financial situation, productive capacity, industrialization, labor market characteristics, natural resources, and technology development could impact independent effects on growth. Also macroeconomic factors such as terms of trade or asset price cycles, could alter the probability of a sustained growth slowdown. Since there is no consensus about why and how middle-income economies may be different, it is imperative to include all the possible potential determinants.

This study follows the recent growth literature to identify the causes of slowdowns. In doing so, this study has considered as broad a range of factors as possible, guided by the growth literature. The set of regressors comprises 45 explanatory variables grouped into eight categories: (i) Institutions and Economic Freedom; (ii) Demography; (iii) Infrastructure; (iv) Health; (v) Macroeconomic Environment and Policies; (vi) Economic Structure; (vii) Trade structure; and (viii) Other.

3.3 Estimation Techniques

This study employs panel probit specifications to study the determinants of growth slowdowns. The panel data model is a superior analysis than the country specific Ordinary Least Square (OLS) or Linear Probability Model (LPM). Unlike the pooled Ordinary Least Square (OLS) model, Panel Probit analysis can account for country specific effects. So, in this study, Panel Probit models were estimated using slowdown as the independent variable with a broad array of explanatory variables, grouped under the eight categories.

The backward and forward selection procedures were employed to generate a limited set of regressors. The backward selection procedures refer to starting with the maximum number of potential explanatory variables, and then dropping the least significant variable. This process is repeated until all remaining variables are significant. The forward selection procedure involves entering the variables one-by-one in a piecewise fashion and retaining only the significant variables.

Including a large number of potential regressors has an important drawback, that is, model uncertainty. Model uncertainty is a well-known issue in growth empirics where not knowing the "true" model tends to inflate the numbers of regressors or cast doubt on the selected random regressors. When the sample size is limited, growth regressions with a wide number of regressors tend to produce unstable and sometimes contradictory results due to model uncertainty. Although the sample size of this study is larger, the issue of model uncertainty is relevant. To address model uncertainty, Bayesian Model Averaging Techniques have been applied.

After every panel probit estimation, two Bayesian model-averaging techniques were applied to the corresponding panel probability model to assess the robustness of the results: The Weighted Average Least Squares (WALS) methodology developed by Magnus, Powell, and Prüfer (2010) and the more standard Bayesian Model Averaging (BMA) developed by Leamer (1978) and popularized by Sala-i-Martin, Doppelhoffer and Miller (2004). Appendix C provides a brief technical description of Weighted Average Least Squares (WALS) and Bayesian Model Averaging (BMA) methods.

The second problem of using a large number of regressors is data unavailability. The sample of 145 countries over 55 years implies inevitable data gaps. Even though the data consists of 1305 observations with 195 slowdowns, data gaps in potential regressors can drastically reduce the sample size for estimation. To address this issue, the study has grouped potential explanatory variables into eight categories and estimated their impact on slowdown episodes separately. Because of having relatively large sample size within each grouped category, this study has avoided the data unavailability problem. Appendix A.3.4 (in Appendix A) reports the sample statistics for the preferred regression by region and time period to give an idea about the differences in coverage between different categories of variables.

The empirical procedure to identify the determinants of growth slowdowns proceeds through the following two steps:

Step 1: For each category, panel probit specifications were estimated with *lagged* level and differenced values of all possible explanatory variables within the specific economic category. That is, under each of the eight categories, for a slowdown episode over 1965–69, the average level of each variable is used together with the change in that

variable between 1960 and 1965. This approach minimizes possible endogeneity issues. The backward and forward selection procedures have been employed to identify a restricted set of robust regressors.

Step 2: To assess the robustness of the preferred panel probit specification identified in step 1, this study employed Bayesian averaging techniques (BMA and WALS) over the full set of variables within the category of interest.

3.4 Data Sources and Descriptive Statistics

The study has exploited a wide variety of explanatory variables and growth literature to identify the 45 regressors. The data for this study covers five-year panel of 145 countries over the years 1960 to 2014. Starting with 7975 observations (145 countries times 55 observations for each), this study employs five-year rolling averages to compute a five-year panel for the sampled countries. This smooths out the business cycle fluctuations so that short term noises can be ignored and results in the sample size of 1595 observations, consisting of 11 observations for each of the 145 countries. Most of the data were collected from the World Development Indicators (WDI) provided by the world bank.

However, the actual number of explanatory variables used is larger than 45 because this study has also tests whether the forms in which these variables influence slowdown probabilities are, more appropriately, levels or differences. So, both the initial level (at the beginning of the period) and lagged difference of variables appear as regressors using the forward and backward selection procedures. Table A.3.3 (in Appendix A) provides a table of variable units and sources. Table A.3.4 (in Appendix A) reports the descriptive statistics.

Chapter 4

Results and Discussion

4.1 Results of Growth Slowdown Regressions

The proximate explanatory variables that can explain growth or slowdowns are culled from the growth literature, which is too vast to review. The rationale of each chosen regressor is briefly discussed before the presentation of results under each category.

4.1.1 Institutions and Economic Freedom

Institutions are crucial for growth and growth literature has paid attention on the role of different types of institutions in accelerating economic growth. La Porta, Lopez-de Silanes, Shleifer, and Vishny (1997, 1998) contended that the quality of a country's legal institutions—such as legal protection of outside investors—could affect the extent of rent seeking by corporate insiders and thereby promote financial development.

Buchanan and Tullock, (1963); North, (1981, 1990); and DeLong and Shleifer, (1993) called for limited government to accelerate growth. Knack and Keefer (1997) showed that formal institutions that promote property rights and contract enforcement are necessary to build social capital, which in turn is related to better economic performance.

Grilli and Millesi-Feretti (1995), Quinn (1997) and Edwards (2001) have focused on the relationship between financial openness and growth. On the other hand, Bussiere and Fratscher (2008) have accepted that financial liberalization may cause an initial acceleration of growth. But per their results, this growth may be difficult to sustain. They also opinioned that this growth can be subject to temporary reversals over a longer time horizon.

This study has used five institutional and economic freedom variables. Four are taken from the Economic Freedom of the World (EFW) index. The *Rule of Law* index integrates indicators of judicial independence, impartial courts, protection of property rights, military interference in the rule of law and politics, integrity of the legal system, legal enforcement of contracts, regulatory restrictions on the sale of real property, business cost of crime and reliability of police. The *Size of Government* index is a measure of governmental involvement in the economy. This index is estimated using a wide number of measures such as government consumption, subsidies and transfers as a percentage of GDP, government investment, and top marginal tax rates.

The *Regulation* index is a measure of the efficiency of the government in a regulatory process and combine indices measuring business, labor and credit market regulations. *Freedom to Trade Internationally* index is constructed from measures of tariffs, regulatory trade barriers, black market exchange rates and international capital market controls. The four indices are constructed such that a higher value of the index indicates better rule of law, limited government, less regulation and more freedom to trade.

The fifth variable used is the *Chinn-Ito* index of financial openness developed by Chinn and Ito (2006). This is based on binary dummy variables codifying the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).*

Table 2 reports the result of the "best" probit specification. The first panel presents coefficient estimates and p-values for those variables found to be significant in the probit analysis. Using the forward and backward selection procedures, significance of

three variables can be asserted. The level of *Rule of Law* is significant—sound legal systems, legal enforcement of contracts and protection of property rights are strongly associated with a reduced probability of a growth slowdown episode. The *Size of Government* and *Regulation* indices are also highly significant both in levels and differences. This suggests that limited governmental intervention and deregulation of credit, labor and product markets reduce the probability of growth slowdowns both in current and subsequent periods.

Table 2. Probit and Robustness Tests Results for Institutional Variables

I. Final probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Institutional Variables	Coef.	P> z	Coef.	P> z
Rule of Law	-0.1307	0.002		
Size of Government	-0.1401	0.003	-0.1583	0.003
Regulation	-0.2462	0.001	-0.1626	0.000
Pseudo R^2	0.0246			
Obs.	1012			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Institutional Variables	WALS t	BMA PIP	WALS t	BMA PIP
Rule of Law	**-2.39**	**0.81**	**-2.05**	**0.85**
Freedom to Trade	-0.65	0.23	-0.41	0.22
Size of Government	**-2.05**	**0.60**	**-1.63**	**0.90**
Regulation	**-2.67**	**0.95**	**-1.13**	**0.90**
Fianancial Openness	0.76	0.03	0.63	0.06

The second panel of Table 2 shows results from Bayesian model averaging estimation for the complete set of explanatory variables. The BMA column reports posterior inclusion probabilities (PIP). Posterior inclusion probabilities (PIP) are the sum

of the posterior probabilities of all the regressions including that variable. Magnus, Powell, and Prüfer (2010) suggested a PIP threshold of 0.5 to include a variable in the estimation. In the case of WALS, a t-ratio with an absolute value of 1 or greater is typically recommended as a threshold for significance. Using these criteria, both WALS and BMA find that the level of the *Rule of Law*, *Size of Government* and *Regulation* and the lagged change in *Size of Government* and *Regulation* are robust correlates of growth slowdowns. Both BMA and WALS techniques precisely confirm the significance of variables identified using the probit analysis.

Table B.4.1 (in Appendix B) shows the regional coverage of countries in the full and sub sample of data available for the regressions in a particular category. The comparison of the regional representation of subsample to the full sample suggests advanced countries are slightly over-represented in this subsample relative to the full sample, and Eastern Europe and Central Asia slightly underrepresented, but in general the correspondence is quite good.

4.1.2 Demography

Aiyer, Duval, et al. (2013) argued that there is little systematic impact of population growth in cross-country settings. In the Solow model, population growth rate is subtracted from the rate of growth of per capita output but new research has focused on the age distribution of a country's population. The countries that are experiencing a demographic transition due to declining mortality ratios tend to acquire a bulge in the working age ratio. People in the working age are more productive than those outside the working age group. Furthermore, workers save for their dependents and a bulge in the

working age ratio generates higher savings, increases available resources and creates productive investment opportunities. Bloom and Williamson, (1998); and Bloom and Canning, (2004) documented a positive impact of the working age ratio on economic growth in a cross-section of countries. Higgins, (1998); and Kelley and Schmidt, (1996) observed that national savings rates are highly associated with demographic structure. Aiyar and Mody (2011) focused on a particular region and used data on the heterogeneous evolution of the age structure of Indian states to conclude that much of the country's growth acceleration since the 1980s can be attributed to the demographic transition. Bloom, Canning, and Malaney (2000) and Mason (2001) discovered that East Asia's "economic miracle" was associated with a major transition in age structure.

