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THE ECONOMIC AND POLITICAL CASE FOR COORDINATING FISCAL STIMULUS

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ABSTRACT

Almost 10 years ago, the G-20 embarked on what it called “the largest coordinated fiscal stimulus in history.” While the benefits of coordinated stimulus in response to a widespread shock are generally accepted, there is debate about the size of the benefits of coordination, how they are distributed across countries, the potential costs of stimulus when it is undertaken by relatively indebted countries and whether countries genuinely coordinated or whether they were doing the same thing they would have done anyway. The paper explores these issues using data analysis, a new computable general equilibrium model of the G-20 and results from in-depth interviews with 61 leaders, ministers, central bank governors and officials from G-20 countries, including Kevin Rudd, Jack Lew, Janet Yellen, Haruhiko Kuroda, Ben Bernanke, Mark Carney, and 55 others. It finds that the first-year GDP gains from fiscal stimulus are twice as large on average for G-20 countries if they coordinate. While most countries benefit a lot, some benefit little and some suffer a loss depending on a range of country characteristics. These GDP gains to the global economy are, on average, a third smaller if stimulus by relatively-indebted countries increases risk premia, but this cost is smaller than the cost of not having stimulus from those countries. Interviews find that coordination from 2008 to 2010 was genuine: more than half of the G-20, particularly smaller economies, did more stimulus because of the G-20. The paper explores the implications of these results for the G-20 in facing future crises.

Keywords: Macroeconomics, international trade and finance, computable general equilibrium models, econometric modelling, mathematical methods, intertemporal choice, fiscal policy.

JEL Codes: F4, C68, C5, C02, E17, D9, D58

I. INTRODUCTION

2018 marks the 10-year anniversary of the G-20 as a leader-level forum. It was created at a time when the global financial system was on a precipice. Stock markets were crashing. Credit markets were freezing. Rolling failures across financial institutions were shattering confidence. Within the space of 12 months, the IMF's forecasts for what global growth would be in 2009 fell from 3.8 to -1.3 percent.¹

The leaders of the G-20 faced the very real prospect of another Great Depression. But they were determined not to make the mistakes of the past. Along with measures to stabilize markets and buttress the global financial system, they implemented a multi-year fiscal expansion to support demand and protect growth and jobs. Countries increased spending, cut taxes and let automatic stabilizers play their role in what they called “the largest coordinated fiscal stimulus in history.”

Without the actions of the G-20, what started as a financial crisis would have quickly become a trade crisis, then an economic crisis, then an employment crisis, then a social crisis and then a political crisis—*Kevin Rudd, 26th Prime Minister of Australia, interviewed September 8, 2017.*

While the benefits of coordinating fiscal stimulus in the face of a widespread shock are generally accepted, questions remain about the size of the benefits from coordination, how they are distributed across countries and what impact increased risk premia can have if heavily-indebted countries also participate in fiscal stimulus.

A related issue is whether coordination agreements involve genuine coordination or not. When G-20 countries are hit by a common shock, they often have a prima facie incentive to undertake fiscal stimulus regardless of what other countries do. Did countries do anything different because of the G-20 or was it “business as usual” masquerading as coordination? Conversely, if coordination is genuine and countries alter their policies because of a G-20 agreement, there is potentially an incentive for countries to cheat on the agreement and free ride on the stimulus efforts of others. There is no clear understanding in the literature on whether the G-20 resulted in countries doing more fiscal stimulus from 2008 to 2010 or what role the G-20 plays in boosting the credibility of commitments and defeating attempts to free-ride.

Fundamentally, policy in the United States won't be pulled by international consensus, it will be driven by domestic policy considerations and domestic politics. There can be a backlash in the United States if you make the argument that you are doing something to comply with international rules rather than as a domestic choice. But consensus from the G-20 was not unwelcome—it certainly helped in getting action from other countries—*Jacob Lew, former Treasury Secretary, United States, interviewed September 7, 2017.*

Many of these issues relate to the broader question of what role political considerations play in a global coordination agreement. The economic benefits of macroeconomic coordination often receive much more attention in the literature than the political benefits. But the economic and political benefits are difficult to separate in practice. It is the combination of the two that encourages politicians to agree to coordination in the first place. Little is known about the role that the G-20 plays in influencing domestic fiscal policy settings and how politicians and officials use the G-20 to achieve their objectives.

The G-20 provides a framework for politicians to argue domestically to do things that they otherwise couldn't do but want to do. It provides political backup—*Wayne Swan, former Treasurer, Australia, interviewed March 21, 2017.*

¹ This is from the IMF's forecasts in April 2008 compared to those in April 2009.

The G-20 is a forum in which you can share diagnoses, figure out what makes sense and try at the margin to come up with something together that is more powerful than what you would achieve otherwise—*Former senior official, United States, interviewed September 12, 2017.*

These are the issues explored in this paper. The paper uses data analysis, a new computable general equilibrium model called the G-Cubed (G-20) model (detailed in McKibbin and Triggs, 2018) and results from interviews with 61 leaders, finance ministers, central bank governors, sherpas and finance deputies from G-20 countries to consider both the economic and political dimensions of coordinated fiscal stimulus. Participants included Kevin Rudd, Janet Yellen, Haruhiko Kuroda, Ben Bernanke, Jack Lew, Mark Carney, and 55 other politicians and officials to whom I am deeply grateful.

The paper is structured as follows. Section 2 introduces the G-20's commitments on coordinated fiscal stimulus. It assesses how well countries did in implementing those commitments and which countries did the heavy lifting.

Section 3 introduces the general equilibrium framework. It finds that the first-year benefits to GDP are twice as large on average for G-20 countries if they act together. But the domestic benefits of coordination depend on characteristics like country size, the actions of your trading partners, openness to trade, monetary policy frameworks and relative price effects. Some G-20 countries benefit a lot, while others suffer a loss because of coordination.

Section 3 also finds that increased risks from fiscal sustainability concerns reduce the aggregate benefits of coordination to global GDP by around a third but, consistent with Auerbach and Gorodnichenko (2017), finds that this cost is smaller than the cost of not coordinating or not having those countries participate in stimulus. Using a game theoretic framework, the paper finds that the incentives to cheat are small.

Section 4 explores whether there was genuine coordination in 2008 to 2010. It finds that more than half of G-20 countries undertook more stimulus because of the G-20, particularly smaller economies. It outlines the economic and political drivers for coordinated stimulus and the mechanisms through which the G-20 influences domestic fiscal settings. Section 5 concludes with a discussion of what these findings mean for the G-20 in dealing with a widespread shock in the future.

II. FISCAL STIMULUS AND THE G-20

At the London summit in 2009, G-20 leaders warned of “the greatest challenge to the world economy in modern times.” Their objective was clear and measurable. They committed to a “concerted fiscal expansion... that will, by the end of [2010], amount to \$5 trillion and raise output by 4 percent” (G-20, 2009).

Did the G-20 achieve its goals?²

There is an important distinction between fiscal stimulus and fiscal expansion. Fiscal stimulus refers to spending and taxation measures deliberately undertaken by the government while fiscal expansion also includes the effects of automatic stabilizers, such as increased social security spending from rising unemployment (see IMF, 2009). The G-20's commitment was to a \$5 trillion fiscal expansion.

In 2009, the IMF forecast that the G-20's combined fiscal stimulus from 2008 to 2010 would be \$1.72 trillion and its combined fiscal expansion would be \$5.36 trillion (IMF, 2009). This would have comfortably achieved the G-20's goal of \$5 trillion. Discretionary stimulus measures accounted for 34 percent of this.

² This section is extracted from Triggs (2018)

Automatic stabilizers accounted for around 36 percent and “other measures” (spending unrelated to the crisis, primarily defense spending)³ accounted for 30 percent.

The G-20 ultimately delivered more than what was forecast. The most recent data suggests the G-20’s total fiscal expansion over this period was \$6.38 trillion. Measured in U.S. dollars, the largest fiscal expansion was from the United States, followed by Japan, the United Kingdom and Germany (Figure 1). When measured as a percent of GDP, the largest fiscal expansions came from the United States, Russia, the United Kingdom, and Australia (Figure 2).

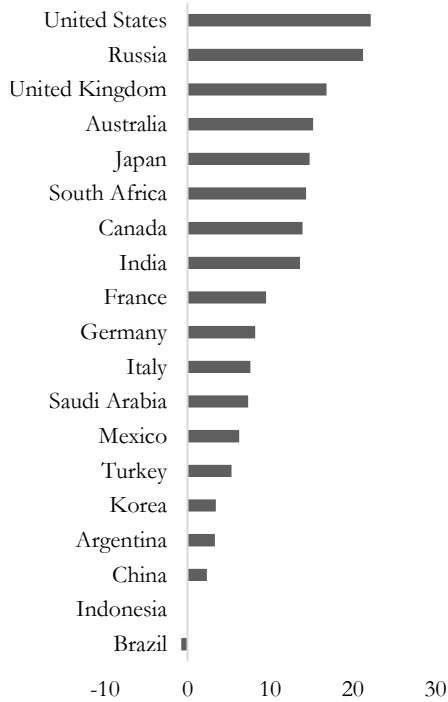
Some countries did comparatively less. As a percent of GDP, Brazil and Indonesia contracted fiscal policy from 2008 to 2010 and the expansions from Argentina, Korea, and Turkey were comparatively small.

China’s fiscal expansion is represented here to be small, both as a percentage of GDP and in U.S. dollars. The IMF’s calculations in 2009 also did not place China in the top 10. But this understates China’s role in the G-20’s stimulus efforts because much of China’s stimulus was through expanded credit by state-owned banks (see Pei, 2012).

Figure 1: Fiscal expansion in U.S. dollars



Figure 2: Fiscal expansion as a % GDP



Source: Data from IMF (2009)

³ Includes non-crisis related discretionary spending or revenue measures (mostly defense spending) and the impact of non-discretionary effects on revenues beyond the normal cycle.

The other limb of the G-20's commitment was to raise world output by 4 percent. World output increased by 8.5 percent from 2008 to 2010, or 5.4 percent if measured from a 2009 baseline. But was this because of the G-20's actions? This paper has not sought to estimate whether this fiscal expansion achieved the G-20's goal of lifting global output by 4 percent since this has already been estimated by others. Modeling from the IMF (2009), Freedman et al (2010) and the ILO (2010) conclude that the G-20 likely achieved its goal, and these estimates were based on the expansions measured in 2009 which were \$1 trillion smaller than what was ultimately delivered.

III. IS THE WHOLE GREATER THAN THE SUM OF ITS PARTS?

While the benefits of coordinated stimulus in the face of a widespread shock are generally accepted (see Resende, Lalonde and Snudden, 2010; Bayoumi, 2014; OECD, 2009; Auerbach and Gorodnichenko, 2017), debates remain about the size of the benefits from coordination, how they are distributed across countries and the impact of increased risk when heavily-indebted countries participate in stimulus.

There is much research on the implications of stimulus, but less on coordination. The research suggests the ideal candidate for fiscal stimulus is an economy which is experiencing weak growth or is in a recession which has a binding zero lower bound for monetary policy such that there is no tightening of monetary policy in response to the fiscal stimulus which would act to offset its effects (Ivanova and Weber, 2011; IMF, 2009; Resende, Lalonde and Snudden, 2010). It is also an economy which favors spending increases over tax cuts since, depending on the circumstances, the former tends to have larger multiplier effects (Resende, Lalonde and Snudden, 2010).

