Quantifying the Fiscal Stimulus Effect
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EXECUTIVE SUMMARY

The Global Financial Crisis has led to a significant decline in world-wide economic activity. Job losses will continue until employers are confident about future demand for their goods and services. Governments are embarking on many and varied fiscal stimulus programs to increase the level of economic activity.

One of the Australian Government’s initiatives has been the Regional and Local Community Infrastructure Program (RLCIP) which will make $800 million available to councils nationwide and around $60 million to SA councils.

An extra dollar spent on goods and services can generate more than one dollar’s worth of additional activity as a portion of it will be re-spent by those who benefitted from the original outlay. This is known as the fiscal multiplier effect.

The various projects undertaken by councils as a result of the RLCIP will vary in the extent of local fiscal stimulation they provide depending on factors such as:

- the population of the region and its existing income levels;
- the mix of Australian and overseas sourced inputs in the project;
- the extent to which the project’s workforce would be otherwise employed; and
- how quickly the project is undertaken and money is spent.

Access Economics has developed a methodology and provided it in the form of an Excel spreadsheet model to help the Local Government Association and South Australian councils assess the fiscal multiplier and income impact of councils’ responses to the RLCIP. This paper outlines the rationale for the model and its assumptions and limitations. It also identifies data that will need to be collected to make use of the model.

The multipliers derived are useful only for the particular purpose explored in this report - they will not apply in the longer term when more favourable economic conditions return. For example, when conditions improve and there is less spare productive capacity, the fiscal multiplier effect of a project can be expected to be smaller.

In making decisions regarding the best use of RCLIP funds, a council should appreciate not only the immediate local fiscal stimulus effect but also consider its community’s needs and priorities and the likely impact of a project proposal on the council’s ongoing financial sustainability.
PART 1: OVERVIEW

1.1 BASIS FOR THE APPROACH AND ITS LIMITATIONS

This report discusses an approach to measuring and using short-term fiscal multipliers based on a ‘first principles’ approach.

When compared with other approaches available to quantify possible fiscal stimulus effects (e.g., input-output analysis or computable general equilibrium (CGE) modelling), the ‘first principles’ approach used in this report is considered by far the most cost effective and transparent given the circumstances.

Nevertheless, the multipliers derived are useful only for the particular purpose explored in this report, namely to indicate the bang-for-the-buck from local government authorities’ stimulus spending – at both regional and national levels – expected over the next two years while the economy experiences a surfeit of spare capacity. These multipliers will not apply in the longer term when more favourable economic conditions return, at which time such multipliers can be expected to revert to smaller values.

1.2 WHY MEASURE FISCAL MULTIPLIERS?

The Global Financial Crisis has led to a significant decline in world-wide economic activity.

Many countries are already in recession (often technically defined as two successive quarters of negative economic growth). When financial data is released shortly for the March 2009 quarter, it is expected to show that Australia too has slipped into recession. It will at the very least show that the rate of growth in the Australian economy has declined dramatically. Unemployment has risen and is expected to continue to do so throughout 2009.

The magnitude of this world-wide economic downturn is the largest since the 1930s’ Great Depression. How long and deep it will turn out to be will depend in part on the actions of governments throughout the world. Internationally, governments are co-operating to undertake very large scale co-ordinated, comprehensive fiscal stimulations of their economies.

In Australia and elsewhere, sub-national governments too are being encouraged to bring forward planned future expenditure proposals and initiate soundly-based additional ones where they can do so without jeopardising their longer-term financial sustainability.

Major declines in economic growth rates and talk and expectations of recession understandably cause private businesses and households to batten down the hatches. The consequential reduction in demand for goods and services in an economy when this occurs can bring about and make more severe the very outcomes that decision-makers were hoping to protect themselves from.
Increases in expenditure by governments can help fill the gap caused by reduced outlays by businesses and households. Such action, if of appropriate timing, magnitude and focus can restimulate demand and economic activity and thereby reduce the likelihood and extent of job losses and help bring about recovery.

An extra dollar spent on goods and services can generate more than one dollar’s worth of additional activity as a portion of it will be respent by those who benefitted from the original outlay. This is known as the fiscal multiplier effect.

A fiscal multiplier may be large (e.g., 3 times the initial outlay) or less than 1. It is dependent on factors such as:

- the extent of underutilised capacity in an economy (the multiplier effect will be less the closer an economy is to full capacity);
- people and business’ marginal propensity to save out of increased income (the higher the proportion that is respent the greater the multiplier);
- the import content of people and business’ spending (funds used to pay for imported goods achieve a once-only local stimulus); and
- how quickly the money is spent (projects that require lots of planning before most spending occurs aren’t able to provide much stimulus when most needed).

1.3 LOCAL GOVERNMENT’S ROLE IN FISCAL STIMULATION

The Australian Government has in recent months embarked on a diverse range of fiscal stimulation initiatives. These programs are intended to provide broad economic stimulation across the country. Their design has had regard to a range of criteria but in particular the likely multiplier impact from the outlays on the national economy.

One of the Australian Government’s initiatives has been the Regional and Local Community Infrastructure Program (RLCIP) which will make $800 million available to councils nationwide and possibly approximately $60 million to SA councils.

