RESEARCH REPORT

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THE MACROECONOMIC IMPACTS OF HOUSING CONSTRUCTION ACTIVITY

Policy and Economic Analysis Program

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THE MACROECONOMIC IMPACTS OF HOUSING CONSTRUCTION ACTIVITY:
Simulations with the FOCUS Model

Report submitted to Canada Mortgage and Housing Corporation

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Summary

This paper presents a series of simulations investigating the macroeconomic impacts of a two-year, temporary increase in housing construction activity. The simulations are conducted with the FOCUS macroeconometric model, built and maintained at the Institute for Policy Analysis, University of Toronto.

The initial sections of the paper describe the FOCUS model in considerable detail and outline how an increase in housing construction activity will work its way through various macroeconomic mechanisms to have its full impact on the Canadian economy. These sections also consider features of the model that will eventually damp or temper the macroeconomic "multiplier" effects and the various assumptions on policy and the economic environment that can affect the results.

The central section of the paper presents results for a total of 16 separate simulations. These simulations consider all the possible combinations of four basic two-way choices of assumptions. Briefly, the simulations consider the impacts of both new construction and of alterations to the existing stock. They examine macroeconomic impacts in situations of both high growth and of low growth for the underlying economy over the next several years. The simulations examine the impact of increased housing activity assuming both "normal" import contents and "double" these imports, as it has been suggested that the import content of housing activity has increased in recent years. Finally, the impacts are examined under two different assumptions for monetary policy: The first case is that the Bank of Canada holds nominal short-term interest rates unchanged in the face of the new housing activity; and the second case is that the Bank of Canada holds the exchange rate unchanged in the face of new activity, changing interest rates if necessary to keep the exchange rate from shifting.

The simulations show that a temporary increase in housing activity can have important induced effects on the economy, and that stimulus of this sort could be considered as a weapon of countercyclical fiscal policy during a slump or recession. We have also found that the stimulus takes up to a year to gather momentum and can persist in effect a year or more after the stimulus is removed. For countercyclical policy, therefore, it is important that a housing stimulus be introduced *early* or, as much as possible, in anticipation of the downturn. If the housing stimulus is introduced well after the downturn has begun, the lags in its operation could perhaps overheat a recovery.

The simulations also indicate that a temporary housing stimulus of this kind develops its *own* contractionary aftershock within 3 to 4 years (or somewhat longer under the interest-rate target). If the object of countercyclical policy is to soften recessions and also to suppress booms in recovery, then a temporary housing stimulus works on *both*, since the shock creates first positive and then negative stimulus to GDP and employment.

The simulations indicate only relatively small differences in impacts when New Construction is compared to Alterations or even when possible "double" import contents are considered. The higher import content of Alterations, or of increased import content in either type of construction, does weaken the multiplier, but not drastically. This is especially the case when the Bank of Canada is pursuing something like the interest-rate target. In this case, increased import content means a bigger

depreciation of the exchange rate, which has its own favourable effects on real output and employment.

Naturally, the simulations have shown that the state of the underlying economy matters for the impacts of a temporary housing shock. The higher the base level of the unemployment rate, the more the housing shock will be turned into extra real output and employment, and the less into extra inflation.

Finally, the simulations show that the impacts of a temporary housing shock cannot be considered in a policy vacuum: the impacts can vary significantly with the policy stance of the Bank of Canada. The more the Bank is prepared to accept additional stimulus, and the inflation it can bring, the larger the impacts will be. The simulations show that, for a $ 1 billion (86$) shock to housing, the inflation forthcoming in a high-unemployment environment is modest, even if the Bank of Canada fully accommodates the shock.

Résumé

Le présent document décrit une série de simulations qui étudient les effets macroéconomiques d'une augmentation temporaire de l'activité de la construction d'habitations pendant deux ans. Ces simulations ont été réalisées à l'aide du modèle macroénonomique FOCUS, établi et maintenu à jour par le Institute for Policy analysis de l' Université de Toronto.

Les premières sections du document expliquent de façon approfondie le modèle FOCUS et comment une augmentation de l'activité de construction d'habitations, par l'entremise de divers mécanismes macroéconomiques, aura une répercussion globale sur l'économie canadienne. Ces sections examinent également les caractéristiques du modèle qui éventuellement tempèrera les effets «multiplicateurs» macroéconomiques et les diverses hypothèses sur la politique et le milieu économiques pouvant influer sur les résultats.

La partie centrale du document présente les résultats pour 16 simulations distinctes au total. Pour celles-ci on envisage toutes les combinaisons possibles de quatres choix bidirectionnels des hypothèses. Succintement, les simulations examinent les effets des constructions neuves et des rénovations des parcs de logements existants. Elles examinent les effets macroéconomiques dans des situations de croissances élevée et faible dans l'économie sous-jacente au cours des quelques années à venir. Les simulations étudient l'effet de l'augmentation de l'activité de logement en supposant à la fois des importations «normales » et en les doublant, puisque l'on a suggéré que l'importation de l'activité de logement a augmenté au cours des dernières années. Enfin, on examine les effets à l'aide de deux hypothèses différentes en matière de politique monétaire. Dans un premier cas, la Banque du Canada ne modifie pas les taux d'intérêt nominal à court terme face à la nouvelle activité de logement. Dans le deuxième cas, la Banque du Canada ne modifie pas le taux de change face à une nouvelle activité de logement, et modifie les taux d'intérêt s'il le faut pour que le taux de change reste le même.

Les simulations indiquent qu'une augmentation temporaire de l'activité de logement peut avoir des effets induits sur l'économie et qu'un stimulus de ce genre pourrait constituer une arme de la politique fiscale contracyclique pendant une période de stagnation économique et ou de récession. Nous nous sommes également rendu compte que cet effet peut prendre jusqu'à un an ou plus après le retrait du stimulus pour qu'on le remarque. Par conséquent, en ce qui a trait à la politique contracyclique, il est essentiel qu'un stimulus de logement soit introduit tôt, ou autant que possible, avant la récession. Si l'on introduit le stimulus bien après le début de la récession, les retards dans son fonctionnement pourrait provoquer une surchauffe de la reprise.

Les simulations indiquent également qu'un stimulus temporaire de ce genre développe sa propre réplique de contraction dans les 3 ou 4 ans qui suivent (ou parfois plus longtemps aux termes du taux d'intérêt visé). Si la politique contracyclique a pour objet d'amoindrir les récessions et aussi de supprimer les périodes de haute prospérité pendant la reprise, un stimulus temporaire du logement exerce alors un effet sur les deux, puisque le choc crée d'abord un stimulus positif, puis un stimulus négatif sur le PIB et l'emploi.

Les simulations n'indiquent que de légères divergences dans les effets lorsque l'on compare la construction neuve aux rénovations ou même lorsqu'on envisage des importations doubles quand c'est possible. L'importation plus élevée pour les rénovations ou l'augmentation des importations pour ces deux types de construction, affaiblit le multiplicateur mais pas de façon marquée. C'est tout particulièrement le cas lorsque la Banque du Canada poursuit une cible de taux d'intérêt. Dans ce cas, l'augmentation de l'importation signifie une dépréciation plus élevée du taux de change, qui exerce ses propres effets favorables sur le rendement réel et l'emploi.

Naturellement, les simulations ont indiqué que l'état de l'économie sous-jacente a de l'importance sur les effets d'un choc temporaire sur le logement. Plus le niveau de base du taux de chômage est élevé, plus le choc sur le logement sera transformé en un rendement réel et en emploi supplémentaires. et moins en une inflation supplémentaire.

Enfin, les simulations ont prouvé que les effets d'un choc temporaire sur l'habitation ne peuvent pas être examinés dans un contexte sans politiques : les effets peuvent varier considérablement avec la politique de la Banque du Canada. Plus la Banque est disposée à accepter un stimulus additionnel et l'inflation connexe, plus les effets seront importants. Les simulations indiquent que pour un choc de 1 million de dollars (86 $), l'inflation est modeste dans un contexte ou le chômage est élevé, même si la Banque du Canada peut accuser le choc.

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Contents:

1. Introduction

This study examines the impact of a two-year increase in housing construction activity on the Canadian macroeconomy. The impact of additional housing activity is investigated with the aid of a computer simulation model of the Canadian economy - specifically, the FOCUS macroeconometric model built and maintained at the Institute for Policy Analysis of the University of Toronto. Using this tool, we will investigate not only the basic impact of additional housing activity, but also how our measure of this impact is affected by whether the economy is at or below full employment, the degree of import content in the construction activity, whether new construction or alterations to existing stock are the source of the new activity, and, finally, how the Bank of Canada responds to the increase in economic activity.

Three major sections follow: Section Two presents and discusses the main features of the FOCUS macroeconometric model and its chief adjustment mechanisms. Section Three details how the simulations were conducted, listing all inputs to the model and all special assumptions surrounding the simulations. Section Four presents detailed simulation results. After the results of the sixteen simulations conducted are individually presented and discussed, the impacts of each of the alternative sets of assumptions listed above will be drawn. A final brief section presents conclusions.

2. The FOCUS Model of the Canadian Economy

2.1 Overview of FOCUS[1]

FOCUS is a quarterly macro-econometric model of the Canadian economy, developed and maintained at the Institute for Policy Analysis, University of Toronto. While FOCUS is an acronym for FOreCasting and User Simulation model and the model is used to develop short-term and medium-term economic projections, FOCUS is primarily designed for policy and impact analysis. The model

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[1]This section is adapted from the FOCUS Model documentation. For the complete model description see *FOCUS: Quarterly Forecasting and User Simulation Model of the Canadian Economy - Version 94A*, by Peter Dungan and Gregory Jump, Institute for Policy Analysis, University of Toronto, 1996.

was first constructed in 1976 but has undergone many re-estimations and re-specifications since that date. The version used in the present study is 94A.

FOCUS is supported by the Institute's Policy and Economic Analysis Program (PEAP) - a continuing research project financed by contributions from public and private member-subscribers. Important financial contributions to the development of FOCUS have also been made by the University of Toronto, the Social Sciences and Humanities Research Council of Canada, the Donner Foundation and the Canadian Tax Foundation.

The models have been applied to a wide variety of fiscal and monetary policy issues, including analyses of: the causes of the 1990-92 recession[2], the impacts of the Canada-U.S. Free-Trade Agreement[3], the GST and its alternatives[4] and potential harmonization of the Ontario sales tax with the GST[5].

FOCUS is a medium-scale quarterly macroeconometric model of the Canadian economy consisting of 300+ behavioural equations and identities and somewhat over 600 variables in total. The model has been developed in the tradition of the Keynesian-Classical synthesis; that is, markets (especially the labour market) can fail to clear for extended periods of time and most expectations are not "rational" in the sense of being formed with full knowledge of the model and of the present (and

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[2]See Wilson, Thomas, Peter Dungan and Steve Murphy, "Sources of the Recession in Canada," *Canadian Business Economics* 2:2, Winter, 1994:3-15.

[3]Dungan, Peter, Richard Harris and Thomas Wilson, "The Canada-U.S. Free Trade Agreement - A Symposium," *Journal of Policy Modeling*, 13:3(Fall, 1991):417-458.

[4] Dungan, Peter, Jack M. Mintz and Thomas Wilson, "Alternatives to the Goods and Services Tax," *Canadian Tax Journal* 38:3 (1990): 644-665

[5]Dungan, Peter, "The Macroeconomic Impacts of Harmonizing the Ontario Retail Sales Tax with the Federal GST: Simulations With the Focus-Ontario Model" in A. Maslove (ed.) *Issues in the Taxation of Individuals* (Toronto, 1994: University of Toronto Press), pp 155-171.

future) values of all exogenous variables.[6] But at the same time, care has been taken in developing the model's structural equations to ensure that they embody desirable equilibrium long-run properties as well as plausible short-run dynamics.

As is of course appropriate, FOCUS is an open-economy model with endogenous (and sensitive) international trade and capital flows. The exchange rate is also fully endogenous, but it is not determined by a regression equation of its own; rather it is a market-clearing price used to "balance" the balance of payments. Any shock to trade or to capital flows (short or long) can and usually will have an effect on the exchange rate. However, our estimation work for FOCUS does not yield a "perfect capital mobility", Mundell-Fleming world in which our interest rate is determined solely by foreign rates. Although capital flows in FOCUS are quite sensitive to interest-rate changes, international trade is also sensitive to domestic demand and to prices and it is the interaction of both these elements that determines the path of the exchange rate.

Perhaps the simplest way to describe FOCUS is to use the familiar IS-LM (AD-AS) textbook presentation of the macroeconomic system: At a given price/wage level, real output and the real rate of interest are found at the intersection of the IS and LM curves. Varying the price level and re-solving the IS-LM system will sketch out a downward sloping aggregate demand (AD) curve for the economy. Meanwhile, rigidities in the labour market which prevent instantaneous achievement of full employment will yield an upward-sloping aggregate supply curve (AS). Equating AD and AS (and IS and LM) determines output, price, employment and the real interest rate for a (temporary) equilibrium which will typically be a point of Keynesian under- (or over-) employment.

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[6]There are, however, some mechanisms in FOCUS for explicitly recognizing expectations and for permitting them to change relatively quickly in light of changes in, for example, money supply or the exchange rate. For a discussion of the properties of FOCUS with and without more "rational" expectations, see Peter Dungan and Thomas A. Wilson, "Modelling Anticipated and Temporary Fiscal Policy Shocks in a Macro-Econometric Model of Canada", Canadian Journal of Economics XXI:1 (February 1988) 41-60.

Overview - the `IS' Curve

Many of the FOCUS equations can be grouped into blocks corresponding to the IS,LM,AD and AS curves of the textbook system. A solution of the model may be regarded as simultaneously determining real output, interest rates, employment, etc., via intersections of these curves. For example, the IS curve, which shows the level of aggregate demand forthcoming at various values of the real interest rate, is represented by all of the equations in FOCUS which determine components of real aggregate demand. These include consumption equations, investment equations, equations for government expenditures and equations determining imports and exports of goods and services. The model equations which determine various components of national income, taxes and personal and disposable incomes also belong in this block, since income shares are part of the circular flow of spending which gives rise to the multiplier behaviour exhibited by real aggregate demand. This block of equations representing the IS curve accounts for a large fraction (probably over 60 per cent) of the total equations in FOCUS. The attention given here reflects the orientation of the model builders, who would describe themselves as neo-Keynesians. If, as Keynes asserted, wage/price rigidities of one form or another are prevalent in the economy, then the main sources of period-to-period variations in output and employment are traceable to shifts in aggregate demand, i.e., to shifts in the IS curve. To understand such variations requires a detailed understanding of the factors underlying the IS curve, and we have taken care to model those factors in a manner consistent with the present state of economic theory.

Overview - the `LM' Curve

A more compact block of equations (some 10 per cent of the total) comprises the model's representation of the LM curve. Included in this block are equations determining interest rates and/or the money supply. A liquidity preference approach has been used here so that a number of financial markets, most notably the bond market, do not appear explicitly in the model. This accounts for the small size of this block relative to that of the IS curve. However, size should not be taken as an indication that financial variables are unimportant to the workings of FOCUS or that monetary policy is deemed to be ineffective. Quite the contrary; the model shows relatively strong responses to

variations in financial variables and monetary policy. (In the jargon of economics textbooks, the LM curve in FOCUS is relatively interest-inelastic, while the IS curve is relatively interest-elastic.)

Overview - the External Balance (BP) Curve

Another small group of equations determines international capital flows and so gives the model a "BP" curve sketching points of external balance. If the exchange rate is permitted to float, FOCUS solutions will always lie along the (short-run) BP curve; if the exchange rate is held fixed, the balance of payments deficit or surplus at equilibrium can be determined.

Overview - the Labour Market and Aggregate Supply

The labour market and aggregate supply are represented in FOCUS by equations determining wage rates, employment and the labour force and by the production function.

The key wage variable in FOCUS is determined by an extended Phillips curve, with wage inflation being a function of productivity, the actual and "full employment" unemployment rates, and both past and anticipated inflation. The rigidity which characterizes wage determination occurs partly via a gradual adjustment of the labour market to differences between actual and full employment and partly via the price inflation terms. Theoretically, if employers and employees were always able to fully anticipate the rate of price inflation, money wage rates would reflect this, and the economy would find itself always at the full employment unemployment rate. In reality at least two factors operate to prevent this: (1) future rates of price inflation cannot always be accurately predicted in advance; and (2) a substantial portion of wage settlements are based on past actual rates of inflation rather than on expected future rates of inflation (e.g.,COLA clauses). FOCUS incorporates both factors via its key wage equation, with the result that solutions to the model produce unemployment rates which can, and usually do, deviate from the full-employment rate. The Phillips-curve nature of the wage equation shows a short-run trade off between unemployment and wage inflation.

It should be noted that the full-employment unemployment rate is not an absolute barrier within the model; solutions with a measured rate of unemployment less than the natural rate are not only feasible

but fully consistent with the existence of a downward-sloping short-run Phillips curve. Rather than a barrier, the natural rate acts as a magnet towards which the model's solutions for the measured unemployment are drawn in longer term simulations. This is in keeping with current theoretical literature which posits the long-run Phillips curve to be a vertical line passing through the natural rate of unemployment.

The key employment equation in FOCUS is based on cost minimization; it is a function of private-sector output, the capital stock and the real wage facing employers. All else equal, a higher real wage in FOCUS will lower employment for any given level of output; the model in effect causes capital and other inputs to be used more intensively in place of some labour.

A small block of six equations determines labour force participation rates for six age/sex categories. The overall labour force is computed by multiplying each participation rate by the corresponding (exogenous) source population and summing up. Participation is found to vary primarily with the level of unemployment (the 'discouraged worker effect') and not with real wages.

Overview - an Integrated Supply Side

Aggregate supply in FOCUS is relatively well integrated - both in itself and with the rest of the model structure. Factor demand equations for labour and machinery and equipment capital are derived from an implicit production function so that labour/capital ratios are responsive to relative prices. Investment in new non-residential structures is stimulated by a positive differential between the internal rate of return on structures and the real, after-tax rate of interest on government bonds. This internal rate of return is determined endogenously as the ratio of corporation profits after-tax to the replacement cost of the capital stock. When the profits/replacement cost ratio is high, structures investment increases. Labour and machinery and equipment stock are viewed partly as "overhead" to plants and partly as variable inputs into the production process. Because of the production function constraint they are substitute factors of production: a rise in wage rates relative to the service price of machinery and equipment will reduce the demand for the former and increase the demand for the latter. When relative prices are stable, both variable factors are complementary to

structures investment; i.e., an increase in structures investment will normally lead to increased demand for both labour and machinery equipment. The workings of this sector approximate the textbook description of a competitive industry: When profits are high, the number of firms entering the industry increases, driving down prices, thereby reducing profitability and moderating the incentives for further entry. Thus the specifications here bridge the short run and the long run.

Overview - Prices; Equating AD and AS

The key price variable in the model is designated PGDPPF and represents the implicit price index for privately-produced GDP at factor cost. In the textbook model we have been following, the aggregate price level is usually determined by equating aggregate demand and aggregate supply. That is, prices adjust instantly to changes in either demand or supply conditions, and all rigidity in the model stems from wages and the labour market. An alternative, more Keynesian, view sees prices set in the short run as rule-of-thumb mark-ups on costs - specifically, unit-labour costs, indirect taxes and inventory interest charges are the explanatory variables. Prices as well as wages are therefore sluggish in their response to changed conditions of demand or supply.

With the determination of prices, our overview of the FOCUS model is complete. However, two special features of the model merit comment in this introduction: the role of expectations in the model and the availability of a wide range of policy levers and `switches':

Special Features of FOCUS - Inflation Expectations

Inflation expectations play an important role in FOCUS and are modelled in an unusual and interesting fashion. FOCUS uses "synthetic" expectations series to represent expected rates of price inflation, 90 days, one year and two years into the future. These series are constructed by regressing actual future rates of price inflation on a set of explanatory variables which we believe comes closer to the kinds of variables on which market participants actually base expectations than the usual distributed lags of past rates of change in prices. For example, one-year-ahead expectations are specified to depend upon recent observations of money supply growth, unemployment rates, foreign

prices and the exchange rate in addition to the actual past rates of price inflation. These additional variables add credibility as well as explanatory power to the specifications.

