RESERVE BANK OF FIJI

Economics Group

Working Paper

Towards A Macroeconomic Model for Fiji

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Abstract

This paper is an attempt to create a quarterly macroeconomic model for Fiji and as would be expected for starters, it uses calibrated coefficients from other studies to run impulse response functions. It builds on a standard small open economy model (which includes Argov et al (2007) among others) with several extensions/modifications. The model incorporates a large foreign economy making it a two-country model to ensure that transactions between the exporting and importing country are modeled explicitly. This addition is vital for a better understanding of global economic shocks. To suit the Fijian case study, instead of using the extended forward looking Uncovered Interest Parity (UIP) condition that is commonly assumed for small open economy models, a constant nominal exchange rate index was assumed. The model also introduces detailed trade balance measures given the importance of trade in Fiji as a source of foreign exchange. Overall, the model captures part of Fiji's history qualitatively and future work is required to improve the magnitudes and the lags of the responses.

1.0 Introduction

Macroeconomic models have become a prominent analytical tool used worldwide for policy deliberations. One of their major attractions lie in their ability to explain the response of macroeconomic indicators to an exogenous shock in a coherent manner. However, the shortcomings can be numerous as well, mainly given that modelers are trying to carry out an impossible task of capturing "reality uncertainties" into a simplified hypothetical world with the use of "beautiful mathematics" (Krugman, 2009). There have been doubts cast on models used for policy analysis by policy makers – both on a technical and theoretical level (Sims, 2002). Macroeconomic models can vary in sizes depending on the empirical question at hand or their intended use.

While the literature is full of macroeconomic models for developed and emerging economies, the same cannot be said for Pacific Small Island Developing States (PSIDS).[4] These economies are usually characterised by small population; under-developed markets; weak transmission mechanisms, if there is one at all; weak and volatile growth; vulnerabilities to shocks and for empirical work purposes - data constraints (Davies and Vaught, 2011). As such, judgments have become an essential part of monetary policy analysis (Svensson et.al, 2005).

[4] According to the United Nations Classification, PSIDS includes Fiji, Marshal Islands, Federated States of Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Accordingly, this paper is an attempt to create a base model that incorporates the unique features of PSIDS using Fiji as a case study.[5]

The model builds on the standard New Keynesian small macroeconomic model[6] in Argov et al (2007).[7] It introduces a separate foreign, larger economy block (making the model a two-country model - of a larger economy and a smaller economy) to ensure that it captures the features of the price-making and price-taking country explicitly. This addition is necessary for a better understanding of the impact of global economic shocks (commodity prices for example) on a small open economy like Fiji. Moreover, it incorporates a detailed trade block which makes a clear distinction between volume and price movements. Additionally, the model indirectly pegs the exchange rate by removing the UIP condition in the Bank of Israel model and equates the exchange rate to zero.[8]

The rest of the paper is structured as follows: section 2 presents a brief macroeconomic history of the Fijian economy from 2006 to 2010, section 3 briefly explains the main equations in the model, section 4 covers impulse response functions of some of the key macroeconomic shocks that had affected Fiji during the review period and section 5 provides some concluding remarks.

[5] While there are few existing macroeconomic models for Fiji in the literature, which includes Singh (2006) and Dulare (2005), among others, their usefulness for policy deliberations are questionable. For example, the authors modeled inflation in totality, failing to make a distinction between inflation that can be impacted by monetary policy – domestic inflation and supply-related inflation - imported inflation where the role of monetary policy is limited.

[6] Adopting and building on a simple model is a suggestion by Laxton and Scott (2000) for starters.

[7] The Bank of Israel model and Argov et al (2007) have been used interchangeably throughout the paper.

[8] Given that all variables are in logs, equating the exchange rate to zero means that the nominal exchange rate index does not move at all throughout the sample period.

2.0 Fiji's Macroeconomic History, 2006 – 2010

Economic growth in Fiji has been low and volatile averaging 0.8 percent over this period, owing to a combination of external and internal factors.

The 2006 Economic Boom

In 2006, the Fijian economy underwent a period of buoyant domestic demand, when compared to the contraction in output a year earlier. The improvement in economic activity was supported by a benign inflation environment in that period. Demand was financed by both private sector credit and fiscal expansion. Private sector credit grew strongly for most months in 2006, registering growth of over 25 percent on an annual basis while government finance noted a budget deficit of 3.4 percent of GDP (excluding amortisation and asset sales). This caused a rise in new lending and deposit rates in the same period, on account of the tight liquidity conditions. With Fiji's narrow production base, indirectly measured by the import content of the consumer basket (67%), the lack of compatible goods to substitute for imports led to a widening trade deficit. Since the early 2000s, most of the growth in demand subtracts from the economy through imports. Accordingly, the foreign reserves level became increasingly unsustainable buying fewer months of retained imports of goods and non-factor services for some time. This concerning trend led the Central Bank imposing a credit ceiling in an attempt to restrain capital flight and the Government to arrange

for the external financing of its deficit in September 2006, through its first international issue of Government bonds amounting to US$150 million.

The Monetary Tightening in 2007

The year 2007 saw some of the outcomes of the drastic policy measures taken in 2006 after a slowdown in private sector credit and improvement in the level of foreign reserves were noted. This came as a breathing space for policy makers given the adverse economic and political climate in Fiji at the end of 2006. Exchange control measures were tightened in an attempt to keep the level of foreign reserves that had built up in the year within the Central Bank's ambit. Tighter monetary conditions in the economy led to the decline in private sector credit growth in 2007. Towards the middle of 2007, liquidity conditions improved both as a result of the reduction in statutory reserve deposits and improvement in net foreign assets, leading to easing in new lending rates. However, the relatively high cost environment, a series of natural disasters,[9] and fiscal tightening led to a contraction in output in 2007. On the external front, Fiji began to lose some competitive edge in its tradable sector while the fall in import demand reflective of the low domestic demand improved the trade balance in that year.

The Terms of Trade Shock in 2008

Like for most countries, the year 2008 was marked by high commodity prices. Oil and food prices were at their historical highs towards

[9] This included floods and tropical cyclones.

mid-year with inflation registering a high of 9.8 percent in September, before subsiding to 6.8 percent at the end of the year. The import bill ascended in 2008 to record a 23 percent annual growth, on account of high oil (28%) and food (32%) imports. The contagion meltdown in the global economy that erupted in September 2008 exposed the vulnerability of Fiji's balance of payments. Weak global demand transmitted almost immediately into a marked decline in foreign receipts, particularly personal remittances, mineral water, fish, timber, textiles, and tourism. The current account deficit widened to 18.2 percent of GDP and the foreign reserves level worsened, barely sufficient to buy 1.8 months of retained imports of goods and non factor services at the end of 2008.

The Global Financial Crisis in late 2008, Impending "Economic Woes" and the Policies Taken

Nevertheless, the Reserve Bank maintained its easing monetary policy stance with the reduction in interest rates on the Bank's discount window as well as the reduction in the Statutory Reserve Deposit (SRD) requirement of commercial banks. Concerns regarding the likelihood of a currency crisis grew, especially after foreign reserves fell to an all-time low in March 2009. Given the growing urgency to quickly arrest the deterioration in the Balance of Payments (BOP), the Fiji dollar was devalued in April 2009, accompanied by a tightening of a wide range of exchange controls. The credit ceiling, which was imposed earlier in December 2006,[10] was kept in place to provide the

[10] Commercial banks'loans and advances to the private sector were to be held at or below levels prevailing on 30 November 2006. The credit limit is an aggregate limit, not a limit on lending to individual commercial banks' customers. Commercial banks were free to lend to individual

necessary restraint on private consumption and domestic demand in general. Ceilings were also imposed on commercial bank lending rates and interest spreads in order to allow the continuation of an adequate flow of credit to productive sectors of the economy. This was necessary at that time given the heightened sense of risk with lenders, which raised concerns on the crippling effects of high interest rates on production and investment. The International Monetary Fund SDR allocations to member countries in 2009 ($168m) also proved critical in the stabilisation of foreign reserves.

