

Crisis Recovery Determinants: Evidence from the Great Recession

by

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Abstract

The 2008 financial crisis led to a global economic downturn, and the policy responses to the recession varied greatly between countries. This thesis analyzes the effects of different macroeconomic determinants on recovery speeds from the 2008 financial crisis. Using a sample of 93 countries that experienced a recession, I examine how growth rates responded to different policy choices. The cross-country evidence indicates that higher investment levels, decreased consumer spending, exchange rate depreciations, and expansionary monetary policy help countries to rebound more quickly after a financial crisis. The results also show that recovery speeds and the effectiveness of different policies vary greatly by development level. Moreover, I find substantial negative effects on growth through regional contagion after the Great Recession, in particular on the European continent.

Chapter 1

a. Motivation

Governments during the 2008 financial crisis were focused both on getting their economies to recover, and getting them to recover quickly. This thesis asks: why did certain countries recover faster than others from the 2008 financial crisis? Are there certain variables that lead some countries to recover more quickly from the crisis than others, and can they be clearly identified? The results from this study are very policy relevant as they can offer guidance to government on which policies should be adopted to increase recovery speeds from economic crises. To some extent, the question is whether policy can aid recovery or not, but perhaps more precisely how policy helps to minimize the duration of a recession.

b. Background

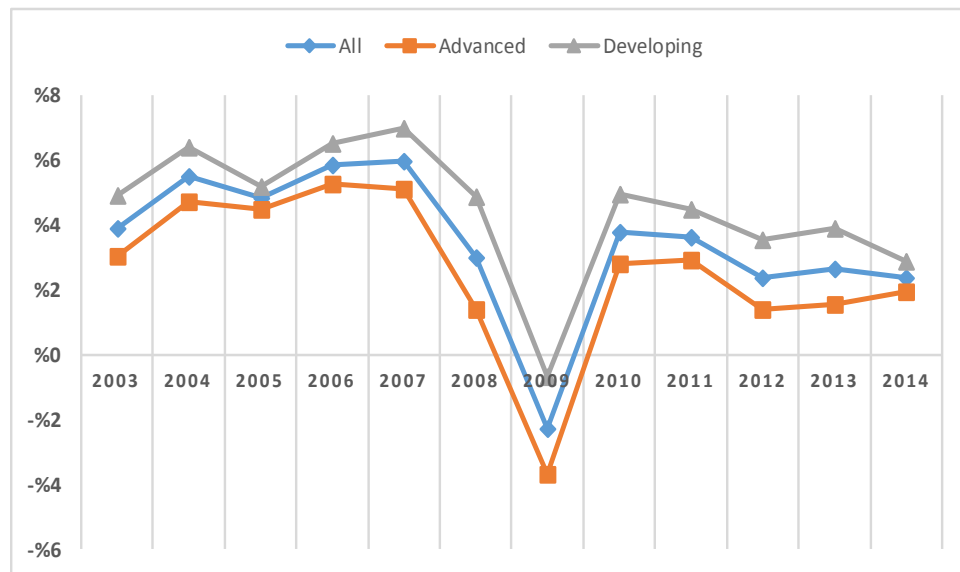


Figure 1: Real GDP Growth during Crisis Years

The 2008 financial crisis was the deepest international recession since the Great Depression in 1929. Figure 1 demonstrates the immediate negative GDP growth effects of the 2008 financial crisis. The average real GDP growth for countries that went into recession during the financial crisis fell from 6% in 2007 to -2.3% in 2009. The recession hit certain countries much harder than others. For instance, advanced economies on average saw GDP growth fall from an average of 5.1% in 2007 to -3.7% in 2009, a difference of 8.8%. In developing countries GDP growth fell from an average of 6.9% in 2007 to -0.7%, a difference of 7.6%. The financial crisis occurred because of a long period of financial deregulation combined with a housing bubble. In the United States of America certain economists, such as Paul Krugman (2009), point to the Gramm-Leach-Bliley Act of 1999 as the initial catalyst for the events that led to the financial crisis. The GLBA repealed parts of the Glass-Steagall Act that had been enacted in the US following the Great Depression, and placed proper regulations on the financial sector. The GLBA is also known as the Financial Services Modernization Act, because it allowed single financial institutions to perform the services provided by an investment bank, a commercial bank, and an insurance company. Before the GLBA, these financial institutions had to be separate corporations and could not perform the services of the other institutions.

The issue with this deregulation and expansion was that commercial banks had previously been regulated so that they were unable to make very risky investments, so that customers could believe their money was safe in a commercial bank. When the commercial banks were combined with investment banks, a portion

of this regulation was relaxed. These deregulations eventually resulted in home loans being given to people who did not have a great credit history.¹ Mortgages suddenly became widely available in the US. As housing prices were on the rise, lenders became more confident in their ability to receive payments from people who they would previously have not issued a mortgage to. The lenders believed that even if the borrowers failed to make payments, they would simply have to sell their house and repay the mortgage. Lenders were also no longer holding on to their loans. The lenders would bundle them into securities that would then be sold forward to investment firms of all sorts. The increase in mortgage issuance led to further increases in housing prices and a growth in the balance sheet of banks.

As a result of these developments a housing bubble built on loans from newly deregulated financial institutions developed between 2000-2006, with the impact reaching far beyond the US. In the US, the housing bubble began to deflate in 2006 as homes became too expensive for most Americans to afford, even with a subprime mortgage loan from one of the banks. The year 2006 saw a 3% fall in housing prices, but 2007 was when the bubble experienced its collapse. Housing prices nationwide fell by 15% in 2007, and by even more than that in some of the major bubble areas such as Florida. The bubble burst when the low credit homeowners began to default on their mortgages, resulting in foreclosures of many of the homes the banks had issued mortgages for. When the foreclosures began to stack up, it led to huge losses for the financial institutions that had become reliant on the mortgage payments for solvency. On September 15th, 2008, the first major event of the 2008 financial crisis

¹ See Krugman (2009), for all statements in this paragraph.

occurred when Lehman Brothers filed for bankruptcy. Lehman Brothers' bankruptcy signaled that widespread liquidity issues were present within the international financial sector. The US government decided not to bail Lehman Brothers out, and the bank's collapse sent out shockwaves throughout the financial sector. The same shockwaves were felt worldwide, as the international financial sectors experienced the same doubts over liquidity and health. The international financial sector experienced its own housing bubble of sorts, but additionally it was highly exposed to the US banking sector. Multiple US banks have great international reach and ties to banks in foreign countries.

The effects of the financial crisis quickly spread to the global economy. Many countries experienced sharp increases in unemployment rates, as well as significant declines in their real gross domestic product. This economic downturn led to particularly severe issues for many governments in the European Union. As their economies slowed down, the national tax revenues fell, causing many governments to face difficulties regarding their debt payments. Simultaneously, the higher debt caused borrowing costs for governments to increase, furthering the financial instability that was already great. The financial instability was coupled with large current account imbalances within the Eurozone, which further exacerbated the negative effects of the financial crisis.

Due to this economic slowdown, many countries began to experience a recession because of the financial crisis. In the US, unemployment rose to 9.4% by

May of 2009, from 5.5% a year earlier.² In other countries, mainly in Europe, the unemployment rate increases were even sharper. In Spain, the unemployment rate was at 8% prior to the crisis and increased to 25% by 2012. These sorts of massive unemployment swings were observed in multiple EU countries, and had a major impact on several Eurozone countries: Spain, Portugal, Greece, Ireland, and Italy. It was not only the labor market that experienced severe consequences; the world industrial production fell by about 13% during the first year of the financial crisis.³ Markets worldwide were in a panic, and the governments needed to figure out what policy action would help restore their nations' economies. Naturally, countries governed by different philosophies developed different responses to the crisis at the same time, and the recovery speed for different countries varied greatly. Certain countries were back on their feet relatively quickly, whilst others are still reeling from the effects of the crisis today, almost nine years later.

Now it is important to examine the contrast in recession experience for a few countries. The contrast will show the heterogeneity in policies and recovery outcomes following the 2008 financial crisis.

c. Country case studies

Figure 2 shows how the recovery experiences of three countries varied during the years following the 2008 financial crisis. The US recovered quickly, Iceland recovered with a slight delay, and Greece had a five-year long recession period before

² See Bureau of Labor Statistics (2012) for all unemployment data.

³ See Eichengreen and O'Rourke (2010).

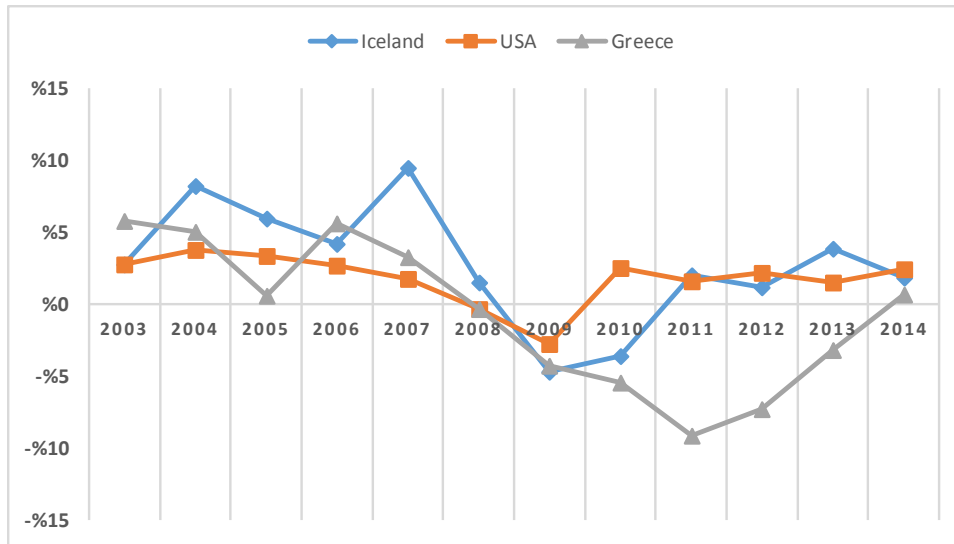


Figure 2: Real GDP Growth in Greece, Iceland, and the US

finally experiencing positive real GDP growth in 2014.

