

Arndt, Sven W.

**Working Paper**

## The pros and cons of North American monetary integration

Claremont Colleges Working Papers, No. 2002-09

**Provided in Cooperation with:**

Department of Economics, Claremont McKenna College

*Suggested Citation:* Arndt, Sven W. (2002) : The pros and cons of North American monetary integration, Claremont Colleges Working Papers, No. 2002-09, Claremont McKenna College, Department of Economics, Claremont, CA

This Version is available at:

<https://hdl.handle.net/10419/31423>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

Sven W. Arndt  
The Lowe Institute of Political Economy  
Claremont McKenna College

# The Pros and Cons of North American Monetary Integration

## Introduction

Questions are once again being raised about exchange rate arrangements in North America. The current discussion is a reaction in part to the arrival of the European Monetary Union (EMU) and its implications for the U.S. dollar and in part to monetary and financial turmoil around the globe. In Canada, concerns about the effects of floating rates on competitiveness add a new element to the debate.

The North American Free Trade Agreement (NAFTA) and various plans to promote regional integration in the western hemisphere raise questions not only about the costs and benefits of *widening* regional trade areas, but also about whether trade integration needs *deeper* cooperation — particularly in monetary and financial terms — in order to achieve its full potential. In Canada recently, deepening cooperation has been subject to renewed scrutiny by academic economists and policy analysts, with particular focus on monetary union. Mexicans, for their part, have pondered the pros and cons of deepening in terms of dollarization.

This study examines the major arguments for and against enhanced monetary integration in North America, with particular emphasis on the Canadian perspective. In this context, the question is whether the current floating-rate regime should be replaced by greater fixity of exchange rates in relation to the U.S. dollar. While the choice among fixed-rate systems is wide in principle, for practical purposes the Canadian debate centres on the pros and cons of monetary union. As other countries in the Northern Hemisphere may be reluctant to embrace monetary union, the following discussion also examines other potential candidate regimes, including currency boards and dollarization.

Although much of the debate focusses on traditional concerns of macroeconomic stability and policy management, some observers suspect the floating rate system of having retarded the development of high-tech manufacturing in Canada. The depreciation of the Canadian dollar, possibly in response to deflation in world commodity prices, may have shielded Canadian manufacturing in ways that undermine incentives to innovate and modernize.

The study begins with a brief *Introduction*. The second section, *The Traditional Arguments*, reviews the core arguments for and against fixed rates and currency union. *Volatility and Misalignment* next examines problems associated with nominal rigidities, while *Exchange Rates and Economic Structure* focusses on the role of exchange rate regimes in the evolution of economic structure. The fifth section, *Determining the Direction of Causality*, addresses two questions: Do exchange rate movements give rise to internal adjustment problems? Or do internal adjustment problems give rise to exchange rate movements? The sixth section, *Choosing the Proper Form of Monetary Cooperation*, considers trade-offs among alternative exchange rate regimes, while the seventh, *The Politics of Monetary Union*, takes up the political dimension of closer monetary cooperation, and is followed by the *Conclusion*.

## The Traditional Arguments

The line-up of key arguments for and against fixed rates depends to some extent on the regime under consideration. Fixed-rate regimes fall into two major categories: soft and hard pegs. The former are widely believed to be too fragile for the prevailing conditions in many countries. The class of hard pegs, which is the focus here, includes currency boards, dollarization and currency union. The following discussion focusses on currency union, with references to the other hard options, as needed. The basic arguments and insights pertaining to optimum currency areas harken back to Mundell (1961), McKinnon (1963), Kenen (1969), and others (Tower and Willett 1976, Berg and Borensztein 2000b, Eichengreen 1997, Emerson et al. 1990 and de Grauwe 1997). They are well known, and hence will be sketched only briefly here.

## Greater Efficiency and Lower Transactions Costs

The chief argument in favour of a common currency is its contribution to efficiency and lower transaction costs. It allows individuals to engage in trade without the cost of currency conversion. Courchene and Harris (2000) estimate Canadian currency conversion costs at about 0.5 percent of GDP, while Murray (2000) pegs annual transaction costs at approximately \$3 billion, the discounted present value of which amounts to about one-tenth of current GDP. These savings are supplemented by cost reductions related to accounting, hedging, invoicing and other operations.

Unlike floating rates and pegged-rate systems, a common currency eliminates uncertainties about future values of exchange rates and thereby improves the efficiency of decision-making. Grubel (2000) argues that the removal of exchange rate risk reduces interest rates, thereby cutting the cost of servicing the Canadian national debt, reducing the complexity of cross-border price comparisons, and providing assorted other benefits.

It is important to note, however, that the exchange rate must be truly fixed. Regimes which allow for the periodic adjustment of exchange rate pegs, for example, do not eliminate all the costs and uncertainties associated with variable rates. This is one of several considerations which inclines many observers toward the “hard” pegs of currency boards and dollarization rather than the “soft” fixity of adjustable pegs.

## Price Stability

A second argument in favour of fixed rates applies particularly to inflation-prone countries. Such countries can “import” price stability by pegging to a low-inflation country or joining low-inflation currency unions. While this consideration is relevant for many Latin American countries, and explains why Argentina and Ecuador would pursue currency board or dollarization schemes, it is not a decisive issue in Canada.

[Figures 1 A, B, about here]

As the two panels of Figure 1 suggest, U.S. and Canadian prices display very similar

long-run patterns. On average, the U.S. track record is better over the last two decades of the twentieth century for consumer prices, but worse for producer prices. Thus Canada would not gain much inflation control from joining a currency area with the United States. Indeed, Murray (2000) has argued that recently, Canada's record on inflation has been better. This may be due to the fact that unlike the Federal Reserve, Canada's central bank announces its inflation targets: this both provides more incentives for policy makers to deliver lower inflation and enhances policy credibility in financial markets.

## Lost Seigniorage and Impaired Policy Autonomy

Currency boards, dollarization and currency unions have their weaknesses, however. One is the partial or complete loss of seigniorage earnings, particularly in the case of dollarization. Another, is the diminution or loss of macro policy independence. Grubel (2000) estimates Canada's seigniorage profits at about \$2 billion per annum. They would be lost entirely under full dollarization and partially under formal monetary union. The constraint on macroeconomic policy independence is particularly severe in the realm of monetary policy, but, as the EMU has shown, also impinges on fiscal policy.

Restraints on policy autonomy matter, particularly in the presence of asymmetric structures and shocks among member countries, and imperfections in their respective goods and factor markets. Asymmetries reduce the extent to which adjustment and the demands on policy share common elements across countries and thus raise the likelihood that countries will disagree on the desired stance of region-wide or system-wide macro policy. Asymmetries make shocks more country-specific and thus reduce common elements in adjustment patterns and policy needs.

If, for example, one country is a resource exporter while the other is not, a decline in world resource prices will have orthogonal implications for the two countries. As monetary policy now is either a region-wide instrument (under currency union) or has region-wide effects, policies that tilt in favour of one country will be inimical to the other. In a currency board and

under dollarization, monetary policy will tend to be driven by the requirements of the centre country, implying that the presence of strong asymmetries will expose peripheral countries to harmful policy shocks. In the case of currency union, where policy makers must manage conflicting regional interests, monetary policy loses its suitability for targeting country-specific disturbances.

From the foregoing, it is clear that loss of monetary policy autonomy is a problem in all fixed-rate regimes, particularly for smaller countries. Any tendency for national monetary conditions to deviate from the large country or from a group of dominant trading partners runs the risk of destabilizing markets. But whereas a small country has no formal influence over its partner's monetary policy under currency boards and dollarization, it participates in the formulation of monetary policy in a currency union. Thus, even a small country may have considerable clout in the conduct of area policy, particularly if it can influence its partner or partners through moral suasion or the soundness of its analysis.

## Compensating for the Loss of Exchange rate Flexibility

The loss of exchange rate flexibility does not necessarily impair an economy's ability to adjust to shocks and disturbances. The burden of adjustment borne by the exchange rate is simply shifted to other variables such as interest rates, wages, prices, employment and output. Adjustment capacity does suffer, however, if wages and prices are sticky, and if labour and other factors of production are immobile. Sticky prices and wages and labour immobility undermine an economy's ability to respond efficiently to shocks and disturbances, and shift the brunt of adjustment to employment and output.

In addition to their role in facilitating adjustment, floating rates have been valued for their apparent ability to shelter the economy from certain types of shocks and disturbances. As Murray (2000, p. 43) describes it, "...movements in the nominal exchange rate can work to offset some of the effects of temporary shocks and facilitate the transition to a new steady state if the shock proves to be permanent." This buffer function, however, has come under critical scrutiny

recently. It is discussed below.

