



Working Paper



A Policy Model for Stabilisation and Growth in the Small Open Economy ¹

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Abstract:

The model presented in this paper demonstrates that because of the structure of small open economies, many of the tools and objectives of conventional economic policy adjustment such as exchange rate adjustment, counter-cyclical fiscal policy, monetary policy and inflation targeting, are beyond their reach. In spite of this limitation, policy makers may craft successful strategies for economic growth and stabilization by judicious use of the tools that they do have. These include the use of fiscal policy for aggregate demand management and exchange rate targeting, together with government tax, expenditure and financing policies and industrial development strategies to enhance international competitiveness.

Keywords: *Small economy, economic model, competitiveness, fiscal policy, monetary policy, exchange rate, inflation, oil price shock, economic vulnerability, capital flight, foreign investment, fiscal sustainability.*

Introduction

A defining characteristic of a small modern economy is the fact that all production and exchange in the domestic economy involves imports, directly or at one remove. By virtue of its size, the small economy lacks the capacity to deploy the scale and variety of production and distribution technologies that would permit any sector of the economy to be productive without imported inputs. Typically, the small economy produces a handful of internationally competitive exports and services, with the proceeds of which it imports all its needs, whereas a large economy has the capacity to produce a diverse range of products and services, some mainly or wholly from domestic sources. Because of this difference with large economies, the framework of analysis for small economies must include at least three commodities, the outputs and prices of which respond to different signals and in distinct ways. The first product is exports, a term we use to encompass tourism and all other services which are sold abroad. The prices of exports are set on an international market, and the small economy can export everything it can profitably produce at those prices. Export prices are exogenous to small economy, and output is limited only by their

¹ This paper will appear in a forthcoming issue of *Social and Economic Studies*. My thanks to three reviewers of this journal whose comments have served, I hope, to make this a more persuasive and useful paper.

capacity to produce competitive output. A second category of products and services is imports. Their prices are also exogenous, and the volume of imports depends on what may be afforded from the earnings from exports. The third category is products that are seldom or never traded – nontradables; their prices and output are both endogenous. However, both the prices and the output of nontradables are influenced by the production of exports, because, like all production in the small economy, the production of nontradables involves imports, which the economy can afford only if it earns sufficient foreign exchange from exports.

The most relevant measure of size from an economic viewpoint is by a combination of GDP and population. Geographical area is less useful, because a country with a low GDP and small population will manifest the structural features of a small economy even if the geographical area of its territory is very large. There is a continuum from the small countries of the Caribbean and countries of similar size, to the world's largest economies. The model offered in this paper represents most closely the structure of economies that are nearest to the smallest end of the spectrum, which is where most Caribbean countries lie.

One contribution this paper makes to the analysis of the small open economy is to demonstrate that in the three-goods model with price elasticities of substitution that are identically zero, exchange rate changes have no effect on the stabilization of the balance of payments or on the rate of growth. A second contribution is to show how the exchange rate may be targeted by managing aggregate demand and the demand for imports to balance the demand for foreign currency to the available supply at the target exchange rate. With this framework of aggregate demand management the small open economy may dispense with exchange controls and other devices to ration foreign currency. A third contribution is a model which includes a growth equation that captures the implications of short-term policy for long-term growth. The growth equation addresses a shortcoming of standard approaches to economic stabilization policy which do not take account of the impact on the long-term growth of capacity to export in the foreign-exchange-constrained economy. In addition, this paper departs from the norm by providing a framework for forecasting where emphasis is on the credibility of the forecast. The forecast, which is conditional on current trends and policies, is used as a benchmark to evaluate economic outcomes, rather than as a predictor of those outcomes.

The first section of this paper outlines a model in the Mundell-Fleming tradition² which incorporates the structural characteristics of the small open economy, and comments on the model's antecedents. Section 2 analyses the options for stabilization which emerge from the model. This is followed in Section 3 by a discussion of the model's implications for policies to stimulate growth in the small open economy. Section 4 explores how fiscal policy may be used to manage aggregate demand to achieve balance of payments equilibrium and target the exchange rate. Section 5 expands on government's revenue and financing constraints and the trade-offs that policymakers must negotiate. Section 6 discusses the limitations and possibilities of monetary policy. In Section 7 a reduced form of the equation that explains inflation is used to demonstrate that the international inflation rate is the best that the small open economy may achieve. Section 8 discusses inferences from the small open economy model, including guidance on policy responses to external shocks, the significance of domestic financing for investment, and the sustainability of public finances.