Providing money to local governments is a good way of ensuring there is equitable stimulation in all geographic areas of Australia. But such programs can have other benefits too, including the following.

- Because local government infrastructure projects are typically of a smaller scale and are project managed locally, they can often be commenced and completed more quickly than projects of other governments. As a result, all other things being equal, they will therefore generate a higher fiscal multiplier.
- Many councils will utilise their own-source funds to augment RLCIP monies in order to undertake projects of maximum local benefit. As a result the Australian Government in terms of its objectives will get a bigger bang for the buck.

1.4 QUANTIFYING THE FISCAL STIMULATION EFFECT OF RCLIP PROJECTS

The various projects undertaken by councils as a result of the RLCIP will vary in the extent of fiscal stimulation they provide depending on their characteristics. Access Economics has developed a methodology and provided it in the form of an Excel spreadsheet model to help
the LGA and councils assess the multiplier impact of RLCIP projects and their impact on economic growth at the national and regional level.

Part 2 of this paper describes the model and its rationale and assumptions.

All parameter values recommended for use by Access Economics in this paper are values based on either estimates suggested by existing economic modelling or, in the absence of such estimates, the exercise of broad judgment by Access Economics. Access Economics proposes use of these various parameters values on the basis that they are reasonable approximations of the required values and are unlikely to overstate the size of any fiscal stimulus impact. More detailed estimation may however result in slightly different parameter values.

The model recognises that the fiscal multiplier effect of a project within a region will depend on the extent to which money spent by local households and businesses is used to buy goods and services from outside the region. All other things being equal, the smaller the population of a region the higher the **marginal propensity to import** from outside of the region and the smaller the fiscal multiplier effect within the region itself of a dollar of extra spending.

- The model includes a factor to adjust the fiscal multiplier effect based on the size of a region (measured by its resident population).

The model also recognises that the fiscal multiplier effect of a project will depend on the otherwise employment status of its workforce. Project employees who would otherwise be unemployed are likely to spend a higher proportion of their wages. They have a higher **marginal propensity to consume** and as a result their engagement in a project will lead to it having a higher fiscal multiplier effect.

- The model includes a factor to adjust the fiscal multiplier effect based on the prior or otherwise employment status of the workforce.

The fiscal multiplier effect of a project will also depend on the extent to which its inputs are sourced from overseas. The higher the Australian content the larger the multiplier impact.

- The model includes a factor to adjust the fiscal multiplier effect of a project based on the mix of Australian and overseas sourced inputs.

Finally, the extent of fiscal stimulation generated in a region from a project will depend not only on its magnitude and fiscal multiplier effect but also on the size of the local economy. Any given project will have a more significant impact in a region with a smaller aggregate economy than in a larger one.

- The model takes account of a region’s estimated aggregate income in order to project the relative impact of the project on the local economy.

### 1.5 SHORT AND LONGER TERM CONSIDERATIONS

The RCLIP can have a very positive impact in mitigating the economic downturn. It is important though that councils, in determining which projects to proceed with, consider not only the immediate fiscal stimulation effects but also the benefits from their expenditure decisions for their communities after the economy recovers.
Employing unemployed local people to dig holes and then fill them in may have a very high fiscal multiplier effect but the first round use of the money will provide no longer term benefits whatsoever.

The eventual future repayment of the money used by governments to generate the fiscal stimulus is expected to have a modest negative impact on medium-term economic activity following the recession. It is important to ensure that funds spent directly by governments now provide not only short-term fiscal stimulation but longer-term net economic and social benefits.

Most South Australian councils currently have very modest levels of net financial liabilities. All have in place infrastructure and asset management plans that identify the timing and quantum of expenditures necessary to minimise the whole of life cost of different levels of service from assets. They also have long-term financial plans that reveal their capacity to undertake additional projects and bring forward future planned initiatives without compromising long-term financial sustainability.

South Australian councils are therefore very well placed to demonstrate to the Australian Government through their use of RCLIP funds the benefits of it partnering with them. They and the LGA will be able to demonstrate the regional fiscal stimulation impact and other benefits of responsible use of the funds that has had regard to both short and longer term considerations.

There will be other benefits too. Current economic conditions mean that councils should be able to secure more competitive prices for projects today than was the case a year ago and will be the case in future. They will also benefit from reduced financing costs as a result of historically low interest rates.
PART 2: 
MEASURING THE IMPACT OF A FISCAL STIMULUS

2.1 OPTIMAL FISCAL POLICY

Under the normal range of economic conditions, macroeconomic stabilisation (over business cycles) should be left primarily to both monetary policy and the so-called ‘automatic stabiliser’ effects of fiscal policy.¹

At times of significant economic downturn, however, there is also a role for expansionary fiscal policy – or a fiscal stimulus. A fiscal stimulus involves a discretionary increase in government spending aimed at giving rise to an even greater increase in aggregate demand and income.

According to the International Monetary Fund (IMF), based on lessons extracted from past economic crises, for a fiscal stimulus to be effective it should be:²

- **timely** (as there is an urgent need for action);
- **large** (because the drop in demand is large);
- **lasting** (as the recession will likely last for some time);
- **diversified** (as there is uncertainty regarding which measures will be most effective);
- **contingent** (to indicate that further action will be taken, if needed);
- **collective** (all levels of government and all countries that have the fiscal space should use it given the severity and global nature of the downturn); and
- **sustainable** (to avoid debt explosion in the long run and adverse effects in the short run).

