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# Culture Macroeconomics Adjustments and Economic Growth

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# Culture, Macroeconomic Adjustments and Economic Growth

by

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**Abstract**

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This paper argues that culture is the underlying determinant causing the delays and massive social costs sometimes seen as countries attempt to stabilize after experiencing external shocks. While there have been significant ties between culture and economic performance in the past, as in Tabellini (2008) and Licht et al. (2007), this paper argues that culture matters more during periods of disequilibrium than it does during times of equilibrium.

The empirical methodology for this paper closely mirrors that of Rodrik (1999), in which he proposed that latent social conflicts and poor institutions of conflict management were the reasons for delayed adjustments to external shocks. The dependent variable for all regressions is the difference between the change in growth from 1975-1990 to 1960-1975. This was the same dependent variable Rodrik (1999) used for his regressions, reasoning that the world economy during the 1970s was very turbulent and filled with external shocks. The independent variables include terms of trade shocks, and Hofstede's Cultural Dimensions. The three main Cultural Dimensions that are considered in this paper are Power Distance, Individualism and Uncertainty Avoidance. Cultural variables present significant issues in terms of endogeneity, which is why instrumental variables will be used in the regressions when possible.

A theoretical model, with components drawn from Alesina and Drazen (1991), supplements the empirical model. Their model has been modified to account for relative income preferences in an attempt to show the significance of the Power Distance variable.

Results show that countries with the largest drops in growth after 1975 were those that had cultural aspects that caused delayed adjustments to external shocks that they faced. Particularly, high scores for Power Distance, low scores for Individualism and high scores for Uncertainty Avoidance translated to poor economic performance after external shocks.

## Table of Contents

## Chapter One

## Introduction

*A. The Phenomenon of Growth Collapses*

In late 1997, Eastern Asia experienced a tough financial crisis during which multiple countries saw their currencies deteriorate and sought help from the IMF. In Indonesia, the Rupiah lost over 80% of its value and Dictator Suharto was forced from power. South Korea suffered a similar fate, the value of the Won declined 53% and a few of its major electronics and car companies (some of the largest in the world) needed emergency bailouts.[1] While this was a very rough time for both countries, their recovery periods were quite different. As seen in the graph of GDP growth for the two countries (Figure 1), South Korea restored growth much more quickly than Indonesia. Particularly, the growth between 1998-1999 (the year after the major devaluation), South Korea grew at a rate of over 8%. Meanwhile, Indonesia's growth rate was still negative with a rate of -0.58%. Also, after Indonesia did restore growth somewhat, it only grew at an average of 3% between 1999 and 2003, much less than the 6% average that it had been experiencing in the years leading up to the crisis. While South Korea also was not able to quite reach its level of previous growth of slightly over 6%, it did make it back to just under 5% for the period 1999-2003. This idea is further illustrated in Figure 2, a graph of the unemployment rates in both countries for the 5 year period after 1998. On this graph, the divergence between Indonesia and South Korea is much more obvious.

[1] *Facts taken from Time (2008)*

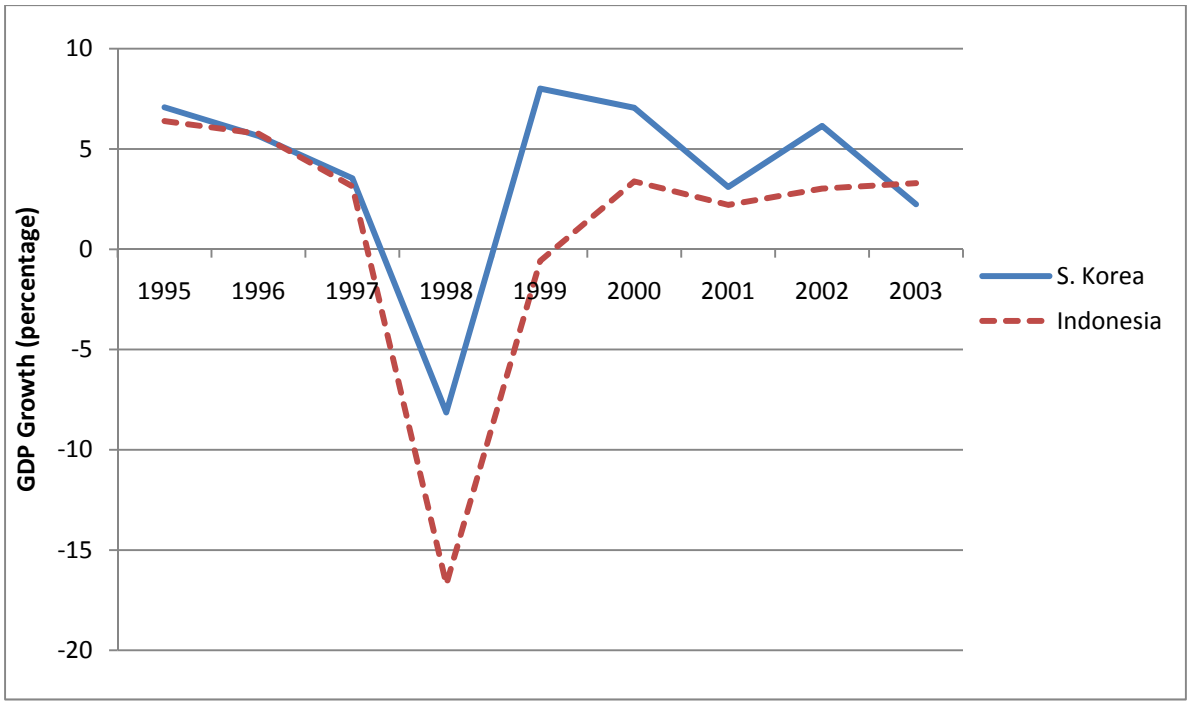


*Figure 1: A graph of GDP growth from 1994-2003 for South Korea and Indonesia.*

One thing that often goes overlooked when trying to explain the reasons for these two countries experiencing two very different fates after a similar initial shock is the response of each country's citizens. The citizens of South Korea waited in line for hours in order to donate their personal treasures of gold and jewelry. South Korea was able to use these possessions to help rebuild their foreign reserves. Having seen the success of this program, Indonesia tried to replicate it. The first person to donate her gold was Dictator Suharto's daughter and she was promptly booed by the people of Indonesia, as they were displeased by the amount of jewelry she had obtained. This paper considers whether culture plays a role in how countries respond to economic shocks since, as seen in the cases of South Korea and Indonesia, the way in which a country responds to shocks can have a lasting effect on the growth rate and other key economic indicators.

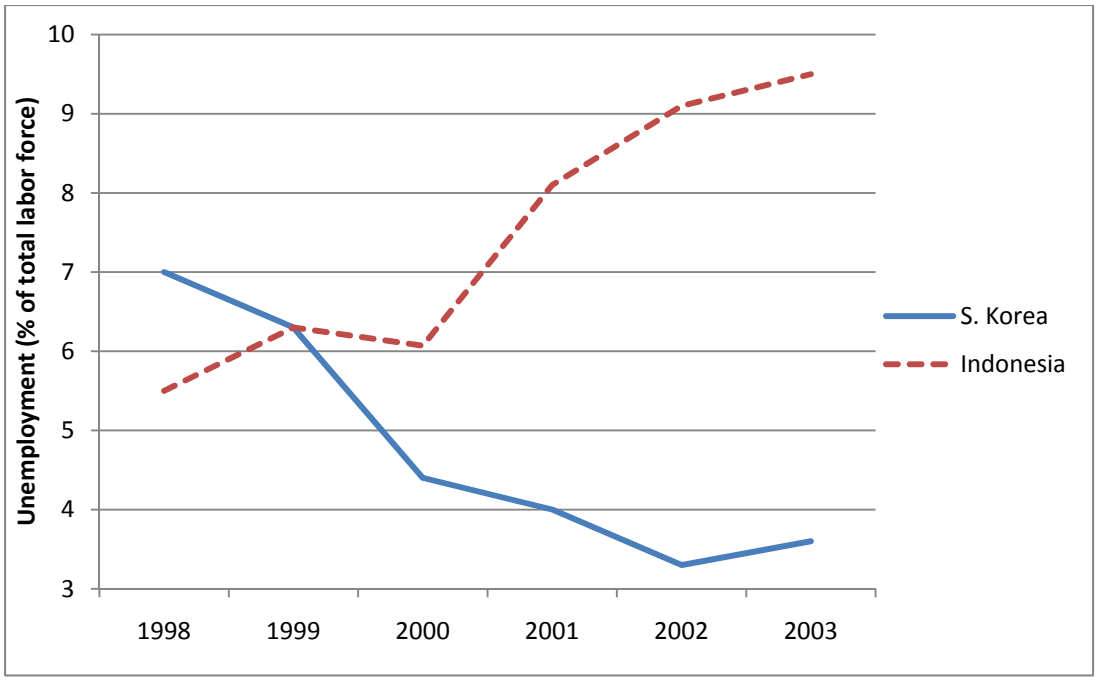


*Figure 2: A graph of the unemployment rate from 1998-2003 for South Korea and Indonesia.*

As shown in the example above, this paper is motivated by the fact that many countries around the world experience growth collapses—meaning that they appear to be growing at a steady rate and then all of a sudden experience a lengthy period of decreased growth. There has been some research that attributes these growth collapses to external shocks—events that occur outside a country's control but have a significant effect (positive or negative) on one or more economic variables. In this literature, namely articles by Easterly, Kremer, Pritchett and Summers (1993) and Raddatz (2007), the focus is on negative external shocks. The findings of these articles, as well as others, such as Rodrik (1999), show that external shocks by themselves could not possibly cause the corresponding growth collapse. There must be another variable interacting with the external shocks that cause this phenomenon.

