



Working Paper



A Practical Policy Model of the Small Open Economy, with Applications¹

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Abstract

Very small economies may achieve high levels of development, as evidenced by Iceland and Mauritius, notwithstanding the facts of their high import dependence, limited capacity for export diversification, open financial markets and susceptibility to external shocks. This paper explains how unorthodox fiscal and monetary policies may be employed to ensure stability and maintain competitiveness and growth in the face of oil price shocks, the impact of natural disasters, capital flight and contraction in foreign investment, in countries characterised by this economic structure. The key to success is the management of aggregate demand through fiscal policy, and the promotion of external competitiveness through the maintenance of balance of payments stability, efficient public administration, high quality public services and modern, well maintained infrastructure.

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

JEL codes: E17, E27, E37, E47, E52, E58, E61, E62, F41, F47, H68.

This paper represents work in progress. You are invited to send your comments to the author at the email address above.

The objective of the paper is to provide tools and a framework for policymakers in small open economies

¹ Comments from Vanus James are gratefully acknowledged. However, the views in the paper are the author's alone.

A defining characteristic of a small modern economy is that all production and exchange, that is to say all activity in the domestic economy, involves imports, directly or at one remove. If any of the 41 countries whose development performance is analysed in my book on small open economies (Worrell 2023) were unable to import, economic activity would quickly revert to the level of Robinson Crusoe on a desert island. 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 the essential functioning of a modern economy using only domestic resources. Instead, the small economy produces a handful of internationally competitive exports and services, with the proceeds of which it imports all its needs. In this way the small economy is more akin to the household, which sells only one item, labour services, to earn income to buy all household needs, than it is to a large economy such as Brazil or the US.

Because of this difference from 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 the small economy, and output is limited only by their 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 of products includes items like electricity supply, public transport, health, education and other services 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. This paper presents a simple framework to model the workings of the small economy, and the way the three producing sectors interact.

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.² There is a continuum from the small countries of the Caribbean and countries of similar size to the world's largest economies. The closer a country is to a GDP of US100 billion or less with a population of 10 million or less, the better the model of this paper will fit.

In order to facilitate its use by policy makers, the model is set up to target familiar objectives such as the level and growth of national income, the rate of domestic inflation and the level of domestic interest rates. We identify the tools available to economic policy makers and discuss how they may be used to influence the target variables. The tools we analyse are mainly fiscal, because, we shall argue, these are the most effective in the small economy. Fiscal tools may be fine-tuned in ways that it will not be possible to analyse in this study, but the essential insights may be captured using the following broad categories:

- Public sector policies that affect international competitiveness;
- Changes in the ratio of taxation to national income;
- The ratio of public sector capital expenditure to GDP;
- The ratio of fiscal savings to GDP.

² For an exhaustive discussion of measures of size, see Carter (1997) and Moore, Beckles and Worrell (2015).

We show that there is an important supporting role for monetary policy in achieving economic targets, but no benefit whatsoever from changes in the exchange rate.

Having set up the framework of a small economy with economic targets and policy tools, we use this apparatus to analyse the following questions:

- What policies can be recommended to foster the growth in incomes of the small economy?
- What, if anything, can policy makers do to cushion the impact of sharp increases in the international price of oil and other imported commodities?
- How can domestic activity be sustained if the prices of exports fall, or there is some other major contraction in foreign earnings?
- What if there is a sudden fall-off or reversal of foreign finance?
- How can small economies increase their resilience in the face of natural disasters?
- How do we know when the public sector finances are sustainable, and what should be done if they are not?

The specific purpose of this model is to provide policy makers with an appropriate analytical framework for day-to-day management of the economy so as to ensure that it remains on a stable path that maximises the country's economic potential in all circumstances. The model has a short term perspective. However, the investment function plays a prominent role, because it is through the growth of productive capacity that the economy provides the foundation for development in the medium and longer term. The model we present would need to be extended in several dimensions to gain full insight about development policy in the small open economy (SOE). Important among these extensions we may list in-depth analysis of the labour market, including investment in skills, migration and income distribution, as well as the efficiency and comprehensiveness of the delivery of public services and infrastructure. These development issues are not a focus of the present paper.

A model of the SOE – an intuitive summary

We begin with the production system for exports of goods and services. The supply of foreign currency depends entirely on the capacity to produce competitive exports, tourism and other tradable services; there is a limitless international market for competitive products and services offered by the SOE. There is also financing available from potential investors worldwide for investment in well-run hotels and export production that yield an internationally competitive rate of return. The foreign investment will also provide the foreign currency for the imported inputs the investment requires. The only local savings contribution needed is to fund the purely domestic inputs for the investment. That proportion is typically small, and if local saving proves insufficient, that portion can also be funded from the unlimited supply of foreign finance. It follows that domestic saving in the SOE is a residual, determined by the local content of investment projects; that residual is typically small.

