

**EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS**



**THE EFFECTS OF FISCAL STIMULUS:
A CROSS-COUNTRY PERSPECTIVE**

September 10, 2009

I. INTRODUCTION

In this report, we exploit cross-country variation in the extent of stimulus to explore how gross domestic product (GDP) responds to stimulus. The literature on the impact of stimulus tends to examine particular episodes or countries and has not systematically taken advantage of cross-country variation. The world economic crisis of 2008-9 provides a unique opportunity to explore the impact of stimulus as many countries have instituted stimulus policies in response to the crisis. The results can help provide rough estimates of the total impact of stimulus on an economy and provide context to analysis of a particular program or model-based analysis.

Countries have different steady state growth rates and have experienced the shock of this crisis to different degrees, so a key element of analysis will be to build a counterfactual. What would we expect to have happened to countries' economies absent a stimulus? We rely on private sector forecasts made in November of 2008 as a measure of GDP expectations prior to the announcement of stimulus plans, but after the shock of the current crisis had begun and forecasters were aware that second quarter growth would be lower than a typical quarter. As a robustness check, we also explore a simple time series forecasting model to predict a "no-stimulus" growth rate across countries. Results using this method are consistent with the main results.

The evidence suggests that countries that did larger stimulus in 2009 had better GDP performance in the second quarter of 2009 than would have been expected. The relationship between "beating expectations" and stimulus looks even stronger when the sample is limited to OECD countries (where the economies are more similar). It should be noted, though, this is a simple bivariate relationship. If monetary policy stimulus or some other policy that generates GDP growth is highly correlated with fiscal stimulus, we might mistakenly attribute some of the impact of the other policy to the fiscal stimulus. But, the basic idea – countries that did more stimulus saw better performance – survives multiple robustness checks.

II. FISCAL STIMULUS AROUND THE WORLD

As the full onset of the world financial crisis was being realized at the start of 2009, many countries decided that an aggressive fiscal stimulus was necessary. The logic was simple. Aggregate demand was falling rapidly and in many cases conventional monetary policy was largely out of ammunition as short-term policy rates had been reduced to close to zero. It was hoped that government spending could step into the breach and provide the necessary lift to the economy to prevent a slide into a deep recession or worse.

The stimulus measures used in this report are an average of three published estimates of stimulus across countries: the International Monetary Fund (IMF) report on stimulus in G20 countries, a Brookings Institution report on stimulus announcements, and an Organisation for Economic Co-operation and Development (OECD) report on stimulus.¹ The estimates are typically quite close and we use an average of the three. Table 1 shows the amount of fiscal stimulus estimated to take effect in 2009 as a share of GDP.² Many countries (including the United States) have stimulus that will extend beyond 2009. The estimates below are strictly for the portion of stimulus that will be done in 2009.

¹ IMF (2009); OECD (2009a); Brookings Institution (2009). Both the IMF and OECD measures include any stimulus announcements up through the middle of June 2009. The Brookings figures were not updated after March, so stimulus announced in the late spring is not included. Including the Brookings estimates in the average thus slightly down-weights any stimulus announced after March. Given that we seek to measure the impact on 2nd quarter GDP, we feel this is appropriate. The Brookings estimates are largely based on a prior IMF report, although they include calculations by Brookings staff as well. A simple average of just the IMF and OECD estimates is correlated with our measure at 0.98, so the decision to include the Brookings estimates does not play a substantial role.

² The sample of countries is based on data availability for stimulus, private forecast data, and actual real GDP growth in 2009:Q2. There is a slight difference between this table and that in Romer (2009). Since that speech, we have found a Brookings estimate for stimulus in South Korea. Adding that to our average slightly lowers the estimate of South Korea's stimulus and shifts the accompanying figures slightly. No qualitative conclusions change. In addition, three countries included in Romer (2009) have not released second quarter GDP data and have been dropped from the sample.

Table 1. Discretionary Fiscal Stimulus in 2009 around the Globe

Country	Share of GDP	Country	Share of GDP
Australia ^a	2.2%	Korea ^a	3.0%
Canada ^a	1.7%	Mexico ^a	1.4%
China	2.6%	Norway ^a	1.2%
Czech Republic ^a	1.6%	Poland ^a	0.8%
France ^a	0.6%	Russia	2.9%
Germany ^a	1.5%	South Africa	2.2%
India	0.6%	Sweden ^a	1.4%
Indonesia	1.4%	Switzerland ^a	0.6%
Italy ^a	0.1%	United Kingdom ^a	1.5%
Japan ^a	2.4%	United States ^a	2.0%

Source: CEA estimates based on IMF, OECD, and Brookings data.

Note: a. Country is an OECD member.