*B. Culture, External Shocks and Growth*

This paper presents the hypothesis that culture determines whether a country will respond well to an external shock or poorly. An external shock can be characterized by a short and small or non-existent growth decline while a poor response to an external shock would be a long period of possibly ten or more years of decreased growth. The channel through which these cultural variables will effect growth is by delaying necessary adjustments in fiscal policy. For instance, when a country experiences a terms of trade shock—a sharp increase in the price of its imports or drop in price in its exports—there are a set of a "textbook" adjustments for this economy to undertake. Rodrik (1999) provides a vivid illustration of these adjustments and presents some questions that countries must ask when altering their fiscal policy:

> To fix ideas, think of an economy that is suddenly and unexpectedly confronted with a drop in the price of its main export. The textbook prescription for this economy is a combination of expenditure-switching and expenditure-reducing policies—a devaluation and fiscal retrenchment. But the precise manner in which these policy changes are administered can have significant distributional implications. Should the devaluation be accompanied by wage controls? Should import tariffs be raised? Should the fiscal retrenchment take place through spending cuts or tax increases? If spending is to be cut, which types of expenditure should bear the brunt of the cuts?

Hence, it is imperative that countries can answer these questions in a timely matter in order to successfully respond to an exogenous shock. If they cannot do so, the social costs of delayed stabilization increase over time and can be quite large. One common problem to delay is the level of short term debt held by the government increases notably, leading to much higher interest payments and leaving the country exposed to a debt crisis.

The cultural variables tested for this hypothesis are Geert Hofstede's Cultural Dimensions which incorporate four main variables: Power Distance, Individualism, Uncertainty

Avoidance and Masculinity. This paper hypothesizes that Power Distance, Individualism and Uncertainty Avoidance will have significant effects on growth when interacted with external shocks. Specifically, this paper tests the hypothesis that countries that have high Power Distance scores (are more adverse to changes in status), lower Individualism scores (are more integrated into groups) and low Uncertainty Avoidance scores (are less adverse to uncertainty and risk), will not respond as well to external shocks and will experience growth collapses.

The theory behind the idea that these cultural variables potentially cause delays extends from previous work by Alesina and Drazen (1991) and the theoretical model proposed in this paper. In their article, Alesina and Drazen note that stabilizations are almost always delayed, yet they contend that if nothing were holding up the bargaining process, stabilizations would occur immediately. They propose that "Delays in stabilization arise due to a political stalemate over distribution." This paper theorizes that the underlying culture in a country is what causes these political stalemates to vary in length. For example, a country that has a higher Individualism score is more likely to have a shorter delay since the parties that are bargaining are more concerned about their own benefit. A lower Individualism score would lead to longer delays since the parties that are bargaining are doing so on behalf of a group and need to consider different things that will promote the total welfare of the group.

The theoretical model in this paper views the decision to delay or concede from the perspective of countries with different Power Distance scores. The model adopts some elements directly from Alesina and Drazen and focuses on a war of attrition with increasing costs to delay. Since the people in countries with higher Power Distance scores are more conscious of their own status, the model shows that they will likely not concede since they have

a higher preference for relative income. The logic behind this is that if they do concede, there is a chance that the other party will delay, in which case the other party will come out the "winner". Thus, the only viable option for each party is to delay, making the cooperative equilibrium unstable.

From an empirical perspective, the period used to determine whether countries experienced growth collapses will be 1960-1989. The dependent variable will be the change in growth from the period 1960-1975 and 1975-1989. 1975 is chosen as a break point since the 1970s were rife with external shocks and thus, this represents a good midpoint. This portion of the analysis mirrors that of Rodrik (1999).

*C. Results and Outline*

The results show that the countries that experienced growth collapses for a given size external shock generally had low Individualism scores, high Power Distance scores and high Uncertainty Avoidance scores. However, Uncertainty Avoidance and Power Distance do not pass all of the robustness tests that the variables are put through. Individualism not only passes these tests but also shows up as more significant than a measure democracy.

The structure of this paper is as follows. Chapter 2 gives an example and background information on delayed stabilizations and culture. Chapter 3 gives a model and presents the theory outlining how culture delays stabilizations. Following that, Chapter 4 presents the sources of data and their characteristics. Chapter 5 provides the empirical results and also discusses these results. Lastly, Chapter 6 offers some concluding remarks.

## Chapter Two

## Delayed Stabilizations and How They Occur

*A. The Need for a Fiscal Change*

In 1973 the United States faced an oil embargo from the Arab members of OPEC as well as Egypt, Syria and Tunisia after the US decided to continue supplying the Israeli army with weapons. While the embargo only lasted for six months, it had a significant impact on the economy. As seen in figure 3, the embargo lead to a sharp decrease in aggregate supply through increased costs of production and transportation, causing a period of stagflation. Assuming the economy was at its natural rate of output, in the short run the economy would move from point to A to point B. Ideally, this is when the government would choose to fight inflation or unemployment, since the consequences to inaction are even worse and are demonstrated in Figure 3. In the medium run, as the expected price level rises to match the increased rate of inflation, wages and prices increase and the aggregate supply curve shifts even further to the left until the economy reaches its new equilibrium level of output and unemployment.[2]

In the case of the United States in the early 1970s, the government chose to combat unemployment. The fiscal policy response was to decrease government spending slightly while offering a large tax cut. However, the question arose, as it always does, who will benefit the most from the tax cut? Will it be progressive and help the poor more than the rich? Will it be a flat rate or fixed dollar amount? Will it be regressive? Which areas of government spending will

[2] This theory is adopted from the textbook *Macroeconomics* by Blanchard, 5th Edition p. 143 in order to show the effects of an oil shock on the macroeconomy.

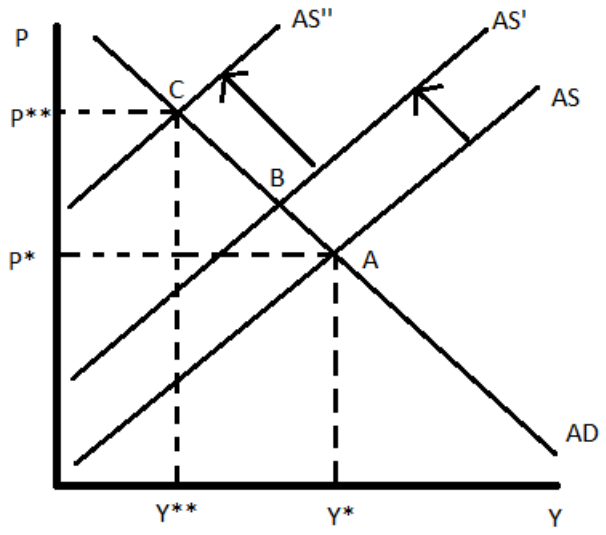


*Figure 3: A graph of the medium run effects of an oil supply shock on the macroeconomy.*

be cut? Every government has to deal with these issues when faced with an external shock. In most cases, the bargaining over these stabilizations can take a long time and get ugly, as there are significant distributional consequences to the results. A change in taxes or government spending can completely alter many people's economic status. As the bargaining time increases, the social costs increase since the problem is not being resolved and likely more problems are arising as a result.

*B. The Theory Behind Delayed Stabilizations*

Alesina and Drazen (1991) explain why macroeconomic adjustments can take so long and illustrate some common characteristics of delayed adjustments. They begin their article by outlining common features that they have noticed in their research and then present a model that explains this behavior. The first common feature of stabilizations that they note is:

1. *There is an agreement on the need for a fiscal change but a political stalemate over how the burden of higher taxes or expenditure cuts should be allocated.* (p. 1172)

Since there is almost always a need for fiscal change after an external shock, this observation ties in closely with the theory from this paper. However, as Alesina and Drazen note, there is rarely an instant agreement of how the burden of stabilization will be distributed since no group wants to risk bearing the majority of the cost. In this context, Alesina and Drazen use examples from France and Britain from the post World War I period to demonstrate their point, but it is also easy to see this scenario played out in the United States political landscape. The Democrats generally argue for lower taxes for the lower and middle classes and higher taxes for the rich, with the Republicans generally contending for lower taxes for the upper class and a less progressive tax system. Often these debates can wage on in Congress for many months and even years. Sometimes, the debate will last until one party can gain a powerful majority in the House and Senate. This leads to Alesina and Drazen's second common feature of delayed stabilizations:

> 2. *When stabilization occurs, it coincides with a political consolidation. Often, one side becomes politically dominant. The burden of stabilization is sometimes quite unequal, with the politically weaker groups bearing a larger burden.* (p.1173)

This feature is commonplace around the world in both democratic and non-democratic governments. If one group has an overwhelming majority power, it can deflect the burden of adjustment away from their political group. For instance, this could occur when one political party has a majority in a democratic government or when there is a powerful dictator. Both scenarios likely lead to one group having to pay more than the other. When one group can force another to bear a larger portion of the costs to stabilization, the outcome is generally not optimal, but it is usually better than if both parties delayed for a long time, which Alesina and

Drazen show is very costly in their model. This leads to the final common characteristic presented by Alesina and Drazen:

> 3. *Successful stabilizations are usually preceded by several failed attempts. Often a previous program appears to be similar to the successful one.* (p. 1174)

This is because of the assumption that there are rising costs of delaying. As the costs increase, a party may have to settle for a deal that it previously thought was unacceptable due to the fact that they cannot afford to delay any longer. Unfortunately, if they had just taken the earlier deal the costs would have been a lot lower. However, since Alesina and Drazen create their model from a war of attrition, the likely outcome will result in there being one "winner" and one "loser", with the loser bearing an unequal portion of the cost of adjustment. If one party concedes while the other delays, the party that concedes is the loser. This is why it is unappealing to concede until it is absolutely necessary to do so.