A critical relationship in the model is therefore the investment equation, and the key variable in the investment equation is the competitiveness indicator. Competitiveness, as any businessman knows, is not a matter of the lowest price, but of the best value for money. Economics 101 teaches us that the small producer has no control over the price at which they sell; it follows that SOEs cannot increase their competitiveness by devaluing their currencies to lower their selling prices.

A more practical assessment of competitiveness may be had by comparing the SOE's share of the market for each good or service it sells abroad, with changes in the price it achieves, relative to its competitors. Since the international price for every quality of traded good is given to every SOE, an increase in the price of exports relative to competitors means that either the country's products are rising in quality or the competitors' quality is falling. We may infer which of these alternatives we are witnessing by observing what happens to the market share. If a country's relative price is rising and it is gaining market share, that country is evidently strengthening its competitive position in the international market.³

There are other factors which attract the attention of potential investors. Countries where hotel occupancies are at full capacity year after year and where there are similar indicators of full capacity in exports will usually attract increased investor interest in those activities. In addition, such factors as the quality and availability of financial services, transportation, infrastructure, health and educational services, public utilities and public services are important indicators of international competitiveness, because they are among the considerations that affect international financiers' choice on location for investment.⁴

A critically important factor for international competitiveness is the management of the finances of the public sector. Because the supply of foreign currency is so critical to economic activity in the SOE, shortages in the market for foreign exchange are extremely disruptive, and can threaten the viability of financial institutions and businesses. As a result, whenever there is apprehension that the financing of public sector activities may impact the availability of foreign currency, investment inflows may be paused or even reversed. Foreign reserves may decline, the interest premium demanded on funds invested in the country may rise and/or the exchange rate may depreciate. That combination of circumstances is often referred to as exchange market pressure (*emp*).⁵ An increase in exchange market pressure is to be avoided by the exercise of fiscal prudence, as a vital element in ensuring and maintaining the competitiveness of the SOE.

Potential foreign currency supply is given by the production of exports of goods and services, with producers working at full capacity, plus the inflows of foreign finance, which, if directed to adding new capacity, will contribute to future growth of foreign incomes. Incomes earned by the foreign inflows stimulate an internal circulation through nontradable transactions - distribution, electricity and water, public, personal and business services, etc. - which adds up to a total GDP which is a multiple of the production of exportables. This multiple does not change noticeably over the medium term. Changes come about as a result of new technologies, such as we have witnessed with the birth of the digital age, and with changes in lifestyles, such as the increase in travel and migration that the Caribbean has witnessed in recent decades. Because such changes are gradual the ratio of total GDP to tradable output will not change significantly within the usual short to medium term time horizon of policy makers.

The equations of the model

We begin with the investment equation, the equation of growth. The factors that attract investment are:

- Whether exportable production is at full capacity;

³ See Worrell (2021).

⁴ The World Economic Forum provides a composite [index of competitiveness](#) which incorporates a wide variety of these items.

⁵ Gevorkyan and Khemraj (2022).

- For nontradables, the anticipated domestic demand;
- The prices of imported inputs;
- Unit labour costs;
- World interest rates;
- The stability of the exchange rate; and
- Qualitative factors.

1. $i = f_1(-x_{cap}(-1), a^*, p_i, ulc, r_f, emp, GCI)$, where

i is the level of investment, $-x_{cap}(-1)$ is the full capacity variable, a^* is expected aggregate expenditure, p_i is the price of imported inputs, ulc are unit labour costs, r_f is the international interest rate, the opportunity cost of investment, emp is the exchange market pressure variable, and GCI is an indicator of non-price competition.

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. $q_t = f_2(p_i, ulc, r)$, where

q_t is the output of tradable goods and services, and r is the domestic interest rate (the cost of working capital).

The output of nontradables is modelled as a two-stage process. We begin with the producers of nontradables. They have an expectation of the demand for their output, based on last year's production and the economic outlook. The intended output, q_n^* , is:

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

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. $p_n = f_4(q_n, p_i, ulc, r)$.

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. $\Delta FXR = p_i(x - m) + FDI + B$

both imports m and exports of goods and services x are bought and sold at ruling international prices p_i . 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 zero⁶, to a useful approximation:

$$7. m = f_3(a).$$

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

$$8. a = q_t + q_n + \Delta MB/p$$

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

The monetary base changes in response to the public sector's borrowing requirement and the credibility of government's overall finances, which is the factor that determines whether and to what extent government can obtain credit from the private sector, domestically or from external sources:

$$9. \Delta MB = - (FISC - B_f - B_d),$$

where *FISC* is the public sector deficit, and *B_f* and *B_d* are government borrowing from foreign and domestic sources, respectively.⁷

The policy tools

The tools available to policy makers in small economies are summarised as follows.