In spite of the one-off impact of the devaluation on general price levels, firm signs of stability were already evident in both the current account and foreign reserves by the end of 2009. The deficit in the current account fell from 18.2 percent of GDP in 2008 to 8.9 percent of GDP in 2009, while foreign reserves were recorded at $1,090.6 million at the end of the year, sufficient to buy 4.2 months of retained imports of goods and non-factor services.

The swift adjustment in the current account and stability gains in foreign reserves in 2009 shifted the focus in 2010 to the resumption of economic growth, especially after the 1.3 percent downturn in the previous year. The Government responded through a fiscal expansion, increasing its total expenditure by 4.3 percent from 2009, resulting in an overall deficit of 3.6 percent of GDP. However, economic activity recovered only marginally (0.1%) in 2010, despite the pickup in the manufacturing, hotel & restaurants and the mining and quarrying sectors. This was owed largely to weak

customers, as long as they manage their total lending within the overall limit. The ceiling on bank lending applies to their average lending over one month.

domestic demand conditions as well as the restraint in levels of investment spending.

3.0 Brief Overview of the main equations in the model[11]

This section presents a brief description of the main equations in the model.

3.1 The Inflation Block

In general, there are three ways to model inflation: backward-looking version, forward-looking version and a hybrid version – a combination of the first two (Patra Kapur, 2010).

Morling et al (1999) who modeled the determinants of inflation in Fiji, used a backward-looking version type of the Phillips Curve, and found that unit labour cost, output gap and import price index were the key variables that explained price movements in Fiji during the period 1966 to 1998. However, the role of forward-looking expectations, an important feature theoretically, was not part of the final model.

Accordingly, the hybrid domestic inflation equation given below, a function of one-step-ahead inflation expectations, lagged inflation, the output gap and the input price differential is used in the model.

$$\pi_t^h = a_{ld}\pi_{t+1}^h + (1 - a_{ld})\pi_{t-1}^h + a_y(0.5y_t + 0.5y_{t-1}) + a_{zf}(p_t^{zf} - ph_t) \qquad (1)$$

$$a_{ld} = 0.4, a_y = 0.06, a_{zf} = 0.06$$

[11] For a thorough discussion of the model specifications, see Argov et al. (2007) or email the author for the extensions built in the model.

where π_t^h is the quarterly inflation of domestic goods, y_t is the output gap and p_t^{zf} is the price of imported inputs used for domestic production and ph_t is the price index of domestically produced goods.

The coefficient of the lead and lag inflation sums to one to ensure that in the long run, inflation is determined independently of the output gap and input price gap.

This equation then feeds into the CPI equation (pc_t)

$$pc_t = w^f pf_t + (1 - w^f) ph_t \quad (2)$$

$$w^f = 0.6$$

where w^f is the weight of the import component in the CPI and pf_t is the price index of imported goods.

3.2 The Output Gap Block

The output gap, y_t, equation is a weighted average of the components of aggregate demand namely consumption, investment, government spending and exports.[12] Consumption normally takes up a significant share of aggregate demand and thus can be the first point of reference in explaining the deviation of output from its potential. In the last decade, consumption of domestically produced goods accounts for around 40 percent of Fiji's GDP.

[12] Their weights were determined by their contribution to GDP in the last decade.

There are two types of consumption goods in the model - imported and domestically produced consumption goods. To reflect domestic and foreign consumers' intertemporal substitution based on their respective prices, competitiveness measures were also introduced.

The model adds the following competitiveness measures: terms of trade, domestic competitiveness and the price gap. While the real effective exchange rate, q_t , is also an option, this was not used in the model mainly given the structural differences of Fiji's CPI basket and those of its trading partners.

The terms of trade (tot_t) is defined as

$$tot_t = e_t + p_t^{*f} - ph_t \quad (3)$$

where e_t is the exchange rate, defined as the price of domestic currency per unit of foreign currency, p_t^{*f} is the price in the foreign economy and $\mathrm{ph_t}$ is the price of domestically produced goods. Therefore a rise in foreign prices relative to domestic prices will improve the domestic economy's terms of trade and vice-versa.

Domestic competitiveness (dom_com_t) is measured by the following relative price equation

$$dom\_com_t = -(ph_t - pc_t) \quad (4)$$

A rise in dom_com_t, indicates an improvement in the attractiveness of domestically produced consumption goods over imported consumer goods.

Price gap (pzf_gap_t) is defined as

$$pzf\_gap_t = p_t^{zf} - ph_t \quad (5)$$

Higher price of production inputs relative to the price level in the economy is a leading indicator of higher prices of output later on.[13]

Demand for consumption goods in the domestic economy is determined by the Euler equation below.

$$yc_t = \lambda yc_{t+1} + \mu yc_{t-1} - \left(\frac{1}{\sigma}\right) 0.25(r_t - r_t^n) + \varepsilon_t^i \quad (6)$$

$$\lambda = 0.1, \mu = 0.6, \sigma = 2$$

where yc_t is consumption, r_t is the annualised real interest rate, r_t^n is the natural real interest rate, σ is the inverse of the intertemporal elasticity of substitution in consumption and ε_t^i is the shock term.

Equation (6) postulates that consumption at time *t* depends on expected consumption at *t+1*, lagged consumption, and the intertemporal substitution of consumption. In its simplest form, higher interest rate at time *t* will postpone consumption to time *t+1* as rational households opt to save more today. In other words, higher interest rates subtract from current consumption levels.

Consumption of domestically produced goods (ych_t), is defined as

$$ych_t = yc_t - 0.3 * (ph_t - pc_t) \quad (7)$$

implying that if the relative price of foreign goods increase then demand will shift to domestically produced goods.

[13] See Argov et al. (2007), pp 24.

Imported consumption goods ($ycimp_t$), is taken as a residual thus defined as

$$ycimp_t = yc_t - ych_t \quad (8)$$

Demand for exports (xh_t) by the foreign economy is determined by the level of income in the foreign economy (y_t^*) and the relative prices of consumption goods available in the foreign economy (set to 0.3).

$$xh_t = y_t^* - \eta\left[(ph_t - e_t) - p_t^{*f}\right] = y_t^* + \eta\left(e_t + p_t^{*f} - ph_t\right) \quad (9)$$

Investment and government expenditure are simple autoregressive processes of order 1, and thus the national identity becomes

$$y_t = \gamma_c ch_t + \gamma_g gh_t + \gamma_{inv} invh_t + \gamma_x xh_t \quad (10)$$

where ch represents the domestic demand of consumption goods, gh is public consumption, $invh$ is investment and xh represents exports, and γ are their relative shares to GDP.

Using Fiji's historical data in the last decade, the following relative shares were obtained

$$\gamma_c = 0.4; \gamma_g = 0.1;\ \gamma_{inv} = 0.025\ and\ \gamma_x = 0.475$$

3.3 The Monetary Policy Rule

The following extended forward-looking Taylor reaction function has been used to represent the role of monetary authorities to stabilise inflation and support economic growth.

$$i_t = (1 - \delta lag)(rn_t + inft_t + \delta\pi(e\delta 4cpi - inft_t) + \delta y * y_t) + \delta lag(i_{t-1}) + \varepsilon_t^i \qquad (11)$$

where δlag is the interest rate smoothing parameter. Normally, this coefficient is set between 0.5 and 1.0 to reflect the intention of the Central Bank on ensuring a gradual adjustment process.[14] δlag is currently set at 0.7. rn_t is the natural interest rate, the interest rate that would have prevailed in the long run. $e\delta 4cpi$ is expected inflation rate one year from time *t* and thus defined as

$$e\delta 4cpi_t = \delta cpi_t + \delta cpi_{t+1} + \delta cpi_{t+2} + \delta cpi_{t+3} \qquad (12)$$

which can be re-written as

$$e\delta 4cpi_t = pc_{t+3} - pc_{t-1} \qquad (12.1)$$

while ε_t is the shock term.

