Chapter 1

Introduction

The papers in this volume represent a selection from the papers I wrote during several decades, while working first at the International Monetary Fund and then teaching at the University of Toronto — many with co-authors. Broadly speaking, all of these papers use models as a way of informing the choice of macroeconomic policies. While some of the papers are technical, they were all written to address real-world economic policy problems. Moreover, these economic problems and consideration of appropriate policy responses continue to be relevant today, as is the economic analysis used to address them.

Part I includes papers that analyse the effects of major international developments affecting the global economy, using a multi-country global model — MULTIMOD — developed by myself and collaborators at the IMF. In each case, the appropriate response of macroeconomic policy (fiscal or monetary) is discussed. The papers here use MULTIMOD to look at three specific issues of great importance for economic policy choice. Those issues are as follows:

- the effects of a transition to an older population on output, capital stocks, factor prices, and current account balances (among other variables);
- how the economic costs of reducing the rate of inflation can be minimized;
- the domestic and global effects of the unification of East and West Germany.

These are issues that obviously continue to be relevant, especially the first two. It is also true, moreover, of German unification, since its effects, for instance, the stresses it imposed on the European Monetary System in the early 1990s, may recur in other situations. This paper not only reports MULTIMOD simulation results but also compares them to two other state-of-the-art multi-country models of that vintage, evaluating the success of these models in capturing the main implications of unification.

Parts II and III consider the interrelated choices of a monetary/exchange rate regime. As is now widely accepted, economies that are exposed to highly mobile capital flows cannot choose their exchange rate regime independently of their monetary policy. Part II considers the policy choice from the perspective of the advantages and disadvantages of various exchange rate regimes that imply differing degrees of commitment to a fixed rate. Part III, in contrast, discusses issues with regard to using monetary policy to target either the rate of inflation or the price level, with the exchange rate assumed able to adjust in order to permit those targets to be achieved. In both cases, the papers argue that it is essential to take into account the specificities of a country's level of development, its financial markets, and the size and orientation of its trade with the rest of the world before coming to a conclusion concerning its appropriate monetary/exchange rate regime.

The monetary/exchange rate regime choice is a cornerstone of economic policy, not just for advanced countries but also emerging market and less-developed economies, and the papers in Parts II and III span the range of countries and issues involved. For the more advanced economies that have sophisticated capital markets and no barriers to capital inflows and outflows, several prominent economists have argued that the choice is essentially between a freely flexible exchange rate and (if regional exchange rate stability is judged to be essential) a single currency (see, for instance, Obstfeld and Rogoff, 1995). For other countries, however, the policy choice may not be that stark, and the first paper in Part II argues that it is important to take into account differences in economic structures and levels of development. In particular, countries that trade primarily with a

larger neighbor may be able to peg to the neighbor's currency in a credible fashion. Other countries may want to use the exchange rate as an intermediate target given its visibility as a key price in the economy, provided that there is a clear commitment to adjust other policies to be consistent with the targeted exchange rate level.

The idea that policy regimes need to be chosen with regard to a country's specificities recurs in Part III. A survey of the prerequisites for inflation targeting (IT) to work well concludes that IT may not be appropriate for all countries, given widely differing economic institutions, degrees of consensus on the objectives of monetary policy, and extent of wage/price flexibility. Thus, the papers in this volume eschew the "one size fits all" approach to economic policy.

In what follows, a more in-depth discussion of the various papers in the book is provided. The reader can refer to the Table of Contents for details concerning titles, authors, and publication details. Reference is made to the papers using the ordering of the Table of Contents, from Chapters 2–11 (this introduction is Chapter 1). In all but two cases (Chapters 9 and 10), these papers have previously been published in academic journals. The first one of the unpublished papers, Chapter 9, on the lessons for Africa from the euro zone, has evolved from a conference paper. The second, on prerequisites for IT (Chapter 10), though widely cited in its working paper form, has not been published. It has continued relevance, given the large number of countries that have adopted or are considering IT. The version presented here is an abridged version of that working paper.

Part I: Macroeconomic Modelling

The three papers in Part I present simulations of the global macroeconomic model then in use at the IMF, MULTIMOD (see Masson *et al.* 1990). The model includes each of the G7 countries separately, the remaining industrial countries as a bloc, and developing countries divided into capital importing and capital exporting countries. The model embodies stock/flow equilibrium, optimizing consumers and firms with rational expectations, and high capital mobility among the industrial countries.