The use of synthetic expectations series permits the model to explicitly identify (and predict) expectations in an internally consistent manner. Variations in expectations will simultaneously alter both interest rates and wage settlements. We might mention that the model also makes some allowance for errors in expectations. The wage equation contains a term for "catch up" which is activated whenever past inflation expectations turn out to have been faulty. This means that FOCUS is able to simulate the impacts of shifts in inflation expectations as a matter of course - in much the same way as it might be used to simulate shifts in government policies.

For the explicitly temporary shocks to be modelled in this paper - an increase in housing activity above base for two years only - the existence of identifiable expectations terms in FOCUS offers a different advantage: Because the shock is known to be temporary, it will also be known that there will be no longer-term effect on inflation. In the simulations for this paper, therefore, the inflation expectations terms are exogenized at base-case levels. This permits us to explicitly recognize the temporary nature of the shock on inflation.

Overview: Policy Levers

Finally, it should be noted that FOCUS provides a variety of levers for monetary policy and the exchange rate. In the simulations specified for this paper, only two of these levers are used: The Bank of Canada can be deemed to be setting the short-term nominal interest rate as its target variable, or, alternatively, the level of the exchange rate.

2.2 Principal Elements of the Model

In this section we expand upon the overview above and provide somewhat more detailed descriptions of the most important sectors of the model. The order of presentation is primarily that of the FOCUS manual itself, and it begins with the components of aggregate demand.

2.2.1 Consumption and Savings

The consumption functions of the model are based on the Permanent Income Hypothesis: consumption depends primarily on a smoothed path of personal disposable income. A shock to actual personal disposable income will take roughly eight quarters to be fully reflected in permanent income . For durables, consumption also depends on existing stocks. A number of other terms also appear, the most important of which for our purposes is the gap between the actual and full-employment unemployment rate. At a given level of permanent income consumption of a given type will be lower if the unemployment rate is higher. That is, despite the smoothing of shocks through permanent income, cyclical swings in the economy carry through directly to consumption, as conveyed through changes in unemployment.

An increase in aggregate demand, therefore, in the form of increased housing activity, will have a secondary impact on consumption, as expected. That effect will be muted, or delayed, by the permanent income mechanism, but this muting or smoothing will be partially offset to the extent that the increased housing activity lowers the unemployment rate.

2.2.2 Non-Residential Investment

Investment in FOCUS is determined by a modified Jorgensonian approach. Briefly, investment depends on anticipated, after-tax returns to capital compared to after-tax borrowing costs (or the opportunity cost of funds). Anticipated returns are further adjusted for depreciation and for tax effects of depreciation and write-offs. Finally, these adjusted anticipated returns are proxied by the most recent two years of actual tax-adjusted corporate cash flow relative to the size of the existing capital stock. As a result of this specification, investment will be affected somewhat by an increase in housing activity, even if only temporary: to the extent that firms' cash flow will be improved, so will be the proxy for expected future returns (relative to borrowing costs) and investment should improve. Note that this specification does not permit firms to "see" that the housing activity shock is only temporary, and may cause investment to over-react to the temporary housing stimulus. Offsetting this are two observations: First, that even the temporary impact of increased housing activity affects the present discounted value of total future returns (especially if the implicit discount

rate is relatively high); and second, that at least some investment is financed out of cash flow and retained earnings - a factor we feel is not yet properly accounted for in the current investment equations.

2.2.3 Residential Investment

Residential investment in the model is driven from housing starts, which in turn are a function primarily of the mortgage rate, the unemployment rate gap (the most powerful cyclical term) and existing housing stocks (with a strong stock adjustment effect). The equations remain endogenous in the simulations reported on below, and so can respond to secondary and induced changes like shifts in the mortgage rate or the unemployment rate. One adjustment is made however: because of the strong stock-adjustment term in the equations, if we simply added additional housing and did nothing else, there would quickly be a negative endogenous response from the housing equations, as the new housing stock generated reductions in housing demand. We have assumed that the new housing demand to be simulated is indeed an addition to long-run demand and so have disabled the stock adjustment effect for the housing additions to be simulated.

2.2.4 Exports and Imports

Exports and imports are modestly disaggregated in the model, with auto trade with the U.S., oil and gas, and services being separately accounted for. Exports depend on foreign activity and prices (which do not change in these simulations) and on domestic prices and the exchange rate. Imports depend on domestic activity (weighted for import content), domestic prices and the exchange rate. For both exports and imports, the relevant elasticities are generally very strong, with lags of from one year up to over two years for full effects to be felt. The net result is that, under a demand shock, there can be important "leakages" through net exports, and especially through imports. There can also be important secondary effects, either positive or negative, if the exchange rate is permitted to adjust.

2.2.5 Capital Flows and the Balance of Payments

As noted in the model overview, international capital flows are not "perfectly mobile" in FOCUS. They are, nonetheless, very sensitive to interest rate changes and to movements in overall GDP - the latter term representing wealth and having an effect through portfolio allocation. Long-term capital flows are broken out in several categories, some showing stock-adjustment behaviour and others not. Short-term flows are a function of short-term interest differentials, of long-term flows (to which short flows provide a temporary cushion) and of changes in the exchange rate (in which short flows are found to "lean into the wind" of potential exchange rate movements, moderating their size). The exchange rate, as noted above, has no individual equation but is instead found by an iterative process in each quarter such that the balance of payments "clears" (exclusive of any exogenous official intervention). Therefore, both interest-rate effects (through capital flows) and price and activity variables (through trade flows) can have an effect on the exchange rate. In the case where the Bank of Canada is targeting the base-case exchange rate, instead an iterative process finds the short-term interest rate that is necessary to clear the balance of payments. For example, if a positive demand shock such as we conduct in this paper were to increase imports and potentially worsen the balance of payments, the model would find out how much short-term interest rates would have to be raised to induce sufficient new capital inflows to keep the balance of payments in balance. Naturally, the solution would include all secondary interactions, including the effect of the higher interest rates on domestic demand and therefore on imports and the trade account.

2.2.6 Corporate Profits and their Disposition; Income Shares

Following from the discussion of investment above, it is important to understand the allocation of major income shares in the model. The way macroeconomic data are prepared, total expenditure is necessarily equal to total income. This condition is imposed in the model by making one category of income a residual - roughly, total expenditure less the sum of all other income components. The residual category in FOCUS is corporate profits. Thus, under an increase in domestic demand and therefore nominal GDP, there will be an automatic and immediate increase in corporate profits to the extent that increases in other categories of income (most importantly, wages and salaries) do not rise to the full extent of GDP. Indeed, this will usually be the case, because both employment and wages

are determined by considerable lags as will be seen below. However, over time wages and salaries and other income components (like the income of the unincorporated sector) will begin to respond to the demand shock and will increase above base, leaving less and less as a residual for corporate profits. Corporate profits therefore generally show a large initial stimulus to a demand shock, and then see this effect whittled away. The opposite is of course true for a negative shock, and the net result is that corporate profits become, as they should, by far the most cyclically sensitive income component.

2.2.7 Taxes, Transfers and Government Accounts

The government sector in FOCUS is divided into all major government levels: federal, provincial, local, hospitals and public pension plans. Current and capital spending at each level are exogenous in real terms. Transfers to persons are generally endogenous and depend on appropriate drivers such as population growth, inflation, GDP growth or unemployment. Federal Employment Insurance transfers are, of course, notably sensitive to the cycle and to changes in economic activity as it affects employment.

Interest on the public debt depends on the size of government deficits and debt and on interest rates, with allowances for rollovers. It is important to note that interest on the public debt, while not a part of GDP (it represents no net production) is a part of personal income. Higher deficits, for example, not only stimulate the economy in the conventional manner, but also through adding to personal income through increased payment on debts (unless new government debt is incurred exclusively by foreigners).

A number of different tax types are distinguished: Corporate taxes, personal income taxes, other personal direct taxes (including payroll taxes such as Employment Insurance and CPP/QPP contributions), and indirect taxes, including the GST, provincial sales taxes, alcohol, cigarette and gasoline taxes and property taxes.

Finally, the various expenditures and revenues are collected in identities for government balances (surplus/deficit), which in turn affect debt levels. There is no feedback from debt or deficit levels directly to interest rates reflecting "risk", but this is unlikely to be important for a temporary shock.

2.2.8 Labour Demand

In FOCUS private-sector employment/labour demand is determined by an equation with three principal terms: output to be produced (defined as real private-sector domestic product at factor cost), after-tax wage costs relative to producer prices, and the capital stock. The after-tax real-wage cost is defined as the average annual wage per employee in the private sector plus the employers' share of Employment Insurance (EI) and Canada/Quebec Pension Plan (CPP) premiums, plus Workers' Compensation (WC) premiums. The output and wage terms enter the equation with distributed and declining lags. The long-run elasticity of demand for labour with respect to output is estimated to be .99 (and obviously not statistically different from 1.0) and the total lag is two years. The well-known phenomenon here is "labour hoarding"; because hiring and firing are costly, firms are unwilling to either expand or contract their work forces until upward or downward output movements have been clearly established. The long-run elasticity of demand for labour with respect to the real after-tax wage term is -.46, and the total lag is six quarters. The capital stock enters without a lag and has an elasticity of .12. Given the estimated coefficients and the structure of the equation, the model will show a lagged, but eventually strong, impact of increased output on employment. However, to the extent that real wages rise, the employment impact will be lessened. In a temporary shock of the kind examined here, the impact of capital-stock changes on employment will not be large.

2.2.9 Labour Supply

Source populations in the model are exogenous. The labour force is determined from the source populations and endogenous equations for participation rates. The FOCUS model distinguishes six age-sex categories: males and females 15-24, 25-54, and 55+. The participation rate equations include some or all of: the employment/population ratio (to capture the "discouraged worker" effect); relative cohort size; and the size of unemployment insurance premiums relative to the private-sector

wages. Real wages themselves, before or after tax, were not found to be significant in any of the equations. Labour supply in the simulations below will therefore largely be driven by the discouraged worker effect. That is, an increase in demand, and consequent increase in employment, will have an attenuated effect on the unemployment rate because participation rates will rise: formerly "discouraged" workers will be drawn back into the labour force.

2.2.10 Private-Sector Wages

The private-sector wage equation is an expectations-augmented Phillips Curve with an explicit (and exogenous) full-employment unemployment rate. The equation determines the rate of change of nominal wages (defined as annual average wages and salaries per employee) based on four major terms: (1) private-sector labour productivity, (2) past CPI inflation, (3) expected future CPI inflation, and (4) the ratio of the actual to the full-employment unemployment rate. The first term is specified as a five-year moving average, and the coefficient is one; there is thus full pass-through of productivity changes to wages, but only with a long lag. Past CPI inflation enters as a distributed lag, with the sum of the coefficients over six quarters at about .69. Expected future inflation is specified as the fitted values of a reduced-form equation for inflation expectations, based on such items as current inflation and changes in the money supply and the exchange rate. The coefficient on this term is approximately .34; thus the combined effect of lagged and expected inflation on nominal wages is just over 1.0. Any permanent and anticipated change in inflation will be reflected in nominal wages. Finally, the ratio of the actual to the full-employment inflation rate has the expected negative sign. The higher is the actual unemployment rate above the full-employment rate, the lower will be nominal wage inflation. The equation is therefore of the form that any deviation from the full-employment unemployment rate will change the rate of wage inflation. In the absence of a continued series of shocks, the wage level will gradually adjust so as to attain full employment. Note that is the *ratio* and not just the difference of the actual to the full-employment unemployment rate that is used. The equation is therefore non-linear, and a given drop in the unemployment rate will have a bigger positive effect on wage inflation for lower base unemployment rates than for higher ones.

2.2.11 Private-Sector Output Price

In the model, the price of aggregate private-sector output (the price of output at "factor cost") is specified as primarily a mark-up over unit labour costs, with some lags in the response to cost changes. Unit labour costs include the employer portion of all payroll taxes. Also present, but of much smaller effect, is a term representing the interest carrying-costs of inventories. A demand shock therefore will have little direct impact on prices (unlike in a "market-clearing" goods market). The inflationary effect of the shock will emerge once higher employment has stimulated higher wages and therefore higher unit labour costs.

Detailed deflators for categories of final demand in FOCUS are run off the basic domestic output price described above, import prices (appropriately weighted with domestic production by expenditure category) and indirect tax burdens (which again vary by expenditure category). Both residential and non-residential price equations also feature a "demand pressure" term by which prices rise faster the higher is the share of the expenditure category in GDP. This feature has been switched off for residential investment in the simulations to follow, since it is assumed that the extra $1 billion of expenditure can be provided from existing capacity without serious bottlenecks.

2.2.12 Interest Rates and Money Supply

As noted in the overview, FOCUS uses the liquidity preference approach to financial modelling, and the bond and other asset markets are not explicitly represented. The basis of the sector is a demand for money equation (M1) that is a function of GDP and the short-term interest rate (the 90-day Finance Company Paper Rate to be precise). If the nominal short-term interest rate is the target for monetary policy, as in half the simulations presented below, then the short-term rate is fixed at base-case levels (it may still be changing over time in the base case) and the demand-for-money equation solves for the money supply necessary to achieve this interest rate given nominal GDP. If the exchange rate is the target for monetary policy, then the exchange rate is fixed at base case levels (again, the rate may be changing over time in the base case) and the model's solution procedure searches for a short-term interest rate that will clear the balance of payments, together with the rest of the simultaneous solution of the model. This interest rate then enters the demand for money

equation to determine the money supply. Longer-term interest rates generally feed off the short-term rate with relatively short lags.

2.3 Impact of Housing Construction Activity in FOCUS

In this section we consider in more qualitative terms how an increase in residential construction activity will affect output, employment and income through the FOCUS model. In effect, we will be asking in general terms how the various factors that underlie the "multiplier" for residential construction work through the model. The subsequent section (2.4) considers the features of FOCUS that will tend to make the multiplier smaller, or "temper" the impact of construction spending, both in the short-run and over time. These different impacts and tempering or "damping" effects are summarized in Chart 2.1.

In the "textbook" multiplier, an increase in aggregate demand must mean an equivalent increase in income; some of this is spent by consumers, further increasing aggregate demand and incomes and yielding another round of consumption increases, and so on. Something like this also happens in FOCUS (and the real world!), but the process has more facets and subtleties and varies in magnitude with the time elapsed from the initial spending shock. Much of the *initial* increase (the first quarter or two) in income that occurs after the residential construction shock in FOCUS is in corporate profits. In fact, we think this is realistic: in the very short run, a sudden increase in sales or output will largely accrue to profits. Due to the "labour hoarding" principle discussed in 2.2.8 above, initially the new output is produced will little increase in employment; instead the existing workforce is employed at higher capacity. It is only as more workers are needed, and finally as wages begin to rise in response, that a greater part of the income from the new output must be "shared" with other income categories. That is, as several quarters go by, the impact of the new output on corporate income begins to diminish, while it is rising on wages and salaries and on unincorporated income.

Right from the beginning, then, corporate profits rise under a housing shock and this will have a positive effect on non-residential investment through the Jorgensonian terms described above - unless

Chart 2.1 Principal Impacts of Housing Construction Activity in FOCUS

Initial Impact	Main "Multiplier" Impacts	"Damping" or "Tempering" Model Responses
Autonomous Increase in Housing Construction Activity	• Corporate Income up - Investment up	• Damped by rising interest rates and "give-back" of some corporate income
	• Employment and Wages and Salaries up • Personal Income and Consumption up	• Damped by personal income tax increases at margin • Damped by reduced government transfers (E.g., Employment Insurance) • Damped by lower government interest payments • Employment damped by real wage increases - further damps consumption
	• Imports up - reduces "multiplier" • If exchange rate permitted to depreciate, exports rise, import increase is partly offset	• As wages and prices rise, trade competitiveness is offset unless exchange rate further depreciates; dampens net export impact

there is also a large and immediate increase in interest rates as well. While the textbook IS-LM model usually features immediate "crowding out" of investment, in FOCUS there is usually at least some short-term "crowding in" and part of the multiplier effect of a demand shock is due to induced private-sector non-residential investment.

Of course, almost immediately incomes begin to be "shared" out of corporate profits. Employment is, of course, a function of output with a long-run elasticity of 1.0 and while the full elasticity takes three years to achieve, the initial quarter has an elasticity of just under .2 and the initial year elasticity is about .6. Therefore, there is a relatively quick pass-through of income from profits to wages and salaries and these go directly into personal income. It should also be noted that even some of the increase in corporate profits goes relatively quickly into personal income through dividends. Also, the interest income of persons will rise if the demand shock leads to an increase in interest rates.

Personal income therefore responds to the output shock with something of a lag but quite strongly after several quarters. However, consumption is a function primarily of *permanent* income and permanent income only responds gradually to an increase in actual personal income. The lag in passing through the initial demand shock to personal income, and the further lag between personal income and consumption, therefore means that the textbook consumption multiplier, while still present and eventually powerful, is far from immediate in its effect. The more employment a given dollar amount of demand shock can create "up front", the bigger the consumption contribution to the multiplier will be, because consumption out of permanent income is also a function of the gap between the actual and full-employment unemployment rates.

So, in FOCUS consumption is eventually the largest component of the "multiplier" but with a considerable lag compared to the simple textbook model. Investment, also in contrast to the textbooks, can actually play a positive role in the multiplier as well - at least until corporate profits are beaten back to base levels as the demand shock becomes mature. A third factor that can be quite strong in FOCUS, but which is often not so in the textbooks, is the foreign sector. The trade side can actually work in both directions. The model shows generally a large import leakage from a demand

shock, which this tends to reduce the multiplier. However, if the resulting increase in net imports leads to an exchange-rate depreciation, the sensitivity of the trade equations to the exchange rate can provide a strong stimulus and offset to the import leakage.

In the latter result, the FOCUS model yields different impacts than those suggested by textbook models with perfect international capital mobility. In such textbook models, any demand stimulus that tends to raise interest rates, even in a minor way, will bring a large inflow of foreign capital that causes the exchange rate to appreciate - dampening or completely eliminating the multiplier. Capital flows in FOCUS, however, while have been estimated to be much less than perfectly mobile. Capital sensitivity is high, in that the model rarely shows large movements in nominal interest rates, but trade sensitivity is high also, and a demand shock can depress net exports more than it attracts capital inflows, and thus lead to downward pressure on the Canadian dollar.

2.4 How Housing Impacts are Tempered by Endogenous Responses

We have seen now the main elements in FOCUS that contribute to the multiplier from a demand shock such as an increase in housing construction. What are the elements in FOCUS that keep the multiplier from being larger, or that cause the multiplier to diminish over time? There are, in fact, quite a number.

Consider consumption. We have seen already that the translation of the initial shock into personal income and then into consumption is rather slow. Additional factors further damp the consumption response: First, overall marginal taxation in Canada is rather high and there is a significant tax leakage that keeps the consumption multiplier lower than it would be otherwise. Second, government transfer payments to persons, and especially Employment Insurance (EI), are sensitive to demand shocks. If demand and employment increase, EI transfers decline relatively quickly, adding a further leakage to personal incomes and hence to consumption. Third, but more long-term in effect, if a demand boost improves government balances then government debts rise less quickly than in the base case (or fall

more rapidly) reducing government interest payments on the debt (again, relative to the base case) and adding a further leakage to personal income.

We have seen above how employment expansion, as it occurs in response to an increase in output, is important for shifting the increase in demand to personal income and therefore consumption, and also in stimulating consumption from any given level of permanent income by the direct appearance of the unemployment-rate gap in the consumption functions. However, the employment equation in FOCUS also includes a real wage term and, with a lag, real wages will respond positively to increased employment through the expectations-augmented Phillips Curve. As real wages rise, firms economize on labour at any given level of output and some of the initial employment gains of the shock begin to be lost - and, with them, some of the consumption multiplier. It is true that the higher wages help keep personal income up, but this is offset by the loss of employment (relative to the initial phase of the shock) and by the diminution of the unemployment-rate effect in the consumption equations themselves.