Research has explored the relationship between fiscal stimulus and fiscal sustainability risks. The traditional view is that fiscal stimulus undertaken by heavily indebted countries is less effective or even counter-productive. Stimulus on top of an already large stock of debt can increase country risk, damage confidence and offset the benefits of stimulus, particularly through a higher cost of capital (Corsetti et al, 2010; McKibbin and Stoeckel, 2011; Ilzetzki, Mendoza and Végh, 2011). One study found that country risk premia in heavily indebted countries can increase by up to 2 percent for every 10 percentage point increase in debt-to-GDP (Veld and Roeger, 2013).

In this paper, the focus is not on the costs and benefits of fiscal stimulus *per se* but on the costs and benefits of having it coordinated. This section uses a multi-country, multi-sector, intertemporal computable general equilibrium model called the G-Cubed (G-20) model (detailed in McKibbin and Triggs, 2018) to compare the outcomes from three scenarios:

1. The impact of a 1 percent of GDP increase in government spending by each G-20 economy when acting alone (e.g., where the U.S. stimulates and others do not, where Korea stimulates and others do not, and so on).
2. The impact of a 1 percent of GDP increase in government spending by each G-20 economy when acting together.
3. The impact of the same coordinated fiscal expansion in (2) but when risk premia increase because of stimulus from heavily indebted G-20 countries.

The goal is to explore the spillovers between countries and whether they create a case for coordination. To do this, it is not necessary to model any particular shock into these scenarios since the focus is on the dynamic trade and financial linkages between countries and how they are impacted by each other's fiscal

policy settings. Modelling a shock would confuse the analysis by making it harder to identify what was caused by the stimulus and what was caused by the chosen shock.⁴

3.1 The G-Cubed (G-20) model

Fiscal stimulus impacts many variables in the economy. Some of these effects are positively signed, some are negatively signed and most are of differing magnitudes. This occurs within a complex set of trade and financial linkages between countries. A general equilibrium framework is therefore critical to understand these complex interactions.

The G-Cubed (G-20) model is a multi-country, multi-sector, intertemporal general equilibrium model. It is designed to bridge the gaps between three areas of research—econometric general equilibrium modelling, international trade theory and modern macroeconomics—by incorporating the best features of each.

Several versions of the model have been developed, which have been incrementally improved and built-on over many years. The version presented in this paper is the newest, and largest, version of the G-Cubed model, designed specifically to study the G-20 and the implications of its policy agenda. Previous versions of G-Cubed have been used to study a range of policy areas, including macroeconomic cooperation, international trade, monetary policy, fiscal policy, tax reform and environmental regulation. Studies have shown the effectiveness of G-Cubed in explaining the adjustment process in a number of historical episodes, including Reaganomics, German reunification, European fiscal consolidation in the 1990s, the formation of NAFTA and the Asian financial crisis. G-Cubed has also proven successful in helping to explain the “six major puzzles in international macroeconomics” highlighted in Obstfeld and Rogoff in a 2000 paper.⁵ It has also proven useful in understanding the 2009 Global Financial Crisis.⁶

The G-Cubed (G-20) model represents the world as 24 autonomous blocks: one for each G-20 economy (including the rest of the eurozone) and four regions, which represent the world’s non-G-20 economies. These are the other economies of the OECD, the other economies of Asia, the other oil-producing economies and a catchall “rest of the world” (Table 1). Each region in G-Cubed is represented by its own multi-sector econometric general equilibrium model with highly disaggregated, multi-sectoral flows of goods and assets between them.

⁴ McKibbin and Stoekel, 2009, which models the relevant shocks associated with the global financial crisis.

⁵ See McKibbin and Vines (2000). Those six puzzles were: (1) the bias in trade toward consuming home goods; (2) the own-country bias in ownership of financial assets; (3) the Feldstein-Horioka result that there is a high correlation between national saving and national investment spending; (4) the international consumption-correlations puzzle—the low correlation between growth in consumption across countries - which is also expressed as the puzzle that output growth seems to be more highly correlated than consumption growth across countries; (5) the apparent breakdown of purchasing power parity in the short to medium-term or the persistence of changes in real exchange rates; and (6) the “exchange rate disconnect puzzle”—shown by the apparent disconnect between exchange rates and underlying macroeconomic variables.

⁶ See McKibbin and Stoekel (2018).

Table 1: Overview of the G-Cubed (G-20) model

| <u>Countries (20)</u> | <u>Regions (4)</u> |
|------------------------------|-------------------------------------------------------------|
| Argentina | Rest of the OECD |
| Australia | Rest of Asia |
| Brazil | Other oil producing countries |
| Canada | Rest of the world |
| China | |
| Rest of eurozone | <u>Sectors (6)</u> |
| France | Energy |
| Germany | Mining |
| Indonesia | Agriculture (including fishing and hunting) |
| India | Durable manufacturing |
| Italy | Non-durable manufacturing |
| Japan | Services |
| Korea | |
| Mexico | <u>Economic Agents in each Country (3)</u> |
| Russia | A representative household |
| Saudi Arabia | A representative firm (in each of the 6 production sectors) |
| South Africa | Government |
| Turkey | |
| United Kingdom | |
| United States | |

Each region has six industries, which correspond to the production of six goods: energy, mining, agriculture (including fishing and hunting), durable manufacturing, non-durable manufacturing and services. Each good in a region is an imperfect substitute for goods from other regions. Thus, there are effectively 144 goods.

Each country consists of six representative firms, a representative household and a government. The model also includes markets for goods and services, factors of production, money and financial assets (bonds, equities and foreign exchange). Finally, each country or region is linked through the flows of goods and assets. Some of the key features of the G-Cubed (G-20) model are:

- Specification of the demand and supply sides of economies.
- Integration of real and financial markets of these economies with explicit arbitrage linking real and financial rates of return.
- Inter-temporal accounting of stocks and flows of real resources and financial assets.
- Imposition of inter-temporal budget constraints so that agents and countries cannot borrow or lend forever without undertaking the required resource transfers necessary to service outstanding liabilities.
- Short-run behavior is a weighted average of neoclassical optimizing behavior based on expected future income streams and Keynesian current income.
- The real side of the model is disaggregated to allow for production of multiple goods and services within economies.
- International trade in goods, services and financial assets.
- Full short-run and long-run macroeconomic closure with macro dynamics at an annual frequency around a long-run Solow-Swan-Ramsey neoclassical growth model.

- The model is solved for a full rational-expectations equilibrium (consisting of a mix of rational and rule of thumb agents) at an annual frequency from 2015 to 2100.

The following simulations elaborate further on some of these key features of the model, and further details are available in McKibbin and Triggs (2018). Section 3.2 compares the benefits of coordinated stimulus to uncoordinated stimulus. Section 3.3 then considers the role of increased risk premia if heavily indebted countries also undertake stimulus. Section 3.4 considers whether there is an incentive to cheat and Section 3.5 draws together the key conclusions from the modeling.

3.2 Coordinated versus uncoordinated fiscal stimulus

This section compares two scenarios: where G-20 countries implement stimulus individually and where they implement stimulus together. The increase in spending in these scenarios is assumed to be equal to 1 percent of GDP each year for 3 years: the same length of time as the G-20's stimulus commitments. It is assumed that all spending is on goods and services rather than government investment in productive assets like infrastructure. This is a realistic assumption given that, as discussed earlier, only 34 percent of the G-20's fiscal expansion was on deliberate increases in spending, and only a fraction of this was on infrastructure (see IMF, 2009 pp.1-2 for a breakdown). Unless otherwise indicated, all results are expressed as the change relative to the baseline (the "business-as-usual" case).

Uncoordinated stimulus

The scenario where countries implement stimulus individually implies 20 separate simulations: where the U.S. stimulates and others do not, where Japan stimulates and others do not, and so on. But to understand the mechanics behind the results, it is useful to consider one simulation in detail: where the United States undertakes stimulus and the other G-20 countries do not (see Figures 3 to 8). This is also a pertinent simulation given that the Trump administration begun undertaking a sizeable fiscal stimulus in 2017 through its tax cuts and proposed infrastructure plan (see Congressional Budget Office, 2017).

Figures 3 to 8 highlight the key results for the United States economy from fiscal stimulus. As would be expected, the increase in government spending increases the size of the United States fiscal deficit, which is between 0.8 and 1 percent higher than the baseline over the three years of stimulus (Figure 3). However, there are significant short- and long-term effects from this policy for the United States.

The government finances its increase in spending by issuing bonds. But the increased demand this places on savings drives up real interest rates. Higher interest rates pushdown investment, along with forward-looking firms, which anticipate a less-favorable, higher tax environment in the future to pay for the increased government spending today. Investment contracts by 0.8 percent below baseline in the third and fourth years, settling around the baseline by 2027 (Figure 4).

Consumption is initially higher from the short-term increase in government spending (Figure 5). But, like firms, forward-looking households anticipate lower wealth in the future due to the higher taxes required to pay for the increase in governments spending. They adjust their intertemporal consumption decisions and reduce current consumption, facilitated by higher real interest rates, which encourage lower consumption (and more savings) today. Backward-looking (or liquidity constrained) households take longer to adjust.

Since consumption and investment are its largest components, the result for United States GDP is not surprising. Figure 6 shows a familiar Keynesian response from fiscal stimulus. GDP initially expands to be 0.6 percent above the baseline as government spending gives a sugar-hit to the economy. But the increased issuance of government bonds to finance the increase in government spending soaks-up savings, which would otherwise be financing the supply-side of the economy. As a result, the medium-term impact is a reduction in GDP before settling around the baseline in the longer-term.

Much of the transition from this policy, particularly the impact on other countries (the key focus of this paper), can be explained by what happens to interest rates, capital flows and exchange rates. Higher interest rates in the United States results in financial capital flowing into the United States to obtain higher returns. This results in an appreciated real effective exchange rate during the three years of stimulus by around 1.5 percent above the baseline (Figure 7). Because its exports are now relatively more expensive to those of other countries, an appreciated exchange rate means a weakened trade balance by 0.6 percent in the first year (Figure 8).