The challenge facing each government is to gauge the right balance between these features.

2.2 ROLE OF THE FISCAL MULTIPLIER

The idea that a fiscal stimulus will give rise to an even greater increase in aggregate demand and income than the original amount spent by a government is associated with the concept of the fiscal multiplier. The multiplier effect refers to the idea that an amount of money

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¹ Fiscal policy involves the aggregate spending and taxation plans of government. Automatic stabilisers are associated with the non-discretionary increases in welfare spending and reductions in taxation collections that take place during an economic downturn.

spent by a government can lead to an even greater increase in aggregate demand and income. In other words, the eventual change is a multiple of the initial change.

The fiscal multiplier is therefore an indicator of the bang-for-the-buck from any government stimulus spending, that is the extra stimulus in aggregate demand and income delivered per dollar of government stimulus spending.

For example, if a government spends $1,000 on goods or services, the money does not disappear, but rather becomes revenue to the supplier and wages to its employees. The supplier and its employees will have higher disposable income as a result, so consumption and hence aggregate demand will rise as well. The individuals who the supplier buys things from will also tend to spend some of that additional income, and so on. Each participant who experiences an increase in disposable income then spends some portion of it on final (consumer) goods, which causes the cycle to repeat many times.

It is generally accepted that, in normal circumstances, the effectiveness of higher government expenditure in stimulating economic activity is relatively modest once real and financial ‘crowding out’ effects on private sector spending are also taken into account. In these circumstances, fiscal multipliers are generally thought to be in the range of 0.5-1.0.³

Fiscal multipliers are likely to be larger only in certain limited circumstances, namely when:

- there is excess capacity, and households have limited time horizons or are liquidity constrained;
- increased government spending does not substitute for private spending, it enhances the productivity of labour and capital, and lower taxes increase labour supply and/or investment;
- government debt is low and the government does not face financing constraints; and
- there is an accompanying monetary expansion with limited inflationary consequences (e.g., because of wage restraint).

Given the anticipated weakness in the global economy over the next two years, the general consensus is that a discretionary fiscal stimulus has an important role to play. This paper assumes that real and financial crowding out will not occur in response to such stimulus initiatives, at least for the next two years. The approach discussed in this paper should therefore only be applied to an economy with plenty of spare capacity, so that extra spending does not crowd out private activity.

³ Fiscal multipliers are likely to be in the ‘small’ range when:

- A fiscal expansion might crowd out private spending by increasing interest rates and prices, and cause an appreciation in the exchange rate;
- a fiscal expansion might act as a substitute for some private spending;
- households may choose to save tax cuts to pay for future tax liabilities; and
- the fiscal expansion may be anticipated and factored into decisions in a way that stops real activity from responding (e.g., to cyclical movements in tax rates).
2.3 DETERMINANTS OF THE FISCAL MULTIPLIER

Wider economic conditions aside, the extent of the multiplier effect is dependent upon the size of leakages:

- of income increases – to savings or taxes; and
- of consumption or investment spending – to imports.

If people tend to save a given percentage of any additional income (denoted the marginal propensity to save, or MPS), the ultimate impact on aggregate demand and income if the government purchases $1,000 worth of goods or services could be $1,000/MPS. If MPS = 0.4, the ultimate increase in aggregate demand and income from the initial increase in spending on this basis would be $2,500. The multiplier in this case (1/MPS) equals 2.5.

This ignores imports. In reality, spending that accrues to foreigners does not circulate in the economy. Also taking the import component of all spending (the marginal propensity to import, or MPM) into account, it can be shown that the correct multiplier is 1/(MPS+MPM) – see Box 1. If MPM = 0.25, the multiplier is approximately 1.5, which is considerably lower than 2.5 reflecting the fact that imports as well as saving stop money from circulating.

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**Box 1: Conventional fiscal multiplier formulation**

Where:
- $\Delta G$ = the initial fiscal stimulus amount,
- $\Delta Y$ = the ultimate stimulus effect on aggregate demand and income,
- MPS = the marginal propensity to save on average, and
- MPM = the marginal propensity to import on average,

the multiplier value ($\Delta Y/\Delta G$) can be derived as follows:

$\Delta Y = \Delta G + \Delta G \cdot (MPS+MPM)$ … first round

$+ \Delta G \cdot (MPS+MPM)^2$ … second round

$+ \Delta G \cdot (MPS+MPM)^3$ … third round

$+ \ldots$

$+ \Delta G \cdot (MPS+MPM)^n$ … $n^{th}$ round

$= \Delta G / (MPS+MPM)$ (based on the sum of an infinite geometric series)

From the above:

$\Delta Y/\Delta G = 1/(MPS+MPM) \quad \ldots (1)$

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4 In turn, the marginal propensity to save is a function of both an individual’s marginal propensity to consume (MPC) and their marginal tax rate (T), with MPS = 1 – MPC(1-T). If MPC = 0.8 and T = 0.25, MPS = 0.4. Multiplier analysis does not consider the economic impact which higher savings can have on investment levels in the economy, and assumes taxes paid to governments will not be circulated.
2.4 FISCAL MULTIPLIERS AND DIFFERENT FORMS OF SPENDING

The above discussion treats various fiscal initiatives as if they have similar effects on the economy. However, different initiatives can have quite different effects on economic activity. The implication is that any analysis of the effects of a given change must also carefully consider the nature of the fiscal initiative at hand.