Eventually, of course, the Phillips Curve specification for the wage equation, combined with the wage sensitive employment equation, ensures that the model will return to the base-case unemployment rate and therefore, the base-case level of output. This is because a demand shock like an increase in housing activity, especially if temporary, will have no effect on the long-run full employment unemployment rate (which is exogenous in FOCUS), long-run labour supply or the capital stock - the three major terms determining the evolution of output in the longer term. Of course, no permanent effect would be expected or even desired from such a temporary demand boost: the purpose of such a boost, if it could be initiated by housing policy, would presumably be to add to aggregate demand in a period when demand was insufficient and the economy was suffering unemployment. The economy will eventually recover on its own, but a demand boost can hasten the process, and no permanent impact is desired.

While the Phillips Curve is perhaps the largest "tempering" factor in the model, there are others that have important effects: First, despite what we noted above regarding initial investment "crowding in",

it is nonetheless true in the longer run that if interest rates rise - as they will in all cases except that of monetary policy targeting interest rates - and as the boost to corporate incomes dissipates with increases in wage income, then investment will be negatively effected. Interest-rate increases will also have a depressing effect on automobile consumption in the model. These movements will, of course, reduce the multiplier. Second, increases in real wages from higher employment will increase unit labour costs and drive up the price level. If the exchange rate is the target of monetary policy and is held at base, then the domestic price increase puts domestic goods at a competitive disadvantage with respect to foreign goods, both for exports and for imports, and a significant leakage or reduction of the multiplier will develop.

2.5 Non-Linearities and Initial Conditions and Their Impacts on Responses to Housing Activity

The real world is undoubtedly more non-linear than the FOCUS model. In the model there are relatively few non-linear effects or ways in which initial conditions of the base case will significantly affect the results from impact experiments such as those conducted in this paper.

Phillips Curve Non-Linearity

The most important non-linearity in the model is embodied in the Phillips Curve that determines nominal wages in the private sector. As was noted above, a key term in the equation determining the rate of change of nominal wages is the ratio of the full-employment unemployment rate to the actual unemployment rate less 1.0. If the actual unemployment rate equals the full-employment rate, then the ratio is 1.0; when the 1.0 in the term is subtracted, the net result is zero and there is no effect on nominal wages from the unemployment-rate term. If the actual unemployment rate is above the full-employment unemployment rate, then the ratio is less than one and (ratio - 1.0) is negative, causing the rate of growth of money wages to be lower, all else equal. Because the *actual* unemployment rate is in the denominator, its base case level matters for how much extra wage inflation will be forthcoming if the unemployment rate falls through a positive demand shock. For small variations

in the base case unemployment rate this non-linearity is not too large, but it is significant over the range of unemployment rates that can be observed from boom to serious recession. For a full-employment unemployment rate of 6.0, a fall in the unemployment rate from 5% to 4% would yield an additional 1.6 percentage points of annual wage inflation, while a fall from 12% to 11% (also a one percentage point drop, but proportionally much smaller) would cause only an additional .24 percentage points of wage inflation.

Other Base-Case Conditions Affecting Impacts

There are a number of other base-case conditions that can have an effect on the size of demand shocks in the model, but these are related to shares of income or final demand that evolve only slowly over time.

For example, at the present time government debt service is a considerable component of personal income. If a shock results in sizeable movements in interest rates, then government debt service can also change a lot, with an important effect on personal income and from there to consumption. However, twenty years ago, when government debt and debt service were much smaller relative to the size of the economy, this personal-income/consumption effect from interest rate changes was also much smaller. As government debt/GDP ratios fall over the next decade the effect will decline in size from the present. The present size of government debt and debt service also has implications for the response of government balances to demand shocks: unless interest rates change, the size of government debt service is largely unaffected by sudden upturns or downturns in GDP and economic activity - unlike many government taxes and transfers. The higher is the size of debt service in total government expenditure, generally the less sensitive is the government balance to a real shock (but *not* an interest-rate shock).

Another example is provided by the extent of exports and imports in GDP - or by expenditure shares in GDP generally. Compared to the 1960s or 1970s, exports and imports are a much larger share of GDP at present. Even if the trade equations are linear in their response to exchange-rate or real activity variables, their base weight in actual GDP will make the economy more sensitive to import

leakages or to exchange-rate changes than it would have been in previous decades. Here also, the base-case conditions will matter for determining the impact of a demand shock.

However, with all the elements mentioned in this section - relative size of debt payments, openness to foreign trade, relative sizes of expenditure categories - it is important to note that such base-case conditions only change to any large extent slowly and gradually. Unlike the Phillips Curve non-linearity, which varies over the business cycle and could be importantly different in five years' time, these other base conditions evolve in a more secular fashion, due to underlying long-term trends in economic conditions or the cumulative effects of major policy shifts. Estimates of policy impacts made with current base cases are unlikely to be invalidated over the next several years by changes in these conditions - indeed the base cases used incorporate at least some of these long-term changes. However, differences in the income and expenditure composition of the economy will be one reason why impacts estimated for the late 1990s will not necessarily be the same as those estimated in the 1960s or 1970s.

3. Conducting the Housing Impact Simulations

We turn now from a general examination of FOCUS to consider the inputs for the housing demand experiments.

3.1 The Base Cases - High and Low Growth

It was specified that high-growth and low-growth base cases would be used for the impact experiments - in large part to capture the Phillips Curve non-linearities discussed above. The two base cases were developed by Informetrica Ltd. We took our own most recent FOCUS base case[7] and adjusted it so that it reflected all the details of the High Growth and Low Growth base cases provided by Informetrica. In the process, many FOCUS variables will have adjusted by their own equations in response to the basic indicators provided by Informetrica, but it is of course the case that not all base-case variables will have exactly the same values in each model - it is simply too big a task to "tune" all variables to another projection. Table 3.1 compares the two base cases for a selection of variables that were so "tuned" in FOCUS.

The two base cases represent a good range of possible economic performance through 2003, although our own projection is for somewhat higher growth than in the "High" case, and a slightly lower unemployment rate. As one can imagine, we therefore think that the likely outcome for the economy will be closer to the "High" case than the "Low", but for contingency planning the "Low" case, which represents economic stagnation through 2003 caused by weak fundamentals and too-tight monetary policy, is certainly worth examining.

The difference between the two base cases that will have the greatest effect on the simulations of extra housing activity is that between the unemployment rates; this difference feeds into the non-linearity of the Phillips curve described above. Table 3.2 summarizes the unemployment rate in each scenario:

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[7]For details of this base case, see Dungan, Peter, Steve Murphy and Thomas Wilson, "National Projection Through 2020," Policy and Economic Analysis Program Policy Study 97-1, Institute for Policy Analysis, University of Toronto.

Table 3.1 High and Low Base Cases - Summary

	1997	1998	1999	2000	2001	2002	2003
High Growth Base Case							
Real GDP	2.8	3.6	3.3	2.2	2.3	2.6	2.0
Consumption	1.6	2.0	2.7	2.4	2.4	2.3	1.8
Government	-1.3	1.7	1.0	1.7	0.4	2.3	2.1
Business Investment	9.0	10.4	7.5	4.5	4.4	3.6	3.3
Residential	9.1	8.0	5.3	3.5	3.3	3.4	3.6
Non-Residential	9.8	5.8	5.6	3.6	4.9	2.7	0.4
Machinery & Equipment	8.6	13.2	9.2	5.2	4.7	4.0	4.1
Exports	5.7	5.3	5.1	3.1	3.7	3.9	2.8
Imports	5.5	6.1	5.5	3.8	3.9	4.0	3.2
GDP Deflator	0.3	1.1	1.2	2.0	1.9	2.1	2.7
Consumer Price Index	1.6	1.6	1.3	1.9	1.8	2.1	2.6
Population	1.1	1.0	1.0	1.0	1.0	0.9	0.9
Participation Rate (%)	64.9	64.8	64.8	64.9	64.8	64.8	64.8
Employment	1.5	2.2	2.1	1.5	1.3	1.4	1.0
Unemployment Rate (%)	9.57	8.61	7.94	7.83	7.70	7.39	7.50
Exchange Rate (US cents)	73.8	75.0	76.3	76.9	77.9	78.9	79.8
90-Day Commerical Paper (%)	2.9	3.4	4.5	4.9	5.2	5.3	5.3
Federal surplus(+)/deficit(-) (Nat'l Accnts Basis)	-4.8	3.8	7.6	9.5	8.7	8.8	11.7
Low Growth Base Case							
Real GDP	2.1	1.8	1.7	2.1	2.5	2.1	2.0
Consumption	0.7	1.2	1.5	2.0	1.9	1.6	1.8
Government	-1.5	-0.2	1.0	1.4	1.6	1.6	1.8
Business Investment	8.2	4.3	2.4	2.4	3.8	3.9	3.6
Residential	6.9	5.4	3.2	2.0	1.9	1.9	1.9
Non-Residential	9.4	1.4	0.4	0.8	1.0	1.8	0.4
Machinery & Equipment	8.3	4.9	2.7	3.1	5.5	5.4	5.4
Exports	5.3	4.2	3.6	3.5	4.1	3.9	3.0
Imports	5.0	3.4	3.1	3.3	3.9	4.0	3.5
GDP Deflator	0.5	1.7	1.4	1.7	1.2	0.9	0.9
Consumer Price Index	1.8	1.8	1.5	1.8	1.4	1.1	1.0
Population	1.1	1.0	1.0	1.0	0.9	0.9	0.9
Participation Rate (%)	64.9	64.8	64.7	64.7	64.7	64.6	64.5
Employment	1.0	0.8	0.8	1.1	1.1	0.9	0.9
Unemployment Rate (%)	10.0	10.2	10.6	10.7	10.7	10.8	10.9
Exchange Rate (US cents)	74.8	75.0	76.3	76.5	77.5	79.2	81.1
90-Day Commerical Paper (%)	2.9	6.4	6.9	7.8	8.0	7.8	7.6
Federal surplus(+)/deficit(-) (Nat'l Accnts Basis)	-6.2	-4.2	-6.6	-8.2	-8.4	-9.6	-8.7

(Figures are year-over-year percentage changes unless otherwise indicated)

Table 3.2

Unemployment Rates in the High and Low Base Cases

	"High"	"Low"
1999	7.94	10.56
2000	7.83	10.67
2001	7.70	10.68
2002	7.39	10.78
2003	7.50	10.89

For 1999 and 2000, when the simulated construction shock occurs, the difference between the unemployment rates in the two base cases averages 2.7 percentage points. In FOCUS, the full-employment unemployment rate at this period is 6.5%. Given the coefficients in the FOCUS wage equation, a one percentage point improvement in the unemployment rate in the "High" Growth (lower unemployment rate) scenario will raise nominal wage inflation by .46 percentage points. However, in the "Low" growth, high unemployment rate scenario, a one percentage point decrease in the unemployment rate will raise nominal wage inflation by .24 percentage points. As can be seen, there is an important difference in the inflation effects of a demand stimulus between the two scenarios, even if it is not huge.

3.2 Detailed Inputs for the Simulations

Informetrica has provided detailed estimates of the direct and indirect (or "upstream" or "backward linkage") impacts of the assumed $1 billion increase in housing construction activity. The estimates have been provided for both New Construction and Alterations, each for the High and Low Base Cases and for "normal" imports and "double" imports where the latter assumes a doubling of 1992 I/O estimated import content to housing construction. This yields a total of eight input estimates sets. Table 3.3 shows these estimates as arranged for input to the FOCUS model.

As can be seen from Table 3.3, the basic $1 billion of real housing investment expenditure has a range of impacts on real and nominal variables depending on whether the expenditure is for New

Table 3.3 Inputs to FOCUS for Direct + Indirect Impacts of Housing Construction

Estimates developed by Informetrica Ltd. and adapted for FOCUS Input

New Construction	Normal Imports				Double Imports			
	High Base		Low Base		High Base		Low Base	
Changes in:	1999	2000	1999	2000	1999	2000	1999	2000
Residential Investment ($86 Mill)	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
GDP at Factor Cost ($86 Mill)	663.6	663.2	660.1	673.8	585.8	585.5	578.4	579.8
Imports ($86 Mill)	220.2	220.6	226.2	223.5	306.2	306.5	314.1	312.9
Employment ('000)	17.7	17.5	17.4	17.2	16.1	16.0	15.8	15.6
Residential Investment ($ Mill)	1301.5	1333.9	1323.3	1355.4	1301.5	1333.9	1323.3	1355.4
GDP at Factor Cost ($ Mill)	927.5	953.0	936.6	961.1	826.2	855.1	833.8	863.9
Imports ($ Mill)	273.5	277.3	281.6	285.6	380.3	380.7	390.2	388.6
Wages and Salaries ($ Mill)	661.1	682.6	660.1	673.8	595.6	615.7	590.9	604.5
Ind. Taxes less Subs. ($ Mill)	97.9	101.3	102.3	106.0	92.4	95.5	96.7	100.4
Unincorporated Income ($ Mill)	126.5	127.7	134.1	137.1	124.8	126.0	132.4	135.5

Alterations	Normal Imports				Double Imports			
	High Base		Low Base		High Base		Low Base	
Changes in:	1999	2000	1999	2000	1999	2000	1999	2000
Residential Investment ($86 Mill)	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
GDP at Factor Cost ($86 Mill)	617.3	616.8	611.8	612.6	521.5	521.2	512.9	514.8
Imports ($86 Mill)	257.0	257.5	263.4	262.6	366.1	366.4	375.1	373.2
Employment ('000)	15.7	15.6	15.5	15.3	13.8	13.8	13.5	13.4
Residential Investment ($ Mill)	1301.5	1333.9	1323.3	1355.4	1301.5	1333.9	1323.3	1355.4
GDP at Factor Cost ($ Mill)	895.5	921.0	905.0	929.8	768.5	798.1	775.8	807.3
Imports ($ Mill)	321.0	325.4	329.7	333.7	454.8	455.1	465.9	463.6
Wages and Salaries ($ Mill)	602.4	620.6	602.0	613.6	521.3	537.9	516.1	527.9
Ind. Taxes less Subs. ($ Mill)	82.4	84.9	85.9	88.9	75.7	78.2	79.2	82.0
Unincorporated Income ($ Mill)	100.1	101.0	105.7	108.1	98.1	99.1	103.8	106.2

Construction or Alterations, is on the High base or the Low base, or assumes Normal imports or Double imports. The direct plus indirect impacts on GDP at factor cost, for example, are highest under New Construction and Normal Imports, and lowest under Alterations construction with Double Imports.

To help identify differences among the scenarios, several cross-wise comparisons of the inputs are made in Table 3.4.

The first comparison is for the High and Low bases, using New Construction and Normal Imports (similar results obtain for the other cases). Because the High and Low bases feature different price levels, it is not surprising that there are differences for inputs in nominal terms - although note that they are in the 4%-6% range for indirect taxes and unincorporated income. Also note that nominal inputs are *lower* for the High base case - this is because the High base actually features lower inflation in 1997-1999, presumably allowing the Bank of Canada to be less restrictive in monetary policy. Somewhat more surprising is that there are also differences between these two cases in *real* terms; for example, direct and indirect real imports are 2.7% lower in the High base than the low, and employment is 1.7% higher. Normally, a pure I/O calculation would not give different real impacts for the same real shock due to the "base case"; but the Informetrica techniques are clearly more complex. In any event, it will need to be kept in mind that the differences between High and Low scenarios in the simulations below are not exclusively due to different model properties under the two cases; they are also due to different inputs.

Comparing New Construction to Alterations in the middle panel of Table 3.4, we observe that Alterations are effectively more import intensive than New Construction. This yields, of course, lower impacts on GDP and employment. It would also appear that New Construction pays more indirect taxes and is more heavily provided by unincorporated business than is Alterations.

The "Double Imports" assumed cover only *direct* imports into housing construction, and not indirect inputs. Therefore, the import effect in the Double Import case is considerably less than twice that

Table 3.4 Comparing Inputs for Construction Type, Base Case and Import Size

	High Base vs. Low Base New Constr; Normal Imports		New Const. vs. Alterations High Base; Normal Imports		Normal vs. Double Imports New Constr.; High Base	
Percentage Difference	1999	2000	1999	2000	1999	2000
Residential Investment ($86)	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($86)	0.5	-1.6	7.5	7.5	13.3	13.3
Imports ($86)	-2.7	-1.3	-14.3	-14.3	-28.1	-28.0
Employment	1.7	1.7	12.7	12.2	9.9	9.4
Residential Investment ($)	-1.6	-1.6	0.0	0.0	0.0	0.0
GDP at Factor Cost ($)	-1.0	-0.8	3.6	3.5	12.3	11.4
Imports ($)	-2.9	-2.9	-14.8	-14.8	-28.1	-27.2
Wages and Salaries ($)	0.2	1.3	9.7	10.0	11.0	10.9
Ind. Taxes less Subs. ($)	-4.3	-4.4	18.8	19.3	6.0	6.1
Unincorporated Income ($)	-5.7	-6.9	26.4	26.4	1.4	1.3

of the Normal Import case. As can be seen in the last panel of Table 3.4, this means that the Normal Import case has a direct plus indirect effect about 13% greater for real GDP and just under 10% greater for employment. There is a much more muted effect of the Double Import assumption on indirect taxes and on unincorporated income.

Entering the Scenario Inputs into FOCUS

The FOCUS model was made to replicate the inputs shown in Table 3.3 under "null" solution - that is, before any of the model's "multiplier" effects were permitted to operate. Due to the simultaneous nature of the model, this was a recursive procedure: For example, the $ 1 billion real housing investment was entered in the model (with all feedbacks turned off) and the effect on imports observed. Add-factors were then applied to the relevant import equation to obtain the proper impact from Table 3.3. With imports and GDP at factor cost now at proper values, then employment could be adjusted by further adds (since its depends on GDP at factor cost) to obtain the proper employment impacts from Table 3.3. With employment adjusted one could proceed to adjust wages and salaries .. and so on. Because the model's own lags would tend to produce impacts on, say, employment, after the two years of the shock to GDP at factor cost, and because the direct plus indirect impacts are specifically for two years only, then some negative adds are actually needed on employment, and several other variables, in the third and subsequent years of the simulations.

While the above may be a little technical, the end result is that FOCUS is made to reproduce exactly the figures of Table 3.4 in 1999 and 2000 and zero impact thereafter before any multiplier-type effects are turned on.

3.3 Details on Simulation Switches and Special Settings

The final step before turning to the simulation results is to list all special simulations switches and settings used in FOCUS for the project. Effectively, FOCUS version 94A (sub-version current as of May 1997) was used with the following adjustments and settings:

(1) Housing Stocks: The effect of the demand shock on the housing stock was neutralized so as to prevent any counter-acting stock-adjustment reduction in housing demand. It was assumed that the shock of $1 billion in each of two years as requested would somehow be over and above any demand forthcoming in the base case coming from desired or optimal stock levels.

(2) Housing Deflator - No Demand Pressure Term: A term representing demand pressure or possible bottlenecks in the deflator for residential investment was disabled. Again the assumption was that the specified addition to housing demand could be supplied out of existing capacity in the housing industry. (This assumption does not, of course, apply to the wider economy and impacts of the shock on total demand and on employment; here the distinction between the High and Low base cases is potentially important).

(3)Government Investment Income and Farm Income Exogenized: Government investment income and farm income in FOCUS are currently simple functions of nominal GDP (and occasionally other variables). While this specification serves its purpose for generating projections, it can create small income distortions and misleading increases in government revenue when GDP is stimulated for reasons that will likely have little impact on these components. In the present simulations, therefore, these items have been exogenized.

(4) Inflations Expectations Exogenized: Since the simulations specified are purely temporary, there should be no change in longer-term inflation expectations. Accordingly, the "synthetic" inflation expectations terms in FOCUS have been exogenized for the current simulations. That is, longer-term inflation expectations are indeed deemed not to change from the base case.