² The Mundell-Fleming model (Mundell (1963), Fleming (1962)) is an IS-LM model with the addition of the external sector.

1. The model and its antecedents

The model is a modification of the familiar Mundell-Fleming framework which continues to inform economic policy in most small open economies (SOEs), thanks largely to the influence of the International Monetary Fund (IMF). Although the academic literature in recent decades has been preoccupied with New Keynesian models, the IMF's workhorse model for the analysis of small economies and developing countries remains the internal-external balance model. Fortunately, there is a comprehensive recent discussion of the model which we may use as reference (Berg et al., 2023).

Modification of the Mundell-Fleming model to incorporate three non-intersecting goods - exports, imports and nontradables - is not novel; it is to be found in Agénor and Montiel (2008), a text which offers an exhaustive analysis of the theoretical foundations, implicit and explicit, of the policies of the World Bank and the IMF. The Agénor-Montiel text also shares with the present model an analysis of medium term growth trajectories and policies that might serve to accelerate growth potential. IMF models are agnostic about medium term trend growth of the economy; the IMF's mandate focusses on economic fluctuations and responses to shocks and issues of growth and development are the World Bank's agenda. However, securing rates of growth that put their economies on a path to converge to the average national income of advanced countries is a major preoccupation of the Caribbean and the developing world. What is even more pertinent for the policy maker is the fact that many of the choices they make in the near term, for example in annual budgetary allocations, will have consequences for the trajectory of long-term growth. The model used in this paper therefore adds a growth equation to the internal-external balance model with three non-intersecting goods. It may be summarised as a Mundell-Fleming type model with three goods which cannot be substituted domestically in production or consumption, with the addition of an eclectic growth equation which defines the path of capacity growth.

The investment equation, specifically investment in the capacity to produce exports of goods and services, defines the upper limit of potential growth in the SOE, because it delineates the maximum international purchasing power of the import-constrained economy. Because the economy is small, finance is available from international capital markets to meet the demand for all investment that offers the ruling market rate of return, after discount for country and market risk. What is more, foreign finance relieves the foreign exchange constraint on investment.

The factors that will determine the rate of return on investment, shown in Equation 1, are the international price pt (the price at which all exports are sold and all imports are bought), cost factors, indicators of the international competitiveness of the investment project, and indicators of country and exchange rate risk. The cost factors include unit labour cost, ulc ; the cost of working capital, r ; and the cost of imported inputs. Exchange rate risk is measured by an index of exchange market pressure emp , a weighted average of exchange rate changes, losses of foreign reserves and increases in short term domestic interest rate increases³. Two indicators of international competitiveness are included: a measure of the extent of full capacity of existing exports in the previous time period $-xcap(-1)$; and the country's ranking in the World Economic Forum's *Global Competitive Index*, or similar report.

Total investment also includes an endogenous element of investment in nontradables, motivated by an accelerator mechanism, represented by the expected aggregate demand variable, a^* .

³ The rationale, derived from the Mundell-Fleming model, is that these are the policy tools which, individually or in combination, reflect policy responses to a scarcity of foreign exchange. See, for example, Van Horen, Jager and Klaasen 2006; Bird and Manfilaras, 2006; and Gevorkyan, 2019.

The investment equation is estimated separately from the rest of the model, and is used to project the potential growth of exports of goods and services, based on historical information on the productivity of capital. This growth path is used as a check on the estimates and projections of the output of tradables q_t ; the trend projection for the output of tradables cannot exceed the potential defined by the rate of investment in new capacity.

$$1. \quad i = f_1(-xcap_t(-1), a^*, p_t, ulc, r_f, emp, GCI).$$

The output of tradables is fully determined on the supply side. The small open economy exports all the goods and services it can supply profitably at the going international price. The amount produced is determined by the costs of production: imported input costs, the cost of working capital and unit labour costs:

$$2. \quad q_t = f_2(p_t, ulc, r).$$

The output of nontradables is modelled as a two-stage process. Producers of nontradables have an expectation of the demand for their output, based on the previous year's production and the expected level of aggregate demand. The intended output, q_n^* , is:

$$3. \quad q_n^* = f_3(a^*, q_n(-1)).$$

That quantity is offered at a price p_n^* . However, both the offered supply and the price will be adjusted to the actual sales in the market, and the realized price and output of nontradables may be represented by:

$$4. \quad p_n = f_4(q_n, p_n, ulc, r).$$

That completes the production side of the model. We turn now to the tools for stabilizing the balance of external payments and containing domestic inflation.