It can be shown that government (consumption and capital) spending is more stimulatory (dollar for dollar) than cash handouts or personal tax reductions. The latter have smaller multipliers than spending increases because they rely entirely on propensities to spend out of income or wealth, without any direct effect on the demand for goods and services.

It can also be shown that government capital (or investment) expenditure is more stimulatory (dollar for dollar) than government consumption expenditure.

“Government investment expenditure has the advantage of augmenting potential output, although the ease and speed with which it can be put into place will be limited by the number of “shovel ready” projects available. Also, it runs the risk of serious wastage when the projects do not make economic sense. However, given the likelihood that the economic weakness will continue into 2010, there should be less concern that the expenditures will only be put into place once the economy has begun to recover. Targeted transfers have the advantage of ease and speed of implementation... However, they carry some risk of difficulty of reversal once the period in which economic stimulus is needed has passed.

... our simulations [indicate] every dollar spent on government investment can increase GDP by about $3, while every dollar of targeted transfers can increase GDP by about $1. ...”

Because the global financial crisis will be here for a while, slow-acting fiscal spending has a role to play. (In the usual recession, the stimulative spending often kicks in after the recession is past and thus becomes part of the problem rather than part of the solution). Moreover, expenditure measures have the advantage of directly stimulating demand rather than giving money to consumers and companies who might not spend it.

On the above basis, it is generally accepted that the most effective component of a fiscal stimulus is infrastructure spending (with a multiplier generally ranging from around 1.7 up to 3 in international studies). This should not be surprising, since the spending creates aggregate demand and income both directly (by putting idle resources to work) and indirectly (since those businesses and workers receiving extra income will then be able to spend more).

New consumption initiatives can also be effective (with a multiplier typically up to 1.5 according to international studies).

Cash handouts have the smallest bang-for-the-buck. They have no direct effect on aggregate demand and income, and boost activity only when spent. Some portion of the tax cuts will be saved, despite the pressure on family budgets. Households are trying to rebuild their financial assets, and they are also likely to suspect (rightly) that taxes will be going up in

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the long term. In addition, personal consumption has a relatively high import content, so there is a greater leakage of demand overseas.\footnote{The US Congressional Budget Office has published the following estimates of the cumulative impact on GDP of various options:}

More generally, based on the formulation in Box 2, it can be shown that differences in the fiscal multipliers for different types of stimulus initiatives can be explained in the main because of the difference between:

- on the one hand, applicable marginal propensities to save and import observed in the “first round” of additional spending in the case of each type of initiative; and
- on the other, the common marginal propensities to save and import typical in the second and subsequent rounds of additional spending.

### Box 2: A ‘differential’ fiscal multiplier formulation

Where:

- $\Delta G$ = the initial fiscal stimulus amount,
- $\Delta Y$ = the ultimate stimulus effect on aggregate demand and income,
- $\text{MPS}^*$ = the first round marginal propensity to save,
- $\text{MPS}$ = the marginal propensity to save on average in the second and subsequent rounds,
- $\text{MPM}^*$ = the first round marginal propensity to import, and
- $\text{MPM}$ = the marginal propensity to import on average in the second and subsequent rounds,

the multiplier value ($\Delta Y/\Delta G$) can be derived as follows:

$$\Delta Y = \Delta G + \Delta G.(\text{MPS}^* + \text{MPM}^*) + \Delta G.(\text{MPS}^* + \text{MPM}^*).\text{MPS} + \Delta G.(\text{MPS}^* + \text{MPM}^*).\text{MPM} + \ldots$$

$$= \Delta G.\left[1 + \frac{1 - \text{MPS}^* - \text{MPM}^*}{\text{MPS} + \text{MPM}}\right]$$

(based on the sum of an infinite geometric series)

From the above:

$$\Delta Y/\Delta G = \left[1 + \frac{1 - \text{MPS}^* - \text{MPM}^*}{\text{MPS} + \text{MPM}}\right]$$

\footnote{The US Congressional Budget Office has published the following estimates of the cumulative impact on GDP of various options:}

<table>
<thead>
<tr>
<th>Option</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases of Goods and Services by the Federal Government</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Transfers to State and Local Governments for Infrastructure</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Transfers to State and Local Governments Not for Infrastructure</td>
<td>1.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Transfers to Persons</td>
<td>2.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Two-Year Tax Cuts for Lower- and Middle-Income People</td>
<td>1.7</td>
<td>0.5</td>
</tr>
<tr>
<td>One-Year Tax Cuts for Higher-Income People</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Tax-Loss Carryback</td>
<td>0.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>
2.5 ‘REGIONAL’ VERSUS ‘NATIONAL’ FISCAL MULTIPLIERS

The preceding discussion provides the basis for fiscal multipliers at the national level.

The concept of the fiscal multiplier can be extended to the sub-national or regional level. For example, building a new community facility may lead to new employment for locals, which may have knock-on economic effects for the city or region.