Interest rates will adjust in order to close the output gap and keep inflation at its targeted level. This is an important block that describes the role of the Central Bank in using interest rate to meet its objectives of price stability and facilitating economic activity.

[14] See Berg et al. (2006).

4.0 Impulse Response Functions

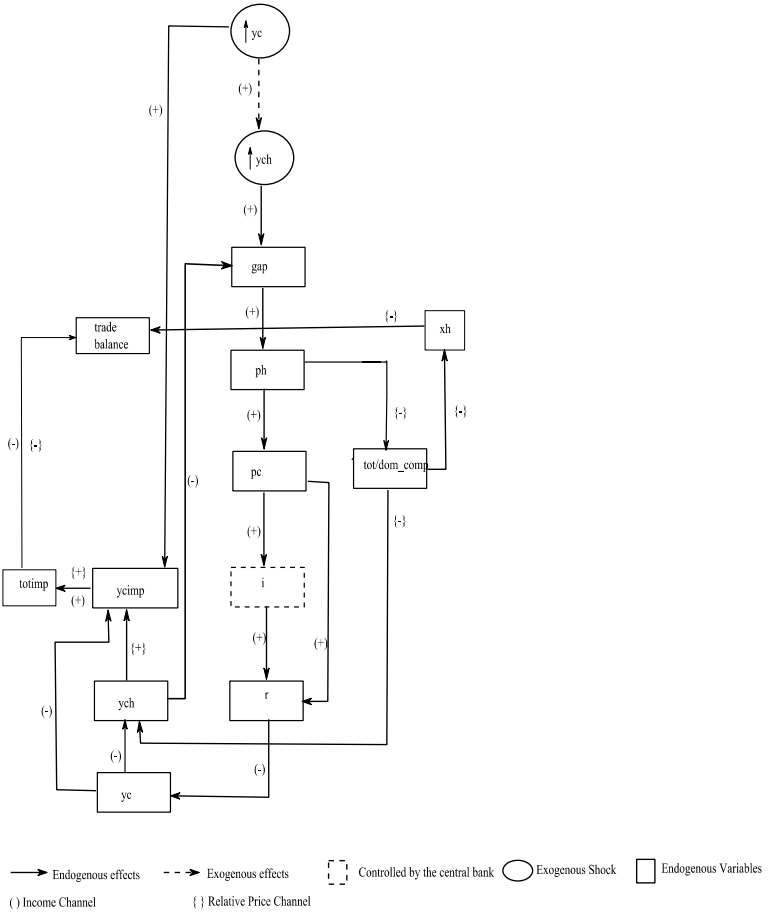
One of the main benefits of macroeconomic models lies in their ability to explain the deviations of macroeconomic variables from their long run levels after a shock.[15] The response of economic agents to shocks/surprises can be both qualitative (shape of response) and quantitative (intensity of response and time that lapses until equilibrium is restored).[16]

In this section, four shocks that shaped Fiji's recent macroeconomic history were simulated to test the model, namely; domestic demand shock, monetary policy tightening, terms of trade shock and foreign demand shock. In each sub-section, a theoretical flowchart is provided to indicate the expected movements of key variables based on the equations built in the model. This is followed by a presentation of the key results of the simulation. Finally, an assessment of the performance of the model is provided after every impulse response function.

[15] This can also pose to be a major drawback for a small open economy like Fiji where most exogenous shocks happen one after the other or even before the impact of an earlier shock has fully passed through.
[16] See Argov et al. (2007).

4.1 Replicating the 2006 Boom – Simulating a 2 percent positive domestic demand shock in 2006 Quarter 2

Flowchart 1: Impact of Positive Domestic Demand Shock

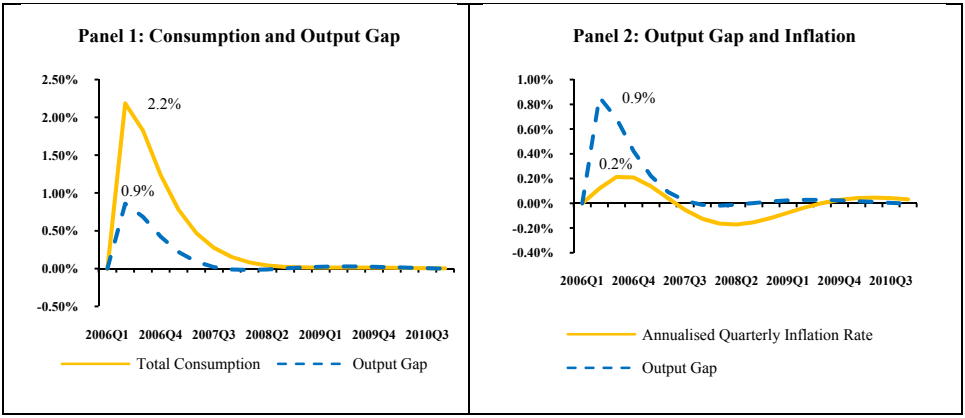


Flowchart 1 provides a summary of at least two of the main channels of transmission in the domestic economy when there is a positive domestic consumption shock (with the +/- signs depicting the direction of effect as built in the model).[17]

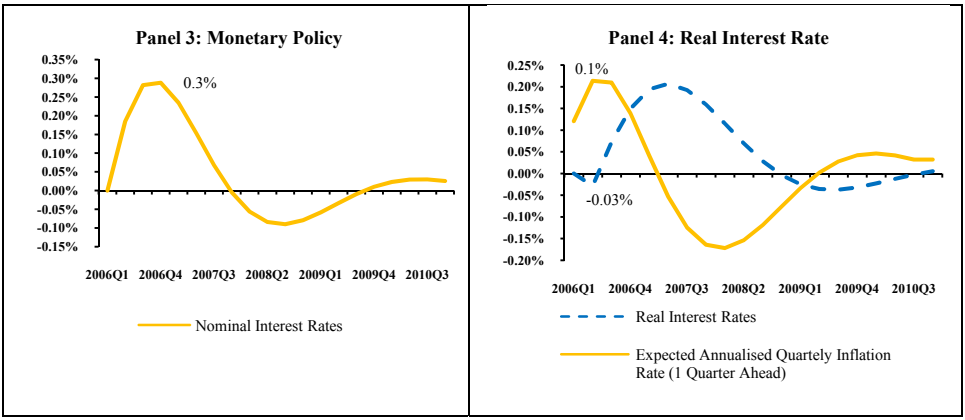
The following charts show the results of the impulse response function of a positive consumption shock.

FIGURE 1

The Income Channel



[17] The intention of these flowcharts is to provide an easier way of thinking through the transmission mechanism although in reality it is difficult to pin down the separate channels at work at a point in time given that all equations run simultaneously.

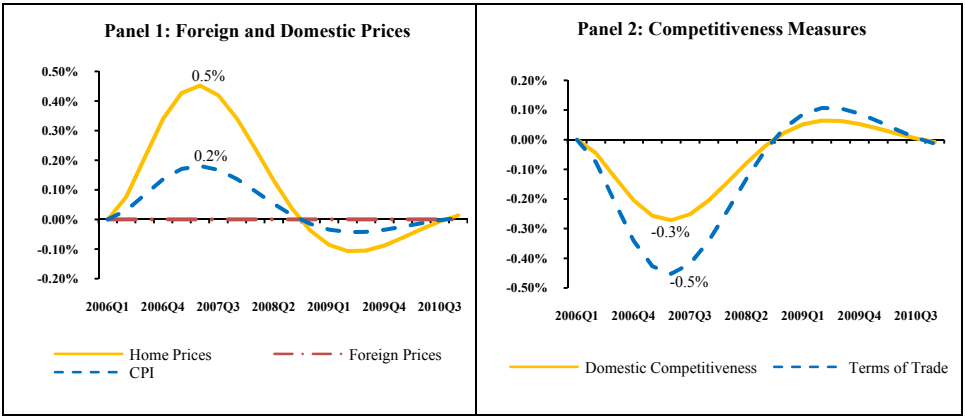


As in Figure 1 above, the 2.0 percent exogenous rise in consumption in the second quarter of 2006 (note that the increase is a little over 2.0 percent given the initial easing in real interest rates) leads to a contemporaneous increase in the output gap by around 0.9 percent (Figure 1, Panel 1). The rise in demand translates to a rise in inflation by 0.2 percent a quarter later (Figure 1, Panel 2).[18] While the Central Bank responds by raising nominal interest rate, the initial boost in expected inflation results in the early decline in real interest rates in the same period (Figure 1, Panel 3 & 4).