## Volatility and Misalignment

Excessive volatility and sustained misalignment are frequent criticisms of Canada's floating rate regime. Fixed exchange rates are seen by many as a way of curtailing both. In building their case for greater fixity of exchange rates, Courchene and Harris (2000, p. 4) observe that "...real exchange rates are substantially more volatile under a flexible rate regime than under a fixed one, and almost all of this volatility is due to movements in the nominal exchange rate." They also express concerns over what they see as large and sustained exchange rate misalignments.

### Volatility

Whether exchange rate volatility is excessive or not depends on what is driving the adjustment process and on how adjustment is distributed between the exchange rate and other variables in the system. Exchange rates behave much like asset prices, which tend to adjust faster than prices in goods and factor markets and which, much like asset prices, tend to be more volatile than the underlying fundamentals. Asset prices and the exchange rate carry the brunt of adjustment in the short run, while the rest of the system struggles to overcome its inherent inertia and thus responds to shocks more gradually.

When goods prices are sticky in a floating-rate regime, the movement of the real exchange rate is dominated by the nominal rate. When prices eventually become unstuck, the real rate starts to revert towards its steady-state value. While this process may exhibit considerable exchange rate volatility, it would be a mistake to conclude that the observed volatility is necessarily disruptive. In fact, volatility may be beneficial in this case by allowing the rest of the economy to take its measured time in responding to the disturbance; stretching out the pace of adjustment may limit the extent of disruption. This is especially valuable when shocks are temporary.

Opponents of floating rates, however, often argue that gyrations in currency values

unrelated to fundamentals may provoke unwarranted and uneconomic adjustments if they are interpreted as representing permanent shifts in relative prices. Such adjustments are inefficient, because they will have to be corrected when the exchange rate reverses its course. For this scenario to work, however, prices, wages, employment, capital formation, and related variables would have to be highly flexible and responsive. There is virtually no evidence to support that view: this suggests that exchange rate volatility is more likely to act as an efficient buffer than a source of instability.

There are two issues here. The first pertains to the causes of exchange rate volatility, the second to the sensitivity of the real economy to exchange rate movements. If exchange rate volatility indicates the presence of disturbances from other sources and if the sensitivity of the real sector is sluggish, then exchange rate movements are important early shock absorbers that allow the rest of the system to avoid costly resource realignments. There is little evidence, as noted above, that exchange rate movements at high frequencies affect the allocation of resources; at lower frequencies, the debate continues on whether observed resource movements are necessarily inefficient. Hence, criticisms that exchange rates display “excess” volatility are still very much judgment calls.

In a system of fixed nominal exchange rates, the real exchange rate adjusts as long as prices are flexible, thus providing an important means of responding to shocks. When prices are sticky, on the other hand, there is no real rate response in the short run, and adjustment is shunted to interest rates and potentially to employment and output. It would thus be inappropriate to interpret the absence of exchange rate movement as a sign of systemic stability and therefore evidence of superior performance. The proper comparison is not between exchange rate volatility across regimes, but between exchange rate volatility and volatility in the variables which adjust when the exchange rate cannot.

When volatility is compared across exchange rate regimes, it is important to include exchange rate realignments that take place in fixed-rate regimes during currency crises. These crisis realignments impose very heavy burdens in terms of lost output, employment, and



economic and social instability. It is these extreme disruptions that have contributed to the widely-held belief that only the so-called “corner” solutions — of fully floating rates or hard pegs — represent viable options for most countries.

Figure 2 shows nominal and real effective exchange rates for the Canadian dollar, as well as the dollar’s movements against the U.S. dollar. We note first how closely the nominal effective rate tracks the bilateral rate: this underscores the importance of the bilateral relationship. Overall, all three rates show considerable movement in both nominal and real terms: but was it excessive? The answer depends on the presumed causes, as we shall see below.

*[Figure 2 about here]*

Would fixed rates have dampened volatility? Certainly in nominal rates, but what about real rates? Were there misalignments during the period? What would be the norm against which misalignment would be measured? Parity? But what if there are longer-run forces defining a downward trend, as the figure seems to suggest? What would be the implications of defending a peg? The debate over these issues continues.

## Misalignments

An addition to excessive volatility, floating rate systems are often blamed for sustained exchange rate “misalignments.” These are typically expressed in terms of real exchange rates and may be defined as departures from purchasing power parity (PPP), as persistent incompatibilities with macro-economic fundamentals, or as incompatible with international “competitiveness.” What leads critics of floating to view misalignments as a particularly unattractive feature of the system is their belief that misalignments encourage inefficient resource allocations.

It is important to recall that misalignments in real terms also occur in fixed-rate systems whenever relative prices change. Indeed, fixed-rate regimes typically start to unravel after the real exchange rate has persistently deviated from the rate that is consistent with the peg. Put differently, movement of relative prices generates an equilibrium nominal exchange rate which

persistently (and often increasingly) deviates from the peg. Under floating rates, changes in relative prices are accommodated continuously by nominal exchange rate adjustments. Under fixed rates, the pressures are allowed to accumulate until the system breaks. An imperfect analogy here might be the adjustment caused by moving tectonic plates in a series of frequent small tremors as opposed to the adjustment caused by large but infrequent earthquakes.

When critics attack volatility and misalignment, they imply that observed movements of exchange rates cannot be explained in terms of standard “fundamentals” and must thus be the result of irrational behavior and market inefficiencies. An example might be the movement of Canada’s nominal and real exchange rate relative to the price ratio, as shown in Figure 3. When the nominal exchange rate fluctuates so significantly relative to a stable price ratio, is this evidence of departures from fundamentals and speculative excess?

Recent work by economists at the Bank of Canada argues that the long-run behavior of the real Canada-U.S. exchange rate can be largely explained by inflation differentials, the relative price of energy and the relative price of non-energy commodities (Amano and van Norden 1993, Murray 2000 and others). Speculation and other forms of “irrational” behavior are apparently not important determinants. Thus, “volatility” in the exchange rate is due largely to volatility in the variables that drive it. This argument goes a step further to suggest that certain episodes of increased volatility in the exchange rate may have been due to stabilizing rather than destabilizing speculation (Murray et al. 1996).

Movements of the Canadian dollar against the U.S. dollar are often matched by similar movements of many other currencies against the U.S. dollar, which appreciated strongly during the first half of the 1980s, and depreciated strongly during the second. This development was driven by U.S. monetary and fiscal policies. The Reagan Administration’s large budget deficits expanded demand for non-tradeables, which raised the relative price of non-tradeables to tradeables, i.e., caused a real appreciation.

This pattern is clearly apparent in Figure 3, which shows the Canadian dollar falling in the first half of the 1980s and rising in the second, while the ratio of consumer prices fluctuates

much less. If the Canadian dollar had been tied to its U.S. counterpart during the 1980s, it would still have fluctuated, except that the pattern would have been reversed.

*[Figure 3 about here]*

This is just another example of how Canada is affected by the actions and policies of its dominant neighbor, regardless of the nature of the exchange rate regime. Canada has tried to deal with such problems in trade relations by embracing the Canada-U.S. Free Trade Area (FTA) and the NAFTA. The current interest in monetary union may be interpreted as an effort to bring similar discipline and control to continental monetary conditions. Tying to the U.S. dollar would certainly provide a buffer against cross-border volatility and misalignment, and the more integrated the two economies become in terms of trade and investment, the more that protection matters, and the stronger the case for currency union becomes.

In sum, excessive volatility and misalignment can clearly complicate the effectiveness of floating rates, but misalignment in particular is also a problem that arises in the context of pegged rates, and volatility asserts itself strongly during the financial crises that often end fixed-rate regimes. Indeed, excessive volatility and sustained misalignment are apt descriptions of the recent performance of many fixed-rate regimes. Until recently, however, currency boards, dollarization and currency union were widely believed to be immune to such criticisms. The Argentinian crisis of 2002 has raised new doubts about the stability of currency boards and, tangentially, of dollarization as well.

In the end, a key issue for Canadians will be the extent of their influence over regional monetary policies under various exchange rate regimes. From this perspective, the majority of fixed-rate regimes do not offer much, because Canada would have little influence over U.S. policies, even though those policies would have serious repercussions for Canada. For currency union to be of interest to Canada, it would have to offer meaningful influence over the union's monetary policies, which means significantly more than becoming an additional district in the U.S. Federal Reserve System.

In a sense, the problems Canada faces with monetary integration are opposite to the

problems of trade integration. With the Canada-U.S. FTA and the NAFTA, minimalist arrangements were preferable for Canada and Mexico, because they limited the extent to which Washington could dictate trade policy toward third countries. With monetary cooperation, on the other hand, minimalist options do not allow much joint management.