In principle, the multiplier remains as formulated in equation (1) from Box 1, but the marginal propensity to import (MPM) needs to be interpreted as covering the imported component of regional spending both from overseas and domestically from other regions.

Regional fiscal multipliers are likely to be smaller to the extent that the more open nature of regional economies sees a larger component of goods and services that are purchased locally being produced elsewhere (i.e., in other regions as well as overseas).

Conversely, regional fiscal multipliers might be larger in regions with relatively low savings rates. Or regional stimulus spending could be focused through liquidity-constrained workers or households whose marginal propensities to consume are relatively high.

However, regional fiscal multipliers estimated by applying the formulation in equation (2) of Box 2 will produce a lower-bound estimate of the multiplier value applicable in the situation facing local government in Australia over the next year or two. This is because this formulation in effect assumes that fiscal stimulus is only taking place in the economy (region) in question and not in other relation economies (regions) — that is, that everything else is unchanged (or ceteris paribus). This is because the multiplier as formulated does not take any account of the impact on a region’s exports from any fiscal stimulus occurring in other regions.

Internationally, the IMF has estimated that, due to spillovers of demand, simultaneous fiscal stimulus across countries may raise each country’s (ceteris paribus) multipliers by a factor of about 50%. Simultaneous fiscal stimulus across regions in Australia over the next year or two is part of the Federal stimulus package. In fact, if stimulus was of a similar magnitude in all regions across a nation, a regional multiplier that also took into account the impact which fiscal stimulus occurring in all other regions had on the region’s exports would tend to converge on the national fiscal multiplier value.

Our suggestion is that the regional fiscal multiplier applying in the context of simultaneous stimulus spending by local government authorities across Australia over the next two years should be the ceteris paribus estimate factored-up by a proportion of the difference between (i) the national multiplier and (ii) the ceteris paribus regional multiplier.
Box 3: The regional multiplier formulation

Where:

MPS* = the first round marginal propensity to save given the nature of the spending,
MPS = the marginal propensity to save on average in the second and subsequent rounds,

MPM* = the first round marginal propensity to import (from overseas) given the nature of the spending, and

MPM = the marginal propensity to import (from overseas) observed on average across the nation in the second and subsequent rounds,

equation (2) in Box 2 can be reformulated into the national fiscal multiplier form as:

\[ 1 + \frac{1 - MPS^* - MPM^*}{MPS + MPM} \]  \( \ldots (3) \)

Likewise, where additionally:

MPM* = the first round marginal propensity to import (both overseas and from other regions) from the spending in question for a particular region, and

MPM = the marginal propensity to import (both overseas and from other regions) observed on average within that region in the second and subsequent rounds,

equation (2) in Box 2 can be reformulated into the \textit{(ceteris paribus)} regional fiscal multiplier form as:

\[ 1 + \frac{1 - MPS^* - MPM^*}{MPS + MPM} \]  \( \ldots (4) \)

Expressing equation (3) as \( 1 + r \), where

\[ r = \frac{1 - MPS^* - MPM^*}{MPS + MPM} \]

and expressing equation (4) as \( 1 + n \), where:

\[ n = \frac{1 - MPS^* - MPM^*}{MPS + MPM} \]

and assuming that the regional fiscal multiplier applying in the context of simultaneous stimulus spending across regions can be approximated as the \textit{(ceteris paribus)} estimate based on applying equation (4) factored-up by a proportion (denoted by the symbol “F”) of the difference between (i) the national multiplier estimated by applying equation (3) and (ii) the \textit{(ceteris paribus)} regional multiplier estimated by applying equation (4), then the regional fiscal multiplier applying in the context of simultaneous stimulus spending across regions can be denoted as:

\[ (1 + r) + F \cdot [(1+n) - (1+r)] \]

\[ = (1 + r) + F \cdot (n - r) \]

\[ = 1 + r - F \cdot r + F \cdot n \]

\[ = 1 + (1-F)\cdot r + F \cdot n \]

When expanded, this formulation becomes:

\[ 1 + \frac{(1-F) \cdot (1-MPS^*-MPM^*)}{(MPS+MPM)} + F \cdot \frac{(1-MPS^*-MPM^*)}{(MPS+MPM)} \ldots (5) \]

The F factor value lies between 0 and 1. If F=0, the regional fiscal multiplier is equal to its \textit{(ceteris paribus)} equivalent. If F=1, there is no difference in value between the regional fiscal multiplier and the national fiscal multiplier.
2.6 ESTIMATING A PARTICULAR REGIONAL FISCAL MULTIPLIER

To estimate a particular regional fiscal multiplier based on equation (5) in Box 3 requires estimates of a number of parameter values.

**Average or common parameters**

The following parameters are common across stimulus projects and regions, and values for these are as recommended by Access Economics. These values are based on estimates suggested by Access Economics’ own existing economic modelling (see Appendix) or, in the absence of such estimates, the exercise of broad judgment by Access Economics.