Figure 3: U.S. fiscal deficit

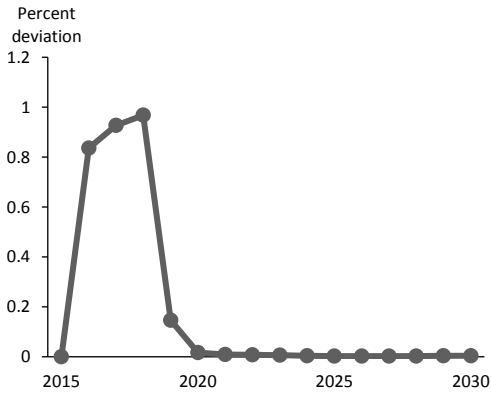


Figure 4: U.S. investment

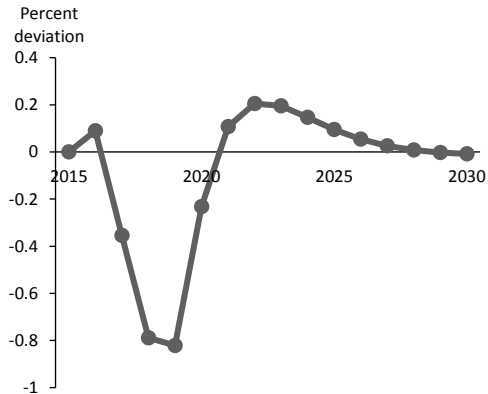


Figure 5: U.S. consumption

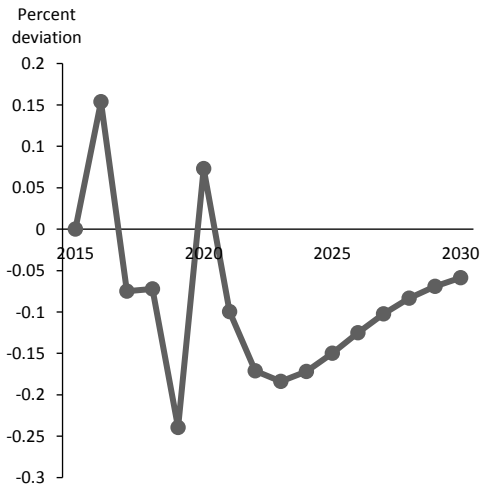


Figure 6: U.S. real GDP

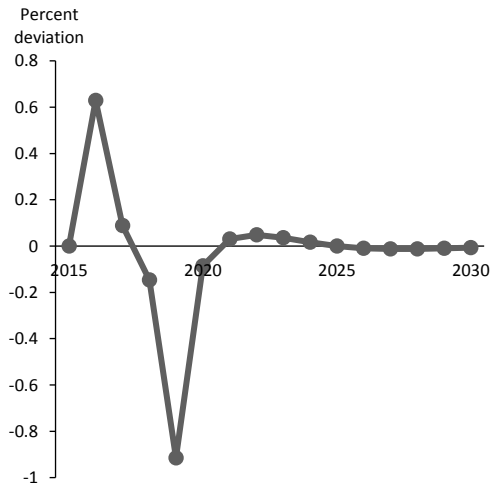


Figure 7: Real effective exchange rate

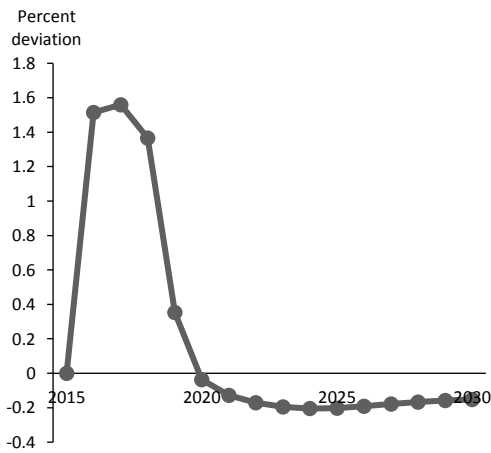
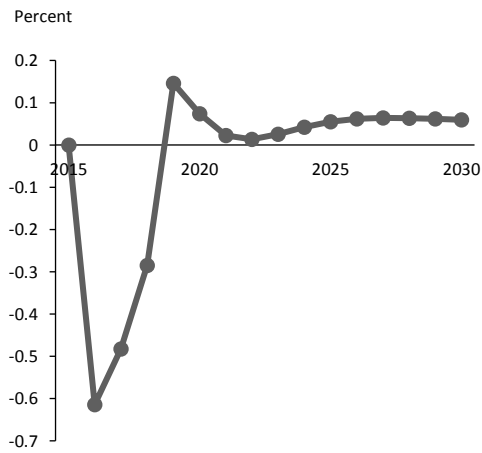


Figure 8: U.S. trade balance



The key issue for coordination, however, is what impact stimulus in the United States has on other G-20 countries. The direct effects are through the impacts of this policy on exchange rates and important demands. An appreciated exchange rate in the United States means a relatively depreciated exchange rate for its trading partners, and some of the increased consumption in the United States falls on imports. Both result in an improved trade balance for the trading partners of the United States, between 0.3 and 0.4 percent for Mexico and Canada in the first year (Figure 9).

This improvement in their trade balance, however, is partially offset by weaker investment caused by higher global interest rates and capital flight out of their economies into the United States (Figure 10). The overall impact on GDP is therefore similar to that of the United States: A short-term sugar hit to the economy from an improved trade-balance, but a medium-term contraction due to weaker investment (Figure 11).

Figure 9: Trade balance

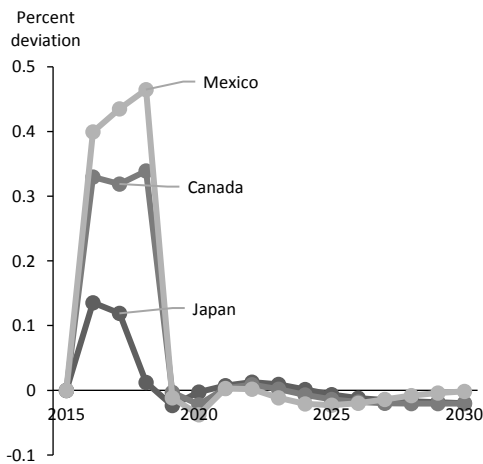


Figure 10: Investment

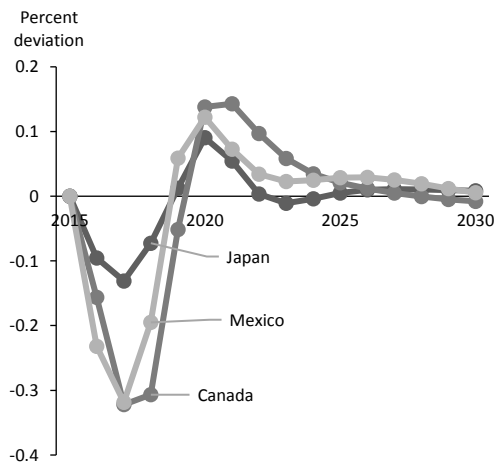


Figure 11: Real GDP

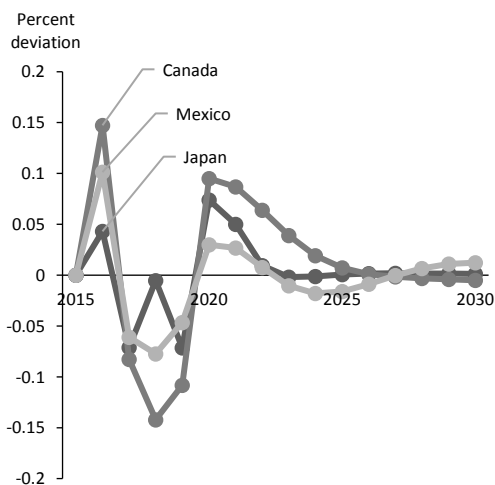
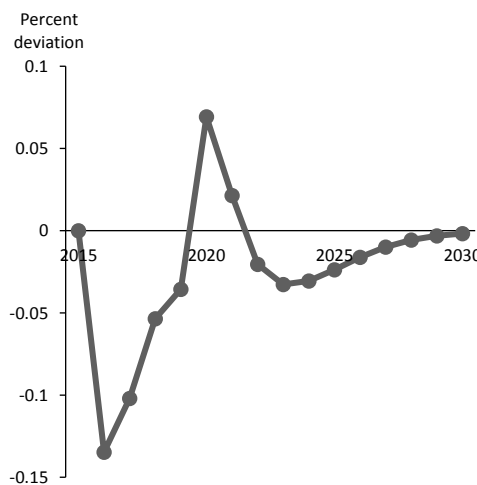


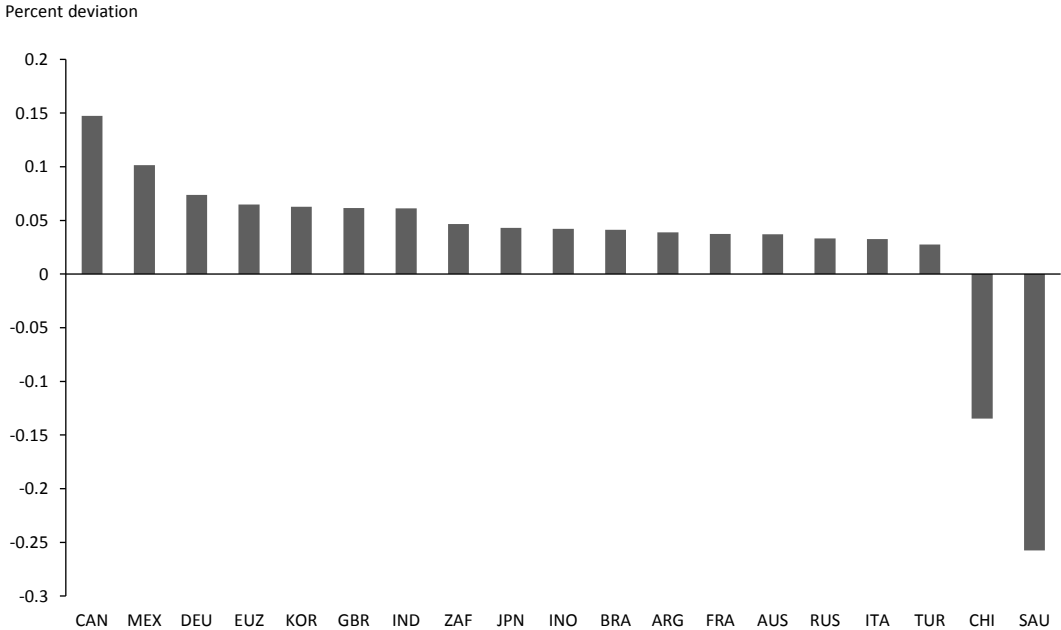
Figure 12: Real GDP in China



Fiscal stimulus in the United States has a differentiated impact across the G-20. Figure 13 shows the first-year impacts on each G-20 country's GDP. The countries that benefit the most are those with the closest trade links to the United States, such as Canada, Mexico, Germany, and Japan. Smaller and more open economies, such as South Africa and Korea, also tend to benefit more than others.

The countries, which benefit the least, are those with smaller trade-links with the United States, although Saudi Arabia and China stand out as special cases. Shown in Figure 12, fiscal stimulus in the United States results in a contraction in Chinese GDP. This is because of China’s monetary policy framework. Because China manages its exchange rate against a basket of currencies (which is heavily weighted toward the U.S. dollar), the appreciation in the U.S. dollar means Chinese authorities must pursue tighter monetary policy in order to maintain the value of its exchange rate. This tighter monetary policy, in turn, causes a larger contraction in economic activity, reducing GDP. This is also the case for Saudi Arabia, which maintains a fixed exchange rate against the U.S. dollar. This highlights one of the well-known trade-offs of having a managed exchange rate.