These three common characteristics help make up the model presented in Alesina and Drazen's article. In this model, they assume that a government is running a budget deficit and it needs to raise taxes to bring the deficit to zero. It is also assumed that before the stabilization, the government is limited to highly inefficient and distortionary methods of public finance. Thus, there is a welfare loss associated with the rise in the level of government debt. There is also a cost for different groups in the country to lobby in order to prevent the burden of stabilization being placed on them. Hence, there are two main costs to delay, the increasing government debt that must be paid back along with any interest associated with it, and the increasing costs of lobbying to avoid bearing the burden of taxation. Alesina and Drazen view

these increasing costs as becoming very high as time goes on and conclude that delayed stabilizations are significantly more costly than quick or immediate stabilizations.

*C. Rodrik's Extension of This Theory*

Rodrik (1999) takes a similar view on the reasons for delayed stabilization and the outcomes. He claims latent social conflicts and institutions of conflict management are the proxies for delay and those countries that have higher levels of social conflict and weaker institutions of conflict management will experience delays to stabilization. He gives the following argument:

> First, the groups are less likely to cooperate when it is difficult to coordinate on a 'fair' distribution of resources. This will be the case in societies that are highly polarized—where, using my terminology, latent social conflict is high. Second, the non-cooperative strategy will appear more appealing when the potential return to unilateral action is high—that is, when it is possible to exclude other groups from the pie. This possibility is most salient when the society's institutions of conflict management are weak…..

These appear to be fairly reasonable assumptions. However, if one group believes that they can exclude another from the pie, and they successfully can, Alesina and Drazen contend that this would make the delay shorter, as noted in point number two in the common feature of delays above. It appears that Rodrik believes that delays are only likely to happen if there are high levels of latent social conflict and weak institutions of conflict management. Clearly there is a slight disconnect in theory between Rodrik and Alesina and Drazen. Hence, it may be that another set of variables other than social conflicts or institutions of conflict management determine the length of delay of stabilizations. This paper proposes that those variables are cultural variables.

*D. Background on Culture*

It is nearly impossible to pinpoint an accurate definition of the term “culture”. In a paper by Guiso, Sapienza and Zingales (2006), they define culture as "those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation." Though others, such as Putnam (1995), would counter this definition with examples of how culture can possibly change over shorter periods of time as he argued in his article regarding America’s declining social capital. As hard as culture is to define, it is even harder to quantify. On top of that, culture is endogenous, so anyone testing it must circumvent that barrier as well. Still, even with all these issues, culture has found its place in economic literature.

The idea of culture influencing growth is certainly not a new one. In fact there is a large literature that focuses on the idea that culture and institutions are correlated and that these in turn determine growth. While it is extremely difficult to establish a causation running from culture to institutions, multiple economists such as Tabellini (2008) and Licht et al. (2007) have provided evidence for this causation. Furthermore Glaeser et al. (2004) actually tried to debunk the possibility that institutions could form culture, citing flaws in the instrumental variables used in many institution papers. Others, such as Stulz et al. (2003) have shown the specific institutions in which culture has influenced. Lastly, some economists have even attempted to narrow down growth to one cultural variable, such as in Gorodnichenko and Roland (2010) when they focused on Individualism/Collectivism as a channel for growth.

Given all of this research regarding culture and growth, it is plausible that culture matters to growth, but it matters more during times of disequilibrium. Thus, this paper tests

culture in framework of Rodrik (1999) to determine whether culture can explain sustained periods of slow growth.

## Chapter Three

## Theoretical Model

*A. Background and Notes about Model*

The theoretical model for this paper adopts key elements from the model presented in Alesina and Drazen (1991). The model introduced by Alesina and Drazen focuses on a war of attrition, in which there are two parties that acknowledge a need for a fiscal policy change due to a bad government policy, but cannot agree on how the burden of change will be distributed. However, by delaying the change in policy, the total social cost increases by keeping the bad policy for a longer time. The stabilization process can be viewed from the angle of an external shock, rather than of a bad government policy, with similar results.

To an extent, Rodrik (1999) views the problem in a similar manner. He claims that the best outcome for both groups is to concede immediately in order bear the least social cost possible. As previously noted, Rodrik focuses on high latent social conflicts and weak institutions of conflict management as reasons for delay.

The model is altered slightly to include a preference for income, in terms of whether a party is more concerned with its own income or its relative income to the other party. The aspect of political cost is also dropped from the model. In Alesina and Drazen's model, political costs include paying increasing amounts for lobbying activities over time. The cost of delay is instead represented by a discount rate that includes the probability of a negative shock.

*B. Model Presentation*

This model is designed to be a game played repeatedly, with increasing costs after each round. In this model, the cost of an immediate adjustment is *ty*, where *t* is the tax rate and *y* is income. As explained previously, there is an increased cost to delaying adjustment. This cost is represented by a factor of $\lambda$, where $\lambda > 1$. Thus, the cost of a delayed adjustment is $\lambda ty$.

There are two political parties or interest groups. The goal for both parties is to avoid bearing the majority of the cost of adjustment. In this case, if one party concedes and the other party delays, the conceding party has to pay a disproportionate amount of the cost of adjustment. The conceding party will pay $\alpha ty$, where $\alpha > ½$ and the delaying party will pay $(1-\alpha)ty$.

We can then define the income that one of the parties receives (after one round) as a function of both parties' strategies, where $y_1 = y_1(s_1,s_2)$ and $s_1$ denotes the strategy of party one. Hence, the following possible outcomes can occur:

| | |
|---|---|
| Both Concede: | $y_1(C,C) = \left(1 - \frac{t}{2}\right) y$ |
| Both Delay: | $y_1(D,D) = \left(1 - \frac{\lambda t}{2}\right) y$ |
| Party one Concedes, Party two Delays: | $y_1(C,D) = (1 - \alpha t) y$ |
| Party one Delays, Party two Concedes: | $y_1(D,C) = [1 - (1 - \alpha) t] y$ |

For simplicity, let $y_1(C,C) = a$, $y_1(C,D) = b$, $y_1(D,C) = c$ and $y_1(D,D) = d$.

The game is played repeatedly, with a discount rate of r.

In this model, the cooperative equilibrium is S = (C,C) and the non-cooperative equilibrium is S = (D,D). The cooperative equilibrium is sustainable if the gain from delay while

the other party cooperates (c-a), is less than the difference in payoff between the cooperative and non-cooperative equilibriums ($\frac{(a-d)}{r}$).

Next, the parties' income preferences are accounted for when determining the final payoffs. Party one's payoff can be viewed as a function of both parties' incomes:

$$\pi_1(y_1,y_2) = (1-\gamma)y_1 + \gamma(y_1 - y_2)$$

Where $\gamma \in (0,1)$ and is a measure of income preference. If $\gamma = 0$, only your own income matters. If $\gamma = 1$, only your relative income matters.

Then, the cooperative equilibrium, S, yields the following payoffs:

$$(\pi_1, \pi_2) = ((1-\gamma)a, (1-\gamma)a)$$

In this case, the cooperative equilibrium becomes unstable for large values of gamma, since the coefficient of (1-$\gamma$) approaches 0. This means that the best payoff possible for parties with gamma values close to 1 is approximately 0 if they cooperate (if party one cooperates and party two delays, party one has a negative payoff due to increased inequality). Thus, in countries where there is a heavy importance on relative income, such as in those with high Power Distance scores; parties will struggle to reach a cooperative equilibrium. The non-cooperative equilibrium becomes the sustainable equilibrium since there is a 50 percent chance that a party will receive a positive payoff and a 50 percent chance the payoff will be approximately zero. At the non-cooperative equilibrium there is a total social loss of 2(a-d) in comparison to the cooperative equilibrium.

*C. How Culture Causes Delays of Stabilization*

The above model explains how countries with high Power Distance scores will experience delayed stabilizations. Since the people in countries with higher Power Distance are more status conscious, they are more concerned about falling in status than they are with gains in their own income. This translates to a high preference for relative income. As seen in the model, people who have a very high preference for relative income are unlikely to concede. Thus, delayed stabilizations occur since both bargaining parties always delay.

Though there is no model for Individualism, the theory behind it is much simpler than Power Distance. According to Hofstede, countries with high Individualism scores prefer to make individual decisions rather than group decisions. The people in countries with high Individualism scores also make decisions on behalf of themselves and their immediate family, not a larger group or extended family. Thus, when it comes to bargaining, a deal is struck quickly since the people are making decisions on their own behalf and do not have to worry about the welfare of a larger group.

The theory surrounding Uncertainty Avoidance is also fairly simple. Since people in countries with high Uncertainty Avoidance scores are more adverse to risk and worry more about the future, they are more likely to strike a deal quickly. Low Uncertainty Avoidance scores are associated with more risk taking and less worry about the future, which translates into delays when bargaining.

In order to better understand how these cultural variables delay stabilizations, an example using Nigeria and Switzerland can be used. Switzerland has a low Power Distance score of 34, a high Individualism score of 68 and an average Uncertainty Avoidance score of 58.