The US response to the financial crisis was first and foremost a bailout of the financial sector. After declining to bailout Lehman Brothers, the Federal Reserve decided that it could not let financial stability come under further threat. On October 3rd, 2008, after much debate, the US government issued a \$700 billion bailout to financial institutions at risk under the Troubled Asset Relief Program.⁴ TARP would be used to purchase distressed assets, mainly mortgages, to increase the solvency of the banks. Simultaneously the government undertook \$825 billion in fiscal stimulus.⁵ The government increased spending whilst also cutting taxes to jump-start the economy from its stagnation. The US government was hoping that the stimulus activity would result in higher consumer spending, an economic pillar that had been

⁴ See Herszenhorn (2008).

⁵ See Teslik (2009).

greatly depressed by the recession because of the increased unemployment and wealth lost through the decrease in housing prices. The Federal Reserve also made sure to lower the federal funds rate from its level of about 5.5% to close to 0%. The low interest rate was supposed to spur borrowing and lead to increases in investment. The Fed also engaged in a Quantitative Easing program. The program purchased bank debt and mortgage-backed securities to aid the financial sector's solvency and lowered long-term interest rates. The US government focused their post-crisis strategy on maintaining financial stability and confidence through the bailout. They also simultaneously enacted interest rate adjustment, fiscal stimulus, and a Quantitative Easing strategy to increase GDP growth by stimulating investment and consumer spending.

There were very few cases in the 2008 financial crisis in which multiple major banks in a single country went bankrupt. In Iceland however, the financial crisis led to the bankruptcy of all three of its major banks, and the government refused to issue a bailout to them. As in the US, the decade leading up to the crisis in Iceland was marked by a vast decrease in banking regulations, with hopes of turning the small island nation into a financial powerhouse modeled after Luxembourg.⁶ In 2003, the banks had assets that equaled about 150% of the country's GDP. By 2007, because of the deregulation and government support, the assets of the banks in Iceland amounted to 744% of GDP. This increase occurred in tandem with Iceland experiencing an average real GDP growth of 5.5% during those same years. When the banks defaulted on their loans, the government refused to bail them out, and instead used policies such

⁶ See Benediktsson, Danielsson, Zoega (2010), for this and all statistics about the Icelandic economy.

as exchange rate manipulation, capital controls, and austerity to stop the Icelandic economy from completely collapsing.

Iceland devalued its currency by 100% in the months following the crisis. At the same time, however, many foreign investors wanted to pull out their krona denominated bonds. The government wanted to stop this investor uncertainty from turning into a consistent capital outflow, so they enacted capital controls. Foreign investors were no longer able to withdraw their assets because of these controls, and Icelanders were unable to purchase foreign currency or assets without government clearance. To stop a colossal backlash from foreign countries, the government kept interest rates high during the post-crisis years so that the foreign owned bonds were still making money, but investors were obviously also worried about the country's economy collapsing and the bonds becoming worthless. Therefore, the nation was unable to use interest rate manipulation as a policy tool like the Federal Reserve did in the US. Instead the government decided that it would focus on rebuilding a healthy, well-regulated financial sector.

Another issue facing Iceland was that it had accumulated foreign debt that was almost four times its GDP. The government of Iceland implemented austerity measures in tandem with tax hikes to be able to pay down their debt balance. This combination of policy responses helped Iceland to be one of the European success stories during the immediate post-crisis years. As early as 2011 the Icelandic economy was already growing again, despite the depth of its recession in the early days. Unemployment in the country was down to 6.3% by 2012, and was 2.9% by September of 2016, the lowest of all European nations. The Icelandic policy response

served the nation extremely well in the years following the financial crisis, and today the country has a positive economic outlook.

On the other hand, Greece is particularly well known for their unsuccessful recovery efforts from the economic downturn following the 2008 financial crisis. Unemployment in Greece was still approximately 23% in 2016, and shows only minor signs of falling.⁷ Greece fell into the same debt crisis as most other European nations because of the financial crisis, but the effects hit them much harder than others. During the pre-crisis years, Greece became very dependent on foreign investment. The financial crisis caused foreign investment to stop flowing into Greece, as the international financial sector experienced turmoil. The Greek government began running a large budget deficit to cope with the lack of foreign funding, and this caused widespread panic in the European Union. The EU was concerned about what the repercussions of a Greek collapse could mean for the other EU member economies and their collective currency, the Euro. The EU, the International Monetary Fund, and the European Central Bank joined together to issue a bailout to the Greeks in May of 2010, after it had become clear that the country was not going to be able to recover without some form of foreign aid. The bailout came in the form of a loan of 110 billion euros, and the goal was for Greece to use the money to pay down their foreign debt and restore stability to the nation. Additionally, Greece agreed to engage in serious structural reforms and austerity.

However, the bailout and the policies were unsuccessful in turning the Greek economy around, and two years later the country had to get a second bailout from the

⁷ See Organization for Economic Co-Operation and Development (2016) data.

IMF, ECB, and European Commission. In March 2012, a 164-billion-euro bailout was given to Greece with the same purpose as the bailout from 2010. Yet again, the bailout was insufficient in restoring stability to Greece. The main concern with Greece was that the country was unable to implement proper austerity. The country had been spending so far above its natural national capacity in the years leading up to the financial crisis that the amount of austerity necessary to bring them back to balance the government budget would have had significant impact on the welfare of its people. Therefore, the government was not eager to implement the necessary budget cuts and instead was reliant on these bailouts to keep the economy from total collapse following the crisis. Greece's problem was that it seemingly only had this one policy option. Being a member of the Eurozone meant that they did not have an independent monetary policy, something that seems to have been very important for the recovery in the US case. Greece was also unable to engage in exchange rate manipulation like Iceland. Instead, Greece was stuck with long-run fiscal reforms, which in addition to taking years to take effect are also very painful on its people. Thus, Greece has had much difficulty recovering from the effects of the 2008 financial crisis.

The Greek example suggests that in the face of a severe economic crisis there must be large-scale policy actions such as the responses by Iceland and the US after the Great Recession. The question then becomes, which kinds of responses are most promising to lead to a speedy recovery. In Iceland's case, it was heavy austerity and a depreciation of the exchange rate that led to its rapid recovery. The US lowered the interest rate, engaged in Quantitative Easing, bailouts, and issued fiscal stimulus in

hopes that it would assist its economy's recovery from the financial crisis. These policies also seemed to work quite well, as the US was one of the countries that recovered relatively fast following the 2008 financial crisis. The focus then shifts towards an analysis of the time frame of each policy. In Iceland's case, the policies were enacted shortly after the financial crisis began. The Icelandic government relaxed their austerity measures fairly quickly, but they did not begin to release the capital controls until late 2016. The same sort of long-term policy can be seen with the US interest rate. The Federal Reserve waited almost nine years before issuing their first-rate hike following the cuts made immediately after the start of the financial crisis. One might wonder whether a rate hike could have happened sooner, or whether countries that had similar experiences as the US had similar success with monetary policy, be it through interest rate manipulation or Quantitative Easing.

d. Literature Review

The years following the financial crisis created an economic dilemma, where different economists suggested policy approaches which they believed would lead to the swiftest recovery. Certain schools of thought focus on increasing investment, whereas others might focus on trade. Thus, different countries had different responses to the effects of the crisis. One of the initial questions in the literature involved identifying which countries experienced a recession due to the impacts of the 2008 financial crisis. Rose and Spiegel (2012) developed a Multiple Indicator Multiple Cause (MIMIC) model to examine this question. Their model uses multiple variables such as GDP growth, unemployment, and consumption spending to identify countries that

had recessions. According to their model, they identified about 100 countries that went into recession because of the effects of the 2008 financial crisis. Their study showed the extent to which this financial crisis was a global crisis, but it struggled to respond to questions about the severity of the crisis. The paper closed raising questions about the role that contagion played in the crisis, and how it might affect the severity of the crisis.

Dwyer and Tan (2014) extended the investigation by Rose and Spiegel (2012). Dwyer and Tan wished to further investigate early warning signals by employing latent class models and splitting the countries into income level groups. This extension allowed them to find that banking credit, inflation, credit market regulation, export dependency, and certain variables with respect to bank claim/deposit ratios all give some robust indication of an approaching financial crisis. Their paper revealed how multi-faceted this crisis was. An all-encompassing model such as Rose and Spiegel (2012), will struggle to uncover robust early warning signals because the effects of the financial crisis varied across countries. This variation makes it difficult to detect the crisis within a model.

On the other hand, Christofides, Eicher, and Papageorgiou (2015) show how inaccurate these early warning signal studies have been. Their study tests early warning signals from previous financial crises and applies those same criteria to the 2008 financial crisis. Their results show that these methods are unreliable in identifying the multiple dimensions of the 2008 financial crisis. However, if they split up all the aspects of the financial crisis, such as banking, balance of payments, exchange rates, and recessions, the early warning signals did show some use. Their

research indicates that there were early warning signals of, for example, a balance of payments crisis occurring. However, a single model is not able to detect all the aspects of a crisis of this scale. Their paper further explores the complicated nature of the 2008 financial crisis and how it would have been difficult to foresee a multi-faceted crisis such as this happening. This raises issues with regards to prevention of such a crisis. Models might detect early warning signals of a balance of payments crisis, but you could not detect a looming banking crisis at the same time. Therefore, policies aimed at preventing the Great Recession would never have been able to prevent all the aspects of the crisis.

In addition to a concentration on crisis prediction and warning signals, there was also a great interest among economists in the ways in which countries recovered from the 2008 financial crisis. Reinhart and Rogoff (2014) examine historical banking crises as well as the 2008 crisis to investigate how countries recovered. Their findings show that the average recovery time, which they define as time until the pre-crisis income level is reached, as being eight years. This result explains why the recovery from the 2008 crisis has been so slow, with only a few countries recovering very quickly. Their paper also examined recovery policies of countries from these banking crises. The responses showed a clear divide between those implemented by advanced and developing economies. Advanced economies tended to implement austerity and forbearance as their policy responses. Developing economies used more radical measures, such as debt restructurings, capital controls, and allowing higher inflation. Reinhart and Rogoff's results further indicate that dramatic measures implemented by developing had a more positive impact on recovery than more reserved policy

measures. The paper does not go into depth as to whether those same policies were also effective in the advanced economies that enacted them. A possible explanation for this difference in policy responses could be that developing economies are more comfortable with government intervention in markets. Their paper raises the important question why certain countries experience different recovery speeds from others, and suggest that the policies implemented by advanced countries should have been more drastic in the post-crisis years than they were.