The strength of the stimulus varied across the world, ranging from Italy's near non-existent stimulus (0.1 percent of GDP) to Korea's 3.0 percent of GDP. The average stimulus for the full sample is 1.6 percent of GDP, and for the OECD is 1.5 percent. The U.S. stimulus was above average, estimated at 2 percent of GDP. This is not the estimate for the total ARRA, but is the estimate of how much of that stimulus will be spent in 2009. This is consistent with roughly 100 billion dollars being spent in each of the second, third, and fourth quarters.

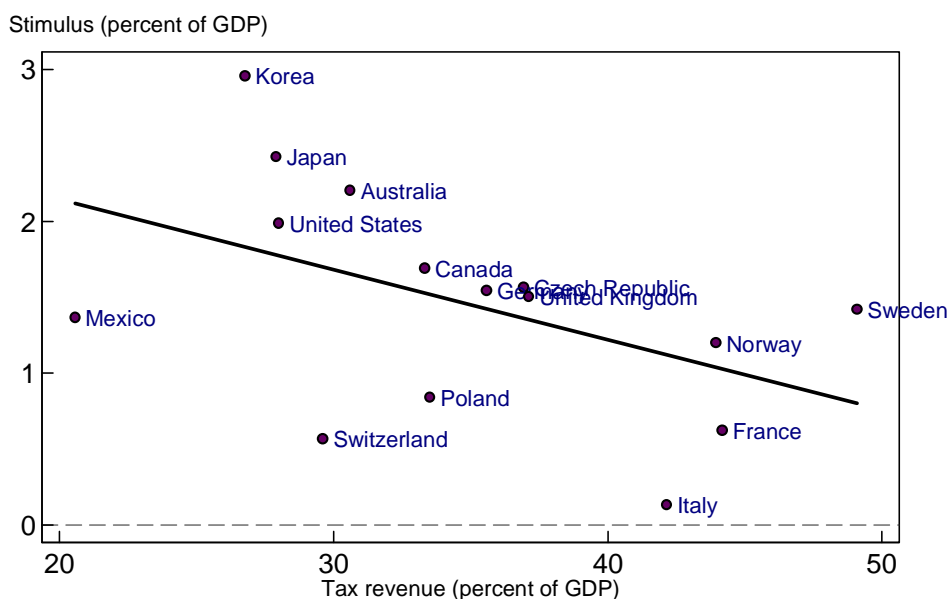
Stimulus plans were not simply a function of how bad the shock in 2009 was expected to be. In fact, there is no correlation between the size of stimulus and forecasts for the performance of the economy in the second quarter of 2009.³ Countries that experienced a bigger drop in the fourth quarter of 2008 undertook a slightly larger stimulus, but this relationship is not statistically significant and the relationship can explain only a small share of stimulus variation.⁴

³ A regression of stimulus size on (predicted growth in 2009:Q2 minus average growth in the 2000's) generates a coefficient close to zero (-0.07) with a standard error of 0.10 and an R^2 of 0.03. Average growth in the 2000's is measured as the average of quarterly growth from 2000 to 2007 (to avoid including quarters affected by this recession).

⁴ The correlation between 2008:Q4 quarter GDP growth and size of stimulus is -0.29. Regressing stimulus on 2008:Q4 quarter GDP growth generates a statistically insignificant coefficient of -0.037, suggesting a 1 standard deviation difference in 2008:Q4 quarter growth rates (roughly 6 percentage points) leads to a 0.2 percent of GDP

Stimulus size is correlated with other fiscal policy. Stimulus is not the only way fiscal policy responds to a crisis; automatic stabilizers (unemployment insurance, welfare, reduction in taxes collected due to lower payrolls) are triggered when an economy slows down. The size of automatic stabilizers present in the economy appears to be negatively correlated with the size of discretionary stimulus. We use the level of taxation in the economy as a proxy for automatic stabilizers. Countries with large levels of taxation see immediate automatic stabilizers as any lost income immediately reduces taxes. Those same countries often tend to have more generous social safety nets (funded by their higher taxes). As Figure 1 shows, those countries that already had large automatic stabilizers in place appear to have done less discretionary fiscal stimulus.⁵

Figure 1. Stimulus and Tax Share of the Economy



Sources: OECD; IMF; Brookings Institution; CEA calculations.

Note: the regression line is $\text{stimulus} = 3.1 - 0.046 * (\text{tax share})$. The coefficient on tax share is significant at the 90% confidence level. The R-squared is 0.23.

larger stimulus. The R^2 is 0.09, thus explaining a small amount of the variation. One could also look at the gap between the 2008:Q4 quarter growth rate and average growth from 2000-2007. This variable does generate a significant coefficient. However, including either 2008:Q4 quarter growth or the gap between average growth and 2008:Q4 quarter growth has little impact on the main correlation of interest – the connection between performance and stimulus. The correlations between stimulus and 2008:Q4 quarter performance are slightly larger for the OECD only sample.

