Trans-Tasman Transmission of Fiscal Shocks

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Abstract

This paper investigates how shocks to government spending and income taxes in Australia affects both Australia and New Zealand economies and looks at the channels through which these effects are transmitted from one economy to the other. A semi-structural vector auto regressive (VAR) approach is used to analyse quarterly data from the period: 1974:3 – 2005:4. The empirical results show that a shock to Australian income tax revenues leads to a decrease in both Australian and New Zealand output, and a shock to Australian government consumption leads to an increase in both Australian and New Zealand output. The impact of government expenditure shocks is transmitted through the interest rate channel only. The empirical results also suggest that the impact of an income tax shock is transmitted through the interest rate channel, which dominates the effect of the exchange rate channel.

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1. Introduction

The Australian and New Zealand economies are closely linked. Australia is New Zealand's largest trading partner both in goods and in services with 19.95% of New Zealand exports to Australia and 19.56% of New Zealand imports from Australia, in the year ended June 2006 (http://www.stats.govt.nz). Australia is also the largest source of foreign direct investment for New Zealand, and is the most common destination for direct equity investment from New Zealand

The international transmission of monetary shocks has been examined thoroughly in papers such as Koray & McMillin (1999), Kim (2001) and Arin & Jolly (2005). Arin & Jolly (2005) look specifically at New Zealand and Australia and the transmission of monetary policy between the two economies. Using a VAR approach their study finds that a monetary shock in either country has a real effect on the other economy in the short run.

Relatively less attention however, has been paid to the transmission of fiscal shocks. Some empirical study has been carried out on the impact of fiscal policy on the trade balance and exchange rate in the U.S. (Kim and Roubini, 2004) and the international transmission of fiscal shocks from the U.S. to Canada (Arin and Koray, 2005). The case of New Zealand and Australia however, has been neglected despite their close economic links and widespread investigation into the possibility of a currency union between the two countries.

Trans Tasman fiscal transmission also warrants investigation as New Zealand is a strong example of a small open economy; it has little or no influence on world prices or interest rates and has relatively low barriers to trade and a floating exchange

rate regime. This provides an ideal setting for examining the international transmission of fiscal shocks.

This study aims to show the channels through which Australian fiscal policy is transmitted to the New Zealand economy. This will be done by using a quarterly data set that spans the period 1974:3-2005:4. With a very close trading and economic relationship and high levels of migration between the two countries it seems likely that changes in the larger economy of Australia would have an effect on New Zealand variables. Therefore, changes in the Australian economy should be considered by policy makers in New Zealand.

The remainder of this paper is organised as follows; Section 2 reviews the previous literature, Section 3 discusses the data, Section 4 discusses the empirical methodology used, Section 5 presents the empirical results, Section 6 presents the robustness checks, and Section 7 concludes.

2. Previous Literature

2.1. Domestic Transmission of Fiscal Shocks

Ricardian Equivalence is a central focus of study on the effect of fiscal shocks. Ricardian equivalence theorem contends that changing from lump-sum tax financing to deficit has no effect on the economy. Ricardian equivalence states that there is an intertemporal budget constraint for government. Reduced tax means reduced government spending either now or in the future, conversely increased tax means increased government spending now or in the future. Economic agents are aware of this and act accordingly.The present value of government revenues should be equal to the present value of government expenditures. Ricardian equivalence implies that economic agents are not myopic and they know that cutting taxes today means an increase in taxes some time in the future.

Initial study on fiscal policy focuses on Ricardian Equivalence, first proposed by Barro (1974). Kormendi (1983) empirically tests Ricardian equivalence and finds evidence to support it. His results indicate that government debt effects private wealth negatively when the present value of future tax revenues is greater than the future value of government consumption. The results of Kormendi (1983) are questioned in a paper by Feldstein and Elmendorf (1990) who question robustness under several alternative specifications. These questions are taken into account and Kormendi (1983)'s original results are shown to hold in Kormendi and Meguire (1990).

Fiscal policy can affect the economy not only through consumption but thorough other channels. VAR studies therefore have been extensively used to analyse the effects of fiscal shocks on the economy.

Edelberg, Eichenbaum and Fisher (1999) look at how shocks to government defense spending affect the U.S. economy. The study uses a narrative approach and utilizes dummy variables for such events as the Korean and Vietnam wars. With their 5 variable VAR model, they show that a shock to defense spending has a temporary positive effect on output and a temporary negative effect on real wages.