4. The Housing Impact Simulations - Results

In this section we present the results of the simulations specified. A total of sixteen sets of results, each for the five-year period 1999-2003 are presented. There are two basic shocks: to New Construction and to Alterations. Each is conducted on both the High and Low Bases. Each is conducted with both Normal and Double direct import coefficients. And finally, each is conducted using two monetary targets: the base-case exchange rate and the base-case short-term nominal interest rate.

4.1 Interpreting the Simulation Outputs

We begin with a brief section on how to read and interpret the results.

First, note that all the results presented in the tables (like Table 4.1) and figures are in terms of *changes* from the base case. It is the impact of the extra housing construction activity that we are interested in. Levels of growth or employment could always be obtained by taking the changes in the tables following and adding them to the base-case figures in Table 3.1, but generally this is uninteresting- especially when shocks are, as in this case, not huge.

The tables present two kinds of changes from base: Many (those not marked by "*") are percentage changes from the base. Those marked with "*" are changes in units, with the units being specified beside the variable description. Some variables are presented in both fashions: for example, in Table 4.1 below, in 1999 real GDP is simulated to have risen .18% above base due to the extra housing construction; this is $1.234 billion in 1986 dollars or $1.588 billion in 1996 dollars. For some variables - e.g., the unemployment rate or debt/GDP ratios - the figure shown is the change in percentage points.

The description of Simulation 1 (New Construction / High Base / Normal Imports / Exchange rate Target) is the most detailed. To avoid tedious repetition, not all of the explanations for movements

in key variables are repeated for each subsequent simulation. However, to make reading of selected simulations possible, the subsequent simulations are not compared with each other in the discussion of each, but only with simulation 1. The reader who only wishes to examine selective cases can therefore read the description of simulation 1 and then only the descriptions of those simulations in which they are interested. Following the description of each individual simulation, Sections 4.3 and following will compare the simulations across the four major categories of differences (Type of Construction, High or Low Base, Normal or Double Imports, Monetary Target).

4.2 Detailed Simulation Results by Experiment

4.2.1 New Construction - High Base - Normal Imports - Exchange Rate Target

Detailed results for this simulation are presented in Table 4.1 and Chart 4.1. We first describe the simulation results and then provide explanations for the major movements in variables observed.

In the first year of the simulation, GDP rises just over $1.2 billion in 1986 dollars (just under $1.6 billion in 1996 dollars); this is an increase of almost .2% in GDP (which is expected to grow between 3.0% and 4.0% in 1997) from a 3% increase in total residential construction activity. The first-year "multiplier" for this shock with the exchange-rate target money rule is just over 1.2 (1234/1000). In the second year of the shock, the impact on GDP rises to $1.6 billion 1986 dollars or .23% of base GDP; the "multiplier" is 1.6. In year 3 the direct and indirect stimulus to the economy has ended but a small positive impact carries over from the first two years: GDP is slightly above base-case. In years 4 and 5 GDP sinks below base-case levels, but not quite to the same extent that it rose above base in years 1 and 2. Experience with FOCUS has shown us that in years past year 5 GDP impacts will rise and fall again in a damped oscillating pattern until zero effect is left - but for a shock of this size the long-run zero impact might take up to 15 years to occur.

Employment has a similar pattern to GDP, but with something of a lag. The extra housing investment creates 21 thousand additional person-years of employment in year 1, 30 thousand in year 2 and almost 13 thousand in year 3, with some losses in person-years of employment in years 4 and

Table 4.1

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / High Base / Normal Imports / Exchange Rate Target

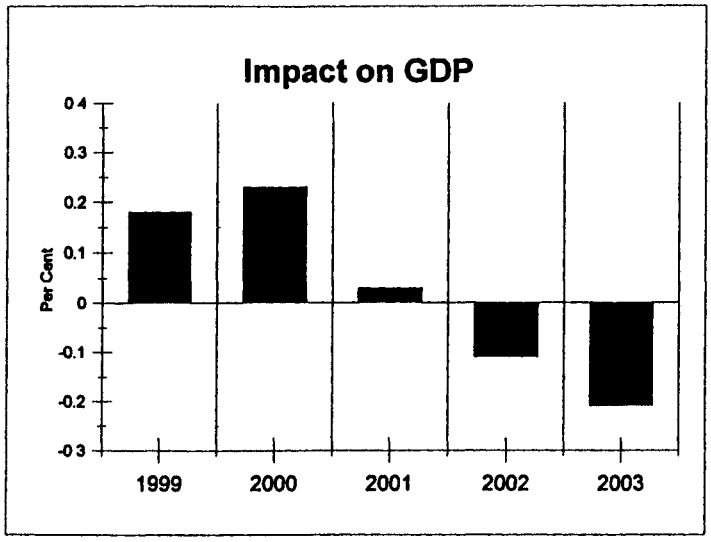
Summary of Impacts

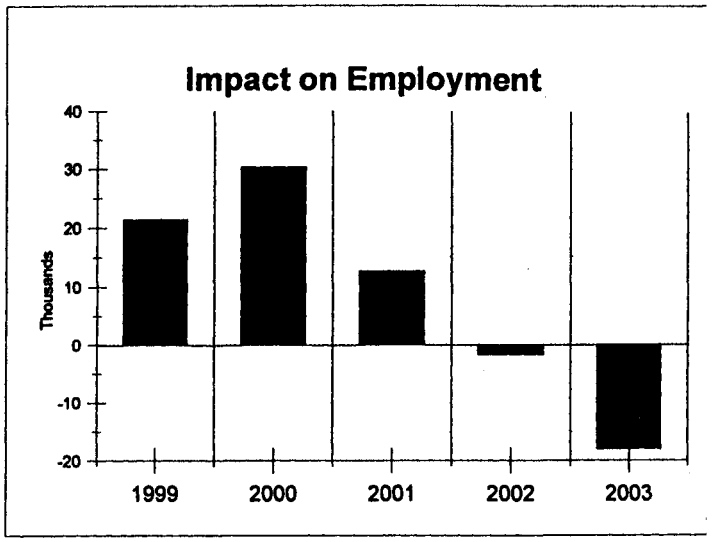
(Percentage Change; * Indicates change in levels)

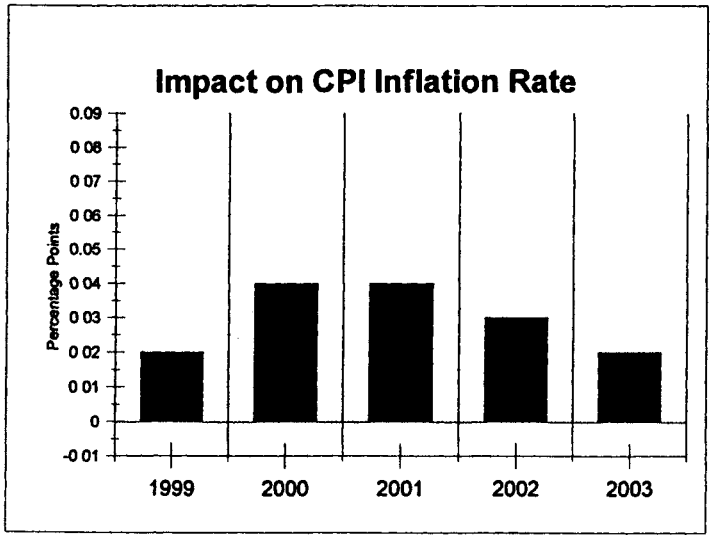
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1234	1617	195	-804	-1530
Real GDP ($96 Million) *	1588	2081	250	-1035	-1969
Real Gross Domestic Product	0.18	0.23	0.03	-0.11	-0.21
Expenditure on Personal Consumption	0.13	0.31	0.24	0.00	-0.19
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.75	0.72	-0.07	-0.14	-0.20
Residential Construction	3.07	3.00	0.01	-0.15	-0.45
Non-Residential Construction	0.00	0.04	0.03	-0.06	-0.12
Machinery and Equipment	0.05	0.01	-0.13	-0.17	-0.14
Exports	-0.01	-0.03	-0.06	-0.07	-0.07
Imports	0.15	0.23	0.15	0.07	0.00
Nominal GDP ($ Million) *	1897	3042	1702	599	-338
Implicit Deflator for GDP	0.03	0.09	0.15	0.17	0.17
Consumer Price Index	0.02	0.06	0.10	0.13	0.15
CPI - Inflation Rate (%) *	0.02	0.04	0.04	0.03	0.02
Unemployment Rate (%) *	-0.10	-0.14	-0.05	0.02	0.09
Employment	0.15	0.21	0.08	-0.01	-0.12
Employment ('000) *	21.4	30.4	12.7	-1.8	-18.1
Finance Co. 90-Day Paper Rate (%) *	0.05	0.08	0.04	0.00	0.00
Industrial Bond Rate (%) *	0.06	0.10	0.04	0.00	0.00
Average Annual Wages and Salaries	0.04	0.11	0.15	0.15	0.13
Real Annual Wages per Employee	0.01	0.05	0.05	0.02	-0.03
Productivity Change (GDP/Employee)	0.03	0.02	-0.06	-0.10	-0.08
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-559	-1057	-873	-593	-315
Cumulative Current Account as a % of GDP *	-0.03	0.04	0.18	0.27	0.32
Federal Gov't: Revenues ($ Mill)	397	660	415	159	-84
Balance (Surp(+),Def(-)) ($ Mill)	384	544	292	96	-262
Provincial Gov'ts: Revenues ($ Mill)	308	546	356	131	-44
Balance (Surp(+),Def(-)) ($ Mill)	302	486	205	-94	-311
Real Personal Disposable Income	0.10	0.17	0.06	-0.07	-0.17
Personal Savings Rate (%) *	-0.04	-0.16	-0.19	-0.07	0.01
Nominal After-Tax Corp. Profits	1.06	1.35	-0.11	-1.31	-1.44

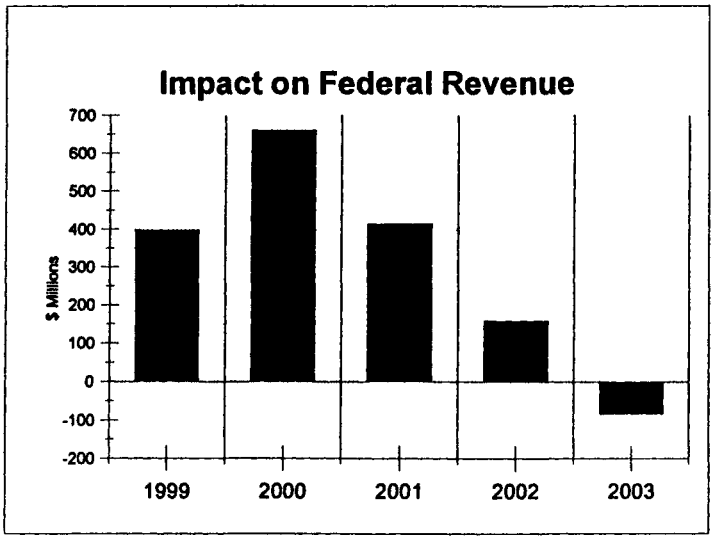
Chart 4.1

New Construction - High Base - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









5. The lagged response of employment can be seen in the fact that the percentage increase in employment in years 1 and 2 is less than the percentage change in GDP - or, put alternatively, labour productivity temporarily increases. The positive impact on employment stimulated by stronger GDP in years 1 and 2 carries over to year 3 despite the fact that GDP in that year is falling away; alternatively, labour productivity then falls below base. In years 4 and 5, employment declines are less in proportion to GDP declines, again because of "labour hoarding" behaviour that causes employment to adjust only with a lag to changes in output. (The "labour hoarding" phenomenon that causes this lagged response of employment to real output is discussed in greater detail in section 2.2.8 above).

There is a variety of patterns across the main components of GDP: Consumption is slow to respond to the output shock and slow to fall away after - much in the fashion of employment. Government current and capital expenditure is fixed in real terms and so does not change under the shock. The movement in residential investment is, of course, largely exogenous in years 1 and 2; in years 4 and 5 there is a noticeable decline. Non-residential and Machinery investment both respond positively to the demand stimulus in years 1 and 2 of the shock - there is "crowding in" - but after the shock is removed there are clear negative impacts. Finally, exports show a small negative impact under the demand stimulus throughout the five years, while imports show a pronounced increase in years 1 through 3, with the impact falling back to zero by year 5.

The CPI inflation rate rises slightly years 1 through 3 of the simulation, and then falls back towards zero. The increase in inflation is modest compared to the width of the Bank of Canada's target inflation bands - that is, one percentage point on each side of 2%. By year 5 there is a cumulative impact on the CPI of .15% of base.

The Bank of Canada is targeting the base-case exchange rate in this simulation and, as can be seen from the negative impact on the Current Account of the Balance of Payments, ordinarily the housing demand shock would be putting downward pressure on the Canadian dollar. To keep the overall Balance of Payments at zero change under the base-case exchange rate, the Bank must raise interest

rates slightly: as can be seen, the Finance Company 90-Day rate goes up a maximum of 8 basis points in the second year of the shock, with longer bond rates rising an equivalent amount. This slight rise in rates is sufficient to bring in enough extra capital inflow to offset the worsened Current Account.

Finally, both the federal and aggregate provincial budget balances are improved by the demand stimulus: By the second year of the housing stimulus, the federal balance has improved by over one-half billion dollars, based on revenue increases of well over 600 million dollars. Revenues have increased broadly based on increased economic activity and also on a slightly higher price level. Total expenditures, however, have also increased somewhat - despite a fall in Employment Insurance (EI) - because of a higher price level. Recall that current and capital expenditures are exogenous in *real* terms and so nominal expenditures rise with an increase in prices, as do also some transfers (such as Old Age Security). An improved budget balance will tend to reduce interest payments on the debt, but a higher interest rate works in the opposite direction, leading to mixed results for this expenditure item.

Provincial balances and expenditures move roughly in line with their federal counterparts, but generally slightly less in magnitude. Note that by the second year of the stimulus, the combined improvement in federal and provincial balances exceeds $ 1 billion.

Factors Underlying the Impact Time-Paths

In these results we can see at work most of the elements encountered when the FOCUS model was described in previous sections: The original shock is, of course, the same amount in each of the first two years. But, as can be seen, originally corporate profits react the most strongly to the shock; the increase of 1.06% in year 1 is almost as large as the 1.35% increase in year 2, despite the fact that the overall GDP impact is considerably higher in the second year. This strong original profit performance explains the "crowding in" of non-residential and machinery investment in years 1 and 2, while the fact that much of this early profit gain is eroded by increases in other income categories explains why the investment effect dies off quickly.

Consumption only responds to the shock with a lag: real consumption is actually above base more in year 3 of the simulation - after the construction shock has ended - than in the first year of the shock. The reason is not particularly income hoarding on the part of consumers; in fact, the savings rate actually falls through much of the simulation due to the positive effect on consumption of a reduction in the unemployment rate. The reason for the delayed effect in consumption is the slow reaction of real personal disposable income, and this is due primarily to lags in the employment and wage equations. In short, it takes several quarters for the original demand stimulus to "trickle down" to the standard multiplier mechanism of higher personal income and resulting higher consumption.

The standard multiplier is not only delayed but also weaker than in "textbook" presentations. Note that real personal disposable income does not rise by as much as GDP even by year 2: there is leakage in the form of higher taxes and lower transfers from governments as well as from a delayed employment response.

The foreign sector also contributes to leakage: Note that imports have risen in percentage terms as much as GDP in year 2, and more than GDP in year 3. One reason is that the induced expenditures from the shock, especially consumer durables and some investment, have relatively high import contents (and higher import contents than the original housing activity). Moreover, the domestic price level has risen somewhat above base; combined with a fixed nominal exchange rate, this means a competitive disadvantage for domestic goods relative to imports. The same loss of competitiveness though higher prices and a fixed exchange rate also explains the loss of exports that also contributes to multiplier leakage.

The pressure on prices comes partly from rising interest rates (through the need to finance inventories), but in the longer run primarily from wage pressure. The price pressure builds up gradually through the second year and continues into the third year and beyond, despite the disappearance of the housing shock due to the lags on the wage equation - which reacts with a lag to reductions in the unemployment rate and to observed inflation - and to lags in the employment equation - which reacts with a lag to increases in output. As a result, price and wage pressure persist

well into year 3 and even year 4. However, in these years the original output shock has disappeared and the employment equation begins to react to higher real wages - again with a lag - by economizing on labour. As a result there is a decline in both output and employment which, because labour has now priced itself higher than in the base case, actually causes a lower-than-base output in years 4 and 5. Put otherwise, the snapback of output and employment to levels below base in years 4 and 5 is due to two causes: The first is the long lags in the wage, price and employment equations that cause labour to price itself "too high" relative to long-term equilibrium in the face of a demand shock that reduces unemployment. The "too high" wage can only be eroded away by a period of unemployment *higher* than base. This first cause is exacerbated by the second - namely, that the shock is itself a temporary one. Just as employers and wage-earners are adjusting to the higher demand, it is removed, necessitating again a period of higher unemployment to erase wage demands that are now "too high" with the demand stimulus gone.

The movements of most other variables in the simulation follow directly from the pattern of oscillating adjustment just outlined. The impact on the CPI inflation rate peaks in years 2 and 3 of the simulation; driven largely by unit labour costs, prices rise with a lag after the demand shock. Even though real wages are below base by year 5 of the simulation, the inflation rate effect is still positive for two reasons: the first is that there is a lag on unit labour costs into the price markup equation, and the second is that nominal wage inflation is still above base because it is feeding off the increased inflation of previous years. It will take another year or two past the five-year horizon of the simulation for the inflation rate to fall back to base levels, and indeed, as part of the damped oscillating adjustment process, inflation will actually go mildly below base for a time.

The impacts on federal and provincial revenues and balances largely follow the pattern of GDP and employment. With negative impacts on real GDP in years 4 and 5, it is no surprise that impacts on revenues and balances also turn negative. Revenues are lower due to reduced economic activity relative to base, and expenditures are still above base for a number of variables, because the overall price level is above base. However, the relative impact on budget balances is much less than for GDP. Part of the reason is that the improved balances in the initial years of the shock have reduced

public debt and when interest rates return to base levels in years 4 and 5 of the simulation, interest payments on debt are reduced relative to base.

4.2.2 New Construction - High Base - Normal Imports - Interest Rate Target

Details for this simulation can be found in Table and Chart 4.2. In the first year of the simulation, real GDP rises by about $1.5 billion (1986 dollars) or almost $2 billion in 1996 dollars. Thus the first-year multiplier is about 1.5. In the second year the multiplier is 2.2 with an output shift of almost $3 billion in 1996 dollars. This is approximately one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 35 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of over 20 thousand person years. By year 5 a small decline in employment relative to base is registered, with additional declines probably required in later years to pull down the real wage.