Tools for increasing competitiveness:

- Factors affecting the exchange market pressure, *emp*: the adequacy and change in foreign reserves, the perceived sustainability of the public sector finances, and the volatility of the exchange rate;
- The quality of health and educational services, and average levels of skill;
- Electricity, water supply, internet coverage, transport infrastructure;
- Social and political stability.

Tools for increasing productivity:

- Impact of industrial zones, subsidies to enterprise, state commercial enterprise;
- Impact of tax system: tax incentives, the corporate tax rate.

Tools of fiscal policy:

- The ratio of tax to GDP;

⁶ Import substitution reduces real domestic production if imports substitutes are not internationally competitive, as may be inferred from empirical studies, e.g. Lewis-Bynoe, Griffith and Moore (2000).

⁷ For a full description of this model and its antecedents, see Worrell (2023). This may be compared with an orthodox model used by the IMF, see Berg and others (2023).

- The ratio of saving on the public sector current account to GDP;
- The ratio of government capital expenditure to GDP.

Monetary policy tool:

- Central bank intervention in the Treasury bill market.

Tools for increasing competitiveness

The effectiveness and efficiency with which the government delivers or superintends the supply of basic public services such as health, education and social order are critical factors in attracting the attention of potential investors in any economy. Sound infrastructure that is well maintained, full national coverage of electricity, water, transport and communications, including internet, are also among the facilities that the investor expects. These are all core functions of any government. The more efficient the government is at delivering public services the more competitive will the economy be in the market for financing of investment. Among the most effective policies that any government may take to promote long-term development of the economy is to effect reforms of public sector operations targeted to raise performance as measured by outcomes such as health statistics, educational achievement, and the timeliness of delivery of goods and services, together with prompt and accurate reporting and accountability.

Government in every society plays a vital role in increases in national productivity, which may be the result of new technology, new and improved processes and organisation, and other changes that may be put under the general heading of entrepreneurship. The fact that such government involvement is universal has only recently been popularised, and Mazzucato (2013) must be credited for making clear the essential similarity in function of the government policies that were successful in raising productivity in very different political and cultural traditions. A full discussion of the variety of strategies that have been employed by governments to stimulate increases in national productivity is beyond our scope. However the following insights may be distilled from the literature and experience.

- Government should pick winners, but only from among enterprises which are already up and running and have exceptional promise and appeal to an international market.
- The government support, financial, material or in terms of expertise and interconnections, should be sufficiently large and for a sufficient length of time to allow for a secure foothold to be established in export markets.
- The government's support should be conditional on performance, with a process of monitoring and evaluation over the term of support. Support should be provided to address shortfalls as they arise during the initial support period. Enterprises which nevertheless fail to reach their export goals by the end of the initial period should be dropped from the programme, and they and their principals would lose eligibility for further support from government programmes. Enterprises that do reach their targets will ordinarily no longer need support.

Something must be said about government support that has proven ineffective in increasing national productivity, if only because such programmes are so common.

- Tax policies, both changes in the overall rate of taxation and concessions for sectors and activities, typically have no measurable effect on national productivity.

- Small loans and grants for individual enterprises and small business cost little and ease frictional unemployment, but it is unrealistic to expect that the small business sector will grow to become a major contributor to national output.

The tools of fiscal policy

The instrument by which policy makers in the small economy adjust aggregate demand in pursuit of economic stability is the public sector borrowing requirement. The borrowing requirement must be no more than private financial institutions, foreign and local, are willing to finance at the ruling cost of funds. The tools the government uses to set the borrowing target may be a combination of changes in the tax burden, the extent of public sector savings and the size of the capital works programme.

The burden of taxation, the proportion of national income that has to be surrendered as taxes of one kind or another, is a variable on which economic policy makers should seek the guidance of political leaders, but they have a responsibility to make it clear that a reduction in the tax burden will increase the public sector borrowing requirement, with the possibility of adverse consequences for macroeconomic stability if measures are not taken to cut expenditures sufficiently.

Government's current expenditure, including all interest payments, should always be kept below government tax and other revenues, so as to allow for a small surplus on the current account. This saving may be used for repair, replacement and restoration of public buildings, vehicles, roads, bridges and other depreciating public assets. It also serves to reassure the financial market of government's prudence if there is no public borrowing to meet current expenditure commitments, and all borrowed funds are directed to government's programme of fixed capital formation.

The third summary tool of fiscal policy is government's contribution to the overall investment ratio for the economy. The magnitude of government's capital works programme has an importance which our model does not capture explicitly, but there is an obvious inference from the contribution of infrastructure to the overall competitiveness of the economy.