Gender bias is an important determinant in growth literature because this bias can hinder growth through higher child mortality rates, increased fertility rates, unequal treatment in employment opportunities and greater malnutrition of females. Sen (1992) argued that the occurrence of "missing women" reflects the cumulative effect of gender discrimination against all cohorts of women alive today. Aiyar and Mody (2011) noted that a more equal sex ratio is robustly connected with a higher economic growth.

This study has taken four demographic variables to study growth slowdowns. The *Population Growth rate* is the increase in a countries population during a period of time. The *Fertility rate* is the average number of births per woman. The *Dependency ratio* is ratio of children and older population to working-age population. Finally, the *Sex ratio* is the ratio of males to females in a population.

The probit results in Table 3 shows that the level of *Dependency ratio* and the changes in the *Dependency ratio*, *Sex Ratio* and *Fertility Rate* are significantly associated with the probabilities of the slowdown episodes. The coefficients show the expected signs—a high ratio of dependents to workers increases the probability of a growth Slowdown. Moreover, an increase in the number of dependents to workers, the ratio of men to women, and number of births per women raises the probability of growth slowdown in subsequent periods.

Table 3. Probit and Robustness Tests Results for Demographic Variables

I. Final probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Demographic Variables	Coef.	P> z	Coef.	P> z
Population Growth				
Fertility Rate			0.4436	0.002
Dependency Ratio	0.0172	0.004	0.0817	0.001
Sex Ratio			0.0790	0.003
Pseudo R^2	0.0535			
Obs.	1230			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Demographic Variables	WALS t	BMA PIP	WALS t	BMA PIP
Population Growth	0.45	0.03	0.39	0.13
Fertility Rate	0.26	0.03	**1.55**	**0.85**
Dependency Ratio	**2.04**	**0.50**	**1.29**	**0.52**
Sex Ratio	0.38	0.08	**2.34**	**0.88**

4.1.3 Infrastructure

Infrastructure is a necessary condition for economic growth as infrastructure provides beneficial externalities to a spectra of productive activities. It has characteristics of a public good and has always been considered to be positively associated with economic growth.

However, when infrastructure development is measured using public investment as proxy, the findings were mixed as pointed out by Romp and de Hann (2007). Recent studies conducted by Demetriades and Mamuneas, (2000); Roller and Waverman, (2001); Calderon and Serven, (2004); Erget, Kozluk, and Sutherland, (2009) have used more direct measures of infrastructure and identified more strong positive impact of public capital on economic growth.

This study involves three variables involving infrastructure—*Electric Power Consumption, Internet access* and *Rail Lines. Electric power consumption* (Kwh per capita) is the log of production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants. *Internet access* is the number of internet users per 100 people. *Rail Lines* is the log of the country's rail route per square kilometer of land area.

Table 4 reports the probit and robustness test results using the infrastructure variables. The probit results show that only the level of electric power consumption is significantly associated with episodes of growth slowdowns. That is, excessive electric power consumption increases the probability of growth slowdowns in the sampled countries. So, the poor infrastructure can be deemed as responsible for sustained periods

of growth slowdowns in the sample. Both BMA and WALS techniques also validate the probit findings.

Table 4. Probit and Robustness Tests Results for Infrastructure Variables

I. Final probit Specification; Dependent Variable: *Slowdown*				
	Levels			
Infrastructure Variables	Coef.	P> z		
Electric Power Consumption	0.4286	0.000		
Pseudo R2	0.0486			
Obs.	980			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
	WALS	BMA	WALS	BMA
Infrastructure Variables	t	PIP	t	PIP
Electric Power Consumption	**3.11**	**0.99**	-0.55	0.42
Internet access	-0.62	0.12	-0.62	0.48
Rail Lines	-0.63	0.12	0.35	0.15

4.1.4 Health

Economists have studied the contribution of human capital to economic growth by defining human capital solely in terms of schooling. Recent growth literature has extended production function models of economic growth to account for health also. Bloom, Canning and Sevilla (2001) found out that health has a positive, sizable and significant impact on economic growth. They suggested that a one-year improvement in a population's life expectancy contributes to a 4 percent increase in output.

This study has exploited three health variables to growth slowdown episodes—*Life Expectancy at Birth*, *Maternal Mortality Ratio* and *Improved Sanitation facilities*. *Life Expectancy at Birth* reflects the overall mortality level of a population.

Life expectancy at Birth is the average number of years a new-born is expected to live if the mortality patterns prevalent at the time of its birth remain the same in the

future. *Maternal Mortality Ratio* (per 100000 live births) is the number of registered maternal death due to birth- or pregnancy-related complications per 100,000 registered live births. *Improved Sanitation Facilities* is the percentage of population with access to improved sanitation facilities.

Looking at Table 5, it can be said that none of the health variables are significant at their level values but all three of them are significant in differences. That is, a country with high life expectancy at birth and high maternal mortality rates has high probability of slowdowns in subsequent periods. This makes intuitive sense because high life expectancy and high maternal deaths will increase the number of aging and older population in a country. *Improved Sanitation Facilities* reduces the probability of growth slowdowns in subsequent periods for the sampled countries.

Table 5. Probit and Robustness Tests Results for Health Variables

I. Final Probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Health Variables	Coef.	P> z	Coef.	P> z
Life Expectancy at Birth			0.02919	0.000
Maternal Mortality Ratio			3.7577	0.007
Improved Sanitation Facilities			-0.9947	0.002
Pseudo R^2	0.1390			
Obs.	1230			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
	WALS	BMA	WALS	BMA
Health Variables	t	PIP	t	PIP
Life Expectancy at Birth	0.35	0.08	**2.25**	**0.87**
Maternal Mortality Ratio	0.09	0.07	**1.91**	**0.81**
Improved Sanitation Facilities	-0.13	0.07	**-1.50**	**0.54**

4.1.5 Macroeconomic Environment and Policies

Growth literature have identified a wide variety of macroeconomic factors associated with a country's economic growth and shocks to the economic growth. Capital inflows have always been identified as conducive to economic growth as it allows capital to be allocated to areas where its marginal product is highest.

Capital inflows facilitate consumption smoothing and diversify idiosyncratic income risks. But Calvo (1998) identified that periods of surging capital inflows are sometimes followed by a cessation or even reversal of the capital flow. This cessation or reversal of capital flows results in severe repercussions for an economy.

Cetorelli and Goldberg, (2011) and Aiyar, (2011, 2012) used recent evidence from the global financial crisis to propose that high domestic spillovers result in reliance on cross-border banking flows. Cerra and Saxena (2008) showed that banking crises and sudden stops may not affect the long-term growth but these shocks will lower potential output levels permanently. The decrease in potential out levels will cause persistent though temporary impact on potential economic growth.

Domestic investment is another crucial factor for growth but overinvestment may create growth slowdowns. Hori (2007) pointed out that the investment slump after the Asian crisis of the late 1990s was at least partly due to overinvestment. Investment booms may cause excessive borrowing and rapid accumulation of public and/or external debt.

Another factor associated with economic growth is *inflation.* Fischer (1993) showed that inflation is associated with negative economic growth. However subsequent literature studying the impact of inflation on economic growth have found ambiguous results, especially when inflation is at low or moderate levels.

Relationship between growth and price competitiveness has been extensively studied by the development economists. Easterly et al., (1993) and Mendoza (1997) proved that terms of trade shocks can explain part of the variance in growth across countries.

For countries that are large importers or exporters of fuel and food, such shocks could be particularly pertinent. However, there is no evidence that providing additional financing in excess of domestic savings is the channel through which financial integration delivers its benefits, as mentioned by Prasad, Rajan, and Subramanian (2007).

To study the impact of macroeconomic environment on growth slowdowns, this study used a number of potential explanatory variables—*Gross Capital Inflows/GDP, Gross Capital Outflows/GDP, Investment share or Gross Capital Formation (percentage of GDP), Trade Openness, Public Debt/GDP, External Debt/GDP, Inflation, Real Exchange Rate (RER), Terms of Trade (TOT), Price of Investment, Reserves/GDP, Banking Crisis, Oil Exporters' Price Shocks, Food Exporters' Price Shocks, Oil Importers' Price Shocks* and *Food Importers' Price Shocks.*

Some of the explanatory variables such as *Gross Capital Inflows/GDP, Gross Capital Outflows/GDP, Investment share or Gross Capital Formation (percentage of GDP), Public Debt/GDP, External Debt/GDP, Inflation, Real Exchange Rate (RER) Terms of Trade (TOT), Price of Investment* are self-explanatory.

Banking Crisis is a dummy variable that has been drawn from the database constructed and updated by Laeven and Valencia (2012). It takes the value of one if the country has experienced a banking crisis in any of the five years preceding the current year. *Trade Openness* is simply a country's exports plus imports divided by GDP.

The four variables *Oil Exporters' Price Shock, Food Exporters' Price Shock, Oil Importers' Price Shock,* and *Food Importers' Price Shock* are included to check if the data reveals anything specific about commodity price shocks in countries that are heavily dependent on commodity exports or imports. Including these shocks can capture an effect that is above and beyond the effect captured by levels and differences of the country's *Terms of Trade (TOT)*.

Oil Exporter's Price Shock is defined as the change in the world oil price over the current period times the share of oil exports as a percent of GDP. *Oil Importer's Price Shock* is defined as the change in the world oil price over the current period times the share of oil imports as a percent of GDP. The *Food Exporters' and Importers Price shocks* are defined analogously, replacing oil by food.