Nigeria, on the other hand, has a high Power Distance of 77, a low Individualism score of 20 and a low Uncertainty Avoidance score of 30. Both countries have a multi-party government that is elected by the people. Now, suppose that both countries experience a negative terms of trade shock and wish to stabilize using the "textbook" policies outlined in Chapter 1. When bargaining over who will bear the tax increases, Switzerland will be able to execute the adjustment quicker than Nigeria for multiple reasons. First, the people of Switzerland have a larger preference for personal income rather than relative income. Because of this, the bargaining parties are most likely to concede since that is the solution that yields the highest benefits for all. Secondly, the bargaining parties are not constrained by having to worry about others when bargaining since they are highly Individualistic. Thirdly, an average Uncertainty Avoidance score may mean that they delay slightly, but it is far from low, so they will not delay for a significant amount of time. In Nigeria, on the other hand, the bargainers are almost entirely concerned with relative income, which means that they will not want to concede in fear that the other party will delay and they will be the "losers". They also have to worry about bargaining on the behalf of larger groups since it is harder to find a deal that pleases everyone. Lastly, Nigerians are less concerned about the future or opposed to risk, therefore there is not a major reason that they should concede earlier rather than later. When looking at the growth results that both countries experienced, this story proves to be quite accurate. Switzerland experienced a 1.16% higher growth rate in 1975-1989 than in 1960-1975. This compares well to the average of -0.12%. Nigeria, however, suffered a decline of 4.29% in growth over the same timeframe, showing that culture does make a difference.

## Chapter Four

## Explanations and Sources of Data

*A. Dependent Variable: Change in Growth*

The dependent variable for this study is the average GDP per capita growth from 1975-1989 minus the average GDP per capita growth from 1960-1975. Rodrik (1999) uses this same measure as his dependent variable in his article. He uses the period from 1975-1989 to allow for more observations, but claims that the results are the same when using 1990 instead. While that same issue does not appear with the data in this paper, the same measure is used anyway for the purpose of consistency so the results can be compared in the end. This data comes from the Penn World Tables version 6.3 and the GDP per capita is measured in 2001 US Dollars. In the results section, this term will be called *dgrowth*.

*B. External Shocks*

The data for terms of trade and openness come from the Global Development Network Growth Database.[3] The measure of terms of trade is measured by the price of exports divided by the price of imports in a given country. Openness is measured by taking the exports of a country plus its imports and dividing this number the country's GDP.

Terms of trade shocks are chosen as the measure of external shocks for multiple reasons. One of the main reasons is that Rodrik (1999) uses them in his paper as his measure of external shocks. Also, as noted in Rodrik's article, the 1970s were rife with terms of trade

[3] http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20701055~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html#1%29 (created on June 1, 2001)

shocks, so there is a good sample period in which to measure the long term effects of these shocks. Lastly, the measure of terms of trade is useful since it incorporates changes in economies themselves. For example, after experiencing a major shock once, governments will often try to implement preventative measures from it happening again. Also, since shocks usually lead to a higher price of a good (or set of goods), this creates an incentive for lower cost substitute goods to enter the market. This has happened in the present world economy with oil. An article in *The Economist* (2011) explains this change well, "The rich world is less vulnerable now [to an oil shock] because it has substantially reduced the amount of oil used per unit of output. America's economy in 2009 was more than twice as large in real terms as in 1980. Yet over that period America's oil consumption rose on slightly, from 17.4m b/d to 17.8m. Europe actually used less oil in 2009 than in 1980, even though its economy had grown." The article also explains how even emerging economies are also less susceptible to an oil shock due to the fact that manufacturing is more efficient and service industries are more prominent. Since terms of trade is a measure of prices, it adjusts accordingly to any swings in export or import prices, whether they are large or small. Thus, any changes in economies themselves from the sample period of 1960-1989 would have been captured in the measure of terms of trade.

There are two types of terms of trade shocks used in this paper. The first focuses on a one time change in terms of trade. This is measured by taking the average terms of trade over two subsequent five year periods and calculating the percentage change between them. This value is then multiplied by the average openness of the first five year period. The formula for

the terms of trade shock employed in this paper uses the periods 1970-1974 and 1975-1979. The formula for this shock is:

$$\frac{(tot_{8084} - tot_{7579})}{tot_{7579}} * open_{7579}$$

Where $tot_{7579}$ represents the average terms of trade over the period 1975-1979 and $open_{7579}$ represents the average openness over the period 1975-1979. This shock is referred to as *ashock1* in the results section.

In order to accurately explain the effects of one of these shocks, the absolute value of the shock may be taken. By doing this, it implies that all terms of trade shocks (even positive ones) will have a negative effect on growth. The reasoning behind this comes from Tornell and Lane (1999) in an article that they propose an idea called the "Voracity effect". In this paper, Tornell and Lane model an economy with two sectors, a formal sector and shadow sector. They claim that an increase in the rate of return in the formal sector actually *reduces* growth. The increase in the rate of return leads to each group attempting to grab a larger share of national wealth by demanding more transfers. This attempt to grab wealth is then reflected in higher taxation in the formal sector, which results in moving capital to the informal sector where it is safe from taxation. This transfer of capital is what causes the reduction in growth. Rodrik (1999) also cites this article to explain why he treats all shocks as negative shocks as well.

The second type of terms of trade shock used in this paper measures the volatility of terms of trade. It is the primary measure that Rodrik uses in his article as well. It is calculated by taking the standard deviation of the first log differences of terms of trade for the years 1971-1980 and then multiplying this value by the average exports as a percentage of GDP for the five year period 1970-1974. This shock is referred to as *totshock2* in the results section.

*C. Culture*

Using culture as an independent variable presents a few difficult obstacles. The first of which is the issue of quantification. While much progress has been made in this regard, there is still not a foolproof solution to this problem. Data from the World Values Survey, which has attempted to turned into culture variables by some, such as Shalom Schwartz, has subsequently been applied to economics as in Licht, Goldschmidt and Schwartz (2007). Other economists have relied on older data from sources such as Geert Hofstede's Cultural Dimensions, which is the data that this paper uses. Hofstede's Cultural Dimensions were chosen since they have been tested over a period of over 40 years and have 80 observations (when including countries with regional values), which is more than other data sets. These Dimensions are taken from his website.[4] There are five dimensions in total: Power Distance, Individualism, Masculinity, Uncertainty Avoidance Index and Long Term Orientation. However, Long Term Orientation is not used in this study due to the fact that there are only 23 observations. Masculinity is also neglected for this study due to issues surrounding its practicality for potential theory. The Cultural Dimensions were calculated using survey data from IBM over the period of 1967-1973. Two surveys were conducted, one in the period of 1967-1969 and one in 1971-1973 among IBM employees in 39 different countries. In 2001, Hofstede published a second edition of his book *Culture's Consequences* in which he claims the earlier data has been validated by more recent subsequent studies. The number of observations had also increased to 74 (including three regions) by 2001. The three dimensions used in this paper are discussed further in detail below.

[4] http://www.geert-hofstede.com/hofstede_dimensions.php

The variable of Power Distance (PDI) deals with the basic issue of income inequality. Power Distance measures the amount of inequality that a person in a given country expects. Countries with high Power Distance scores expect a lot of inequality, while countries with low scores expect very low amounts of inequality. Another attribute associated with Power Distance is class consciousness. Countries with high Power Distance scores generally have a better understanding of their own position on the order of inequality. The index ranges from 11 (Austria) to 104 (Malaysia).

The next measure of culture used, Individualism (IDV), measures the extent to which individuals are integrated into groups. A higher Individualism score is associated with more of an "everyone for themselves" mentality. Also, Hofstede explains that the people in higher Individualism countries generally believe that individual decisions are considered better than group decisions. He also notes that Individualism is negatively correlated with Power Distance. The scale for Individualism runs from 6 (Guatemala) to 91 (United States).

The final measure, Uncertainty Avoidance (UAI), measures the tolerance that a people in a country have for uncertainty. The IBM survey used three indicators to measure this: rule orientation, employment stability and stress. Hofstede associates a high Uncertainty Avoidance score with less risk-taking and a greater fear of failure. People in these countries also have a higher anxiety level and worry more about the future. This index runs from 8 (Singapore) to 112 (Greece).

The other main issue that arises when working with culture stems from the fact that culture is endogenous. It is difficult to prove causation from culture to growth when it could also be plausible that economic growth causes different cultural traits to appear. This issue is

easier to control for than quantification issues by using linguistic instruments in order to decrease measurement error. The idea of using linguistic instruments for measures of culture comes from the Sapir-Whorf hypothesis, which states that language and culture constitute one another. The instruments for this paper come from Kashima and Kashima (1998).

The first instrument that they propose is *Pronoun Drop*. They explain this measure as "An explicit use of "I" (i.e., first-person singular deictic pronoun) signals that the person is highlighted as a figure against the speech context that constitutes the ground; its absence reduces the prominence of the speaker's person, thus reducing the figure-ground differentiation. " Thus, for example, the absence of the use of "I" in English would constitute a Pronoun Drop. In the data set, 1=Yes (there is a Pronoun Drop) and 0=No (there is not). Kashima and Kashima claim that Pronoun Drop is highly correlated with the Individualism cultural variable. In fact, Pronoun Drop has been used as an instrument for Individualism in previous economics papers such as Tabellini (2008) and Licht et al. (2007).