The optimal fiscal strategy, using these tools together, is to use the revenues made available by public preferences with respect to the tax burden to deliver priority public services in the most efficient manner, leaving small savings on the current account. Government borrowing and current account savings should be devoted fully to fixed capital formation and the replacement and upgrade of depreciated assets. The fiscal strategy should be adjusted whenever the government fails to secure funding from the private sector, at home and abroad, for the full extent of its borrowing requirement. Expenditures should be cut, or tax rates increased, in order to avoid borrowing local currency from the central bank. Injections of spending power in local currency will generate a demand for imports which deplete foreign reserves and put the exchange rate at risk of depreciation. It is also unwise to allow a deficit on the current account of the public finances to persist, even where the current overspending can be financed without resort to money creation, because that indicates that the programme of fixed capital formation is being constrained below what would be optimal. In such circumstances government could enhance international competitiveness and the growth of production capacity by switching some current spending to infrastructure, equipment, new technology or other capital formation in the public sector.

The monetary policy tools

The monetary instruments available to the central bank to influence aggregate expenditures in the small open economy are judicious sales of foreign currency from its foreign reserves and the auction of short term Treasury bills. Monetary policy, properly crafted, can play an important supporting role to fiscal policy in the management of aggregate spending and the stabilisation of the balance of external payments of the SOE, and by providing guidance on interest expectations based on fundamentals.

The openness of financial markets in small modern economies means that cross-border financial flows tie domestic interest rates to the foreign interest rate in a relation which depends on the country risk premium and the cost of exchange:

$$10. \quad r - r_f = f_3(c_x, emp)$$

The equation expresses the domestic interest premium, $r - r_f$, as a function of the costs of exchanging local and foreign currency, c_x , with a widening of that premium when there is exchange market pressure, emp .

In the medium to long term the trend of domestic interest rates may be expected to follow the pattern set by the international rate. However, should there be a sudden increase in import prices or a reversal of foreign investment, monetary policy may be used to buy time for fiscal measures to take effect, by supplying foreign currency from reserves to close the balance of payments financing gap. This strategy is effective only if it is employed in support of a fiscal adjustment policy which is sufficient to convince the foreign currency market that aggregate expenditure has been cut back to a level that restores balance to the external accounts.

In other circumstances the central bank may give forward guidance on the evolution of the general trend of interest rates, and keep the short-term local rate on trend via the Treasury bill auction. All that is required is that the government finance its cash flow needs by public auction of Treasury bills, which the central bank bids for in competition with commercial banks. By comparing banks' appetite with government's needs in successive auctions, the central bank may tailor its purchases and sales of Treasury bills in amounts and at rates that result in an average realised rate that evolves in a pattern the central bank desires. The success of this policy depends on the prudent exercise of fiscal policy, in particular the use of Treasury bills for short-term cash flow management, so that the government's financing needs do not persistently exceed the amounts the banks apply for.⁸

The exchange rate is an intermediary variable

Changes in the exchange rate of the local currency have no effect on real output in the small open economy, because they do not impact the supply of foreign currency in any way. Exports are sold at ruling world market prices and tourist and other export services are priced in US dollars or other foreign currencies. Imports are bought at international prices, and the amount imported depends only on the purchasing power of the national income at those prices. One other factor constrains domestic inflation: the fact that import and export price elasticities are near zero. In a large economy the price of nontradables may diverge from the international price by virtue of the substitution of domestic products for imports for the nontradable sector, a possibility which does not exist in the small economy. In the small economy, additional nominal spending on nontradables always produces a demand for imports, with implications for the exchange rate whenever the additional demand is large or persistent.

⁸ See Worrell (2023), pages 255 – 256.

The consequence of the absence of real effects of relative price (i.e. real exchange rate) changes is that domestic prices are tied to the international price through balance of payments effects. The domestic price p_d is a weighted average of the domestic currency price of tradables εp_t and the price of nontradables:

$$11. \quad p_d = \alpha \varepsilon p_t + (1 - \alpha) p_n$$

where ε is the change in the exchange rate. The arguments in the equation determining the price of nontradables are the international price, unit labour costs and interest rates, which are all exogenous variables, and the output of nontradables (Equation 4). The realised output of nontradables in turn is a function of intended absorption, after a process of adjusting to the wealth effects of monetary expansion and changes in the purchasing power of domestic money (Equation 3). The extent to which actual absorption increases depends on the impact of the extra import requirements generated, and the reaction on the foreign exchange market. From the balance of payments identity (Equation 5) we know that the financing for extra imports must be drawn from foreign reserves, since nothing else in the relationship has changed.