There have also been multiple case studies on the recovery experiences of individual or groups of countries. Purfield and Rosenberg (2010) consider the adjustments made by the Baltic nations, Estonia, Latvia and Lithuania, following the 2008 financial crisis. The Baltic experience was unique because the countries all had their currencies pegged to the Euro at the time. Despite this policy crutch, the Baltics recovered relatively swiftly from the financial crisis. Purfield and Rosenberg attribute some of this fast recovery to the rapid change their economies had been experiencing in the pre-crisis years. Purfield and Rosenberg believe that because the economies were so used to experiencing change, the policy adjustments were not a total shock to their citizens when implemented. This flexibility of the economy allowed policy to come into effect much faster than it would have in a stagnant economy. However, this was not the only major factor in their recovery. The Baltic governments were quick to implement large austerity measures in their countries. These measures were very painful to workers' wages, pensions, and social benefits, but they were viewed as necessary to get the economy quickly on its feet again. The maneuverings of the Baltic governments were very impressive, especially when considered that they were

under a currency peg, as well as the pre-EU membership economic constraints. This paper is another piece of evidence that strong austerity measures seem to lead to a faster financial crisis recovery.

Prior to the 2008 financial crisis, several studies examined crises that occurred in the 1990s or earlier to see what sort of policies helped countries to recover the fastest. Desai and Mitra (2004) performed a case study asking, “Why Do Some Countries Recover More Readily from Financial Crises?” To answer this question, they compared the financial crisis in Thailand from the late 1990s to the financial crisis in Argentina in the early 2000s. They considered the pre-crisis macroeconomic statistics of the countries against each other, asking whether certain structural differences lead to a faster recovery. For instance, one of their major arguments for why Thailand recovered more readily than Argentina from its crisis, was Thailand’s pre-crisis export strength. Export strength was such an important factor because of its ability to attract foreign capital flows into the country. These foreign capital flows could then be used to pay down the foreign debt that had led to these crises. Moreover, the foreign capital flowing in Thailand led to greater investor confidence in the nation. The resulting increase in investment contributed to the countries quick recovery from its crisis.

Park and Lee (2001) performed instead a large cross-country analysis of crisis recoveries in Asia during the latter half of the 20th century. Their study mainly focuses on currency crises that were common in East Asia during that period. They linked different macroeconomic variables to the GDP growth rate of countries from 160 crisis episodes to see which variables had the greatest effect in the recovery speed

of the crisis countries. They find that with relation to a currency crisis, currency depreciations as well as expansionary fiscal and monetary policy are the main drivers of recovery speed. Applying this kind of cross-country study to the nations that experienced a recession after the 2008 financial crisis would allow an evaluation of what kinds of variables seem to have been most important for economic recovery speeds more recently.

Chapter 2

a. Empirical Approach

To answer the questions posed in the previous chapter, I examine the effects of various policies on the recovery of crisis countries from the 2008 financial crisis. The goal is to compare the effectiveness of different policy measures on crisis recovery speed. For the measure of crisis recovery, I use the growth rate of real GDP. A country's real GDP growth is an indicator of changes in economic activity in a country. During a recession, since economic activity falls, real GDP growth is negative. A positive real GDP growth following a recession represents recovery from the recession. I am asking what caused countries to reach the positive real GDP growth. Why did some countries recover faster from negative real GDP growth in 2008, and were there key policies that contributed to this increase in real GDP growth?

To investigate the effects of policy on the recovery from the 2008 financial crisis, I regress the real GDP growth rates from crisis countries on various macroeconomic indicators. I use Rose and Spiegel's (2012) definition of crisis countries for the sample that I consider. Their paper identifies approximately 100 countries that experienced some form of a recession because of the 2008 financial crisis. I chose 93 countries that had sufficient data coverage for my sample. In the baseline regressions GDP growth from these 93 countries is regressed on several potential determinants of economic recoveries during the period 2009-2013.

Following the empirical approach in Park and Lee (2003), I consider the 1-to-5 year

recovery windows to investigate recovery speed determinants after the Great Recession:

$$y_{i,2008+k} = \beta X_{i,2008+k} + \epsilon_{i,2008+k} \quad (1)$$

Where $i = 1, \dots, N$, represent countries and $k = 1, \dots, 5$, represent each time horizon in the 1-to-5 year window. With,

$$y_{i,2008+k} = \frac{1}{k} \sum_{j=1}^k (\ln GDP_{i,2008+j} - \ln GDP_{i,2008+j-1}) \quad (2)$$

This specification compares the policy effects directly to the GDP growth rates. y is the average growth rate of real GDP over 1-to-5 year windows after the financial crisis in 2008, X is the independent variable. i represent each country with i , and the time horizons are controlled for by the variable k . I use the 1-to-5 year averages to consider the short and medium run time horizons for economic recovery. Averages also smooth out the effects of policy, if in the first crisis year the interest rate is lowered to 0, and then keep it there afterwards. Then the change in the interest rate would be 0 for all the years following the first year. By using the averages, this negative change in the interest rate would be carried through the five-year time period. This regression specification allows me to elicit how different potential recovery determinants have contributed to real GDP growth rates after the crisis.

As seen in Figure 1, the recovery was much greater in developing economies than it was in advanced economies. The developing economies in our sample have a higher average real GDP growth rate, so when they recover from a crisis they recover to a higher growth rate than advanced economies, and the regression captures it as a

faster recovery. To control for this difference, I split the sample into 50 advanced economies and 43 developing economies and report separate estimates for developing and advanced economies. By splitting the sample, I also uncover what sort of factors account for other differences in recovery.

I decided on a baseline regression with 13 variables for a sample size of 93 countries. The baseline regression is applied to the full sample, advanced sample, and developing sample separately. In addition to the baseline regression I also run additional regressions using separate variables that are unavailable for the complete 93 country sample.

Table 1 – Summary Statistics

<i>Variable Name</i>	<i>Definition</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>Min</i>	<i>Max</i>	<i>Source</i>
Initial GDP per capita (in logs)	Natural log of real GDP per capita in 2008.	4.11	0.47	2.87	5.03	WDI
Inflation Rate	Annual percentage change in the consumer price index.	0.04	0.04	-0.04	0.33	IMF
Current Account Balance (% of GDP)	The sum of net exports of goods and services, net primary income, and net secondary income.	-0.01	0.09	-0.04	0.33	IMF
Change in Foreign Reserves (in %)	Percentage change of foreign currency held by the central bank.	0.09	0.22	-1.00	1.74	IMF
IMF Program	Dummy indicator whether a country had a pre-existing IMF loan agreement or entered one following the crisis.	0.33	0.47	0.00	1.00	IMF

Capital Formation (% of GDP)	Additions to fixed assets plus net changes in the level of inventories.	0.24	0.06	0.10	0.48	WDI
Change in Household Expenditure (in %)	Change in the purchase of all goods and services by households in each year.	0.01	0.05	-0.21	0.37	WDI
Percentage Change in Government Expenditure	Change in all government expenditures for purchases of goods and services.	0.03	0.06	-0.22	0.38	WDI
Trade Share (% of GDP)	Sum of exports and imports of goods and services as share of GDP.	0.97	0.62	0.22	4.32	WDI
Americas	Dummy with value 1 if country is on American continent, 0 otherwise.	0.25	0.43	0.00	1.00	N/A
Europe	Dummy with value 1 if country is on European continent, 0 otherwise.	0.43	0.50	0.00	1.00	N/A
Africa	Dummy with value 1 if country is on African continent, 0 otherwise.	0.09	0.28	0.00	1.00	N/A
Foreign Exchange Rate Mechanism Index	Index of flexibility of exchange rate, 1 indicating flexible FX rate, 0 indicating no separate currency.	0.42	0.28	0.07	0.87	Ilzetzki, Reinhart, and Rogoff (2008)
Change in M2 (in %)	Change in money supply defined as cash in nation plus near money.	0.09	0.08	-0.31	0.60	IMF
Change in Credit Market Regulation (in %)	Change in level of government intervention in credit markets. Positive change an increase in	-0.01	0.44	-1.47	4.65	Heritage Foundation

	regulation, negative change a decrease.					
Change in Interest Rate	Change in the central bank interest rate.	-0.85	1.71	-14.32	11.00	IMF
Initial Government Debt-to-GDP Ratio (in %)	Central government debt as a percent of GDP.	44.89	33.62	3.22	167.60	Reinhart and Rogoff (2010)
Change in Real Foreign Exchange Rate (in %)	Change in real exchange rate index.	-0.01	0.05	-0.22	0.24	USDA

b. Recovery Determinants

Each variable in the table above serves a very specific empirical purpose. To begin, the initial GDP per capita is used to investigate the relationship between economic development and the recovery rate. As seen earlier, I expect that the lower the initial GDP per capita, the faster the recovery rate of a nation from the 2008 financial crisis. The current account balance is included to examine whether having a negative or low current account balance has any effect on the recovery rate. For instance, Greece had about a -10% current account balance deficit at the start of the crisis, compared to the US and Iceland with about -3%. I sourced this data from the World Development Indicators, and would expect that nations with a more positive current account balance should be more capable of recovery due to their ability to substitute demand slumps domestically by exporting goods.

Similar to the current account balance, the trade share as a percent of GDP represents how reliant an economy is on international trade. I source this data from the IMF. If a nation has a higher level of trade, I might expect an international crisis

to have a negative effect on their recovery. Therefore, the relationship between trade share and GDP growth should be negative.

To capture the effects of regional contagion, I include continental dummies. These variables will indicate whether certain areas of the world were less capable of a fast recovery from the 2008 financial crisis, due to regional contagion. I expect that nations within Europe have a slower recovery rate. The nations in Europe are more closely tied economically than those on other continents due to the presence of the European Union. Moreover, the presence of a common currency area in Europe means that many countries did not have monetary policy options available to them.

A foreign exchange rate mechanism variable is added to gauge a nation's ability to use exchange rate manipulation in their recovery policy. One would expect that countries with hard pegs or within currency unions, due to their inability to engage in devaluation of their currency, would have slower recovery rates than countries that had the ability to enact such policies. A perfect example of this expectation is the comparison between Greece and Iceland. Following the 2008 financial crisis, Iceland could immediately devalue their currency since they have a flexible exchange rate mechanism. Greece did not have this option as a member of the Eurozone currency union. Greece would have liked to devalue their currency, but that policy option was not available to them. I source my data regarding exchange rate flexibility from Ilzetzki, Reinhart, and Rogoff (2008), who labeled the foreign exchange rate mechanisms on a scale of 1 to 14, with 14 being totally free floating and a 1 indicating that a currency has been adopted from another country. I convert this data into an index between 0 and 1 where 1 represents a highly flexible exchange

rate. The exchange rate mechanism should have a positive relation with GDP. As the exchange rate becomes more flexible, countries should be able to recover faster.