In the equation for the balance of payments,

$$5. \quad \Delta FXR = p_t(x - m) + FDI + B$$

both imports m and exports of goods and services x are bought and sold at ruling international prices p_t . Foreign investment FDI depends on the overall investment in Equation 1, and B is net foreign borrowing by government and the private sector. With given amounts of exports, foreign investment and net borrowing, the balance of external payments, which is reflected in the changes in foreign reserves, ΔFXR , depends on the demand for imports.

The demand for imports is a function of aggregate demand only, because the coefficient of price substitution between imports and internationally competitive domestic production is zero:

$$6. \quad m = f_5(a).$$

Aggregate demand is approximated by the total of output and additions to the stock of money, in real terms:

$$7. \quad a = q_t + q_n + \Delta MB/p$$

where the last term is the real value of additions to the monetary base.

Changes in the monetary base are modelled as a residual, equal to that proportion of the fiscal deficit which cannot be financed from local or foreign borrowing at the market rate of interest.

$$8. \Delta MB = - (FISC - B_f(r_f) - B_d(r)),$$

where $FISC$ is the public sector deficit, and B_f and B_d are government borrowing from foreign and domestic sources, respectively.

The domestic interest rate r is determined by the foreign interest rate r_f through the interest parity condition:

$$9. r = r_f + \delta e^*,$$

where δe^* is the expected change in the value of the exchange rate.

This system of equations may be used to determine the outputs of tradables and nontradables, the price of nontradables, and the balance of external payments as reflected in the change in foreign reserves, as functions of the size of the government's fiscal deficit and the amount of accommodation received from the central bank, given the values of the variables whose values are exogenous in the short run: the extent of full capacity utilization in the tradable sector, unit labour costs, international prices and interest rates, and foreign direct investment.

2. Stabilisation policy in the SOE

Stabilization policy in the SOE amounts to maintaining the balance of inflows and outflows on the external account, since there is a market mechanism in the model for equilibrating the nontradable market. The conventional approach to stabilizing the balance of payments in the face of an adverse external shock is expenditure- and output-switching policy, where exchange rate adjustment is augmented where necessary with counter-cyclical fiscal policy to further stimulate domestic output. Rewriting the balance of payments identity in local currency terms gives:

$$10. e.\Delta FXR = e.p_f.x(q_n, e) - e.p_f.m(a, e) + e.FDI + e.B.$$

However, $\delta x/\delta e$ and $\delta m/\delta e$ are identically zero in the SOE. If there is a shock to export earnings the only options for stabilization are an equivalent reduction in imports or an increase in foreign borrowing if sources are available. For countries lacking international market access and countries whose international credit is rated below investment grade, the main source of finance is the IMF. In cases where market funding is available, the country may need to secure a programme with Fund assistance to provide the market with sufficient confidence to lend.

Exchange rate stability often proves to be a bone of contention in concluding programs for IMF assistance to countries in these circumstances. The reason is that, in the standard IMF model, exchange rate depreciation eases the pain of adjustment to shocks by diverting demand from foreign to the local market and supply from the local market to foreign markets. In more recent times the IMF has acknowledged the need for exchange rate stability in SOEs (Blanchard, Della'Ariccia and Mauro, 2010; Ostry, Ghosh and Chamon, 2012), but programs negotiated with SOE Fund members are still based on the standard model that assumes some beneficial response to changes in the real exchange rate. Many SOEs do accept some degree of exchange rate flexibility, as an element for IMF-supported adjustment programmes in the hope that it will allow for a degree of counter-cyclical policy. However, in the SOE counter-cyclical policy aggravates the loss of foreign reserves and intensifies exchange market pressure because there is no net foreign currency supply response to the exchange rate change. As is apparent from Equation 11, the appropriate SOE response to an adverse export shock is fiscal contraction to restore balance of payments equilibrium and secure the international spending power of domestic income against depreciation.

The fact that the exchange rate tool is not available means that the SOE, unlike a large economy, cannot soften the impact of an adverse shock to exports. Should the government make the mistake of loosening fiscal policy and increasing the money supply, the increase in perceived exchange rate risk leads to capital flight and precipitate currency depreciation. As may be inferred from Equation 1, high volatility of the exchange rate will increase the exchange risk premium (as *emp* rises), with negative consequences for investment. Counter-cyclical fiscal policy in an SOE which faces an export shock has adverse effects on the potential growth of the economy over the medium and long-term. Far from alleviating short-term impacts, such policy prejudices the chance of recovering from the shock and restoring the pre-shock growth trend.