- **\( F \)** = the scaling up factor between the *ceteris paribus* regional multiplier and the national multiplier
  - = 50%

- **\( MPS \)** = the marginal propensity to save on average in the second and subsequent rounds
  - = 1 – MPC.(1-T)

where

- **MPC** = the marginal propensity to consume on average in the second and subsequent rounds
  - = 0.51 (for derivation see Appendix)

- **\( T \)** = marginal tax rate
  - = 0.29 (for derivation see Appendix)

- **\( MPM_n \)** = the marginal propensity to import (from overseas) observed on average across the nation in the second and subsequent rounds
  - = 0.24 (for derivation see Appendix)

- **\( MPM_r \)** = the marginal propensity to import (both overseas and from other regions) observed on average within that region in the second and subsequent rounds
  - = \( MPM_n + R.(1- MPM_n) \)

where **\( R \)** = a region-specific factor based on the resident population of the council(s) as follows:

<table>
<thead>
<tr>
<th>resident population of council(s)</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000,000+</td>
<td>0.3</td>
</tr>
<tr>
<td>500,000-1,000,000</td>
<td>0.4</td>
</tr>
<tr>
<td>300,000-500,000</td>
<td>0.5</td>
</tr>
<tr>
<td>200,000-300,000</td>
<td>0.6</td>
</tr>
<tr>
<td>100,000-200,000</td>
<td>0.7</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>0.8</td>
</tr>
<tr>
<td>&lt;50,000</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Access Economics proposes use of these various common parameters values on the basis that they are reasonable approximations of the required values and are unlikely to overstate the size of any fiscal stimulus impact. More detailed estimation may result in slightly different parameter values.
Project-specific parameters

However, all first-round parameters are project specific, and need to be estimated from data collected regarding the infrastructure project in question:

\[ MPS^* = \text{the first round marginal propensity to save given the nature of the spending} = 1 - MPC^* (1 - T) \]

where

\[ MPC^* = \text{the first round marginal propensity to consume associated with infrastructure project in question, and} \]
\[ T = \text{the marginal tax rate (as above), and} \]
\[ MPM^*_{\text{n}} = \text{the first round marginal propensity to import (from overseas) associated with infrastructure project in question.} \]

The final parameter is \( MPM^*_{\text{r}} \). Rather than this parameter being estimated separately from \( MPM^*_{\text{n}} \), our suggestion is that the following formulation be used instead:

\[ MPM^*_{\text{n}} + R (1 - MPM^*_{\text{n}}) \]

where \( R = \text{the region-specific factor applying between } MPM_{\text{n}} \text{ and } MPM_{\text{r}} \text{ for the second and subsequent rounds (as specified in Table 1 above).} \)

2.7 ESTIMATING PROJECT-SPECIFIC PARAMETER VALUES

The first round parameters whose values are dependent on the type and nature of the infrastructure project undertaken by councils are:

\[ MPC^* = \text{the first round marginal propensity to consume, and} \]
\[ MPM^*_{\text{n}} = \text{the first round marginal propensity to import (from overseas).} \]

First round marginal propensity to consume (MPC*)

The first round marginal propensity to consume depends primarily on the ‘prior’ or ‘otherwise’ employment status of the workforce involved in the infrastructure project in question.

For ease of application, Access Economics recommends the following formulation:

**TABLE 2**

<table>
<thead>
<tr>
<th>‘prior’ or ‘otherwise’ employment status of workforce</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>predominantly unemployed (&gt;25% unemployed)</td>
<td>MPC+0.4</td>
</tr>
<tr>
<td>&gt;15% unemployed</td>
<td>MPC+0.3</td>
</tr>
<tr>
<td>&gt;10% unemployed</td>
<td>MPC+0.2</td>
</tr>
<tr>
<td>&gt;5% unemployed</td>
<td>MPC+0.1</td>
</tr>
<tr>
<td>full employed (&lt;5% unemployed)</td>
<td>MPC+0</td>
</tr>
</tbody>
</table>

First round (national) marginal propensity to import (MPM*\textsubscript{n})

The first round marginal propensity to import (from overseas) will depend primarily on the expenditure composition and input sourcing of the infrastructure project in question.

For ease of application, Access Economics recommends the following formulation:
TABLE 3

<table>
<thead>
<tr>
<th>type of infrastructure project</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%+ of spend on pre-manufactured materials and purchased assets; 75%+ of construction inputs sourced from overseas</td>
<td>MPM&lt;sub&gt;n&lt;/sub&gt;+0.1</td>
</tr>
<tr>
<td>50%+ of spend on pre-manufactured materials and purchased assets; 50%+ of construction inputs sourced from overseas</td>
<td>MPM&lt;sub&gt;n&lt;/sub&gt;+0</td>
</tr>
<tr>
<td>project with characteristics between those above and below</td>
<td>MPM&lt;sub&gt;n&lt;/sub&gt;-0.1</td>
</tr>
<tr>
<td>75%+ of spend on wages &amp; materials; 75%+ of construction inputs sourced domestically</td>
<td>MPM&lt;sub&gt;n&lt;/sub&gt;-0.2</td>
</tr>
</tbody>
</table>

The parameters values proposed for use by Access Economics in Tables 2 and 3 are based on the exercise of broad judgment by Access Economics (see Appendix). Access Economics proposes use of these values on the basis that they are reasonable approximations of the required values and are unlikely to overstate the size of any fiscal stimulus impact. More detailed estimation may result in slightly different parameter values.