Another important variable to account for is the initial government debt-to-GDP ratio, which represents a country's ability to run budget deficits. If a nation has a very high debt-to-GDP ratio, then it would be expected that they are unable to engage in much fiscal stimulus. A controversial Reinhart and Rogoff (2010) study found that countries with a debt-to-GDP ratio of 90% or higher experienced slower growth than those with a lower ratio. I use the data from their study to source this variable. Therefore, I expect a high debt-to-GDP ratio should lead to a slower recovery since the government's policy actions are restricted.

To capture the effects of monetary policy, I use the change in the money supply (M2). I source the data for M2 from the IMF. Expansionary monetary policy would be a positive change in M2, and this is expected to have a positive correlation with GDP growth after a crisis. Expansionary monetary policy has multiple effects on the economy, one of which is a lower interest rate, which should in turn spur investment. In the US, the Quantitative Easing program increased M2 by 7% during the early years of the crisis. However, the inflation rate remained at 2% or below. This distinction occurred because the banks were holding most of the M2 on their balance sheets, and it was never arriving in the hands of consumers. Therefore, the M2 variable is used to capture the effects of programs such as QE on recovery speed.

I use the inflation rate to capture the amount of money that is arriving in the economy, following a change in the money supply. I source the data for the inflation rate from the IMF. The inflation rate gives better insights into how well the effects of

monetary policy are penetrating through to consumers. If expansionary monetary policy is enacted, but the inflation rate shows very little change, this low inflation effect means that the banks are holding onto the money instead of using it to issue loans or invest. If the banks were to increase their loans and investments, GDP would rise. Therefore, I would expect inflation to have a positive correlation with GDP growth after an economic crisis. The greater the inflation rate the higher GDP growth should be.

An additional monetary policy variable is the change in the benchmark interest rate of the central bank. I source the data for this variable from the IMF. The change in the interest rate captures further actions done in relation to monetary policy by the central bank. A lower interest rate should lead to greater investment and greater GDP growth.

To capture the effects of fiscal policy, I include the change in government expenditure. The data for this variable is sourced from the WDI. A fiscal stimulus is represented by an increase in the change in government expenditure. Fiscal stimulus is expected to lead to an increase in GDP growth, because government expenditure functions similarly to investment in the economy.

I include the change in household expenditure as further determinant of a recovery, which additionally captures the effects of tax policy and savings. I source the data for this variable from the WDI. A cut in taxes results in greater household expenditure. I use household expenditure here because tax rates and policies are complex variables that are not readily available for many countries. This variable also captures the effects of saving. An increase in saving would lead to a decrease in

household expenditure. Since consumption is the largest component of GDP for most countries, an increase in household expenditure should lead to an increase in GDP growth.

Capital formation as a percent of GDP captures whether investment levels in a country affect its recovery. The data for capital formation is sourced from the WDI. I expect that higher capital formation would lead to a faster recovery, since capital formation is analogous to investment levels. The greater the investment levels in a country, the greater its recovery potential due to capital availability.

Following the crisis, multiple countries entered IMF loan agreements. Our sample includes 31 countries that were a part of an IMF program or loan agreement between 2009-2013. These agreements helped alleviate some of the pressure from deficits that were built up during the financial crisis. An IMF program means not only that a country has received a loan, but also multiple policy suggestions from the IMF. I expect that receiving monetary support, as well as policy recommendations from the IMF would lead to a greater increase in GDP.

To further investigate a government's policy with respect to its exchange rate, I also include the change in foreign reserves. I source the data on foreign reserves from the IMF. An increase in the foreign reserves should correspond with an exchange rate increase, which is a currency depreciation. The currency depreciation should then lead to an increase in exports, a decrease in imports, and an increase in GDP growth. Therefore, foreign reserves should be positively correlated with GDP growth. I also include a variable for the real foreign exchange rate. The real foreign exchange rate should be positively correlated with GDP growth for similar reasons as

explained above. Currency depreciation, which is represented by an increase in the foreign exchange rate, causes higher exports, fewer imports, and higher GDP growth.

Lastly, the percentage change in credit market regulation captures whether the implementation of new banking regulations assisted the recoveries of countries. I source the data on credit market regulation from the Heritage Foundation. The variable is based on the bank ownership, private credit availability, and interest rate control levels of countries. An increase in regulation means that banks are no longer as free to act, as they were prior to the crisis. Anecdotally, it is expected that an increase in regulation means greater stability, and therefore a faster recovery. However, it can also be argued that an increase in regulation means less money entering the economy through the financial system, and therefore less investment. The effects of the credit market regulation variable are unclear, as it is unknown which effect, if any, will dominate.

To recap, in the baseline regression, I use the following variables:

1. Initial GDP per capita (in logs)
2. Inflation Rate (in %)
3. Current Account Balance (% of GDP)
4. Change in Foreign Reserves (in %)
5. IMF Program
6. Capital Formation (% of GDP)
7. Change in Household Expenditure (in %)
8. Change in Government Expenditure (in %)
9. Trade Share (% of GDP)
10. Americas, Europe, and Africa Dummies (with Asia as baseline category)
11. Foreign Exchange Rate Mechanism Index

These variables are available for all 93 countries in my dataset. Certain variables were unavailable for all 93 countries. In these cases, I add these variables to separate

regressions in addition to the baseline variables listed above. Due to data gap overlaps, each additional variable is included individually. Therefore, there are five separate regressions for all five of these variables. These additional individual variables are:

1. Change in M2 (in %)
2. Change in Credit Market Regulation (in %)
3. Change in Interest Rate
4. Initial Government Debt-to-GDP Ratio
5. Change in Real Foreign Exchange Rate (in %)

For the changes in M2 and credit market regulations, the number of observations exceeds 80, but for the remaining three variables, the number of observations ranges only between 55 and 61 due to data constraints.

c. Results

Table 2 presents the baseline regression results for the full sample based on equations (1). Each column of the table represents a different time horizon, and each row a different recovery determinant. The first result is the highly statistically significant negative relation between initial real GDP per capita and the growth rate. The initial real GDP per capita is a significant determinant of recovery speed after the financial crisis except in the very short run ($t+1$). The impact of the initial real GDP per capita at $t+2$ is negative and retains the same effect through the later years.

I find that the current account balance is highly significant in the later years of the post-crisis period. The positive relation between the current account balance and the growth rate implies that crisis countries that have greater net exports recover faster. However, a positive current account balance does not aid recovery speed in the

Table 2: Full Sample Baseline Regression Results

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Initial GDP per capita (at time t)	-0.021 (0.013)	-0.024** (0.010)	-0.020*** (0.007)	-0.019*** (0.005)	-0.021*** (0.005)
Inflation	-0.130 (0.083)	-0.084 (0.067)	0.010 (0.046)	0.030 (0.039)	0.050 (0.034)
Current Account Balance	0.011 (0.081)	0.091 (0.066)	0.119** (0.045)	0.112*** (0.039)	0.124*** (0.041)
Change in Foreign Reserves	0.024* (0.013)	0.022* (0.012)	0.026** (0.013)	0.006 (0.008)	-0.001 (0.012)
IMF Program	-0.009 (0.013)	-0.013 (0.011)	-0.008 (0.008)	-0.008 (0.005)	-0.006 (0.005)
Capital Formation (% of GDP)	0.105 (0.083)	0.088 (0.061)	0.117*** (0.041)	0.134*** (0.030)	0.121*** (0.029)
Change in Household Expenditure	0.074 (0.093)	-0.040 (0.153)	-0.442** (0.198)	-0.542*** (0.176)	-0.496*** (0.153)
Change in Government Expenditure	-0.155 (0.108)	-0.124 (0.087)	-0.097 (0.070)	-0.063 (0.055)	-0.010 (0.074)
Trade Share (% of GDP)	-0.010* (0.006)	0.001 (0.005)	0.002 (0.003)	0.001 (0.002)	0.001 (0.002)
Americas	-0.022* (0.012)	-0.008 (0.009)	-0.002 (0.007)	-0.004 (0.006)	-0.004 (0.006)
Europe	-0.047*** (0.015)	-0.027*** (0.010)	-0.020*** (0.007)	-0.024*** (0.005)	-0.024*** (0.005)
African	-0.010 (0.019)	-0.002 (0.010)	-0.001 (0.009)	-0.002 (0.007)	-0.006 (0.006)
FX Mechanism Index	-0.008 (0.015)	0.006 (0.013)	0.000 (0.010)	0.006 (0.008)	0.009 (0.007)
Observations	93	93	93	93	93
R-Squared	0.369	0.379	0.536	0.647	0.678

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

immediate post-crisis period (t+1 and t+2)

Another statistically significant variable is the change in foreign reserves, particularly in the early recovery years. This result means that countries that devalued

their currency in the immediate post-crisis period saw a faster recovery in those years than countries that did not follow this strategy.

The capital formation ratio is another highly statistically significant several years after the crisis hit. As expected, there is a positive relation. Countries that were more inclined to engage in investment after the crisis had a far faster recovery than countries with low investment ratios. However, this relation does not appear in the after a crisis.

A very interesting result is the highly significant negative relation between household consumption growth and the GDP growth rate, implying that a decrease in household consumption is correlated with an increase in the growth rate. There is a possible explanation for this result, which is that a decrease in household consumption could go along with an increase in household savings. As seen earlier, the investment levels of a country are positively correlated to the recovery rate. Therefore, if you interpret a decrease in household consumption as a gain for investment, it can explain the negative relation between consumption and the growth rate. This result also has implications for tax policy adjustment. A cut in taxes would represent an increase in household consumption. This result shows a decrease in household consumption to have a beneficial effect on crisis recovery speed, and therefore it seems tax cuts are not the most efficient way to elicit recovery speed. Policies that further private investment instead of raising consumption levels seem like a more effective approach after a deep financial crisis.

Another variable that is significant is a country's trade share, but it is only significant in the first year (t+1) after a crisis. A greater trade share corresponds with

a slower recovery from crisis. This result suggests that countries with less exposure to international shocks experienced an initial boost to their recovery rate. The relation breaks down in the later years, as it seems the indication from current account balance takes priority. The ability to export becomes significant following the immediate impact effects of a crisis, and this change might be what causes trade share to lose its significance.

