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ABSTRACT

This paper examines the impact of global financial crises on the Australian economy and how monetary and fiscal policy may be used to manage economic downturns that result. To do so, it presents a straightforward analytical framework incorporating financial wealth, exchange rate expectations, foreign demand and interest rate risk to analyse the key role played by the nominal exchange rate in insulating national income from the worst effects of foreign financial crises. In the event the economy is not fully insulated by exchange rate depreciation, it shows that, in principle, monetary policy is a superior instrument to fiscal stimulus for restoring aggregate demand to the full employment level. Since monetary policy is not handicapped by numerous problems that render fiscal stimulus less effective, it should normally be considered a sufficient instrument on its own.

Keywords: global financial crisis, national income, exchange rate, monetary policy, fiscal stimulus.

JEL classifications: F31, F33, F41.

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HOW SHOULD MACROECONOMIC POLICY RESPOND TO FOREIGN FINANCIAL CRISES?

1. Introduction

This paper develops a framework for analysing the macroeconomic impact of foreign financial crises, such as the global financial crisis (GFC) of 2008-09 and the Asian crisis of 1997-98, on the Australian economy. Like a number of economies in the world, Australia was safeguarded from the GFC by the underlying strength of its domestic banking and financial systems. Nonetheless, the GFC contributed to a marked slowdown in Australia's GDP, reduced working hours and a rise in unemployment.

The GFC began to build in the United States and Western Europe from early 2008, but reached its crescendo in September 2008 with the failure of the investment bank Lehman Brothers. Credit availability, international equity values and commodity prices collapsed worldwide and the worst of its aftermath for real economies spanned the December 2008 and March 2009 quarters. Australia's real GDP per head, two of the three trend measures of real GDP (the production and income based) and nominal GDP, recorded at least two successive quarters of negative growth.

There was also a sharp fall in the value of the Australian dollar, as also happened during the Asian financial crisis of 1997-98. Between its pre-crisis high point in June 2008 and mid-crisis low point in January 2009, the Australian dollar depreciated by 28 percent in trade weighted terms and by 33 percent against the United States dollar. It reached its lowest value against the United States dollar in October 2008 co-inciding with the first of a series of fiscal stimulus packages. This massive dollar depreciation was sustained throughout the crisis interval, as shown in Figure 1 which charts quarterly real GDP growth and the effective exchange rate, measured on an average quarterly basis, from March 2008 to December 2009.

Figure 1 – Australia’s GDP Growth and Effective Exchange Rate, Mar 2008 – Dec 2009

Sources: Australian Bureau of Statistics, Bank for International Settlements.

Figure 2 reveals the changing composition of aggregate demand over the course of the GFC. What is most apparent here is that during the December 2008 and March 2009 quarters, when the impact of the GFC on the real economy was greatest, the most notable quarter to quarter turnarounds in aggregate expenditure were in investment, including inventories, and the trade balance, not in household consumption or government spending, though the latter may have been lower without stimulus.

Theory tells us that exchange rates and trade balances are closely related. Yet the role played by the exchange rate in shielding the Australian economy from the full force of the GFC via the trade balance turnaround has been much neglected in analysis and official commentary on

this topic, which has tended to emphasise the impact on the consumption and government spending, changes in which were minimal. Continued strong export growth to China also played a role.

Figure 2 – GDP by Expenditure, Mar 2008 – Dec2009, Quarterly Changes

Mindful of the actual behaviour of Australia's GDP and exchange rate during the GFC as illustrated above, the framework to be developed in what follows improves understanding of the macroeconomic consequences of external financial crises, such as the GFC and the earlier Asian crisis, in two ways. First, it explains how Australia's nominal exchange rate acts as the key shock absorber, heavily insulating the real economy during times of intense financial stress abroad.