The components of GDP show generally results similar to Simulation 1 but with greater impacts. Consumption responds with a lag and is actually stronger in year 3 than in year 1. The impact is greater than in Simulation 1 because interest rates do not rise (this will affect auto sales) and because income impacts are greater. Government spending is exogenous. Residential spending is stronger in this simulation than in Simulation 1 because the Bank of Canada is keeping interest rates from rising and because the unemployment rate falls more. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise

Table 4.2

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / High Base / Normal Imports / Interest Rate Target

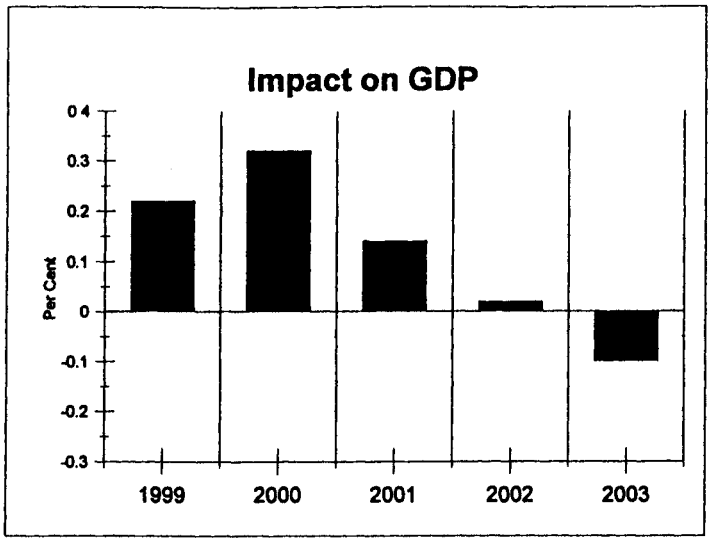
Summary of Impacts

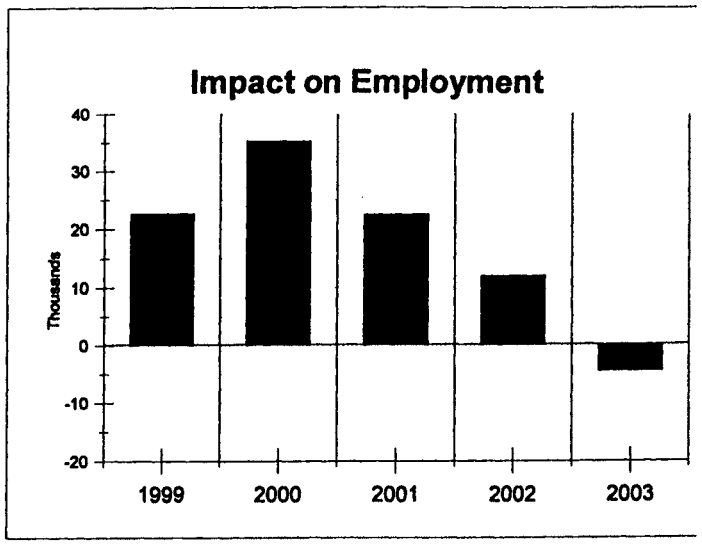
(Percentage Change; * Indicates change in levels)

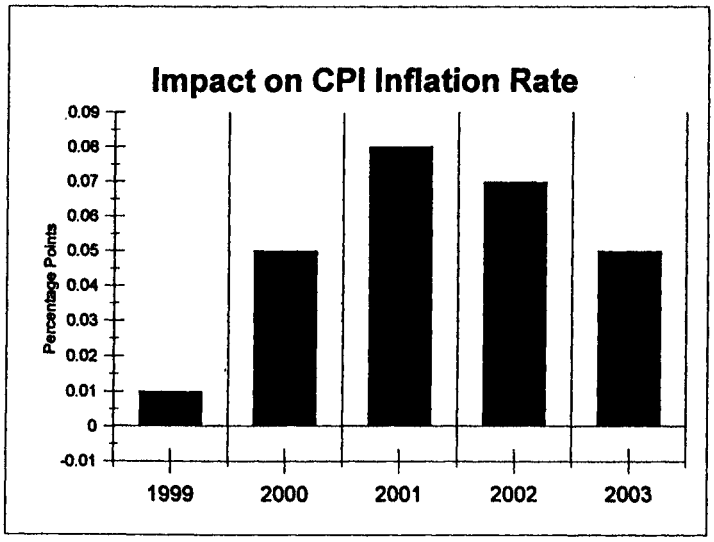
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1520	2239	1026	140	-757
Real GDP ($96 Million) *	1956	2882	1320	180	-974
Real Gross Domestic Product	0.22	0.32	0.14	0.02	-0.10
Expenditure on Personal Consumption	0.08	0.20	0.19	0.06	-0.08
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.83	0.97	0.24	0.04	-0.14
Residential Construction	3.24	3.49	0.48	0.06	-0.36
Non-Residential Construction	0.05	0.12	0.10	0.00	-0.08
Machinery and Equipment	0.10	0.22	0.19	0.05	-0.08
Exports	0.03	0.07	0.07	0.05	0.03
Imports	0.07	0.14	0.13	0.09	0.05
Nominal GDP ($ Million) *	1939	3393	2731	2374	1799
Implicit Deflator for GDP	-0.01	0.04	0.14	0.21	0.27
Consumer Price Index	0.01	0.05	0.14	0.21	0.26
CPI - Inflation Rate (%) *	0.01	0.05	0.08	0.07	0.05
Unemployment Rate (%) *	-0.11	-0.16	-0.09	-0.04	0.04
Employment	0.16	0.24	0.15	0.08	-0.03
Employment ('000) *	22.7	35.2	22.5	12.0	-4.5
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.04	0.13	0.21	0.26	0.29
Real Annual Wages per Employee	0.03	0.07	0.07	0.05	0.03
Productivity Change (GDP/Employee)	0.06	0.07	-0.01	-0.06	-0.07
Exchange Rate (US $/Cdn $)	-0.08	-0.17	-0.21	-0.24	-0.23
Balance on Current Account ($ Mill) *	-260	-454	-303	-144	-8
Cumulative Current Account as a % of GDP *	-0.05	-0.04	0.02	0.05	0.07
Federal Gov't: Revenues ($ Mill)	363	635	525	448	285
Balance (Surp(+),Def(-)) ($ Mill)	495	905	752	533	193
Provincial Gov'ts: Revenues ($ Mill)	282	533	479	423	326
Balance (Surp(+),Def(-)) ($ Mill)	282	458	265	75	-137
Real Personal Disposable Income	0.12	0.18	0.09	0.00	-0.08
Personal Savings Rate (%) *	0.04	-0.01	-0.10	-0.06	-0.01
Nominal After-Tax Corp. Profits	0.92	1.21	0.40	-0.19	-0.53

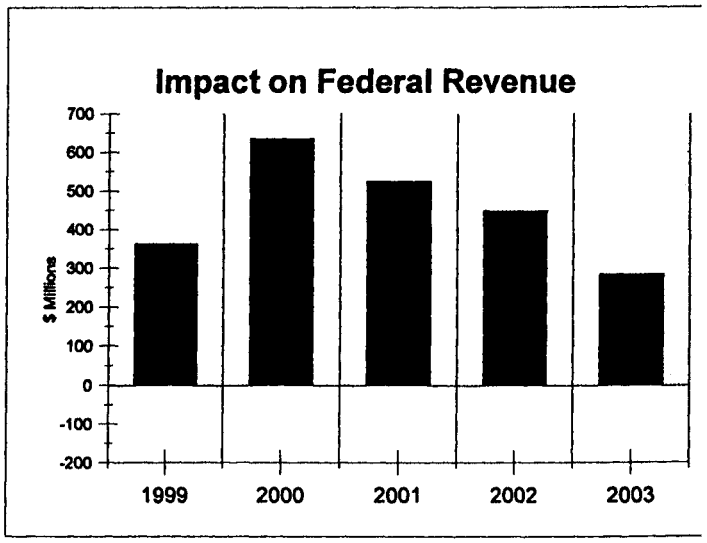
Chart 4.2

New Construction - High Base - Normal Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









through the simulation period and imports do not rise as much as in Simulation 1, despite higher economic activity. The reason is that the exchange rate depreciates - by as much as one-quarter of one per cent by the fourth year of the simulation. This exchange-rate change was forestalled in Simulation 1 by the Bank of Canada raising interest rates.

The extra economic activity when the Bank of Canada targets the nominal interest rate (compared to Simulation 1) has, of course, a price in terms of higher induced inflation. By year 3, the CPI inflation rate is almost one-tenth of one percentage point above base. This is double the inflation-rate impact when the Bank of Canada was targeting the exchange rate, but it is still small relative to the two percentage point band in which inflation is supposed to be able to move. After year 3, the CPI inflation rate impact declines back towards base levels. By year 5 of the simulation, the CPI price level is about one-quarter of a per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by close to $1 billion, and the provincial balance by almost $1/2 billion. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact - and this difference is much more pronounced than in Simulation 1. There are two reasons: The first is that provincial expenditures, being relatively larger in the current and capital area (which are fixed in real terms) are more sensitive to the higher inflation generated when the Bank of Canada targets interest rates. The second reason is that the federal government balance is more sensitive to interest rates because its debt-interest payments are relatively larger than those of the provinces. In the present simulation, in which interest rates do not rise, there is proportionally less impact on federal expenditures.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above. Briefly, the pattern of impacts seen in this simulation is due to the action and interaction of a variety of lag structures in the model. The lagged impact of output on employment causes the slower reaction of employment, personal income and, therefore, of consumption. The

lagged response of wages to employment and inflation further delays the full response of consumption, and also tends to make the real wage "too high" once the housing demand shock has disappeared. Only a spell of unemployment above the base case can bring the real wage, slowly, back to its long-term level again - hence the damped oscillating pattern of output.

4.2.3 New Construction - High Base - Double Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.3. In the first year of the simulation, real GDP rises by about $1.1 billion (1986 dollars) or just over $1.4 billion in 1996 dollars. The first- and second-year multipliers are about 1.1 and 1.4 respectively. The maximum impact on GDP, in the second year, is about two tenths of a per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is positive but small. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of unemployment higher than base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at almost 29 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of about 12 thousand person years. By year 5 there is a decline in employment relative to base of over 17 thousand; this has already pulled the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Government spending is exogenous. Residential spending is weaker in year 2 in this simulation than in Simulation 1 because the Bank of Canada must raise interest rates more to keep the Canadian dollar from depreciating when the import content of the basic demand shock is higher. Non-residential and Machinery investment are

Table 4.3

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / High Base / Double Imports / Exchange Rate Target

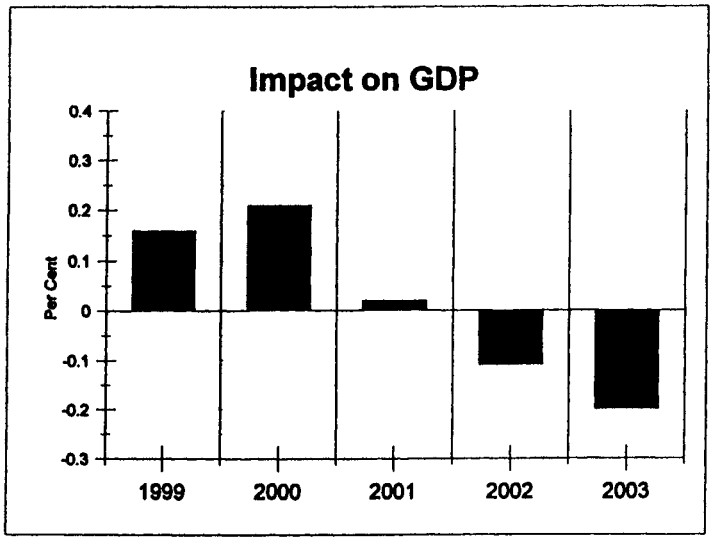
Summary of Impacts

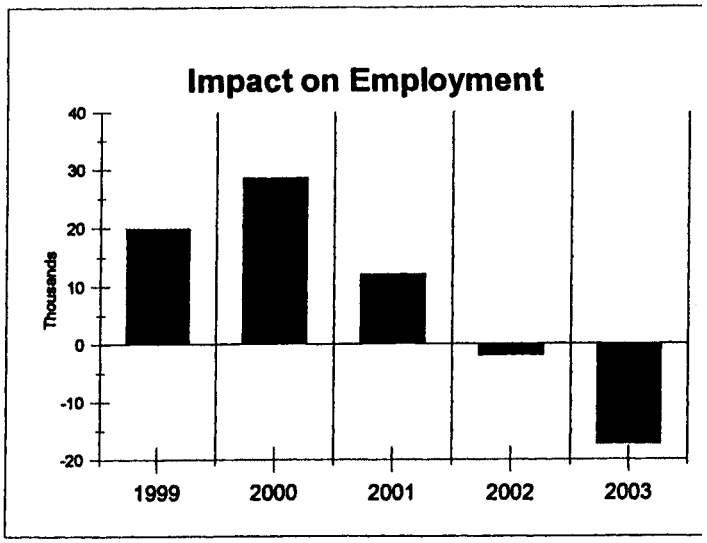
(Percentage Change; * Indicates change in levels)

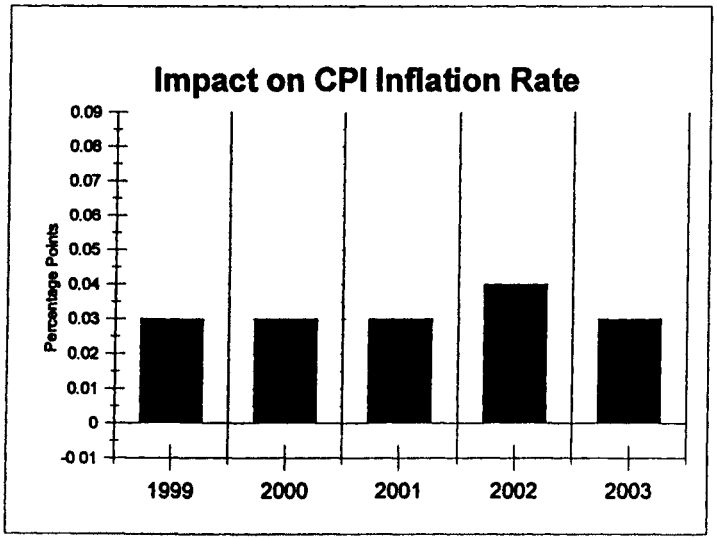
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1113	1466	156	-796	-1495
Real GDP ($96 Million) *	1433	1887	201	-1024	-1924
Real Gross Domestic Product	0.16	0.21	0.02	-0.11	-0.20
Expenditure on Personal Consumption	0.14	0.31	0.22	-0.02	-0.18
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.72	0.67	-0.07	-0.12	-0.19
Residential Construction	3.00	2.92	0.04	-0.09	-0.43
Non-Residential Construction	-0.01	0.03	0.03	-0.05	-0.11
Machinery and Equipment	0.02	-0.05	-0.16	-0.15	-0.12
Exports	-0.01	-0.04	-0.05	-0.06	-0.07
Imports	0.18	0.25	0.13	0.06	0.01
Nominal GDP ($ Million) *	1829	2883	1568	521	-335
Implicit Deflator for GDP	0.04	0.10	0.14	0.16	0.17
Consumer Price Index	0.03	0.06	0.09	0.13	0.15
CPI - Inflation Rate (%) *	0.03	0.03	0.03	0.04	0.03
Unemployment Rate (%) *	-0.09	-0.13	-0.05	0.02	0.09
Employment	0.14	0.19	0.08	-0.01	-0.11
Employment ('000) *	19.8	28.6	12.1	-2.0	-17.4
Finance Co. 90-Day Paper Rate (%) *	0.07	0.09	0.02	0.00	0.01
Industrial Bond Rate (%) *	0.08	0.10	0.03	-0.01	0.01
Average Annual Wages and Salaries	0.04	0.10	0.14	0.14	0.11
Real Annual Wages per Employee	0.01	0.04	0.05	0.01	-0.04
Productivity Change (GDP/Employee)	0.02	0.01	-0.06	-0.10	-0.08
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-679	-1149	-825	-565	-327
Cumulative Current Account as a % of GDP *	-0.02	0.06	0.20	0.28	0.33
Federal Gov't: Revenues ($ Mill)	395	639	384	138	-80
Balance (Surp(+),Def(-)) ($ Mill)	332	466	276	106	-267
Provincial Gov'ts: Revenues ($ Mill)	306	527	325	108	-44
Balance (Surp(+),Def(-)) ($ Mill)	295	470	183	-107	-298
Real Personal Disposable Income	0.09	0.16	0.05	-0.08	-0.17
Personal Savings Rate (%) *	-0.06	-0.17	-0.18	-0.06	0.00
Nominal After-Tax Corp. Profits	1.12	1.32	-0.23	-1.30	-1.27

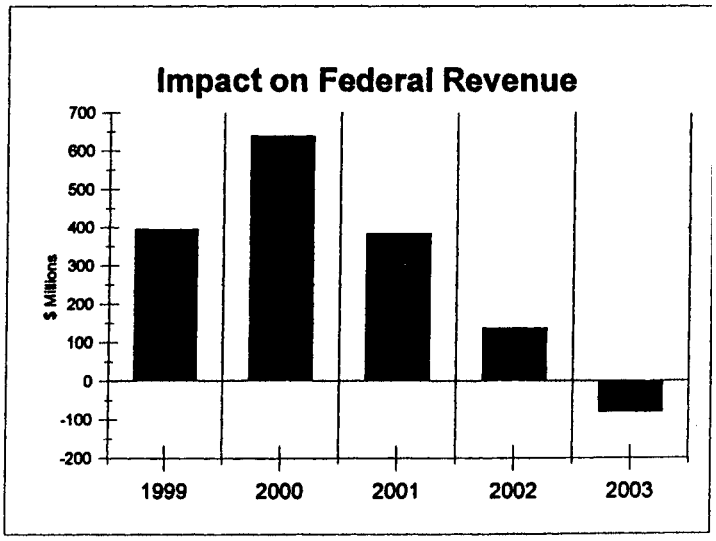
Chart 4.3

New Construction - High Base - Double Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









lower than in Simulation 1 due to these higher interest rates and lower relative activity. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports are, of course, higher in years 1 and 2 because this is part of the basic housing shock.

The additional inflation caused by this shock is quite modest, and is lower than that of Simulation 1 due to the lower impact on real activity and employment. The effect peaks in year 4 at just .04 percentage points above base. Interest rates rise a maximum of 9 basis points in the second year - more than in Simulation 1 despite the lower economic activity in this case.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. The effect of the higher interest rates needed to protect the dollar from the heavier imports can be seen in the difference between improvements in revenues and balance for the federal government.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above. Briefly, the pattern of impacts seen in this simulation is due to the action and interaction of a variety of lag structures in the model. The lagged impact of output on employment causes the slower reaction of employment, personal income and, therefore, of consumption. The lagged response of wages to employment and inflation further delays the full response of consumption, and also tends to make the real wage "too high" once the housing demand shock has disappeared. Only a spell of unemployment above the base case can bring the real wage back to its long-term level again, and the process results in continual overshooting and a damped oscillating pattern. The effect happens more quickly in Simulation 3 than Simulation 1 (or 2) because the initial impact is smaller due to the extra import leakage.