## Exchange Rates and Economic Structure

The novelty in the contemporary Canadian debate over closer monetary cooperation is that it goes beyond traditional considerations by arguing that floating rates have inimical effects on Canada's long-run competitiveness. Sustained depreciation of the Canadian dollar, often attributed to deflation in world commodity prices, is believed to have retarded innovation and modernization in the Canadian manufacturing sector.

Critics, including Courchene and Harris (2000) and Grubel (2000) interpret the "floating-rate-as-buffer" argument not as a strength of flexible exchange rates but as a weakness. They worry that the value of the Canadian dollar has been dominated by developments in the commodity sector. While sustained depreciation may protect Canada's resource-based industries in the face of world commodity price deflation, it also shields other sectors from foreign competition, and that may not be good. Specifically, protection from foreign competition may have undermined incentives to invest, innovate and modernize in the country's manufacturing industries. Even a strong supporter of floating like McCallum (1999, 2000) acknowledges the possibility of such a causal relationship.

This perspective introduces a new dimension into the debate on optimal exchange rate policy, because it goes beyond the traditional preoccupation with macroeconomic stability to the implications of floating rates for economic structure and long-run growth. Here, the buffering function of the floating rate is not the benign force described above and reflected in the earlier quotation from Murray, but a source of long-term decline. Currency depreciation shields one sector from the consequences of declining world commodity prices, but only at the expense of lost competitiveness in the rest of the economy. In this context, exchange rate buffering

generates efficiency and welfare losses analogous to those attributed to tariffs and other forms of protection.

The effects of monetary integration on economic structure have received some attention in the literature. Frankel and Rose (1998), for example, have argued in evaluating the EMU that monetary integration promotes synchronization of business cycles among member countries through increased trade linkages. Trade encourages similarity among industrial structures and thus reduces the problems associated with asymmetric shocks. This view is shared by the European Union (EU) and may be particularly relevant to monetary unions among similar countries in which intra-industry trade dominates.

This view is challenged by Krugman (1993), for example, who argues that trade and monetary integration tend to encourage greater specialization among members, thereby sharpening differences among them and intensifying the problems created by asymmetric shocks (Soltwedel et al. 2000). In the end, the outcome is likely to depend on the relative importance of inter- and intra-industry trade in the integrated area. Where inter-industry trade dominates, as it would in currency unions between industrialized and industrializing countries, greater specialization and hence heightened asymmetry would be the likely result. Where intra-industry trade is dominant, as in the EU, greater specialization is compatible with rising correlation among business cycles, especially if specialization along product-variety lines is prevalent. Specialization in terms of intra-industry product variety ensures that industry-specific shocks affect everybody.

Recent developments in offshore assembly, component trade and intra-product specialization add a new force that tends to increase cyclical linkage and thus reduce the problem of asymmetric shocks even in — or perhaps especially in — monetary unions between industrialized and industrializing economies. As major industries resort increasingly to offshore sourcing and production, industry-specific global demand and supply shocks affect every country which has a piece of the action. A demand shock in the motor vehicle industry, for example, affects producers in the United States, Canada and Mexico in similar ways, because the industry

has been internationalized and production is shared among the three NAFTA members. Analogous considerations apply to aircraft, consumer electronics, apparel and many other industries (Arndt 1998, 2001; Arndt and Huemer 2001; and Arndt and Kierzkowski 2001).

## Price Deflation in the World Resource Sector

As noted above, the contemporary Canadian debate on the optimal exchange rate regime has been influenced strongly by the role of world prices of raw materials, natural resources, and agricultural commodities. Under floating rates, a relative decline in commodity prices shifts world demand away from Canadian products. The Canadian dollar depreciates to an extent that depends on the magnitude of the shock, the importance of commodity trade in Canada's total trade, and the presence of nominal rigidities in the system.

The essence of the argument is as follows. Although the nominal exchange rate is a general price, it often moves as a result of changing conditions in particularly dominant sectors. The influence is more pronounced as the share of those sectors in total trade grows. Exchange rate changes generated in this manner have implications not only for the sectors in question, but for every part of the economy in which exchange rates matter.

Let us consider manufacturing, for example. In a fixed exchange rate system, global deflation of commodity prices would exert downward pressure on domestic commodity prices at the initial exchange rate. The decline in the relative price of commodities reduces profitability in the resource sector and creates incentives for labour and capital to relocate. As the domestic currency depreciates, however, the need for domestic commodity price reductions is eased. At the same time, and at given world prices for manufactured goods, this depreciation allows domestic manufacturing prices to rise. Here, the change in internal relative prices is accomplished at least in part by a rise in manufacturing prices rather than a decline in resource sector prices. The change in relative prices still shifts profitability toward manufacturing, and encourages reallocation of productive resources into that sector.

If factor prices are downwardly flexible, wages and capital rentals can be adjusted

downward in the resource sector to help absorb the shock. If factor prices are rigid in the resource sector, the adjustment burden falls more fully on resource reallocation. In the presence of nominal rigidities, especially the downward rigidity of wages, currency depreciation eases the burden of adjustment in the resource sector, because the required realignment of relative prices described above is accomplished in part by a rise in manufacturing prices.

To this point, the story is largely conventional. What distinguishes the Canadian debate from that story, however, is the concern that adjustment under floating rates may have adverse effects on modernization of the manufacturing sector. The currency depreciation protects domestic manufacturing industries from foreign competition and thereby undermines incentives to stay competitive and modernize. In the view of critics who believe that Canadian manufacturing is not moving fast enough toward high tech, knowledge-intensive industries, part of the blame belongs to the sustained depreciation of the Canadian dollar.

This is a subtle but important shift in emphasis and focus. It is no longer the relative price between domestic manufacturing and domestic resource industries, but the relative price between domestic and foreign (especially U.S.) manufacturing that causes concerns. An increase in the former favours expansion of Canadian manufacturing; an increase in the latter biases the expansion against modernization. As a result, Canadian manufacturing may expand, but it will do so in the direction of older, more traditional types of manufacturing. From a long-run perspective, this is a recipe for trouble.

This possibility is at the heart of the call for monetary union by Courchene and Harris (2000). It is acknowledged as potentially troublesome even by opponents of monetary union like McCallum (1999, 2000). And it is relevant to resource-rich, advanced countries like Norway and Iceland (Gylfason (2000)). The evidence, however, is far from clear, and a great deal more research is needed before any policy-related conclusions would be justified. Moreover, as McCallum (2000) notes, even if the evidence ultimately links the exchange rate to technical progress in manufacturing, it may be no more than an argument for a stronger Canadian dollar than it would be for currency union.

## The Role of World Commodity Prices

The case consists of two propositions: first, the sustained depreciation of the Canadian dollar is the result of a global slump in commodity prices; second, the sustained depreciation of a country's currency undermines industrial innovation and technical progress.

With respect to the first proposition, the evolution of commodity prices is displayed in Figure 4. After a significant drop in the first half of the 1980s, commodity prices have fluctuated around a rather flat trend since then. A comparison of fluctuations in commodity prices with fluctuations in the exchange rate (Figure 3) suggests a rough correlation, especially in the earlier part of the period. Commodity prices decline between 1980 and 1986 and the Canadian dollar depreciates. Prices rise subsequently, with fuel-inclusive commodity prices peaking in 1991, and the dollar appreciates. After that, the relationship is much more questionable.

*[Figure 4 about here]*

While it is certainly possible to see interaction between world commodity prices and the exchange rate, that relationship is not compelling in a causal sense, especially in view of competing explanations of exchange rate behavior. It would thus be a mistake to base an argument for fixed rates on the presumed role of world commodity prices in depressing the value of the floating Canadian dollar.

## The Role Of Productivity

In recent work, Harris (1999, 2001) has focussed on technology shocks and productivity to explain the alleged lack of innovative vigor in Canadian manufacturing. He emphasizes the role of productivity under floating rates in economies with structurally diverse sectors. The framework is a two-sector model of a small open economy that relies on imported technology for industrial advancement. One of the two sectors consists of "old economy" industries (which include heavy manufacturing and, in Canada's case, natural resources), while the other contains "new economy" industries (like information-based, software, and high tech manufacturing).



Labour markets serving the two sectors are structurally different: in the old economy, the nominal wage is inflexible, perhaps because of strong labour unions; in the new, wages are flexible and competition ensures full employment.

The system is shocked by the arrival of a general-purpose technology (GPT) in the new economy, together with a world price decline in the old economy. This double whammy is intended to mirror the stylized facts of the past decade, during which the information revolution coincided with depressed world commodity prices. The GPT shock boosts productivity in the new economy and encourages resource reallocation from the old to the new. At the initial exchange rate, the sector-specific productivity shock tends to cause output and employment to fall in the old economy and rise in the new.