Table 6 provides the panel results involving macroeconomic policy variables. The initial level of *Gross Capital Inflows/GDP* is associated with a higher probability of growth slowdown episodes. This results are consistent with Aiyer, Duval, et al (2013) and indicate either a Dutch Disease—negative impact on an economy due to phenomena that gives rise to a sharp inflow of foreign currency or Sudden Stops—an abrupt reduction in net capital flows into an economy.

Table 6. Probit and Robustness Tests Results for Macroeconomic Variables

I. Final Probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Macroeconomic Variables	Coef.	P> z	Coef.	P> z
Gross Capital Inflows/GDP	0.2055	0.004	-0.1045	0.004
Gross Capital Formation			0.0653	0.007
Trade Openness			-0.0221	0.005
Pseudo R2	0.0403			
Obs.	1062			

II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Macroeconomic Variables	WALS t	BMA PIP	WALS t	BMA PIP
Inflation	-0.77	0.15	0.95	0.12
Real Exchange Rate (RER)	0.81	0.16	0.25	0.02
Trade Openness	0.16	0.10	**-1.13**	**0.92**
External Debt/GDP	-0.76	0.21	-0.04	0.11
Public Debt/GDP	-0.32	0.10	0.34	0.14
Terms of Trade (TOT)*	0.14	0.10	-0.33	0.14
Gross Capital Inflows/GDP	**1.91**	**0.69**	**-2.05**	**0.75**
Gross Capital Outflows/GDP	0.40	0.11	-0.43	0.07
Gross Capital Formation	0.77	0.15	**2.15**	**0.81**
Price of Investment	0.56	0.09	0.10	0.03
Reserves/GDP	-0.72	0.12	0.08	0.02
Banking Crisis	0.34	0.09		
Oil Exporters' Price Shock*	0.78	0.12		
Food Exporters' Price Shock*	0.11	0.15		
Oil Importers' Price Shock*	-0.61	0.08		
Food Importers' Price Shock*	0.21	0.17		

* Contemporaneous

Following Aiyer, Duval, et al (2013), this study has discriminated between the Dutch Disease and Sudden Stops by examining the correlation between (a) the initial

level of capital inflows and the change in the *Real Exchange Rate (RER)* and (b) the initial level of capital inflows and the change in capital inflows over the current period. The correlation coefficient of (b) is strongly negative while the correlation coefficient of (a) is close to zero. This result support the Sudden Stops interpretation. Also, a Dutch Disease explanation does not fit the situation as the level and change in the RER, both of which were included as explanatory variables into the specification, are not found to be significant.

Gross Capital Inflows/GDP in differences is also significantly associated with growth slowdowns suggesting that a reduction in *Gross Capital Inflows / GDP* can cause a growth slowdown in the subsequent periods. A rapid increase in an economy's *Investment Share* or *Gross Capital Formation* is strongly associated with the slowdown probability of subsequent periods.

An increasing *Trade Openness* result in decreasing slowdown probability for subsequent periods. This finding is consistent with theory as trade openness offers a diversification from internal risks to a mix of internal and external risks, thereby acting as a buffer against idiosyncratic domestic shocks.

4.1.6 Economic Structure

When an economy expands beyond its pre-capitalist stage, it experiences an expansion in its formal employment and output in the manufacturing sector. This expansion result in a withdrawal of labor from the other parts of the economy, mainly from the initially dominant agricultural sector. Harris and Todaro (1970) and Lewis (1979) have viewed this migration of labor from agricultural sector to manufacturing sector and the

corresponding structural transformation of the economy as the engine of economic development and growth.

The economic structure is an important factor driving growth so this study has taken three economic structure variables to study the probability of growth slowdowns. The three structural variables—Agricultural Share, Service Share and Manufacturing Share. Table 7 presents the results of panel regressions showing that the variables are highly significant in both levels and differences. The sign of the coefficients is negative, that is, a lower initial share of GDP in agriculture, services and manufacturing and a diminishing share of GDP in agriculture, services and manufacturing are associated with an increased probability of growth slowdown. BMA and WALS techniques also confirms these findings. These results suggest that economies undergoing rapid structural changes are in a concomitant risk of facing slowdowns. During the phases of economic development, surplus labor typically moves from the traditional agricultural sector and informal services sector to newly expanding industrial sector. As a results, agriculture and informal services decline in relative terms, whereas industry and modern manufacturing expands. This expansion of industry induces economic growth. But this development process involves risks of growth slowdown that would not occur in a low-income country with no structural transformation and no growth. However, structural transformation is needed to ensure growth and the possibility of a slowdown is rather preferable to a stagnation.

It is imperative to study the relationship between growth slowdowns and output diversification. Papageorgiou and Spatafora's (2012) index of Output Diversification, covering 12 economy-wide sectors from 2000 onwards, has been used to study the

relationship. The Lack of Output Diversification were separately included in the probit specification due to the unavailability of data relative to the other structural variables used. When included separately in the probit specification, the results show that the Lack of Output Diversification is associated with higher probability of economic slowdowns.

Table 7. Probit and Robustness Tests Results for Structural Variables

I. Final Probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Structural Variables	Coef.	P> z	Coef.	P> z
Agriculture Share	-0.0337	0.000	-0.0653	0.000
Service Share	-0.014	0.001	-0.0148	0.005
Manufacturing Share	-0.0238	0.004	-0.0357	0.015
Pseudo R2	0.0385			
Obs.	1091			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Structural Variables	WALS t	BMA PIP	WALS t	BMA PIP
Agriculture Share	**-3.20**	**0.99**	**-3.01**	**0.91**
Service Share	**-2.35**	**0.77**	**-3.87**	**0.54**
Manufacturing Share	**-1.76**	**0.57**	**-1.84**	**0.62**

4.1.7 Trade Structure

Facets of Trade Structure of an economy and its relevance to economic growth and resilience have long been explored in the growth literature. Regional economic centers can expand trade opportunities and facilitate economic growth. Distance can result in transportation costs and market segmentation, which may reduce in economies of scale for domestic firms.

Redding and Venables (2004) showed association between distance metrics and per capita income. Boulhol and de Serres (2008) replicated the Redding and Venables (2004) study by using a different sample to show that the relationship between distance metrics and per capita income is also valid within a panel of advanced countries. Also, regional integration can improve growth prospects by allowing economies to take advantage of their geographical location. Regional integration can be a strong tool to facilitate growth as Ben-David (1993) pointed out that the trade agreements in Europe have amplified convergence among the member nations.

Export diversification has also been discovered to be favorably related to growth, mostly for countries that are at an early stage of development. Koren and Tenreyro (2007) pinpointed that economic diversification can increase the resilience of low-income countries to external shocks, while Agosin (2003) and Gartner and Papageorgiou (2011) gathered evidence that export diversification has a positive impact on growth in case of emerging economies too.

To study the impact of trade structure on slowdown episodes, this study focuses on three variables—*Distance (GDP weighted)*, *Regional Integration* and *Lack of Export Diversification.* The data on *Distance (GDP weighted)* comes from World Bank. For each country *i*, *Distance (GDP weighted)* sums the distance to every other country in the world *j*, weighting each distance by the share of country *j* in world GDP. This suggests that the index will be low for countries that are close to large and economically important countries but high for countries that are geographically isolated from economic centers. *Regional Integration* is the country's amount of intra-regional trade relative to its total

trade. *Lack of Export Diversification* is a Theil index calculated by Papageorgiou and Spatafora (2012) using product data at the four-digit SITC level.

Table 8. Probit and Robustness Tests Results for Trade Variables

I. Final Probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Trade Variables	Coef.	P> z	Coef.	P> z
Distance	0.0135	0.002		
Regional Integration	-0.0014	0.005		
Pseudo R^2	0.0700			
Obs.	699			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Trade Variables	WALS t	BMA PIP	WALS t	BMA PIP
Distance	**1.29**	**0.52**		
Regional Integration	**-1.30**	**0.53**	0.02	0.07
Lack of Export Diversification	0.83	0.11	0.61	0.06

The results in Table 8 shows that *Distance* and *Regional Integration* are both important determinants of growth slowdowns. Bayesian Averaging Robustness Tests also confirm the findings. The findings suggest that the larger the GDP weighted distance of a country from its potential trade partners, the higher the probability of a growth slowdown. Also, the greater the share of intra-regional trade undertaken by a country, the less likely is the probability of a slowdown. *Lack of Export Diversification* was not found significant because including *Export Diversification* along with *Distance* and *Regional Integration* forces to drop a considerable amount of data on *Export Diversification* because of unavailability of data for *Distance* and *Regional Integration.* The estimation involving only growth slowdowns and *Export Diversification* suggest that diversified export base is indeed result in a lower probability of slowdown.

4.1.8 Other Variables

There are some other important variables associated with growth but these variables do not fit under any of the previous categories. The study includes *Ethnolinguistic Fractionalization (ELF) Index* as this *ELF index* has often been linked with poor social capital and negative economic growth. *Tropics*—the fraction of a country's land area that lies in the tropical zone, was included to account for the various features of climatic conditions on economic growth slowdown episodes.

Sala-i-Martin, Dopplehofer, and Miller (2004) found that controlled for a being a *Spanish Colony* in the past and having a large *Buddhist* population are variables that are significantly associated with growth, even after controlling for other institutional and cultural factors. So, this study has included *Spanish Colony* and *Buddhist* population as explanatory variables. Finally, *Wars and Civil Conflicts*, and *Natural Disasters* were included as these incidences can clearly depress economic growth.

Since the explanatory variables are either time-invariant or exogenous in nature, only the level values were included in the probit specification. Table 9 presents the results and suggests that *Wars and Civil Conflicts* and *Tropics* are significantly associated with growth slowdown. Increased numbers of *Wars and Civil Conflicts* increases the probability of a growth slowdown. Also the larger the fraction of a country's area in the *Tropics*, the greater the probability of facing a growth slowdown.