⁵ A consistent measure of level of taxation is only available across the OECD countries. We use the measure of taxation in the economy from the OECD (OECD, 2009b). The measure is the ratio of tax revenues to GDP in the

III. THE IMPACT OF STIMULUS ON GROWTH

As noted above, any test of the impact of stimulus relies crucially on the counterfactual of what would have happened had there not been a stimulus. We can compare the unadjusted growth rate in the second quarter to the size of the stimulus package, and there is a positive relationship. This relationship could be biased in two ways. Countries with generally higher growth rates may have been in a better position to perform stimulus and may also simply be faster-growing countries, leading to a false positive correlation between stimulus and growth. More likely, countries with weak performance, or weak expected performance, may have done more fiscal stimulus, leading to a negative bias in the relationship. We can control for both of these effects by examining the growth rate in the second quarter relative to a forecasted growth rate that contained information about the shock, but was made before the stimulus packages were known.

Our main measure of the counterfactual is the private sector forecast by JP Morgan of GDP growth for the second quarter of 2009 that was made in November of 2008.⁶ The JP Morgan forecast has the advantage over market average expectations of being publicly reported far in advance (before any stimulus is announced) and of having forecasts for a wide set of countries made on a specific day.

The JP Morgan forecasts made in November contained a significant amount of information about performance in the second quarter. The 20 countries in our sample were forecast to have an average growth rate of 1.5 percent while actual growth was 1.9 percent. The actual growth and forecast are correlated at 0.71 across these countries. Further, the forecast contains more information than simply knowing a country's previous history: we can include both the forecast and the average growth rate over the 2000s in a regression, and the forecast has a significant coefficient and adds to the R^2 of the regression.

economy in 2006. It includes all levels of government including social insurance. The correlation between the stimulus and tax share is -0.48.

⁶ See JP Morgan (2008).

We take these expectations and subtract them from current performance to get a measure of whether countries outperformed expectations. Current performance is measured by the actual GDP growth rate in the second quarter of 2009.⁷

If countries that experienced larger negative shocks adopted greater stimulus, the relationship between stimulus and the difference between actual performance and pre-crisis expectations will tend to understate the benefits of stimulus. As noted above, however, our first effort to look for such an effect – the examination of the relationship between stimulus and pre-stimulus expectations of growth in 2009:Q2 – finds no evidence of such behavior. However, this does not fully eliminate the possibility that one source of the cross-country variation in stimulus was variation in the size of shocks.

A more serious problem is the negative correlation between discretionary stimulus and automatic stabilizers. Countries with smaller discretionary packages tended to have larger swings in automatic policy. As a result, total fiscal stimulus in the countries with low discretionary stimulus is more similar to the countries with high discretionary stimulus than the measure of discretionary stimulus alone suggests. Thus, examining the relationship between discretionary stimulus and growth performance relative to expectations could underestimate the impact of stimulus on growth.

A final possible confounding factor is the possibility of other policies that are correlated with discretionary fiscal policy. If monetary policy stimulus or some other policy that increases growth is positively correlated with discretionary stimulus, we might mistakenly attribute some of the impact of the other policy to fiscal stimulus. Alternatively, if countries that pursued less discretionary stimulus used other policies more, our analysis will understate the effects of stimulus. For all of these reasons, our analysis should be interpreted with caution.

⁷ For Norway, we use the Mainland GDP series (which is what JP Morgan forecasts) and we use the JP Morgan seasonal adjustment of Russia's data given that this is the series that is consistent with their forecast. China and the Czech Republic's flash estimate release only year on year changes at the quarterly frequency, so we use JP Morgan's estimate of what those yearly changes implied for quarterly growth. See JP Morgan (2009).

Figures 2 and 3 show the relationship for the full sample of countries and for OECD countries only. There is a clear upward-sloping relationship. Countries that undertook larger stimulus outperformed expectations when compared to countries that did smaller stimulus. The relationship is even stronger for the OECD-only sample. Some of the outliers in Figure 2 are non-OECD countries such as South Africa. It is sensible that the relationship may be more consistent across the OECD countries that have more similarities in the way fiscal policy is pursued, the channels through which it affects the economy, and the extent to which the shock of the recession hit them.

The figures highlight a number of notable cases. All four large stimulus countries (Japan, China, Korea, and Russia) outperformed expectations by a considerable amount. Conversely, two of the smallest stimulus countries (Italy and Switzerland) show below expected growth. The points do not all fit exactly on the line. Relatively low stimulus countries such as India and France performed slightly better than expectations while some relatively high stimulus countries such as South Africa did worse than expected. Mexico is one of the largest outliers. We note that while we do not want to simply try to explain away any inconvenient data point, Mexico's experience with H1N1 flu is estimated to have been a significant drag and one not predicted in November.