4.2.4 New Construction - High Base - Double Imports - Interest rate Target

Details for this simulation can be found in Table and Chart 4.4. In the first year of the simulation, real GDP rises by almost $1.5 billion (1986 dollars) or almost $1.9 billion in 1996 dollars. Thus the first-year multiplier is about 1.5. In the second year the multiplier is 2.2 with an output shift of $2.8 billion in 1996 dollars. This is just under one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, a strong growth momentum carries over, pushing GDP over $1 billion ($86) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls to just over base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 34 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of over 20 thousand person years. By year 5 a small decline in employment relative to base is registered, with additional declines probably required in later years to pull down the real wage.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Government spending is exogenous. Residential spending is stronger in this simulation than in Simulation 1 because the Bank of Canada is keeping interest rates from rising and because the unemployment rate falls more. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in Simulation 1, despite higher economic activity. The reason is that the exchange rate depreciates - by as much as one-quarter of one per cent by the fourth year of the simulation. Note, then, that the higher import leakage has proportionally a much smaller impact on the simulation outcome in this case than when the exchange rate is fixed. That is because while the larger imports represent a larger

Table 4.4

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / High Base / Double Imports / Interest Rate Target

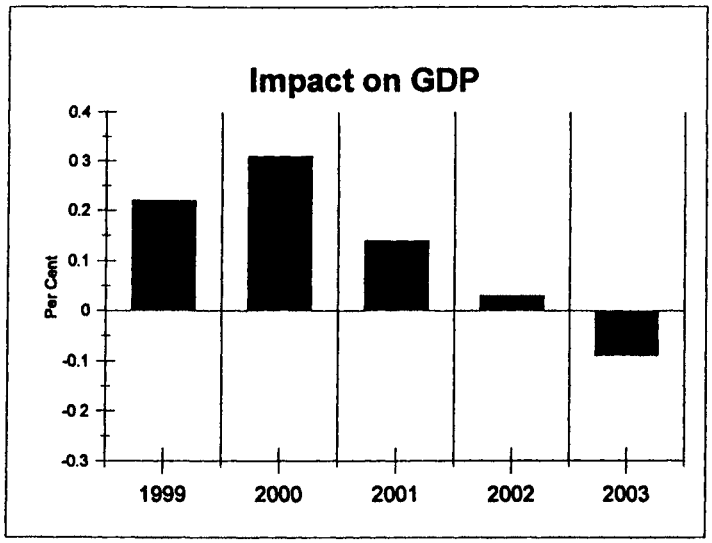
Summary of Impacts

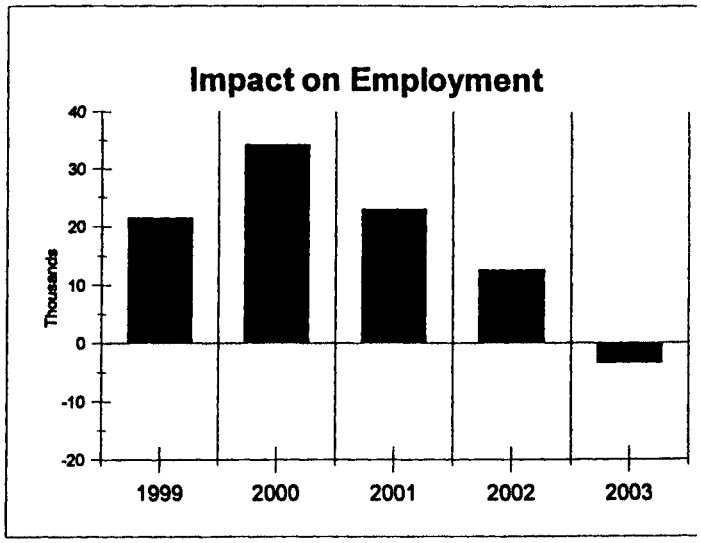
(Percentage Change; * Indicates change in levels)

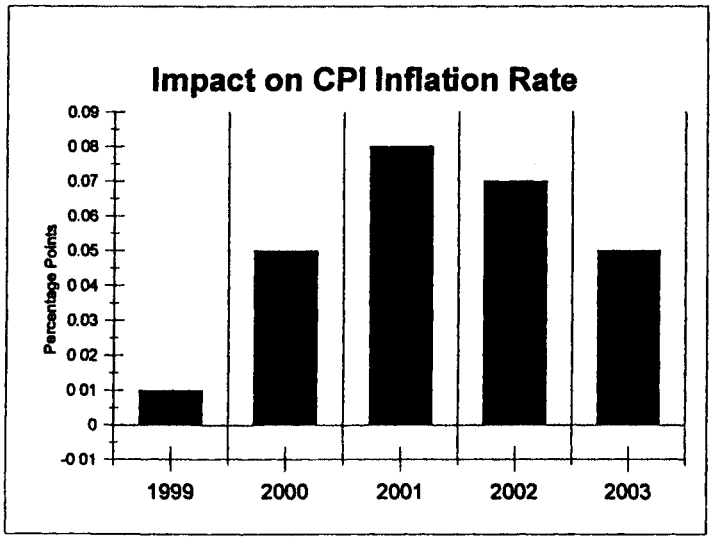
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1469	2172	1029	188	-692
Real GDP ($96 Million) *	1891	2796	1324	242	-891
Real Gross Domestic Product	0.22	0.31	0.14	0.03	-0.09
Expenditure on Personal Consumption	0.07	0.19	0.19	0.06	-0.07
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.82	0.96	0.24	0.05	-0.13
Residential Construction	3.22	3.47	0.49	0.09	-0.33
Non-Residential Construction	0.05	0.12	0.10	0.00	-0.08
Machinery and Equipment	0.09	0.21	0.18	0.05	-0.07
Exports	0.04	0.08	0.08	0.06	0.03
Imports	0.08	0.15	0.12	0.09	0.05
Nominal GDP ($ Million) *	1871	3292	2708	2407	1867
Implicit Deflator for GDP	-0.01	0.04	0.13	0.21	0.27
Consumer Price Index	0.01	0.05	0.13	0.21	0.26
CPI - Inflation Rate (%) *	0.01	0.05	0.08	0.07	0.05
Unemployment Rate (%) *	-0.10	-0.16	-0.09	-0.04	0.03
Employment	0.15	0.23	0.15	0.08	-0.02
Employment ('000) *	21.5	34.2	22.9	12.6	-3.4
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.04	0.12	0.20	0.26	0.29
Real Annual Wages per Employee	0.03	0.07	0.07	0.05	0.03
Productivity Change (GDP/Employee)	0.06	0.07	-0.01	-0.06	-0.07
Exchange Rate (US $/Cdn $)	-0.10	-0.19	-0.22	-0.24	-0.23
Balance on Current Account ($ Mill) *	-303	-482	-275	-124	-2
Cumulative Current Account as a % of GDP *	-0.04	-0.03	0.03	0.05	0.07
Federal Gov't: Revenues ($ Mill)	349	616	520	453	298
Balance (Surp(+),Def(-)) ($ Mill)	473	875	743	542	215
Provincial Gov'ts: Revenues ($ Mill)	271	516	473	426	336
Balance (Surp(+),Def(-)) ($ Mill)	268	441	262	82	-124
Real Personal Disposable Income	0.11	0.17	0.09	0.00	-0.08
Personal Savings Rate (%) *	0.04	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	0.94	1.19	0.39	-0.13	-0.47

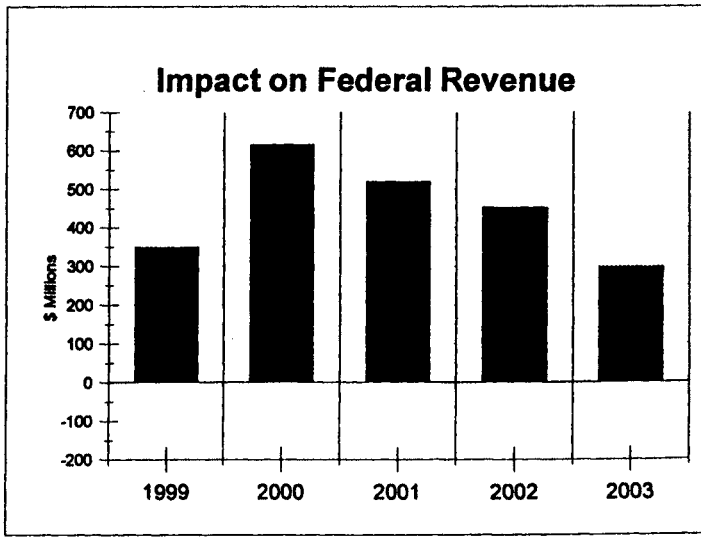
Chart 4.4

New Construction - High Base - Double Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









initial leakage from the shock, they also call forth a larger exchange rate depreciation (to clear the balance of payments) and this means extra stimulation.

The extra economic activity when the Bank of Canada targets the nominal interest rate (compared to Simulation 1) means higher induced inflation. By year 3, the CPI inflation rate is almost one-tenth of one percentage point above base. This is double the inflation-rate impact when the Bank of Canada was targeting the exchange rate, but it is still small relative to the two percentage point band in which inflation is supposed to be able to move. After year 3, the CPI inflation rate impact declines back towards base levels. By year 5 of the simulation, the CPI price level is about one-quarter of a per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by almost $900 million, and the provincial balance by almost $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact - and this difference is much more pronounced than in Simulation 1. There are two reasons: The first is that provincial expenditures, being relatively larger in the current and capital area (which are fixed in real terms) are more sensitive to the higher inflation generated when the Bank of Canada targets interest rates. The second reason is that the federal government balance is more sensitive to interest rates because its debt-interest payments are relatively larger than those of the provinces. In the present simulation, in which interest rates do not rise, there is proportionally less impact on federal expenditures.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above. Briefly, the pattern of impacts seen in this simulation is due to the action and interaction of a variety of lag structures in the model. The lagged impact of output on employment causes the slower reaction of employment, personal income and, therefore, of consumption. The lagged response of wages to employment and inflation further delays the full response of

consumption, and also tends to make the real wage "too high" once the housing demand shock has disappeared. Only a spell of unemployment above the base case can bring the real wage, slowly, back to its long-term level again - hence the damped oscillating pattern of output.

4.2.5 New Construction - Low Base - Normal Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.5. In the first year of the simulation, real GDP rises by about $1.2 billion (1986 dollars) or almost $1.6 billion in 1996 dollars. The first- and second-year multipliers are about 1.2 and 1.7 respectively. The maximum impact on GDP, in the second year, is about a quarter of a per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is positive but small. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of unemployment higher than base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at almost 30 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 14 thousand person years. By year 5 there is a decline in employment relative to base of about 11 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Government spending is exogenous. Residential spending shows some additional stimulation beyond the base case due to lower unemployment only partly offset by small interest-rate increases. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher

Table 4.5

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / Low Base / Normal Imports / Exchange Rate Target

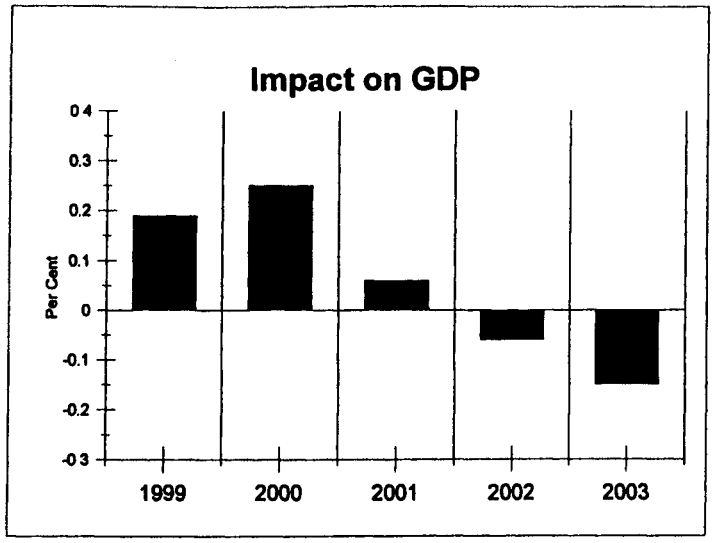
Summary of Impacts

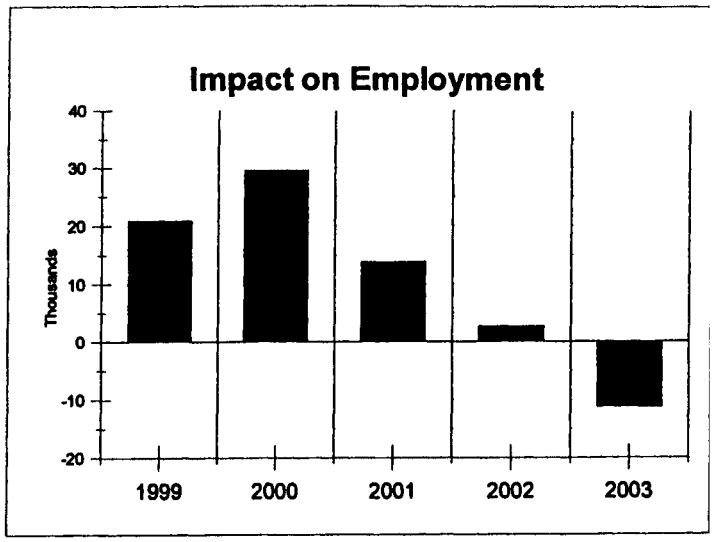
(Percentage Change; * Indicates change in levels)

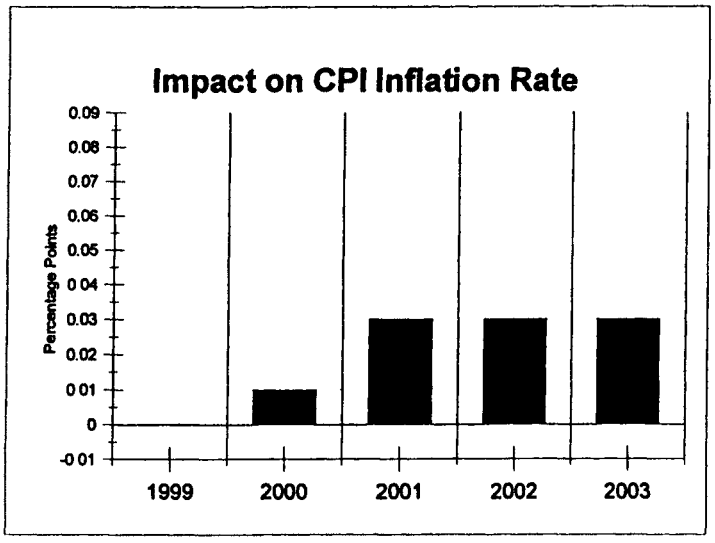
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1231	1652	408	-403	-1056
Real GDP ($96 Million) *	1584	2126	525	-519	-1359
Real Gross Domestic Product	0.19	0.25	0.06	-0.06	-0.15
Expenditure on Personal Consumption	0.12	0.27	0.21	0.01	-0.15
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.84	0.85	0.01	-0.06	-0.14
Residential Construction	3.26	3.26	0.09	-0.04	-0.32
Non-Residential Construction	0.00	0.04	0.02	-0.06	-0.12
Machinery and Equipment	0.05	0.06	-0.04	-0.07	-0.07
Exports	0.00	-0.01	-0.02	-0.03	-0.04
Imports	0.13	0.20	0.11	0.05	0.00
Nominal GDP ($ Million) *	1699	2547	1196	259	-483
Implicit Deflator for GDP	0.01	0.03	0.07	0.08	0.10
Consumer Price Index	0.00	0.01	0.04	0.06	0.09
CPI - Inflation Rate (%) *	0.00	0.01	0.03	0.03	0.03
Unemployment Rate (%) *	-0.10	-0.14	-0.06	0.00	0.06
Employment	0.15	0.21	0.10	0.02	-0.08
Employment ('000) *	20.9	29.6	13.9	2.7	-11.3
Finance Co. 90-Day Paper Rate (%) *	0.05	0.07	0.02	-0.01	0.00
Industrial Bond Rate (%) *	0.06	0.08	0.02	-0.01	0.00
Average Annual Wages and Salaries	0.02	0.06	0.08	0.08	0.08
Real Annual Wages per Employee	0.02	0.05	0.05	0.02	-0.01
Productivity Change (GDP/Employee)	0.03	0.03	-0.04	-0.08	-0.07
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-503	-890	-661	-423	-199
Cumulative Current Account as a % of GDP *	-0.03	0.04	0.16	0.24	0.27
Federal Gov't: Revenues ($ Mill)	358	542	272	47	-135
Balance (Surp(+),Def(-)) ($ Mill)	375	519	280	139	-161
Provincial Gov'ts: Revenues ($ Mill)	272	439	231	41	-88
Balance (Surp(+),Def(-)) ($ Mill)	286	445	191	-41	-210
Real Personal Disposable Income	0.12	0.18	0.06	-0.05	-0.14
Personal Savings Rate (%) *	0.00	-0.10	-0.15	-0.06	0.01
Nominal After-Tax Corp. Profits	0.90	0.95	-0.41	-1.71	-1.95

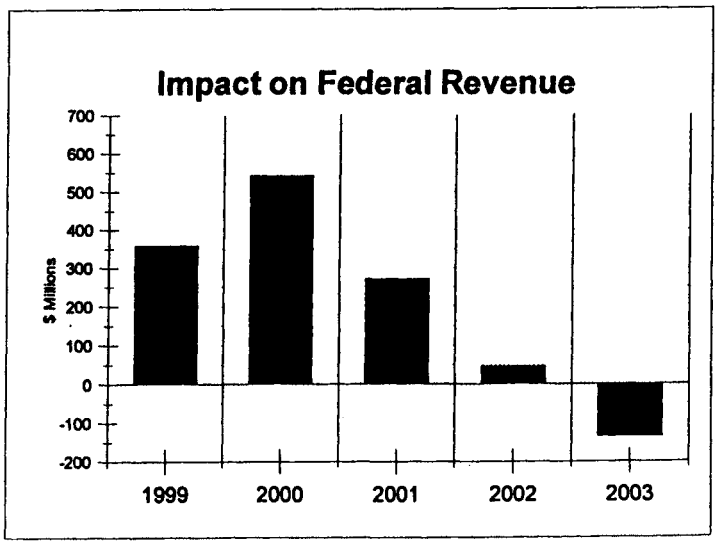
Chart 4.5

New Construction - Low Base - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise in years 1 and 2 because this is part of the basic housing shock, and additionally through the import share of the induced domestic demand..

The additional inflation caused by this shock is quite modest, and is lower than that of Simulation 1 due to the higher output and employment gap in this base, which mute effects on wages and hence on prices. The additional inflation peaks in year 4 at just .03 percentage points above base. Interest rates rise a maximum of 7 basis points in the second year - just under the increase of Simulation 1 because of the lower inflation impact.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. Because provincial spending is more sensitive to inflation, the gap between revenue and balance improvements is more pronounced for provincial governments than for the federal government.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above. Briefly, the pattern of impacts is due to the action and interaction of a variety of lag structures in the model. The lagged impact of output on employment causes the slower reaction of employment, personal income and, therefore, of consumption. The lagged response of wages to employment and inflation further delays the full response of consumption, and also tends to make the real wage "too high" once the housing demand shock has disappeared. Only a spell of unemployment above the base case can bring the real wage back to its long-term level again, and the process results in continual overshooting and a damped oscillating pattern. The effect requires less severe of a downturn in Simulation 5 relative to Simulation 1 , because the low-growth base case mutes impacts on wages and prices and so causes there to be less to address.

4.2.6 New Construction - Low Base - Normal Imports - Interest Rate Target

Details for this simulation can be found in Table and Chart 4.6. In the first year of the simulation, real GDP rises by about $1.5 billion (1986 dollars) or $1.9 billion in 1996 dollars. Thus the first-year multiplier is about 1.5. In the second year the multiplier is 2.2 with an output shift of $2.8 billion in 1996 dollars. This is approximately one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base. Because this simulation was conducted on the "Low" growth base, however, not as much wage and price increase occurs in the initial years of the shock and the negative portion required to re-adjust real wages is less severe.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 35 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of 23 thousand person years. By year 5 a tiny decline in employment relative to base is registered, with additional declines probably required in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is almost as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate; an exchange rate that depreciates by almost one-fifth of one per cent is the reason.