Fatas and Mihov (2002) then use a semi-structural VAR model with US data from 1960 to 1996 to investigate the effects of government expenditures on output. They show that an increase in government spending has a significant positive and persistent effect on output while investment does not respond significantly to an increase in government spending. This is in contrast to Edelberg et al (1999) who find that the positive response of output to a shock to defense spending is only temporary.

Blanchard & Perotti (2002) also find that spending shocks tend to have longer lasting effects than tax shocks using a structural VAR model. A unique feature of their study is the incorporation of taxes along with spending shocks in characterising the response of output. They show that fiscal policy shocks cause temporary changes in GDP and its components, a result consistent with Edelberg *et.al.* (1999).

Perotti (2002) is the first study to use non-U.S. data. Data for five OECD countries; the U.S., West Germany, the UK, Canada, and Australia, is used in a structural VAR model to investigate the effects of fiscal policy on GDP, prices and interest rates. The results show that in general, government spending multipliers are positive. There is also evidence of positive tax multipliers in some countries; namely Australia, the UK and West Germany. Interestingly, Perotti (2002)'s results demonstrate that fiscal multipliers are smaller in the period post 1980 and also note that the response to fiscal shocks in the U.S. is not consistent with the rest of the OECD countries in his sample.

Arin and Koray (2006) investigate the positive tax multipliers shown by Perotti (2002). They look at four different types of taxes; income, corporate, indirect and social security. They use a semi-structural VAR model to investigate Canadian data and contend that positive tax multipliers only occur for corporate tax shocks. Their results suggest that different taxes have different and sometimes offsetting effects on the economy. They also suggest that the variation in the sign and magnitude of tax multipliers for different countries, found in previous studies, can be explained by the composition of tax shocks in those countries.

It is obvious that different taxes have different effects on the economy; accordingly it is best to concentrate on a particular tax rather than taxes as a whole. In this study the focus is on income taxes, as income taxes are the largest component, making up close to 69% of total tax revenues.

2.2. Fiscal Policy and Economic Growth

In the Neoclassical setting, as in Solow (1956), growth depends endogenously on the accumulation of technology, physical and human capital. In this framework, fiscal shocks would have no effect on output growth.

Barro (1990) develops an endogenous-growth model with the assumption that there are constant returns, infinite-lived households in a closed economy and most importantly tax-financed government services. According to Barro (1990), growth is found to be adversely affected by income taxes, and the paper shows that the increasing utility-type expenditures lower growth and saving rates.

Emperical work by Kocherlakota and Yi (1997) supports the endogenous growth model. The study uses a time series model with data from the UK and the U.S. The UK data spans 100 years and the U.S. data spans 160 years. Kocherlakota and Yi (1997) show that permanent changes in fiscal policy can have permanent effects on the growth rate.

Kneller, Bleaney, and Gemmell (1999) also re-evaluate the effect of fiscal policy tools on economic growth and find that most previous literature ignores a very important bias which may occur in specifying government budget constraints. They argue that to specify the government budget constraint is very important for the interpretation of fiscal parameters, and incorporating government expenditure into these specifications can eliminate the bias. Their model however, is limited to a five-year average of the variables which can only capture the short-run effects. Kneller *et al.* (1999) classify taxes and government spending into two different groups; distortionary and non-distortionary taxation as well as productive expenditure and non-productive expenditure. Distortionary taxes are described as taxes on income,

profit, payroll, property and social security taxes. Non-distortionary taxes on the other hand are taxes on domestic goods and services (such as GST). Productive expenditures are those on general public services, defence, educational, health, housing, and transport and communication. Unproductive expenditures include social security, welfare, recreation and economic services expenditure. Kneller *et al* (1999)'s results show that distortionary taxation has a negative effect on economic growth whereas non-distortionary taxation does not. They also show that productive expenditure, not surprisingly, enhances growth whereas non-productive expenditures dampen it.

Widmalm (2001) uses pooled cross-sectional data for the period 1965-1990 for 23 OECD countries. This study looks at the importance of income tax revenues as a proportion of total tax revenues and finds that the proportion of tax revenue raised by income tax has a negative correlation with economic growth, which is consistent with Kneller *et al.* (1999).

Lee and Gordon (2005) study how tax structure affects a country's growth rate, by using cross-country data from the period 1970-1997, while controlling for four determinants of economic growth in their model; domestic productivity which can be approximated by a Cobb-Douglas function, changes in capital/labour ratio, changes in education, and corruption. Their results show that average tax rates on labour income and the effective overall marginal tax rates are not significantly associated with economic growth. This contradicts the findings of Padavano and Galli (2001) who show that marginal income tax rates are negatively associated with economic growth.