Furthermore, a simple non-parametric exercise – dividing the sample at the median stimulus – also suggests stimulus has improved performance. The countries above the median stimulus outperformed expectations by 1.6 percentage points and those below underperformed by 0.6 percentage points.

Figure 2. Outperforming Expectations and Stimulus, Full Sample

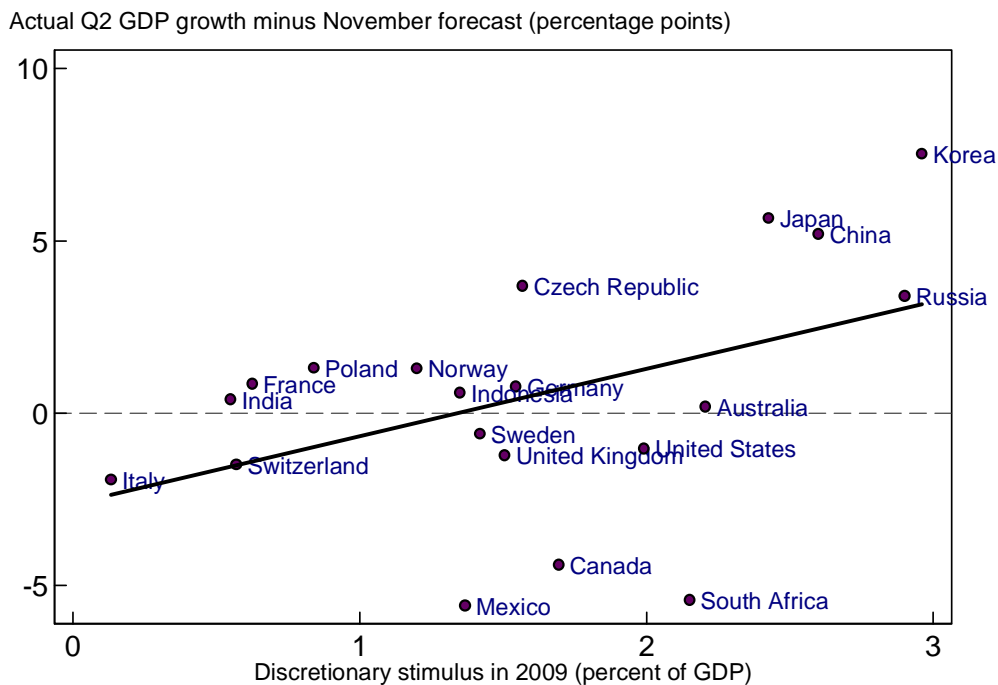


Figure 3. Outperforming Expectations and Stimulus, OECD Sample

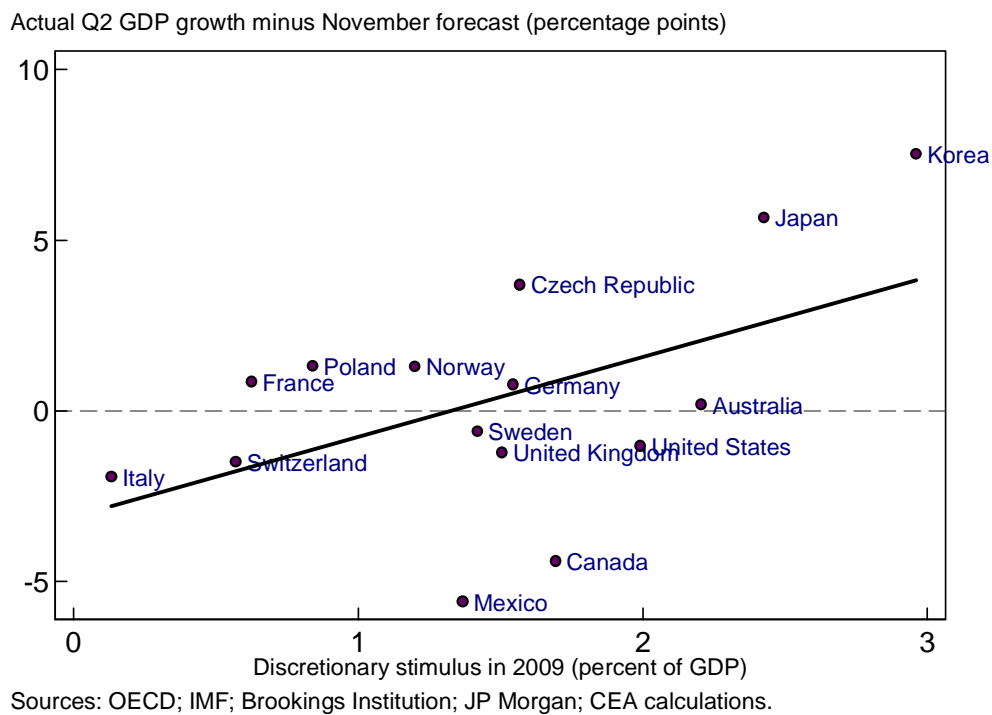


Table 2: Regression Details for Figures 2 and 3

	Full sample	OECD sample
Coefficient on stimulus	1.95**	2.34**
Standard error	0.80	1.00
Constant	-2.63**	-3.10**
Standard error	1.12	1.40
R-squared	0.20	0.26
Observations	20	15

OLS regressions with heteroskedasticity robust standard errors. ** represents statistical significance at the 95% confidence level.