Table 9. Probit and Robustness Tests Results for Other Variables

I. Final Probit Specification; Dependent Variable: *Slowdown*				
	Levels		**Differences**	
Other Variables	Coef.	P> z	Coef.	P> z
Tropics	0.5422	0.021		
Wars and Civil Conflicts	0.3851	0.000		
Pseudo R^2	0.0400			
Obs.	825			
II. Bayesian Averaging Robustness Tests				
	Levels		**Differences**	
Other Variables	WALS t	BMA PIP	WALS t	BMA PIP
ELF Index	-0.41	0.03	-	-
Buddhist	0.12	0.02	-	-
Spanish Colony	0.33	0.04	-	-
Tropics	**1.73**	**0.58**	-	-
Natural Disasters	-0.19	0.01	-	-
Wars and Civil Conflicts	**2.03**	**0.69**	-	-

4.1.9 Summary

Table 10 summarizes the results of the probit analysis by listing all the significant explanatory variables. The average marginal effects of each variable have also been reported to gain a better understanding of the impact of each variable on economic growth slowdown. Also, the last two columns of the table show the effect on the probability of a slowdown if the explanatory variables move from the 25th percentile of the distribution to the 75th percentile of the distribution. Some of the policy variables seem to have a very substantial impact on slowdown probabilities. For instance, the results imply that changing trade openness from the 25th percentile level to the median lowers the probability of a slowdown by 1.10 percentage points, while a further move to the 75th percentile lowers that probability by a further 1.30 percentage points.

Table 10. Summary of Probit Specifications

Regressors	Probit Coef.	Average Marginal Effects	Change in Slowdown Probability from	
			p(50)-p (25)	p(75)-p (50)
Institutional Variables				
Rule of Law	-0.1307***	-1.6	-4.50	-3.20
Size of Government	-0.1401***	-3.1	-2.10	-2.00
Regulation	-0.2462***	-1.2	-1.40	-1.50
D.Size of Government	-0.1583***	-2.9	-2.80	-2.70
D.Regulation	-0.1626***	-2.3	-3.70	-3.50
Demographic Variables				
Dependency Ratio	0.0172***	0.3	2.80	2.30
D.Fertility Rate	0.4436***	0.1	0.50	0.50
D.Dependency Ratio	0.0817***	0.2	0.80	0.70
D.Sex Ratio	0.0790***	1.5	0.40	0.30
Infrastructure Variables				
Electric Power Consumption	0.4286**	1.6	2.20	2.10
Health Variables				
D.Life Expectancy at Birth	0.0292***	0.7	1.40	2.30
D.Maternal Mortality Ratio	3.7577**	4.9	2.30	2.50
D.Improved Sanitation Facilities	-0.9947**	-1.3	-1.90	-1.90
Macroeconomic Variables				
Gross Capital Inflows/GDP	0.2055***	2.5	1.50	2.30
D.Gross Capital Inflows/GDP	-0.1045***	-1.5	-3.50	-4.30
D.Gross Capital Formation	0.0653***	1.1	1.90	1.80
D.Trade Openness	-0.0221***	-0.4	-1.10	-1.30
Structural Variables				
Agriculture Share	-0.0337**	-0.4	-2.80	-3.10
Service Share	-0.0140**	-0.2	-3.00	-2.80
Manufacturing Share	-0.0238***	-0.3	-1.40	-1.30
D.Agriculture Share	-0.0653**	-0.8	-1.60	-1.40
D.Service Share	-0.0148**	-0.2	-2.00	-1.60
D.Manufacturing Share	-0.0357**	-0.4	-1.30	-1.10
(Lack of Output Diversification)	0.0341***	0.5	2.50	8.30
Trade Variables				
Distance	0.0135***	0.2	3.00	2.90
Regional Integration	-0.0014***	-0.1	-2.40	-3.20
(Lack of Export Diversification)	0.1335***	2.7	2.30	2.30
Other Variables				
Tropics	0.5422***	3.1	4.00	3.20
Wars and Civil Conflicts	0.3851**	7.1		

Notes:

*p < 0.1, ** p < 0.05, *** p < 0.01

The Prefix D. refers to differences

Brackets indicates variables that are significant only when regressed separately

4.10 Results of Combined Probit Specification

It is imperative to study the determinants of growth slowdown from a collective perspective. This will help resolve the omitted variable bias and provide more meaningful results. But due to data unavailability of some variables, the combined regression with all the 45 explanatory variables severely restricts the sample size. So, using a forward and backward selection procedure, a combined probit specification was estimated using the most significant variables from each category. Table 11 reports the results of the combined probit specification.

Table 11: Results of Combined Probit Specifications

Regressors	Probit Coef.	P> z
Institutional Variables		
Size of Government	-0.0846	0.1710
D.Regulation	-0.1206***	0.0000
Demographic Variables		
Dependency Ratio	0.0314***	0.0080
Infrastructure Variables		
Electric Power Consumption	0.2512***	0.0067
Health Variables		
D.Life Expectancy at Birth	0.0453***	0.0087
Macroeconomic Variables		
D.Gross Capital Inflows/GDP	-0.0265*	0.0700
D.Trade Openness	-0.0195**	0.0450
Structural Variables		
Manufacturing Share	-0.0520***	0.0040
Trade Variables		
Distance	0.0646***	0.0001
Regional Integration	-0.0361***	0.0005
Other Variables		
Tropics	0.0008	0.8590
Notes:		
*p < 0.1, ** p < 0.05, *** p < 0.01		
The Prefix D. refers to differences		

By looking at Table 11, the *Size of the Government* is no longer significant. So, under the institutional variables, *Regulation* is the most significant factor that affects slowdown. *Dependency Ratio* continues to be a significant factor affecting slowdown. For the infrastructure, *Electric Power Consumption* is associated with higher probability of slowdowns. *Manufacturing Share* is important for the sampled countries and help to reduce the probability of slowing down. The variables under the *Other* category is not significantly associated with slowdown for the sampled country.

4.11 Full Sample Vs Middle-Income Countries (MICS)

Since in the sampled countries, the middle-income countries (MICs) differ from the others in experiencing a higher frequency of growth slowdowns, it is important to study the determinants of growth slowdowns in these middle-income countries and compare the results with the results obtained from the probit specifications. To study the Middle-Income Countries (MICS) better, all the regressions were repeated by restricting the sample to Middle-Income Countries (MICS) only. Table 12 shows how the results differ across the full sample and restricted sample.

For the restricted sample, the probit results for the institutional variables suggest that the *Rule of Law* in levels is no longer significant and *Size of Government* is the only significant variable in levels. The reason could be that, at low levels of income, the enforcement of a sound legal system is required, but once a country meets the condition of sound legal system, the capacity of the private sector to innovate and grow becomes relatively more important. The private sector's capacity to expand can be hampered by extensive governmental intervention in the economy, which therefore become significant for the Middle-Income Countries (MICs). Also, the coefficient on *Regulation* in

differences is significantly larger for Middle-Income Countries (MICs) than for the full sample of countries. This confirms that deregulation is a particularly important channel for guarding against growth slowdowns in Middle-Income Countries (MICs).

For the demographic variables, only the *Dependency Ratio* in levels and *Sex Ratio* in differences are significant for the restricted sample. That is, the increases in the number of dependents on workers and the ratio of men to women both increases the probability of slowdown episodes in subsequent periods for the Middle-Income Countries (MICs).

The infrastructure variable—*Electric Power Consumption* and *Rails Lines* in levels are significant for the restricted sample. The magnitude of the coefficient suggest that the infrastructure development matters more once an economy has exceeded the low-income status. All the health variables in differences are significant for the restricted sample but the magnitudes are lower than the full sample coefficients. This suggests that, once a country has achieved the middle-income status, the health structure development may not be considered as important as in the low-income status.

The probit specifications using Macroeconomic variables in the restricted sample shows almost similar results as found from the full sample. For the structural variables, the restricted sample results show that, the *Agricultural Share* and *Service Share* in levels are no longer significant. As the Middle-Income Countries (MICs) are more focused on industry oriented manufacturing, these two variables cease to be significant.

The trade variables show similar results and it is noted that the magnitude of *Distance (GDP weighted)* has increased for the Middle-Income Countries (MICs).

Table 12. Full Sample Vs Middle-Income Countries (MICs)

Regressors	Probit Coef. Full Sample	Probit Coef. Restricted Sample	WALS	PIP
Institutional Variables				
Rule of Law	-0.1307***			
Size of Government	-0.1401***	-0.3622***	-1.99	0.58
Regulation	-0.2462***	-0.7940***	-3.24	0.96
D.Size of Government	-0.1583***	-0.4190***	-1.79	0.58
D.Regulation	-0.1626***	-0.9935***	-2.92	0.97
Demographic Variables				
Dependency Ratio	0.0172***	0.0534***		
D.Fertility Rate	0.4436***			
D.Dependency Ratio	0.0817***			
D.Sex Ratio	0.0790***	0.1581***		
Infrastructure Variables				
Electric Power Consumption	0.4286**	0.8410***	1.70	0.59
Rail Lines		-0.1589**	-1.99	0.67
Health Variables				
D.Life Expectancy at Birth	0.0292***	0.0226***	-1.79	0.58
D.Maternal Mortality Ratio	3.7577**	2.9324***	-1.65	0.52
D.Improved Sanitation Facilities	-0.9947**	-0.3580***	-1.63	0.51
Macroeconomic Variables				
Gross Capital Inflows/GDP	0.2055***	0.1592***	2.25	0.79
D.Gross Capital Inflows/GDP	-0.1045***	-0.1695*	-1.30	0.50
D.Gross Capital Formation	0.0653***	0.0475***	2.42	0.84
D.Trade Openness	-0.0221***	-0.0310***	-2.62	0.72
Structural Variables				
Agriculture Share	-0.0337**			
Service Share	-0.0140**			
Manufacturing Share	-0.0238***	-0.0885**	-1.21	0.51
D.Agriculture Share	-0.0653**	-0.0263***	-1.30	0.52
D.Service Share	-0.0148**	-0.0154***	-1.73	0.60
D.Manufacturing Share	-0.0357***	-0.1601***	-1.84	0.73
(Lack of Output Diversification)	0.0341***			
Trade Variables				
Distance	0.0135***	0.3421*	1.29	0.50
Regional Integration	-0.0014***	-0.0150***	-1.46	0.61
(Lack of Export Diversification)	0.1335***			
Other Variables				
Tropics	0.5422***			
Wars and Civil Conflicts	0.3851**	0.6880***	2.09	0.84
Notes:				
*p < 0.1, ** p < 0.05, *** p < 0.01				
The Prefix D. refers to differences				

From Table 12, it is clear that the findings that both *Output Diversification* and *Trade Diversification* reduces the probability of a slowdown, when regressed separately, disappears when the sample is restricted. This can be explained with the argument that in low-income countries, such diversification is particularly necessary for economic growth as the low-income countries are transitioning out of a primarily agriculture-based economy.