Figure 13: First year impact on each G-20 country’s GDP from U.S. fiscal stimulus



Now consider the impacts of stimulus when it comes from other G-20 countries. In a 20x20 matrix, Table 2 shows the impact of stimulus undertaken unilaterally by each G-20 country on its peers. All results show the impact on GDP in the first year that stimulus is undertaken. The x-axis gives the country, which is stimulating, and the y-axis shows the impact on each other G-20 country. For example, when the U.S. undertakes stimulus on its own, the benefit to U.S. GDP is 0.63 percent, the benefit to Japan’s GDP is 0.04 percent, the benefit to Germany’s GDP is 0.07 percent, and so on.

The results in Table 2 are consistent with many of the findings in the literature and consistent with what you would expect from a gravity model. Countries benefit most when stimulus is undertaken by their major trading partners. Stimulus in the United States, for example, benefits Canada and Mexico the most—its largest trading partners.

The economic impacts of stimulus are also heavily affected by the level of openness of different economies and monetary policy and exchange rate frameworks. The own-benefits of fiscal stimulus in France and Italy, for example, are particularly large. This is because they share a common currency with the rest of the eurozone such that, when they undertake stimulus alone, it has a more muted effect on the exchange rate than is the case for countries, which have their own exchange rates. Conversely, however, when Germany

or the rest of the eurozone undertake stimulus, the first-year GDP impact on France and Italy is negative because they suffer the effects of an appreciated euro.

Table 2: How each G-20 country benefits from the unilateral stimulus of others (% GDP)

| | USA | JPN | DEU | GBR | FRA | ITA | EUZ | CAN | AUS | KOR | TUR | CHI | IND | INO | MEX | ARG | BRA | RUS | SAU | ZAF |
|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| USA | 0.63 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| JPN | 0.04 | 0.43 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| DEU | 0.07 | 0.03 | 0.26 | 0.02 | -0.07 | -0.05 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| GBR | 0.06 | 0.01 | 0.03 | 0.22 | 0.02 | 0.02 | 0.04 | 0.01 | 0.01 | 0.01 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 |
| FRA | 0.04 | 0.01 | -0.17 | 0.02 | 0.68 | -0.05 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| ITA | 0.03 | 0.01 | -0.14 | 0.01 | -0.06 | 0.48 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EUZ | 0.06 | 0.02 | -0.13 | 0.03 | -0.06 | -0.04 | 0.41 | 0.01 | 0.01 | 0.01 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| CAN | 0.15 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.24 | 0.00 | 0.01 | 0.00 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| AUS | 0.04 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.26 | 0.01 | 0.00 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| KOR | 0.06 | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 | 0.10 | 0.00 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| TUR | 0.03 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.16 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CHI | -0.13 | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.50 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IND | 0.06 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.00 | 0.01 | 0.00 | 0.04 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| INO | 0.04 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.01 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MEX | 0.10 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.03 | 0.00 | 0.00 | -0.06 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| ARG | 0.04 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.26 | 0.03 | 0.00 | 0.00 | 0.00 |
| BRA | 0.04 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.48 | 0.00 | 0.00 | 0.00 |
| RUS | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 |
| SAU | -0.26 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.03 | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.22 | 0.00 |
| ZAF | 0.05 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.18 |

Note: Numbers in red represent the top five most significantly impacted economies

Table 2 can also be read from left to right to see which countries' stimulus influences each G-20 country the most. Australia, for example, benefits most from stimulus when it comes from China, the United States, Japan and Korea—its largest trading partners.

Coordinated stimulus

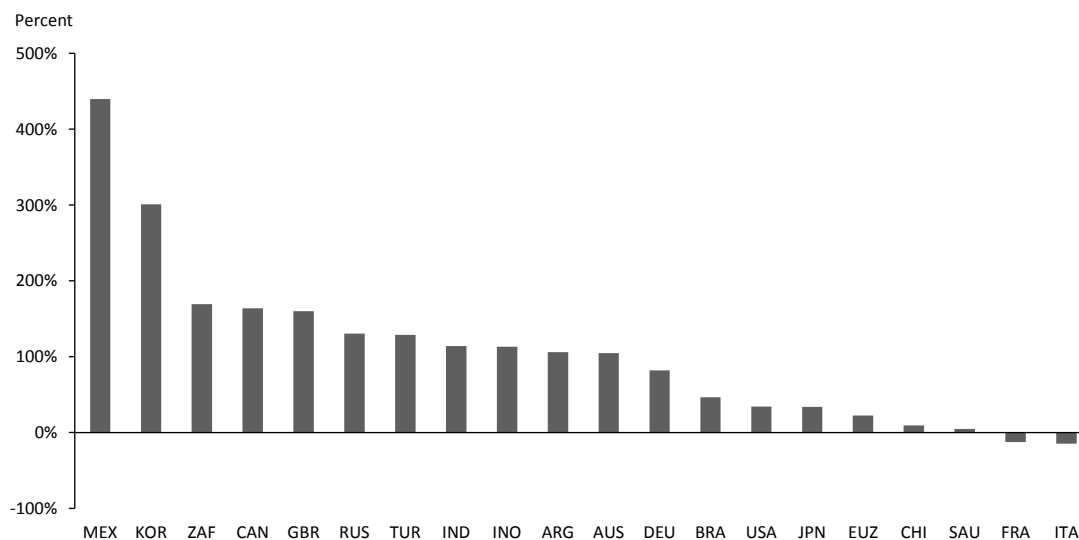
The critical question for this paper, however, is whether these spillovers imply a case for coordination. Are G-20 countries better off undertaking fiscal stimulus together or alone?

The results suggest there are strong benefits from coordination for most, but not all, G-20 countries. On average, the benefit to first-year GDP is twice as large (106 percent) for G-20 countries when they undertake their stimulus together than when they undertake it alone. But the impacts of coordination differ significantly from one G-20 economy to the next.

The benefit of coordination primarily comes from the effect on exchange rates and, to a lesser extent, through increased demand through the import channel. When a country stimulates alone, its exchange rate appreciates which acts to offset some of the benefits of its fiscal stimulus. When countries stimulate together, this exchange rate effect is offset and the effect of stimulus is larger. These effects are, however, partly mitigated by reduced investment from accentuated effects on real interest rates because, with all countries increasing spending at the same time, the demand on global savings is much larger than when a country acts alone.

Figure 14 shows, for each G-20 country, the first-year benefit to GDP from fiscal stimulus when undertaken together compared to when it is undertaken alone. That is, it shows, as a percentage, how much larger (or smaller) the first-year impact on GDP is when stimulus is undertaken together compared to when stimulus is undertaken alone.

Figure 14: How much larger the increase to first year GDP is when stimulus is coordinated (%)



As earlier, the countries, which benefit the most from coordination, tend to be those with more open economies and that trade more with the rest of the world. This is a logical finding since the primary benefit of coordination is avoiding an appreciated exchange rate. Hence, the more a country trades, the bigger is the benefit of avoiding this appreciated exchange rate and the larger is the benefits of coordination.

The country, which benefits the most, and for unique reasons, is Mexico. Capital flows in and out of Mexico tend to be highly sensitive to changes in fiscal policy, so much so that (as in Table 2) Mexico suffers a first-year loss to GDP when it undertakes fiscal stimulus alone. This is caused by much sharper contractions in investment and its trade balance than is the case for other G-20 countries. When the rest of the G-20 undertakes stimulus as well, first-year GDP in Mexico increases such that it is significantly better off from coordination.

The economies that benefit little from coordination tend to be the larger economies, which are less influenced by the actions of the rest of the world, and those countries that trade relatively less. The economies which lose from coordination tend to be those which have inflexible monetary policy and exchange rate frameworks, namely France, Italy and, to a lesser extent, Saudi Arabia and China. As earlier, France and Italy benefit significantly when they stimulate alone because their common currency with the eurozone means a more muted exchange rate effect. But when the rest of the eurozone stimulates, too, this exchange rate effect partially offsets some of the benefits of stimulus. Hence, they are worse off from coordination.

Saudi Arabia loses from coordination for a similar reason. When it stimulates alone, the impact on its exchange rate is more muted because its exchange rate is pegged to the United States dollar. But when the United States stimulates, too, the United States dollar appreciates, requiring tighter monetary policy from Saudi Arabian officials, which, in turn, depresses economic activity in Saudi Arabia. China similarly benefits little, but the benefits of increased demand tend to dominate.

It should be noted, however, that while coordination exacerbates the short-run benefits of fiscal stimulus (for most countries), it also exacerbates the medium-term cost. Coordination results in a steeper medium-term decline in GDP and slightly lower GDP in the long-run relative to the baseline. This is shown in Figure

15 for Canada and Figure 16 for Indonesia. The benefits of coordinated stimulus outlined above therefore presumes policymakers, by implementing stimulus, are more concerned about the short-term than the long-term. The results from in-depth interviews discussed in Section 4 suggests this is a reasonable assumption.

Figure 15: Impact of coordinated versus uncoordinated stimulus on Canada's GDP

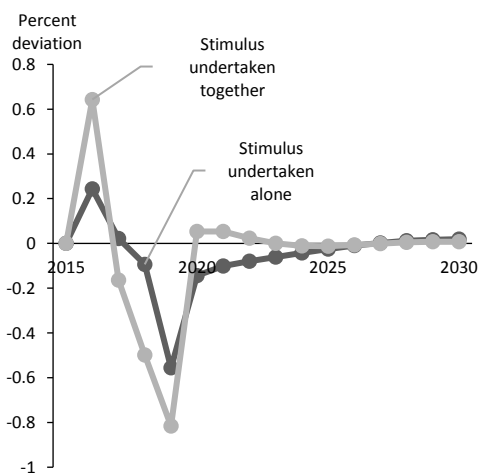
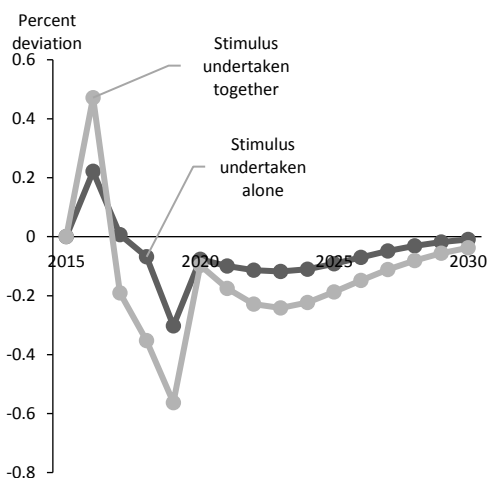


Figure 16: Impact of coordinated versus uncoordinated stimulus on Indonesian GDP



3.3 The role of risk and fiscal sustainability

Many warn that fiscal stimulus can, in certain circumstances, cause negative effects for the economy. These include increased risk premia, reduced confidence, a higher cost of capital and shifts in global trade and financial flows (Veld and Roeger, 2013; Laubach, 2009; Poghosyan, 2012). Others argue these concerns are overstated. Auerbach and Gorodnichenko (2017), for example, found that government-spending shocks do not lead to persistent increases in debt-to-GDP ratios or costs of borrowing, especially during periods of economic weakness.

If Auerbach and Gorodnichenko (2017) are correct, then the above analysis need not be taken further. However, if Veld and Roeger (2013), Laubach (2009) and others are correct then it is worth considering what effect an increase in risk might have for the above results.