[18] The lower impact of domestic demand on inflation reflects the set up of the domestic economy.

FIGURE 2

The Relative Price Channel

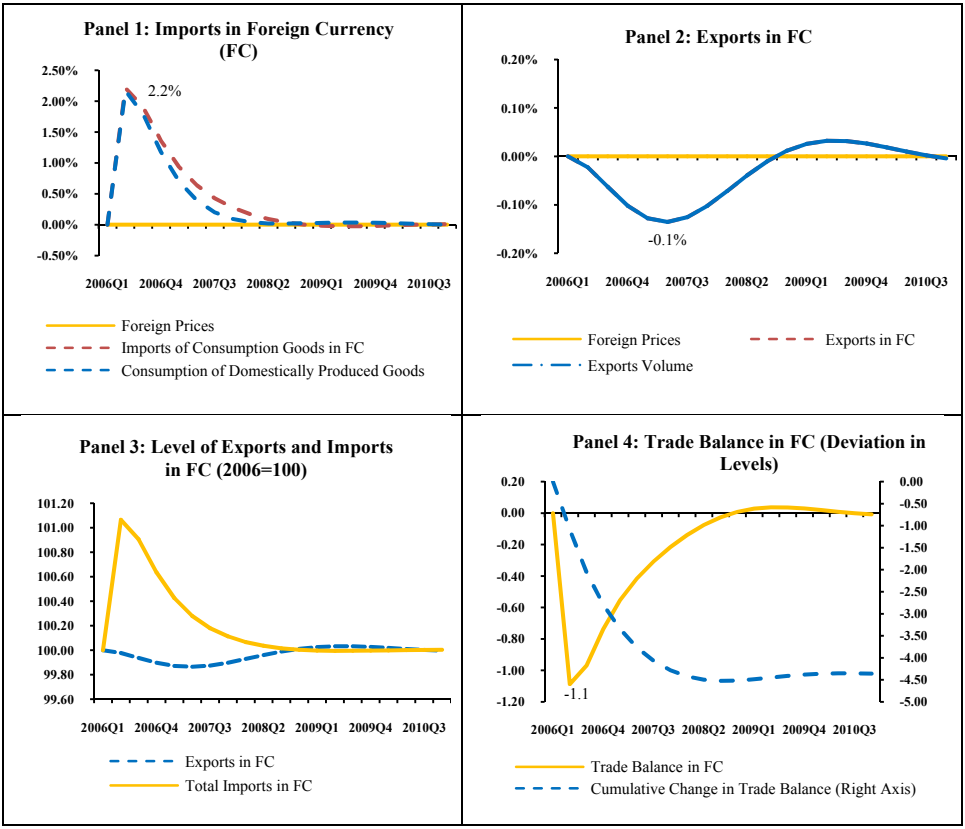


Given the domestic inflationary pressures, domestic prices increase by 0.5 percent (Figure 2, Panel 1) which in turn reduces the competitiveness of domestically produced goods by 0.3 percent. Accordingly, the terms of trade worsens by 0.5 percent (Figure 2, Panel 2).

The gap between imported consumption goods and domestically produced consumption goods is minimal attesting to the role of relative prices (Figure 3, Panel 1). Nevertheless, the rise in domestic prices lowers the attractiveness of export goods, with exports volume declining by 0.1 percent in the second quarter of 2007 (Figure 3, Panel 2).

FIGURE 3

Trade Balance



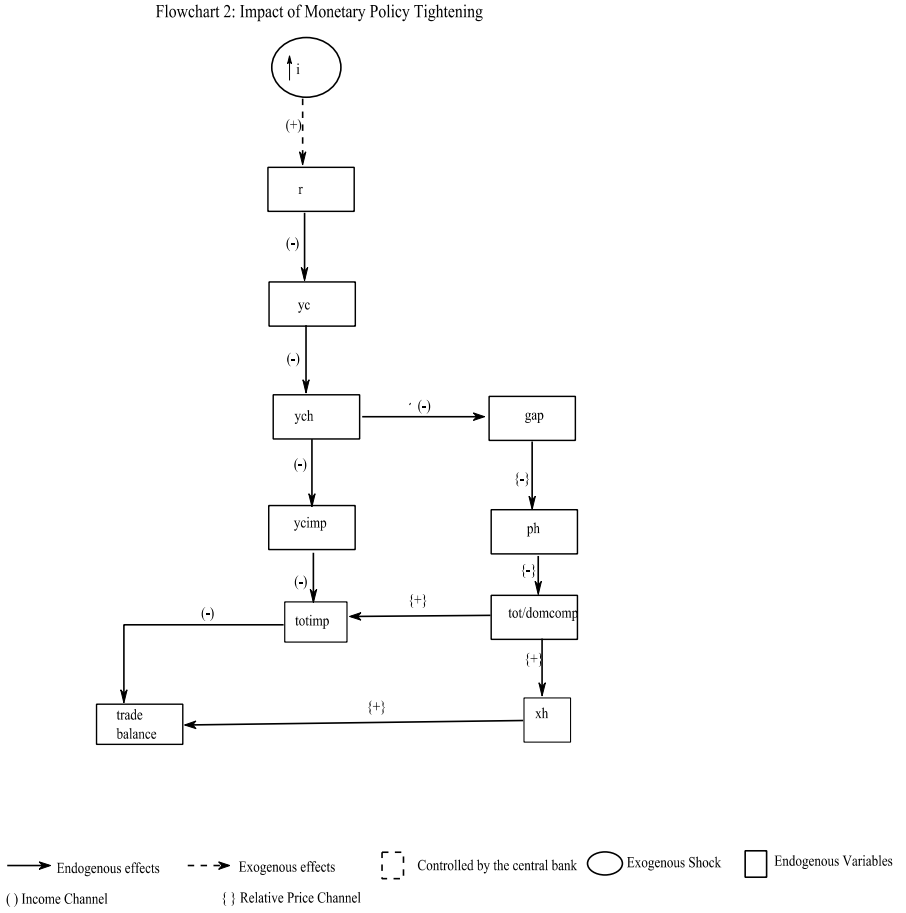
Consequently, the lower volume of exports and higher volume of imports (Figure 3, Panel 3) result in the contemporaneous widening of the trade deficit by 1.1 percent (Figure 3, Panel 4). It takes almost 3 years in the simulation for the trade balance to return to their pre-shock level (indicative of the constraints of the monetary policy rule) implying a cumulative loss of reserves of around 4.4 percent.

The above results highlight that domestic demand shocks may not necessarily be an immediate threat to price stability, however, if persistent can affect our BOP.

While the model qualitatively reproduces the boom in 2006, the magnitudes of the changes are too small when compared to the actual impact of the shock in 2006, especially its impact on inflation and trade.[19]

[19] Nevertheless, it must be emphasised that this is under the assumption that there are no other shocks/drivers at work simultaneously. In reality the economy is likely to have been buffeted by a number of simultaneous shocks.