It seems that average labour taxes and the top corporate tax rate are negatively associated with growth. It is important to capture these long-run effects while

investigating short-term fluctuations; therefore the benchmark model is estimated in levels rather than differences.

2.3. International Transmission of Fiscal Shocks

The domestic transmission of fiscal policy shocks has been researched thoroughly while international transmission has been paid relatively less attention.

Earlier theory on transmission of fiscal shocks has a Keynesian flavour, which is developed in the seminal papers by Fleming (1962) and Mundell (1963). The theory is developed further by Dornbusch (1976) who introduces sticky prices into the framework. The Dornbusch sticky price model shows that interest rates are the transmission mechanism through which one economy's fiscal shock affects another. In these models, under a fiscal expansion the exchange rate appreciates, which deteriorates the current account of the home country and improves the current account of the foreign country. Output increases both in the home country (due to partial crowding-out) and the foreign country.

More recent theoretical work is along the lines of dynamic general equilibrium models. Using a two-country dynamic general equilibrium model, Frenkel & Razin (1987) explore international transmission. They introduce the concept that individuals behave as though they have finite horizons, at any given time there is a certain probability of their survival, so rather than acting as though there are infinite horizons, individuals are aware that they will die and act accordingly. This results in a departure from the Ricardian proposition that budget deficits do not matter. The increase in government spending that we expect after a rise in taxes may not be realised within our lifetime.

Also, Bianconi & Turnovsky (1997) use an integrated infinite-horizon intertemporal optimisation of a two-country model. They find that lump sum tax financing leads to increasing output in both the short run and the long run in the home country. It does however lead to decreasing output in both the short run and the long run in the foreign country. These results are reversed with capital income taxes. Their results also show that when there is a permanent increase in government spending this leads to a decrease in wealth which decreases consumption, and leads to an increase in real interest rates and labour input in both home and foreign countries. While domestic output increases, foreign output decreases.

On the empirical side, Kim and Roubini (2004) use US data for the floating exchange rate period. They utilize a semi-structural VAR model in which the ordering of the variables in the basic identification scheme is real gross domestic product, government budget, current account, real interest rate and real exchange rate. They find that U.S. expansionary fiscal shocks improve current account and depreciate the real exchange rate which is contradictive to the theoretical work by Dornbusch (1976).

Further detailed empirical analysis shows that the current account improvement is due to partial Ricardian behaviour of private saving and to a fall in investment while the real exchange rate depreciation is mainly due to nominal exchange rate depreciation. Various components of government budget are incorporated in robustness checks, this is particularly important as literature in domestic transmission shows that different components of the government budget can have different effects on economy as illustrated by Alesina and Perotti (1995) who look at whether an expansion relies more on certain components of the budget. In

their model, growth does not necessarily decline in periods of continued fiscal adjustment.

Arin and Koray (2005) extend further study by looking at how fiscal shocks affect real interest rates and real exchange rates, and how fiscal shocks are transmitted internationally. They also use a semi-structural VAR model to analyse how fiscal shocks in the U.S. affect the Canadian economy with quarterly data from 1961 to 2004. Their results show that a positive shock to U.S. government spending has a temporary positive effect on U.S. output and decreases the U.S. real interest rate. The Canadian interest rate, however, responds positively and Canadian output falls. The results imply that unanticipated increases in the U.S. defense expenditures have a "beggar thy neighbor" effect on Canada. When the benchmark model is extended with different components of GDP, the results show that the decrease in Canadian output can be explained with the decrease in Canadian investment. Shocks to U.S. income taxes, on the other hand, decrease U.S. output, and cause both American and Canadian real interest rates to rise, and the exchange rate to appreciate. The Canadian output does not respond significantly as the decrease in investment is offset by the improvement in the trade balance. This result is consistent with Kim and Roubini (2003).

The findings by Koray and McMillin (2006) also support Kim and Roubini (2003). They use a VAR model with a Choleski Decomposition. Quarterly data is used from the period 1981:3-2005:3. The ordering is similar to Arin and Koray (2005), except they exclude Canadian variables and introduce the trade balance into the model as the last variable in the ordering. They also show that positive fiscal shocks lead to depreciation in the real exchange rate through the real interest rate channel. Not surprisingly, the trade balance improves.