Second, under circumstances where exchange rate adjustment is insufficient to fully insulate the real economy and when asset prices and financial wealth are slow to rebound, it compares the effects of further monetary expansion and fiscal stimulus on national income and exchange rates. In so doing, it shows that, under assumptions that are reasonable within the

Australian context, monetary policy is unambiguously superior to fiscal policy as a way of restoring full employment national income.

The next section lays the analytical foundations for interpreting the linkages between the financial and real sectors of the economy. Section 3 then uses the framework to analyse the impact of external financial crises on the economy and to compare the use of fiscal versus monetary measures to counter the recessionary effects of the crisis. The final section highlights the main findings and their implications for future responses to such events.

2. Analytical Framework

This section develops a macroeconomic framework for examining the impact of the GFC on Australia's national income and exchange rate. Methodologically, it focuses directly on macroeconomic variables of most interest to policymakers, without recourse to microeconomic foundations. Its novelty lies in its inclusion of financial wealth, interest risk and foreign macroeconomic activity as sources of fluctuation in aggregate demand domestically and foreign interest rates, the exchange rate, and exchange rate expectations as key influences on domestic liquidity conditions.

Although it has features in common with textbook Mundell-Fleming analysis, the framework differs from that approach in several important respects. First, it explicitly models the impact of foreign financial crises by incorporating new financial and real variables, including asset prices, exchange rate expectations, interest rate risk and foreign demand, into the specification of the real and monetary sectors of the economy. Second, it highlights the key role of the exchange rate in national income determination in open economies and is presented in national income space - exchange rate space, not in the standard national income- interest rate

space (as for instance in Abel, Bernanke and Croushore 2007, Blanchard 2009, and Dornbusch, Fischer and Startz 2007).

Third, by respecifying underlying monetary relations to include exchange rate effects, it derives new results about the effectiveness of fiscal policy, at odds with those obtained from the textbook model under the assumption of perfect capital mobility. We begin with aggregate production and spending before turning to the monetary side of the economy.

Real Sector Linkages

National income equals expenditure on consumption, investment, autonomous government spending, and exports less imports. Hence,

$$y = c(y - \tau, q) + i(r, q) + g + x(e, y^*) - m(e, y) \quad (1)$$

where τ is income taxes,

$y - \tau$ is national disposable income,

q is wealth,

r is the domestic interest rate,

g is government purchases,

e is the effective exchange rate, and

y^* is foreign demand for domestically produced goods and services.

We assume that in initial equilibrium, the economy is at full employment national income, defined as that level of output associated with the natural rate of unemployment. Both foreign and domestic inflation is presumed minimal and within the central bank's target range, which implies that short run nominal exchange rate variation fully translates to real exchange rate variation.

Next assume consumption, investment, export and import functions, with all national accounts variables expressed in real terms.

$$c = \bar{c} + \alpha(y - \tau) + \upsilon q \quad 0 > \alpha > 1, \quad \upsilon > 0 \quad (2)$$

$$i = \bar{i} - \gamma r + \sigma q \quad \gamma > 0, \quad \sigma > 0 \quad (3)$$

$$x = \bar{x} + y^* + \xi e \quad \xi > 0 \quad (4)$$

$$m = \bar{m} + \mu y - \varsigma e \quad 0 > \mu > 1, \quad \varsigma > 0 \quad (5)$$

where

$\bar{c}, \bar{i}, \bar{x}, \bar{m}$ are autonomous consumption, investment, exports and imports respectively,

α is the marginal propensity to consume,

υ measures the responsiveness of consumption to changes in wealth, q ,

γ gauges the responsiveness of investment to the interest rate,

σ is the responsiveness of investment to changes in asset prices or wealth,

y^* is foreign demand for domestically produced goods and services,

ξ is the responsiveness of exports to the exchange rate,

μ is the marginal propensity to import, and

ς is the responsiveness of imports to the exchange rate.