2.8 FROM MULTIPLIERS TO THE RELATIVE STIMULUS IMPACT

The accompanying spreadsheet calculates regional fiscal multipliers based upon the above parameters values and formulations.

While key in themselves, estimates of fiscal multiplier values (ΔY/ΔG) do not tell the whole story. What is required is the percentage boost in regional income itself (ΔY/Y).

We suggest that the impact of a council’s stimulus spending – whether regionally or nationally – be calculated as the annualised average boost to aggregate demand and income over the first two years of the stimulus as a percentage of a region’s aggregate income at end June 2009.

On this basis, the annualised % impact of a council’s stimulus spending – whether regionally or nationally – can be measured as follows:

\[
\frac{\Delta Y}{Y} = \left[ 1 + \frac{\Delta G \cdot Q/Q \cdot \Delta Y/\Delta G}{Y_0} \right]^{0.5} - 1
\]

where:

\( \Delta G = \Delta G_C + \Delta G_L \)

where:

\( \Delta G_C \) = the Commonwealth Government capital grant provided to fund the stimulus project, and

\( \Delta G_L \) = any additional spending (or top-up) by the council to fund the project beyond that previously allowed for by the council in its most recent long-term financial plan;
Quantifying the Fiscal Stimulus Effect

\( q/Q \) = a time-weighting factor which recognises that infrastructure spending undertaken early in the next two years will have a greater impact on regional income in that time period than infrastructure spending which takes place later in the next two years

\[
= \frac{\Delta G_{q_1} \cdot 8/8 + \Delta G_{q_2} \cdot 7/8 + \Delta G_{q_3} \cdot 6/8 + \Delta G_{q_4} \cdot 5/8 + \Delta G_{q_5} \cdot 4/8 + \Delta G_{q_6} \cdot 3/8 + \Delta G_{q_7} \cdot 2/8 + \Delta G_{q_8} \cdot 1/8}{\Delta G}
\]

\( >0 \) and \( <1 \)

where \( \Delta G_{qn} \) is the amount spent in the \( n^{th} \) quarter, as compiled by the council;

\( \Delta Y/\Delta G \) = the relevant fiscal multiplier as measured by applying (5) and the parameters values as suggested in sections 2.5 and 2.6 above; and

\( Y_0 \) = an estimate of regional income at end June 2009 (which, in the absence of any better data, may have to be based on the aggregate taxable income of the council’s residents as sourced from the ABS, escalated from the observation of a year or two ago in line with nominal GSP growth.

The accompanying spreadsheet also calculates the impact of a council’s stimulus spending by applying the formulation in equation (6).

2.9 DATA TO BE COLLECTED BY COUNCILS

To operationalise calculation of the impact of a council’s stimulus spending requires the following information to be collected by a council for each infrastructure project comprising its stimulus spending:

- the total amount to be spent by 30 June 2011, comprising:
  - the amount being funded by Federal stimulus grants, and
  - any top-up financing amount from the council itself beyond that previously allowed for by the council in its long-term financial plan;
- the quarterly time profile of total spending on the project through to 30 June 2011;
- the ‘prior’ or ‘otherwise’ employment status of the workforce involved in the infrastructure project; and
- the type and nature of the infrastructure spending itself, especially:
  - its composition between wages, materials, acquisition of assets, etc, and
  - the sourcing of materials and asset purchases in the form of the approximate % of the project spend on imported materials and other offshore payments.
APPENDIX: KEY PARAMETER ESTIMATES

The model set out in this report makes use of key parameter estimates. This appendix notes the derivation of the proxies used here.

The estimates are proxies not merely because economic data and models are not perfect, but also because the requirement is for estimates of effects ‘at the margin’ rather than ‘on average’, but average decisions are rather more readily able to be identified in the data than marginal decisions.

(1) Marginal propensity to consume (MPC)

The calculations here require an estimate of the marginal propensity to save, and hence the marginal propensity to consume. The latter can be measured against household disposable income, but it makes more sense for these purposes to measure it against national income as a whole, using the proxy in this instance of nominal GDP.

The average propensity to consume in 2008 was 54.5%, calculated as nominal private consumer spending as a share of nominal GDP for 2008 as a whole. However, the average Australian family is trying to raise the rate at which it is saving at the moment, and neither the average propensity to consume from 2008 as a whole nor past proxies for the marginal propensity to consume may be particularly useful in current circumstances.

CHART 1: HOUSEHOLD SAVING AS A SHARE OF DISPOSABLE HOUSEHOLD INCOME

Source: ABS 8502.0
Until the 1980s, Australian families save a fairly steady rate out of the money coming through the door (at an average of about 12%, the rate which is still that seen in Germany today).

However, from the 1980s through to the early years of this decade, Australian incomes rose fast, yet we increasingly borrowed to allow our spending to grow at faster rates than our income. We were encouraged to do so by strong capital gains, culminating in the sharp falls in saving rates evident during boom in housing prices along the east coast in 2002 and 2003.

Excellent capital gains on housing and shares therefore led to a fall in amounts saved out of the money coming through the door. By early 2004 the average Australian family spent 4% more than it earned (even after allowing for the compulsory 9% going into superannuation – as Chart 1 does).

The next phase in our behaviour saw Australians start to repair their saving habits in the last handful of years. Yet that did not weigh much on the pace of retail spending growth, as incomes themselves were growing faster thanks to the impact of the China boom.