The generalised aging of the populations in the industrial countries, linked to the post-world-war-two baby boom, is studied in Chapter 2. This was one of the first attempts to quantify the effects of an older population in an empirical general-equilibrium global model. An older population has a number of important economic effects. They include the following:

- fewer active members of the labour force, hence lower output per capita (other things equal);
- greater government expenditures on health care and pensions;
- higher consumption from a given household disposable income, or equivalently, a lower aggregate savings rate, for a given interest rate and aggregate wealth.

The implications for such variables as output, interest rates, capital stocks, exchange rates and current account balances are complex, and a quantitative assessment (or even a qualitative one) requires an empirical general-equilibrium model. The country-specific effects, moreover, depend on the extent of aging in one country relative to that in other countries. The overall effects could be expected to be large, in any case, given that projections of elderly dependency ratios (those over 65 divided by those between 15–64) were projected to increase from 20% in 1985 to 35% in 2025 in the average G7 country.

The simulation results depend importantly on an estimated consumption equation that has both life-cycle and liquidity-constrained elements, plus a positive effect of the old age dependency ratio. They do not assume that all consumers can implement a lifetime plan, but rather rely on the statistical relationship between dependency ratios and saving. The projections of population and government spending were taken from other sources. They project a larger and earlier increase in dependency ratios in Japan and Germany than in the other G7 countries, and this differential has a strong influence on simulation results.

Looking first at the effect of aging on consumption, and ignoring effects on labour supply and government expenditure, both Japan and Germany have lower saving and these countries run current

account deficits, while the United States runs surpluses and accumulates net foreign assets. The labour supply effect, in contrast, lowers GDP in all countries, by 2020 when dependency ratios have increased significantly in all countries. Government spending effects are more moderate, but tend to go in the same direction as the consumption effects, lowering aggregate saving.

The combined effects of the three channels imply very different impacts on the United States versus Japan and Germany, with the other G7 countries somewhere in between. The relatively less important increase in dependency ratios in the United States produces a real exchange rate depreciation, a fall in the real interest rate and increase in output there (which declines to zero by 2025), associated with current account surpluses relative to the baseline. In contrast, Germany and, especially, Japan experience falls in output, real exchange rate appreciations and current account deficits. Interestingly, real interest rates (which are forward looking in the model) fall initially and then rise, as the demographic effects stabilize toward the end of the simulations.

The simulations highlight some features that are often ignored, namely that different extents of population aging in different countries have a major effect on the results through exchange rate changes. This difference explains why the United States sustains a depreciation and an increase in output (despite a fall in labour supply), as other countries' output falls and consumption increases. While the path of consumption is shown to be sensitive to modelling strategies, the simulations are an antidote to simplistic analysis using a growth model with fully optimising consumers applied to a single country.

A second important issue considered using MULTIMOD is the cost of disinflation, studied in Chapter 3. In the two decades that followed the breakdown of the Bretton Woods system of fixed parities — characterised by sharp increases in oil and other commodity prices — most countries faced the difficult choice of restricting demand through high interest rates in order to contain and eventually reduce the rate of increase of prices. How drastic should the adjustment be — should it be a short, sharp increase in interest

rates, or a more gradual monetary contraction? The answer should depend on the resulting increase in unemployment, and associated decrease in output — the cumulative output loss — in the two cases.

The 1970s, 1980s and 1990s also saw a great deal of research into the dynamics of inflation. It was increasingly recognised that inflation expectations did not just look at past experience of inflation but rather could be influenced by a credible announcement of a policy change. But, the extent of that forward-looking behaviour is important in influencing the output costs of disinflation. If expectations of the future are all that matters, then costless disinflation is possible — contrary to actual experience. The paper shows that there is some critical level for forward-looking behaviour above which costs can be eliminated, while below that value some output losses are unavoidable.

In Chapter 3, a model of inflation is estimated with both forward- and backward-looking expectation elements, whose weights sum to one. The estimation results find a significant effect of output capacity utilisation in boosting inflation, and suggest that the weight on forward-looking expectations is slightly less than one-half. Both of the extremes — purely backward-looking or forward-looking models — are rejected by the data. The model does not imply that a costless disinflation path is possible, and alternative speeds of disinflation are simulated in order to identify those with the lowest cost.