Combining Equations 3 and 4 and incorporating the arguments into Equation 11, produces the following expression for domestic prices:

$$12. \quad p_d = \alpha \varepsilon p_t + (1 - \alpha) f_4 \{ [\Delta r^\mu \Delta FXR^\pi \varepsilon^{(1-\mu-\pi)}] / (a_1^*/a_0), ulc, r, q_n(-1) \}$$

where a_1^*/a_0 is the aggregate of desired spending after an exchange rate change or fiscal stimulus, compared with spending in the absence of any trigger. In circumstances where foreign reserves are already at the minimum level that market agents consider adequate, authorities are well advised to impose fiscal cutbacks and short term government borrowing to ensure that a_1^* returns to the a_0 level. In this case the a_1^*/a_0 term has a value of unity. Even when foreign reserves are well in excess of the minimum, conservative management of public expenditures and financing may be advisable whenever foreign reserve losses exceed normal transaction balances and seasonal expectations. In any case, the realised level of absorption is governed by balance of payments considerations, as are all the arguments on the right hand side of Equation 13, except for the unit cost of labour. The best that can be achieved, with respect to inflation in the small economy, is to avoid aggravating the pass-through of the international rate of inflation by avoiding excess exchange market pressure that triggers large depreciations of the exchange rate.

In addition to the inflationary impact of domestic currency depreciation, volatility in the exchange rate is to be avoided because it increases financial sector risks, creates a bias in favour of hoarding foreign currency, raises the premium on foreign investment and may divert investment to competing destinations with more stable currencies. The risk of an unexpected exchange rate change means that all cross*border transactions have to be insured, either through explicit insurance arrangements, avoidance of credit strict control of currency exposure, all of which are costly. Hoarding, higher risk premiums and loss of investment to competing destinations all may contribute to a significant loss of future production capacity and lower potential growth.

The exchange rate of the small economy does not have a unique equilibrium that can be arrived at through market discovery, that is, by allowing buyers to offer higher and higher bids until they exhaust the spending power of domestic incomes. If the exchange is not managed, sellers will have an incentive to hoard foreign currency whenever they anticipate a depreciation, or whenever they hear a rumour that others have begun to take similar action. That triggers panic buying and exchange rate overshooting.

In spite of this, many central banks in small countries have given up on the management of the exchange rate, because of widespread failure of efforts to counter herd behaviour and runs on the exchange rate through foreign exchange intervention and exchange controls.

The key to successful exchange rate management is to balance the demand and supply of foreign exchange by aggregate demand management. As we have demonstrated above, the government may always tailor the economy's spending power by adjustment of the public sector borrowing requirement and net borrowing from the central bank.⁹ Because of lags in the impact of fiscal changes, a coordinated forward-looking design of fiscal and monetary policy is needed, together with a system of monitoring and adjustment, to secure a balance of external receipts and payments at the central bank's target exchange rate.¹⁰ There is no merit in allowing the exchange rate of a small country to vary in terms of its US dollar value (or euro, in case of some European countries), although in practice government may lack the credibility and technical capacity to peg the exchange rate using fiscal policy for aggregate demand management. Even so, some targetted management of the exchange rate is required, and an effective framework for the coordination of fiscal and monetary policy is essential, whatever the exchange rate regime.

The exchange rate in the small economy is properly regarded not as a policy tool nor as a final objective of policy. Instead, a stable and predictable exchange rate is an intermediate variable which greatly facilitates the achievement of economic stability and improves the climate for investment and growth.

Monetary policy and inflation targetting

It is evident from Equation 12 that monetary policy is often accorded a prominence it does not deserve in the macroeconomics of the small open economy.¹¹ The interest rate variable that appears in Equation 12 is not a policy variable; it is a derivative of the international rate to which it is tied via the uncovered parity condition. Such monetary effects as manifest themselves in changes in aggregate expenditure intentions come up against the foreign exchange constraint. Changes in credit availability in domestic currency will cause surges in inflation only to the extent that they result in exchange rate depreciation. The small economy targets inflation by targetting a gradual, predictable evolution in the exchange rate, or better still, an unchanged value of domestic money in terms of the US dollar or euro. If it proves impossible to achieve this, the best alternative for low inflation is to use the US dollar or euro as the local currency.

There is an important role for monetary policy in support of fiscal adjustment when that becomes necessary. While some fiscal contractionary measures such as the temporary suspension of capital works may be put in place very quickly, most have a gestation period of six to nine months before their full impact on aggregate spending appears. During that interim, government's borrowing from the central bank will remain above the targetted level. The central bank should take pre-emptive action to raise short term interest rates through its intervention in the Treasury bill auction, as an incentive to banks that might otherwise wish to hedge against the possibility that the fiscal response might prove inadequate. The fiscal and monetary actions should be closely coordinated and publicly announced so as to avoid misreading of the monetary signal. Lack of coordination between the fiscal adjustment and interest rate increase might cause the rate increase to be misinterpreted as evidence that the central bank was attempting to impose

⁹ The value of prudent fiscal management in exchange rate stability and inflation control is recognized in recent literature. See Chen, Dabla-Norris, Goncalves, Jakab, and Lindé (2023).