The other language instrument that comes from Kashima and Kashima (1998) is the use of multiple second-person singular pronouns. In this paper, this instrument will be called *T-V Differentiation* (stemming from tu and vos in Latin). Kashima and Kashima give this explanation of the *T-V Differentiation* variable, "To use the T-V distinction appropriately, the speakers must pay close attention to the type of their interpersonal relationships with their addressees. This seems to suggest that people who use a language with multiple yous would be more aware of status difference." It is this acknowledgement of status difference that makes this variable a potentially good instrument for Power Distance. Some examples of this variable can be seen in English, where there is only one second-person pronoun (you) and Spanish, where there are

two second-person pronoun forms (tu and usted). In the data set 1= 2 PS (there are two second-person pronouns) and 0= 1 PS (only 1 second-person pronoun). Licht et al. (2007) use this variable as an instrument for their variables Egalitarianism and Hierarchy, which vary slightly from Power Distance but essentially measure the same thing.

*Table 1: Descriptive Statistics for main variables.*

| | *PDI* | *IDV* | *UAI* | *ashock1* | *totshock2* | *dgrowth* |
|---|---|---|---|---|---|---|
| Mean | 57.45614 | 41.5614035 | 61.68421 | 6.790355 | 2.529237 | -0.00122 |
| Standard Error | 2.788837 | 3.31057559 | 3.257261 | 1.039075 | 0.325145 | 0.003252 |
| Median | 61 | 36 | 60 | 4.502359 | 1.785168 | 0.00093 |
| Mode | 77 | 20 | 86 | N/A | N/A | N/A |
| Standard Deviation | 21.05526 | 24.9942976 | 24.59178 | 7.635613 | 2.454792 | 0.024553 |
| Minimum | 11 | 6 | 8 | 0.327201 | 0.232481 | -0.10765 |
| Maximum | 104 | 91 | 112 | 34.69291 | 13.63305 | 0.045028 |
| Count | 57 | 57 | 57 | 54 | 57 | 57 |

*D. Polity*

In order to run a robustness check at the end of the results chapter, polity data will be used to compare the results from this paper with those found in Rodrik (1999). Polity is measure of democracy and although Rodrik does not use this exact measure in his article, he also uses a measure of democracy, so the two are comparable. This measure runs on a scale from -10 to 10, with 10 being the most democratic but it has been rescaled from 0 to 1. This data comes from the Center for Systemic Peace.

*E. Descriptive Statistics*

The descriptive statistics for the main variables are listed above in table 1. A few interesting things to note are the standard deviations on the terms of trade shocks, with *ashock1* being much larger than *totshock2*. This makes sense though, since *totshock2* is a

measure of standard deviation itself. It also useful to take note of the means of the cultural variables in order to have a reference point for when the specific scores are discussed in Chapter Six.

*F. Empirical Models*

This paper will test the following empirical models using the variables described in the previous sections in Chapter Four.

1. $dGrowth = \beta_0 + \beta_1 Shock_i + \beta_2 Hofstede_i + \varepsilon$
   Where $Shock_i$ is either *ashock1* or *totshock2* and $Hofstede_i$ is either PDI, IDV or UAI as defined above.

2. $dGrowth = \beta_0 + \beta_1 Shock_i + \beta_2 Hofstede_i * Shock_i + \varepsilon$
   Where $Shock_i$ and $Hofstede_i$ are defined the same as in model 1.

3. $dGrowth = \beta_0 + \beta_1 Shock_i + \beta_2 Hofstede_i * Shock_i + \beta_3 Hofstede_i + \varepsilon$
   Where $Shock_i$ and $Hofstede_i$ are defined the same as in model 1.

4. $Hofstedehat_i = \beta_0 + \beta_2 Lang_i + \varepsilon$ (regression 1)
   $dGrowth = \beta_0 + \beta_1 Shock_i + \beta_2 Hofstedehat_i * Shock_i + \varepsilon$ (regression 2)
   Where Hofstedehat is the estimated value of either PDI or IDV using the T-V Differentiation and Pronoun Drop instruments accordingly. $Shock_i$ is defined the same as in model 1.

## Chapter Five

## Empirical Results and Analysis

*A. Choosing a Shock*

As explained in the Data section, there are two types of shocks used for the regressions in this paper. The first of which is a percentage change in terms of trade multiplied by the openness of a country, designed to measure a one-time terms of trade shock. The periods chosen for terms of trade are 1975-1979 and 1980-1984. The percentage difference between these periods is multiplied by the average openness from 1975-1979. The absolute value of this shock is then taken, which implies that even a positive change in terms of trade has a negative effect on growth, as discussed in Chapter Three. The absolute value of the shock is also used since it had a higher t-stat than the normal shock when regressed on growth. This same type of shock was examined for the periods 1970-1974 and 1975-1979, however none of the results for the interaction variables turned out to be significant. Since this shock did not contribute anything to the hypothesis, it was left out of the results.[5] However, it should be noted that the absolute value of this omitted shock was also more significant than the shock by itself.

The second shock examined is calculated by taking the standard deviation of the first log differences of the terms of trade from 1971-1980 and multiplying that value by the average exports over the period 1970-1974. This measure is the same as in Rodrik (1999) and is included for the sake of repetition so that the two sets of results can be compared in the end.

[5] Uncertainty Avoidance was significant in the stand alone regressions at the 90% level with a t-stat of -1.81.

*B. Regression Explanations*

For the first few sets of regressions, a regular OLS regression is used with the option of White heteroskedasticity. This option is used in order to improve the measurements of the standard error. Under the normal OLS regression, there are stringent assumptions about the covariance and standard error of variables and these assumptions can cause the standard errors to be biased. By turning on the White heteroskedasticity option, these assumptions are relaxed, allowing for a non-linear distribution of standard errors. This option generally improves the standard error which causes the t-stats to increase on the variables, while the coefficients remain constant.

Once the regressions reach the point of instrument inclusion, a Two-Stage Least Squared regression is run. Each stage is demonstrated in Chapter Four Section F. There are also a few more individual regressions run for robustness checks but they are explained as they appear later in the chapter.

*C. Results: A First Glance*

This initial section examines correlations between external shocks and growth alongside culture and growth. The dependent variable in these initial regressions is the difference in the growth rates from 1960-1975 and 1975-1989. The results are displayed in tables 2 and 3. For the regressions in table 2, there are two independent variables present for every regression, which are the lagged growth term (growth from 1960-1975) and the absolute value of *totshock1*. Rodrik (1999) includes the lagged growth term in his analysis to allow for convergence effects and so it is included in these regressions accordingly.

*Table 2: Regression Results using ashock1 and stand alone cultural variables*

| | Dependent Variable: Average Growth 1975-1989 minus Average Growth 1960-1975 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *constant* | 0.0407<br>(3.87) | 0.0365<br>(3.18) | 0.0434<br>(3.08) | 0.0468<br>(3.93) |
| *1960-1975* | -0.5227<br>(-3.30) | -0.5197<br>(-3.28) | -0.5254<br>(-3.28) | -0.4886<br>(-3.03) |
| *ashock1* | -0.0010<br>(-2.43) | -0.0011<br>(-2.53) | -0.0010<br>(-2.42) | -0.0011<br>(-2.51) |
| *IDV* | | 0.0001<br>(0.91) | | |
| *PDI* | | | -4E-05<br>(-0.29) | |
| *UAI* | | | | -0.0001<br>(-1.08) |
| N | 53 | 53 | 53 | 53 |
| adj $R^2$ | 0.30 | 0.29 | 0.28 | 0.30 |

Coefficients are listed, t-stat in parentheses

Regression one (column 1) shows the effects of an external shock on growth. *ashock1* enters with a negative coefficient and is significant at the 95% level with a t-stat of -2.43. The negative coefficient was anticipated since this variable is treating all shocks as having a negative effect, as explained above.

Regression two adds Individualism (IDV) and it enters with a positive coefficient, as expected, but an insignificant t-stat of 0.91. The measure of external shocks, *ashock1*, remains significant at the 95% level with a negative coefficient and a t-stat of -2.53.

The next regression (shown in column 3) uses the measure of Power Distance (PDI) instead of Individualism. Power Distance enters with a negative coefficient but is insignificant with a -0.30 t-stat. External shocks remain significant at the 95% level with a negative coefficient and t-stat of -2.42.

*Table 3: Regression Results using totshock2 and stand alone cultural variables*

| | Dependent Variable: Average Growth 1975-1989 minus Average Growth 1960-1975 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *constant* | 0.0538<br>(5.55) | 0.0594<br>(5.30) | 0.0489<br>(3.99) | 0.0608<br>(5.56) |
| *1960-1975* | -0.6523<br>(-5.03) | -0.6546<br>(-5.05) | -0.6453<br>(-4.93) | -0.6249<br>(-4.80) |
| *totshock2* | -0.0048<br>(-4.59) | -0.0052<br>(-4.65) | -0.0049<br>(-4.61) | -0.0049<br>(-4.67) |
| *IDV* | | -0.0001<br>(-1.00) | | |
| *PDI* | | | 8E-05<br>(0.66) | |
| *UAI* | | | | -0.0001<br>(-1.35) |
| N | 57 | 57 | 57 | 57 |
| adj $R^2$ | 0.40 | 0.40 | 0.39 | 0.41 |

Coefficients are listed, t-stat in parentheses

The final regression for this table (shown in column 4) uses the cultural measure of Uncertainty Avoidance (UAI). Uncertainty Avoidance enters with a negative coefficient and is also insignificant with a t-stat of -1.08. It has the highest t-stat of all the cultural variables and also features the highest adjusted $R^2$, with a value of 0.30. The term *ashock1* continues to remain significant at the 95% level with a negative coefficient and a t-stat of -2.51.