Risk can enter the G-Cubed model in many ways, including for particular assets. In this paper, it is assumed to be through changes in the risk premia for the entire country. This means that investors require an additional return if they are to hold assets in a country that they now judge to be relatively riskier. The change in country risk premia is given through the interest parity equation in the G-Cubed model where the rate of return for any country at any time is equal to the rate of return for the United States, plus any expected exchange rate changes between the two countries, plus the risk premium (see McKibbin and Triggs, 2018).

The literature gives different estimates on the relationship between increased debt and deficits and risk premia (see Ardagna et al, 2004; Laubach, 2009; Poghosyan, 2012). A result that is typical of this literature is from Veld and Roeger (2013). They found that increased debt had no effect on risk for countries with debt-to-GDP less than 60 percent. But for countries with debt-to-GDP between 60 and 90 percent, they found that a 10 percentage point increase in debt-to-GDP increased risk premia by 1 percent. For countries

with debt-to-GDP exceeding 90 percent, they found that a 10 percentage point increase in debt-to-GDP increased risk premia by 2 percent.

Although some studies disagree with the Veld and Roeger’s results, it nevertheless provides a starting point—the results from which can then be scaled according to alternative estimates. Applying these findings in a linear fashion to G-20 countries suggests that a 1 percent increase in spending for three years will have the effects on country risk listed in Table 3. Most countries experience no change because their debt-to-GDP is under 60 percent. Some countries experience a moderate increase in risk because their debt-to-GDP is between 60 and 90 percent. Others experience a large increase in risk because their debt-to-GDP is over 90 percent of GDP. A stylized graph of the relationship identified by Veld and Roeger (2013) is shown in Figure 17.

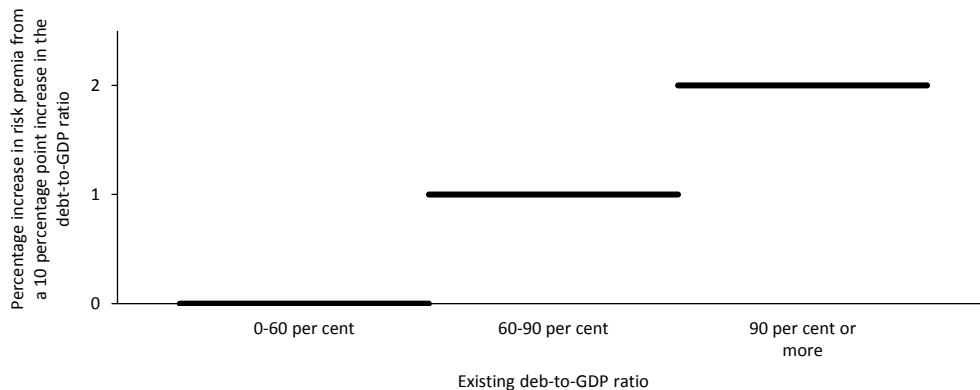
In some respects, Table 2 includes an unusual selection of countries. Other than Brazil and India, the countries captured by this methodology are the advanced economies that are typically treated by markets as being safe havens rather than the source of risk. The ways in which the results differ when risk is applied to the emerging market economies is considered at the end of this section.

Table 3: Cumulative percentage increases in country risk premia from fiscal expansion

| | Year 1 | Year 2 | Year 3 and beyond |
|----------------|--------|--------|-------------------|
| Argentina | 0 | 0 | 0 |
| Australia | 0 | 0 | 0 |
| Brazil | 0.01 | 0.02 | 0.03 |
| Canada | 0.02 | 0.04 | 0.06 |
| China | 0 | 0 | 0 |
| France | 0.02 | 0.04 | 0.06 |
| EU | 0.01 | 0.02 | 0.03 |
| Germany | 0.01 | 0.02 | 0.03 |
| India | 0.01 | 0.02 | 0.03 |
| Indonesia | 0 | 0 | 0 |
| Italy | 0.02 | 0.04 | 0.06 |
| Japan | 0.02 | 0.04 | 0.06 |
| Korea | 0 | 0 | 0 |
| Mexico | 0 | 0 | 0 |
| Russia | 0 | 0 | 0 |
| Saudi Arabia | 0 | 0 | 0 |
| South Africa | 0 | 0 | 0 |
| Turkey | 0 | 0 | 0 |
| United Kingdom | 0.02 | 0.04 | 0.06 |
| United States | 0.02 | 0.04 | 0.06 |

Source: Calculations based on Veld and Roeger (2013) and IMF World Economic Outlook database, Oct 2017

Figure 17: The assumed increase in risk premia from a 10 percentage point increase in debt-to-GDP for economies, based on their existing debt-to-GDP ratio



Source: Calculations based on Veld and Roeger (2013)

The effect of an increase in risk in the G-Cubed model is to cause a global reallocation of capital. Because investors perceive these economies to be riskier than before, they are less willing to hold assets in those countries. Because of this risk reappraisal, capital pours out of the economies that now have higher risk to obtain higher (risk-adjusted) returns elsewhere. Importantly, this increase in risk is assumed to be staggered, but permanent. Risk increases as debt increases but remains elevated for the rest of time. This has important implications for forward-looking agents who might otherwise change their behavior in anticipation of the risk-shock subsiding (see McKibbin and Stoeckel, 2009).

This increase in risk acts to offset some of the effects of fiscal stimulus in those economies. While the effect of fiscal stimulus is to draw-in capital, the effect of increased risk is to push capital out. The net impact, for most countries, is to only slightly reduce GDP. The contrast is shown for two relatively indebted countries—Canada and Japan—in Figures 18 and 19. For Canada, the effect of increased risk is comparatively small, a result which is typical for most countries. For Japan, given it has the largest stock of debt in the G-20 by some margin, the effect is significant.

Figure 18: Stimulus with increased risk versus without – Canada

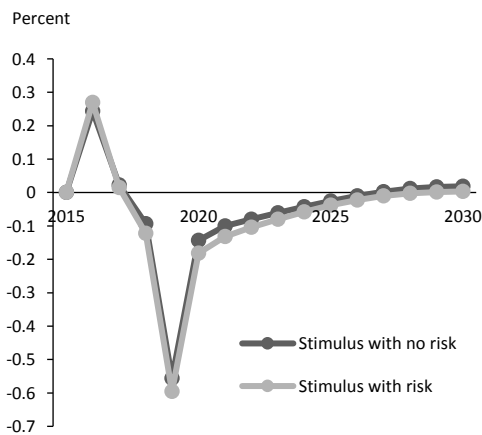
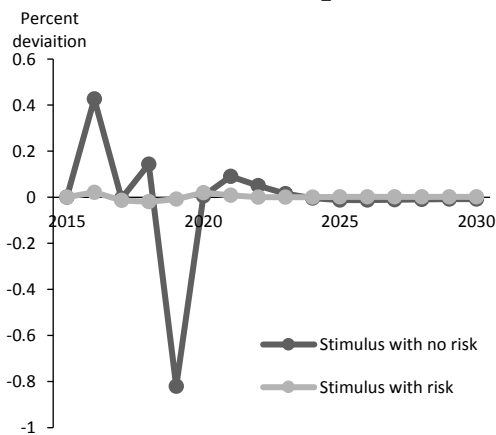


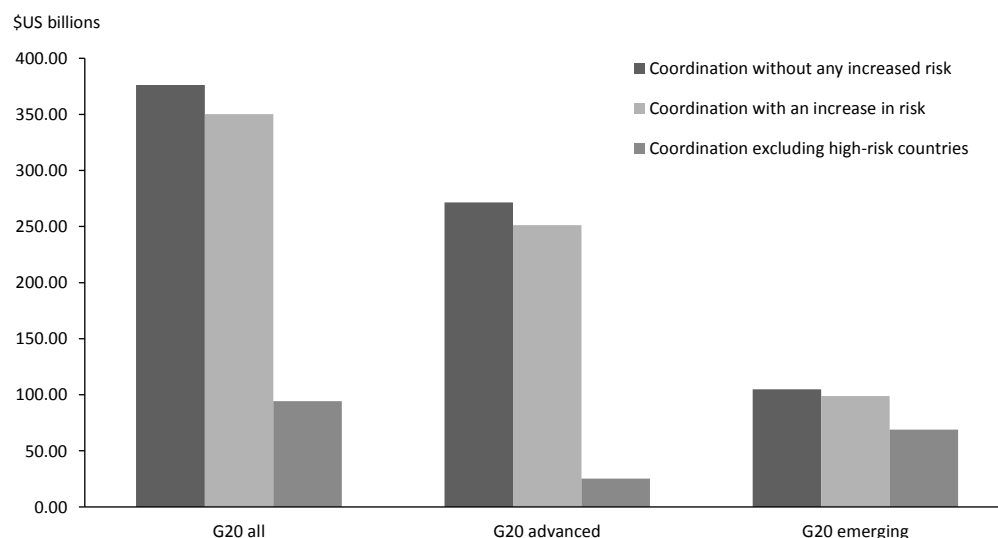
Figure 19: Stimulus with increased risk versus without - Japan



The critical question in thinking about future crises is whether we would want countries with relatively high levels of debt to still participate in coordinated stimulus given it results in an increase in risk in the global economy.

The results suggest the answer is: yes. Excluding relatively indebted countries from coordinated stimulus would exclude 10 of the largest G-20 countries. Having these countries not undertake stimulus results in the first-year aggregate boost to G-20 GDP being less than a third of what it is compared to when they stimulate, too. So while having these relatively indebted countries undertake stimulus causes an increase in risk in the global economy, the cost of excluding these economies from coordinated stimulus is larger than the cost of the increased risk (Figure 20).

Figure 20: The first-year impact of G-20 GDP from stimulus: without risk, with risk and excluding the high-risk countries



Two areas in this analysis warrant further consideration. The first is what would happen if it were the emerging market economies, rather than the advanced economies, which suffered the increase in risk. When this scenario is modelled, the results above are essentially reversed—capital is reallocated in favor of the advanced economies because they have lower risk premia. The effects on the benefits of coordination, however, are not changed. Countries are still better off acting together than alone.

The second issue is whether coordination itself could reduce risk and boost confidence. Many G-20 politicians and officials argued that coordinating stimulus during the global financial crisis acted to boost confidence and reduce risk by reassuring markets that countries were acting and working together (see Section 4). If true, this would mean that risk is lower because of coordination that would further increase the benefits of coordination.

3.4 An incentive to cheat?

Section 3.2 showed how each G-20 country benefits from the fiscal stimulus of others. This raises the question of whether individual countries have an incentive to cheat on a coordination agreement by withholding their own stimulus and free riding on the stimulus efforts of others.

The analysis below suggests the incentive to free ride is not strong. Again, assuming countries are focused primarily on the short-term (which the below interviews suggest is a reasonable assumption) G-20 countries have an incentive to undertake stimulus regardless of what other countries are doing.

This can be seen using simple game theory. Figure 21 shows the incentive matrix of four countries: Australia (which is representative of the incentives most countries face), France, Italy, and China (all three of which are special cases of countries which suffer a loss from coordination).

These incentive matrices show that all countries are better off stimulating, regardless of what the rest of the G-20 does.