4.12 Middle Income Trap Vs Regression to the Mean

This study has already identified the existence of middle income trap and the factors associated with the trap. However, one strand of recent growth literature has refuted the existence of middle income trap. Bulman, Eden, Nguyen (2014) have argued that there is no existence of unusual stagnation at any middle-income levels. But they agreed that the determinants of growth vary at low and high income levels. Pritchett and Summers (2014) also argued that the regression to the mean is more robust in the data than the middle-income trap.

To analyze whether the findings of this study is driven by regression to the mean instead of a middle-income trap, the sampled countries were divided into three income groups following Bulman, Eden and Nguyen (2014). Low-Income countries are those countries with a PPP GDP per capita less than or equal to 10% of U.S. PPP GDP per capita (2011 International $). Middle-Income countries are defined as the countries with PPP GDP per capita between 10% and 50% of U.S. PPP GDP per capita (2011 International $). High-Income countries have PPP GDP per capita above 50% of U.S. PPP GDP per capita (2011 International $).

Figure 2 shows the countries' long run changes in their income relative to the U.S. The log of per capita income relative to the U.S. in 1960 is on the X axis and the log of per capita income relative to the U.S. 2014 is on the Y axis. Each axis is divided into three areas-- representing the low, middle and high income groups. Countries in the top quadrant (in red) are those that have "escaped" from middle income to high income over this period. It is clear from the figure that only eleven countries have managed to escape the middle-income group over the 55 years. The list of escapees includes Bahrain; Hong Kong SAR, China; Israel; Ireland; Japan; Republic of Korea; Portugal; Puerto Rico; Saudi Arabia; Spain and Taiwan Province of China.

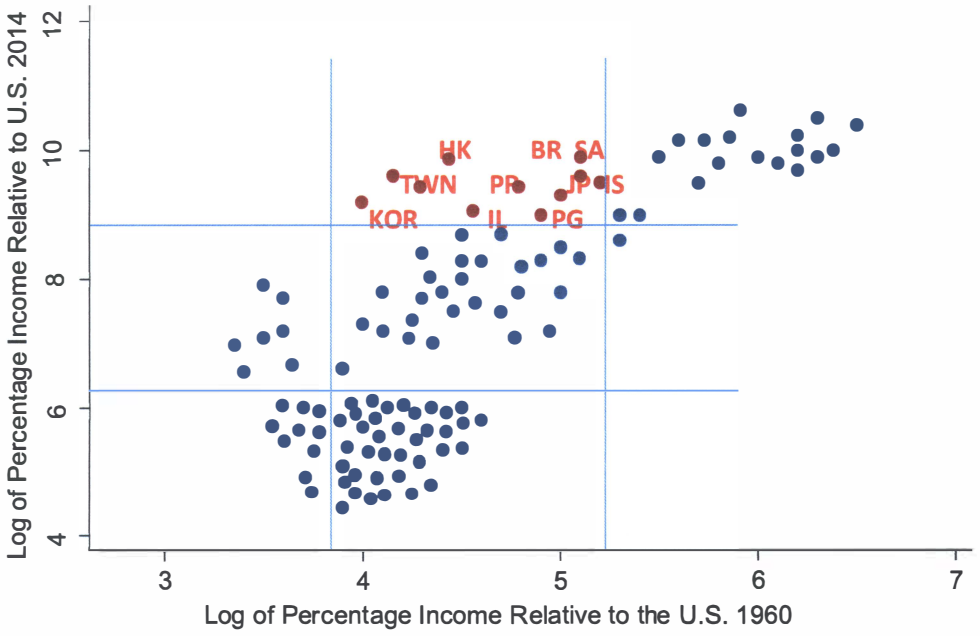

Figure 2. Evidence of Middle-Income Trap, 1960-2014

The dominant fact that emerges from the figure confirms the existence of middle-income trap as only four countries have managed to achieve high-income status over the

span on 55 years. Table 13 provides the income distribution of the sampled countries and also shows the income group transitions of the sampled countries.

Taking 1960 and 1970 as the base year to 2014, Table 13 shows the income group transitions of the sampled countries. It is evident the income levels are highly persistent and can be considered sticky. Almost all the high-income countries in 1960 and 1970 remained high income countries in 2014 and few low-income countries joined the middle-income status. Most of the middle-income countries remained stuck at the middle-income levels except the four countries that graduated to high income status.

Table 13. Income Group transitions, Base Years to 2014

	Base Year			
Number of countries in the sample	1960		1970	
Low Income	51		66	
Middle Income	38		52	
High Income	19		27	
Total	**108**		**145**	
Income group transitions (%), base year to 2014				
Low→Low	44	86.3%	56	84.4%
Low→Middle	7	13.7%	9	13.6%
Low→High	0	0.0%	1	1.5%
Middle→Low	2	5.8%	1	1.9%
Middle→Middle	25	65.8%	41	78.8%
Middle→High	11	28.9%	10	19.2%
High→Low	0	0.0%	0	0.0%
High→Middle	1	5.3%	1	3.7%
High→High	18	94.7%	26	96.3%
Total	**108**	**100.0%**	**145**	**100.0%**

There can be the existence of fluid transitions among the sampled countries, that is, some countries might have moved to a higher status and then moved back to original status over the 55 years' period. However, in most of the cases, once a country moves to

a higher income level, the probability of reverting back to a lower income status is relatively less. Also, the evaluation the transitions from base year to 2014 only confirms the previous findings that most of the middle-income countries are stuck at the middle-income level.

To observe the average growth of "escapees", average annual growth rates at different per capita income levels relative to the U.S. were plotted. Figure 3 shows the growth rates of both escapees and non-escapees. The blue column shows the average growth for countries that never escaped the middle-income status, whereas the orange column shows the growth rates of those countries that have escaped the middle-income status. The escapees have strong growth rates. Also, some of these countries growth rates can be close to those of high-income countries and these escapees were able to achieve high income status because of their strong growth rates, which in turn were induced by country specific policies and conditions.

In contrast, non-escapees have stable growth rates at all income levels. Non-Escapees as a whole are not growing towards the high-income status. As a reason, these countries can be deemed to be caught at a middle-income trap. The non-escapees as a group are facing relative stagnation for the entire period. Figure 3 confirms the existence of middle-income trap in the sampled countries as most of the middle-income countries are stuck at the middle-income status.

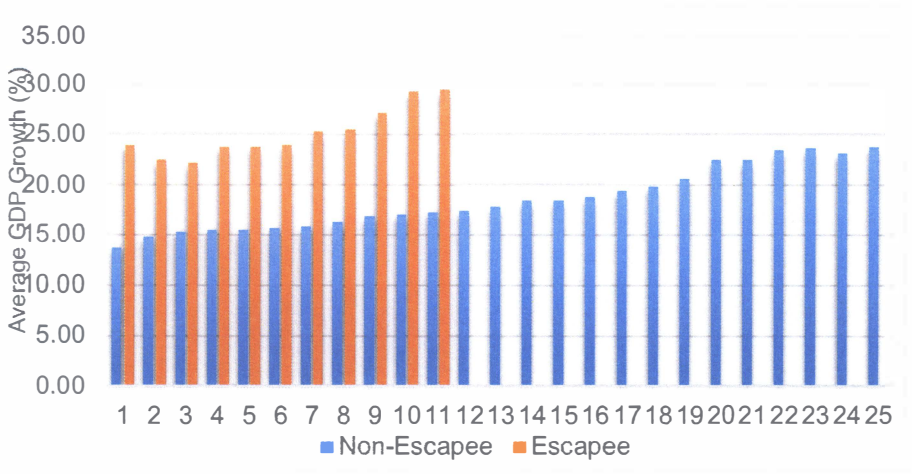

Figure 3. Average GDP Growth Rates for Escapees and Non-escapees

The following graph is drawn by plotting the countries' subsequent 10-year average growth against the log of countries' initial income relative to the U.S. in 1960, 1970, 1980, 1990, 2000 and 2010. Figure 4 also validates the previous findings that countries are indeed stuck at middle-income levels. The U-shaped curve implies that the countries are systemically slowing down at middle income levels.

Figure 4. Initial Income Relative to U.S. and Average Growth

4.13 Middle-Income Trap and Policy Implications

This study aims to contribute to the policy formulation by capitalizing on the variables identified in the previous sections. Some of the variables identified can be exploited by developing effective policies, especially over short time horizons. Prudential regulation systems, free trade policies, sound infrastructure, improved health conditions and deregulation in required areas are all examples of how growth slowdowns can be avoided by an economy in a relatively short period of time. There are indeed some variables that can be influenced by policy but only over a medium- to long time horizon, such as demographic trends and the rule of law.

Table B.4.2 (in Appendix B) presents an illustrative "growth slowdown risk" map for seven Asian MICs under the seven categories identified in the previous section. Since the variables under the "other" category is mostly irrelevant to policy formulations, the "other" variables were not included in designing the risk map. The middle-income risk map was created following Aiyer, Duval, et al. (2014). Under each category, a score was calculated using the restricted sample coefficients listed in Table 12 to the 2010-2014 data for the Asian MICs. This score reflects the probability of an imminent slowdown over the next five years. The ranking of one signifies the greatest risk of slowdown in that category, whereas seven signifies the least risk. The ranking is not done using levels of the underlying variables, but using the weighted mix of levels and differences that came out significant in the empirical estimation. The rankings are presented using colors—the red color indicates lower rankings while the green color denotes higher ones, relative to other countries featured in the table.

