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Elizabeth Kowalski '00

Illinois Wesleyan University

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Determinants Of Economic Growth In East Asia:
A Linear Regression Model

Elizabeth Kowalski
Research Honors Project
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Advisor: Dr. Ossella-Durbal

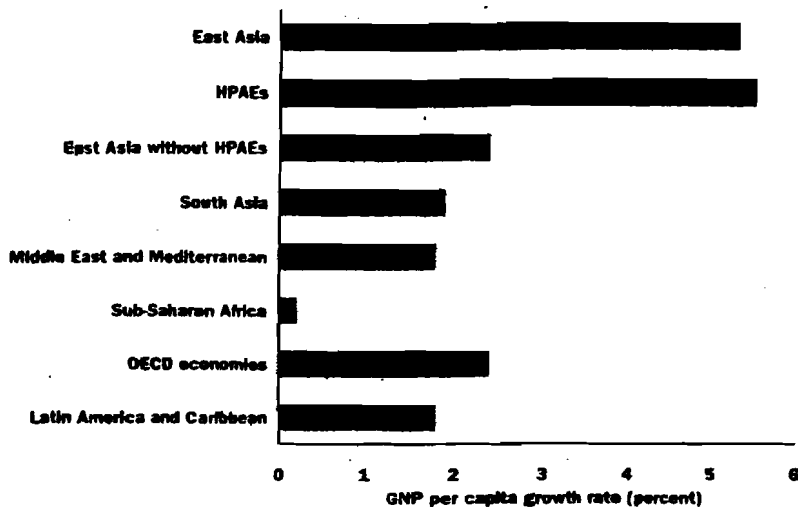
Section I: Introduction

The level of economic growth for a country represents many aspects of life in that country. These aspects range from the strengths or weaknesses of macroeconomic policy to the quality of life for the average citizen. High or stable levels of economic growth are associated with very productive economies, higher GDP per capita and higher standards of living. However, low levels of economic growth are linked to low levels of productivity, poor living conditions and stagnant markets. High levels of economic growth are clearly desirable.

Many countries have experienced substantial economic growth rates over the past century (Mankiw 80). However, a distinct group of countries which has recently achieved the most astounding growth is a group of countries in East Asia. According to the World Bank, the countries of East Asiaⁱ have averaged well over a 5% growth rate per capita per year from 1965 through 1990 with the High Performing Asian Economies (HPAEs)ⁱⁱ growing at over 5.5% a year (World Bank 2). Figure 1 shows the average growth rate of East Asia as compared to other regions. Another reason why the economic growth in East Asia is widely studied is because of the amazing levels of equality in income distribution maintained throughout high growth periods. Figure 2 shows the relationship between GDP growth and the Gini coefficient (a measure of income inequality) in many East Asian economies. As a result of this “rapid, shared growth” (World Bank 4), human welfare has dramatically increased including higher life expectancy rates, decreased absolute poverty and improved education.

Figure 1

Figure 1 Average Growth of GNP per Capita, 1965-90



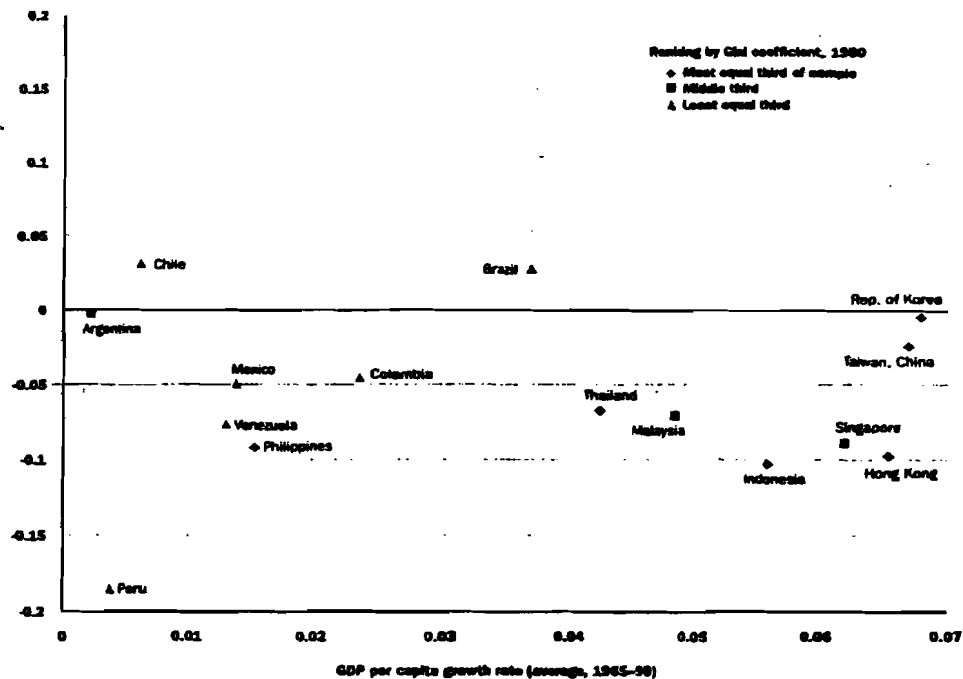
Source: World Bank (1992d).

East Asian Miracle pg.2

Figure 2

Figure 2 Change in inequality and the GDP per Capita Growth Rate

Change in average Gini coefficient (1980s minus 1960s)



Note: Figure 2 plots the relationship between average per capita income growth and changes in the decade average of the Gini coefficients from the 1960s to the 1980s; a negative number indicates that income became less concentrated. The decade average is used because data are available for different years in different economies; the decade average for the 1960s begins with data from 1965.