Consider Australia. If the rest of the G-20 stimulates, Australia has two choices: it can stimulate as well (which boosts Australian GDP in the first year by 0.54 percent) or it could not stimulate (which boosts Australian GDP by only 0.22 percent). If the G-20 stimulates, Australia is therefore better off stimulating as well.

If the G-20 does not stimulate then Australia again has two choices: Either it can stimulate on its own (which boosts Australian GDP by 0.26 percent) or it could not stimulate in which case it faces the negative costs of the shock that the fiscal stimulus was meant to be in response to. Regardless of what the G-20 does, Australia is better off stimulating. The same is true for France, Italy, China, and all other G-20 countries.

Figure 21: Incentive matrixes of G-20 countries: to stimulate or not to stimulate?

| | | G-20 | |
|-----------|------------------|-----------|------------------|
| | | Stimulate | Do not stimulate |
| Australia | Stimulate | 0.54 | 0.26 |
| | Do not stimulate | 0.22 | Shock |
| France | Stimulate | 0.60 | 0.68 |
| | Do not stimulate | -0.47 | Shock |
| Italy | Stimulate | 0.41 | 0.48 |
| | Do not stimulate | -0.11 | Shock |
| China | Stimulate | 0.55 | 0.50 |
| | Do not stimulate | 0.04 | Shock |

3.5 Conclusion on the economic case for coordination

This section showed there is a strong economic case for fiscal stimulus to be coordinated. The first-year benefit from fiscal stimulus is twice as large (106 percent) on average for G-20 countries when it is coordinated across the G-20. But these benefits are distributed differently across countries. The benefits of coordination depend on a country's level of openness, their monetary policy frameworks and exchange rate regimes. Some countries benefit substantially, such as Canada, Korea, and Australia. Others benefit little, such as France, Italy, and China that, for these three, is because of their exchange rate frameworks.

This section found that if fiscal stimulus acts to increase country risk premia among relatively indebted countries, this acts to reduce the GDP benefits from coordination. However, excluding relatively indebted

countries from coordinated stimulus means significantly less stimulus is added to the global economy. The results found that the cost of not having these heavily-indebted countries undertaking stimulus is larger than the cost of the increase in risk such that, in the event of a future widespread shock, we would still want these countries to undertake stimulus, even if it increases risk premia.

Finally, the section looked at whether G-20 countries have an incentive to cheat by withholding stimulus and free riding on the stimulus efforts of others. Using a simple game theoretic framework, it showed that such an incentive does not exist. Countries have an incentive to stimulate regardless of what other G-20 countries are doing.

IV. COORDINATION OR COINCIDENCE? DOES THE G-20 INFLUENCE DOMESTIC FISCAL EXPANSIONS?

One of the key conclusions from the above modelling is that countries have an incentive to undertake stimulus regardless of what other G-20 countries are doing. Given this, it is reasonable to question whether the fiscal expansions by G-20 countries from 2008 to 2010 were genuinely coordinated or whether countries were simply moving in the same direction given they faced a common shock. The answer to this question is critical to understanding both the usefulness of coordination agreements in the first place, and for designing coordination agreements in the future.

It depends on how you define coordination. In response to a sound everyone turns their head. We might say “oh look, everyone coordinated in turning their heads” but in reality it was a similar response to a common shock. During the crisis, some countries would have had a similar fiscal policy response regardless of the G-20—*Phil Lowe, Governor of the Reserve Bank, Australia, interviewed April 29, 2017.*

On the question of whether coordination was genuine or not, much of the G-20’s fiscal expansion can be immediately ruled-out. Automatic stabilizers accounted for 36 percent of the overall expansion that, as the name suggests, occur automatically. The same is true for another 30 percent of the total expansion which was from spending unrelated to the crisis (mostly defense spending) (IMF, 2009).

For the remaining 34 percent, although authors question whether the G-20 played a coordinating role or not, there has been no conclusive study which has answered this question. Helleiner (2014) used an event analysis to explore whether the G-20’s agreement on coordinated fiscal stimulus influenced the domestic policies of China. He noted that China’s fiscal stimulus package was announced before the leaders G-20 meeting in 2008 and therefore concluded that the G-20 did not have an effect (see also Wade, 2011).

There are several reasons to be skeptical of this conclusion. Fiscal stimulus, after all, was not a one-year event—it was a process, which persisted from 2008 to 2010 (and sometimes longer). Many countries, including China, not only had multiple stimulus packages but were also constantly assessing how long they should keep stimulus going. Furthermore, the majority of the G-20’s agenda is agreed and delivered before the leaders meeting in the dozens of meetings of ministers and officials throughout the year. The G-20 also represents a “repeat game” where policymakers slowly chip away at an issue until a consensus is reached.

Nothing of substance is settled at most international meetings; all important issues are usually settled beforehand—*Raghuram Rajan, former Governor of the Reserve Bank of India.*⁷

This paper therefore adopts a different approach. There is only one *ex ante* transmission mechanism between the G-20 and the domestic policies of its members, and that is the policymakers themselves. If policies are directly influenced by the G-20, it is because the politicians and officials who attended those meetings changed the domestic policies of their country because of what was agreed and discussed. As the old saying goes: if you want answers, go to the source.

This paper has done exactly that. It reports the results from in-depth interviews with 61 leaders, central bank governors, ministers and officials from across all G-20 countries. These are the individuals who make up the G-20 and are responsible for shaping the policies in their countries. The findings of this paper are testament to the generosity and openness of these policymakers in discussing their experiences in global economic cooperation. Participants included Kevin Rudd, Janet Yellen, Haruhiko Kuroda, Ben Bernanke, Jack Lew, Mark Carney, and 55 other politicians and officials to whom I am deeply grateful. The methodology used for this research and a breakdown of the sample is extracted to Appendix A.

4.1 Does the G-20 influence fiscal policy expansions?

At either extreme, there are often two views expressed in the popular media on the G-20's influence on domestic fiscal policy expansions. One view is that fiscal policies are determined entirely domestically. Under this view, any apparent coordination in global bodies like the G-20 is merely coincidental, and little weight should be attached to the role of these global bodies regarding fiscal policies.

The other view is that, in the wake of the global financial crisis, leaders came together in the G-20 and negotiated a global agreement to coordinate fiscal stimulus. This agreement resulted in individual G-20 politicians and officials returning to their capitals and implementing the stimulus they had agreed to do in the G-20.

The interviews conducted for this research suggests that neither view is correct. While it is wrong to say that countries' fiscal policies are determined by the G-20, it is also wrong to say that the G-20 has no influence over domestic fiscal policies. The interviews found that the G-20 does influence fiscal policy expansions. But the extent of this influence appears to vary across four critical dimensions:

- The relative size of the economy: smaller economies reported being more influenced by the G-20 than larger ones.
- The level of development: G-20 emerging market and developing economies reported being more influenced by the G-20 than advanced economies.
- The state of the economy: perhaps unsurprisingly, all economies reported being much less likely to expand fiscal policies because of a G-20 agreement outside of a crisis.
- The extent to which policymakers are convinced of the benefits of coordination: policymakers who are skeptical of the economic benefits of coordination reported their country being less influenced by any coordination agreements.

In total, 11 of the G-20 economies reported that they undertook more fiscal stimulus from 2008 to 2010 because of the G-20 than they otherwise would have done (Figures 22 and 23). For some countries, the increase in stimulus in 2008 was substantial—up to half a percent of GDP—while for others it was more marginal.

⁷ Rajan, R. (2010). *Fault lines*. Princeton University Press. p208.

The G-20 played a positive role in the quantum of Australia's fiscal stimulus. We could deploy the argument in domestic politics that the world was undertaking a similar approach. The discussion also reinforced for many countries the enormity of the crisis facing the global economy. I know from private conversations that a number of countries undertook more stimulus because of discussions and agreements at the G-20—*Kevin Rudd, 26th Prime Minister of Australia, interviewed September 8, 2017.*

The G-20 collective action and the IMF statements made it easier for Australia to do 2 percent of GDP worth of stimulus—*Gordon de Brouwer, former Sherpa, Australia, interviewed February 23, 2017.*

The fact we had international consensus made it much easier for governments to undertake deficit spending—*Simon Kennedy, former Sherpa, Canada, interviewed August 3, 2017.*

We probably would have undertaken the same measures, but the level of urgency, confidence and quality would be lower—*Mahendra Siregar, former Sherpa, Indonesia, interviewed May 22, 2017.*

For stimulus, yes. Absolutely we did more, as did others. Leaders understood the degree of uncertainty better because they were sharing notes more than if they sat at home in their countries. They were a lot more aware of the spillovers between each other so they were more willing to do more as a consequence—*Martin Parkinson, Secretary of the Department of the Prime Minister and Cabinet, Australia, interviewed May 30, 2017.*

There was a lot of urging on us by our international partners for us to do more given our sound fiscal position—to use that space—and we listen to our international partners. We have also provided a lot of funding through the IMF and through capital increases for the MDBs. That for sure would not have happened without the G-20. It also went almost unnoticed in the wider public that the MDBs created several dedicated facilities, for infrastructure financing for example, and this funding would not have been made available without the G-20, or was at least significantly increased because of the G-20—*Holger Fabig, senior G-20 official, Germany, interviewed April 7, 2017.*

The relative size of economies appears to make a difference (Figure 22). Divided between large and small,⁸ 70 percent of smaller economies said their fiscal expansions were larger because of the G-20 compared to just 40 percent of larger economies. Emerging market economies were also slightly more likely to have been influenced by the G-20 than advanced economies: 60 percent compared to 40 percent (Figure 23).

Stimulus was not really coordinated, at least not from the U.S. perspective. Countries may have changed their behavior because of the G-20 a little bit, there was a shared imperative and coincidence of interest. I think the forum was less important than the imperative—*Former senior official, United States, interviewed September 12, 2017.*

The fiscal commitments we made in 2014 reflected what we were trying to do anyway. In terms of outcomes, we eased up on some tax provisions, and reached a short-term agreement on annual appropriations—but I don't think it was principally because of the G-20. Those things had their own domestic momentum—*Jacob Lew, former Treasury Secretary, United States, interviewed September 7, 2017.*

⁸ Ranked by GDP (PPP), large countries are classified as China, the EU, the United States, India, Japan, Germany, Russia, Indonesia, Brazil and the United Kingdom.