Table 3 replicates the regressions run in table 2, with the change that the independent variable *totshock2* (Rodrik's measure of terms of trade shocks) replaces the term *ashock1*. As previously noted, this particular measure of external shocks is designed to measure the effects of the volatility of terms of trade.

These results are similar to those seen in table 2. None of the stand alone cultural variables were significant at the 90% level. Uncertainty Avoidance had the highest t-stat with a

value of -1.35. The coefficient on Individualism switched to negative, which was somewhat surprising, but with an insignificant t-stat of -1.00 and the fact that this is a stand alone measure and not interacted with external shocks; it does not present any worrisome problems for the hypothesis. The coefficient on Power Distance also switched from negative to positive, but for the same reasons as with Individualism and a t-stat of 0.66, it is not much cause for concern. In each of the regressions it is interesting to note that the measure of external shocks, *totshock2*, was highly significant at the 99% level and also entered with a negative coefficient in each case. The adjusted $R^2$ was also about 10% higher in each regression, mainly due to the higher significance of the external shocks, as the cultural variables had little effect on these numbers.

While none of these regressions featured a significant cultural variable, it is not a big concern for this paper since the main hypothesis deals with how culture interacts with external shocks. That being said, it was definitely unexpected that *none* of the cultural variables were significant. Given all of the previously discussed studies that have linked culture and institutions closely together (with causation running from culture to institutions), it would seem that at least one if not two or all of the cultural variables would have been significant. The fact that Rodrik's (1999) initial regressions showed that measures of institutional quality, such as *institutions (ICRG), democracy* and *income inequality,* were all significant make it hard to swallow that none of Hofstede's Cultural Dimensions were significant.

*Table 4: Regression Results using ashock1 interacted with culture*

| Dependent Variable: Average Growth 1975-1989 minus Average Growth 1960-1975 | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *constant* | 0.0397<br>(3.40) | 0.0402<br>(3.38) | 0.0396<br>(3.04) |
| *1960-1975* | -0.4742<br>(-2.67) | -0.4959<br>(-2.75) | -0.5017<br>(-2.65) |
| *ashock1* | -0.0033<br>(-3.30) | 0.0004<br>(0.65) | 0.0009<br>(0.74) |
| *ashock1idv* | 4E-05<br>(3.18) | | |
| *ashock1pdi* | | -3E-05<br>(-1.97) | |
| *ashock1uai* | | | -3E-05<br>(-2.01) |
| N | 53 | 53 | 53 |
| adj $R^2$ | 0.37 | 0.32 | 0.32 |

Coefficients are listed, t-stat in parentheses

*D. Interaction Variables*

Next, the core of the hypothesis is tested— culture interacting with external shocks and the corresponding effects on growth. As above, two different shocks are used and two sets of interaction variables are created. The first employs the absolute value of the measure *totshock1*, focusing on a one time terms of trade shock. The second uses Rodrik's (1999) measure of external shocks, focusing on volatility of terms of trade. These regressions also include the lagged growth term (growth from 1960-1975) for the same reasons as in the first set of regressions.

The first regression (shown in column 1 of table 4), shows the results for the Individualism cultural variable interacted with the absolute value of *totshock1*. This term enters with a *positive* coefficient and is significant at the 99% level with a t-stat of 3.18. The measure

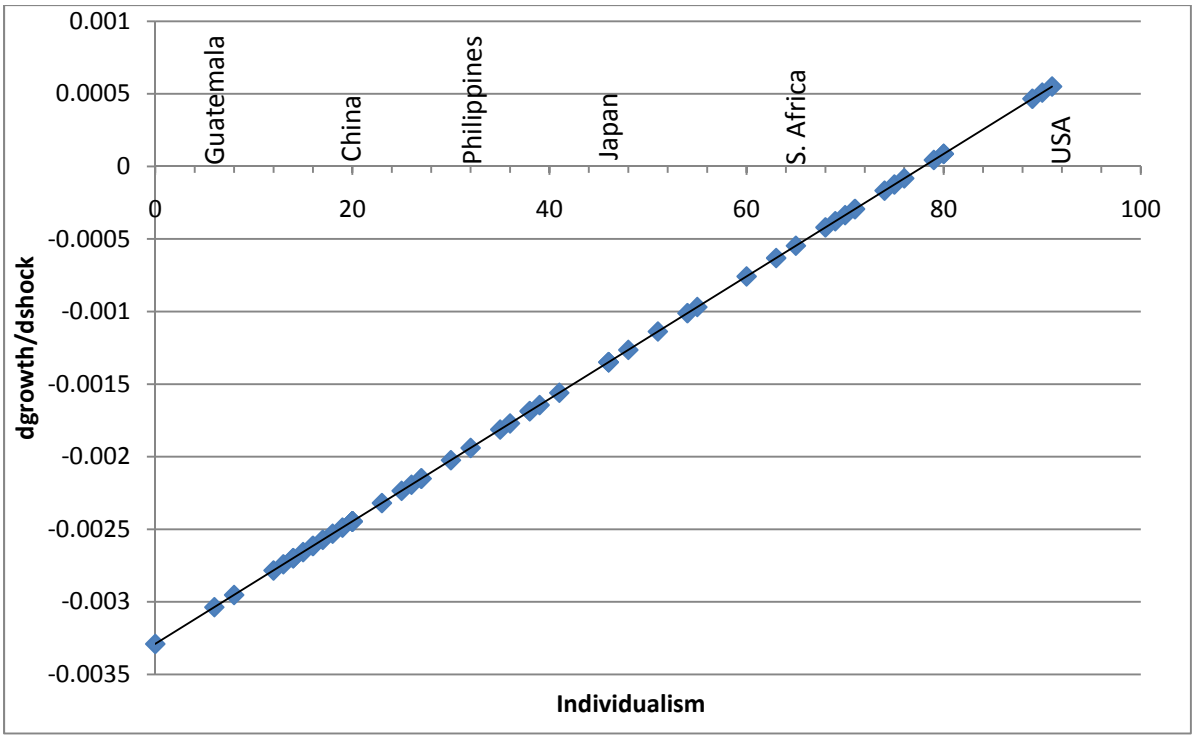


*Figure 4: A graph of the partial derivative of change in growth with respect to ashock1 vs. Individualism.*

of external shocks, *ashock1*, comes in with a negative coefficient and is significant at the 99% level with a -3.30 t-stat. The fact that the coefficient on *ashock1idv* is positive is interesting as it implies that for high values of Individualism, the shock is completely neutralized. While the hypothesis proposed that a higher level of Individualism would reduce the impact of the shock, it did not predict it would do so to this extent.

This idea is fleshed out further in figure 4, which shows a graph of the partial derivative of the change in growth with respect to the shock. As the graph shows, any country with an Individualism score over 78 is able to effectively neutralize the shock. These countries are New Zealand (79), Netherlands (80), Canada (80), United Kingdom (89), Australia (90) and United States (91). The plausible theory behind these countries being able to neutralize the shock is that the bargaining parties in these countries enter agreements with their main concern being

themselves and not larger groups, they are able to make deals quickly and effectively and are able to successfully combat an external shock and restore growth after a short period. The same cannot be said for countries like Guatemala that have very low Individualism scores and are susceptible to slower growth after an external shock. In fact, it is possible to calculate the growth collapses that different countries could experience by taking the standard deviation of *ashock1* (7.636) and multiplying it by the coefficient found for each country. Using some examples from Figure 4, Guatemala could experience a growth collapse of 2.3%, while a growth collapses in Japan would only be at most 1.0% and even less in South Africa, with 0.4%. These results demonstrate how important Individualism may be.

The second regression in Table 4 shows the effect of Power Distance interacted with *ashock1*. This term enters with a negative coefficient and is significant at the 90% level (just missing 95%) with a t-stat of -1.97. In this regression *ashock1* surprisingly enters with a positive coefficient and is insignificant with a t-stat of 0.65. The logic following this seems to be that the external shock itself does not present a significant threat to a country's growth, but when a shock occurs in a country that has a medium to high PDI, it can cause a growth collapse. This idea is further demonstrated in Figure 5. On this graph, the y-intercept is actually positive, but the trend line quickly dips below the x-axis into negative growth for any value of Power Distance above 13. The only countries that are able to stay out of the negative growth range are Austria (11) and Israel (13). Thus, according to these initial regressions, almost every country will experience a period of decreased growth following an external shock, and countries that have a higher PDI will experience a greater growth collapse. In the case of Malaysia, with a 104 PDI score, the growth decline could be as large as 2.1% when assuming a