Source: World Bank data.

East Asian Miracle pg.4

In an introduction to his book Lessons from East Asia, Danny M. Leipziger describes many results of economic growth seen in East Asia.

The success of East Asian development is legendary. No other group of developing countries has done as well in fostering growth, reducing poverty, integrating with world markets, or raising standards of living. Over the past 25 years, per capita incomes have almost quadrupled. Absolute poverty has fallen by about two-thirds on average, population growth rates have declined rapidly, and health and education levels have improved markedly. (1)

Many economists have documented and written about the growth in East Asia in effort to explain how it has developed. A clear explanation of how the East Asian economies have performed so well might serve as a guideline for other developing countries to follow.

When analyzing East Asian economic development, it is necessary to keep in mind that the region suffered from a tremendous financial crisis in late 1997. This paper, however, will examine the period before the crisis. This will allow a focus on the non-financial determinants of growth without confounding the model with the effects of financial capital flows. Keeping in mind the financial crisis in East Asia, it is necessary to study the growth seen in this region prior to 1998 in an attempt to reestablish these economies after the crisis.

As the East Asian stock markets have begun to regain strength, these countries need to understand what factors aided them the most in their previous growth. While there are many theories presented in the literature, this study will focus on the neoclassical, structuralist and market friendly theories of growth in East Asia. Simply stated, the neoclassical model focuses on strong labor and capital markets, along with

increased privatization to encourage economic development. On the other hand, the structuralist view focuses on more government intervention to create such situations as price distortions encouraging savings, investment, and other behavior necessary for a strong growing economy. Directly in the middle of these two extremes lies the market friendly view which focuses on effective government policy to encourage efficient markets and outward orientation. This paper will focus on the key growth indicators of these three theories and determine which indicators are strongest when trying to predict economic growth. Variables representing outward orientation (exports and foreign direct investment), government intervention (spending and investment), and macroeconomic stability (debt and inflation) will be regressed against GDP growth. This regression will analyze a group of sixteen countries (listed in Appendix A) over a time period from 1983 to 1997ⁱⁱⁱ. It is hypothesized that the countries of East Asia have been most successful following the market friendly theory of policy integration.

This paper will follow a section by section approach to explain East Asian economic growth. Section II will consist of a review of the literature on this topic, presenting the various theories considered by economists. Section III will explain in detail the three theories examined in this study – the neoclassical, the structuralist, and the market friendly theory. Sections IV and V will analyze the data and empirical model as well as present descriptive statistics for all the variables used in the model, respectively. The results of the model will be discussed in Section VI. Finally, Section VII will present concluding thoughts along with policy implications.

Section II: Review of Literature

As was already stated, many economists have studied and written about the recent economic growth in East Asia. Throughout the literature, there are proponents of both the neoclassical and structuralist theories. However, some of the strongest and most conclusive research finds that the East Asian economies have more closely followed the market friendly approach to growth.

In a paper entitled “Common Foundations of East Asian Success,” Peter Petri (1997) analyzes different factors that have played a role in the strong economic development of many East Asian economies. In determining how these factors contribute, he hopes to find some common ties between the East Asian countries and “advice” for other developing countries. Unfortunately, he is not truly able to create an equation for the miracle economy. Petri notices many common trends but nothing that really stands out and leads in these economic developments.

Petri introduces four major theories which may represent the economic growth witnessed in East Asia. These theories include the neoclassical, structuralist, cultural and interaction views. This paper will focus only on the neoclassical and structuralist theories as they seem to be the two most economically-based theories. They will be discussed in further detail in Section III. The cultural theory discusses how cultural and religious traditions encourage economic organization. Petri states, “Confucian traditions may have been responsible for East Asia’s unusually high propensities to save and educate and for its strong, publicly motivated bureaucracies” (547). Alternately, the interaction theory discusses geographic relationships between the countries in the region. Petri introduced this interaction theory because he believes it “suggests that East Asian economic growth

may have been shaped by regional contacts – including flows of goods, investments, technologies, aspirations and ideas about governance” (547). Taking all four theories into consideration, Petri draws from these views to determine possible causes of East Asian economic growth.

Some of the variables he looked at were outward-orientated development strategies, public resource mobilization and investment, targeted industrial policies, regulated financial markets, and favorable external environment. Petri examines each variable which he thinks has an effect on economic growth and attributes that variable to one of the four theories. He takes a qualitative approach to his research by presenting ideas on which variables represent which theory. However, no rigorous analysis is seen regarding the impact of each variable on economic growth. Therefore, this paper builds on previous research by regressing each variable against economic growth and analyzing the results of this regression.