No coordination was required, as every country wants to pump up its economy to the extent possible: the G-20 leaders were pushing on an open door when they called for coordinated stimulus—*Raghuram Rajan, former Central Bank Governor, India.*

Figure 22: The G-20’s influence on fiscal stimulus: large and small economies

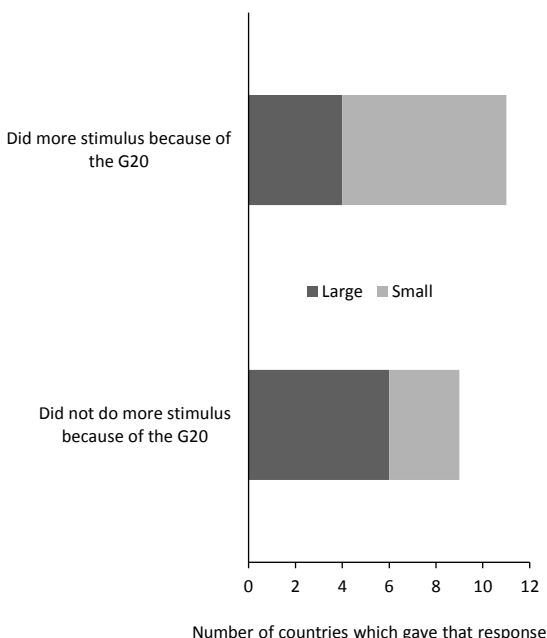
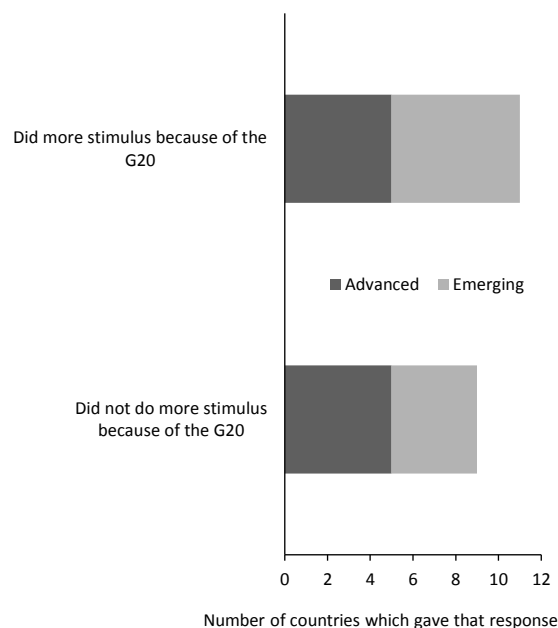


Figure 23: The G-20’s influence on fiscal stimulus: advanced and emerging economies



Perhaps unsurprisingly, the G-20 appears to have more influence over domestic fiscal policy settings during a crisis than outside of a crisis, and when economies are facing a symmetric, or shared, challenge. This was highlighted by comparing two periods in which the G-20 pushed for expansive fiscal policies: in 2008 (as part of crisis-response) and from 2013 to 2017 (as part of a move, led by the United States, for more “growth friendly” fiscal policies). Policymakers suggest the G-20’s influence over fiscal expansions was much weaker outside of a crisis.

I don’t think any of us put out commitments we didn’t believe, but I can tell you that a lot of the commitments from the United States were things that required Congress to act, and we knew that would be difficult. The G-20 can help drive domestic systems toward moving ahead on difficult matters, but in the end, it takes either a groundswell of domestic support or a crisis to get some of those policies through—*Jacob Lew, former Treasury Secretary, United States, interviewed September 7, 2017.*

The opposition to fiscal stimulus during a crisis is much weaker than outside of a crisis—*Senior G-20 official, Italy, interviewed February 18, 2017.*

During the crisis, fiscal policy coordination delivered a desirable outcome. Although such coordination has been less observed since then, it is not because the G-20’s influence has weakened but because it is less clear nowadays whether such degree of policy coordination is needed as we are out of the crisis and cyclical positions of each country are less synchronized—*Chang Yong Rhee, former Secretary General and Sherpa of the Presidential Committee for the 2010 G-20 Seoul Summit, Republic of Korea, interviewed August 17, 2017.*

It was coordinated from 2008 to 2010 because everyone was in the mess together. Whether in a more complex set of circumstances you could get a coordinated outcome like that I don't know—*Wayne Swan, former Treasurer, Australia, interviewed March 21, 2017.*

The idea of coordinated stimulus has become more contentious because fiscal positions have deteriorated and debt is high. If you had a repeat GFC today you might get other countries not agreeing to coordinated stimulus—*Central Bank official, advanced economy, interviewed August 17, 2017.*

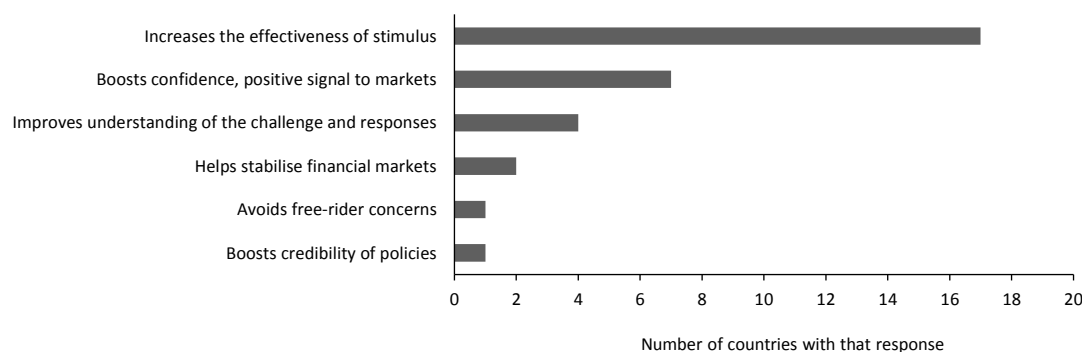
The G-20 can therefore play a positive role in influencing fiscal expansions in many countries, under certain circumstances. The issue that remains, however, is why this influence exists.

Why does the G-20 influence domestic fiscal expansions?

Policymakers identified a range of interrelated economic and political benefits that they perceived to come from coordinated fiscal expansion. These benefits ultimately underpinned the decision-making in their countries.

When asked about the economic benefits from participating in coordinated stimulus (Figure 24), the most common response was that fiscal stimulus results in positive spillovers between countries. Having more countries undertaking fiscal stimulus resulted in a whole that was greater than the sum of its parts, as demonstrated in the modelling above.

Figure 24: What policymakers perceive to be the economic benefits of coordinated fiscal stimulus



Policymakers said that coordination was also important because it boosted market confidence or sent a positive signal to the markets, helped them to better understand the nature of the problem and how other countries were going to react. It boosted the credibility of their commitments to markets and helped prevent other countries from free riding on their fiscal expansions.⁹

Coordination was crucial to avoiding beggar-thy-neighbor policies—*Senior G-20 official, Italy, interviewed February 18, 2017.*

The collective action and its size and timing were very important to shift market sentiment. It is often not only the size of fiscal stimulus but the effect of political awareness and identification of

⁹ The numbers in parentheses do not sum to 100 because most countries gave multiple reasons for their answer.

the right measures which have a significant impact on boosting confidence - *Senior central bank official, emerging market economy, interviewed May 17, 2017.*

A real benefit of having that stimulus was that we learned from the lessons of other countries and the importance of keeping stimulus measures prudent—not to create unnecessary future fiscal risk. That was very important. We were able to learn from what other countries were doing in the G-20—*Mahendra Siregar, former Sherpa, Indonesia, interviewed May 22, 2017.*

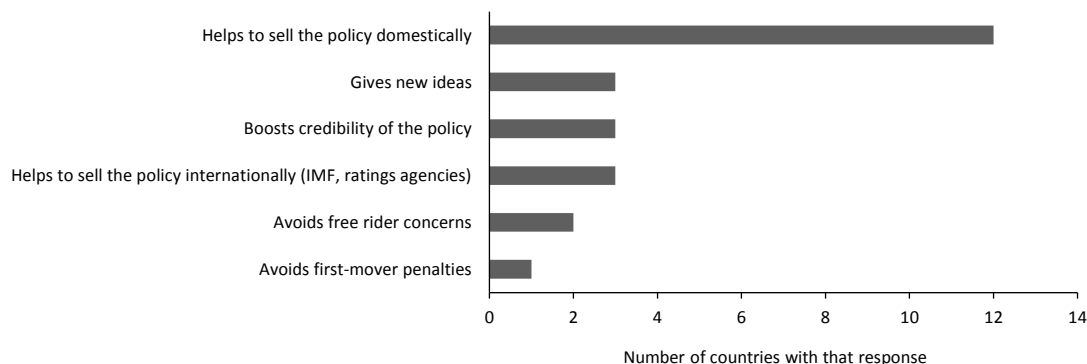
It was a strong signal of international cooperation, which boosted confidence and reassured businesses and the public that governments were able to act. Put quite simply, but it is true—I think the world needs to see pictures of world leaders coming together in difficult times, to see that these people do actually come together, they do talk to each other and they do reach significant conclusions. That in itself is a very powerful message for the global economy. This is vital for confidence—*Holger Fabig, senior G-20 official, Germany, interviewed April 7, 2017.*

Fifteen of the 20 countries felt that there were also political benefits to their country from having fiscal stimulus coordinated, although many noted that the political and economic benefits can be difficult to disentangle:

Political and economic advantages can go hand-in-hand. Boosting the credibility of a policy is good for politics but also makes the policy more effective through increased business and household confidence—*Gordon de Brouwer, former Sherpa, Australia, interviewed February 23, 2017.*

The primary political benefit (Figure 25) was that it helped sell the policy domestically and bolster the credibility of their policy to a domestic audience. It also helped calm concerns among the public that other countries might be free riding on their country’s efforts. It gave them policy ideas, it gave them support around political messaging, it helped them to avoid international political pressures from credit rating agencies and international organizations which might otherwise disapprove of expansive fiscal policy (particularly for emerging economies) and it helped them avoid political pressure from being a global “first mover.”

Figure 25: How the G-20 influences domestic fiscal stimulus



To be honest, it helped sell the stimulus domestically but also to explain to the luddites in the Opposition that we weren’t being Robinson Crusoe on this. Making the case for stimulus was aided by the magnitude of the collective actions from other countries, embraced in the London communique—*Kevin Rudd, 26th Prime Minister of Australia, interviewed September 8, 2017.*

It was definitely easier to do stimulus in Indonesia because of the G-20. This was the opposite of the situation in 1998 when the IMF’s recommendations were to pursue tighter fiscal policy during

a crisis. We focused on tax cuts and increased spending on social assistance—*Muhamad Basri, former Finance Minister, Indonesia, interviewed November 6, 2017.*

In Argentina, the G-20 helped with the politics of stimulus. We could say that “what we are doing is also supported by the G-20” which showed that we were not alone putting in place fiscal stimulus policies—*Cecilia Nahón, Former Sherpa, Argentina, interviewed October 2, 2017.*

Korea undertook fiscal stimulus in 2008 and 2009, and the supplementary budget was relatively smoothly passed in the Parliament as the other G-20 members committed to such stimulus as well—*Chang Yong Rhee, former Secretary General and Sherpa of the Presidential Committee for the 2010 G-20 Seoul Summit, Republic of Korea, interviewed August 17, 2017.*

The G-20’s coordinated actions provided vital political cover for some governments who might have otherwise had domestic constituency concerns—*Wayne Swan, former Treasurer, Australia, interviewed March 21, 2017.*

It helped sell the policy globally. It allowed fiscal stimulus without attracting negative attention from the credit rating agencies, the IMF and other similar bodies. Coordination made fiscal stimulus more respectable—*Arvind Mayaram, former finance deputy, India, interviewed June 7, 2017.*

Coordinated stimulus was used politically by all countries. The coordination legitimized their domestic stimulus—*Hugo Gobbi, former sous sherpa, Argentina, interviewed May 12, 2017.*

The concern of fiscal leakages to other countries certainly played out in Australia. If people spent their stimulus cheques on plasma TV’s, well, we don’t make plasma TV’s in this country—*Gordon de Brouwer, former Sherpa, Australia, interviewed February 23, 2017.*

The countries that found there were no political benefits, again, tended to be larger economies. The most common reasons were that domestic considerations simply trumped any international considerations, there was weak domestic opposition to stimulus in the first place or, for several EU countries, that fiscal rule and discussions in the EU dominated any influence from the G-20. Domestically-legislated fiscal rules, such as that in Indonesia, also played a critical role.