This is the conventional result of sector-specific technological change. The depression in world commodity prices merely intensifies the pressures on the old economy. Currency depreciation, on the other hand, inhibits this process; by protecting the old economy, it stabilizes employment there and thus mutes pressures to reallocate resources. In this set-up, depreciation inhibits the process of economic transformation regardless of its cause, which could run from depressed commodity prices to an asset bubble in the United States.

## Nominal Rigidities

The role of nominal rigidities in the old economy is crucial in this scenario. If prices and wages in the old economy were flexible downward, the exchange rate would be relieved of much of the burden of adjustment. The combination of asymmetric shocks and nominal rigidities implies that the existing currency union between the old and the new economies is a mistake which should be replaced with floating rates. Dissolution is clearly not an option, which means that labour market reforms are needed to enable the country to deal more effectively with this type of asymmetric shocks.

If labour market and related structural reforms are politically unattainable, is enlarging the currency union to include the United States the answer? If labour markets remain rigid in

the old economy, what exactly will fixed rates vis-à-vis the United States achieve — apart from reducing the importance of Canada's old sectors in the continent-wide economy and permanently fixing the exchange rate between Canada's manufacturing sector and its U.S. counterpart?

Harris does not say how labour market rigidities would affect adjustment in the context of a Canada-U.S. currency union. While deflation in world commodity prices would still exert downward pressure on commodity prices, this time throughout the currency union, the resultant pressure on the value of the union's currency in world exchange markets would be weaker in view of the reduced weight and importance of the continent-wide resource sector in the continent-wide economy. With currency depreciation carrying a smaller burden of adjustment to global price deflation, however, downward pressures on Canadian commodity prices would be commensurately greater. Labour market rigidities would then ensure depressed conditions in the sector.

While currency union would not do much to solve the problems of the old sector, this scenario implies that competitive pressures flowing from adoption of GPT innovations in the United States would not be muted by depreciation and thus would be fully felt by Canadian manufacturers. Harris argues that this would stimulate technological progress in Canada. This leaves the question of whether and to what extent Canada has fallen behind technologically.

## Technological Change

The modernization argument turns on the impact of the exchange rate regime on industrial competitiveness. In this sense, it differs from traditional trade and exchange rate theory. When a new, cost-saving technology becomes available, it is adopted, relative goods and factor prices adjust, factors are reallocated, and trade patterns reflect the new realities. While differential rates of growth in tradeables and non-tradeables may affect exchange rates, the causality runs from growth to the exchange rate.

In the Harris model, technologies are imported and their implementation is costly. Currency depreciation impedes their implementation: first, because its protective effect reduces

the urgency of the competitiveness pressures; second, because it raises the cost of, and reduces the expected return on, imported technologies. To the extent that this helps explain the stylized facts, however, it is again more an argument for a strong dollar than for currency union.

There is considerable disagreement, however, over the stylized facts and over whether and by how much technical progress has lagged in Canada. While innovation may have been sluggish in computers and electronic equipment, there is no consensus that Canada has lagged in overall terms, especially in comparison with Europe's industrialized nations (Murray 2000, McCallum 1999 and 2000, and Schreyer 2000). Evidence amassed in a recent study by the Organization for Economic Cooperation and Development (OECD 2000) gives a mixed picture at best.

The study shows that Canada continues to have one of the smallest gaps in per capita GDP when compared to United States; however its growth rate of per capita GDP has been lower recently than most of the countries in the sample. The study attributes this in part to slower growth of labour productivity. Relatively speaking, human capital formation has played an important role in Canadian labour productivity growth. Much of the observed growth in productivity appears to be based on growth within sectors rather than on sectoral shifts.

In the mid-1990s, Canada did lag behind the United States and other countries in the share of value-added of information and communication technology industries (ICT) in total GDP. The OECD data confirm the aforementioned observation that productivity growth in office, accounting and computing equipment appears to have been comparatively anemic, especially toward the end of the decade. On the other hand, the contribution of ICT capital to output growth was higher in the 1990s than in the preceding decade, smaller than in the United States, but comparatively strong in relation to other countries in the sample.

It is difficult to make a strong case for technological backwardness on the basis of this kind of evidence.

## Collecting the Pieces of the Argument

There is a widely held view among economists that neither Canada nor the United States, as configured currently, represent optimal currency areas. Some, including Robert Mundell, have argued in the past that if there were to be just two currency areas in North America, a North-South rather than East-West division of the continent would have been better. In assessing the extent to which Canada itself satisfies the optimum currency area criteria, most economists would give it a low or failing grade on labour-market flexibility and on symmetry of structure.

What monetary union advocates hope to achieve is to reduce the problems associated with internal asymmetries between the resource sector and the “rest” of the Canadian economy by expanding the domain of the Canadian currency area to the United States. In the new, enlarged entity, the asymmetries between the two Canada’s would remain, but the influence and weight of the old economy would be sharply reduced. Monetary union would not solve the rigidity problem in the old economy directly.

Courchene and Harris (2000), as well as Grubel (2000), tend to see strong compatibilities between the United States and “most” of Canada, so that the benefits from reducing the influence of the resource sector would not be offset by costs associated with asymmetric structures and shocks elsewhere. Murray (2000), on the other hand, is less sanguine especially about asymmetric responses to commodity price shocks. If terms-of-trade movements are one indicator of compatibility, Figure 5 suggests considerable divergence between the two countries. The work of Bayoumi and Eichengreen (1994) and Carr and Floyd (2002) provides further evidence on asymmetries in real shocks.

*[Figure 5 about here]*

There is also uncertainty about the likely effect of currency union on the mobility of workers between the two countries. Capital and skilled workers are already highly mobile, but Courchene and Harris (2000) worry that migration has been mainly in one direction, with a brain drain of skilled workers and professionals in response to higher U.S. wages and living standards. They hold the depressed Canadian dollar responsible for part of the income disparities and see

currency union as a way of improving Canada's relative position.

The likely effect of currency union on migration of unskilled workers is unclear. Shifts in relative prices against the resource sector are expected to expose the sector to strong adjustment pressures. In the face of nominal wage rigidities, such pressures will be met by elimination of jobs. If labour mobility is limited, policy makers will face major adjustment problems. There is no evidence that unskilled workers will be more willing or able to move into U.S. jurisdictions than among Canadian regions. The eventual outcome could resemble the recent European experience, where declining sector-specific competitiveness has resulted in higher unemployment, with relatively little geographic or inter-sectoral migration of labour.

## Determining the Direction of Causality

In the debate surveyed above, causality has been assumed to run from an exogenous decline in world commodity prices to a depreciating Canadian dollar to retardation of manufacturing innovation. There is no agreement on the direction of causality, however, with many economists inclined to think that it may run the other way.

Grubel (2000), for one, suggests that causality runs from wage-setting union behavior via monetary accommodation to currency depreciation. Briefly, labour-union demands for wage increases in excess of productivity gains create unemployment and related market pressures, which are met by the central bank with monetary expansion. While the policy is intended to stimulate aggregate demand, it allows prices to rise along with nominal wages and thereby keeps the growth of real wages in check. The rise in domestic prices relative to those abroad causes the home currency to depreciate (Coricelli et al. 2001).

Here, too, there are echoes of the European experience. Indeed, it was a vicious cycle of this kind that induced Austria to adopt the hard-currency peg to the German mark many years ago in an attempt to break the link from wages to prices and exchange rates (Arndt 1982). The policy worked extremely well: it imposed discipline on both wage-setting and price-setting in Austria and forced both into conformity with the inflation targets of the Bundesbank. Courchene

and Harris (2000) refer to the Austrian case in their discussion of a possible fixed-rate scenario for Canada.

Grubel (2000) questions the causal link from world commodity prices, arguing that the econometric evidence is not very strong. As an alternative — or additional — explanation, he cites some evidence which relates the depreciation of the Canadian dollar to the growing debt of Canadian governments, and particularly to the foreign-currency denominated component of the debt. Servicing and repaying the foreign portion of debt places downward pressures on the Canadian dollar. The role of external indebtedness does not normally receive much attention in economists' models of exchange rate determination. There is mounting evidence, however, that external debt burdens may have contributed to the difficulties in South-East Asia in 1997 and in Argentina in 2002.

In Grubel's view, the evidence overall is too scanty to permit a firm conclusion with respect to the causes of Canada's depreciating dollar. He notes, however, that a depreciation gives producers in non-resource sectors room to raise prices, profits and wages. This sows the seed for future problems when world commodity prices rise. When that happens and the Canadian dollar appreciates, hysteresis effects will make it difficult for these industries to reduce wages and prices. They will then find themselves in a weakened position of global competitiveness as exports fall and imports rise.