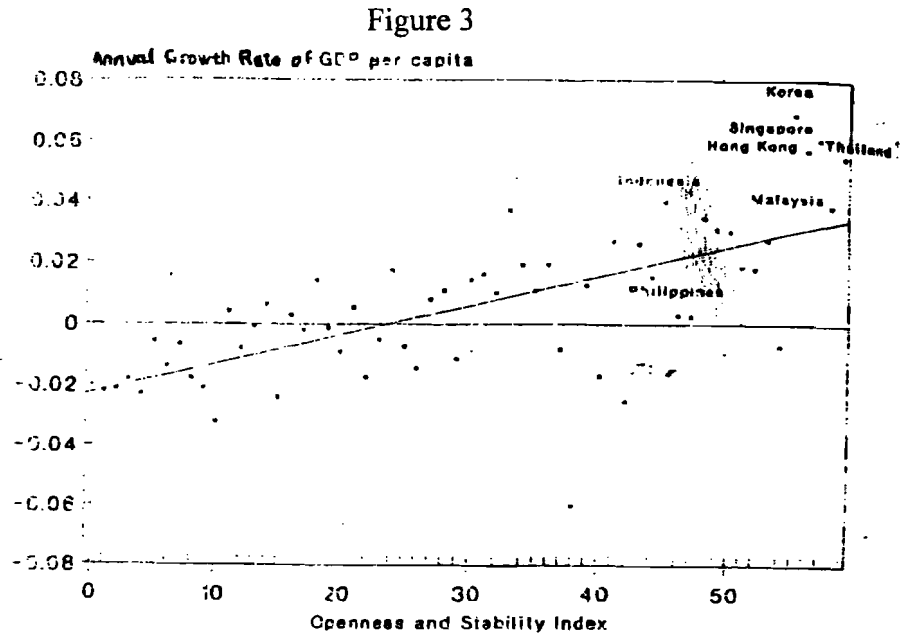
In the concluding sections of his paper, Petri determines that there is no single “recipe” for a developing economy to follow. Instead, he uses a metaphor of a road race to explain his findings. He uses the track to emphasize the importance of the “smoothness of the general economic environment” (555). Steering correlates with the allocation of resources in an efficient way. And finally the engines represent strong leadership. In each of these categories, Petri looks at specific countries that have strengths in each area and how these strengths can be adapted in other ways encouraging growth.

Petri came to the conclusion that “a ‘multifactor’ approach is needed to understand how success emerged from a variety of policies in a variety of institutional

settings” (557). Similar to Petri’s analysis, Vinod Thomas and Yan Wang ask the same questions about the growth in East Asia. In their paper entitled “Distortions, Interventions, and Productivity Growth: Is East Asia Different?” Thomas and Wang (1996) examine government intervention, distortions, trade and geographical proximity as possible explanations for East Asian performance. However, Thomas and Wang believe that the single most important factor is the “superior policy framework adopted by the East Asian economies” (266).

The methodology Thomas and Wang used to test their hypothesis is to compare the East Asian economies to other developing countries. The empirical models used in their paper follow neoclassical growth theory while also assessing the link between growth and distortion and growth and intervention. Through their models, Thomas and Wang come to some interesting conclusions. The first major conclusion is that trade openness and macroeconomic stability have a “significant and positive association with economic growth” (278). This result is also suggested by an analysis of the association between openness and stability and productivity growth as shown in Figure 3. As the graph shows, all of the HPAEs appear in the upper right corner. Another major conclusion that Thomas and Wang reach is that “moderate [government] expenditure alone is not necessarily associated with high performance. The quality of implementation, the quality of the human capital base, the type of expenditure, and intangible factors are all likely to influence outcomes” (273). Thomas and Wang believe that the East Asian economies do indeed have the high qualities of implementation, type of expenditure and other factors that have led to high levels of growth. Through their

research, they also come to the conclusion that the East Asian economies have a “greater return” (278) from their successful policy framework.



Thomas and Wang pg.272

Another article that deals with the determinants of economic growth in East Asia is the paper by Reuven Glick and Ramon Moreno entitled “The East Asian Miracle: Growth Because of Government Intervention and Protectionism or in Spite of It?” In this paper, Glick and Moreno (1996) argue that “the ... Newly Industrialized Economies (NIEs) and countries in the region adopted interventionist although ‘market friendly’ policies involving some use of export promotion, selective import barriers, and industrial policies” (20). Through their analysis, Glick and Moreno have outlined three main theories on why policies favoring greater openness and international trade lead to better growth performance. The first theory is that international trade can contribute to growth by creating a channel for new technology and styles of management. Another theory on the importance of outward orientation is that policies encouraging this activity create an

incentive for companies to compete in world markets rather than only in domestic ones. And finally, Glick and Moreno believe that international trade may lead to economic growth because of the increased access to world markets.

Glick and Moreno have also researched how outward orientated policies have affected growth in East Asia. They believe that support was given to industries which were already successful, perhaps even already globally successful. Along with this support however, incentives were given to exporters across “virtually all industries and activities” (23). Free entry for imports also aided exporters with many of the necessary intermediate goods necessary for production. Glick and Moreno believe that all of these facts have led to successful growth in East Asia. They also believe that these facts can lead to some important lessons for other countries.

The first important lesson from Glick and Moreno’s analysis of economic growth in East Asia is that government intervention may be important in picking industries that can compete in world markets. However, mistakes can be very costly. Another important policy lesson is that “industrial policies may succeed in promoting certain types of firms but may discourage the type of innovation and entrepreneurship needed to achieve higher levels of development” (24). With all of these studies in mind, we will now examine the three strongest theories associated with East Asian growth.

Section III: Theory

A: Neoclassical Theory

Neoclassical economic theory was first introduced by Alfred Marshall (1842-1924). Textbook theory focuses on the hedonism and rationality of consumers as

introduced by classical economics as well as a laissez-faire government. However, neoclassical economists felt there was indeed a need for some government intervention. As Yuval P. Yonay states in his analysis of the neoclassical economists, these economists “assigned the state the role of ameliorating the detrimental outcomes of free markets and looked favorably at trade unions as a necessary tool for improving the lot of laborers” (35). Yonay also states that neoclassical economists changed the focus of economics from macro questions of national income to micro analysis of firms and consumers.