Table 4.6

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / Low Base / Normal Imports / Interest Rate Target

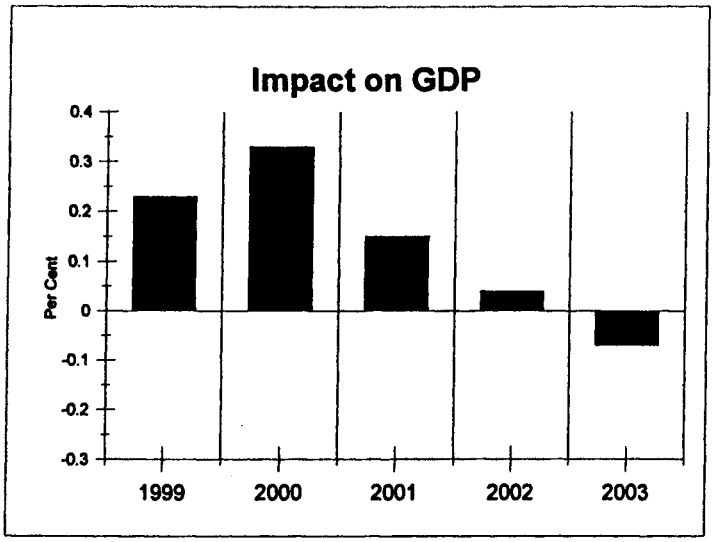
Summary of Impacts

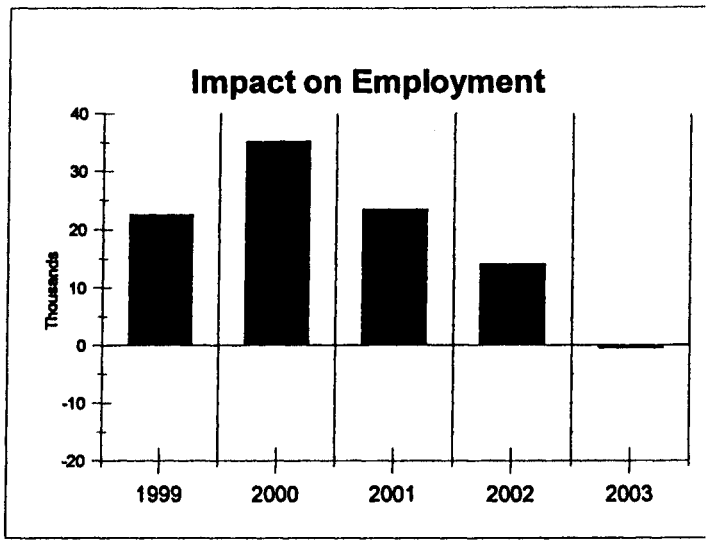
(Percentage Change; * Indicates change in levels)

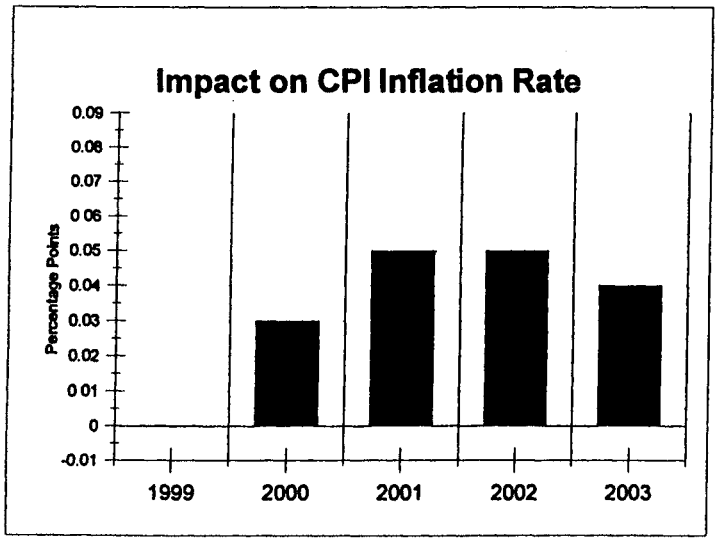
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1498	2206	1048	270	-507
Real GDP ($96 Million) *	1929	2839	1349	347	-652
Real Gross Domestic Product	0.23	0.33	0.15	0.04	-0.07
Expenditure on Personal Consumption	0.08	0.20	0.19	0.06	-0.07
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.91	1.07	0.24	0.05	-0.12
Residential Construction	3.43	3.70	0.47	0.07	-0.30
Non-Residential Construction	0.05	0.13	0.11	0.00	-0.09
Machinery and Equipment	0.09	0.22	0.18	0.05	-0.05
Exports	0.03	0.07	0.07	0.06	0.03
Imports	0.07	0.13	0.11	0.06	0.03
Nominal GDP ($ Million) *	1873	3078	2115	1541	896
Implicit Deflator for GDP	-0.01	0.01	0.07	0.12	0.16
Consumer Price Index	0.00	0.02	0.07	0.12	0.16
CPI - Inflation Rate (%) *	0.00	0.03	0.05	0.05	0.04
Unemployment Rate (%) *	-0.11	-0.16	-0.10	-0.05	0.01
Employment	0.16	0.25	0.16	0.10	0.00
Employment ('000) *	22.6	35.2	23.5	14.1	-0.5
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.03	0.08	0.13	0.16	0.18
Real Annual Wages per Employee	0.03	0.06	0.06	0.04	0.02
Productivity Change (GDP/Employee)	0.06	0.07	-0.01	-0.06	-0.07
Exchange Rate (US $/Cdn $)	-0.08	-0.16	-0.17	-0.18	-0.16
Balance on Current Account ($ Mill) *	-255	-408	-191	-4	112
Cumulative Current Account as a % of GDP *	-0.05	-0.04	0.03	0.05	0.06
Federal Gov't: Revenues ($ Mill)	353	564	389	275	113
Balance (Surp(+),Def(-)) ($ Mill)	510	910	733	525	221
Provincial Gov'ts: Revenues ($ Mill)	269	466	350	255	150
Balance (Surp(+),Def(-)) ($ Mill)	282	452	257	90	-82
Real Personal Disposable Income	0.12	0.18	0.08	0.00	-0.07
Personal Savings Rate (%) *	0.04	-0.02	-0.10	-0.06	-0.01
Nominal After-Tax Corp. Profits	1.02	1.21	0.21	-0.58	-1.12

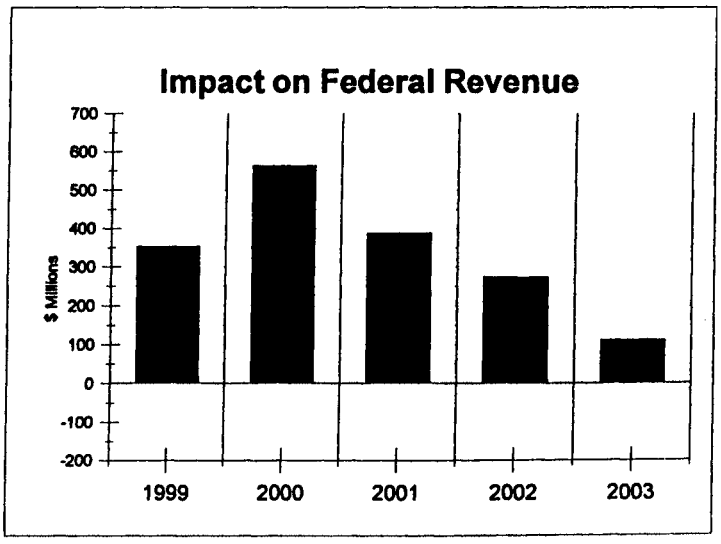
Chart 4.6

New Construction - Low Base - Normal Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









Despite the depreciating exchange rate, the impact on the CPI inflation rate is relatively modest because we have started from a high unemployment rate. The maximum inflation rate increase is five one-hundredths of a per cent (in years 4 and 5). This is more than when the exchange rate is targeted (even in the High base case) but still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is about .16 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by $900 million, and the provincial balance by almost $1/2 billion. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact - and this difference is much more pronounced than in Simulation 1.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.7 New Construction - Low Base - Double Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.7. In the first year of the simulation, real GDP rises by about $1.1 billion (1986 dollars) or over $1.4 billion in 1996 dollars. The first- and second-year multipliers are about 1.1 and 1.5 respectively. The maximum impact on GDP, in the second year, is just under a quarter of one per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is positive but small. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of unemployment higher than base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Table 4.7

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / Low Base / Double Imports / Exchange Rate Target

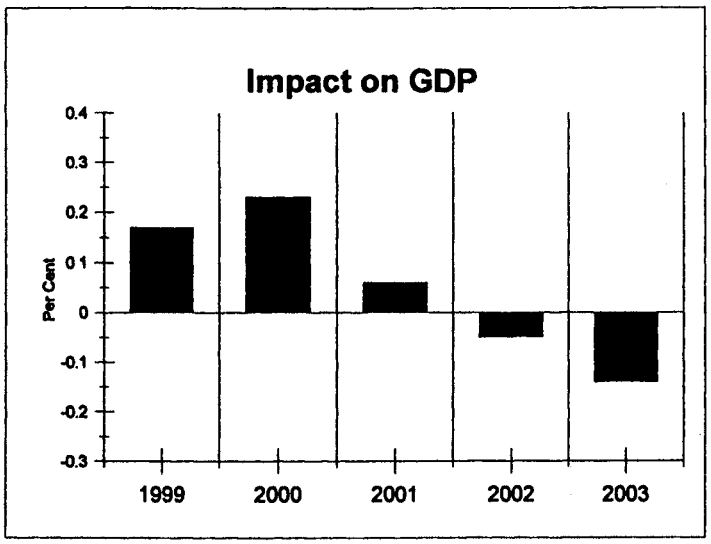
Summary of Impacts

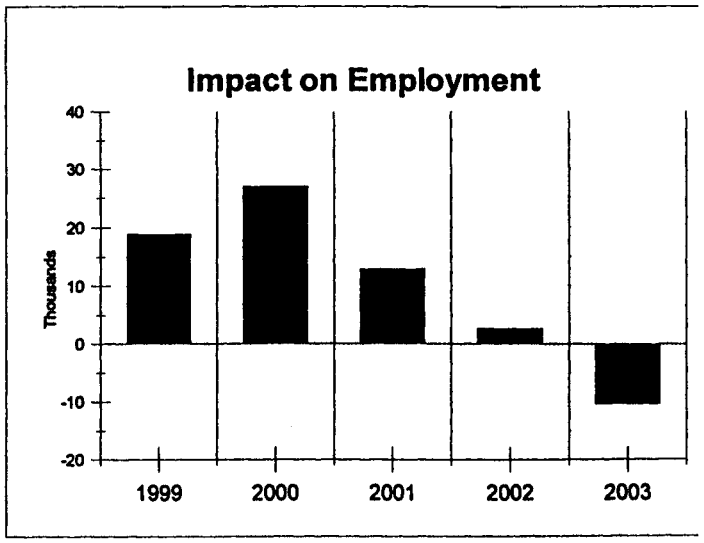
(Percentage Change; * Indicates change in levels)

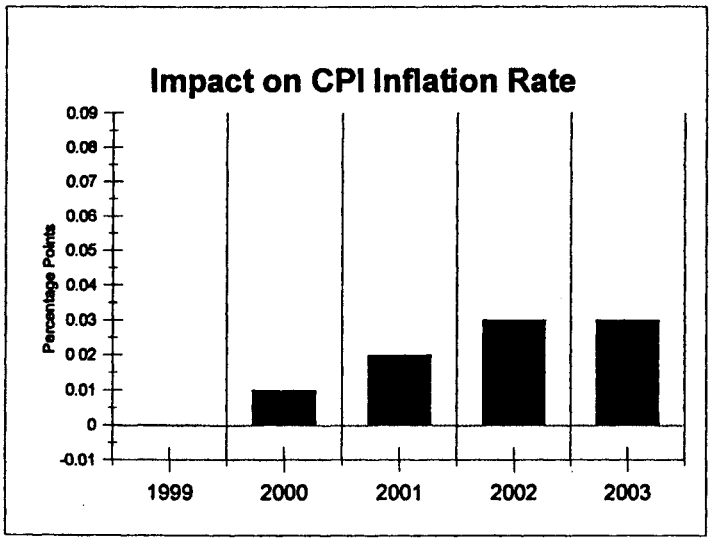
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1108	1503	391	-369	-989
Real GDP ($96 Million) *	1426	1934	503	-475	-1273
Real Gross Domestic Product	0.17	0.23	0.06	-0.05	-0.14
Expenditure on Personal Consumption	0.12	0.26	0.20	0.00	-0.15
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.81	0.80	0.00	-0.03	-0.12
Residential Construction	3.18	3.17	0.12	0.03	-0.29
Non-Residential Construction	-0.01	0.02	0.02	-0.05	-0.12
Machinery and Equipment	0.03	0.01	-0.06	-0.06	-0.05
Exports	-0.01	-0.02	-0.02	-0.03	-0.03
Imports	0.16	0.22	0.10	0.04	0.00
Nominal GDP ($ Million) *	1582	2355	1090	208	-469
Implicit Deflator for GDP	0.01	0.03	0.06	0.07	0.09
Consumer Price Index	0.00	0.01	0.03	0.06	0.08
CPI - Inflation Rate (%) *	0.00	0.01	0.02	0.03	0.03
Unemployment Rate (%) *	-0.09	-0.12	-0.05	0.00	0.05
Employment	0.13	0.19	0.09	0.02	-0.07
Employment ('000) *	18.9	27.0	12.9	2.7	-10.4
Finance Co. 90-Day Paper Rate (%) *	0.06	0.07	0.01	-0.01	0.00
Industrial Bond Rate (%) *	0.07	0.08	0.01	-0.01	0.00
Average Annual Wages and Salaries	0.02	0.06	0.08	0.08	0.07
Real Annual Wages per Employee	0.02	0.05	0.04	0.02	-0.01
Productivity Change (GDP/Employee)	0.03	0.03	-0.03	-0.07	-0.07
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-612	-976	-628	-404	-208
Cumulative Current Account as a % of GDP *	-0.01	0.06	0.18	0.25	0.29
Federal Gov't: Revenues ($ Mill)	347	515	245	31	-128
Balance (Surp(+),Def(-)) ($ Mill)	311	423	256	148	-166
Provincial Gov'ts: Revenues ($ Mill)	262	414	205	25	-85
Balance (Surp(+),Def(-)) ($ Mill)	274	423	172	-48	-197
Real Personal Disposable Income	0.11	0.17	0.06	-0.06	-0.13
Personal Savings Rate (%) *	-0.02	-0.10	-0.14	-0.05	0.01
Nominal After-Tax Corp. Profits	0.90	0.88	-0.46	-1.68	-1.80

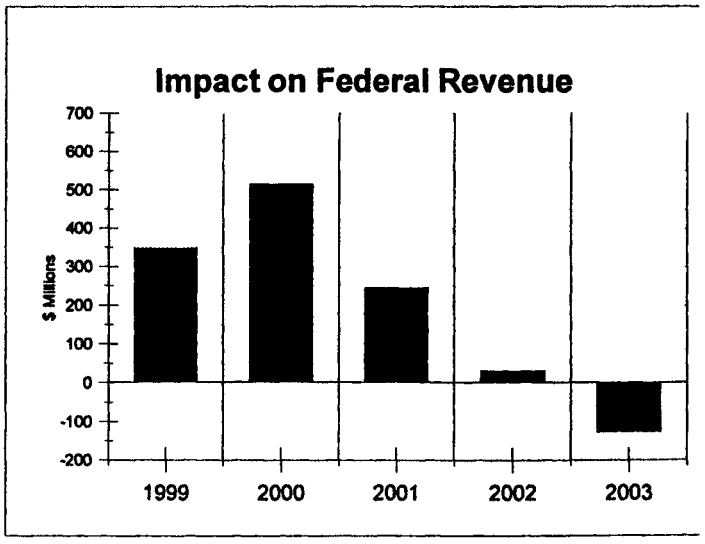
Chart 4.7

New Construction - Low Base - Double Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 27 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 13 thousand person years. By year 5 there is a decline in employment relative to base of about 10 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Residential spending shows some additional stimulation beyond the base case due to lower unemployment only partly offset by small interest-rate increases. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise relatively strongly in years 1 and 2 because this is a "Double Imports" shock.

The additional inflation caused by this shock is very modest, and is lower than that of Simulation 1 due to the higher output and employment gap in this base, which mute effects on wages and hence on prices, *and* due to the increased leakage from imports. The additional inflation peaks in year 4 at just .03 percentage points above base. Interest rates rise a maximum of 7 basis points in the second year and fall to base levels immediately thereafter.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. Because provincial spending is more sensitive to inflation, the gap between revenue and balance improvements is more pronounced for provincial governments than for the federal government.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.8 New Construction - Low Base - Double Imports - Interest rate Target

Details for this simulation can be found in Table and Chart 4.8. In the first year of the simulation, real GDP rises by about $1.4 billion (1986 dollars) or almost $1.9 billion in 1996 dollars. Thus the first-year multiplier is about 1.4. In the second year the multiplier is 2.1 with an output shift of $2.7 billion in 1996 dollars. This is approximately one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base. Because this simulation was conducted on the "Low" growth base, however, not as much wage and price increase occurs in the initial years of the shock and the period of negative impact required to re-adjust real wages is less severe.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 34 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of 23 thousand person years. By year 5 there is no change in employment relative to base, but small negative impacts would probably occur in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and

Table 4.8

** $ 1 Billion Increase in Housing Construction 1999-2000 **
New Construction / Low Base / Double Imports / Interest Rate Target

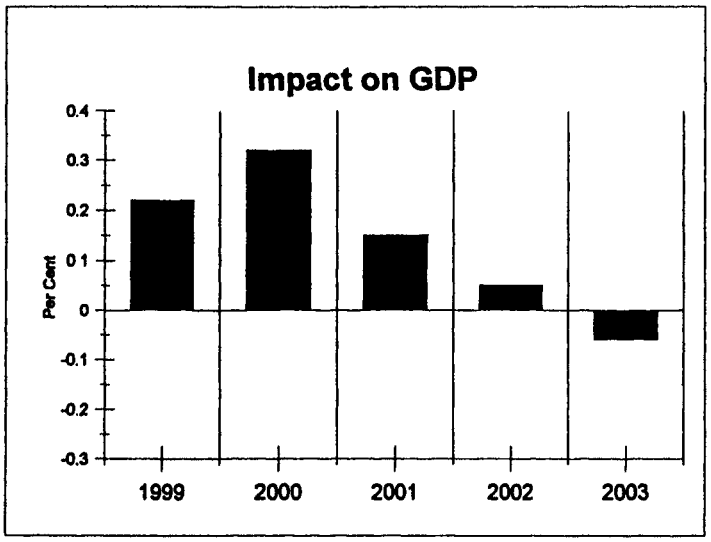
Summary of Impacts

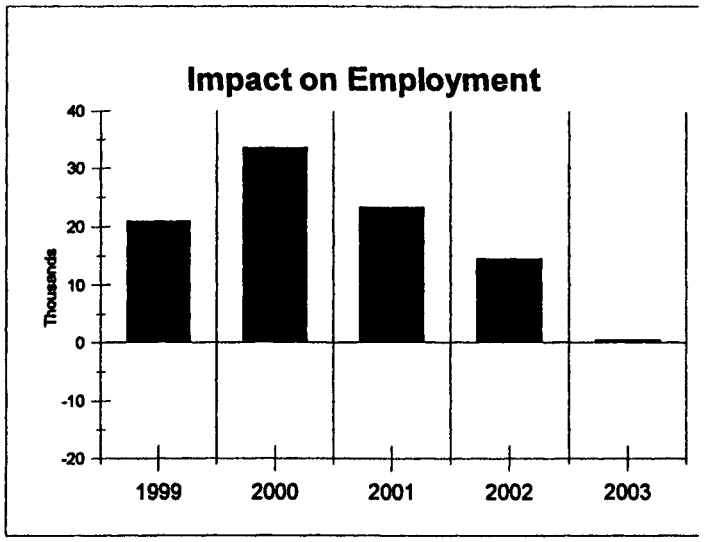
(Percentage Change; * Indicates change in levels)