The risk map shows that imply that, compared with other Asian economies,

Malaysia, the Philippines and China would face a higher risk of growth slowdown origination from institutions. The Philippines, Vietnam and India are at risk of slowing down due to the demographic factors. The Philippines, India and Indonesia will be facing a growth slowdown due to poor infrastructure. On trade, India and China needs to focus more on regional integration, while Thailand and the Philippines seem well integrated. The rankings in a particular category does not indicate that one country has better performance in that category compared to the other country but rather that one country has improved more rapidly in that category over the last period of the sample.

Table B.4.3 expands this methodology to a number of Middle-Income countries and try to compare the Asian countries with Latin American and Middle East and North African (MENA) countries. It is clearly evident from the Table that, compared with the other two regions, Asian countries are facing a high risk of slowdowns due to infrastructure. The regional integration in Asian countries compare favorably with Latin American and Middle East and North African (MENA) countries. Even though India and Indonesia were lagging behind the other Asian middle income economies, they are well situated in the broader sample. So, the trade is the variable that can strengthen the Asian region and work against growth slowdowns.

Chapter 5

Conclusion

This study attempts to uncover two facts—whether the middle-income trap exists and if any, then what factors are responsible for the same. The study has identified that some Middle-Income Countries (MICs) did get "stuck" at middle-income levels. The findings suggest that Middle-Income Countries (MICs) that could not "escape" the trap remain stagnant and failed to graduate to a high-income status.

After confirming the existence of "middle-income trap", the study aims to identify the determinants of growth slowdowns by using a range of potential explanatory variables grouped under eight categories—Institution and Economic Freedom, Demography, Infrastructure, Health, Macroeconomic Environment and Policies, Economic Structure, Trade Structure and Other. The panel probit estimation techniques were employed and the robustness of the results were tested using Bayesian Model Averaging Techniques.

The results showed that the probability of growth slowdowns can be affected due to several explanatory variables. Regulation and the Size of Government are important institutional variables that can impact growth slowdowns. Several demographic and infrastructural issues also influence episodes of slowdowns. Maternal mortality rates, life expectancy at birth and improved sanitation facilities also plays role in slowing down a country's growth.

Macroeconomic policies and environment is the most important factor governing growth. The study has controlled for a number of macroeconomic issues to identify the macroeconomic variables associated with growth slowdowns. The results show that

capital inflows, investment and trade openness are the most crucial factors affecting growth slowdowns. Economic share of agriculture, services and manufacturing also impacts growth slowdowns. Trade and regional integration are also relevant to growth slowdowns as greater share of intra-regional trade results in lower slowdown probabilities. The robustness of the results were confirmed using Bayesian Model Averaging (BMA) and Weighted Average Least Square (WALS) techniques.

To check whether the causes of slowdown in Middle-Income Countries (MICs) are different than the low and high income countries, the study repeats all the regressions by restricting the sample to middle-income countries only. The results show that government size and regulation are particularly important factors associated with slowdowns in Middle-Income Countries (MICs) as limited governmental interventions promote private expansion and appropriate deregulation acts as a buffer against economic growth slowdowns. Moreover, Infrastructure is significantly associated with slowdowns in Middle-Income Countries (MICs). Insufficient infrastructural facilities emerge as a potential risk factor for growth.

Although the study has identified periods of growth slowdowns, it seeks to pinpoint that the growth slowdowns were caused due to middle-income trap and not merely reflects the regression to the mean phenomenon. To link the growth slowdowns with middle-income trap, the study has constructed mobility matrices. The mobility matrices reaffirm the existence of middle-income trap in the sampled countries over the 55-year period horizon.

The study also offers policy implications for the Middle-Income Countries (MICs) by constructing an illustrative slowdown risk map over the next five years and

compare the potential risk of slowing down among Asian, Latin American and Middle East and North African (MENA) Countries. The slowdown risk map shows that the Asian countries are at high risk of slowing down due to poor infrastructure, while Latin American and Middle East and North African (MENA) countries are lagging behind in trade and regional integration.

This study is the one of the most comprehensive study on middle-income trap involving 145 countries over the period 1960-2014. The methodology of this study is more rooted in the growth theory and literature. The study also controls for potential endogeneity issues and unavailability of data. The findings of this study are fairly consistent with theory. With recent anxiety about being stuck at a middle-income, the focus on middle-income trap tends to increase. This study is a valuable addition to the existing middle-income trap literature.

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Appendix A

Tables and Charts

Table A.3.1. Growth Slowdowns Episodes

(By income group)

Middle Income					
Albania	2005-2009	Guyana	2005-2009	Peru	1975-1979
Algeria	1980-1984	Haiti	1980-1984	Peru	1980-1984
Algeria	1985-1989	Honduras	1965-1969	Philippines	2005-2009
Argentina	1980-1984	Honduras	1980-1984	Poland	1980-1984
Argentina	1995-1999	Honduras	2005-2009	Portugal	1970-1974
Argentina	2005-2009	Indonesia	1995-1999	Romania	1975-1979
Armenia	2005-2009	Iran	1970-1974	Romania	1980-1984
Belize	1990-1994	Iran	1975-1979	Romania	2005-2009
Belize	2005-2009	Iran	1995-1999	South Africa	2005-2009
Bolivia	1975-1979	Iran	2005-2009	South Africa	1980-1984
Bolivia	2005-2009	Iraq	1980-1984	Spain	1965-1969
Botswana	1975-1979	Jamaica	1970-1974	Swaziland	1990-1994
Botswana	2000-2004	Jamaica	1990-1994	Syria	1975-1979
Brazil	1975-1979	Jamaica	2005-2009	Syria	1980-1984
Brazil	1980-1984	Jordan	1965-1969	Syria	1995-1999
Brazil	2005-2009	Jordan	1980-1984	Thailand	1995-1999
Bulgaria	1980-1984	Jordan	2005-2009	Thailand	2005-2009
Bulgaria	2005-2009	Kazakhstan	2005-2009	Tonga	1985-1989
Chile	1970-1974	Korea, Republic of	1970-1974	Trinidad &Tobago	1965-1969
Chile	1995-1999	Kyrgyz Republic	1970-1974	Trinidad &Tobago	1980-1984
Chile	2005-2009	Lesotho	2005-2009	Tunisia	1975-1979
China	2005-2009	Lesotho	2000-2004	Turkmenistan	2005-2009
Congo, Republic of	1985-1989	Malaysia	1980-1984	Turkmenistan	2005-2009
Congo, Republic of	2005-2009	Malaysia	1995-1999	Uganda	2005-2009
Cote d' Ivoire	2005-2009	Maldives	1985-1989	Uruguay	1995-1999
Croatia	2005-2009	Maldives	2005-2009	Venezuela	1975-1979
Cyprus	1980-1984	Mali	2005-2009	Vietnam	2005-2009
Dominican Republic	1975-1979	Malta	1980-1984	Yemen	2000-2004
Ecuador	1975-1979	Mauritius	1975-1979	Yemen	2005-2009
Ecuador	1980-1984	Mexico	1980-1984	Zambia	1970-1974
Ecuador	2005-2009	Namibia	1970-1974		
Egypt	1995-1999	Nicaragua	1965-1969		
El Salvador	1975-1979	Nicaragua	1985-1989		
El Salvador	1995-1999	Panama	2005-2009		
El Salvador	2005-2009	Panama	1980-1984		
Estonia	2005-2009	Papua New Guinea	1985-1989		
Gabon	1975-1979	Papua New Guinea	1980-1984		
Gambia	2005-2009	Papua New Guinea	1995-1999		
Guatemala	1980-1984	Paraguay	1980-1984		
Guyana	2000-2004	Paraguay	2005-2009		

Table A.3.1. Growth Slowdowns Episodes, concluded

(By income group)

High Income		**Low Income**			
Australia	2005-2009	Afghanistan	1985-1989	Pakistan	2005-2009
Barbados	1970-1974	Bangladesh	2005-2009	Rwanda	1985-1989
Bahrain	1980-1984	Benin	1970-1974	Rwanda	2005-2009
Bahrain	2005-2009	Benin	1985-1989	Senegal	2005-2009
Barbados	1980-1984	Burundi	1970-1974	Sierra Leone	1990-1994
Barbados	2000-2004	Burundi	2000-2004	Sierra Leone	2005-2009
Barbados	2005-2009	Burundi	2005-2009	Sudan	2000-2004
Belgium	2005-2009	Cameroon	1985-1989	Togo	1980-1984
Brunei	1980-1984	Congo, Republic of	1970-1974	Uganda	1970-1974
Canada	2005-2009	Cote d`Ivoire	1970-1974	Zambia	1975-1979
Colombia	2005-2009	Denmark	2005-2009	Zambia	2005-2009
Cyprus	1990-1994	Egypt	1965-1969	Zimbabwe	1975-1979
Czech Republic	2005-2009	Ghana	1970-1974	Zimbabwe	1990-1994
Finland	2000-2004	Indonesia	1975-1979	Zimbabwe	2000-2004
Hong Kong SAR	1980-1984	Kenya	1990-1994	Zimbabwe	2005-2009
Hong Kong SAR	1990-1994	Lao P.D.R.	1985-1989		
Iceland	2005-2009	Lao P.D.R.	2005-2009		
Ireland	2000-2004	Latvia	2005-2009		
Ireland	2005-2009	Liberia	1980-1984		
Israel	1975-1979	Liberia	1985-1989		
Israel	2005-2009	Liberia	2000-2004		
Japan	1970-1974	Liechtenstein	2005-2009		
Japan	1990-1994	Malawi	1970-1974		
Korea	1990-1994	Malawi	1975-1979		
Korea	1995-1999	Malawi	1980-1984		
Korea	2005-2009	Malawi	2005-2009		
Kuwait	1995-1999	Mauritania	1975-1979		
Malta	2000-2004	Mongolia	1990-1994		
Portugal	1990-1994	Morocco	1965-1969		
Portugal	2000-2004	Mozambique	1975-1979		
Singapore	1995-1999	Mozambique	2005-2009		
Spain	1975-1979	Niger	1980-1984		
Spain	2000-2004	Nigeria	2005-2009		
Sweden	2005-2009	Pakistan	1965-1969		
Switzerland	2005-2009	Pakistan	2005-2009		