In sum, the preferred policy for SOEs faced with an adverse export shock is to restrain aggregate demand using fiscal policy so as to maintain equilibrium in the foreign currency market and avoid unexpected volatility of the exchange rate. In that way the SOE positions itself for a speedy recovery after the shock by ensuring that the discounted return on investment is unaffected by the shock. If the export shock is temporary growth may be expected to resume on trend, as compared to reduced growth prospects if the exchange rate is not anchored. A stable external balance and an exchange rate which evolves in a predictable manner is also the best foundation for the structural policies that must be undertaken to accelerate foreign currency earnings if the export shock proves to be permanent.

Two important features of this approach to the exchange rate anchor deserve to be clarified.

The first is that the exchange rate is anchored through a market equilibrium mechanism, by containing the demand for foreign currency to the available supply at the target exchange rate. There is no rationing. For efficient functioning the policy requires an institutional framework of close collaboration of monetary and fiscal policy, high frequency foreign currency market monitoring, forecasting, targeting, feedback and adjustment to objectives when needed, and a credible information system.

Secondly the exchange rate can be targeted using fiscal policy to manage aggregate demand with a variety of exchange rate anchors, including crawling pegs, exchange rates that are subject to discrete adjustments and rates that are kept within a band, in addition to fixed currency rates. The critical factor for success is that the anchor enjoys credibility in the foreign currency market, with no evidence of informal foreign currency trading of any consequence.

3. Stimulating growth in the small open economy

In order to increase the SOE's capacity to export and relieve the foreign exchange constraint on growth, it is necessary to accelerate the rate of investment. The arguments in the investment equation (Equation 1) that are susceptible to influence by macroeconomic policy are unit labor costs *ulc*, exchange market pressure *emp*, and the index of global competitiveness *GCI*. The exchange market variable is the one for which the model as presented gives clearest guidance. Exchange rate instability depresses investment by increasing the risk premium, and therefore macroeconomic stability emerges as essential for the maintenance and acceleration of economic growth. The exchange rate anchor, maintained via aggregate demand management to equilibrate the foreign currency market, provides the best environment for growth-oriented policy in the SOE.

The factors that affect unit labour cost are many and complex, including the quality of the labour force, the composition of export production, the purchasing power of average incomes, the distribution of incomes, rates of emigration and immigration, and institutional arrangements in the labour market. James

(this volume) provides a detailed measure of labour force quality for Trinidad-Tobago which illustrates the challenge of making generalizations with respect to this variable. The balance of demand and supply of skills which influences the average wage is affected by the degree of inward and outward migration, itself a complex issue which is surveyed in the context of globalization by Borjas (2014). The relationship between skills, migration, outsourcing and the growth of international supply chains, all of which are characteristics of globalization, have a strong bearing on the labour market equilibrium in the SOE and the resulting unit labour costs (Rodrik, 2024).

Various measures have been devised to capture in a summary indicator all the competitiveness factors that contribute to a country's attractiveness to potential foreign investors. The World Economic Forum's *Global Competitiveness Index*, published annually up until 2020, combined indices of the strength of the institutional framework, the quality of infrastructure, the macroeconomic environment, the country's health and educational services, the efficiency of the markets for goods and labour, the development of financial markets, the readiness to absorb new technology, the size of the market, the sophistication of business practices, and the evidence of innovation, as the main headings under which the competitiveness indicators were grouped. A less comprehensive indicator is currently produced by the International Institute for Management Development (IMD, 2025).

A number of issues highlighted in these competitiveness indices offer guidance about growth promoting government policies. Among them are high quality of infrastructure and public utility and communications facilities and services, which reduce the external costs associated with investment projects. Strong budgetary provision for public expenditure and the adequacy of the budgetary allocation for maintenance are important indicators of a growth-oriented strategy which takes full consideration of the importance of these factors for improving country competitiveness. Good quality of educational and health services are also high on the list of public goods that contribute to competitiveness. Sound educational systems have the double benefit of producing a skilled workforce and attracting immigrants with specialist skills. Another prominent factor in competitiveness surveys is the efficiency of the regulatory and administrative services of government.