Along with Petri’s analysis and description of this theory, he outlines the major characteristics of the neoclassical theory as applied to the East Asian experience. In light of this view, he believes that East Asian economies have succeeded because of four main reasons. First, they adopted an outward orientated trade strategy to build linkages with world markets and technology with such policies as export promotion and broad liberalization. They have also pursued conservative macroeconomic policies to create a stable economic environment. These countries have invested vigorously in human capital to develop an educated and technically competent labor force. And lastly, Petri highlights how many East Asian countries have maintained competitive markets to facilitate the transformation from primary production to manufacturing and eventually to knowledge-intensive industries (545-546).

Neoclassical theory also has current applications with the recent emergence of increasing numbers of private companies in China. An article published in *Business Week* by Mark L. Clifford, Sheri Prasso and Dexter Roberts states, “while thousands of state-owned factories still languish with massive debt, red ink, and bloated workforces, maverick entrepreneurs are picking up the slack, generating badly needed jobs and

helping Chinese industry approach world standards” (72). The article also states that this change in market composition will make markets more globally and technologically competitive (73). Another very recent example comes from the World Trade Organization’s (WTO) negotiations with China. In late 1999, U.S. negotiators started to work out a deal that would open one of the largest markets, with 1.2 billion consumers, to U.S. products (Holland 1). These negotiations show China’s enthusiasm for growth, decreasing barriers to trade and increased globalization. Both of these examples support Petri’s assertion that outward orientation and increases in human capital have aided East Asian economic growth.

B: Structuralist Theory

Structuralist theory falls on the opposite extreme from the neoclassical view. This theory stresses high levels of government intervention as necessary for strong economic growth. The model for aggregate demand and aggregate supply shows how shocks to the economy can cause recessions which result in such detrimental effects as high unemployment, low income levels, and reduced economic well-being. However, the model also shows that a government’s use of fiscal and monetary policy can prevent these recessions and respond to them to strengthen the economy. Some economists who follow this school of thought believe it is a waste for a government not to use fiscal and monetary policy to stabilize the economy or encourage growth (Mankiw 362). As suggested by the World Bank, many economists see market failures as “pervasive and a justification for governments to lead the market in critical ways” (83).

Petri also outlines some major characteristics of East Asian economies in this theory. With the structuralist theory in mind, Petri sees three main reasons for economic

success in East Asia. First, Asian governments have targeted areas of the economy that they believe have strong opportunities for growth. Second, they have also directed large amounts of resources to these growth areas. Some implications of this targeting may include trade restrictions and preferential access to credit. The third characteristic of East Asian governments that falls under the structuralist theory is that governments try to avoid making big policy mistakes by doing such things as setting export standards or promoting only certain successful firms (Petri 546).

A current application of the structuralist theory can be seen in the plans Malaysia has for redeveloping its economy. The focus in Malaysia is on public as well as private sectors to play a crucial role in the nation's growth. Government officials stress "resuscitating the economy but also attending to the structural economic weaknesses for sustainable growth" (Berhad 12). Another example of this theory can be seen in Japan, Korea and Taiwan. These countries did not entirely rely on markets to allocate savings. "Rather, they repressed interest rates and directed credit in order to guide investments" (World Bank 83). These examples clearly represent how government intervention and distortion can support a growing economy.