Labour market behavior and rigidities may be endogenous to the exchange rate regime. Before Austria adopted its hard currency peg to the German mark, workers and labour unions fully expected negative employment effects resulting from their wage-setting behavior to be met by the central bank with monetary accommodation, while the inevitable increase in prices induced by monetary accommodation would in turn be met by devaluation of the schilling.

After adoption of the hard-currency peg, Austrian monetary policy came to be credibly tied to that of the Bundesbank, ruling out monetary accommodation of excessive wage increases. Hence, wage inflation would result in unemployment and lost output. The pattern of wage-setting changed drastically, with nominal wage settlements disciplined by productivity growth

and by the inflation target of the Bundesbank.

From this perspective, it is easy to see why monetary and exchange rate policy autonomy may appear as a curse rather than a blessing. Austrians who lived through both periods — those before and after the hard-currency peg — have little difficulty deciding which regime they prefer.

## Choosing the Proper Form of Monetary Cooperation

As noted earlier, exchange rate fixity may be achieved in a number of ways, running from the softer varieties of pegged but adjustable rates to the hard peg of the currency board, dollarization, and finally currency union. Although soft pegs would help achieve some of the objectives discussed in the foregoing pages, they do not resolve many of the risks which the move away from floating is intended to eliminate.

Most of the available options can be implemented unilaterally by Canada. With the exception of currency union, they do not require active U.S. participation. The choice between soft and hard pegs would depend to some extent on the importance of the structuralist critique of floating rates. As the history of devaluations in Iceland suggests, soft pegs may not solve the problem, because governments are not always able to resist pressures from the resource sector to devalue the currency whenever world competition becomes too intense.

Among hard pegs, currency board, dollarization, and monetary union are the viable options, although the Argentinian debacle and the apparent role of excessive foreign indebtedness raise major questions about the long-run sustainability of currency boards and even dollarization (Alexander and von Furstenberg 2000; Berg and Borensztein 2000a; Wagner 2000; and Willett 2001). While exit strategies are indeed more limited and exit entails higher costs than under soft pegs, the recent Argentinian experience suggests that a currency board cannot prevent governments from running policies which undermine the viability of the system and that even a currency board will be abandoned when the costs of maintaining it are high enough. The Argentinian crisis has dealt the credibility of the currency board option a serious blow.

Does this mean that the set of viable hard pegs has been reduced to just two — dollarization and currency union? There is no doubt that exit from both is more difficult. Indeed, exit may be more difficult from dollarization than from currency union, because it would create a more serious institutional vacuum at the level of central banking and monetary policy. Exit from a currency union like the EMU would be difficult, but the institutional and policy vacuum would be much less severe.

Canadian proponents of closer monetary integration may argue with considerable justification that policy mismanagement of the Argentinian type is not possible in Canada, so that the currency board remains a viable option, along with dollarization and currency union. That is probably correct, except that Canada carries a significant external debt burden, which could cause problems over time in the context of a currency board.

In the end, any move towards greater monetary coordination, whether unilateral or joint, will require reforms of policies and structures in participating countries. An important lesson from the European experience is the importance of preparedness. Beginning with the EMS and culminating in the convergence criteria of the Maastricht Treaty, Europe insisted on reforms prior to entry (Hochreiter 2000). The one significant exception was the failure to implement labour market reforms and that failure may yet come to haunt the EMU. Labour market rigidities should be on the agenda of any move toward greater fixity of exchange rates.

In preparing for the EMU, Europe's policy makers understood the need for reforms designed to reduce policy and structural differences. The Maastricht Treaty and its focus on convergence reflect that recognition. Ideally, labour-market reforms should also have been undertaken, but the political will was not there. Hughes Hallett and Viegi (2000) have argued that failure to implement labour-market reforms ex ante exposes a currency union to additional risk.

Furthermore, if McCallum, Murray and others are correct in their claim that the issue is more one of strengthening the Canadian dollar than one of monetary integration, then labour market and other structural reforms may be a way of bringing about a stronger Canadian dollar.



This suggests that Canada might do well to pursue structural reforms before making any commitments in the direction of exchange rate fixity.

## The Politics of Monetary Union

Although many proponents of North American currency union see the EMU as a model, it is important to recall that political rather than economic motives have typically been the driving force behind economic integration in Europe. Time and again, when the case for further integration was difficult to make on economic grounds, political arguments saved the day. There is no counterpart to this important force in North America. Economic arguments must carry a much greater share of the case for monetary cooperation.

There is very little political interest in monetary union in the United States. Although an element of public opinion is sympathetic to the notion that closer monetary cooperation is in the enlightened interest of the United States, because it will contribute to stability in the region, the public at large and the U.S. Congress are indifferent.

As unilateral initiatives involving currency boards and dollarization have increased throughout the hemisphere, some observers have argued that the United States has no choice but to get involved. This argument is strengthened further by ongoing integration in the areas of trade and foreign investment, which are creating an integrated economic space in which greater monetary cooperation will become essential.

The emergence of the euro may drive the United States to seek greater monetary coordination in the Western Hemisphere in order to limit the euro's ability to encroach on the dollar's role as the world transactions and reserve currency. But these are long-run arguments at best (McKinnon 2000).

While it is clear that there is not much political support for greater monetary cooperation in the United States, it is unclear whether there is broad political support in Canada. Without such support it will be difficult for Canada to build a case; furthermore, Canadians wish to preserve some form of cultural independence from the United States.

While there may not be political support for monetary union, there would be widespread support for a stronger Canadian dollar. Canadian policy makers could do worse than to focus on strengthening the currency, an objective which would be well served by structural reforms in labour markets and elsewhere in the economy. In seeking to strengthen the dollar, they will create conditions that may make currency union a stronger option in the future.

## Conclusion

It is not easy to make a case for currency unification (and, by extension, for most other forms of exchange rate fixity) in Canada. Neither the existing Canadian monetary union nor the proposed one satisfies all the requirements for an optimum currency area. Recent Canadian macroeconomic experience says that greater monetary coordination is not needed, because Canada is outperforming the United States on the inflation front. Nor does the country need to be rescued from major policy misadventures. And, finally, the political climate on both sides of the border is indifferent, if not hostile, to the idea of closer monetary cooperation.

Interestingly, similar arguments accompanied virtually the entire history of European economic integration. On nearly every occasion when Europe took a major step forward, including Maastricht, there were voices proclaiming that the attempt was doomed. But the process continued and monetary union is a reality today. Traditional economic considerations, both for and against, were not strong enough to provide clear-cut guidelines. That is why a healthy political tail wind was needed to move the ship along.

An important feature that distinguishes the current Canadian debate from its European antecedents is the structuralist hypothesis linking exchange rates to modernization. It remains to be seen whether this argument stands up. A great deal more analytical work and empirical evidence are needed, not only on the allegedly deleterious effects of floating rates on growth and industrial structure, but on the curative effect of monetary union.

Much of the Canadian case for monetary integration is based on structural asymmetries within the country, whose influence monetary union with the United States would mute, but not

eliminate. To opponents of monetary union, the argument is more one of strengthening the value of the Canadian dollar, a goal which can be accomplished without formal monetary integration, and within the present political climate in Canada.

While the economic arguments are deficient and the political support weak at this juncture, there are forces at work that seem to make monetary integration in the hemisphere inevitable in the longer run.

## Bibliography

- Alexander, V. and G.M. von Furstenberg. "Monetary Unions — A Superior Alternative to Full Dollarization in the Long Run." *North American Journal of Economics and Finance* 11, 2 (2000): \_\_\_\_ - \_\_\_\_.
- Amano, R. & S. van Norden. "A Forecasting Equation for the Canada-U.S. Dollar Exchange Rate." In *The Exchange Rate and the Economy*. Ottawa: The Bank of Canada, 1993, pp. \_\_\_\_ - \_\_\_\_.
- Arndt, S.W. *The Political Economy of Austria*. Washington, D.C.: AEI Press, 1982, pp. \_\_\_\_ - \_\_\_\_.
- \_\_\_\_\_. "Super-specialization and the Gains from Trade." *Contemporary Economic Policy* 16 (1998): \_\_\_\_ - \_\_\_\_.
- \_\_\_\_\_. "Offshore Sourcing and Production-Sharing in Preference Areas." In *Fragmentation: New Production Patterns in the World Economy*. Edited by S.W. Arndt and H. Kierzkowski. New York: Oxford University Press, 2001, pp. \_\_\_\_ - \_\_\_\_.
- Arndt, S.W. and A. Huemer. "North American Trade After NAFTA: Part I & II." *Claremont Policy Briefs*. Claremont: Lowe Institute of Political Economy, April and July 2000, pp. \_\_\_\_ - \_\_\_\_.
- Bayoumi, T. and B. Eichengreen. "One Money or Many? Analyzing the Prospects for Monetary Unification in Various Parts of the World." Princeton: *Studies in International Finance* 76 (1994): \_\_\_\_ - \_\_\_\_.
- Berg, A. and E. Borensztein. "The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies." International Monetary Fund Working Study No. 29, February 2000a.
- \_\_\_\_\_. "Full Dollarization: The Pros and Cons." *IMF Economic Issues* 24 (2000b): \_\_\_\_ - \_\_\_\_.
- Carr, J.L. and J.F. Floyd. "Real and Monetary Shocks to the Canadian Dollar: Do Canada and the United States form an Optimum Currency Area?" *North American Journal of Economics and Finance* 13 (2000): \_\_\_\_ - \_\_\_\_.
- Coricelli, F., A. Cukierman and A. Dalmazzo. "Economic Performance and Stabilization Policy