As seen in Table 2, in both samples, this visual relationship is statistically robust.⁸ We can reject that there is no impact on the GDP performance at the 95 percent confidence level. Further, despite including only one explanatory variable – size of stimulus – we can explain a considerable amount of the variation of how well a country performed relative to expectations. The R^2 is 0.20 for the full sample and 0.26 for the OECD sample.

The coefficient on stimulus is 1.95 in the full sample and 2.34 in the OECD sample with a 95 percent confidence interval of roughly 0.2 to 4.5. Taken literally, this would suggest that a 1 percent of GDP stimulus led to faster growth in the second quarter of 2 percentage points (at an annualized rate). This would be a substantial multiplier. We do not know the precise distribution of stimulus spending by quarter, though. So, if more than one-quarter of the spending were in 2009:Q2, we might want to interpret the multiplier as somewhat smaller. To be clear, the growth rate is annualized, meaning if one had higher stimulus of 1 percent of GDP, one would expect higher growth of 2 percentage points over the whole year, suggesting a multiplier of 2. Because we do not know the timing, we must use the full year spending, and thus use an annualized growth rate. If one-quarter of the stimulus is spent in the second quarter (so 0.25 percent of GDP) and the quarterly growth rate is higher by 0.5 percent, we get a stimulus multiplier of 2.

⁸ Throughout the paper we use standard errors that are robust to heteroskedasticity to control for the fact that there is a wide variation in both the size of the stimulus and growth performance. These standard errors are similar to unadjusted standard errors.

We can use these results to predict what would have happened in the United States had there been no stimulus. The results suggest that rather than having a GDP growth rate of -1 percent in the second quarter of 2009, if there had been no stimulus, the United States may have had a growth rate in the range of -3.1 to -5 percent. The constant in the OECD sample suggests countries would have fallen short of expectations by 3.1 percentage points if they had done no stimulus. The forecast for the United States in November 08 for 2009:Q2 growth was 0 percent, so that suggests absent stimulus the United States would have had a growth rate of -3.1 percent. Alternatively, the coefficient in the regression suggests that the 2 percent of GDP stimulus the United States did should have lifted U.S. growth by 4 percentage points, so without a stimulus the United States would have grown at a rate of -5 percent. The range across these two methods is attributable to the fact that the United States lies slightly below the regression line. For a country exactly on the regression line, the prediction using either method would be the same.

IV. ALTERNATE FORECASTS

Rather than use the private sector forecast, we have also generated a simple time series forecast. We run a panel of quarterly growth rates:

$$y_{it} = a_i + B_{i1}y_{it-1} + B_{i2}y_{it-2} + B_{i3}y_{it-3} + B_{i4}y_{it-4} + u_{it}$$

where y is the quarterly GDP growth rate. This allows for GDP growth in a given quarter to be a function of country constants (the a_i) and a function of four lags of quarterly growth. We run the panel over 1990 through 2008, and use the results to predict quarterly GDP growth in the second quarter of 2009. We take these forecasts as a different measure of how well countries were expected to perform absent a stimulus.⁹

⁹ The forecasts use actual data from the first quarter of 2009 to make the prediction. Given that some stimulus packages had been announced but not enacted at that point in time, we view using the first quarter as appropriate. Using only data up through 2008 to forecast the first quarter and then the second only has substantial impacts on the forecasts of a few countries and strengthens the OECD sample results while weakening the overall sample results. Because the packages had been announced, we could not use market expectations from that period.

The forecasts themselves are similar to the JP Morgan forecasts, though not purely overlapping. The two series are correlated at a rate of 0.58. The simple time series forecast is more pessimistic: actual growth was 0.9 percent, JP Morgan forecast 1.1 percent, and the time series forecast -1.5 percent.¹⁰ We have made the forecast quite simple so it is clear the forecasts were not in any way arranged to generate a positive result of stimulus on growth, but despite their simplicity, they hold a substantial amount of predictive power. The forecasts are correlated with actual growth at a rate of 0.73; the forecasts can predict a significant part of the realized growth rate (the R^2 from a regression of actual growth on the forecast was 0.53); and, even including average growth rate over the 2000s in a regression, the coefficient on our forecast is still statistically significantly different from zero. Using this simple forecast as a robustness exercise allows us to show that the overall results in the paper are not driven by a particular bias in the way the JP Morgan forecasts were created.