In a world of rapidly changing technologies the capacity and disposition for innovation has become an important competitive advantage. Debate continues as to how other countries may emulate the extraordinary success of the Asian Tigers - Hong Kong, South Korea, Taiwan and Singapore - in successfully diversifying their economies through stimulating innovation and entrepreneurship. In a study of these and four other East Asian countries - Japan, Malaysia, Indonesia and Thailand - Page (1994) lists macroeconomic stability, the capacity to respond effectively to macroeconomic shocks, and educational policies that stressed broadly based primary education as important factors in the Asian countries' success. Page also points to the important role of official industrial policy, particularly in the cases of Japan and South Korea. The importance of state support in accelerating growth has been further emphasized by the work of Mazzucato (2013) which reveals ways in which all governments, even those without explicit industrial policies, have financed and promoted entrepreneurship. Studies all point out that an essential criterion and indicator for the success of industrial policy is export performance; state support in whatever form should be sustained only for those firms and Industries which meet their export targets.

4. Using fiscal policy to manage aggregate demand

The fact that the SOE is a price taker in international markets means that the foreign currency market should be treated as a fixed-price market in which the balance of demand and supply is achieved through

the adjustment of quantities. Both in the long run and in the short run, the condition for external balance is satisfied by equating the supply and demand for foreign currency at the ruling exchange rate, whatever that happens to be. This implies that stabilization policy in the short run must focus on demand because supply can only be increased in the medium and long run. This is true even if there is persistent excess capacity in the export sector; the persistence of excess capacity is evidence of problems of quality, reliability and consistency which cannot be cured in the short run. Balance of payments stabilisation through a market-determined exchange rate anchor is not only an important policy objective, it also fosters the credibility of the economic management framework and improves the climate for investment and growth.

The reason fiscal policy features so prominently in discussion of adjustment strategy in SOEs is that it is the only instrument available to manage aggregate demand. The alternative of rationing foreign currency was tried extensively in the Caribbean and elsewhere in the 1970s and 1980s, with unfortunate results in every case. The emergence of informal markets and shortages led to external and domestic instability and reduced the potential growth of the affected economies for many decades. In the face of an adverse export shock the only action that will stabilize the external accounts is a fiscal contraction sufficient to reduce the supply of base money by an amount that depresses aggregate spending and the resulting import requirement by the amount of the shock. Failure to act risks creating apprehension about shortages of foreign currency, leading traders and their bankers to take defensive positions against the local currency, thereby bringing forward the calamity they fear. Any defensive action the authorities may attempt in these circumstances will simply increase the uncertainty.

There is an obvious political difficulty in implementing contractionary fiscal policy in an economy which has been hit with a reduction in export earnings. The experiences of countries with long-term fixed pegs - Belize and Barbados are examples - demonstrate that this difficulty may be overcome by providing adequate information. The exchange rate anchor is highly prized and if the population appreciates the link between the financing that the Central Bank provides to cover government expenditure in local currency and the subsequent demand for foreign currency, these experiences suggest a willingness to accept the fiscal contraction necessary to secure the foreign currency balance, even in difficult circumstances.

There are other challenges with the use of the fiscal tool. The most practical way to reduce government's borrowing needs in the near term is to halt capital spending. While this may be acceptable and necessary in the short run, if the shock proves to be permanent a reallocation of government expenditure priorities will be needed to allow for the restoration of government's investment program to avoid impairment of long-term competitiveness.

A second challenge is that fiscal policy is subject to lags. Even where a government with a firm reputation for fiscal prudence puts measures in place to cut its borrowing requirement by an amount which markets deem to be adequate, the impact on imports may take some months to work through the economy. In this interval it may be helpful to introduce an extra premium on domestic over the international interest rate, temporary controls on domestic credit or other monetary measures to dissuade traders and financiers from precautionary capital flight. These measures are helpful only if the fiscal contractionary stance is fully credible.

Stabilization policy in the SOE is a joint responsibility of the fiscal and monetary authorities. Together they must analyse the nature of the shock to the balance of payments and the extent of fiscal contraction and supplementary monetary measures needed. They should jointly tailor their short-term economic forecast to reflect the expected path of adjustment, and together they should monitor the process closely,

making changes as needed. Importantly, they must jointly communicate with the foreign currency market and the general public to inform expectations and maintain credibility.

The Treasury and the Central Bank should also work jointly to make a determination as to whether the export shock is temporary or permanent. In either case the emphasis must be to maintain competitiveness, taking account of the considerations that enter into the investment equation - Equation (1) - in setting priorities for government expenditure allocations and tax and debt policy. In the case of a permanent shock it will also be necessary to give higher priority to structural changes and innovative strategies in order to accelerate the growth of export capacity.