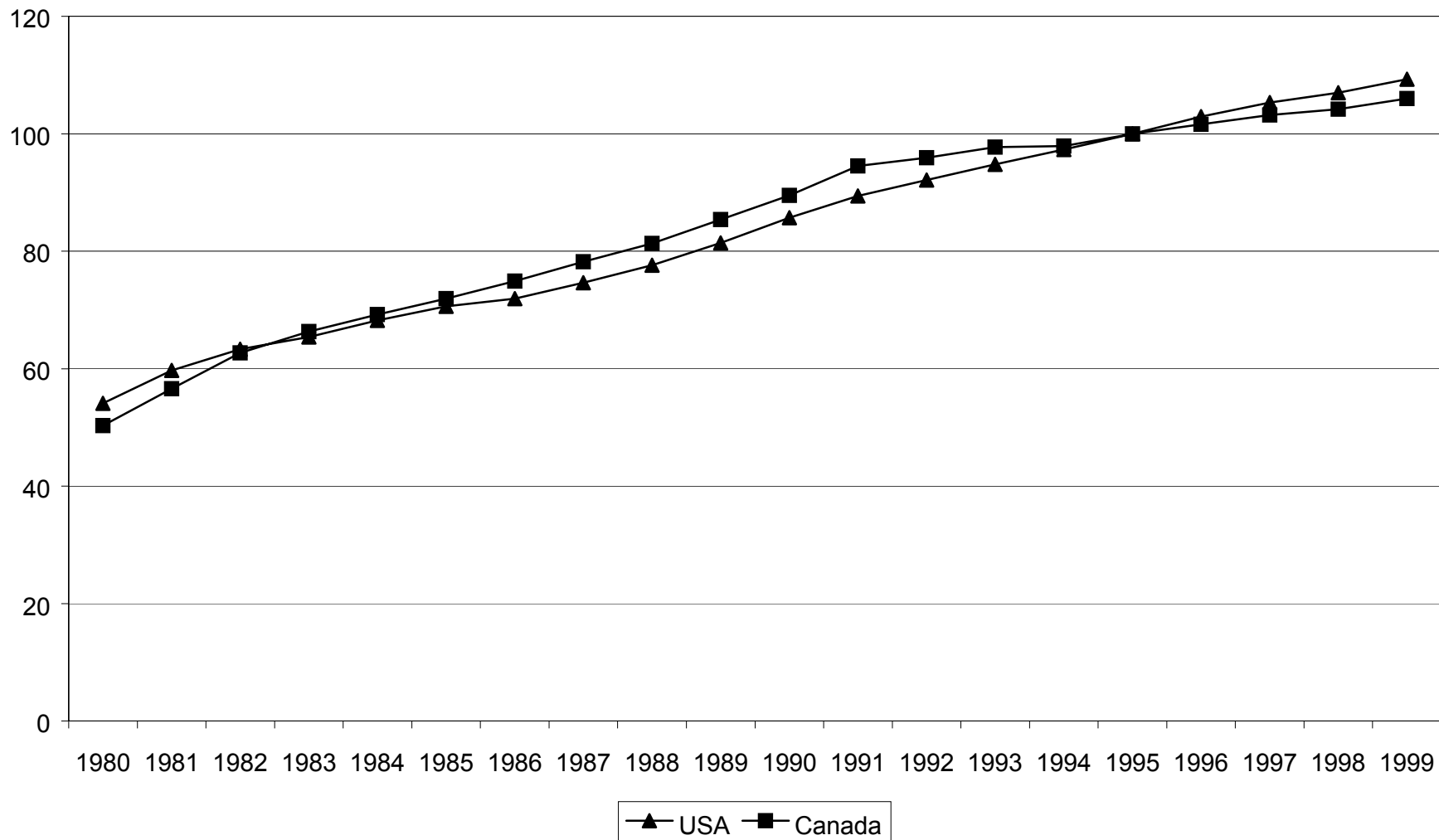
- in a Monetary Union with Imperfect Labour and Goods Markets.” Discussion Paper No. 2745, CEPR, March 2001.
- Courchene, T.J. and R.G. Harris. “North American Monetary Union: Analytical Principles and Operational Guidelines.” *North American Journal of Economics and Finance* 11, 1 (2000): \_\_\_\_-\_\_\_\_.
- De Grauwe, P. *The Economics of Monetary Integration*, Third edition. Oxford: Oxford University Press, 1997, pp. \_\_\_\_-\_\_\_\_.
- Eichengreen, B. *European Monetary Unification: Theory, Practice, and Analysis*. Cambridge: MA: MIT Press, 1997, pp. \_\_\_\_-\_\_\_\_.
- Emerson, M. [et al.] “One Market, One Money: An Evaluation of Forming an Economic and Monetary Union.” *European Economy* 44 (1990): \_\_\_\_-\_\_\_\_.
- Frankel, J.A. and A.K. Rose. “The Endogeneity of the Optimum Currency Area Criteria.” *Economic Journal* 108, 449 (1998): \_\_\_\_-\_\_\_\_.
- Grubel, H.G. “The Merit of a Canada-U.S. Monetary Union.” *North American Journal of Economics and Finance* 11, 1 (2000): \_\_\_\_-\_\_\_\_.
- Gylfason, T. “Fix or Flex? Alternative Exchange Rate Regimes in an Era of Global Capital Mobility.” *North American Journal of Economics and Finance* 11, 1 (2000): \_\_\_\_-\_\_\_\_.
- Harris, R.G. *Determinants of Canadian Productivity Growth: Issues and Prospects*. Discussion Paper No. 8. Ottawa: Industry Canada, December 1999.
- \_\_\_\_\_. *The New Economy and the Exchange Rate Regime*. Discussion Paper No. 0111. Adelaide: Centre for International Economic Studies, Adelaide University, March 2001.
- Hochreiter, E. “Exchange Rate Regimes and Capital Mobility: Issues and Some Lessons from Central and Eastern European Applicant Countries.” *North American Journal of Economics and Finance* 11, 2 (2000): \_\_\_\_-\_\_\_\_.
- Hughes Hallett, A. and N. Viegi. “Labour Market Reform and Monetary Policy in EMU: Do Asymmetries Matter?” [Journal name, volume, issue,] (2000): \_\_\_\_-\_\_\_\_,
- Kenen, P.B. “The Theory of Optimum Currency Areas: An Eclectic View.” In *Monetary*

- Problems of the International Economy*. Edited by R.A. Mundell and A.K. Swoboda. Chicago: University of Chicago Press, 1969, pp. \_\_\_\_-\_\_\_\_.
- Krugman, P. "Lessons of Massachusetts for EMU." In *Adjustment and Growth in the European Monetary Union*. Edited by F. Torres and F. Giavazzi. New York: Cambridge University Press, 1993, pp. \_\_\_\_-\_\_\_\_.
- McCallum, John. "Seven Issues in the Choice of Exchange Rate Regime for Canada." *Current Analysis*. [City of publication]: Royal Bank of Canada, February 1999, pp. \_\_\_\_-\_\_\_\_.
- \_\_\_\_\_. "Engaging the Debate: Costs and Benefits of a North American Common Currency." *Current Analysis*. [City of publication]: Royal Bank of Canada, March 2000, pp. \_\_\_\_-\_\_\_\_.
- McKinnon, R.I. "Optimum Currency Areas." *American Economic Review* 53 (1963): \_\_\_\_-\_\_\_\_.
- \_\_\_\_\_. "On the Periphery of the International Dollar Standard: Canada, Latin America, and East Asia." *North American Journal of Economics and Finance* 11, 2 (2000): \_\_\_\_-\_\_\_\_.
- Mundell, R.A. (1961), "A Theory of Optimum Currency Areas," *American Economic Review*, 51.
- Murray, J. "Why Canada Needs a Flexible Exchange Rate." *North American Journal of Economics and Finance* 11, 1 (2000): \_\_\_\_-\_\_\_\_.
- Murray, J., S. van Norden and R. Vigfusson. "Excess Volatility and Speculative Bubbles in the Canadian Dollar: Real or Imagined?" Technical Report No. 76. Ottawa: Bank of Canada, July 1996.
- OECD. OECD Economic Outlook, No. 67. Paris: Organization for Economic Cooperation and Development, June 2000, pp. \_\_\_\_-\_\_\_\_.
- Schreyer, P. "The Contribution of Information and Communications Technology to Output Growth: A Study of the G7 Countries." OECD STI Working Paper 2000/2. Paris: OECD, March 2000.
- Soltwedel, R., D. Dohse and C. Krieger-Boden. "EMU Challenges to European Labour Markets." IMF World Economic Outlook: Supporting Studies, [Study No. \_\_], 2000.