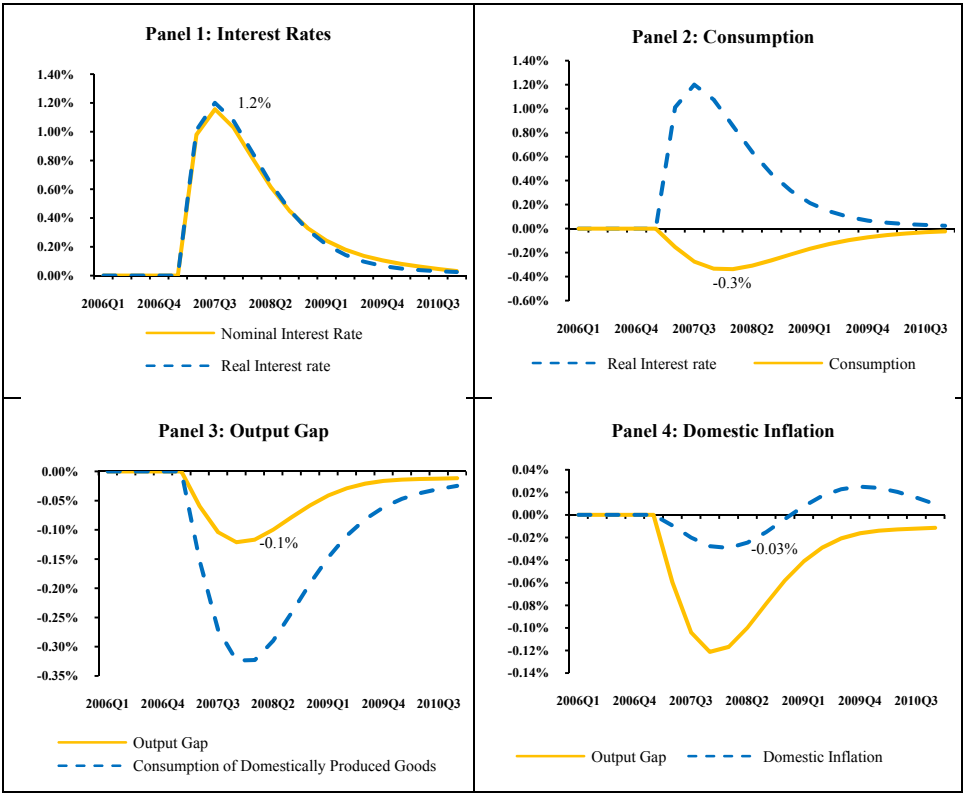
4.2 Replicating the Monetary Policy tightening in 2007 by simulating a 1 percent nominal interest rate increase in 2007 Quarter 2



Flowchart 2 illustrates the main linkages in the event of a monetary policy tightening followed by the key results of the simulation.

FIGURE 4

The Income Channel

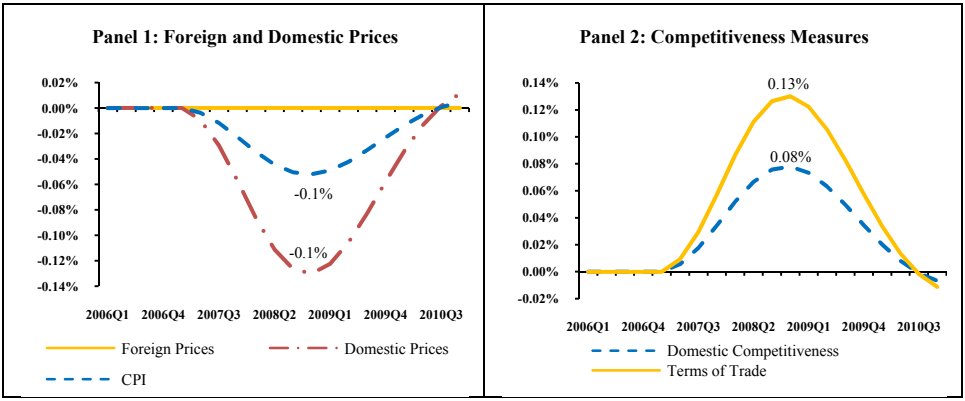


Given the intention of the Central Bank to smooth out interest rate changes, interest rates reduces gradually after the shock taking almost 4 years to return to steady state (Figure 4, Panel 1). The rise in real interest rate dampens consumption by around 0.3 percent in the first quarter of 2008 (Figure 4, Panel 2). With domestic consumption only accounting for around 40 percent of GDP, the decline in consumption only results in around 0.1

percent contraction in output (Figure 4, Panel 3) and the subsequent decline in inflation by around 0.03 percent in the first quarter of 2008 (Figure 4, Panel 4).

FIGURE 5

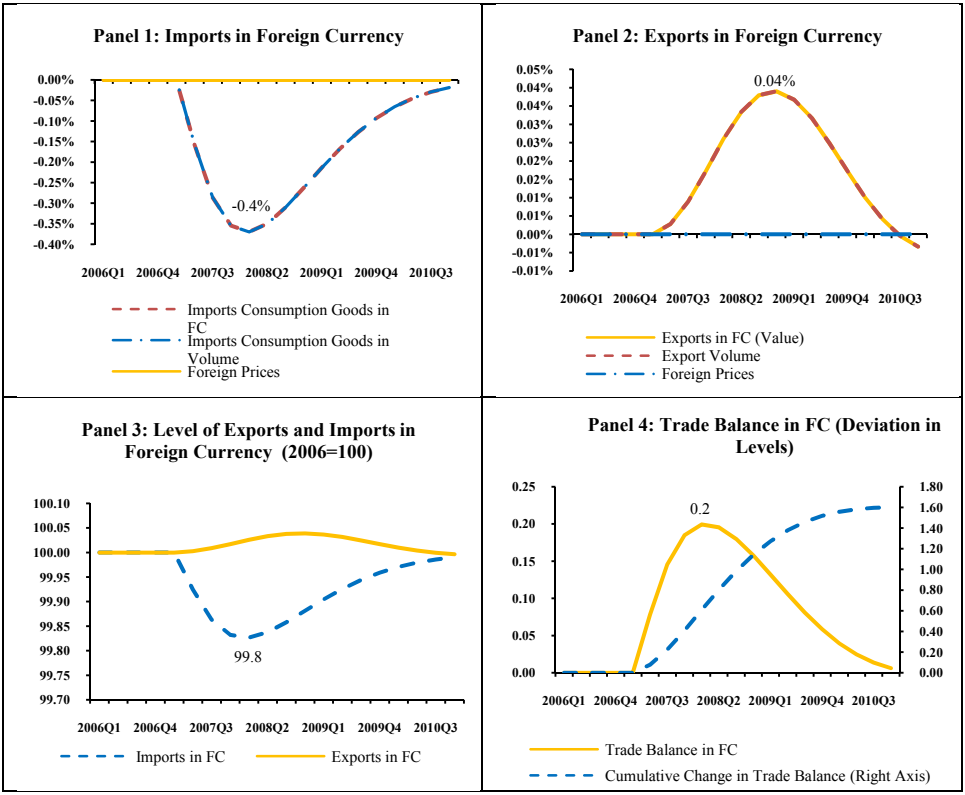
The Relative Price Channel



The decline in domestic prices, which also underpins the decline in the CPI (Figure 5, Panel 1), boost both domestic competitiveness and terms of trade (Figure 5, Panel 2), albeit marginally.