5. Guidelines for tax, government expenditure and government financing policies

The external balance requirement is the objective used to set the target for the central bank's net lending to government in the SOE. Of the many ways to achieve that target, there will be a selection which is most productive in terms of competitiveness, investment in export capacity, and acceleration of economic growth. To explore this issue consider the government revenue expenditure and financing identity:

$$11. \tau(y) - G_c - G_k = B_d + B_f + \Delta MB$$

where government revenues are a function τ of national income y , G_c and G_k are government consumption and capital expenditures respectively, B_d and B_f are government's domestic and foreign borrowing and ΔMB is the change in high-powered money.

The functional form $\tau(y)$ will be a country specific combination of the tax structure and rates of taxation on each tax category. If the country needs to adjust to a shock which is temporary, time-bound surcharges may be an appropriate way to dampen aggregate spending. However, if the foreign currency loss proves long-lasting, a surcharge is not recommended because of the impact it will have on the rate of return on the country's exports as well as the consequences for income distribution. As a general rule, export competitiveness cannot be achieved via tax policy if the SOE has no underlying comparative advantage in the export of the product or service. However, where novel investment projects offer international comparable rates of return and financiers do have market incentives to invest, tax policy may be used selectively along with other government assistance to support innovation and lower barriers to entry in the early stages of the establishment of a new industry.

On the expenditure side, trends in government consumption should be evaluated periodically, together with the structure of taxation, in terms of their impact on human development and inequalities in the society, as well as their impact on the overall efficiency of government's public and administrative services. The evaluation would need to take account of the factors that determine the composition and the cost of the provision of public services, including land area, topography, remoteness, climate and agricultural and mineral resources. The scope for expenditure adjustment may also be affected by the small size of the economy (Alesina and Wacziarg, 1998). Human development and improved quality of livelihoods are policy objectives in themselves and the health, education, administrative and other services provided by government contribute to the country's international competitiveness and growth potential.

In tranquil times a prudent government will maintain a small surplus on the current account ($\tau(y) - G_c$) to help fund depreciation expenses and the repair and upgrade of government facilities. Government

borrowing, foreign and domestic, should be specific to government capital works projects. This strategy allows government to maintain and upgrade ports, airports, roads and public facilities and to modernize communications, public utilities and services in a continuous process, within the limits of available financing. Building and maintaining a reputation for prudence ensures the government's international credit worthiness and facilitates the maximum access to finance at the most favorable interest rates. Funding is available from international financial institutions, governments of large countries and private financial markets for SOEs whose credit is rated at “investment” grade. As a result, prudent governments are more competitive and have greater growth potential: they are able to maintain a more stable macroeconomic environment and they score higher on the indices of International competitiveness.

6. Monetary policy in the SOE

The existence of a multitude of channels, formal and informal, for international financial transactions means that the domestic interest rate obeys the uncovered interest parity condition, apart from exchange costs and a country risk premium:

$$12. \quad r - r_f = f_6(c(\delta e), emp)$$

where $c(\delta e)$ is the cost of exchange and the exchange market pressure emp is the factor which influences the country risk premium⁴. This implies that the central bank cannot set a policy rate that deviates from the trend of the international rate except for short periods. Contrary to conventional wisdom, all modern economies feature active markets in foreign and domestic liquidity with participation of the central bank which can be used for monetary intervention, whatever the extent of trading in equities and long dated securities. However, such intervention does not empower domestic monetary policy in the context of a liquidity market which is open to international financial flows.

Credit restrictions and stipulations with respect to liquidity are other tools with which small open economies have experimented, to little effect. Consider the market for loanable funds: banks are able to fully satisfy the demand for credit from all qualified borrowers, from local and foreign sources, at the ruling international interest rate (with the addition of exchange cost and country risk premiums on the local rate). The amount of new credit therefore depends only on the level of income:

$$13. \quad \Delta CR = f_7(y)$$

The supply of loanable funds depends on the additions to base money and the change in the foreign exchange reserves:

$$14. \quad \Delta MO = f_8(\Delta MB, \Delta FXR).$$

The difference, the change in the level of liquidity ($\Delta LIQ = \Delta MO - \Delta CR$) may be held in local or foreign currency depending on factors such as the extent of central bank intervention, the exchange rate target, the degree of bank oligopoly, and economies of scale in banking (Khemraj, 2014).