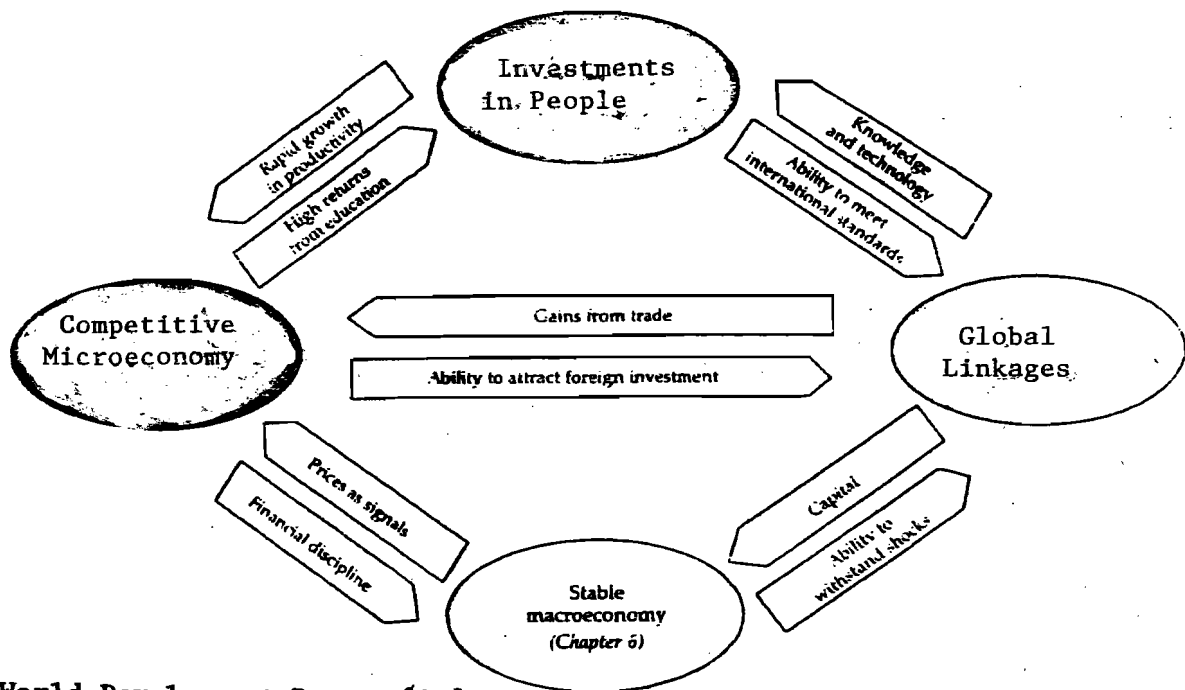
C: Market Friendly Theory

The market friendly theory of economic growth was first introduced in the 1991 World Development Report (WDR) by the World Bank emphasizing an "effective but carefully limited government activism" (World Bank 10). This theory represents a synthesis of many growth theories including the neoclassical and structuralist theories. The main idea of the market friendly theory is the interaction of four central elements –

investment in people, global linkages, a stable macroeconomy and a competitive microeconomy. As the report indicates, “All four sets are worth doing in their own right. But because of their linkages, the results will probably be disproportionately strong if done together” (WDR 6). Figure 4 shows some of these linkages between the four main elements of this theory.

Figure 4

Figure 4 The interactions in a market-friendly strategy for development



World Development Report 1991 pg.6

In the market friendly theory, investment in people involves much more than investments in human capital as suggested by most growth literature. This investment includes expanding work opportunities for women, providing day care services, family planning, clean water, improved waste disposal and environmental regulations (WDR

69). Evidence of this type of investment can be seen in the efforts to reduce infant mortality in Malaysia and health programs to raise life expectancy in China (WDR 7).

Global linkages and openness to trade have “improved resource allocation, increased competition and product specialization and provided a broad avenue for technology transfer” (WDR 108). The World Development Report also points out that many East Asian countries have been successful at assimilating technology and openness by taking such measures as sending students to study abroad, exploiting linkages with overseas nationals and encouraging exchanges with research centers (WDR 88).

The third main element in the market friendly theory is a stable macroeconomy. Overspending by the government can result in large deficits, excessive borrowing or such financial problems as inflation or overvaluation of currency. The World Development Report suggests that a stable macroeconomy is likely to promote savings and investment and will also “make it easier to attract foreign savings” (WDR 109).

Finally, a competitive microeconomy is necessary for strong economic growth in the market friendly theory. “It can help to transform a stagnating economy into a vigorously expanding one” (WDR 70). The World Development Report also suggests that competition has very often lead to innovation, the diffusion of technology and an efficient use of resources (WDR 7).

Section IV: Empirical Model and Data

The neoclassical, structuralist and market friendly theories all discuss many different variables which may act as indicators of economic growth in East Asia. The purpose of this paper will be to focus on only a few major indicators of economic growth

to determine their relative importance to GDP growth. These indicators fall under three main headings: outward orientation, government indicators and macroeconomic indicators.

Outward orientation is one of the key indicators of economic growth as suggested by neoclassical theory. The variables included in this category will measure how successful a country is at utilizing its global linkages and how responsive other countries and markets are to this behavior. In this model, the indicators for outward orientation will include net exports (EXP) and foreign direct investment (FDI) as percentages of GDP. Exports of goods and services represent demand for that country's products in other countries and therefore strong markets for that country's goods. Demand for a country's goods in world markets reflect growth potential and strong economic stability. As the 1991 World Development Report states, "By affecting the nature of inputs as well as production processes, trade could generate gains which greatly exceed this short-term benefit from improved resource allocation" (98). For this reason, exports should have a positive correlation with growth.

Also classified under outward orientation, foreign direct investment (FDI) represents how interested foreign companies are in that particular country's companies and markets. If levels of FDI are high, this could be because foreign companies are enthusiastically interested in investing in these countries. Neoclassical theory suggests that FDI has a positive effect on growth because this investment would strengthen private markets. "Because foreign firms already have marketing linkages, know-how and production experience, some host countries have actively encouraged global exporters to establish production units in their country" (World Development Report 95). These host

economies know of the advantages of FDI in their country and how it can affect growth rates. However, the causation is not clearly defined between growth and FDI. Reasons for FDI encouraging growth have already been demonstrated. The reverse situation is also plausible. Levels of economic growth can be positive for numerous reasons as expressed throughout this paper. A company, looking for a country to invest in, values high levels of growth and economic potential. In this case, growth causes increased levels of FDI. However, for the sake of predicting a correlation between FDI and growth, this paper will only focus on the positive correlation as suggested by neoclassical theory.

Key indicators of growth as described by the structuralist theory deal with government indicators. Variables included in this classification represent the degree of government involvement in an economy. My model includes variables for government spending (SPEND) and total investment (INVEST) as percentages of GDP. Structuralist theory would suggest that both of these variables have positive effects on GDP as they involve increased government intervention and economic stimulation. Both of these variables represent ways in which a government can use fiscal policy to respond to or create shocks in the economy. Economists who follow structural theory believe government spending and investment is necessary for economic growth.

For this model, two other variables will also be included which help to complete the picture of growth as described by the market friendly theory. These variables are macroeconomic indicators including the inflation rate (INFLAT) and government debt (DEBT), both as a percentage a GDP. These indicators represent the macroeconomic stability of a country. High inflation rates and high levels of government debt usually signal a financial or economic problem with the economy. If this is the case, the

government and private markets are probably more interested in solving their own economic problems than finding room for growth. This leads one to believe that both the inflation rate and government debt have negative correlations with GDP.