The final highly significant result is the European continental dummy, which is highly negatively related to the recovery rate. This result is in line with expectations due to the impact of the Eurozone crisis hindering countries' recoveries. For instance, in the $t+3$ time period, the coefficient is -0.02 , which implies that European countries through 2011 had on average a 2% slower recovery than countries outside of Europe. This result shows the economic impact of contagion. I expect that the economic ties between countries in the EU, geographic compactness, and the lack of monetary policy all play a large role in this contagion effect.

The inflation rate, change in government expenditure, the IMF program dummy, the African continental dummy, and the foreign exchange rate mechanism index are all insignificant in the full sample regression. Some of these results are surprising, but given the amount of significance in other determinants, it seems that those variables are dominant in their impact on the recovery speed.

Table 3 presents results for the sample of advanced economies, defined as those with a GDP per capita greater than \$10,000. In the advanced country sample, several variables become insignificant compared to Table 2: initial GDP per capita,

Table 3: Advanced Country Sample Regression Results:

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Initial GDP per capita (at time t)	0.038 (0.035)	0.016 (0.028)	-0.005 (0.017)	-0.005 (0.014)	-0.008 (0.013)
Inflation	0.015 (0.155)	0.227 (0.261)	0.172 (0.211)	0.354* (0.175)	0.353** (0.146)
Current Account Balance	-0.074 (0.122)	0.111 (0.096)	0.124** (0.060)	0.124** (0.047)	0.132*** (0.045)
Change in Foreign Reserves	0.006 (0.012)	0.003 (0.017)	0.014 (0.013)	-0.003 (0.008)	-0.014 (0.013)
IMF Program	0.011 (0.022)	-0.009 (0.019)	-0.005 (0.012)	-0.006 (0.008)	-0.005 (0.006)
Capital Formation (% of GDP)	-0.045 (0.143)	0.080 (0.141)	0.105 (0.084)	0.145* (0.082)	0.109 (0.091)
Change in Household Expenditure	0.194 (0.141)	-0.072 (0.218)	-0.569* (0.288)	-0.594** (0.263)	-0.510** (0.210)
Change in Government Expenditure	-0.109 (0.161)	-0.251 (0.245)	-0.103 (0.264)	-0.041 (0.190)	-0.010 (0.211)
Trade Share (% of GDP)	-0.007 (0.008)	-0.001 (0.006)	0.003 (0.004)	0.001 (0.003)	0.001 (0.002)
Americas	-0.025 (0.027)	-0.021 (0.021)	-0.008 (0.013)	-0.004 (0.010)	-0.003 (0.008)
Europe	-0.051** (0.020)	-0.036*** (0.013)	-0.023*** (0.008)	-0.022*** (0.006)	-0.020*** (0.006)
African	-	-	-	-	-
FX Mech Index	0.007 (0.021)	-0.001 (0.019)	0.002 (0.012)	0.008 (0.010)	0.011 (0.009)
Observations	50	50	50	50	50
R-Squared	0.334	0.384	0.598	0.681	0.72

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

change in foreign reserves, capital formation, and trade share. This significant change reveals why it was important to include initial GDP per capita in this investigation.

By splitting the sample, we now see that there are fundamental differences in the recovery rate between advanced and developing countries.

A new highly significant variable in the advanced sample compared to Table 2 is the inflation rate. This result is only in the last two time horizons, suggesting that inflation is insignificant in the short-term. However, this result could also be due to the delayed impact of increasing the money supply. An increase in the money supply by the central bank in the earlier years of the crisis would then begin to see inflation pick up in the later years. An increase in the money supply seems to have a positive impact on recovery speed.

Apart from this inflation result, the advanced economies sample does not return anything noticeably different from the full sample. Therefore, suggesting that household expenditure, the current account balance, and the European continental dummy are key determinants for crisis recovery rate in the baseline regression. However, part of the less significant effects in the advanced country sample could also be due to the nearly 50% drop in sample size, which makes it harder to identify significant determinants.

Table 4 presents the regression results for the developing economies sample, defined as those with a GDP per capita less than \$10,000. The developing economies sample also returns fewer significant results than the full sample. In developing economies, the initial GDP per capita, current account balance, change in household expenditure, and trade share are all no longer significant. In return, capital formation and the change in foreign reserves remain significant determinants of recovery speed.

The developing sample returns a significant result with respect to inflation in $t+2$. This result is a negative relationship with the growth rate, which is contrary to

Table 4: Developing Country Sample Regression Results

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Initial GDP per capita (at time t)	-0.034 (0.036)	-0.004 (0.024)	0.010 (0.023)	0.008 (0.016)	0.004 (0.015)
Inflation	-0.169 (0.141)	-0.251** (0.092)	-0.053 (0.057)	-0.021 (0.032)	0.009 (0.030)
Current Account Balance	0.043 (0.181)	-0.048 (0.120)	-0.007 (0.091)	-0.006 (0.065)	-0.009 (0.063)
Change in Foreign Reserves	0.034 (0.027)	0.046* (0.027)	0.074** (0.028)	0.060** (0.027)	0.064** (0.025)
IMF Program	-0.025* (0.013)	-0.015 (0.011)	-0.006 (0.010)	-0.006 (0.007)	-0.003 (0.006)
Capital Formation (% of GDP)	0.144 (0.095)	0.087 (0.066)	0.121** (0.047)	0.144*** (0.034)	0.136*** (0.033)
Change in Household Expenditure	-0.040 (0.108)	0.189 (0.160)	-0.116 (0.224)	-0.203 (0.136)	-0.115 (0.136)
Change in Government Expenditure	-0.225 (0.155)	-0.080 (0.105)	-0.003 (0.083)	0.013 (0.069)	0.060 (0.071)
Trade Share (% of GDP)	-0.025 (0.016)	-0.012 (0.014)	-0.015 (0.009)	-0.014* (0.008)	-0.009 (0.007)
Americas	-0.004 (0.017)	-0.003 (0.013)	-0.008 (0.011)	-0.011 (0.008)	-0.012 (0.009)
Europe	-0.025 (0.026)	-0.025 (0.015)	-0.025** (0.011)	-0.028*** (0.008)	-0.030*** (0.007)
African	0.000 (0.020)	-0.001 (0.012)	-0.004 (0.009)	-0.006 (0.007)	-0.007 (0.006)
FX Mech Index	-0.019 (0.032)	-0.009 (0.024)	-0.028 (0.021)	-0.021 (0.014)	-0.011 (0.011)
Observations	43	43	43	43	43
R-Squared	0.531	0.5	0.544	0.666	0.681

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

expectation. This result does not persist throughout the medium-term time horizon, and seems to be isolated in the short-term impact on recovery rate.

These results suggest that there are fundamental differences in policy importance between advanced and developing economies. Advanced economies are

more reliant on increasing saving, increasing the money supply, and the ability to export, whereas developing countries are more reliant on a high investment ratio and currency depreciation. These results say that a country's economic development level affects the way in which it should respond to a crisis.

d. Additional Recovery Determinants

For the additional variables, I take the baseline regression with 13 variables and add one of the additional variables to it. The sample sizes of these additional variables were too small to include in the baseline regression, and they are variables that capture interesting policy parameters not explored by the 13 baseline variables. For each additional variable, I again split the sample up into advanced and developing economies in addition to the full sample. Tables 8, 9, and 10 are located in the appendix. They display the results for the full sample, advanced sample, and developing sample respectively. Each row represents a separate regression being run, and reports the coefficient, standard error, and number of observations for the additional variable only.

The first new determinant is the M2 money supply. For the full sample, this variable is highly significant across all years, and positively related to growth. The split samples reiterate this same result, an increase in the M2 leads to an increase in growth. Across all 3 regressions, an increase in the M2 is significantly and positively related to the growth rate. These results suggest that an increase in the money supply is a very good policy for a fast economic recovery regardless of a country's economic development level. This impact occurred in the case of the USA with their

Quantitative Easing program. The QE program expanded the US money supply greatly, and the US recovered relatively quickly from the financial crisis.

The change in credit market regulation does not return quite as promising results as the change in M2 did, but there are still some interesting significant results. In the full sample case, the change in capital regulation is significant and positive in the t+2 time period. This result means that an increase in capital regulations after the financial crisis benefited countries' recovery relatively quickly. This result is in line with expectations since a large cause of the financial crisis was relaxed capital regulations. In the advanced economy sample this early period significance for capital regulation remains, but has a negative impact in the developing economy sample. The capital regulation also does not seem to have the same level of impact as M2 did on recovery rate. The difference between the results might be since there are benefits and losses to both increasing and decreasing credit market regulation in countries. The results support both arguments as valid in certain cases.

The change in the interest rate is a key variable that is commonly thought of as key to economic recovery. In the full sample regression, there is a minor significant result for interest rate change in the t+1 time period. This result is negative, implying that lowering the interest rate increases the recovery rate of an economy. Thus, lowering short-term interest rates is indeed a powerful short-term tool to increase the speed of recovery after a recession. The developing economies regression for the interest rate change has a negative significant relation in t+1, but no other time period. The results for the interest rate change are quite interesting. It would be expected that this relationship would be negative and highly significant

across most time periods. However, the zero lower bound impacts the change in the interest rate. Countries were not able to constantly decrease their central bank interest rate in order to stimulate investment in their economy. Most countries lowered their interest rate below 1% within a year or two of the crisis, then the interest rate change stays at close to year following as you cannot lower the interest rate much more. My regression specification does not detect the impact of a variable if it is not being changed, therefore interest rates in the long-term time horizon show little effect.

The fourth individual variable is the initial government debt-to-GDP ratio. For the full sample, the debt-to-GDP ratio turns up no significant results. In the advanced economies regression, initial government debt-to-GDP is also never significant. There are significant results for the initial debt-to-GDP ratio in periods t+3 through t+5. The results show a negative relation with the recovery rate, so developing economies with a low debt-to-GDP ratio had a faster recovery. It seems that the initial government debt-to-GDP ratio is not an integral part of a fast recovery. In the case of developing economies, it helps to have a lower ratio at the start of a crisis, but the impact is minor in scale. The results of my study contradict those found by Reinhart and Rogoff (2010). My study says that in most countries, the government debt-to-GDP ratio is an insignificant factor for recovery rate. It does however lend some favor to Reinhart and Rogoff (2010) with respect to developing countries, but the impact of a high debt-to-GDP ratio is minor compared to other variables in my study.