Table A.3.2. Growth Slowdowns Episodes

(By criteria)

Country	Year	Conditional Convergence[1]	Absolute Convergence[2]
Egypt	1965-1969	1	1
Honduras	1965-1969	1	1
Jordan	1965-1969	1	1
Morocco	1965-1969	1	1
Nicaragua	1965-1969	1	1
Pakistan	1965-1969	1	1
Spain	1965-1969	1	1
Trinidad&Tobago	1965-1969	1	1
Barbados	1970-1974	1	1
Benin	1970-1974	1	1
Burundi	1970-1974	1	1
Chile	1970-1974	1	1
Cote d`Ivoire	1970-1974	1	1
Ghana	1970-1974	1	1
Iran	1970-1974	1	1
Jamaica	1970-1974	1	1
Japan	1970-1974	1	1
Korea, Republic of	1970-1974	1	1
Kyrgyz Republic	1970-1974	1	1
Malawi	1970-1974	1	1
Namibia	1970-1974	1	1
Portugal	1970-1974	1	1
Congo, Republic of	1970-1974	1	1
Uganda	1970-1974	1	1
Zambia	1970-1975	1	1
Bolivia	1975-1979	1	1
Botswana	1975-1979	1	1
Brazil	1975-1979	1	1
Dominican Republic	1975-1979	1	0
Ecuador	1975-1979	1	1
El Salvador	1975-1979	1	1
Gabon	1975-1979	1	1

Table A.3.2. Growth Slowdowns Episodes, continued

(By criteria)

Country	Year	Conditional Convergence	Absolute Convergence
Indonesia	1975-1979	1	1
Iran	1975-1979	1	1
Israel	1975-1979	1	1
Malawi	1975-1979	1	1
Mauritania	1975-1979	1	0
Mauritius	1975-1979	1	1
Mozambique	1975-1979	1	1
Peru	1975-1979	1	1
Romania	1975-1979	1	1
Spain	1975-1979	1	0
Syria	1975-1979	1	1
Tunisia	1975-1979	1	1
Venezuela	1975-1979	1	1
Zambia	1975-1979	1	1
Zimbabwe	1975-1979	1	1
Algeria	1980-1984	1	1
Argentina	1980-1984	1	1
Bahrain	1980-1984	1	1
Barbados	1980-1984	1	1
Brazil	1980-1984	1	1
Brunei	1980-1984	1	1
Bulgaria	1980-1984	1	1
Cyprus	1980-1984	1	1
Ecuador	1980-1984	1	1
Guatemala	1980-1984	1	1
Haiti	1980-1984	1	1
Honduras	1980-1984	1	1
Hong Kong SAR	1980-1984	1	0
Iraq	1980-1984	1	0
Jordan	1980-1984	1	0
Liberia	1980-1984	1	1
Malawi	1980-1984	1	1
Malaysia	1980-1985	1	1
Malta	1980-1984	1	1
Mexico	1980-1984	1	1
Niger	1980-1984	1	1

Table A.3.2. Growth Slowdowns Episodes, continued

(By criteria)

Country	Year	Conditional Convergence	Absolute Convergence
Panama	1980-1984	1	1
Papua New Guinea	1980-1984	1	1
Paraguay	1980-1984	1	1
Peru	1980-1984	1	1
Poland	1980-1984	1	1
Romania	1980-1984	1	1
South Africa	1980-1984	1	1
Syria	1980-1984	1	1
Togo	1980-1984	1	1
Trinidad&Tobago	1980-1984	1	1
Argentina	1985-1989	1	1
Algeria	1985-1989	1	1
Benin	1985-1989	1	1
Cameroon	1985-1989	1	1
Congo, Republic of	1985-1990	1	1
Lao P.D.R.	1985-1989	1	1
Liberia	1985-1989	1	1
Maldives	1985-1989	1	1
Nicaragua	1985-1989	1	1
Papua New Guinea	1985-1989	1	1
Rwanda	1985-1989	1	1
Tonga	1985-1989	1	1
Belize	1990-1994	1	1
Cyprus	1990-1995	1	1
Hong Kong SAR	1990-1994	1	1
Jamaica	1990-1994	1	1
Japan	1990-1994	1	0
Kenya	1990-1994	1	1
Korea	1990-1994	1	1
Mongolia	1990-1994	1	1
Portugal	1990-1994	1	1
Sierra Leone	1990-1994	1	1
Swaziland	1990-1994	1	1
Zimbabwe	1990-1994	1	0

Table A.3.2. Growth Slowdowns Episodes, continued

(By criteria)

Country	Year	Conditional Convergence	Absolute Convergence
Argentina	1995-1999	1	1
Chile	1995-1999	1	1
Egypt	1995-1999	1	1
El Salvador	1995-1999	1	1
Indonesia	1995-1999	1	1
Iran	1995-1999	1	1
Korea	1995-1999	1	1
Kuwait	1995-1999	1	1
Malaysia	1995-1999	1	0
Papua New Guinea	1995-1999	1	1
Singapore	1995-1999	1	1
Syria	1995-1999	1	1
Thailand	1995-1999	1	1
Uruguay	1995-1999	1	1
Barbados	2000-2004	1	1
Botswana	2000-2004	1	1
Burundi	2000-2004	1	1
Finland	2000-2004	1	1
Guyana	2000-2004	1	1
Ireland	2000-2004	1	1
Lesotho	2000-2004	1	1
Liberia	2000-2004	1	1
Malta	2000-2004	1	1
Portugal	2000-2004	1	1
Spain	2000-2004	1	0
Sudan	2000-2004	1	1
Yemen	2000-2004	1	1
Zimbabwe	2000-2004	1	1
Armenia	2005-2009	1	1
Australia	2005-2009	1	0
Bahrain	2005-2009	1	1
Canada	2005-2009	1	1
Pakistan	2005-2009	1	1
Philippines	2005-2009	1	1
Turkmenistan	2005-2009	1	1

Table A.3.2. Growth Slowdowns Episodes, continued

(By criteria)

Country	Year	Conditional Convergence	Absolute Convergence
Albania	2005-2009	1	1
Argentina	2005-2009	1	1
Bangladesh	2005-2009	1	1
Barbados	2005-2009	1	1
Belgium	2005-2009	1	1
Belize	2005-2009	1	1
Bolivia	2005-2009	1	1
Brazil	2005-2009	1	1
Bulgaria	2005-2009	1	1
Burundi	2005-2009	1	1
Chile	2005-2009	1	1
China	2005-2009	1	1
Colombia	2005-2009	1	1
Congo, Republic of	2005-2009	1	1
Cote d' Ivoire	2005-2009	1	1
Croatia	2005-2009	1	1
Czech Republic	2005-2009	1	1
Denmark	2005-2009	1	1
Ecuador	2005-2009	1	1
El Salvador	2005-2009	1	1
Papua New Guinea	2005-2009	1	1
Gambia	2005-2009	1	1
Guyana	2005-2009	1	1
Honduras	2005-2009	1	1
Iceland	2005-2009	1	1
Iran	2005-2009	1	0
Ireland	2005-2009	1	1
Israel	2005-2009	1	0
Jamaica	2005-2009	1	1
Jordan	2005-2009	1	1
Kazakhstan	2005-2009	1	0
Korea	2005-2009	1	1

Table A.3.2. Growth Slowdowns Episodes, concluded

(By criteria)

Country	Year	Conditional Convergence	Absolute Convergence
Lao P.D.R.	2005-2009	1	1
Latvia	2005-2009	1	1
Lesotho	2005-2009	1	1
Liechtenstein	2005-2009	1	1
Malawi	2005-2009	1	1
Maldives	2005-2009	1	1
Mali	2005-2009	1	1
Mozambique	2005-2009	1	1
Nigeria	2005-2009	1	1
Pakistan	2005-2009	1	1
Panama	2005-2009	1	1
Paraguay	2005-2009	1	1
Romania	2005-2009	1	1
Rwanda	2005-2009	1	1
Senegal	2005-2009	1	1
Sierra Leone	2005-2009	1	1
South Africa	2005-2009	1	1
Sweden	2005-2009	1	0
Switzerland	2005-2009	1	0
Thailand	2005-2009	1	1
Turkmenistan	2005-2009	1	1
Vietnam	2005-2009	1	1
Yemen	2005-2009	1	1
Zambia	2005-2009	1	1
Zimbabwe	2005-2009	1	1
Total		195	179

Notes:

1. Conditional convergence refers to identifying the growth slowdown episodes using random effects panel regressions with physical and human capital as regressors.
2. Absolute convergence refers to identifying the growth slowdown episodes using random effects panel regressions with only initial level of income as regressor.