We then take these forecasts and again subtract them from actual GDP growth in 2009:Q2 and compare them to fiscal stimulus. The results are similar to those obtained when using the JP Morgan forecasts. Figure 4 and 5 show the results using the forecast for the full sample and for the OECD only sample. The details of the regressions are reported in Table 3. China is missing from the sample because it does not report quarterly real GDP statistics. Estimates of the recent performance are available, allowing us to include China in the main regressions, but we lack a time series of the data to allow us to include them in forecasting exercise.

The figures show that once again, there is a noticeable upward-sloping relationship. Countries that did more stimulus outperformed expectations relative to countries that did little stimulus. The full sample (even without China) shows a positive and statistically significant coefficient on stimulus (see Table 3). Again, the coefficient is very close to 2. The OECD

¹⁰ These figures differ from the average growth rates discussed above in section III for JP Morgan and actual growth because China is unavailable in our forecast and hence excluded from these statistics for comparison purposes. In addition, we use Russian and Indian GDP seasonally adjusted by Haver analytics as opposed to JP Morgan for both our forecasts and the measure of second quarter GDP growth because we lack sufficient time series data for the JP Morgan estimates to do our forecasts. This also slightly lowers the actual growth number compared to that in section III.

sample has a similar coefficient (1.71) but in this case with the smaller OECD sample, we cannot reject zero impact of stimulus. The bulk of the confidence interval, though, is positive.

Once again, we can consider the implications for the United States. The time series forecast suggested a growth rate of -1.9 percent and the full sample constant was -0.5 percent (the OECD was 0 percent), suggesting that absent stimulus we could have expected a U.S. growth rate in the range of -1.9 percent to -2.4 percent. The coefficient on stimulus was between 1.5 and 2, suggesting that absent the 2 percent of GDP stimulus of the U.S. growth would have been between 3 and 4 percentage points below its actual level of -1 percent. Thus, once again between these two methods, we estimate that the United States would have had GDP growth in the second quarter of 2009 between -2.0 percent and -5 percent had there been no stimulus.

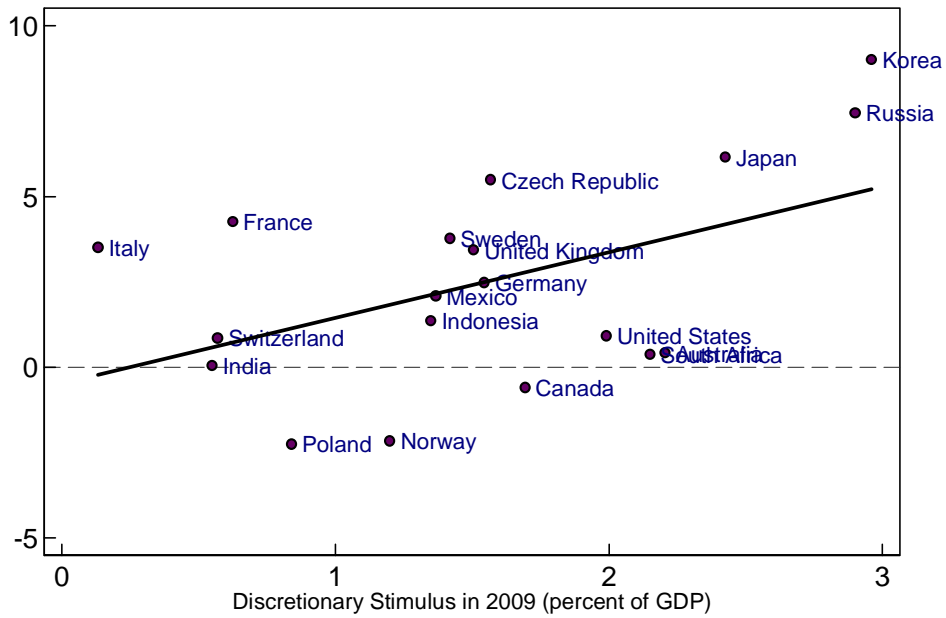
Turning to other countries, again the largest stimulus countries (Russia, Japan, and Korea) all outperform expectations substantially (by more than 5 percentage points). Of the three smallest stimulus countries, two are very close to expectations (India and Switzerland) while Italy is above expectations.¹¹ Again, France overperforms expectations and Canada underperforms. Poland is a significant underperformer in this exercise but overperformed when using JP Morgan forecasts. The actual growth rate was 2.1 percent. Our method forecasts a growth rate of 4.3 percent, significantly above the realized rate, making Poland an underperformer while JP Morgan had forecast a rate of 0.8 percent significantly below actual, making Poland an overperformer.