FIGURE 6

Trade Balance



The volume and value of imported consumption goods declines to the tune of 0.4 percent a year later, on account of the improvement in the competitiveness of domestically produced goods (Figure 6, Panel 1). Similarly, the increase of the terms of trade results in the rise in exports volume and value by 0.04 percent (Figure 6, Panel 2). Accordingly, the decline in the levels of imports and improvement in exports (Figure 6, Panel 3)

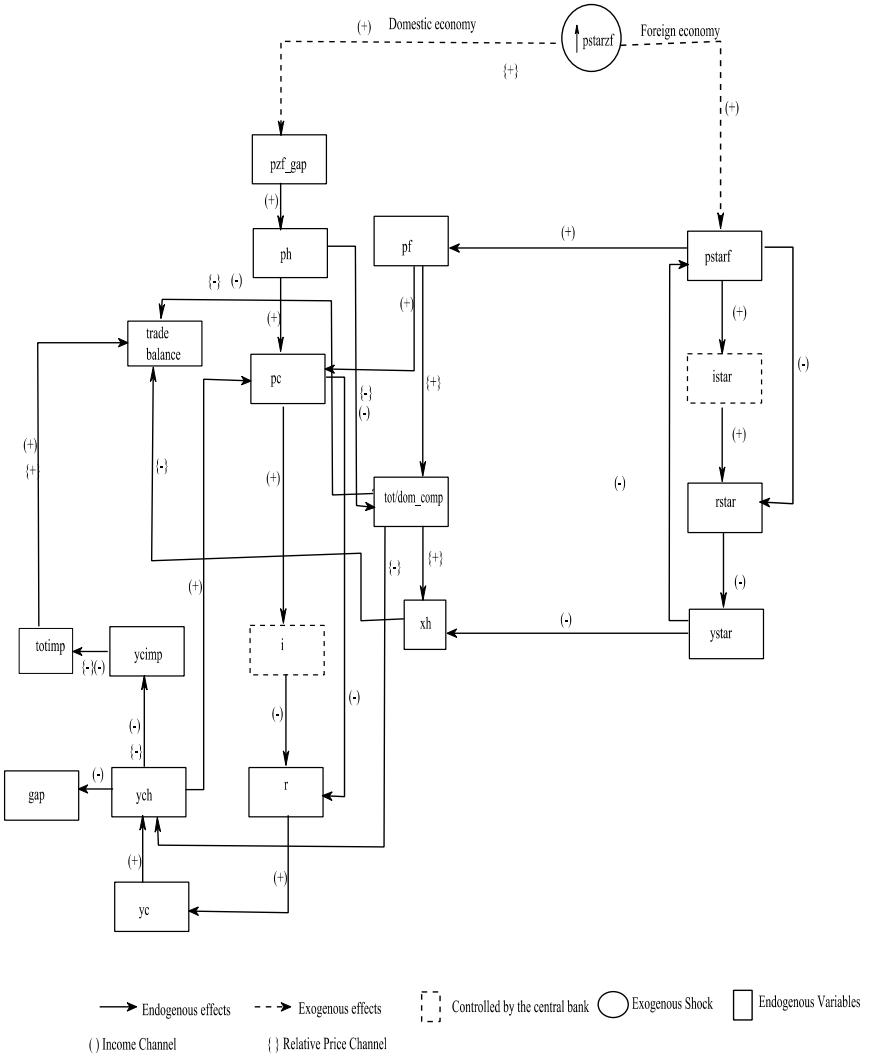
results in the improvement of the trade account by 1.6 percent (Figure 6, Panel 4).

Here it is clear that the impact of a 100 basis points monetary policy tightening on inflation, output and the trade account is minimal. For monetary policy to be effective, more drastic measures or even complementary measures are required.

Qualitatively, the results of the model look plausible as the Central Bank had to resort to more drastic measures, apart from the interest rate, in December 2006 with the imposition of the credit ceiling on individual banks to protect the country's foreign reserves position.

4.3 Replicating the Terms of Trade Shock by Simulating a 10 percent shock to foreign input prices in 2008 Quarter 3

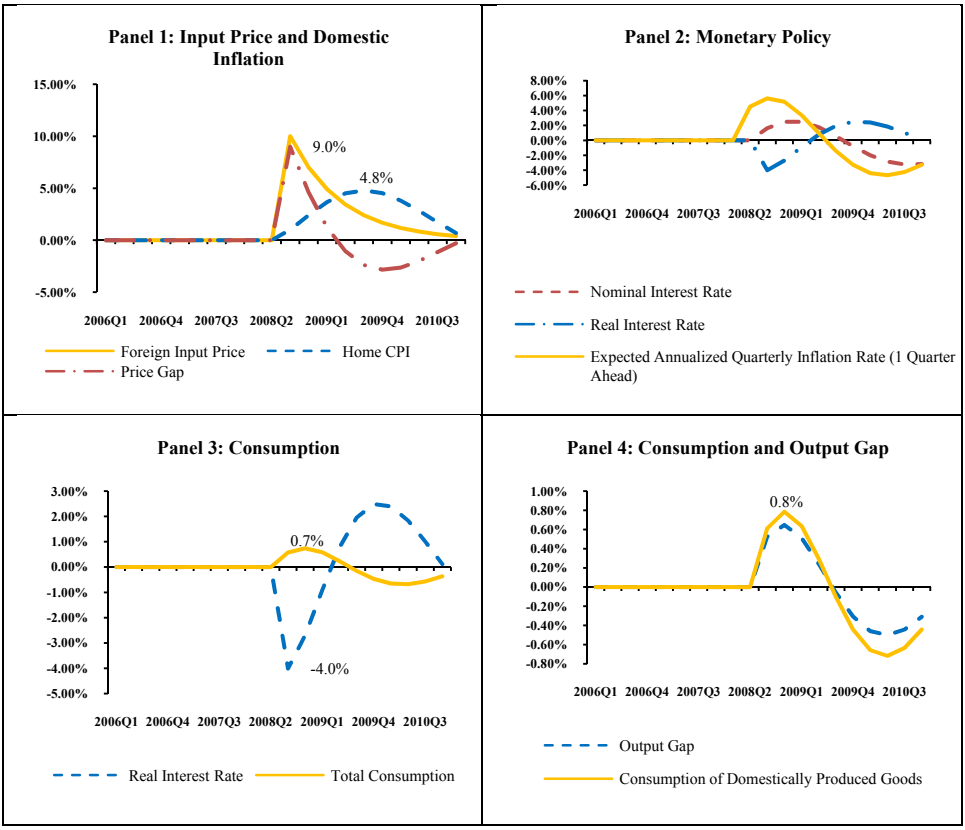
Flowchart 3: Impact of Foreign Input Price Shock



Flowchart 3 presents a rundown of the main linkages and transmission channels between two trading partner countries (a smaller economy and a bigger economy) when both are affected by a foreign input price shock (oil price shock for example).

FIGURE 7

The Income Channel

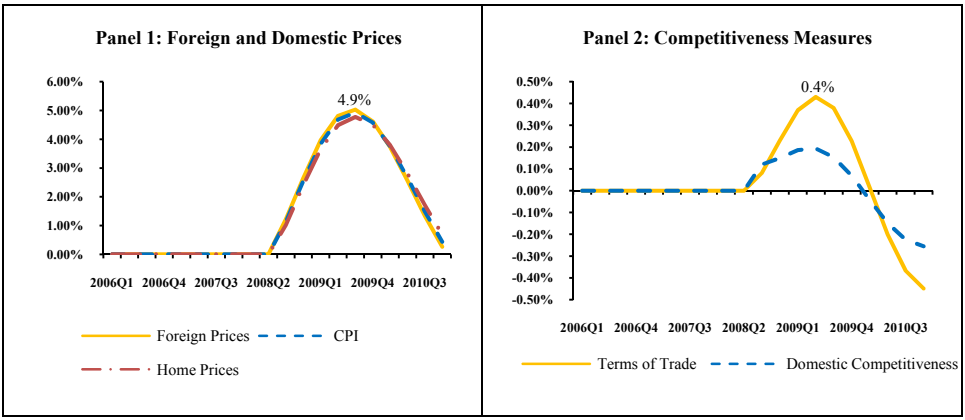


An oil price shock can raise inflation in two ways (Figure 7, Panel 1). Firstly, an oil price shock will affect the price ratio of intermediate imports to domestic prices. Secondly, higher prices of consumption goods in the trading partner economy will be imported by the domestic economy. The Central Bank will raise interest rate (and thus real interest rate) in an attempt to contain inflation. However, expected inflation increases immediately, but nominal interest rate is sticky. This leads to an initial decline in real interest rate, before it increases eventually (Figure 7, Panel 2). Lower real interest rate boosts demand for consumption goods (Figure 7, Panel 3) and in turn the output gap initially, before the tighter monetary stance later on reduces consumption and induces a negative output gap (Figure 7, Panel 4).