The final individual variable I examine is the change in the real foreign exchange rate. In the full sample, the real FX change is significant with a negative relation in t+5. This result is contrary to the expectation. A lower real FX rate means

an appreciation in a countries currency. This result indicates less exports, therefore one would expect less GDP growth. In the advanced economy regression, the same t+5 negative relation for the real FX rate occurs. The developing economy sample does not return a significant result. It does seem like changes in the real FX rate have little impact on recovery speed. This could be because other variables in the regression capture its effects. The changes in foreign reserves combined with the current account balance create an accurate representation of the effects on exchange rates and trade.

e. What Drives Recovery Speed? A Brief Synthesis

The above results show that certain policies will allow countries to recover faster. Overall, the most effective policies seem to be those focused on raising investment levels, depreciating the currency, expansionary monetary policy, encouraging exports, and avoiding contagion. Countries with a high initial GDP per capita, as well as those located in Europe experienced a slower recovery than others. But perhaps the most interesting result of this study is the negative relationship between the change in household expenditure and the recovery rate. As discussed earlier, this result suggests that investment is more impactful on recovery than increasing household consumption. Therefore, it seems that in order to achieve a faster recovery, countries should be actively encouraging investment and saving as a means to support economic growth. At the same time, the estimations suggest that fiscal stimulus is not an effective determinant of recovery speed. An increase in government expenditure does not correlate with a significant increase in recovery, because in most cases fiscal

stimulus is focused on bolstering consumer expenditure. The effectiveness of different policies also seems to vary depending on countries' economic development level. For instance, advanced economies receive greater impact from increasing exports, increasing the money supply, and encouraging private investment. Whereas, developing economies are impacted by currency depreciations and increasing investment levels.

The results from this chapter show important policy implications, but there is a possibility of the presence of simultaneity bias. The recovery determinants I use should be impacted to some extent by the GDP growth. Therefore, in Chapter 3 I will investigate whether simultaneity bias has a significant presence in the results.

Chapter 3

a. Addressing Simultaneity Bias

Chapter 2 shows multiple interesting results with regards to the effects of macroeconomic determinants on recovery speed. However, there is a possibility that the results are subject to some simultaneity bias. With most macroeconomic data, the variables are impacted to some extent by the GDP growth of a country. Since I examine the effects of macroeconomic determinants on the real GDP growth, there potentially might be some simultaneity issues with the results. For example, it can be that household expenditure might vary depending on growth of a country. An increase in GDP should cause household expenditure growth as well. Therefore, the coefficient would be impacted by this GDP growth effect on household expenditure. In this chapter I would like to address this issue, and produce further evidence that will help to reinforce the confidence in my results.

One possibility to control for simultaneity bias would be to use an instrumental variable approach. Instrumental variables are variables that are correlated with the independent variable, and unrelated to the dependent variable. So, for instance, looking at inflation you could use the change in money supply as an instrument, since inflation is correlated to changes in the money supply. However, instrumenting for macroeconomic variables in my study is quite difficult, since it is hard to find variables that are independent of GDP growth. In the above example, changes in the money supply would have some correlation with GDP growth, and therefore it is not a good instrument. A general convention in macroeconomic

research is to use lagged values of the independent variables as the instruments.⁸ However, in my study the lagged values were insufficiently correlated with the dependent variables. There is no straightforward solution to this problem, and therefore using an instrumental variable regression will not be possible.

I shifted my focus towards simply performing a very similar regression to the one from Chapter 2, but now I use lagged values for the independent variables. This is the next best approach, because it also me to test the results from Chapter 2 on similar variables just in different time periods. By lagging the independent variables, I separate them from simultaneity bias. I can then test the dependent variable on independent variables that have little possibility of simultaneity bias, and see whether the results are the same.

$$y_{i,2008+k} = \beta X_{i,2008-k} + \epsilon_{i,2008-k} \quad (3)$$

There should now be next to no simultaneity, as macroeconomic determinants between 2003 and 2007 should not be driven by the growth rate in 2009. To increase the confidence in the Chapter 2 results, the important must have similar coefficients in the lagged variable regression to eliminate doubts about potential simultaneity bias.

An additional benefit of this specification is that it also investigates to what extent pre-crisis conditions can help to explain the recovery speed as well. I can examine whether pre-crisis conditions are more or less important to recovery speed than policy decisions after the crisis.

⁸ Reed (2014)

b. Lagged Variable Regressions

Using the specification outlined in equation (3), I regress average real GDP growth for 1-to-5 years after the crisis on the independent variables from the time period 2003 to 2007. Due to data constraints, the results for the five additional variables as outlined in Tables 8, 9, and 10 could not be run with the lagged sample.

Table 5 presents the results for the regression of the full sample using the lagged variables. Due to data constraints, the sample size slightly decreases. Several pre-crisis variables turn out to have a significant effect on recovery speed. It is now important to compare these coefficients and results to those found in Chapter 2.

A more in-depth look at the coefficients reveals that these results are actually quite similar to the ones from the baseline regression. The initial GDP per capita, the current account balance, and the change in the foreign reserves all line up with the significant results from the baseline regression. The initial GDP per capita shows a negative impact on recovery speed. The current account balance shows a positive impact on recovery speed. And finally, the change in the foreign reserves has a positive impact on recovery speed. Since the results line up, I would say that this indicates there is no simultaneity bias impacting the Chapter 2 result for these variables.

The first variable that shows a noticeable difference between the two regressions is capital formation as a percent of GDP. In the baseline regression, this variable returns a highly significant positive coefficient. However, in the lagged variable regression it is never significant. That result is particularly interesting

Table 5: Full Sample Regression Results – Lagged Variables

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Initial GDP per capita (at time t-5)	-0.011 (0.017)	-0.016 (0.012)	-0.025*** (0.009)	-0.017*** (0.006)	-0.018*** (0.006)
Inflation (t-5)	0.048 (0.082)	0.009 (0.078)	-0.070 (0.078)	-0.041 (0.062)	0.005 (0.065)
Current Account Balance (t-5)	0.015 (0.085)	0.121 (0.081)	0.175*** (0.064)	0.089** (0.039)	0.123*** (0.038)
Change in Foreign Reserves (t-5)	-0.019 (0.013)	-0.003 (0.007)	-0.001 (0.007)	0.005*** (0.001)	0.004** (0.002)
IMF Program (t-5)	-0.002 (0.015)	0.003 (0.011)	-0.003 (0.009)	0.005 (0.007)	0.006 (0.006)
Capital Formation (% of GDP, t-5)	-0.0259 (0.131)	-0.018 (0.103)	-0.0125 (0.061)	0.0403 (0.046)	0.0685 (0.047)
Change in Household Expenditure (t-5)	-0.106 (0.082)	0.002 (0.117)	-0.0566 (0.062)	-0.140** (0.054)	-0.136** (0.063)
Change in Government Expenditure (t-5)	-0.004 (0.081)	-0.014 (0.065)	0.161* (0.083)	0.001 (0.042)	-0.072* (0.038)
Trade Share (% of GDP, t-5)	-0.008 (0.007)	0.004 (0.006)	0.006 (0.004)	0.004 (0.003)	0.001 (0.003)
Americas	-0.032** (0.014)	-0.014 (0.012)	0.000 (0.009)	-0.007 (0.008)	-0.004 (0.006)
Europe	-0.059*** (0.017)	-0.035*** (0.013)	-0.020** (0.008)	-0.029*** (0.007)	-0.027*** (0.006)
African	-0.004 (0.019)	-0.006 (0.012)	-0.012 (0.009)	-0.009 (0.007)	-0.008 (0.007)
FX Mechanism Index (t-5)	0.007 (0.017)	0.019 (0.012)	0.014 (0.009)	0.013* (0.007)	0.009 (0.007)
Observations	89	88	91	91	92
R-Squared	0.34	0.396	0.505	0.554	0.607

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

because I would expect that the capital formation as a percent of GDP might not change dramatically between the time periods 2003-2007 and 2009-2013. However, there is an indication that investment levels experienced significant change. The

correlations between the pre and post crisis investment levels are relatively low at around 0.55-0.6. This is compared with 0.8-0.85 correlations in the pre and post crisis current account balance. Therefore, it seems that pre-crisis investment levels are not a great indicator of post-crisis investment. The effects of business cycles have a clear impact on the investment levels, and this effect is observed in the investment levels following the financial crisis. It seems that pre-crisis investment levels are not a good indicator of recovery speed, especially when pre-crisis investment levels are not the best predictors of post-crisis investment in the capital stock as is reasonable to expect after a housing crisis.

One of the striking results from the baseline regression was the negative correlation between the change in household expenditure and the recovery rate. This result occurs again in the lagged variable regression. This result shows that simultaneity is not impacting the results from Chapter 2, and it reiterates the importance of saving over spending. It also shows that countries with a higher tendency to save prior to the recession recovered faster from the financial crisis.

Multiple results were insignificant or had minor significance in the baseline regression. Similar to the Chapter 2 regressions, the results for the change in government expenditure show no conclusive impact on recovery rate. Similarly, the results of the lagged regression also confirm that a country's trade share has no significant impact on its recovery speed. The results of the lagged regression indicate that trade share has no significant impact on recovery speed.

Lastly, there are the results for the continental dummies. Since countries do not change their location over time, these variables were not lagged. The results are

also close to identical between the two regressions, with the only difference being minor change in the levels of significance on a couple of coefficients. The European continental dummy remains significant, showing that contagion effects of crises are not impacted by simultaneity bias.

Overall, the comparison between the baseline regression and the full sample lagged variable regressions show striking similarities. The nearly matching results when using either specification indicates that simultaneity bias is not likely to drive the results from Chapter 2. Therefore, it seems that pre-crisis conditions have the same impact on recovery speed as the post-crisis conditions do. The results from the full sample lagged variable regression are promising, however it is important to also examine whether the same also holds true when the sample is again split into advanced and developing economies.

Table 6 presents the results for the regression of the advanced sample using the lagged independent variables. The results show no consistent significant effect throughout the different sample period for any variable, but there are multiple significant short-term results.