¹⁰ See Worrell (2023), Chapter 12.

¹¹ See, for example, Basu, Boz, Gopinath, Roch, Francisco and Unsal (2023).

financial discipline on the Treasury. If that were the case, a prudent commercial banker will minimise their local currency exposure, whatever they may expect of the outcome of that tussle.

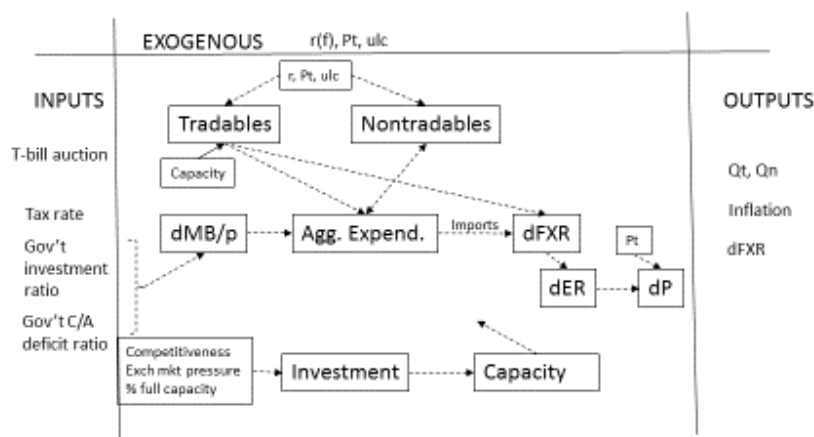
Use of the Treasury bill auction does not presume the existence of an active market in financial instruments. All that is required is that the Treasury manages the public sector cash flow requirements through an auction of short term bills in which commercial banks and other financial institutions participate. The target of the interest rate policy is not domestic credit, but to avoid an adverse shift in the preferences for local currency that might lead to capital flight. The interest rate increase is not permanent; it is a holding operation to stabilise the foreign currency market during the interval when the fiscal measures are kicking in.

Other than intervention at the Treasury bill auction, the tools available to the central bank of a small country are innocuous or downright harmful. Commercial bank borrowing from central banks is now such a rarity that the central bank's discount rate is an irrelevance; reserve requirements in local currency do not matter, because foreign finance is available in unlimited supply; exchange controls are little more than an inconvenience for retail transactions with no macro effects, and credit limits are honoured mostly in the breach. Over three decades ago, temporary limits on bank credit were helpful in dampening aggregate spending in Barbados during the period when the fiscal adjustment strategy was being perfected in response to the balance of payments crisis of 1991. However, the universal use of digital bank transfers for international finance and payments in the years since makes it unlikely that such limits could be useful today.

A summary and use of the policy model

Figure 1 presents a visual summary of the policy model. The policy tools are in the left hand column; at the top of the diagram are the exogenous variables: the international interest rate and the price of tradables are features of the international market over which the small economy has no control, while the factors that affect unit labour cost, though of crucial importance, are beyond the scope of this study. The outcomes to which policy interventions are targeted are in the right hand column. The top part of the diagram shows the direction of influence for measures to maintain the stability of the economy, while the growth-inducing competitiveness factors are below.

Figure 1.



Economists are used to focus on the goodness of fit of their models, but Worrell (2023)¹² suggests that the model presented in this paper be used for benchmarking targets and policy instruments for short term economic management of the SOE. In practice, given data limitations and policy makers' need for timeliness, rough and ready forecasting techniques, ad hoc adjustments based on current developments, special factors and qualitative information all have to be brought to bear in computing the projection. The forecast thrown up by these means is used as a benchmark to evaluate progress towards coordinated targets, on a daily, weekly, monthly, quarterly and annual basis. As an example, foreign reserves may be monitored daily, interest rates weekly, prices and government accounts monthly, and the balance of payments quarterly, towards annual targets for growth, inflation and foreign reserves. In this way policy changes can be made and evaluated along the way so as to achieve the best outcomes possible for the annual targets, given eventualities and circumstances as they arise.

An oil price shock

The consumption of imported petroleum products in a small non-oil-producing economy depends only on the level of domestic economic activity. A substantial increase in oil prices will therefore reduce oil imports to the extent that it induces a recession in domestic economic activity. The immediate impact of a sudden large jump in oil prices is a depletion of foreign reserves, as the central bank supplies the market with the additional foreign exchange to cover the extra cost. However, measures need to be taken to reduce aggregate expenditures in the economy, so as to reduce the volume of fuel imports in line with what can be afforded at the new prices. It makes no sense to allow the exchange rate to depreciate, because oil has to be paid for in US dollars. On the contrary, depreciation of the exchange rate is to be avoided, because it inflates domestic prices, aggravating the loss of spending power which results from the recession imposed by lower fuel imports.