GDP growth in annual percentages, based on constant 1995 U.S. dollars, is used as the dependant variable. This study analyzes a group of sixteen countries (listed in Appendix A) over a time period from 1983 to 1997. All data used was taken from the 1998 World Bank World Indicators Tables. A brief description of the variables used in the analysis is given in Table 1, with more complete definitions given in Appendix B.

Table 1
Regression Variables, Definitions and Expected Sign to Dependent Variable

Category	Variable	Definition	Expected Sign
Dependant Variable	GROWTH	GDP growth (annual %)	N/A
Outward Orientation	EXP	Exports of goods and services (% of GDP)	+
Outward Orientation	FDI	Foreign Direct Investment, net inflows (% of GDP)	+
Government Indicators	SPEND	Expenditure, total (% of GDP)	+
Government Indicators	INVEST	Gross domestic investment (% of GDP)	+
Macroeconomic Indicators	INFL	Inflation, GDP deflator (annual %)	-
Macroeconomic Indicators	DEBT	Central government debt, total (% of GDP)	-

With all of these variables considered, the regression model for determinants of economic growth is as follows:

$$\text{GROWTH} = a + b_1\text{EXP} + b_2\text{FDI} + b_3\text{SPEND} + b_4\text{INVEST} + b_5\text{INFL} + b_6\text{DEBT} + b_7\text{COUNTRY_DUMMY} + e$$

Since this model utilizes time-series as well as cross-country data, dummy variables for each country are also included. These dummy variables simply control the model for the multitude of other variables which can have an effect on a particular country's economic growth rate.

Section V: Descriptive Statistics

As mentioned earlier, the sample used in this model consists of a group of sixteen East Asian countries over fifteen years (1983-1997). With perfect information, this combination should leave us with 240 data sets. However, not all data is available for each country in each year. Table 2 shows the descriptive statistics for all the available data.

Table 2
Descriptive Statistics for All Data Points Available

Variable	N	Minimum	Maximum	Mean	Std. Dev.
GROWTH	221	-9.50	15.20	5.60	4.32
EXP	196	2.56	203.22	50.86	49.17
FDI	157	-.04	14.89	2.58	3.21
SPEND	112	6.43	35.05	19.00	5.50
INVEST	194	6.18	57.40	29.28	9.61
INFL	220	-31.91	411.07	17.34	49.26
DEBT	86	3.71	103.52	41.99	27.40

Many observations can be made from these descriptive statistics. As Table 2 shows, the variable with the most data points is the economic growth variable. The average growth rate for this region is 5.6% per year with a maximum of 15.2% per year. These relatively high percentages can easily be compared to world averages as was seen in Figure 1. Another statistic that stands out in this table is the average level of exports which is nearly 51% of GDP. The maximum level of exports is 203% of GDP. The

World Bank reports that among low- and middle-income countries, average export levels were 18% in 1980 and 24% in 1997 (272). While these high means and maximums (in relation to world averages) are indeed interesting, it is also important to notice the seemingly low levels of FDI as a percentage of GDP in this region. The mean for this sample is 2.58% of GDP – a seemingly small percentage of GDP. However, World Bank averages for levels of GDP in low- and middle-income countries are 0.4% of GDP in 1980 and 1.3% of GDP in 1997 (222).

While it is important to look at all the data points available, it will be more appropriate for this analysis to examine the descriptive statistics for only the complete data sets that were used in the OLS regression and compare them to those of the larger group. The complete data sample that was used in the regression only consists of 83 data sets as information was not available for every country in every year. Only in 83 cases were all the variables available. The descriptive statistics for all the complete data sets are shown in Table 3.

Table 3
Descriptive Statistics for All Complete Data Sets Used in the Regression

Variable	N	Minimum	Maximum	Mean	Std. Dev.
GROWTH	83	-7.32	13.29	6.17	3.95
EXP	83	9.30	203.22	55.70	56.43
FDI	83	.00	14.89	2.39	3.49
SPEND	83	10.06	35.05	19.04	4.76
INVEST	83	15.33	48.49	31.03	6.93
INFL	83	-8.64	66.59	7.22	9.52
DEBT	83	3.71	103.52	41.51	27.27

When comparing the statistics for each variable in Table 2 and Table 3, it can be observed that most of the values for the mean and standard deviation are fairly consistent. From this, it can be concluded that the sample actually used in this regression is

representative of the larger sample and perhaps the entire region. The only noticeable exception to this conclusion is the variable for inflation. The statistic for the larger group has a mean of 17.34 with a standard deviation of 49.26, whereas this statistic for the smaller group has a mean of 7.22 with a standard deviation of 9.52. This indicates that the variable for inflation is probably not truly representative of the economies of East Asia.

Section V: Results and Analysis

The results of the linear regression of all the variables against growth are shown in Table 4. The coefficients and significance levels for the country dummy variables are included as well. The country dummy variable left out of the regression as a means for comparison is Japan^{iv}.