In a money and credit market with these characteristics, rationing devices such as credit limits or liquidity requirements have no lasting effect on spending, output or prices. Foreign financing is available in unlimited amounts should there be any shortage of domestic liquidity, whether or not that shortage is

⁴ This is an amplified specification of Equation 9.

induced by official policy. If local banks are restricted in the quantity of credit they may offer to qualified borrowers these customers will have little difficulty in accessing the needed funds in foreign currency on formal or informal markets.

Although monetary policy cannot be used to target inflation in SOEs, central bank intervention can play a useful role in providing guidance on interest rate trends and in supplying an indicative yield curve for longer-term debt issues in dormant financial markets. In most SOEs the central bank is best equipped to read trends in international financial markets; by judicious intervention in the local market for short-term treasury bills the central bank can smooth the reaction of the domestic to the foreign interest rate to reduce its volatility. The bank may then use the interest trend to construct an indicative yield curve for use in longer term government bond issues, using the bank's and Treasury's joint forecast for economic activity (Belgrave et al., 2012).

In times of crisis the Treasury bill rate, credit restrictions and reserve requirements may help to bridge the gap between the time of implementation of contractionary fiscal policy and the time when the various elements of that policy begin to relieve the excess demand for foreign currency. However, critical to the success of such strategies are the credibility of the fiscal adjustment package and the flow of information on its impact on the foreign currency market as the policy takes effect.

7. Inflation in the small open economy

The domestic price is a weighted average of the domestic price of tradables (ep_f) and the price of nontradables:

$$15. \quad p = \alpha ep_f + (1 - \alpha)p_n$$

Domestic inflation can be held below the rate of inflation of foreign prices only if there are tools available to policy makers which can drive nontradable prices down more quickly than the international rate of inflation. The reduced form of the determinants of domestic inflation from Equations 2, 3, 4 and 15 is:

$$16. \quad p = f_9(e, \Delta MB/p, p_f, ulc, r, q_n(-1)).$$

The first derivatives of prices with respect to every one of the arguments in this equation are positive, implying that the variables would need to decline in order to have a dampening effect on inflation. The first two policy variables in this list are the exchange rate and the change in base money. Of the other variables, unit labour costs are not a practical policy tool that can be adjusted to target product prices: the factors that make for changes in unit labour costs are structural and institutional, including the degree of openness of the labour market, average skill levels, technical change, and the prevalence of trades unions and income policies. Interest costs are tied to international rates by the interest parity condition. Therefore, the only possibility for dampening the impact of imported inflation is to contract the monetary base through contractionary fiscal policy. Since fiscal contraction cannot be sustained beyond the short run, the best the small open economy can achieve with respect to target inflation is to match the international rate of inflation without aggravating its effects by monetary expansion.

8. Inferences from the model

The demand management tools available to the small open economy are sufficient to maintain macroeconomic stability, secure access to international funding at the best market rates, and thereby

ensure the economy's resilience and growth potential. Research has shown that, even though small open economies may suffer from structural vulnerabilities, those which demonstrate a high degree of resilience may attain high levels of development. Macroeconomic stability is a crucial element of that resilience (Briguglio, Cordina and Kisanga, 2006).

The key to short term macroeconomic stability in the small open economy is the maintenance of external balance, which may be achieved by adjusting aggregate spending and the resulting demand for foreign currency in line with the available expected and actual supply. It is always necessary to cut aggregate spending in the wake of any external shock which threatens to reduce the supply of foreign currency, in order to stabilize expectations and avoid capital flight. Only when the market has settled at the target exchange rate can further measures be contemplated, depending on the nature of the shock. If the shock is temporary, a credit-worthy government will have little difficulty in securing financing from international financial institutions and international capital markets. Such governments are resilient, recovering quickly and completely from external shocks.

A permanent external shock due to technological obsolescence or other irreversible change in markets, products or tastes, lowers the path of future potential growth of the small open economy, compared to the trajectory before the shock. That is the inescapable consequence of the lack of substitutability between foreign and domestic production and consumption. The specifics depend on the nature of the shock. Natural disasters such as hurricanes, earthquakes and pandemics are difficult to classify because their magnitude and effects vary so widely. The strategy for improving resilience should be informed by the balance of the extent of destruction, frequency of occurrence, and nature and cost of insurance against the calamity. At one extreme are rare events such as the Asian tsunami of 2004 or the volcanic eruption on the island of Montserrat in 1997, which destroy economies, communities or regions beyond all possibility of repair. At the other extreme are destructive events that regularly affect the economy every year. Public expenditures should include investments to ensure the public services and utilities are built and maintained to standards resistant to the latter perils. Government should also invest in early warning, emergency management and recovery facilities. Insurance can play a vital part in the recovery from natural disasters; because the extent of insurance coverage in any economy is directly related to the level of average incomes, there is a resilience benefit from economic growth.