The domestic interest rate, r , is related to an appropriately weighted foreign interest rate via uncovered interest parity, inclusive of a time varying risk premium. Since $\hat{e}$, expected exchange rate depreciation is $\frac{f}{e} - 1$, we can express this relationship as

$$r = r^* + \hat{e} + \theta \quad \text{or} \quad r = r^* + \frac{f}{e} - 1 + \theta \quad (6)$$

where

r^* is the foreign interest rate,

θ is the time varying risk premium, and

f is the expected future spot exchange rate.

Substituting (6) into (3), adding relations (2)-(5), and solving for y therefore yields

$$y = \frac{(\bar{c} + \bar{i} + \bar{x} - \bar{m} + g + y^*) - \alpha\tau + (\xi + \varsigma)e - \gamma(r^* + \frac{f}{e} - 1 + \theta) + (\nu + \sigma)q}{(1 + \mu - \alpha)} \quad (7)$$

This expression provides a basis for analysing short run national income determination in exchange rate - national income space. However, to make the following exposition consistent with the exchange rate measure used in Australian financial markets, the nominal effective exchange rate is redefined as $E = \frac{1}{e}$, such that a rise (fall) in the value of E denotes appreciation (depreciation).

Since

$$\frac{\partial y}{\partial e} > 0, \text{ or } \frac{\partial y}{\partial E} < 0, \quad (8)$$

this allows us to draw a downward sloping schedule, labelled the YY schedule in exchange rate-output (or $E - y$) space, as shown in Figure 3.

Moreover,

$$\frac{\partial y}{\partial g} > 0, \frac{\partial y}{\partial y^*} > 0, \frac{\partial y}{\partial \tau} < 0, \frac{\partial y}{\partial r^*} < 0, \frac{\partial y}{\partial f} < 0, \frac{\partial y}{\partial \theta} < 0, \frac{\partial y}{\partial q} > 0, \quad (9)$$

which implies, everything else being equal, that a slump in asset prices and hence wealth, expected exchange rate depreciation, and a higher interest risk premium shift the YY schedule leftward, whereas lower foreign interest rates, higher government spending and transfer payments or income tax cuts, shift the schedule rightward.

Figure 3 – General Equilibrium

Monetary Sector Linkages

On the monetary side of the economy, the real demand for cash balances, L , equals the real money supply, so that

$$L(y, r) = \frac{M}{P} \quad (10)$$

Money demand depends positively on national income according to the parameter, κ , and negatively on the domestic interest rate, according to the parameter η , such that,

$$\frac{M}{P} = \kappa y - \eta r \quad \kappa > 0, \quad \eta > 0 \quad (11)$$

The national price level is a weighted measure of the price of domestic goods and services, P_d as well as the foreign currency price of imported goods and services, P_m , converted via the exchange rate,

$$P = \sigma P_d + (1 - \sigma) e P_m \quad (12)$$

Substituting (6) and (12) into (11) and solving for y , yields

$$y = \left[\left\{ \frac{M}{\sigma P_d + (1 - \sigma) e P_m} \right\} + \eta (r^* + f/e - 1 + \theta) \right] / \kappa \quad (13)$$

Partially differentiating (13) with respect to the nominal exchange rate, we find

$$\partial y / \partial e < 0 \quad \text{or} \quad \partial y / \partial E > 0 \quad (14)$$

This implies an upward sloping schedule, labelled the *MM* schedule, can be drawn in exchange rate-national income (or $E - y$) space in Figure 3. Relation (13) also allows us to identify key shift factors. Specifically, since

$$\partial y / \partial M > 0, \quad \partial y / \partial r^* > 0, \quad \partial y / \partial f > 0, \quad \partial y / \partial \theta > 0 \quad (15)$$

increases in the domestic money supply, in foreign interest rates, and the risk premium, as well as expected exchange rate depreciation, shift the *MM* schedule rightwards, everything else equal.

Having established these foundations, it is now possible to examine, first, the impact of foreign financial crises on the economy, and, second, whether fiscal policy or monetary policy should be deployed to speed recovery to full employment national income, y_N .