Table 4: Results of Initial Regression*

Variable	Coefficient	t-statistic	Significance Level	Predicted Sign?
(Constant)	-2.094	-0.500	0.619	N/A
EXP	0.113	2.144	0.036	Yes
FDI	0.575	2.341	0.022	Yes
SPEND	-0.351	-3.071	0.003	No
INVEST	0.191	2.317	0.024	Yes
INFL	-0.086	-1.635	0.107	Yes
DEBT	0.106	2.509	0.014	No
Indonesia	3.615	2.090	0.040	N/A
Korea	5.178	2.364	0.021	N/A
Malaysia	-5.927	-1.719	0.090	N/A
Mongolia	2.186	0.573	0.569	N/A
Philippines	-2.312	-1.167	0.247	N/A
Singapore	-24.181	-2.786	0.007	N/A
Thailand	2.721	1.346	0.183	N/A

*Dependent Variable: GDP Growth in Annual Percentages

Adjusted R Square = 0.531

N = 83

Durbin-Watson Statistic = 1.485

These results are important and interesting for many reasons. An adjusted r-squared of 0.531 means that this model has successfully explained away over half of the variance in economic growth in many East Asian countries. This statistic along with the sign and significance level of each variable can tell us many things about growth rates in East Asia. Most of the variables returned the predicted signs and were highly significant. It should also be noted that the Durbin-Watson statistic was 1.485 which reports inconclusive results. This study did not further explore issues of autocorrelation and multicollinearity.

The variables that represent outward orientation - exports and foreign direct investment – both had positive correlations to GDP growth and were significant at the 0.04 and 0.02 levels, respectively. This model suggests that GDP growth would increase by 0.11% if exports were to increase by 1% of GDP. These results also suggest that if FDI were to increase by 1% of GDP, GDP growth would increase by 0.58%. As we saw earlier when analyzing descriptive statistics for this region, the average percentage of FDI was 2.39% of GDP. This regression shows that it would be economically beneficial for a country to try to attract more foreign direct investment. These two results from exports and foreign direct investment lead to the conclusion that there are strengths in the neoclassical theory of economic growth and outward orientation indeed has a positive effect on a country's growth rate.

Government spending and investment are two variables that represent the structuralist theory of economic growth. The results on SPEND and INVEST were somewhat successful. This model suggests that government spending decreases economic growth rates but total investment (including government investment) increases economic

growth. These conclusions do not completely support the structuralist model of economic growth. Instead, the negative sign on government spending may be associated with more of an emphasis on the neoclassical theory of economic growth. The neoclassical theory focuses on less government intervention. In fact, a study done by Vinod Thomas and Yan Wang in 1996 found that “government interventions as measured by expenditures are positively associated with GDP up to a point. Beyond a certain point, the relationship seems inverse” (275). However, this negative result can also be indicative of the presence of the market friendly theory in East Asian economies – only a minimal amount of government intervention and spending is good for economic growth. Evidence of the market friendly theory is also supported by the fact that the sign on investment was positive and significant. In the article “Some Lessons from the East Asian Miracle” Joseph Stiglitz points out that the governments of East Asia confined their roles to “helping to direct investment to ensure that resources were deployed in ways that would enhance economic growth and stability and creating an atmosphere conducive to private investment and ensured political stability” (156). The combination of the signs on both government spending and total investment lead to the conclusion that higher levels of investment including “land improvements, plant, machinery, and equipment purchases, and the construction of roads, railways, and the like, including commercial and industrial buildings, offices, schools, hospitals, and private residential dwellings” (World Development Indicators) are more important for economic growth than government spending. Therefore, used together, the results from SPEND and INVEST support the market friendly theory which focuses more on government investment as an important influence on economic growth.

The last category of variables includes macroeconomic indicators. The model reports that if inflation were to decrease by 0.09%, GDP growth would increase by 1%. This result is very intuitive and supports the market friendly theory which emphasizes macroeconomic stability as an important variable in economic growth. The coefficient of central government debt is a positive 0.106 with a significance level of 0.014. This result suggests that economic growth will, however, increase as government debt increases. Unfortunately, this result is counter-intuitive and not as expected.

The positive coefficient on DEBT may be related to government investment. Some sort of financing needs to be done in order for a country to lay out such investments. High levels of government debt may lead to high levels of economic growth if the borrowing involved was intended and used for such productive means as investment in people or private markets. The World Bank has also reported how successful the East Asian economies have been in managing debt. "In particular, they generally limited fiscal deficits to levels that could be prudently financed without increasing inflationary pressures and responded quickly when fiscal pressures were perceived to [be] building up" (12).

Another important thing to notice from the regression results is the insignificance of the INFL variable. However, when considering the descriptive statistics for the sample, the only variable that was not similar and comparable to the larger group of data points was inflation. Therefore, the insignificance of this variable may not be an accurate reflection of the effect of inflation on GDP growth because this sample does not truly represent the inflation rates of the countries of East Asia.

When looking at the results of the linear regression, it is important to understand the value of using dummy variables for each East Asian country. Since the country dummy variable for Japan was removed from the regression, it becomes the basis of comparison for the dummies. For example, when looking at Thailand, you would interpret the dummy coefficient by saying that after controlling for all the variables in the model, Thailand's growth rate starts out at 2.721 percentage points higher than Japan's growth. When the coefficient is relatively close to zero, these differences in "starting off points" can be attributed to any number of other factors that may have an effect on the economic growth of a country. However, in this analysis, the coefficient for the Singapore dummy variable is -24.181. This would suggest that compared to Japan and keeping all variables in the equation equal to zero, Singapore has a starting off point 24 percentage points lower than that of Japan. An explanation for this result is that since Singapore is so export dependent, if their exports were in fact equal to zero, the country would be behind most other economies in the region. Glick and Moreno report that in Singapore, "openness was achieved by ending all restrictions on imports and giving free rein to the export sector" (22). In fact, over the fifteen year period examined in this study, exports in Singapore have averaged well over 125% of GDP.