Again we can examine a simple non-parametric exercise of comparing growth to expectations for those above and below the median stimulus. Since the time series forecasts were quite pessimistic, most countries outperformed expectations. However, the large stimulus countries did so by more. Countries above the median (1.5 percent of GDP stimulus) grew 3.5 percentage points faster than expectations while those below the median overperformed by 1.3 percentage points.

¹¹ Italy's growth was forecast to be 0 percent by JP Morgan and -5.4 percent by our technique. Thus they perform below JP Morgan expectations and are quite close to the regression line in Figure 3, but using our forecasts, they overperform significantly.

Figure 4. Outperforming Expectations and Stimulus, Full Sample

Actual Q2 GDP growth minus time series forecast (percentage points)



Sources: OECD; IMF; Brookings Institution; CEA calculations.

Figure 5. Outperforming Expectations and Stimulus, OECD Sample

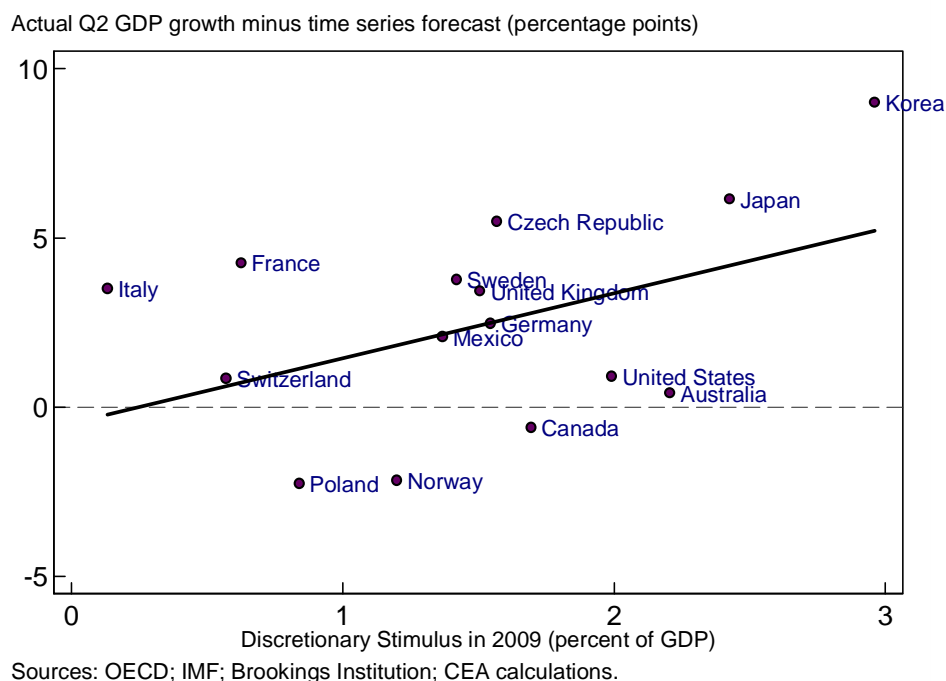


Table 3: Regression details for Figures 4 and 5 (using time series forecast as baseline)

	Full sample	OECD sample
Coefficient on stimulus	1.93*	1.71
Standard error	0.95	1.24
Constant	-0.48	-0.01
Standard error	1.54	1.93
R-squared	0.24	0.17
Observations	19	15

OLS regressions with heteroskedasticity robust standard errors. * represents statistical significance at the 90% confidence level.

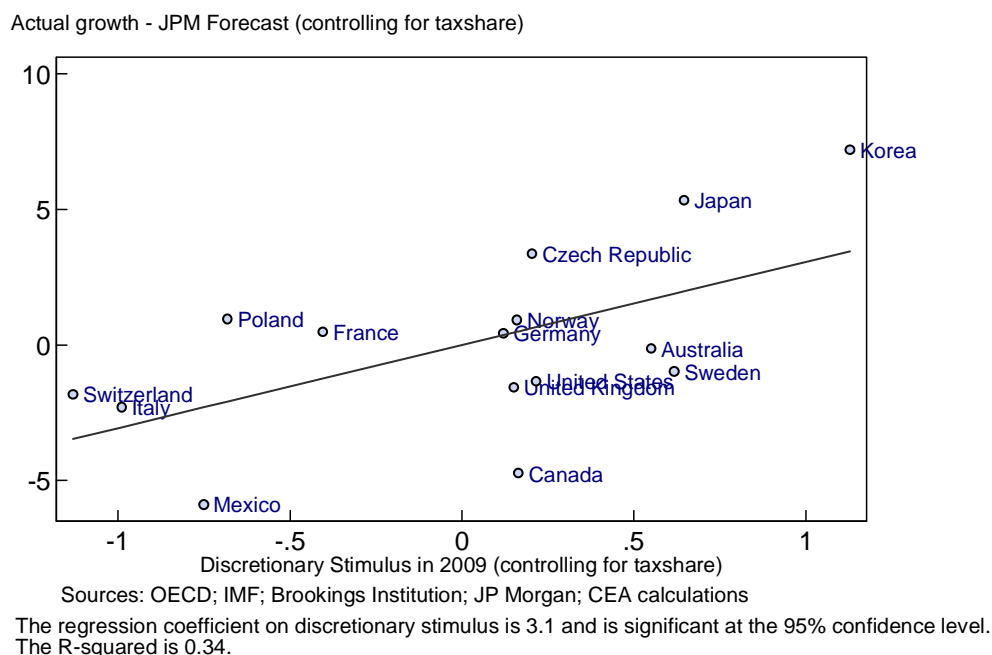
Professional forecasters with detailed knowledge should be better informed than a simple time series forecast, but it is reassuring that a very similar picture arises regarding the relationship between stimulus and GDP growth from this process.