In the advanced sample regression from Table 3 the inflation rate, the current account balance, the change in household expenditure, and the European continental dummy are significant. All four of these variables retain significance in the lagged variable regression. A higher inflation has a positive effect on recovery speed. A higher current account balance also corresponds to a faster recovery speed. A decrease in the household expenditure has a positive impact on the recovery speed. Lastly, the European continental dummy shows negative contagion effects on

Table 6: Advanced Sample Regression Results – Lagged Variables

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Initial GDP per capita (at time t-5)	0.023 (0.033)	-0.007 (0.033)	-0.042** (0.017)	-0.014 (0.016)	-0.012 (0.012)
Inflation (t-5)	0.391** (0.188)	0.347 (0.209)	0.200 (0.179)	0.335 (0.271)	0.321 (0.259)
Current Account Balance (t-5)	0.066 (0.090)	0.096 (0.152)	0.214*** (0.068)	0.112 (0.083)	0.145** (0.067)
Change in Foreign Reserves (t-5)	-0.023 (0.017)	-0.001 (0.011)	0.002 (0.009)	0.016 (0.013)	0.015 (0.013)
IMF Program (t-5)	0.012 (0.022)	-0.006 (0.020)	-0.021 (0.012)	-0.012 (0.016)	-0.007 (0.009)
Capital Formation (% of GDP, t-5)	-0.106 (0.149)	-0.251 (0.167)	-0.161*** (0.040)	-0.110 (0.071)	-0.007 (0.055)
Change in Household Expenditure (t-5)	0.051 (0.114)	-0.087 (0.270)	-0.223*** (0.061)	0.0555 (0.114)	-0.190* (0.099)
Change in Government Expenditure (t-5)	0.131 (0.125)	0.107 (0.249)	0.469*** (0.101)	-0.047 (0.105)	-0.161** (0.073)
Trade Share (% of GDP, t-5)	-0.008 (0.007)	0.009 (0.008)	0.010** (0.005)	0.005 (0.004)	-0.001 (0.004)
Americas	-0.041* (0.021)	-0.027 (0.021)	0.007 (0.011)	-0.012 (0.012)	0.004 (0.009)
Europe	-0.056*** (0.020)	-0.033** (0.016)	-0.015 (0.009)	-0.019** (0.008)	-0.019** (0.008)
African	-	-	-	-	-
FX Mechanism Index (t-5)	0.008 (0.022)	0.017 (0.019)	0.014 (0.010)	0.018* (0.010)	0.009 (0.009)
Observations	48	47	49	49	50
R-Squared	0.425	0.478	0.776	0.549	0.662

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

recovery speed. Since these variables line up with the results from Chapter 2, I would say that this indicates there is no simultaneity bias impacting these results.

There are a greater number of significant results in the lagged variable regression than the standard regression. These results appear for the trade share,

change in government expenditure, and capital formation as percent of GDP. The trade share appears as somewhat significant in the lagged variable regression with a positive relationship. This data point raises slight doubts about whether the trade share has simultaneity bias. For the change in government expenditure, the advanced sample lagged variable regression shows a similar result to the full sample lagged regression. There are two separate data points with significant coefficients, but with different signs. I take this as proof that change in government expenditure has no consistent significant impact on recovery rate, as the standard regression results suggest. Similar to the full sample, capital formation returns inconclusive results due to the relatively low correlation between the pre and post crisis variables. Therefore, there is a possible presence of simultaneity bias, but the impact is very small.

Overall however, the lagged variable regression for the advanced country sample shows that simultaneity bias has no major impact on the results from Chapter 2. The major results with respect to the current account balance, change in household expenditure, and inflation all show no signs of simultaneity bias impacting their estimated effect on recovery speed.

Table 7 presents the results for the regression of the developing sample using the lagged variables. The results show few significant variables, but they have important implications for the investigation of simultaneity bias.

In the developing sample regression from Table 3 the capital formation, the change in foreign reserves, and the European continental dummy are significant. All three of these variables retain significance in the lagged variable regression. A higher

Table 7: Developing Sample Regression Results – Lagged Variables

Variable Names	Average GDP growth rate from $t+1$ to $t+5$				
	$t+1$	$t+2$	$t+3$	$t+4$	$t+5$
Initial GDP per capita (at time $t-5$)	-0.027 (0.034)	-0.011 (0.022)	-0.009 (0.020)	-0.004 (0.012)	-0.002 (0.014)
Inflation ($t-5$)	0.116 (0.094)	0.054 (0.113)	0.048 (0.107)	-0.038 (0.075)	-0.050 (0.072)
Current Account Balance ($t-5$)	-0.178 (0.163)	-0.031 (0.107)	-0.013 (0.059)	0.061 (0.042)	0.082** (0.037)
Change in Foreign Reserves ($t-5$)	-0.018 (0.017)	-0.011 (0.018)	-0.011 (0.017)	0.007*** (0.002)	0.005** (0.002)
IMF Program ($t-5$)	-0.004 (0.017)	0.006 (0.012)	0.012 (0.010)	0.013* (0.007)	0.012* (0.007)
Capital Formation (% of GDP, $t-5$)	0.099 (0.231)	0.162 (0.107)	0.174** (0.082)	0.132** (0.062)	0.143** (0.057)
Change in Household Expenditure ($t-5$)	-0.259 (0.187)	-0.014 (0.110)	-0.0241 (0.078)	-0.178*** (0.046)	-0.042 (0.099)
Change in Government Expenditure ($t-5$)	-0.155* (0.089)	-0.061 (0.080)	-0.128* (0.073)	-0.018 (0.049)	-0.040 (0.034)
Trade Share (% of GDP, $t-5$)	-0.018 (0.019)	-0.001 (0.011)	0.001 (0.016)	0.000 (0.008)	-0.001 (0.010)
Americas	-0.037 (0.028)	-0.019 (0.016)	-0.007 (0.014)	-0.013 (0.013)	-0.008 (0.011)
Europe	-0.078** (0.036)	-0.057** (0.021)	-0.045*** (0.014)	-0.049*** (0.009)	-0.042*** (0.009)
African	-0.002 (0.023)	-0.012 (0.014)	-0.011 (0.013)	-0.013* (0.007)	-0.011 (0.008)
FX Mechanism Index ($t-5$)	-0.008 (0.030)	0.020 (0.017)	0.019 (0.019)	0.009 (0.009)	0.005 (0.014)
Observations	41	41	42	42	42
R-Squared	0.468	0.39	0.418	0.609	0.562

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively

capital formation increases recovery speed. An increase in foreign reserves, creating currency depreciation, also increases recovery speed. The European continental dummy continues to show the significant negative effects of contagion. Since these

variables line up with the results from Chapter 2, I would say that this indicates there is no simultaneity bias impacting these results.

There are a few non-significant variables from the standard regression that appear as significant in the lagged variable regression, such as inflation, trade share, and the IMF program dummy. However, none of these coefficients show a significant effect for longer than one time horizon. Since they are not persistent significant results in the lagged variable regression, I do not take them as evidence that the standard regression lacks accuracy in the representation of those variables.

The lagged variable regression supports the conclusion that the developing sample is not impacted by simultaneity bias. Developing countries seem to have their recovery rates driven by key factors related to foreign reserve manipulation and the level of investment. Additionally, contagion effects play a significant role in depressing a recovery, such as in the case of many European countries after the Great Recession.

Chapter 4

a. Policy Recommendations

After performing the lagged variable regressions and comparing their results to the results found in Chapter 2, it seems that there is little simultaneity bias present in the results. The only major result that is called into question is the significance of capital formation as percent of GDP in the baseline regression for the full sample, because the lagged capital formation might not be an adequate substitute for the post-crisis equivalent of the same variable. Except for the capital formation variable, most variables showed up as significant and having the same correlation in both regressions. Therefore, it seems that simultaneity bias has no significant impact on the results from Chapter 2.

Based on the estimation results in Chapters 2 and 3, the following policy recommendations emerge for countries' quick and successful recovery after a financial crisis. For all countries, regardless of economic size, there are three major policy variables that governments should be focused on. The first factor is the current account balance. Countries that have a positive current account balance experience a faster recovery from a crisis. Therefore, countries should focus on promoting a healthy export sector by, for example, by promoting an exchange rate depreciation or export subsidies. The reason a positive current account balance has a positive effect on recovery speed is because it means countries can more effectively substitute depressed domestic demand by increasing foreign exports. The second major factor in determining recovery speed is the change in household expenditure. The results say that falling household expenditure leads to a faster recovery speed. Therefore,

countries should focus on policies that encourage saving and investments into the capital stock of the economy. This result also suggests that decreasing taxes might not have a positive impact on recovery rate, since lower taxes would lead to an increase in household expenditure. The impact of household expenditure ties in with that of the current account balance. If household expenditure falls, imports should fall which should further improve the current account balance. The third major factor in determining recovery speed is the change in foreign reserves. The results show that increasing foreign reserves leads to a faster recovery. An increase in foreign reserves is a devaluation of the currency. Devaluing your currency leads to an increase in exports, which in tandem with the current account balance is a promising strategy to increase the recovery rate. Moreover, the empirical analysis shows that increases in M2 have a significant impact on recovery speeds. M2 should also be closely tied to the exchange rate. An increase in M2 represents a currency depreciation, which as seen from the foreign reserves has a significant impact on recovery speed. This variable says that expansionary monetary policy and Quantitative Easing lead to significant gains for the recovery speed from the financial crisis. These are the four main factors that are significant determinants of recovery speed for the full sample of countries. They are variables that can be affected by government policy, as opposed to variables which capture local contagion and development stage.

Additionally, the results show that recovery speed is also affected significantly by starting conditions and regional contagion. The initial GDP per capita result, which led to my decision to examine split samples, shows that developing economies recover faster from financial crisis than advanced economies. It also seems

that the effects of crisis contagion are an extremely relevant determinant of recovery speed. Countries in Europe had a very slow recovery due to their economic ties through trade and the European Union. So, when the majority of European nations enter into a crisis, the demand for exports falls in addition to a domestic depression. On the other hand, countries such as the US who were located outside of Europe did not have their recoveries slowed by contagion. Contagion creates significant disadvantages for certain countries, whereas others arguable benefit from a lack of contagion effects. However, this result does not indicate that economic integration is a negative factor in recovery speed. Economic integration is beneficial in most cases, as seen with the results of the current account balance and exports.