3. The Macroeconomic Impact of Foreign Financial Crises

In the first instance, a foreign financial crisis, such as the GFC, shatters consumer and business confidence at home and abroad which causes equity values and financial wealth to plummet, reducing domestic and foreign consumption and investment and foreign demand for exports. In light of the increased risk associated with Australia's reliance on foreign

borrowing and sharp fall in international commodity prices, the exchange rate would be expected to depreciate and interest risk premium rise.

Together, in the absence of any discretionary macroeconomic policy response at home or abroad, these factors $(q \downarrow, y^* \downarrow, f \uparrow, \theta \uparrow)$ cause the YY schedule in Figure 4 to shift leftward, reducing GDP and depreciating the exchange rate. The negative impact of the crisis on GDP would be greatest if the central bank sought to maintain the value of the exchange rate at its pre-crisis level. Under these circumstances, the money supply would need to contract to maintain the exchange rate at E_N , a recession would surely ensue with output falling to level y_R , as shown.

However, under a floating exchange rate, if financial markets expect the exchange rate to depreciate and the risk premium to rise $(f \uparrow, \theta \uparrow)$, as depicted in Figure 4, this simultaneously shifts the MM schedule rightward as well. Hence, the spot exchange rate automatically depreciates markedly, consistent with Australian dollar behaviour during both the GFC in 2008-09 and Asian financial crisis in 1997-98.

As a result, although national income falls below its initial full employment level at y_N , exchange rate depreciation greatly insulates the economy from the foreign financial shock compared to the impact under a managed exchange rate regime. The slopes of the YY and MM schedules determine the degree to which national income falls below the full employment level.

Figure 4 – Real and Financial Impact of a Foreign Financial Crisis

4. Fiscal vs Monetary Responses

Macroeconomic Policy Abroad

If foreign central banks immediately implement a co-ordinated response to the financial crisis enveloping their economies by lowering official interest rates, this helps restore consumer and business confidence and arrest asset price falls, thus limiting the magnitude of the leftward shift of the YY schedule through the foreign interest rate, wealth and foreign demand channels. In reality automatic fiscal stabilisers would also mitigate the aggregate demand slump.

In the absence of any discretionary domestic monetary policy response, lower foreign interest rates, everything else the same, would partially offset any rightward shift of the MM schedule from the effects of expected exchange rate depreciation and higher interest risk premium. To

prevent this, the central bank also needs to act quickly by expanding domestic liquidity ($M \uparrow$) in concert with foreign central banks.

Domestic Macroeconomic Policy Response

Should asset prices and wealth quickly rebound of their own accord, consumer and business sentiment would recover, risk aversion in financial markets would diminish, household consumption and private investment would rise and the YY schedule would shift back rightwards over time, without need of further discretionary macroeconomic policy. Taking expansionary monetary and fiscal policies implemented abroad into account as well, any initial domestic liquidity expansion would then have to be rewound to forestall inflationary pressures, consequent on aggregate demand exceeding full employment output at y_N .

However, if the authorities predict that national output will remain below the full employment level for an extended period, they may contemplate further macropolicy options for speeding recovery. The question then arises as to whether there should be further liquidity expansion, or discretionary fiscal stimulus, to restore aggregate demand to the pre-crisis level. The effects of these alternative macropolicy options can now be examined with reference to Figure 5.

Starting with monetary policy, it is evident from the Figure that with sufficient monetary expansion, the MM schedule could conceivably be shifted, via the concomitant exchange rate depreciation, as far rightward as necessary to restore national income to y_N . Even if the elasticity of expenditure to interest and exchange rates is low, monetary policy can be calibrated to provide the stimulus required. Moreover, although monetary policy may be constrained under extreme circumstances by a zero bound on interest rates, that is not a problem in this model.