The third paper, in Part I (Chapter 4), reports on the use of three rational expectations, multi-country models to assess the effects of German unification. Appropriately, the paper is co-authored by the heads of the three groups, Joseph Gagnon (the MX3 model, maintained at the Federal Reserve Board), Warwick McKibbin (MSG2 model, at the Brookings Institution) and myself (MULTIMOD, where the work was done in close collaboration with the IMF's European Department in 1990).

German unification was a major shock to the European economy. It involved opening up East Germany to competition (which meant the closing of many uneconomic plants), the restructuring of East German industry, the conversion of Ost marks at a one-to-one rate

into deutsche marks, and massive fiscal transfers to East Germany (which amounted to over 40% of East German GDP in each of the first 5 years). The expansionary fiscal policy put upward pressure on interest rates and tended to appreciate the deutsche mark, causing strains within the EMS and leading to a large widening in the margins of fluctuation around central parities as well as an abandonment of their defense by the UK and Italy.

German unification was a major challenge for the modelling groups. None of the models included East Germany explicitly, so that some *ad hoc* changes were necessary. In 1990, data on the competitiveness (or lack of it) of the East German economy were not known, nor was it clear how the process of privatizing the government-owned means of production would proceed. Finally, the size of the fiscal transfers and the effect of the expansion of the German money supply relative to money demand had to be estimated.

Despite these challenges and the fact that the modelling groups were working independently, simulations of the three models got many of the broad effects of unification right. It was correctly anticipated that government spending would put upward pressure on output, inflation, and interest rates, and lead to German current account deficits, facilitated by a real exchange rate depreciation. The possibility of tensions within the EMS was well understood, and some of the modelers simulated realignment scenarios in which the other EMS currencies devalued against the deutsche mark — well before the EMS crisis. All in all, the results of this important exercise highlighted the usefulness of the new generation of rational expectations, multi-country models.

Part II: Exchange Rate Regimes and International Currencies

Part II begins with a discussion of the range of possible exchange rate regimes (Chapter 5), arguing that each may be appropriate for some countries at various stages of development. It then goes on to consider more specifically the case for and against monetary unions, in particular in Africa (Chapters 6 and 7), and an evaluation of the

experience of the prime example of a monetary union among a group of sovereign countries — the euro zone (Chapters 8 and 9).

The creation of European Monetary Union has stimulated interest in creating regional monetary unions in Africa — a continent that already has two monetary unions (the West and Central African CFA franc zones), as well as an hybrid exchange-rate union centered around South Africa's rand. Monetary integration in Europe has inspired a vast literature, much of it following the lead of Robert Mundell, who in a seminal 1961 paper put forward the notion of “optimum currency areas”. While this literature focuses on the costs of sharing a common currency in the absence of factor mobility, wage/price flexibility, or fiscal transfers, it provides few insights into the benefits of a common currency, which in principle should include reducing transactions costs and stimulating trade and investment. A more recent strand of literature has attempted to quantify those benefits, in particular the increased trade that results when countries are members of a currency union (see, for instance, Rose, 2000; Glick and Rose, 2015). Estimates of this effect should inform the decision whether or not to proceed with monetary unions in Africa.

Part II includes two papers (Chapters 6 and 7) that evaluate plans for monetary unions in Africa. These include a number of projects at various stages of realization within Regional Economic Communities (RECs) on the continent. Prime among them is a plan (whose timetable has however been postponed several times) to create a common currency for West Africa (ECOWAS) that would subsume the West African CFA franc zone and also include Nigeria, Ghana and several smaller countries in the region. A monetary union has also been agreed among members of the East African Community and is slated to be put in place in 2024.

In joint work (Chapter 6) with Xavier Debrun and Catherine Pattillo,¹ these and other projects were evaluated using a model which embodies some important aspects of the costs and benefits of being a member of a monetary union. A monetary union by

¹See also references in Chapter 6 to related joint work with Debrun and Pattillo.

definition involves sharing a common monetary policy. The common monetary policy imposes costs, since it cannot respond to country-specific shocks, but countries may also benefit from the fact that a common currency prevents neighbouring countries from engineering competitive depreciations of their currencies. This model was calibrated to African data and used to evaluate the regional monetary unions. Important inputs to the evaluation are as follows:

- *The extent of trade among the countries of a region:* Countries with little trade with their neighbours could be expected to benefit little from exchange rate stability with regards to them.
- *Asymmetry of terms of trade shocks:* This would put stress on a monetary union.
- *Asymmetry of fiscal discipline:* Countries that run large deficits would put pressures on the central bank to provide monetary financing. Therefore, more fiscally disciplined countries would not want to share a currency with very undisciplined ones.