For advanced economies, there are also four major factors to focus on. Similar to the full sample, the current account balance and the change in household expenditure are key variables to focus policy on. Both current account balance and the change in household expenditure maintain the same recommendations as they indicated in the full sample. The change in M2 also has a significant impact on recovery speed for advanced economies. An increase in M2 implies a faster recovery, so increasing the money supply positively affects recovery speed. In addition to these factors, advanced economies should also focus on their inflation rate. A high inflation rate correlates with a faster recovery in advanced economies. Advanced countries should therefore not be too afraid of policies that lead to high inflation, since expansionary monetary policy and Quantitative Easing are shown to have a significant impact on recovery speed.

For developing countries, there are only three major factors to focus on. The first is the change in foreign reserves. The recommendations with regards to foreign reserves are the same as they are in the full sample, and increase leads to a faster recovery. The second major factor in determining recovery speed is the change in M2, an increase in M2 leading to a faster recovery. The third factor is the capital formation as a percent of GDP. In developing economies higher investment levels lead to a faster recovery. This distinction between developing economies and the full sample might stem from the greater effects of business cycles on the capital formation in advanced countries, meaning it is harder for them to stimulate investment. Therefore, developing economies should encourage a greater share of GDP to be used on investment to experience a faster recovery, which could be done by enhancing government support for growth sectors or maintaining low interest rates.

With regards to earlier literature on economic recoveries, Desai and Mitra (2004) also found that export strength was highly important in the recovery for Thailand from their 1990s crisis. My study further highlights the importance of a healthy current account for a fast recovery. Park and Lee (2001) found that in the East Asian crises during the second half of the 20th century currency depreciations, monetary stimulus, and fiscal stimulus led to faster recoveries. My study confirms the significant impact of expansionary monetary policy, as well as the benefits of currency depreciations and their effects on exports. However, my study does not find fiscal stimulus to be a significant factor for countries' recoveries after the 2008 financial crisis. This result could, however, also be because austerity policies were particularly popular after the Great Recession.

Overall, this study highlights that certain macroeconomic determinants are more important for a quick recovery after a financial crisis than others. Countries should be focused on policies that allow investment and savings to increase, since investment leads to greater economic growth and development. They should encourage and facilitate exports, which shows the need for international trade policy coordination to avoid an uptick in protective measures in the aftermath of a crisis. Finally, they should engage in expansionary monetary policy or Quantitative Easing as these policies have a high impact on recovery speed. Focusing on these factors over others should help countries to rebound more quickly after a financial crisis.

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Appendix

Table 8: Full Sample Additional Variable Regression Results

Variable Names	Average GDP growth rate from t+1 to t+5				
	t+1	t+2	t+3	t+4	t+5
Change in M2	0.181** (0.080) 82 Obs.	0.245*** (0.070) 82 Obs.	0.193*** (0.059) 82 Obs.	0.205*** (0.059) 81 Obs.	0.174*** (0.054) 81 Obs.
Change in Credit Market Regulation	0.000 (0.020) 85 Obs.	0.013** (0.006) 85 Obs.	0.012 (0.008) 85 Obs.	0.007 (0.008) 85 Obs.	0.002 (0.009) 85 Obs.
Change in Interest Rate	-0.001 (0.001) 60 Obs.	0.000 (0.003) 60 Obs.	-0.001 (0.003) 60 Obs.	0.000 (0.004) 60 Obs.	-0.001 (0.004) 60 Obs.
Initial Government Debt-to-GDP Ratio (at time t)	0.009 (0.016) 55 Obs.	0.011 (0.013) 55 Obs.	-0.003 (0.012) 55 Obs.	-0.004 (0.010) 55 Obs.	-0.005 (0.009) 55 Obs.
Change in Real Foreign Exchange Rate	-0.068 (0.093) 58 Obs.	-0.198 (0.142) 58 Obs.	-0.140 (0.136) 58 Obs.	-0.175 (0.106) 58 Obs.	-0.370*** (0.127) 58 Obs.

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively. Number of observations in additional variable regressions is located beneath standard errors. In addition to the listed row variable, all regressions include the 13 baseline variables. For example, Change in M2 is included with the 13 baseline variables for a sample size total of 36, but does not account for any of the other additional variables.

Table 9: Advanced Sample Additional Variable Regression Results

Variable Names	Average GDP growth rate from t+1 to t+5				
	<i>t+1</i>	<i>t+2</i>	<i>t+3</i>	<i>t+4</i>	<i>t+5</i>
Change in M2	0.374** (0.146) 46 Obs.	0.372*** (0.122) 46 Obs.	0.198** (0.073) 46 Obs.	0.330*** (0.117) 45 Obs.	0.289*** (0.098) 45 Obs.
Change in Credit Market Regulation	-0.024 (0.024) 45 Obs.	0.017** (0.006) 45 Obs.	0.018* (0.009) 45 Obs.	0.017 (0.010) 45 Obs.	0.011 (0.010) 45 Obs.
Change in Interest Rate	-0.010* (0.005) 36 Obs.	-0.009 (0.010) 36 Obs.	0.014 (0.013) 36 Obs.	0.003 (0.014) 36 Obs.	0.000 (0.015) 36 Obs.
Initial Government Debt-to-GDP Ratio (at time t)	0.028 (0.022) 27 Obs.	0.020 (0.014) 27 Obs.	0.011 (0.012) 27 Obs.	0.008 (0.009) 27 Obs.	0.009 (0.008) 27 Obs.
Change in Real Foreign Exchange Rate	0.016 (0.062) 32 Obs.	-0.135 (0.137) 32 Obs.	0.008 (0.235) 32 Obs.	-0.093 (0.357) 32 Obs.	-0.735** (0.297) 32 Obs.

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively. Number of observations in additional variable regressions is located beneath standard errors. In addition to the listed row variable, all regressions include the 13 baseline variables. For example, Change in M2 is included with the 13 baseline variables for a sample size total of 36, but does not account for any of the other additional variables.

Table 10: Developing Sample Additional Variable Regression Results

Variable Names	Average GDP growth rate from t+1 to t+5				
	<i>t+1</i>	<i>t+2</i>	<i>t+3</i>	<i>t+4</i>	<i>t+5</i>
Change in M2	0.193** (0.090) 36 Obs.	0.209** (0.080) 36 Obs.	0.191** (0.074) 36 Obs.	0.129* (0.065) 36 Obs.	0.136** (0.057) 36 Obs.
Change in Credit Market Regulation	-0.067* (0.036) 40 Obs.	0.005 (0.016) 40 Obs.	0.007 (0.019) 40 Obs.	-0.011 (0.013) 40 Obs.	-0.011 (0.018) 40 Obs.
Change in Interest Rate	-0.002** (0.001) 24 Obs.	0.000 (0.001) 24 Obs.	0.000 (0.002) 24 Obs.	0.006 (0.003) 24 Obs.	0.006 (0.005) 24 Obs.
Initial Government Debt-to-GDP Ratio (at time t)	-0.009 (0.035) 28 Obs.	0.012 (0.023) 28 Obs.	-0.026* (0.014) 28 Obs.	-0.028** (0.009) 28 Obs.	-0.029*** (0.006) 28 Obs.
Change in Real Foreign Exchange Rate	-0.212* (0.105) 26 Obs.	-0.102 (0.138) 26 Obs.	-0.074 (0.295) 26 Obs.	-0.162 (0.171) 26 Obs.	-0.139 (0.229) 26 Obs.

Notes: Robust standard errors are shown in parenthesis. ***, **, and * indicate 1, 5 and 10 percent significance level, respectively. Number of observations in additional variable regressions is located beneath standard errors. In addition to the listed row variable, all regressions include the 13 baseline variables. For example, Change in M2 is included with the 13 baseline variables for a sample size total of 36, but does not account for any of the other additional variables.

Table 11: List of Countries in Full Sample

Albania	Egypt, Arab Rep.	Mauritius	Turkey
Algeria	El Salvador	Mexico	Ukraine
Antigua and Barbuda	Estonia	Morocco	United Kingdom
Argentina	Finland	Namibia	United States
Armenia	France	Netherlands	Uruguay
Australia	Georgia	New Zealand	Venezuela
Austria	Germany	Norway	
Bahamas, The	Greece	Oman	
Bahrain	Guyana	Panama	
Barbados	Hong Kong	Paraguay	
Belarus	Hungary	Peru	
Belgium	Iceland	Poland	
Belize	Indonesia	Portugal	
Benin	Ireland	Romania	
Botswana	Israel	Russian Federation	
Brazil	Italy	Saudi Arabia	
Brunei Darussalam	Jamaica	Seychelles	
Bulgaria	Japan	Singapore	
Canada	Kazakhstan	Slovak Republic	
Chile	Korea, Rep.	Slovenia	
China	Kuwait	South Africa	
Colombia	Kyrgyz Republic	Spain	
Costa Rica	Latvia	Sri Lanka	
Croatia	Lebanon	St. Kitts and Nevis	
Cyprus	Lithuania	Swaziland	
Czech Republic	Luxembourg	Sweden	
Denmark	Macao	Switzerland	
Dominican Republic	Macedonia, FYR	Thailand	
Ecuador	Malaysia	Tunisia	

Table 12: List of Countries in Advanced Sample (GDP per capita >\$10,000)

Antigua and Barbuda	Hungary	Singapore
Australia	Iceland	Slovak Republic
Austria	Ireland	Slovenia
Bahamas, The	Israel	Spain
Bahrain	Italy	St. Kitts and Nevis
Barbados	Japan	Sweden
Belgium	Korea, Rep.	Switzerland
Brunei Darussalam	Kuwait	United Kingdom
Canada	Latvia	United States
Chile	Lithuania	Uruguay
Croatia	Luxembourg	
Cyprus	Macao	
Czech Republic	Netherlands	
Denmark	New Zealand	
Estonia	Norway	
Finland	Oman	
France	Poland	
Germany	Portugal	
Greece	Saudi Arabia	
Hong Kong	Seychelles	

Table 13: List of Countries in Developing Sample (GDP per capita <\$10,000)

Albania	Egypt, Arab Rep.	Panama
Algeria	El Salvador	Paraguay
Argentina	Georgia	Peru
Armenia	Guyana	Romania
Belarus	Indonesia	Russian Federation
Belize	Jamaica	South Africa
Benin	Kazakhstan	Sri Lanka
Botswana	Kyrgyz Republic	Swaziland
Brazil	Lebanon	Thailand
Bulgaria	Macedonia, FYR	Tunisia
China	Malaysia	Turkey
Colombia	Mauritius	Ukraine
Costa Rica	Mexico	Venezuela
Dominican Republic	Morocco	
Ecuador	Namibia	