¹² Chapter 12.

The recommended response to a sharp increase in the price of imported fuels is to judiciously reduce public sector spending and the net lending by the central bank to government, so as to deflate aggregate expenditure in the economy and restore balance to the external payments at the lower level of imported fuel that the country can now afford.

The reduction in economic activity (compared with what would have been possible with lower oil prices) is unavoidable, because domestic fuels are not available to substitute for fuel imports: almost all transport worldwide runs on fossil fuel and the alternatives to fossil fuels for the production of electricity cannot be ramped up significantly in the short term. The only policy option for the SOE is to modulate the cuts in public expenditure in such a way as to minimise the impact on the most vulnerable in society. In the US, by contrast, high oil prices make it profitable to ramp up fossil fuel production from relatively high-cost sources, to substitute for the imported product.

The authorities in the SOE may set their targets for the reduction in public spending and government borrowing using the relationships of the model described above. The projected loss of foreign exchange over the target period of adjustment (usually 12-18 months) may be calculated from Equation 5. To reduce imports by the required amount, expenditure reduction of the amount calculated from Equation 7 should be the target. Equations 8 and 9 may be used to deduce the adjustments in the fiscal balances and government's balances with the central bank.

The impact of natural disasters

The iron logic of full short-term expenditure reduction applies to any shock that reduces foreign earnings or the affordability of imports, including events such as the onset of the COVID-19 pandemic. However, evidence from the Eastern Caribbean Currency Union (ECCU) suggests that the decline in economic activity in the wake of hurricanes and volcanic activity may not be significant. That region has been very severely and quite frequently hit with these events, but in every case, the recovery to levels before the disaster, or better, has been remarkably swift. The main reason has been substantial financial inflows for reconstruction and rehabilitation in the wake of each disaster, and the economic activity this has stimulated. The sources of this funding included grants and loans from national and international institutions and international relief agencies, but there are two other major sources whose importance must be highlighted: property insurance and linkages with the diaspora.

The Caribbean diaspora, mainly in North America but more and more widely dispersed as time goes by, not only provides considerable support, provisions and finance, but also may open opportunities for migration in extreme circumstances, as was the case for a volcanic eruption which rendered two-thirds of the island of Montserrat uninhabitable in 1997.

Balance of payments data suggest that a major contributor to finance for reconstruction in the ECCU has been for the payment of insurance claims. Most new housing and commercial construction in the last half century has been with the use of mortgage financing, and it is now rare to find a building of any substance and in current use that is not covered by insurance. The countries of the ECCU are all well above average levels of human development in the Latin American and Caribbean region, and the general quality of construction reflects that fact. There is an absence of large communities with substandard living conditions, and with incomes so low that they cannot afford adequate accommodation, much less insure it. Insofar as there may be a shortage of finance for reconstruction after a natural disaster, the solution is to lift communities out of destitution so they can afford decent housing and adequate insurance coverage.

Capital flight

The sudden reversal of foreign financial inflows in the SOE is almost always the result of apprehension about the sustainability of the public sector financial management, and the associated risk of exchange rate depreciation. No small economy has an active market in the exchange of local and foreign financial assets purely with the objective of maximising financial returns. Local currency assets are held only to the minimum needed to cover local currency obligations, and any excess liquidity is held in foreign currency, to minimise the exchange rate risk. In such markets, prudent financial management dictates that financial exposure in local currency should be reduced whenever there is an increased risk of a depreciation of the local currency. This is readily accomplished by central treasuries of international banks and trading companies, whatever the nature of the exchange control regime.

It follows that the correct policy response to a sudden reversal of capital inflows in the SOE is a consolidation of the public sector budget to achieve savings that are large enough to satisfy agents active in the foreign exchange market that there is no longer a threat of significant depreciation of the domestic currency. It may be helpful to support fiscal consolidation with a modest additional premium on the Treasury bill rate, so long as the central bank and the Treasury signal clearly that this is a temporary compensation offered to those who are willing to keep faith with the government during the interval when the initiatives for fiscal consolidation are taking full effect. Coordination of the interest rate policy and the fiscal adjustment measures is essential; if the interest rate policy is interpreted as an attempt to dissuade treasury managers of international companies and banks from taking defensive positions in foreign currency when the threat of a devaluation persists in the absence of adequate fiscal cut-backs, the flight of capital will intensify.