V. OTHER FACTORS

As noted, automatic stabilizers may partially mitigate the estimated relationship between stimulus and growth. If countries with low stimulus did extensive spending through automatic stabilizers, we would not expect to find a particularly large gap between high stimulus countries and low stimulus countries if we omit the size of automatic stabilizers. Consistent with this supposition, if we control for the tax share of the economy in the OECD sample, we find even stronger results regarding the effectiveness of stimulus. Taking the JP Morgan forecasts as our baseline, we regress performance relative to expectations on both the size of stimulus and the share of tax revenue in the economy. The coefficient on stimulus gets even larger than in the simple bivariate regression.

We can examine the partial scatter plot of stimulus and growth relative to expectations, shown in Figure 6. This figure controls for the level of taxes as a share of the economy. We see that relative to the basic scatter plot for the OECD sample (Figure 3), when we control for tax share, this helps explain the relatively small stimulus in France and Norway (and hence shifts these points to the right – towards the regression line), and shifts Mexico to the left as it had low stimulus and low tax share. These adjustments lead to a larger more significant coefficient as well as a clearer visual relationship.

Figure 6. Outperforming Expectations and Stimulus (controlling for tax share)



VI. NARRATIVE EVIDENCE

The relationship demonstrated in this paper is not a random correlation without a logical connection. Observers in many countries see the link between stimulus and the beginnings of recovery. Zhuang Jian, senior economist with the Asian Development Bank, stated that government-led investment and ample credit are the main reason behind the growth in China. Also, the spokesman for the National Bureau of Statistics in China has stated that the stimulus package was the reason the economic growth is improving. For example, extensive government construction has helped fixed asset investment increase 33.5 percent in the last six months, the most in five years.¹² Further, the Chinese stimulus is often credited with helping its neighbors as well. The Institute for International Trade (ITT) reported that while Korean exports dropped 21.8 percent year on year in July 2009, exports to China contracted only 12.9 percent. The IIT explicitly linked better performance in exports to China with China's stimulus policies.¹³

¹² See China View (2009).

¹³ See Yonhap News Agency (2009).

The German statistical agency reported that not only was government spending higher because of the stimulus there, but personal consumption expenditure's positive contribution to growth was largely a result of stimulus (specifically, Germany's "cash for clunkers").¹⁴ In Japan, according to government officials, public investment has shown a steady improvement and private consumption has been supported by the effects of the policy packages.¹⁵ Lastly, in Korea, the statistical agency reported that in the second quarter, construction investment and government expenditure showed sustained growth, and construction investment growth was due to an increase in the public sector.¹⁶ Stimulus has not acted alone. In both Germany and Korea, exports have been an important part of a return to growth, but stimulus has played a significant role.

VII. CONCLUSION

The cross-country evidence relies on a small number of outcomes and the stimulus measures are for a year, and hence not the perfect measure of stimulus in the quarter. As a result, all of these estimates are subject to some revision and substantial margins of error. But, we do see a consistent positive statistically robust relationship between stimulus and growth performance. Countries with stimulus did better than expected and did so by a margin that is consistent with a sizable multiplier effect.

All the countries that did very large stimulus (over 2.3 percent of GDP) saw surprisingly strong growth when measured with respect to either private sector forecasts or simple time series forecasts. Countries with small stimulus packages did not perform as well relative to expectations when compared to the high stimulus countries. Across different samples of countries and with different measures of forecasts, we consistently find that high stimulus countries did better and the coefficient on stimulus is typically in the range of 2. This suggests

¹⁴ See Statistisches Bundesamt Deutschland (2009).

¹⁵ See Japanese Cabinet Office (2009).

¹⁶ See Bank of Korea (2009).

that for every 1 percent of GDP done as stimulus, countries grew roughly 2 percentage points faster. This evidence is based on the total fiscal stimulus, not a portion of the stimulus, and does not rely on an extensive number of assumptions regarding how the economy or fiscal stimulus operates. Thus, it provides useful context to both model-based evidence and explorations of specific programs.

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