Regarding the impact on competitiveness, both the domestic CPI and imported CPI will increase (Figure 8, Panel 1). As such, the impact on the competitiveness will be determined by the relative magnitude of these price changes which depend in the case of an oil price shock, on the relative oil intensity of production in the two economies. Hence, the impact of the terms of trade shock on competitiveness is determined in the model and depends on calibration (parameter choices) and the nature of the shock. Here, the model is calibrated so that price competitiveness remains broadly unchanged (Figure 8, Panel 2).

FIGURE 8

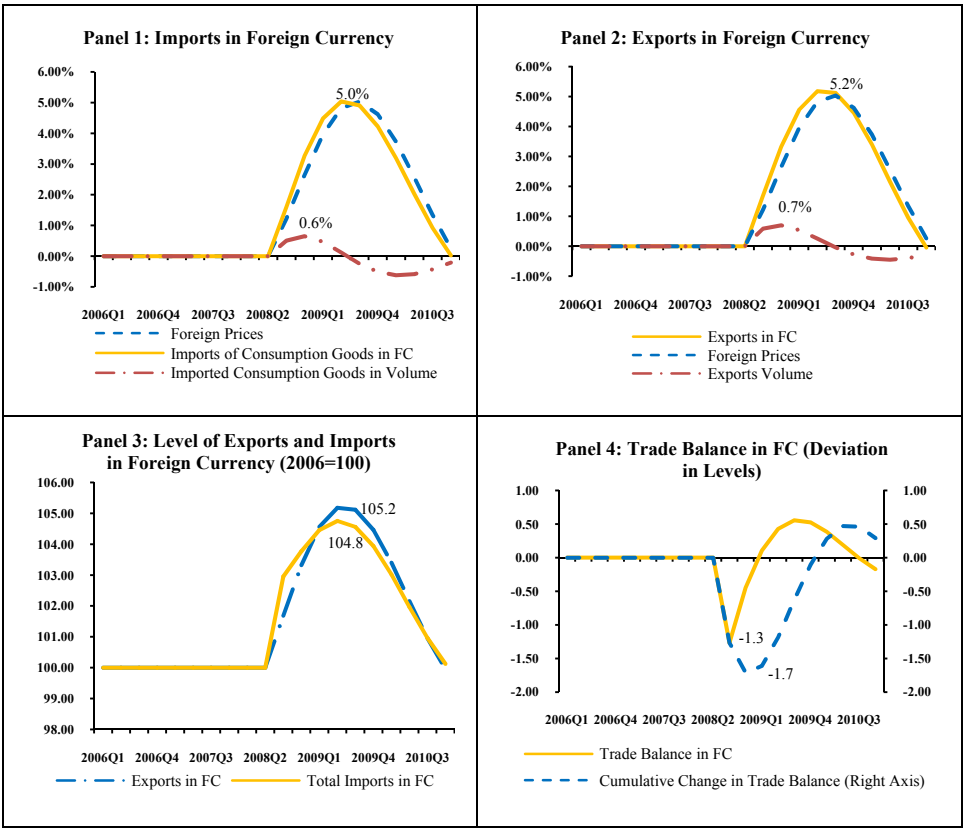
The Relative Price Channel



While the foreign currency value of imported consumption goods increases by a notable 5.0 percent due to higher import prices, the increase in volume is more subdued peaking at a mere 0.6 percent, reflecting broadly unchanged competitiveness and a relatively small change in consumption (Figure 9, Panel 1). Similarly, while the foreign currency value of exports notes a 5.2 percent improvement, volume only increases by 0.7 percent as the high oil prices raise business cost of production and thus export prices (Figure 9, Panel 2). Regarding the levels, export and import responses are broadly similar (Figure 9, Panel 3), but the effect on the trade balance is negative given the large weight of imports in Fiji's trade (Figure 9, Panel 4).

FIGURE 9

Trade Balance

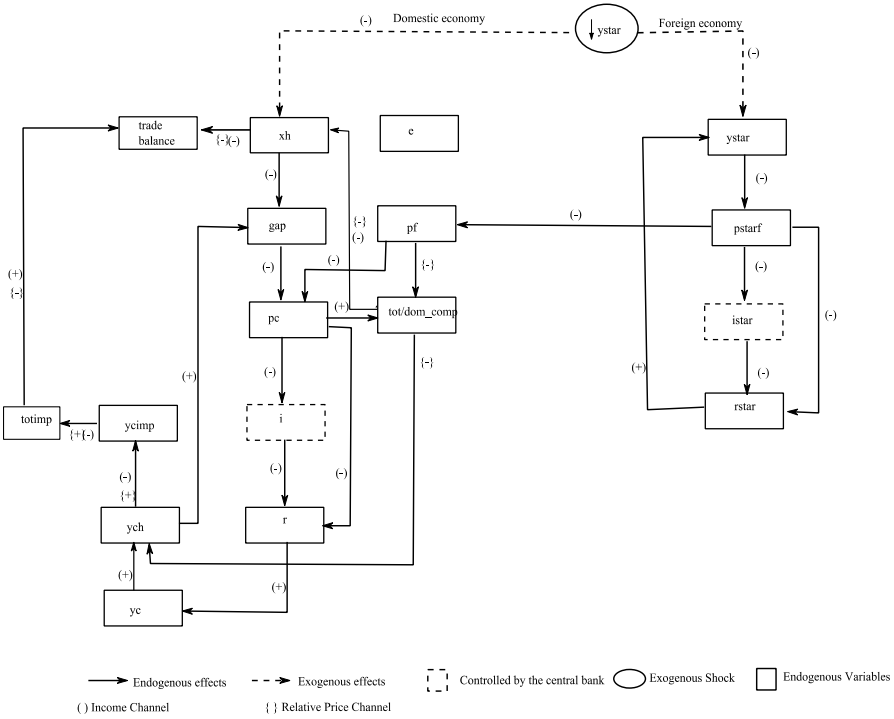


While the model accounts for the high inflation episodes experienced in Fiji, the effect of price competitiveness is ambiguous.[20] Additionally, the model does not adequately capture the impact of the shock on the trade deficit. In 2008, the trade deficit widened to the tune of 24.4 percent (18.2% of GDP). The initial increase in the output gap is also less plausible.

[20] The oil intensity of the two countries is a subject for future research.

4.4 Replicating the Impact of the Global Financial Crisis by Running a 5 percent persistent negative foreign demand shock in 2008 Quarter 3

Flowchart 4: Impact of Negative Foreign Demand Shock



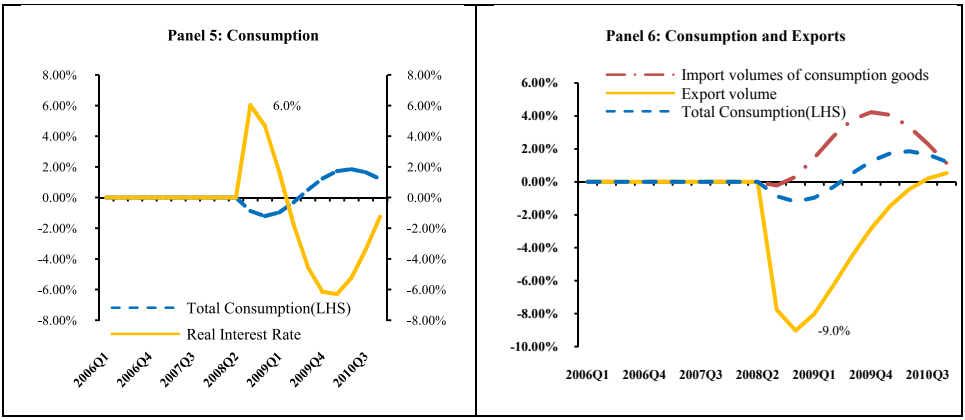
Flowchart 4 gives an outline of the transmission channels in the domestic economy when there is a foreign demand shock.