Now the average Australian family wants and needs to save more than they have been doing. That is why much of the Federal Government’s last stimulus package in December ended up being saved rather than spent.

The first Federal stimulus package came in December 2008 and – based on an average propensity consume from household disposable income in 2008 as a whole versus the matching measure calculated for the December quarter – the marginal propensity to consume was lower than usual. This latter ratio has been used to factor down the average propensity to consume for 2008 from 54.5% to an estimate of the current marginal propensity to consume out of nominal GDP of 51% and so an MPC value in the second and subsequent rounds of 0.51.

As to the MPC value in the first round, it is conceivable that the MPC could range up to 1. On this basis, the +0.1, +0.2, +0.3 and +0.4 notching values in Table 2 are reasonable.

(2) Marginal tax rate (T)

The average rate of personal income tax in Australia dropped in recent years following a series of personal income tax cuts – 1 July 2009 marked the sixth year in a row with a tax cut.

Average personal rates were 22.3 cents in the dollar of wage and salary incomes in 2007-08. As Chart 2 shows, they dipped further in 2008-09, though in part that has been due to one-off tax bonuses. A reasonable estimate of the current average rate of personal income tax in Australia is therefore around 21 cents (or about 10.3 cents in the dollar of overall nominal GDP).
However, the calculations here require not the average but the marginal rate of tax. As Australia has a progressive personal income tax system, the (average) marginal rate of tax in Australia on an additional dollar is higher than average rate of 21 cents in the dollar – it is about 29 cents in the dollar.

Moreover, the issue becomes more complicated still because higher incomes can lead to some welfare payments being withdrawn. For example, there can be reduced rates of family benefits payments or aged pension payments in response to higher incomes. For this particular exercise, however, income is changing because of the Government stimulus packages (additions to welfare payments or personal income tax bonuses). Therefore the best number to use is a marginal rate of tax of 29 cents in the dollar, and so a $T$ value of 0.29.

(3) Marginal propensity to import (from overseas) ($MPM_n$)

Across 2008 as a whole, the average propensity to import was 24%, calculated as total imports as a share of nominal GDP. That estimate is useful for indicating the marginal propensity to import for the nation as a whole, though the weak economy of the moment may make the marginal propensity lower, while the falls in the $A$ through the course of 2008 may – other things equal – make it higher. Access Economics is therefore happy with 24% as a proxy for the overall marginal propensity to import, and so an $MPM_n$ value in the second and subsequent rounds of 0.24.

As to the $MPM_n$ value in the first round, consideration of the propensity to import in response to different types of stimulus spending suggests at least a +0.1 and -0.1 range around this 0.24 value. This is suggested by our calculation of the first round of import leakage impact of
stimulus spending which consists of welfare or tax bonuses, and a different measure for infrastructure spending.

The first round marginal propensity to import out of stimulus monies which go to consumers is suggested by consumption imports as a share of nominal private consumption spending for 2008 as a whole. An allowance is also needed for a component of ‘intermediate imports’ and imports of services to feed into the production of consumer products. Specifically, categories included in this ratio (with varying weights) are machinery and industrial equipment, capital goods, primary industrial supplies, iron and steel and plastics. This measure shows an average propensity to import consumer products in 2008 of 30.3%, suggesting that consumer products have a relatively higher imported content than the average. That same figure, 30.3%, can be used as a proxy for the marginal propensity to import out of stimulus monies which go to consumers.

The first round marginal propensity to import out of stimulus monies which go to infrastructure spending is suggested by building-related imports as a share of spending on building. This measure starts with capital and intermediate imports and subtracts the parts of those imports related to computers and cars. Intermediate import categories used to derive this ratio (with varying weights) include food and beverages, transport equipment, fuel, processed industrial supplies and other merchandise goods. A few services have also been included – transportation services, travel services, personal cultural and recreation services, as well as tourism related service debts, and then measures that as a ratio of turnover in engineering and commercial construction in 2008. This measure shows an average propensity to import ‘inputs to infrastructure’ in 2008 of 15.4%, suggesting that infrastructure inputs have a relatively lower imported content than the average. That same figure, 15.4%, can be used as a proxy for the marginal propensity to import out of stimulus monies which go to (average) infrastructure spending. An even lower marginal propensity to import is conceivable out of infrastructure spending which by its nature has a lower import content.

On this basis, the +0.1, -0.1 and -0.2 notching values in Table 3 are reasonable.

(4) Resultant estimates of national multipliers

Applying the formulation in equation (6), together with:
- the above second and subsequent round values (MPC of 0.51, T of 0.29 and $M_{pm}$ of 0.24); and
- first round values of MPC and $M_{pm}$ based on the most favourable notching values suggested in Tables 2 and 3 (+0.4 and -0.2 respectively),

suggests a national fiscal multiplier (i.e. where $F=1$) for stimulus monies which go to infrastructure spending of 1.69.

That is roughly the mid-point of the range of multipliers identified by the US Congressional Budget Office for Transfers to State and Local Governments for Infrastructure of 1.0 to 2.5.

This seems a reasonable result given that imports are a lower share of spending in the US than they are in Australia, while US taxes are also lower.