- Tower, E. and T.D. Willett. "The Theory of Optimum Currency Areas and Exchange rate Flexibility." Princeton Special Papers in International Economics, No. 11, May 1976.
- Wagner, H. "Which Exchange Rate Regimes in an Era of High Capital Mobility?" *North American Journal of Economics and Finance* 11, 1 (2000): \_\_\_\_ - \_\_\_\_.
- Willett, T.D. "Truth in Advertising and the Great Dollarization Scam." *Journal of Policy Modeling* 23 (2001): \_\_\_\_ - \_\_\_\_ . (Given as "forthcoming")

**Figure 1a: Consumer Prices - Index Numbers (1995=100)**

Source: International Financial Statistics Yearbook 2000

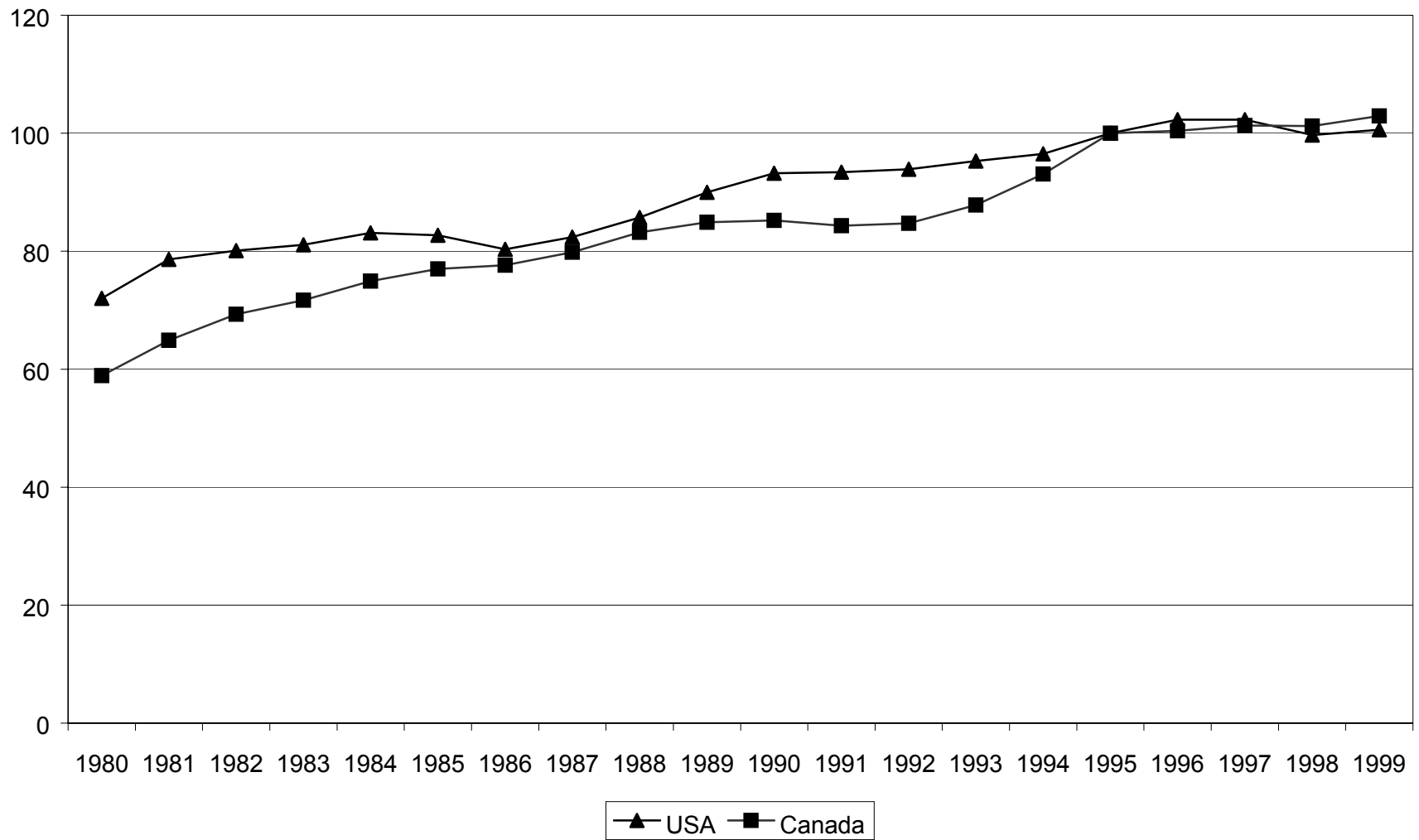






**Figure 1b: Industry/ Producer Prices - Index Numbers (1995=100)**

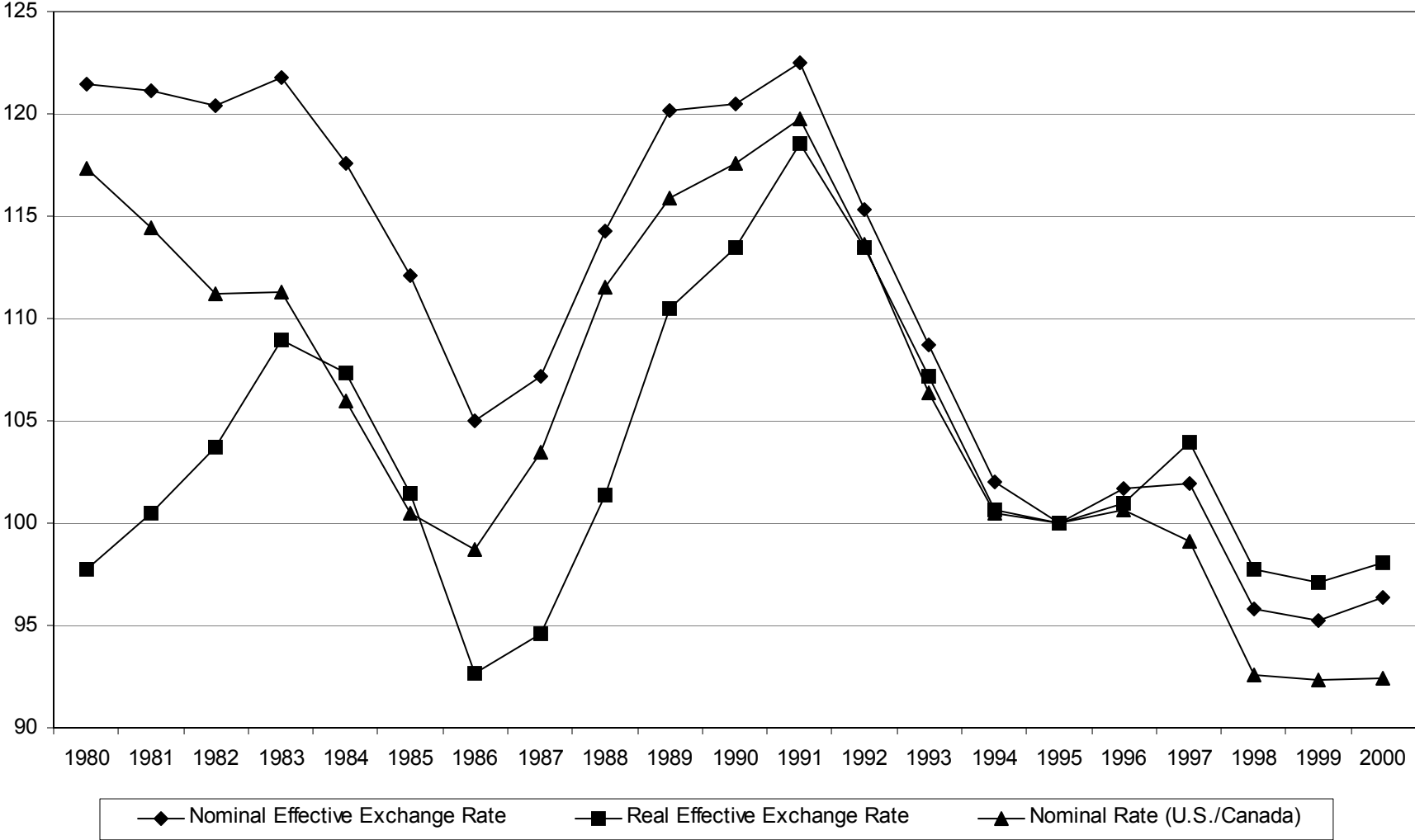
Source: International Financial Statistics Yearbook 2000