Overwhelmingly, the results of this model support the market friendly view of economic growth in East Asia. The strong positive coefficients on exports and foreign direct investment reveal that outward orientation plays a large role in economic growth. Government intervention, mainly investment, also helps support a growing economy. Finally, this study has also shown that low levels of inflation are also important in a growing economy. Strong global linkages, a competitive microeconomy and a stable

macroeconomy – the key components to the market friendly theory – are all seen as highly significant in promoting economic growth in East Asia.

Section VI: Conclusion and Implications

The main conclusion that can be drawn from this study is that an empirical model which includes a wide variety of economic variables is highly successful in explaining the variance in GDP growth in East Asia. Variables explaining outward orientation, government indicators and macroeconomic indicators are all highly significant as determinants of growth. The market friendly theory of policy integration is supported by this model and comes closest to explaining the relationship between governments and private markets in East Asia.

This study also shows that increased levels of exports and investment including FDI and domestic investment will all help support increased levels of economic growth in East Asia. Some policy implications from these results are for government encouragement of market friendly activities (exports and investment). However, because it was shown that government spending will decrease economic growth, East Asian governments need to use discretion in their promotional activities.

Although this model was very successful in explaining the determinants of economic growth in East Asia and supporting the market friendly theory of growth, there were some limitations to this research. One limitation and reason for continued research is the availability of data. As was explained in Section V, only 83 complete data sets were used in this regression. The main reason for this was because additional data was not easily available. A second reason for continued research on this topic would be to

further look into issues concerning government spending and investment. This model showed that total domestic and government investment had a positive correlation to GDP growth. However, government spending had a negative correlation to GDP growth. It would be interesting to analyze different types of government spending and investment to determine which forms have the greatest effect on GDP growth.

Although there were a few limitations, this study was very successful in pointing out the key determinants of economic growth in East Asia. The market friendly theory which includes an interaction of investment in people, global linkages, a stable macroeconomy and a competitive microeconomy is the most successful in describing growth. Continued interaction of all available economic tools along with the flexibility to reevaluate growth strategies has led to the above average success of East Asian economies.

End Notes

ⁱ The World Bank defines “East Asia” as “all the low-and middle-income economies of East and Southeast Asia and the Pacific, east of and including China and Thailand” (xvi). Unless otherwise stated or defined, “East Asia” will refer to the geographical classification of countries.

ⁱⁱ The HPAEs consist of Japan; the “Four Tigers” – Hong Kong, the Republic of Korea, Singapore and Taiwan, China; and the three newly industrialized economies (NIEs) of Indonesia, Malaysia and Thailand (World Bank 1).

ⁱⁱⁱ This study looks at the years 1983 to 1997 in an attempt for the results not to be affected by the financial crisis mentioned in the text.

^{iv} Data for Japan was included in the model in terms of all the independent variables. Only the country dummy variable for Japan was excluded as is necessary for regressions using dummy variables.

Appendix A: Countries Considered for Analysis in Descriptive Statistics

Brunei
Cambodia
China
Hong Kong, China
Indonesia*
Japan*
Korea, Rep.*
Lao PDR
Macao
Malaysia*
Micronesia, Fed. Sts.
Mongolia*
Philippines*
Singapore*
Thailand*
Vietnam

*Countries Used in Regression Analysis

Appendix B: Variable Definitions

*Definitions taken from World Development Indicators, World Bank Tables, 1998

GDP growth (annual %)

Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 1995 U.S. dollars. GDP measures the total output of goods and services for final use occurring within the domestic territory of a given country, regardless of the allocation to domestic and foreign claims. Gross domestic product at purchaser values (market prices) is the sum of gross value added by all resident and nonresident producers in the economy plus any taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

Exports of goods and services (% of GDP)

Exports of goods and services represent the value of all goods and other market services provided to the world. Included is the value of merchandise, freight, insurance, travel, and other nonfactor services. Factor and property income (formerly called factor services), such as investment income, interest, and labor income, is excluded.

Foreign direct investment, net inflows (% of GDP)

Foreign direct investment is net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Expenditure, total (% of GDP)

Total expenditure of the central government includes nonrepayable current and capital (development) expenditure. It includes expenditures financed by grants in kind and other cash adjustments, but does not include government lending or repayments to the government or government acquisition of equity for public policy purposes. Data are shown for central government only.

Gross domestic investment (% of GDP)

Gross domestic investment consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including commercial and industrial buildings, offices, schools, hospitals, and private residential dwellings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales.

Inflation, GDP deflator (annual %)

Inflation as measured by the annual growth rate of the GDP implicit deflator. GDP implicit deflator measures the average annual rate of price change in the economy as a whole for the periods shown.

Central government debt, total (% of GDP)

Total debt is the entire stock of direct, government, fixed term contractual obligations to others outstanding as a particular date. It includes domestic debt (such as debt by monetary authorities, deposit money banks, nonfinancial public enterprises, and households) and foreign debt (such as debt to international development institutions and foreign governments). It is the gross amount of government liabilities not reduced by the amount of government claims against others. Because debt is a stock rather than a flow, it is measured as of a given date, usually the last day of the fiscal year. Data are shown for central government only.

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