Figure 5 – Alternative Macroeconomic Policy Responses

Of itself, monetary expansion accompanied by a depreciating currency is usually inflationary, but under these circumstances with aggregate demand falling short of potential output, the inflationary effect of the money supply increase and depreciation would be muted. The magnitude of the additional monetary expansion required to achieve full employment is governed by the scale of the fiscal response in economies directly and indirectly affected by the crisis, since expansionary fiscal measures raise foreign demand for domestic product ($y^* \uparrow$).

China's substantial fiscal stimulus in response to the GFC greatly assisted Australia's exports in this way. Fiscal policy in China and in other emerging economies is likely to be more effective domestically than in Australia if their exchange rates are pegged and international capital flows are heavily controlled.

Instead of domestic monetary expansion, this framework also suggests that domestic fiscal stimulus can be used, either in the form of higher government spending ($g \uparrow$), reduced income taxes, ($\tau \downarrow$), or higher income transfers ($-\tau \uparrow$). The last two of these, changes to taxes and transfers, rely on the assumption that household consumption behaves in accordance with the Keynesian consumption function. In Figure 5, this translates as a rightward shift of the YY schedule which, in principle, could be shifted enough to raise national output from the crisis affected level of y_C back to y_N .

However, the consequence of a discretionary fiscal policy response is worsening international competitiveness via an appreciating exchange rate which rises from E_C to E_N . The trade deficit therefore widens, consistent with the ‘twin deficits’ hypothesis, compared to the rise in net exports that occurs via monetary expansion and associated real depreciation.

This presumes that once global financial markets have stabilised, exchange rate expectations return to what could be considered the normal case of static expectations, where, in the absence of a consensus model of exchange rate determination, the future exchange rate is expected to be no different from the current rate. However, if on the contrary, markets expect the exchange rate to appreciate following fiscal expansion, as predicted by this model, then the M_0M_0 schedule would move leftward, everything else equal, driving the exchange rate even higher, thereby rendering the fiscal stimulus even less effective.

Apart from the practical problem of long lags in implementing fiscal stimulus programs, especially those involving infrastructure spending, there are further theoretical problems associated with activist fiscal policy. For instance, household consumption behaviour may not accord with the simple Keynesian consumption function. Instead, tax cuts and transfer

payments may be saved consistent with Friedman's permanent income hypothesis (Friedman 1957, Taylor 2009).

Relatedly, the Ricardian equivalence proposition (Barro 1974, Ricciutti 2003) suggests that households, wary of increased taxes required to pay off newly created public debt in the future, will save today rather than spend. If a dollar of new public debt negates a dollar of consumer spending in this way, tax cuts and welfare payments prove ineffective as a stimulus measure and in the limit case the *YY* schedule would not shift. Empirical evidence for a range of economies suggests that at least half of the change in fiscal balances in advanced economies has been offset by an opposite change in private saving (Bernheim 1987, Masson, Bayoumi and Hossein 1998, Loayaza, Schmidt-Hebbel and Serven 2000, and Hemming, Kell and Mahfouz 2002).

5. Concluding Comments

This paper has presented a framework for considering the impact of external financial crises on the Australia economy which is consistent with the economy's past behaviour during external crisis episodes. It also helps explain Australia's resilience during the 2001 global recession when the Australian dollar fell to a record low against the United States dollar.

It has shown that, in the first instance, the nominal exchange rate plays the pivotal role in insulating national output and employment from the worst effects of external financial shocks. Monetary and fiscal responses in crisis-source economies, combined with a relaxation of monetary policy domestically, are sufficient for countering the impact of external crises on domestic output and employment.

Of course, Ricardian effects that minimise any YY shift in the first instance obviate the need to borrow abroad. Yet, to the extent that fiscally-induced spending does actually appreciate the exchange rate and widen the trade deficit, foreign debt will rise equivalently and have to be serviced into the future. Unless the rate of return on government stimulus spending exceeds this servicing cost, the additional foreign borrowing will act as a drain on future national income, as proposed in Makin (2009). All in all, fiscally related problems can be avoided by predominantly relying on monetary policy, as happened during the Asian crisis.

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