Table A.3.3. Independent Variables: Unit and Sources

Descriptions	Sources	Category	Start	End	Frequency
Fertility rate, total (births per woman)	WDI	Demography	1960	2014	Annual
Dependency ratio	United Nations	Demography	1960	2014	5-year
Sex ratio	United Nations	Demography	1960	2014	5-year
Population Growth Rate	WDI	Demography	1960	2014	Annual
Maternal Mortality Ratio (per 100000 live births)	WDI	Health	1960	2014	Annual
Life expectancy at birth	WDI	Health	1960	2014	Annual
Improved sanitation facilities	WDI	Health	1960	2014	Annual
Agriculture share of value added (percent of GDP)	WDI	Economic Structure	1960	2014	Annual
Services share of value added (percent of GDP)	WDI	Economic Structure	1960	2014	Annual
Industry share value added (percent of GDP)	WDI	Economic Structure	1960	2014	Annual
Output diversification	Papageorgiou and Spatafora (2012)	Economic Structure	2000	2014	Annual
Rail lines	WDI	Infrastructure	1960	2014	5-year
Electric Power Consumption	WDI	Infrastructure	1960	2014	5-year
Internet Access	WDI	Infrastructure	1960	2014	5-year
Size of government	Economic Freedom dataset	Institutions	1960	2014	5-year
Rule of law	Economic Freedom dataset	Institutions	1960	2014	5-year
Freedom to trade internationally	Economic Freedom dataset	Institutions	1960	2014	5-year
Regulation	Economic Freedom dataset	Institutions	1960	2014	5-year
Financial openness	Chinn and Ito (2006)	Institutions	1970	2014	Annual
Gross capital inflows as percentage of GDP	World Economic Outlook; WDI	MACRO	1960	2014	Annual
Gross capital outflows as percentage of GDP	World Economic Outlook; WDI	MACRO	1960	2014	Annual
Banking crisis dummy	Laeven and Valencia (2012)	MACRO	1970	2011	Annual
Real exchange rate	WDI	MACRO	1960	2014	Annual
Inflation	WDI	MACRO	1960	2014	Annual
Trade openness (percent)	PWT 8.1	MACRO	1960	2014	Annual
CPI inflation	WDI	MACRO	1960	2014	Annual
Price level of investment	PWT 8.1	MACRO	1960	2014	Annual
External debt (net) to GDP ratio	Lane and Milesi Ferretti; WDI	MACRO	1960	2014	Annual
Public debt to GDP ratio	WDI	MACRO	1960	2014	Annual
Terms of trade	World Economic Outlook; WDI	MACRO	1960	2014	Annual
Reserves/GDP ratio	World Economic Outlook; WDI	MACRO	1960	2014	Annual
Investment share of PPP GDP per capita at 2005 constant	PWT	MACRO	1960	2014	Annual
Oil exporters' price shock	self-calculated	MACRO	1960	2014	Annual
Food exporters' price shock	self-calculated	MACRO	1960	2014	Annual
Oil importers' price shock	self-calculated	MACRO	1960	2014	Annual
Food importers' price shock	self-calculated	MACRO	1960	2014	Annual
Fraction of country in tropics	Sala-i-martin and others (2004)	Other	1960	2010	Annual
Spanish colony	Sala-i-martin and others (2004)	Other	1960	2010	Annual
Fraction Buddhist	Sala-i-martin and others (2004)	Other	1960	2010	Annual
Ethno linguistic fractionalization	Sala-i-martin and others (2004)	Other	1960	2010	Annual
War and civil conflicts	Correlates of War Project	Other	1960	2014	Annual
Natural disaster	International Disaster Database	Other	1960	2014	Annual
Distance (GDP weighted)	World Bank	TRADE	1960	2014	Annual
Regional integration	self-calculated	TRADE	1960	2014	Annual
Trade diversification - Theil Index	Papageorgiou and Spatafora (2012)	TRADE	1960	2014	Annual

Table A.3.4 Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Slowdown (Conditional Convergene)	1305	0.15	0.36	0	1
Slowdown (Absolute Convergence)	1305	0.09	0.28	0	1
Maternal Mortality Ratio	1198	222.22	282.66	13	1800
Improved Sanitation Facilities	1191	69.74	30.07	3.84	100.00
Life Expectancyat Birth	1305	63.87	11.58	21.38	83.54
Dependency Ratio	1305	71.54	19.87	18.36	117.55
Population Growth Rate	1305	1.82	1.42	-3.77	15.53
Fertility Ratio	1305	3.99	2.06	0.87	8.82
Sex Ratio	1305	2.06	1.08	1.01	5.57
Agriculture share of value added (percent of GDP)	1098	18.64	15.95	8.00	92.04
Services share of value added (percent of GDP)	1076	4.56	4.48	-16.30157	62.99
Industry share value added (percent of GDP)	1081	15.35	7.38	0.25326	41.30
Electric Power Consumption	980	3294.04	4600.05	6.668635	52953.95
Internet Access	986	48.68	29.75	11.69	46.06
Rail Lines	963	11070.86	26392.99	259.5	256123.20
Distance (GDP weighted)	1067	61.32	12.93	27.5	91.79
Tropics as a fraction of a country	911	31.29	22.61	0	98.86
Regional Integration (in billions)	1098	14700.00	452000.00	7010.00	616000.00
Gross capital Formation	1048	49.90	22.50	10	39.40
Inflation	1305	35.34	325.67	-10.7694	10759.60
Trade Openness	1067	60.00	37.20	-65.50	24.20
Gross Capital Inflows	1082	3.12	6.00	-17.50768	77.74
Public Debt/ GDP	1097	54.20	40.20	0.2139	283.75
Investment	1298	50.40	22.40	0	37.60
Banking Crisis	1305	0.08	0.27	0	1
Real Exchange Rate	1305	114.80	88.35	33.06342	1768.273
External debt/GDP	1250	56.21	64.98	0	896.0762
Terms of Trade	1070	13.50	10.10	55.40	18.60
Gross Capital Outflows	873	28.90	17.25	1.90	49.35
Reserve/GDP	920	0.15	4.43	-37.8474	26.78
Oil exporters' price shock	1305	24.74	79.88	-48.65504	622.2341
Oil importers' price shock	1305	21.91	42.14	-18.617	250.7623
Food exporters' price shock	1184	3135.24	3541.08	0.0713963	22627.25
Food importers' price shock	1181	1729.32	1243.86	108.5638	9214.063
Rule of law	1012	5.83	1.61	0.6	9.7
Size of Government	807	5.43	1.83	1.1	9.3
Freedom to Trade internationally	1044	7.00	2.13	0	9.9
Regulation	1039	6.09	1.34	1	9.059999
Chinn-Ito Index	1305	0.03	1.50	-1.863972	2.439009
Wars and Civil Conflicts	852	26.32	13.25	3.00	53.00

Appendix B

Tables and Charts

Table B.4.1 Sample Statistics by Category

	Advanced	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	Total	Ratio (in percent)
Institution and Economic Freedom									
Full Sample	331	132	188	230	208	71	145	1305	24.3%
Sub Sample	54	57	49	50	21	31	55	317	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	17.0%	18.0%	15.5%	15.8%	6.6%	9.8%	17.4%		
Demography									
Full Sample	331	132	188	230	208	71	145	1305	62.7%
Sub Sample	184	115	68	109	41	61	240	818	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	22.5%	14.1%	8.3%	13.3%	5.0%	7.5%	29.3%		
Infrastructure									
Full Sample	331	132	188	230	208	71	145	1305	56.9%
Sub Sample	178	73	41	189	97	59	106	743	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	24.0%	9.8%	5.5%	25.4%	13.1%	7.9%	14.3%		
Health									
Full Sample	331	132	188	230	208	71	145	1305	62.4%
Sub Sample	195	85	43	206	106	64	116	815	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	23.9%	10.4%	5.3%	25.3%	13.0%	7.9%	14.2%		
Macroeconomic Environment									
Full Sample	331	132	188	230	208	71	145	1305	57.7%
Sub Sample	125	107	74	123	176	33	115	753	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	16.6%	14.2%	9.8%	16.3%	23.4%	4.4%	15.3%		
Economic Structure									
Full Sample	331	132	188	230	208	71	145	1305	58.2%
Sub Sample	125	107	74	123	176	40	115	760	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	16.4%	14.1%	9.7%	16.2%	23.2%	5.3%	15.1%		
Trade Structure									
Full Sample	331	132	188	230	208	71	145	1305	44.0%
Sub Sample	138	73	41	143	75	35	69	574	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	24.0%	12.7%	7.1%	24.9%	13.1%	6.1%	12.0%		
Other									
Full Sample	331	132	188	230	208	71	145	1305	73.7%
Sub Sample	213	95	23	189	114	53	275	962	
Full Sample Regional Coverage (%)	25.4%	10.1%	14.4%	17.6%	15.9%	5.4%	11.1%		
Sub Sample Regional Coverage (%)	16.3%	7.3%	1.8%	14.5%	8.7%	4.1%	21.1%		

Table B.4.3 Trap Map for Asian Middle-Income Countries

Country	Institution	Demography	Infrastructure	Health	Macroeconomic Factors	Economic Structure	Trade
China	3	6	5	2	6	5	2
India	4	3	1	1	3	4	1
Indonesia	5	5	2	3	5	2	3
Malaysia	1	4	7	7	1	7	4
Phillipines	2	1	3	5	2	3	5
Thailand	6	7	4	6	7	6	6
Vietnam	7	2	6	4	4	1	7

Table B.4.3 Trap Map for Middle-Income Countries (MICs)

Country	Institution	Demography	Infrastructure	Health	Macroeconomic Factors	Economic Structure	Trade
China	4	7	7	6	4	7	7
India	6	4	1	2	3	6	4
Indonesia	5	5	5	4	7	4	6
Malaysia	2	4	5	7	1	7	7
Phillipines	4	1	3	5	2	6	7
Thailand	6	7	4	6	7	5	7
Vietnam	7	4	6	5	5	5	7
Argentina	1	3	7	1	7	4	3
Bolivia	2	1	3	1	3	6	7
Brazil	3	6	6	6	4	2	1
Chile	6	7	6	2	7	2	1
Colombia	7	4	4	4	6	4	3
Costa Rica	4	6	7	7	4	4	3
Ecuador	5	2	4	4	1	7	3
El Salvador	5	3	6	7	6	6	4
Guatemala	6	1	3	4	3	6	4
Honduras	3	1	3	3	7	6	4
Mexico	4	3	6	4	4	7	3
Panama	4	3	4	4	3	1	3
Paraguay	7	2	2	1	4	6	4
Peru	4	3	4	3	7	1	3
Uruguay	4	3	7	6	6	3	3
Iran	3	7	7	2	1	4	6
Jordan	1	4	3	3	3	7	7
Egypt	7	3	4	3	3	4	6
Algeria	1	6	3	1	4	1	4
Morocco	2	7	4	4	4	3	4
Tunisia	3	7	4	3	1	3	6
Asia	7	7	1	7	4	5	7
Larin America	2	5	7	5	3	2	1
MENA	4	1	5	6	2	4	6