The small open economy has very little capacity to ameliorate the impact of external shocks of the magnitude of the Global Financial Crisis of 2007/2008 and the Covid-19 pandemic in 2020. The volatility of growth in small open economies in the wake of the global financial crisis has been shown to be greater than for large countries (Armstrong and Read, 2020). More recently the Covid-19 pandemic had an impact on small economies, especially those that are tourism based, that was even larger in the short run. Small economies borrowed heavily to procure vaccines and health supplies, and to cushion the impact on the most vulnerable in society, but their best efforts were dwarfed by the magnitude of the shock.

It is also the case that the small open economy disposes of adequate tools to maintain and improve international competitiveness. Maintaining levels of competitiveness is a matter of keeping pace with changes in technology, tastes and marketing institutions and arrangements, securing finance for ongoing investment from the international market by offering competitive rates of return, and maintaining an economic environment which minimizes the external costs of doing business. There is no necessary inconsistency between stabilization policy and strategies for enhancing competitiveness. To the contrary, macroeconomic stability reduces country risk premiums and creates fertile ground for attracting foreign direct investment. Moreover, investment in health, education and efficient public services are among expenditures which are socially productive while at the same time enhancing international competitiveness. There is therefore no trade-off between growth promoting expenditure and socially

productive spending. On the contrary, efforts to push social spending beyond the limits prudent use of tax revenue and borrowing will allow are both socially inefficient and economically destabilizing because they generate foreign currency shortages and destabilise the exchange rate.

Domestic saving is a residual in the small open economy, equal to the proportion of imported inputs needed for investment projects. The savings-investment identity is:

$$16. \quad i = m_i \cdot FDI + (1 - m_i)s$$

Where FDI and s are foreign and domestic savings, respectively, and m_i is the import propensity of investment projects. It follows that:

$$17. \quad s = (i - FDI)/(1 - m_i).$$

Domestic savings are determined independently of the supply of investible domestic funds. If financial savings are in excess of this amount the surplus remains in the financial system as liquid funds; investment is never constrained by availability of domestic savings.

The link between public finances and the balance of external payments provides a useful indicator of the limits of sustainable public sector deficits: a fiscal stance which inflates aggregate demand sufficiently to threaten the stability of the balance of payments and the credibility of the exchange rate anchor is not sustainable. The fiscal stance can be sustained over the medium term only when the external accounts have been returned to equilibrium, foreign reserves are at levels which foreign currency market agents consider adequate, and the exchange rate target is secure.

9. Conclusion

This paper uses a three-sector model borrowed from the literature to explore the options for stabilization and growth in the small open economy. The model includes an export good, not consumed at home, which is sold at ruling international prices in amounts limited by production capacity; an import good, used in all consumption and investment, bought at ruling international prices; and a nontradable good. The model comprises equations for exports, up to the limit of production capacity; imports, depending on the international spending power of domestic incomes; the demand and supply of nontradables; and wealth effects arising from money creation. There is a foreign currency constraint expressed by the balance of payments equation. The paper shows how the small economy may tailor policy available tools, which are mainly fiscal, for stabilization and growth, given this economic structure.

In the face of an external shock the small open economy has limited capacity to mediate the impact, and the main burden will be on real income. The paper demonstrates an approach to stabilization which is anchored on the exchange rate and which situates the economy for the most rapid recovery from the income effects of the external shock. It does mean that, so long as the loss of foreign currency inflows persist, expenditures must be restrained so as to protect the exchange rate. Should the exchange rate anchor be lost, the decline in international purchasing power will be even more severe because of inflation resulting from currency devaluation.

With respect to growth, private investment to increase capacity in competitive exports is assured: private investors at home and abroad can be depended upon to seek out ventures which offer an internationally comparable rate of return, once country and exchange risks are factored in. The present study expands on the vital role of government in providing an efficient regulatory and administrative framework, protecting

the country's international credit worthiness, minimizing exchange rate volatility and promoting innovation.

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