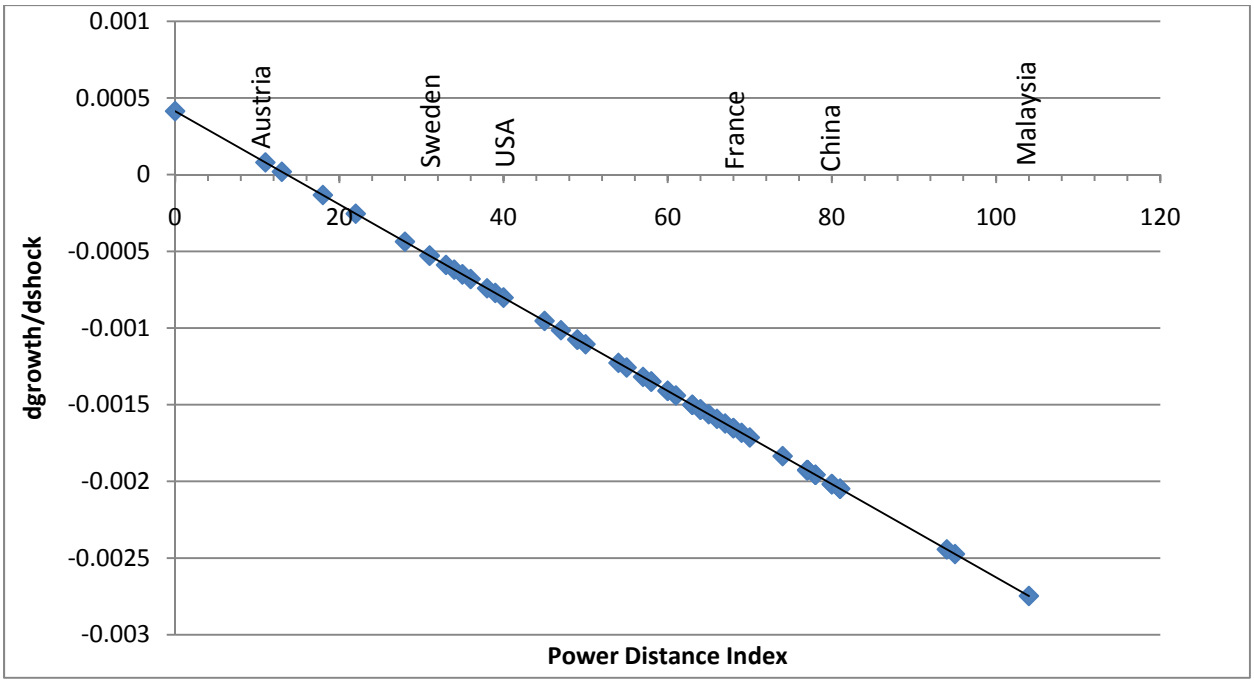


*Figure 5: A graph of the partial derivative of change in growth with respect to ashock1 vs. PDI.*

shock of one standard deviation. Some other examples from Figure 5 are France with a possible decline of 1.3% and Sweden with a smaller decline of 0.4%.

The last regression (shown in column 3), displays the interaction between *ashock1* and the Uncertainty Avoidance cultural variable. The coefficient on this term is negative and significant at the 95% level with a t-stat of -2.01. The measure of external shocks, *ashock1*, enters with a positive coefficient and is insignificant with a t-stat of 0.74. The fact that the coefficient for the interaction term is negative is surprising, as the hypothesis predicted that it would actually be positive.

As shown for the other two measures, Figure 6 displays the graph of the partial derivative of the change in growth with respect to *ashock1* versus Uncertainty Avoidance. This graph takes a similar form to the graph in Figure 5 for Power Distance. This is not what was expected given the logic entertained in the hypothesis. The theory surrounding Uncertainty

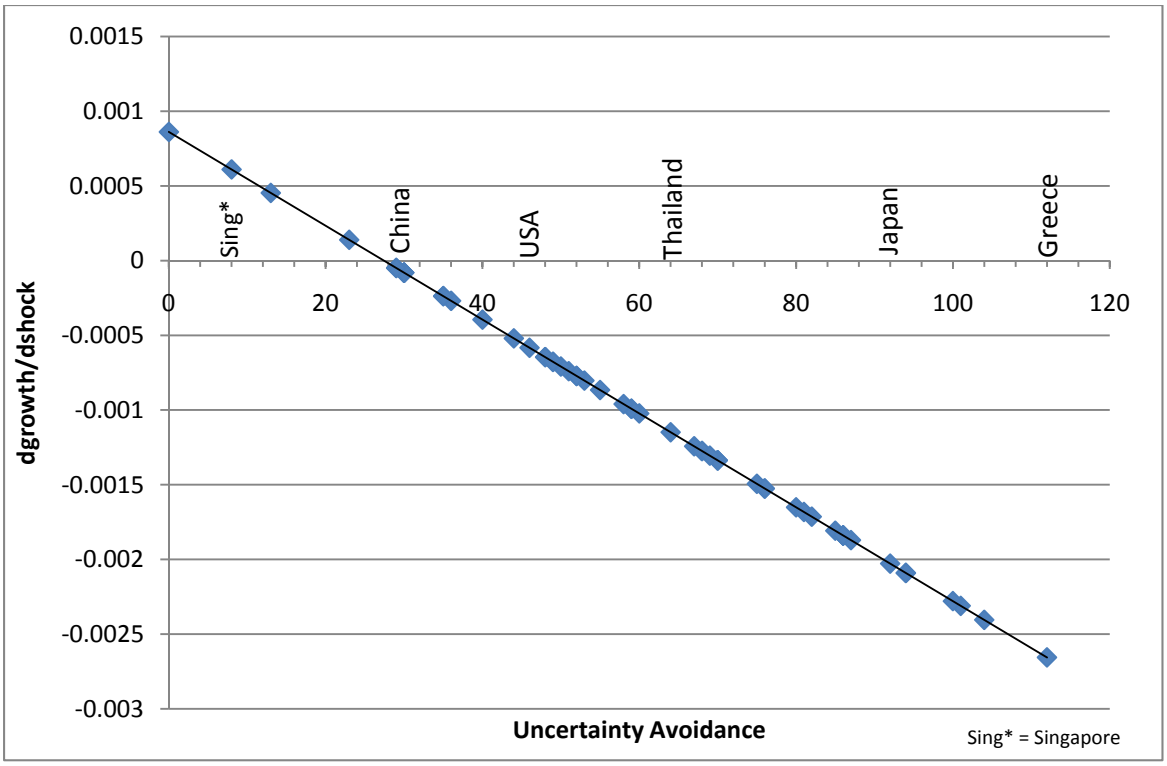


*Figure 6: A graph of the partial derivative of change in growth with respect to ashock1 vs. UAI.*

Avoidance was that people in countries with higher Uncertainty Avoidance would want to make deals more quickly since they would want to eliminate uncertainty. This would have translated to a better handling of external shocks as the Uncertainty Avoidance score increased. Given these results though, Greece, the country with the highest Uncertainty Avoidance score, could theoretically experience a growth collapse of up to 2.0%, while Thailand would only suffer a collapse of 0.9% and China a miniscule 0.1%.

For the second set of regressions (displayed in table 5), Rodrik's measure of shocks, *totshock2*, was interacted with the cultural variables Individualism, Power Distance and Uncertainty Avoidance. The results in these regressions were similar to those with the stand alone cultural variables, none of the interaction variables turned out to be even close to significant. The variable that was closest to being significant was *shock2pdi*, which only had a

*Table 5: Regression Results using totshock2 interacted with culture*

| Dependent Variable: Average Growth 1975-1989 minus Average Growth 1960-1975 | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *constant* | 0.0541<br>(5.51) | 0.0531<br>(5.42) | 0.0537<br>(5.49) |
| *1960-1975* | -0.6505<br>(-4.97) | -0.6402<br>(-4.86) | -0.6493<br>(-4.95) |
| *totshock2* | -0.0045<br>(-2.91) | -0.0067<br>(-2.13) | -0.0041<br>(-1.59) |
| *shock2idv* | -1E-05<br>(-0.30) | | |
| *shock2pdi* | | 3E-05<br>(0.63) | |
| *shock2uai* | | | -1E-05<br>(-0.31) |
| N | 57 | 57 | 57 |
| adj $R^2$ | 0.39 | 0.39 | 0.39 |

Coefficients are listed, t-stat in parentheses

t-stat of 0.63. It is interesting to note that in this set of regressions, the coefficients involving Individualism and Power Distance switch signs, so that Individualism is negative and Power Distance is positive. This is contrary to the hypothesis presented in this paper. It is also surprising that none of the variables turned out be significant. For similar reasons as mentioned in the discussion regarding table 3, it would seem that given Rodrik's findings of multiple institutional variables being significant, that at least one of the cultural variables would also be significant seeing as institutions and culture are correlated.

*E. Instrument Inclusion*

While the results presented above are interesting, particularly those regarding Individualism, Power Distance and Uncertainty Avoidance interacting with the onetime shocks,

*Table 6: Regression results for linguistic Instrument inclusion*

| Dependent Variable: Avg. Growth 1975-1989 minus Avg. Growth 1960-1975 | | |
|---|---|---|
| | (1) | (2) |
| *constant* | 0.0570<br>(3.89) | 0.0394<br>(0.40) |
| *1960-1975* | -0.2969<br>(-1.71) | -0.1712<br>(-0.36) |
| *ashock1* | -0.0065<br>(-4.29) | 0.0066<br>(0.45) |
| *ashock1idv* | 0.0001<br>(3.60) | |
| *idv* | -0.0006<br>(-2.75) | |
| *ashock1pdi* | | -0.0002<br>(-0.58) |
| *pdi* | | -0.0002<br>(-0.13) |
| N | 48 | 48 |

Coefficients are listed, t-stat in parentheses

they are subject to endogeneity issues. Are these growth collapses explained by culture and its interaction with external shocks? Or, has the culture of different countries been formed by the growth rates that they experience? In order to control for this problem, linguistic instruments from Kashima and Kashima (1998) are included in a Two-Stage Least Squares regression for the variables Individualism and Power Distance. A suitable instrument for Uncertainty Avoidance could not be found. Table 6 displays the results of these regressions.