The G-20’s actions on stimulus didn’t really help us politically. But the U.S. has complicated politics. Most Americans, and many in Congress, are proudly indifferent to what the rest of the world thinks —*Former senior official, United States, interviewed September 12, 2017.*

I tried as best I could to use the G-20 as an additional reason for domestic action in the U.S. But the American system is hard to drive that way, and you need to be careful in how you make the case. In the United States, there can be a backlash if you make the argument that you’re doing something to comply with international rules rather than as a domestic choice. But the consensus from the G-20 was not unwelcome—it certainly helped in getting action from other countries—*Jacob Lew, former Treasury Secretary, United States, interviewed September 7, 2017.*

For whatever reason, India rarely uses international agreements to leverage or justify changes in domestic policy. Partly, I think, this is a long shadow from the history of imperial colonization in India—*Montek Ahluwalia, former Sherpa, India, interviewed June 10, 2017.*

The G-20’s focus on fiscal stimulus and consolidation had limited impact domestically because of Indonesia’s fiscal rule: the deficit cannot exceed 3 percent—otherwise the President can be

impeached—*Muhamad Basri, former Finance Minister, Indonesia, interviewed November 6, 2017.*

The above results suggest the G-20 can influence fiscal policy expansions, but this influence varies from country to country depending on the relative size of the economy, its level of development and the state of its economy.

V. CONCLUSION

Almost 10 years ago, the G-20 embarked on what it called “the largest coordinated fiscal stimulus in history.” But this paper is more focused on the future than the past.

If the global financial crisis occurred tomorrow, there are several questions that we would want answers to when thinking about a potential fiscal policy response: what are the benefits of coordinated fiscal stimulus? Will countries change their domestic policies in response to a global agreement? Has this been done successfully in the past? And what happens if, as is the case today, some of those countries are have much more debt than they previously did? Would we still want them to undertake fiscal stimulus?

This paper explored each of these questions using data analysis, a new computable general equilibrium model called the G-Cubed (G-20) model and in-depth interviews with 61 politicians and officials from across all G-20 countries.

The paper found that most countries are significantly better off stimulating together than stimulating alone. On average, the first-year GDP gain from fiscal stimulus is twice as large if stimulus is undertaken along with all other G-20 countries than if it is undertaken alone.

But the paper found that not all countries benefit from coordination. The countries that are more open to international trade and finance and have more market-determined exchange rates tend to benefit the most. Economies that are relatively closed will tend to be more indifferent between undertaking stimulus alone compared to having it coordinated across the G-20. Economies that do not have market-determined exchange rates or, like those in the eurozone, share an exchange rate with other countries, tend to lose because of coordination. The interactions of exchange rates, interest rates and capital flows mean that these countries would generally prefer to stimulate alone rather than stimulate with the rest of the G-20. These countries are, however, in the minority.

Many commentators have been skeptical about whether countries did more stimulus because of the G-20. But no studies have been able to reach a robust conclusion one way or the other. This paper argued that there is only one *ex ante* transmission mechanism between the G-20 and the domestic policies of its members, and that is the policymakers themselves. If policies are directly influenced by the G-20, it is because the politicians and officials who attended those meetings changed the domestic policies of their country because of what was agreed and discussed. As the old saying goes: if you want answers, go to the source.

This paper did exactly that. Through in-depth interviews with 61 politicians and officials from across the G-20, it found that more than half of G-20 countries undertook more stimulus because of the G-20 than they otherwise would have done. Relatively smaller economies were more likely to undertake more stimulus because of the G-20 than was the case for larger economies. Emerging market economies also appear to be more influenced by the G-20 than advanced economies.

The paper explored the many reasons why this influence exists. G-20 coordination gives policymakers a bigger bang-for-their buck. It can also help them to sell the policy domestically. It can bolster the credibility

of their policy to a domestic audience. It can help them calm concerns among the public that other countries might be free riding on their country's efforts. It can give them policy ideas, give them support around political messaging and help them to avoid international political pressures from credit rating agencies and international organizations, which might otherwise disapprove of expansive fiscal policy.

In short, the paper found that different countries will use the G-20 differently. This is a critical insight that is often overlooked, particularly by policymakers in larger economies. While the G-20 may offer little economic or political benefit to politicians and officials in larger economies, it can significantly help policymakers in smaller economies. Understanding how different countries use the G-20, both economically and politically, is critical to shaping an effective G-20 agenda.

The paper considered the implications of increased debt for any future fiscal stimulus. From 2007 to 2018, G-20 countries have added \$33 trillion to the global stock of debt. Many warn that fiscal stimulus can, in certain circumstances, cause negative effects for the economy. These include increased risk premia, reduced confidence, a higher cost of capital and shifts in global trade and financial flows (Veld and Roeger, 2013; Laubach, 2009; Poghosyan, 2012). Others, however, argue that these concerns are overstated. Auerbach and Gorodnichenko (2017), for example, found that government-spending shocks do not lead to persistent increases in debt-to-GDP ratios or costs of borrowing, especially during periods of economic weakness.

While this debate continues, this paper looked at what effect an increase in risk premia would have for a future agreement to coordinate stimulus if it was to occur. It found that having these relatively indebted countries undertake stimulus reduces the overall benefits of coordinated stimulus. But the cost of excluding these economies from coordinated stimulus is larger than the cost of increased risk. Excluding these countries reduces the overall benefit to first-year global GDP by almost two-thirds.

Finally, the paper showed that the G-20, if anything, over delivered on its promises. It promised to deliver a \$5 trillion fiscal expansion from 2008 to 2010 and it ended up delivering \$6.38 trillion. The findings of this paper suggest that the role of the G-20 in delivering coordinated fiscal stimulus from 2008 to 2010 should not be underestimated. We would want at least a similar level of global cooperation should another global financial crisis occur in the future.

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ATTACHMENT A—IN-DEPTH INTERVIEWS METHODOLOGY

The population for this research—referring to the group that the research intends to generalize its findings across—is summarized in Table A1. It can be organized by G-20 stream (left to right) and by seniority (top to bottom), multiplied by 20 countries. The objective of this research was to interview the most senior policymakers possible in each G-20 stream from each G-20 country. This implies a total sample of 60 individuals. This minimizes bias by ensuring representation across all countries and streams of the G-20 given different streams often have different areas of responsibility and expertise.

Table A1: The theoretical population for the research

| Leaders stream | Finance ministers stream | Central bank governors stream |
|-------------------------------|--------------------------|-------------------------------|
| Leaders | Finance ministers | Central bank governors |
| Sherpas (advisors to leaders) | Finance deputies | Central bank deputies |
| Sous-Sherpas | Finance deputy deputies | Central bank deputy deputies |
| Other officials | Other officials | Other officials |

In total, 61 policymakers were interviewed. Table A2 shows the size of the sample and how it is distributed across countries and workstreams. The identities of the policymakers who participated in this research are confidential, except for where they have been directly quoted. All quotes have been approved by those to whom they are attributed.

There are debates in the literature on the appropriate sample size when undertaking in-depth interviews, but a sample of 61 is more than adequate given the specialized nature of this research and the unique position of the policymakers.¹⁰

Although interviewing multiple policymakers within a country is vital to reducing potential bias (see Baxter and Eyles (2010) on the importance of “triangulation”) the downside is that some countries are overrepresented in the sample (e.g., Australia). To address this, the accounts of policymakers are aggregated by country. Aggregation, however, requires that there be no significant disagreement between the policymakers within a country. This turned out to be the case. It was only in rare circumstances that the accounts of policymakers differed within the same country. Where inconsistencies did arise, they were addressed through follow-up conversations and through a weighting system based on the policymaker’s area of expertise (e.g., monetary policy), the time in which they served and their seniority.¹¹

Finally, a challenge of any qualitative research is in standardizing the data so that it can be reported in a way that is accurate but also digestible. This paper uses the commonly used technique, detailed by Diccobloom and Crabtree (2006), referred to as an “editing approach.” This is where the investigator reviews and

¹⁰ As summarized by Dorkin (2012), the concept of “saturation” is the most important guide in determining the appropriate sample size (see also Mason, 2010). Saturation is defined as the point at which the data collection process no longer offers any new or relevant data or “when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of your core theoretical categories” (Charmaz, 2006, p. 113). Many factors are important in determining the appropriate size of a sample, including the quality of data, the scope of the study, the nature of the topic, the nature of the individuals being interviewed, the amount of useful information obtained from each participant and the qualitative method and study designed used (Morse, 2000).

¹¹ First, the accounts of policymakers who worked within the relevant G-20 work-stream were given preference over the accounts of policymakers who did not work in that policy stream. The accounts of central bank governors, for example, were given greater weight on the topic of monetary policy than the accounts of Sherpas. Second, the accounts of policymakers who worked on the G-20 at the time that an issue was discussed were given preference over the accounts of policymakers who did not work on the G-20 at that time. For example, the accounts of finance ministers who were present for the fiscal stimulus discussions in 2009 were given preference over the accounts of finance ministers who worked on the G-20 at a later date. Third, the accounts of more senior policymakers were given preference over the accounts of less senior policymakers. The view of a central bank governor, for example, was given preference over the view of a central bank deputy.

identifies themes and text segments much as an editor does in organizing text.¹² This allows the results, reported in the sections that follow, to be partially standardized, complemented with direct quotes to flesh out what policymakers meant by their responses.

Table A2: Sample distribution for the interviews of G-20 politicians and officials

| Country | Total | G-20 work stream | | |
|----------------|-------|------------------|---------|--------------|
| | | Leader | Finance | Central bank |
| Argentina | 2 | 2 | | |
| Australia | 9 | 4 | 3 | 2 |
| Brazil | 1 | | | 1 |
| Canada | 3 | 1 | 1 | 1 |
| China | 2 | 1 | | 1 |
| European Union | 3 | 1 | 1 | 1 |
| France | 2 | 1 | | 1 |
| Germany | 3 | 1 | 1 | 1 |
| India | 3 | 1 | 1 | 1 |
| Indonesia | 2 | 1 | 1 | |
| Italy | 4 | 1 | 1 | 2 |
| Japan | 2 | | | 2 |
| Mexico | 1 | 1 | | |
| Korea | 2 | | 1 | 1 |
| Russia | 3 | 1 | 1 | 1 |
| Saudi Arabia | 1 | 1 | | |
| South Africa | 3 | 1 | 1 | 1 |
| Turkey | 2 | 1 | | 1 |
| United Kingdom | 7 | 2 | 2 | 3 |
| United States | 6 | 2 | 2 | 2 |
| Total | 61 | 23 | 16 | 22 |

¹² A team from Ontario, Canada used this strategy to apply more than 100 codes in a study to understand the smoking experience and cessation process (see Diccico-Bloom and Crabtree, 2006).



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