Aside from the existing monetary/exchange rate unions (the CFA franc and rand zones) which our welfare analysis suggested are generally beneficial, our analysis reached sceptical conclusions as to whether new monetary unions would be desirable. However, extending the existing ones to a few other countries with similar economic structures might be mutually beneficial.

In another paper (Chapter 7), I considered whether estimates that a common currency could produce a large increase in trade (by a factor of two or three) would overturn these conclusions. In fact, because much of African countries' exports is comprised of primary commodities that go to Asia, Europe or North America, intraregional trade is at present very small. Even such a large increase of intraregional trade would therefore not provide enough in the way of benefits to offset the costs of heterogeneity among the countries concerned, since in most regions there are large differences in fiscal discipline and in terms of trade shocks. In particular, a hypothetical ECOWAS monetary union would include, on the one hand, a large oil exporter lacking fiscal discipline (Nigeria), and, on the other hand, mostly oil importers exhibiting greater fiscal discipline. Thus,

the terms of trade of the two would move in opposite directions in response to a global oil price shock. A common currency, by tying them together, would make adjustment to such a shock more difficult for both sets of countries. In addition, the other countries of the region might suffer from the large budget deficits run by Nigeria because they could exert pressures on the central bank to provide monetary financing, producing higher inflation and a depreciating currency.

The same model also sheds light on the tensions within the euro zone, and Chapter 8 considers its implications. The statutes of the European Central Bank (ECB) are designed to insulate it from fiscal dominance, that is, allay concerns that fiscal indiscipline might put pressures on the central bank to pursue an easier monetary policy. What if the ECB were not in fact independent from those pressures? Using the same model as for African monetary unions, calibrated to EU data, Chapter 8 provides a possible answer. Unlike in Africa, where intraregional trade is low and terms of trade shock asymmetries are high, in Europe the reverse is true.

Thus, potential gains from monetary union are large, as long as fiscal asymmetries are not too great. The model simulations conclude that membership in the euro zone is beneficial for most countries relative to their pre-euro zone status, with the major exception of Germany — on the assumption that the Bundesbank, when the deutsche mark was in existence, was independent of fiscal pressures, while the ECB is assumed not to be independent. The paper goes on to consider whether the welfare of remaining euro zone countries would be improved if any of the other countries left the euro zone. In particular, model simulations suggest that France, Greece and Italy are countries whose membership in the zone is problematic because of their lack of fiscal discipline. The departure of any of them individually would improve welfare of the other members. Finally, the paper considers the incentives facing Germany: would a narrower monetary union with only fiscally responsible countries — for instance, the “core ERM” countries which maintained their exchange rates against the deutsche mark during the 1992–1993 ERM crisis (Austria, Belgium, Luxembourg and the Netherlands)

be incentive compatible if it could commit to IT and be free of fiscal pressures? The answer given by the model is “no”, because such a narrow monetary union would not internalise much trade, while still preventing the common monetary policy from responding fully to Germany-specific shocks.

Part II concludes with a paper that draws some lessons for other regions from the euro zone experience over the past two decades (Chapter 9). Clearly, despite decades of planning and the expenditure of considerable resources in preparation, the architects of the euro zone did not anticipate the extent that weak government finances and banking crises could feed upon themselves and produce a loss of confidence in the currency. The crisis that the euro zone has faced episodically since 2008 has led the ECB to change drastically the way it intervened in financial markets to prevent the increase in government borrowing costs of weaker member countries. The crisis has also laid bare the failures of community institutions to produce fiscal discipline that the Stability and Growth Pact aimed to correct, and the need to buttress monetary union with other policies to bolster solidarity among member states and to make viable the monetary union. In particular, the elements of a banking union — common supervision and lender of last resort facilities — are now viewed as essential, and are being implemented within the euro zone, as well as greater sharing of risks.

What are the lessons from this for Africa? The paper argues that the requirements for a successful monetary union are more stringent than was previously thought, and they include the need for a high degree of solidarity among countries and the sharing of similar economic philosophies. Unexpected events are likely to threaten the monetary union, and countries must be willing and able to reach agreement among themselves to take the necessary steps to preserve it. The political will to proceed with a monetary union is not sufficient, since that political will is unlikely to survive evidence that continued membership in the monetary union carries with it large economic costs. Finally, the experience of the euro zone suggests caution in committing to such arrangements, and the need for a long lead time to create the necessary institutions to support a monetary union.