Column 1 features the results of using Pronoun Drop as an instrument for Individualism. As the results show, the theory regarding Individualism continues to hold up when controlling for the endogeneity of culture. The *ashock1idv* variable enters with a positive coefficient and is significant at the 99% level with a t-stat of 3.60. Individualism and the measure of external

shocks, *ashock1*, both enter with negative coefficients and are significant at the 99% level as well.

Column 2 displays the results of using T-V Differentiation as an instrument for Power Distance. Unfortunately, these results do not still hold in the presence of an instrument. None of the variables are significant, though the *ashock1pdi* does have a negative coefficient, as expected. However, these results may not be significant because the instrument being used is poor.

In order to determine whether these instruments were viable, each instrument was regressed on the cultural variable that it was sought to measure. When Pronoun Drop was used as the independent variable for a regression with Individualism as the dependent variable, the t-stat was highly significant with a value of -7.63. Also,the F-stat was 58.17, assuring its viability.

On the other hand, when regressing T-V Differentiation on Power Distance, the t-stat was still significant at the 95% level with a value of 2.21, but the F-stat was only 4.87, well below level of at least 8 that is desired for an instrument. Thus, the failure of Power Distance to stand up to a Two-Stage Least Squares regression may largely be a result of the poor instrument used. Unfortunately, given the fact that it came from the field of psychology and not economics, it is difficult to find a suitable alternative.

*F. Robustness*

In order to ensure that none of the variables that we found to be significant suffer from the omitted variable bias, the regressions with the interaction variables are re-run in order to include the stand alone cultural variables. Although Rodrik (1999) does not do this in his article,

*Table 7: Regression results including stand alone cultural variables with interaction variables*

| Dependent Variable: Avg Growth 1975-1989 minus Avg Growth 1960-1975 | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *constant* | 0.0467<br>(3.37) | 0.0261<br>(1.98) | 0.0386<br>(2.13) |
| *1960-1975* | -0.4578<br>(-2.67) | -0.4661<br>(-2.62) | -0.5052<br>(-2.71) |
| *ashock1* | -0.0042<br>(-3.16) | 0.0014<br>(1.71) | 0.0010<br>(0.59) |
| *ashock1idv* | 0.0001<br>(3.05) | | |
| *idv* | -0.0002<br>(-1.37) | | |
| *ashock1pdi* | | -0.0001<br>(-2.26) | |
| *pdi* | | 0.0002<br>(1.34) | |
| *ashock1uai* | | | -3E-05<br>(-1.33) |
| *uai* | | | 2E-05<br>(0.10) |
| N | 53 | 53 | 53 |
| adj $R^2$ | 0.38 | 0.33 | 0.31 |

Coefficients are listed, t-stat in parentheses

it is an important thing to check to ensure that results are non-spurious. Table 7 shows these results. It is clear that the term *ashock1uai* did not pass the test and was significant previously due to the omission of the stand alone variable *uai.* The new t-stat on *ashock1uai* is -1.33, which is insignificant. On the other hand, both the variables *ashock1idv* and *ashock1pdi* stand up to this test. The term *ashock1idv* enters with a highly significant t-stat of 3.05, significant at the 99% level. *ashock1pdi* is also still significant at the 95% level, with a t-stat of -2.26. So while *ashock1uai* did not stand up to this test, the other two variables did. Given the fact that

*Table 8: A correlation matrix between the cultural variables.*

| | *PDI* | *IDV* | *UAI* |
|---|---|---|---|
| PDI | 1 | | |
| IDV | -0.66516 | 1 | |
| UAI | 0.07298 | -0.17434 | 1 |

*ashock1uai* had the opposite sign on the coefficient as predicted, it is not that surprising that it did not survive this test.

In order to further check the robustness of these findings, Individualism and Power Distance must be analyzed to show that they are actually two different variables and not just essentially measuring the same thing twice. In order to do this, a regression using both *ashock1idv* and *ashock1pdi* is run and a correlation matrix is calculated. The results of these tests show that Power Distance and Individualism are in fact highly correlated. As seen in the correlation matrix (table 8), IDV is negatively correlated with PDI by 66.5 percent. The results of the regression show a similar phenomenon. The t-statistic of *ashock1pdi* becomes insignificant (value is 0.72) when in the presence of *ashock1idv*, meaning that the two are correlated enough for *ashock1idv* to explain most of what *ashock1pdi* was explaining. The variable *ashock1idv* remains significant at the 95% level (almost 99% level), with a t-stat of 2.54.

While Hofstede had mentioned in *Culture's Consequences* (2001) that Power Distance was negatively correlated with Individualism, he did not specify to the extent that these variables were correlated and had made no other mention that they might be as closely correlated as they turned out to be. The implications of this are both disappointing, yet intriguing at the same time. It means that only one of the three variables tested in the hypothesis turned out to have the characteristics that were initially predicted, and since

Individualism clearly cannot encompass every cultural aspect of a country, it means that culture may not have as large a role as initially believed. On the other hand however, the fact that Power Distance and Individualism are so closely correlated—with Individualism being highly significant in every regression and Power Distance significant in most—shows that Individualism likely does have a substantial impact on the way that countries handle external shocks. The ways in which countries can utilize this information for their own benefit is outlined in the next Chapter.

*G. Rodrik Comparison*

In order to compare Rodrik's findings to the results found in this paper, a measure of polity was interacted with *ashock1* (to form *ashock1dem)* and tested in the same regression as Individualism and Power Distance. The results are displayed below in table 9. Column 1 shows the results for a regression featuring *ashock1idv* and *ashock1dem*. In this regression, *ashock1idv* has a t-stat of 1.94, which is significant at the 90% level and almost at the 95% level. Meanwhile, *ashock1dem* has a t-stat of only 0.55, which is insignificant. This tells us that Rodrik's findings of democracy being significant are likely just a product of democracy being correlated with Individualism (they are 63% correlated). This is not surprising given the previously discussed literature on culture relating to institutions, such as Tabellini (2008), Licht et al. (2007) and more. Furthermore, it shows that culture directly alters economic growth and is not simply a channel to growth through institutions. More studies like these could help show a causation running from culture to growth and help end the long debate over whether culture or institutions effect growth more.

*Table 9: Regression results comparing interaction variables for culture and democracy*

| | Dependent Variable: Avg Growth 1975-1989 minus Avg Growth 1960-1975 | |
|---|---|---|
| | (1) | (2) |
| *constant* | 0.0413<br>(3.81) | 0.0370<br>(3.45) |
| *1960-1975* | -0.5130<br>(-2.97) | -0.4917<br>(-2.81) |
| *ashock1* | -0.0031<br>(-3.14) | -0.0021<br>(-1.89) |
| *ashock1idv* | 4E-05<br>(1.94) | |
| *ashock1dem* | 3E-05<br>(0.55) | 0.0001<br>(2.39) |
| *ashock1pdi* | | 2E-05<br>(0.83) |
| N | 51 | 51 |
| adj $R^2$ | 0.43 | 0.41 |

Coefficients are listed, t-stat in parentheses

## Chapter Six

## Conclusion

These results show that culture may have a larger influence on economic growth after external shocks than previously believed. In particular, it shows that Individualism likely plays a larger role than Rodrik's proposed variable of institutions of conflict management. The fact that Individualism remained significant even in the presence of democracy also indicates the possibility that democracy only effects growth through its influence on culture.

The policy implications that can be derived from these results are fairly limited in scope. For instance, countries cannot simply institute policies that change their culture in order to be less vulnerable to growth collapses resulting from external shocks. However, what these results do provide is some insight into the weaknesses that certain countries face when attempting to stabilize after external shocks. By knowing their weaknesses, countries with lower Individualism scores can create preemptive plans to help them deal with external shocks. One example could be emergency laws that the country must undertake in the presence of a shock in order to execute the "textbook" adjustments that were discussed in Chapter 1. This would help to eliminate the human element and significantly decrease the adjustment time. (Coming up with the laws that would be enacted would be a whole other issue though). Another possible solution could be to have all countries with low Individualism scores create a bi-partisan council that advises the governments on which policies to follow when dealing with external shocks. This council would have to be made up of people from many different countries though in order to ensure bi-partisanship and that the bargaining time would actually decrease.

It is also important to note that most of the countries with low Individualism scores and high Power Distance scores are in Latin America, the Middle East and Asia. Meanwhile, the countries with high Individualism scores and low Power Distance scores are mostly in North America, Western Europe and the Australia region. While many of the Latin American, Middle Eastern and Asian countries have been growing faster than those with high Individualism scores and low Power Distance scores recently, it does not mean that this theory is implausible. It is likely that if a major shock hits those countries with low Individualism scores and high Power Distance scores that they may experience a Japan-like growth collapse and take a while to recover.

There is still a good bit of work to be done in order to fully determine which elements interact with external shocks to cause growth collapses. Though democracy was tested against culture, this measure of democracy was not the exact one that Rodrik used, nor were the other variables that he tested compared to culture. In order to fully establish which channels effect growth the most, all cultural, institutional and conflict variables must be tested. There may also be other variables that were not proposed in either Rodrik's article or this paper that may play a significant role when interacted with external shocks. Also, these results would benefit from an increased number of observations. Given that Hofstede's Cultural Dimensions only included 80 observations and that terms of trade data from the 1960s was also fairly limited, the largest sample size for any of the regressions turned out to be 57. While this is comparable to Rodrik's number of observations, there are still almost 150 countries that go unaccounted for. In order to rely on the accurateness of these findings, the number of observations would ideally be increased through extensions in Hofstede's Cultural Dimensions and better terms of trade data.

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