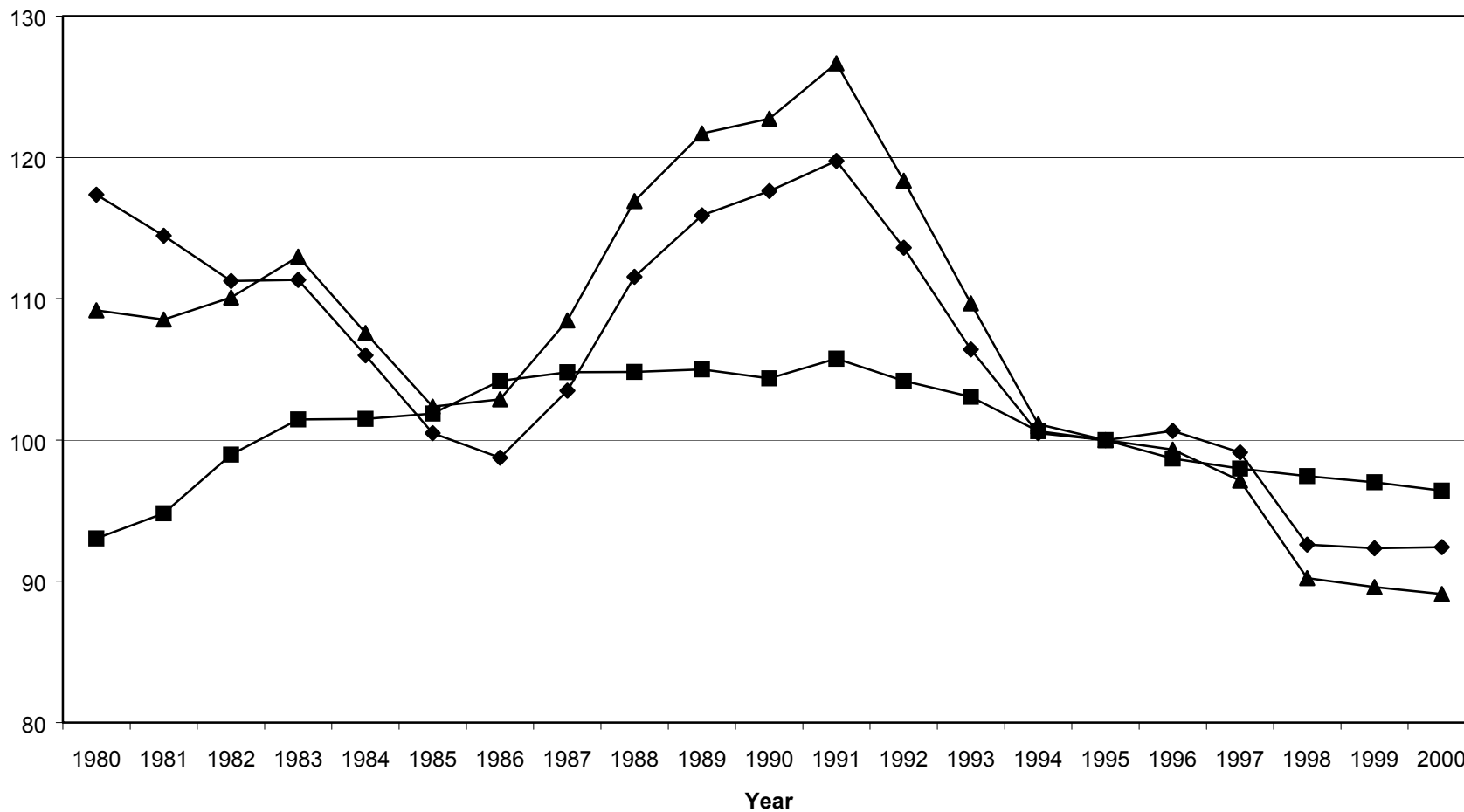
**Figure 2: Canada: Exchange Rates (1995=100)**

Source: International Financial Statistics, January 2002



**Figure 3: Canada: Nominal and Real Exchange Rates (1995=100)**

Source: International Financial Statistics, January 2002



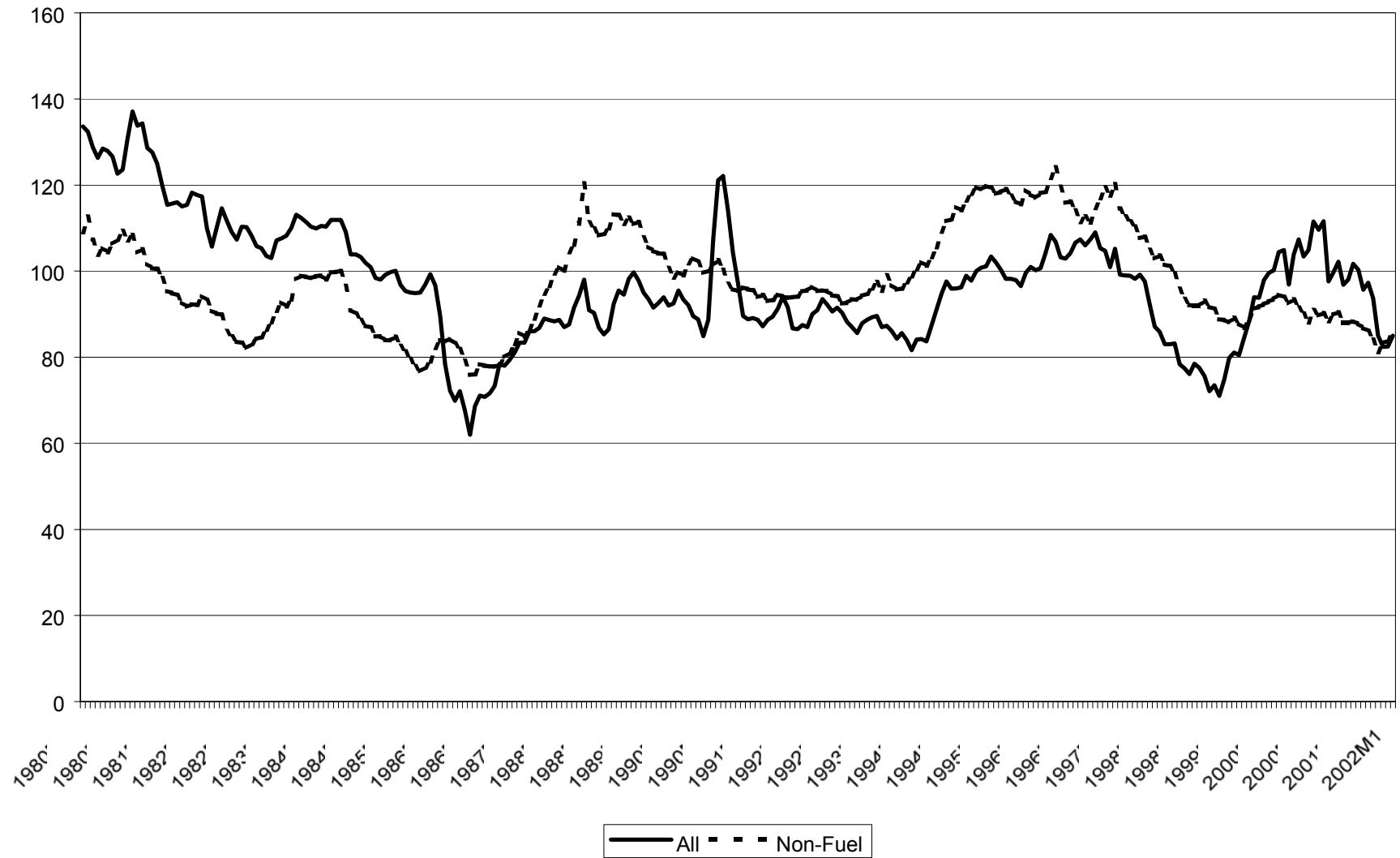
◆ Nominal Exchange Rate (U.S.)

■ Canada-CPI/ USA-CPI (scale by 100)

▲ Real Exchange Rate (nominal\*(Canada/U.S. CF)

**Figure 4: World Commodity Price Indices (1990=100)**

Source: International Monetary Fund



**Figure 5: Terms of Trade - % change**

Source: International Financial Statistics Yearbook 2000