As seen in Figure 10, the negative foreign demand shock in the third quarter of 2008 is expected to affect the domestic economy via two main factors - fall in foreign output and prices. In Figure 10, Panel 1, foreign output

notes a 7.8 percent quarterly decline in the following quarter while inflation declines by 3.9 percent in the first quarter of 2009. Given the fall in foreign demand, export volume takes a hit with a larger decline of 9.0 percent at the end of 2008 (Figure 10, Panel 2). However, exports only make up around half of the national income; therefore the output gap declines by much less (by 5.1%). It takes almost two years in the simulation for foreign output, output gap and export volume to return to their pre-shock levels.

FIGURE 10

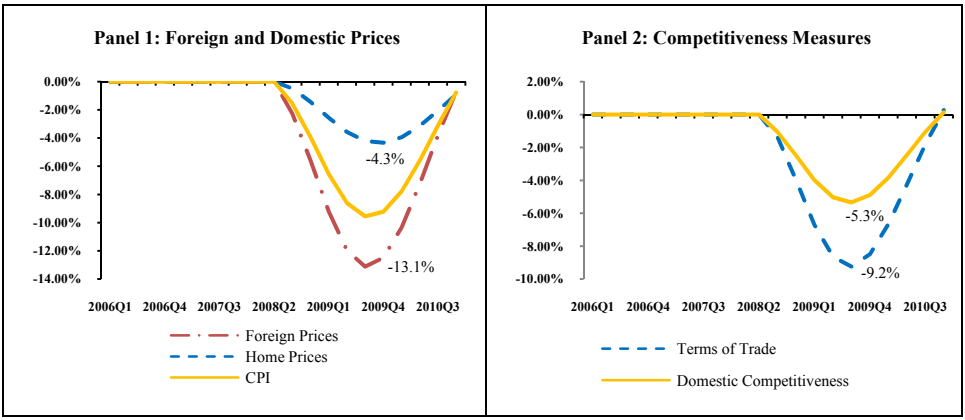
Income Channel



The fall in the output gap (thus domestic inflation) and foreign prices lead to a decline in quarterly inflation rate by around 2.6 percent (Figure 10, Panel 3). The monetary policy easing in early 2009 to the tune of 6.5 percent is not sufficient to offset the much larger fall in annualised inflation (Figure 10, Panel 4). Therefore, the real interest rate remain positive for a while dampening consumption levels (Figure 10, Panel 5). Only until the real interest rate declines then consumption starts to pickup. However, the initial fall in exports was more significant in affecting the output gap and the trade balance than the dampening effect of the real interest rate on consumption levels (Figure 10, panel 6).

FIGURE 11

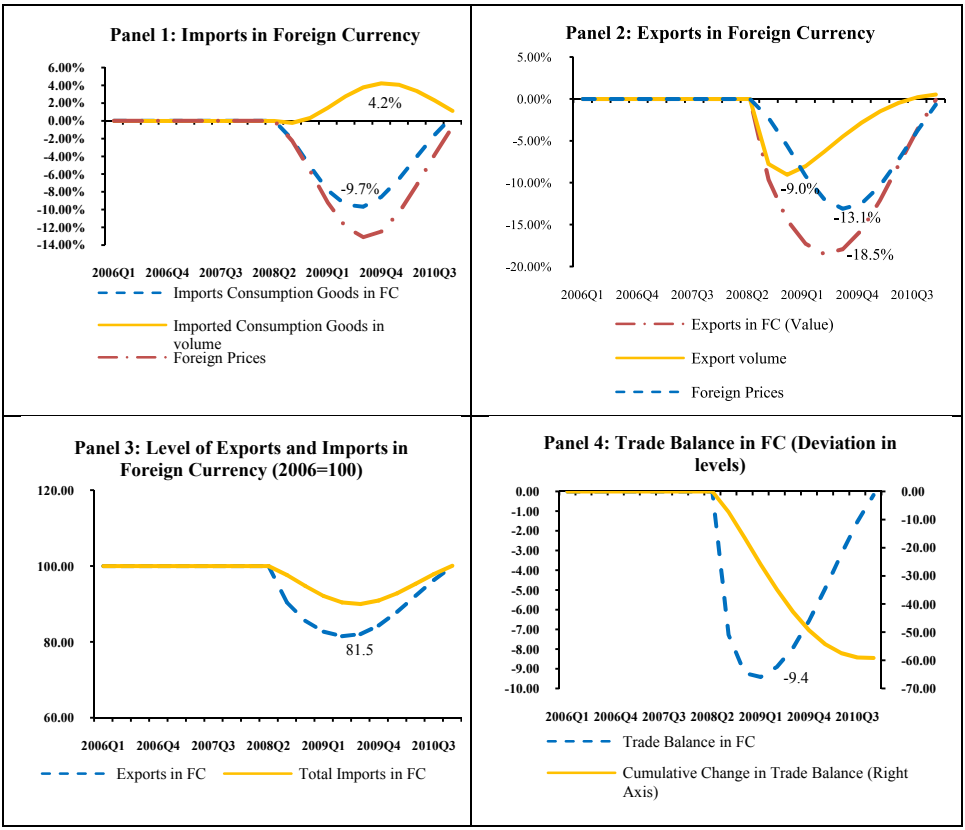
Relative Price Channel



In addition, the much larger fall in foreign prices compared to the fall in domestic prices (Figure 11, Panel 1) means that the domestic economy loses out on competitiveness. Both the terms of trade and domestic competitiveness worsen by 9.2 percent and 5.3 percent, respectively (Figure 11, Panel 2). Accordingly, with the relative price channel, exports decline and imported consumption goods become more attractive.

FIGURE 12

Trade Balance



The value of imports falls despite the rise in volume depicting that the price effect dominates (Figure 12, Panel 1). The fall in the volume of exports combined with the loss in competitiveness result in a significant fall in the value of exports (Figure 12, Panel 2). In sum, the much larger decline in exports value compared to imports (Figure 12, Panel 3) leads to the widening of the trade deficit by around 9.4 percent in early 2009 (Figure 12, Panel 4).

Cumulatively, the loss in the trade balance amounts to a staggering 60 percent by the end of 2010. Indirectly, if the foreign reserves level in Fiji were mostly dominated by the trade balance, without any drastic policy intervention, the global financial crisis in late 2008 and early 2009 would have severely affected Fiji's BOP.

Again the results of the simulation trace the actual shape of the response in Fiji quite well. However, the magnitudes and time lags taken are less plausible.

5.0 Findings and Concluding Remarks

Qualitatively, the model captures Fiji's economic history quite well and implies some important findings.

Notably, the interest rate on its own can become a dull monetary policy tool for PSIDS. It requires supporting policies to make it effective. A case in point were the conditions that led the Central Bank in 2007 to keep the credit ceiling given that the interest rate tightening was not doing enough to reduce the double-digit private sector credit growth rate during that period.

Additionally, the model accounts for the BOP crisis via the terms of trade shock and the fall in foreign demand shock.

Nevertheless, the drawbacks of the current model are numerous as well. Quantitatively, the model does not adequately capture Fiji's macroeconomic history. The separate blocks in the model also need to be formally estimated to ensure that the coefficients are specific to Fiji. Moreover, the model requires a fiscal policy block to capture the key role of governments in small open economies.

Finally, the current model still needs to adequately capture the role of the exchange rate in the transmission channels. Work on improving these limitations are currently underway towards an appropriate model that can be used for policy analysis and forecasting.

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