Part III: Monetary Regimes

Since the early 1990s, a number of advanced countries have adopted IT as their monetary regime and use a specific numerical target for inflation at some future point as operational guide for monetary policy settings — specifically short-term interest rates. A previously unpublished paper written in 1997 (Chapter 10) considers whether such a regime can and should also be adopted by developing countries.

The paper provides a thorough review of the literature on IT, which was already extensive, concluding that the regime is characterised by two essential requirements as follows:

- It must have a central bank able to conduct its monetary policy with a degree of independence. In particular, it must be free from fiscal dominance, that is, monetary policy must not be subservient to the need to finance government deficits.
- The authorities must not have any firm commitment to target any other nominal variable, such as the exchange rate.

In practice, central banks that operationalize IT need to have a quantitative model that permits them to forecast inflation over a horizon that corresponds to the lags in the effect of monetary policy instruments on inflation. By explaining to the public the basis for their instrument settings, central banks can improve the transparency of monetary policy and anchor the public's expectations. If the transmission mechanism is very uncertain, however, then it is likely that targets frequently will not be met, and the credibility advantages of IT will not accrue.

In discussing the scope for IT among developing countries, Chapter 10 first stresses the great heterogeneity of the countries concerned. For instance, data on seigniorage (that is, the amount of monetary financing), rates of inflation and budget deficits differ widely. Some countries can clearly be ruled out on the grounds that those variables have high values that suggest the central bank would not be able to operate sufficiently independently to be successful in meeting IT objectives.

As for the second prerequisite, the absence of another nominal target, there was during the 1990s a shift away from pegged exchange rates, largely in response to the crises in emerging markets. Many countries retained some implicit or explicit commitment to an exchange rate level or range that would interfere with IT, however. Furthermore, the monetary linkages were more uncertain than was the case for the advanced countries that had adopted IT.

Thus, the paper concluded that most developing countries were probably not ready for IT, but "... a strengthening of their institutions may ... make IT an attractive option for some developing countries ... In fact, it is quite possible that IT will receive increasing consideration in developing countries as high capital mobility and instability in money demand make alternative nominal anchors less feasible." Indeed, that has proved to be the case, and several dozen developing countries now practice IT in some form.

Another important issue with respect to monetary targeting is the choice between a target for the rate of inflation versus one for the price level (or a fixed upward path for prices). This is the subject of Chapter 11. The main difference between the two regimes is that in the case of overshoots or undershoots of inflation, IT would not reverse them later but price level (or price path) targeting, which we will call PT for short, would. Supporters of PT claim that this would enhance the stabilising properties of PT relative to IT, because if private agents expected implementation errors to be corrected, then they would align their expectations more closely to the official targets. Thus, there would be a credibility advantage to PT.

However, Chapter 11 argues that there is another force at play that could detract from these credibility advantages, namely the increased likelihood that the PT regime would be abandoned in the event of a very large and unanticipated shock to the system. This may occur precisely because PT is more constraining. The experience with the gold standard during the 1930s is instructive. In the face of global loss of confidence and widespread unemployment, countries that were on the gold standard (which included most of the industrialised countries) abandoned the peg of their currencies to gold to pursue more expansionary monetary policies. This could

also occur if PT were adopted, and expectations might take this into account, nullifying the credibility enhancement relative to IT. Indeed, simulations of a calibrated global economic model suggest that for a country like Canada, PT is dominated by IT, which is more robust to large shocks.

References

- Glick, R. and Rose, A. "Currency Unions and Trade: A Post-EMU Mea Culpa," Paper Presented to a Conference at the Federal Reserve Bank of San Francisco, October 26, 2015.
- Masson, P.R., Symansky, S. and Meredith, G. *MULTIMOD Mark II: A Revised and Extended Model*, Occasional Paper 71 (Washington: International Monetary Fund, 1990).
- Mundell, R. "A Theory of Optimum Currency Areas", *American Economic Review*, Vol. 51, No. 4, pp. 657–665 (1961).
- Obstfeld, M. and Rogoff, K. "The Mirage of Fixed Exchange Rates," *Journal of Economic Perspectives*, Vol. 9, No. 4, pp. 73–96. (Fall 1995).
- Rose, A. "One Money, One Market: Estimating the Effect of Common Currencies on Trade," *Economic Policy*, Vol. 30, pp. 9–45, (2000).