Foreign direct investment

The motivation for financial inflows to the SOE, apart from those related to the purchase and sales of goods and services, is fixed capital formation. These inflows may also be affected by adverse fiscal circumstances as described above. Projects may be delayed or abandoned if a climate of macroeconomic instability persists, and increases in the country's risk premium may be harmful in competition with rival destinations for international investment projects. The recommended policy of fiscal consolidation supported by interest rate adjustment will also address any fall in foreign direct investment that is triggered by domestic policy uncertainty.

Foreign direct investment in the SOE may also fall as a result of external shocks if the shock has a global effect on investment preferences. An example was the impact of the Global Financial Recession of 2007-08 on the purchase of second homes in the Caribbean by UK buyers. As a result of tighter guidelines on the management of credit risks by UK banks in the wake of the crisis, many borrowers from that country could no longer obtain mortgages for the purchase of overseas property. The result was a substantial drop in direct investment in several countries and a recession in real estate and construction from which economies have been slow to recover.

It is unrealistic to presume that policy makers in the SOE may adopt any domestic policy measure that mitigates the losses from a foreign shock of this kind. Instead the authorities might wish to evaluate the balance of competitive strengths in the domestic economy, and adjust official financial assistance and other support in line with any changes they detect. In the case of contraction in foreign investment in

homes abroad by seasonal visitors who can no longer obtain mortgages for such purchases in their home countries, other options for making finance available to these borrowers might be explored.

Fiscal sustainability in the SOE

The structural openness of the small economy, the import content of all spending and the aggregate spending effects of central bank net lending to government form a chain that provides an unambiguous measure of fiscal sustainability in SOEs, one which involves no assumptions about expenditure multipliers, interest rate expectations or GDP growth. Whenever the central bank makes a net advance to the public sector in domestic currency, there is an addition to domestic purchasing power which will lead, immediately or after a short interval, to a purchase of imports with foreign currency. As may be readily appreciated (see Equation 5) increased importation, with nothing else changed except for the additional central bank accommodation, will cause a fall in the foreign reserves. Using this relationship, a sustainable public sector deficit may be defined as one which may be financed with an amount of net credit from the central bank which leaves the country with adequate foreign reserve cover. Foreign exchange cover is considered adequate when it provides enough ammunition to allow the central bank to manage the exchange rate in accordance with the authorities' preferred strategy. The definition does not assume a fixed exchange rate, though a fixed exchange is easiest for an SOE to manage, provided the authorities do so through the use of fiscal and monetary policy to manage aggregate demand, together with the maintenance of adequate foreign reserves. However, even countries which do not target any value of the exchange rate will need to intervene in the foreign exchange market from time to time to avoid excess volatility due to rumour, misinformation and herd behaviour; for this they need adequate foreign reserves.¹³

Concluding observations

This study suggests tools and a framework for policy makers in small open economies to target stable growth of output and incomes. The peculiarity of a small economy that distinguishes it from a large economy, is that its labour force is so limited that it can produce only very few tradable goods and services at internationally competitive prices. It exports this production to earn foreign currency to purchase the variety of goods and services the country imports for final consumption and inputs for all investment and production. In the small economy, there is no significant domestic consumption of domestic production of exportable goods and services, and almost no competitive domestic production of goods and services that may be substituted for imports. There are therefore no real effects of relative price changes, such as changes in the real exchange rate.

Our study presents a model that demonstrates how fiscal and monetary tools can be used to enhance competitiveness and stimulate investment and growth, while managing aggregate demand to keep the economy stable in countries where exchange rate policies are ineffective. A focus on the quality and coverage of public services and infrastructure, the quality of health and educational services and the efficiency of government administration are critical ways in which government can enhance international competitiveness. Maintenance of macroeconomic stability and prudent management of the public finances are also factors that influence investment decisions. Improvements in international competitiveness will be reflected in increases in investment and growth.

¹³ An example of the application of this measure of fiscal sustainability in the Caribbean may be found in Worrell et al. (2015).

The recommended response to a sharp increase in oil prices, the onset of a pandemic such as COVID-19 or similar loss of international purchasing power, is to judiciously reduce public sector spending and net lending by the central bank to government. This reduces aggregate spending in the economy and restores external balance until such time as there is a recovery in spending power for the purchase of imports. A reduction in aggregate demand is required in response to any shock to the current account of the balance of payments.

A corollary of the direct link between fiscal policy and balance of payments outcomes is that we can use the adequacy of foreign reserves as a benchmark for the sustainability of the public finances, providing the small economy with an unambiguous signal of the limit to fiscal expansion. The absence of exchange market pressure is a reliable indicator of the sustainability of the public finances in all circumstances.

An examination of the performances of small economies in the UNDP's *Human Development Report* is enough to make the point that small size is not a barrier to development (Worrell 2023, 399). A focus on non-price competitiveness and the management of aggregate demand with an eye to the external balance appears to be the strategy that offers the small economy the best path to development success.

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