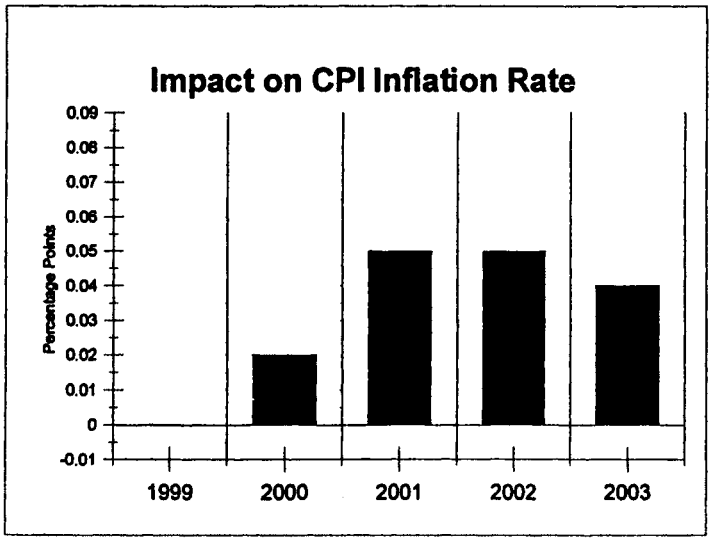
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1444	2130	1049	320	-431
Real GDP ($96 Million) *	1858	2741	1350	412	-555
Real Gross Domestic Product	0.22	0.32	0.15	0.05	-0.06
Expenditure on Personal Consumption	0.07	0.19	0.19	0.07	-0.06
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.90	1.05	0.23	0.05	-0.11
Residential Construction	3.40	3.67	0.47	0.09	-0.27
Non-Residential Construction	0.05	0.13	0.11	0.00	-0.08
Machinery and Equipment	0.09	0.20	0.17	0.05	-0.05
Exports	0.04	0.08	0.08	0.06	0.04
Imports	0.08	0.14	0.10	0.06	0.03
Nominal GDP ($ Million) *	1800	2971	2093	1575	960
Implicit Deflator for GDP	-0.01	0.01	0.07	0.12	0.16
Consumer Price Index	0.00	0.02	0.07	0.12	0.16
CPI - Inflation Rate (%) *	0.00	0.02	0.05	0.05	0.04
Unemployment Rate (%) *	-0.10	-0.16	-0.10	-0.06	0.01
Employment	0.15	0.24	0.16	0.10	0.00
Employment ('000) *	21.0	33.6	23.3	14.5	0.5
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.03	0.08	0.13	0.16	0.18
Real Annual Wages per Employee	0.03	0.06	0.06	0.04	0.02
Productivity Change (GDP/Employee)	0.06	0.07	-0.01	-0.06	-0.06
Exchange Rate (US $/Cdn $)	-0.10	-0.18	-0.18	-0.19	-0.16
Balance on Current Account ($ Mill) *	-299	-436	-164	15	118
Cumulative Current Account as a % of GDP *	-0.04	-0.03	0.04	0.06	0.06
Federal Gov't: Revenues ($ Mill)	338	544	385	280	125
Balance (Surp(+),Def(-)) ($ Mill)	485	872	717	529	240
Provincial Gov'ts: Revenues ($ Mill)	257	449	345	259	159
Balance (Surp(+),Def(-)) ($ Mill)	268	433	252	95	-70
Real Personal Disposable Income	0.11	0.17	0.08	0.00	-0.07
Personal Savings Rate (%) *	0.03	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	1.03	1.18	0.22	-0.50	-1.04

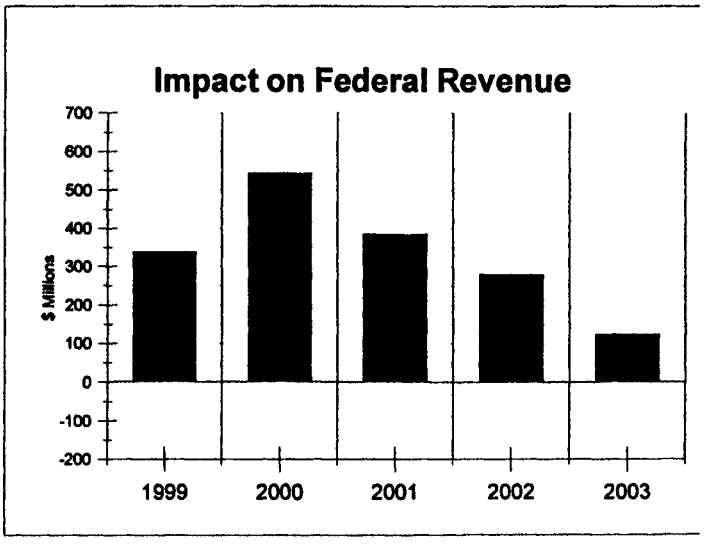
Chart 4.8

New Construction - Low Base - Double Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate; an exchange rate that depreciates by almost one-fifth of one per cent through much of the simulation is the reason.

Despite the depreciating exchange rate, the impact on the CPI inflation rate is relatively modest because we have started from a high unemployment rate. The maximum inflation rate increase is five one-hundredths of a per cent (in years 3 and 4). This is more than when the exchange rate is targeted (even in the High base case) but still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is about .16 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by almost $900 million, and the provincial balance by over $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact, especially for the balance. The reason is that federal expenditures, notably for EI, are more cyclically sensitive and provincial expenditures more sensitive to an increase in the price level.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.9 Alterations - High Base - Normal Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.9. This and the remaining seven simulations to review are all for housing construction in the form of Alterations, rather than new construction. As we showed in Table 3.4 above, the main difference between Alterations and New Construction is that the former uses higher imports (roughly 14% more) and less employment (roughly 12% less), but its workers are generally better paid (the difference is total Wages and Salaries paid is less than the difference in employment). We should not thus expect massive differences between the simulations with New Construction and those based on Alterations.

Table 4.9

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / High Base / Normal Imports / Exchange Rate Target

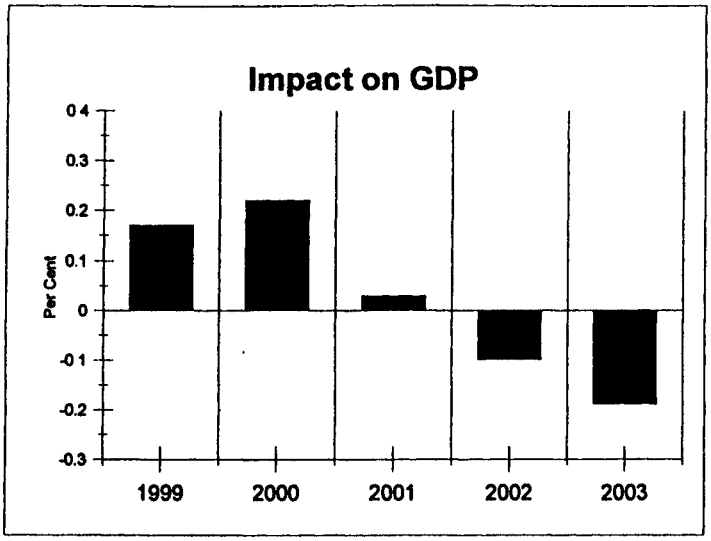
Summary of Impacts

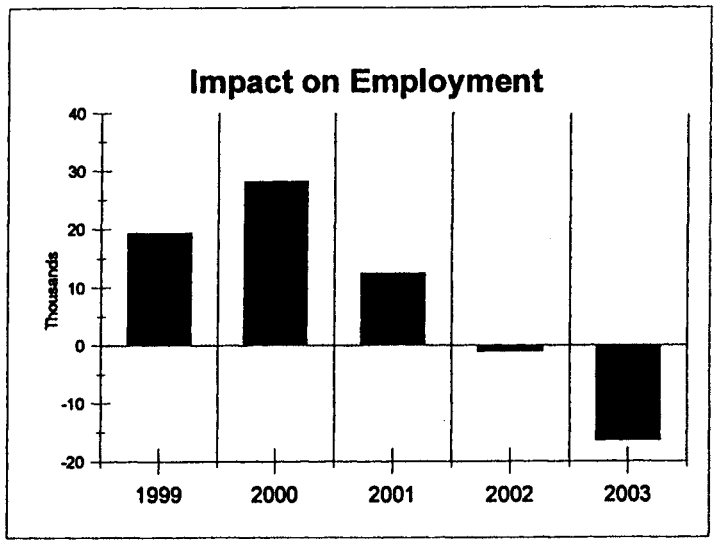
(Percentage Change; * Indicates change in levels)

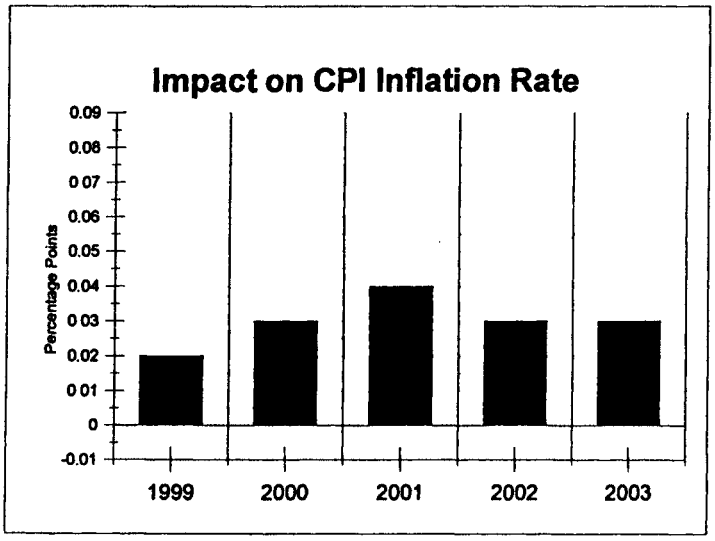
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1172	1555	229	-715	-1421
Real GDP ($96 Million) *	1509	2001	294	-920	-1829
Real Gross Domestic Product	0.17	0.22	0.03	-0.10	-0.19
Expenditure on Personal Consumption	0.13	0.31	0.23	0.00	-0.17
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.73	0.69	-0.06	-0.12	-0.19
Residential Construction	3.01	2.93	0.04	-0.09	-0.41
Non-Residential Construction	0.00	0.05	0.04	-0.05	-0.11
Machinery and Equipment	0.04	-0.01	-0.14	-0.15	-0.12
Exports	-0.01	-0.03	-0.05	-0.06	-0.07
Imports	0.16	0.23	0.13	0.07	0.01
Nominal GDP ($ Million) *	1801	2877	1613	588	-275
Implicit Deflator for GDP	0.03	0.08	0.13	0.16	0.17
Consumer Price Index	0.02	0.05	0.09	0.12	0.15
CPI - Inflation Rate (%) *	0.02	0.03	0.04	0.03	0.03
Unemployment Rate (%) *	-0.09	-0.13	-0.05	0.02	0.08
Employment	0.13	0.19	0.08	-0.01	-0.11
Employment ('000) *	19.3	28.2	12.5	-1.1	-16.5
Finance Co. 90-Day Paper Rate (%) *	0.06	0.08	0.03	0.00	0.00
Industrial Bond Rate (%) *	0.07	0.10	0.03	0.00	0.00
Average Annual Wages and Salaries	0.03	0.10	0.14	0.14	0.12
Real Annual Wages per Employee	0.01	0.05	0.05	0.02	-0.02
Productivity Change (GDP/Employee)	0.03	0.02	-0.05	-0.09	-0.08
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-605	-1077	-827	-571	-328
Cumulative Current Account as a % of GDP *	-0.02	0.05	0.18	0.27	0.31
Federal Gov't: Revenues ($ Mill)	377	626	397	156	-67
Balance (Surp(+),Def(-)) ($ Mill)	336	481	288	117	-241
Provincial Gov'ts: Revenues ($ Mill)	289	514	336	123	-32
Balance (Surp(+),Def(-)) ($ Mill)	286	464	196	-88	-287
Real Personal Disposable Income	0.09	0.16	0.06	-0.06	-0.16
Personal Savings Rate (%) *	-0.05	-0.16	-0.18	-0.07	0.00
Nominal After-Tax Corp. Profits	1.12	1.38	-0.16	-1.28	-1.35

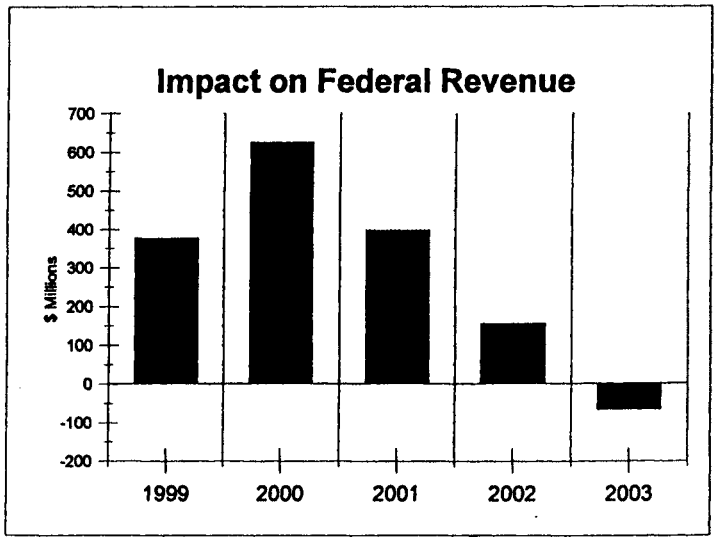
Chart 4.9

Alterations - High Base - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









generally better paid (the difference is total Wages and Salaries paid is less than the difference in employment). We should not thus expect massive differences between the simulations with New Construction and those based on Alterations.

In the first year of the simulation, real GDP in Simulation 9 rises by about $1.2 billion (1986 dollars) or over $1.5 billion in 1996 dollars. The first- and second-year multipliers are about 1.2 and 1.6 respectively. The maximum impact on GDP, in the second year, is just over one-fifth of one per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is positive but small. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of unemployment higher than base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 28 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 13 thousand person years. By year 5 there is a decline in employment relative to base of about 16 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Residential spending is up primarily because of the basic shock; the extra stimulative effect of lower unemployment is offset by the negative effect of higher interest rates as the Bank of Canada defends the base exchange rate. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise relatively

strongly in years 1 and 2 because Alterations are more import-intensive than New Construction, as well as due to the import share of induced expenditure and some price substitution effects.

The additional inflation caused by this shock is relatively modest, and is generally a little lower than that of Simulation 1 due to the greater import leakage and smaller employment impact of Alterations. The additional inflation peaks in year 3 at just .04 percentage points above base. Interest rates rise a maximum of 8 basis points in the second year and fall to base levels in years 4 and 5.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. Because provincial spending is more sensitive to inflation, the gap between revenue and balance improvements is somewhat more pronounced for provincial governments than for the federal government.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.10 Alterations - High Base - Normal Imports - Interest Rate Target

Details for this simulation can be found in Table and Chart 4.10. In the first year of the simulation, real GDP rises by about $1.5 billion (1986 dollars) or $1.9 billion in 1996 dollars. Thus the first-year multiplier is about 1.5. In the second year the multiplier is 2.2 with an output shift of $2.8 billion in 1996 dollars. This is approximately one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Table 4.10

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / High Base / Normal Imports / Interest Rate Target

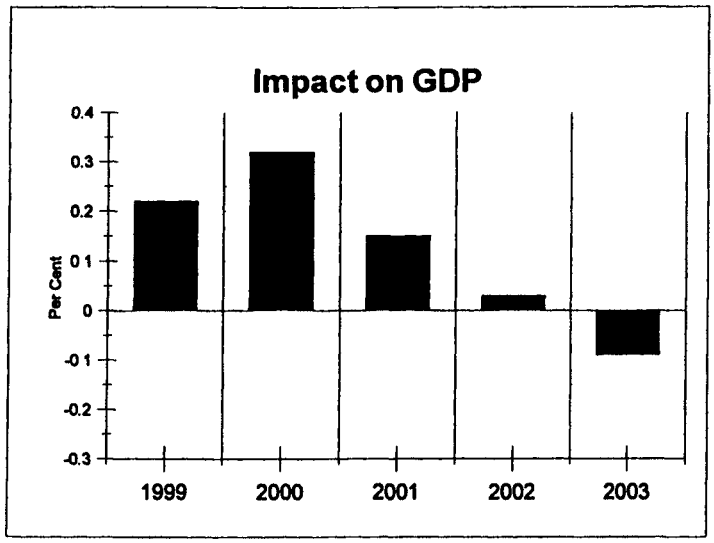
Summary of Impacts

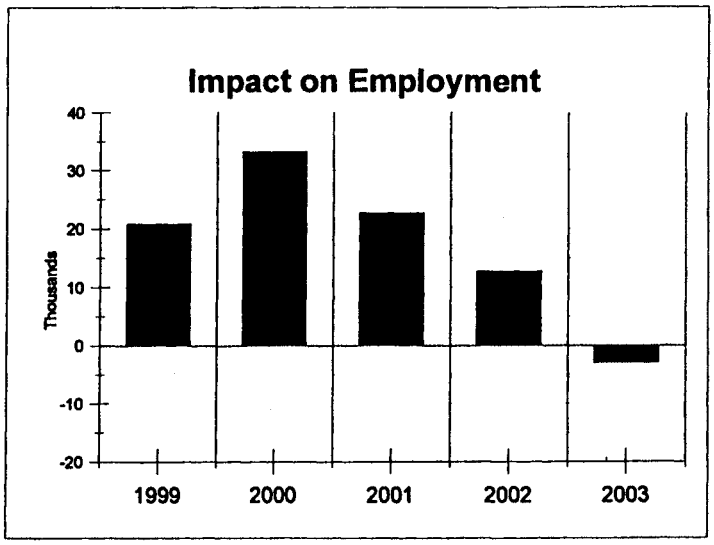
(Percentage Change; * Indicates change in levels)

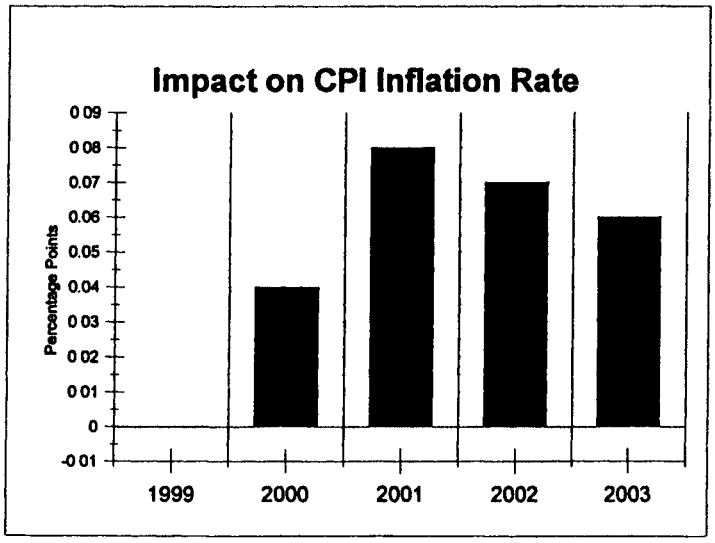
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1486	2204	1060	229	-643
Real GDP ($96 Million) *	1913	2837	1364	295	-827
Real Gross Domestic Product	0.22	0.32	0.15	0.03	-0.09
Expenditure on Personal Consumption	0.07	0.19	0.19	0.07	-0.06
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.82	0.96	0.24	0.06	-0.12
Residential Construction	3.20	3.44	0.49	0.10	-0.31
Non-Residential Construction	0.05	0.13	0.10	0.00	-0.08
Machinery and Equipment	0.09	0.22	0.19	0.06	-0.06
Exports	0.03	0.07	0.07	0.06	0.03
Imports	0.07	0.14	0.12	0.09	0.05
Nominal GDP ($ Million) *	1842	3249	2672	2376	1849
Implicit Deflator for GDP	-0.01	0.03	0.12	0.20	0.26
Consumer Price Index	0.00	0.05	0.13	0.20	0.25
CPI - Inflation Rate (%) *	0.00	0.04	0.08	0.07	0.06
Unemployment Rate (%) *	-0.10	-0.15	-0.09	-0.04	0.03
Employment	0.14	0.23	0.15	0.08	-0.02
Employment ('000) *	20.8	33.2	22.6	12.8	-3.0
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.04	0.12	0.20	0.26	0.29
Real Annual Wages per Employee	0.03	0.08	0.08	0.06	0.03
Productivity Change (GDP/Employee)	0.07	0.08	-0.01	-0.05	-0.07
Exchange Rate (US $/Cdn $)	-0.09	-0.18	-0.21	-0.24	-0.23
Balance on Current Account ($ Mill) *	-275	-457	-282	-133	-10
Cumulative Current Account as a % of GDP *	-0.04	-0.04	0.02	0.05	0.07
Federal Gov't: Revenues ($ Mill)	338	603	517	451	298
Balance (Surp(+),Def(-)) ($ Mill)	459	857	740	544	221
Provincial Gov'ts: Revenues ($ Mill)	260	503	469	422	334
Balance (Surp(+),Def(-)) ($ Mill)	264	436	264	87	-117
Real Personal Disposable Income	0.11	0.18	0.09	0.01	-0.07
Personal Savings Rate (%) *	0.04	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	0.97	1.24	0.39	-0.17	-0.51

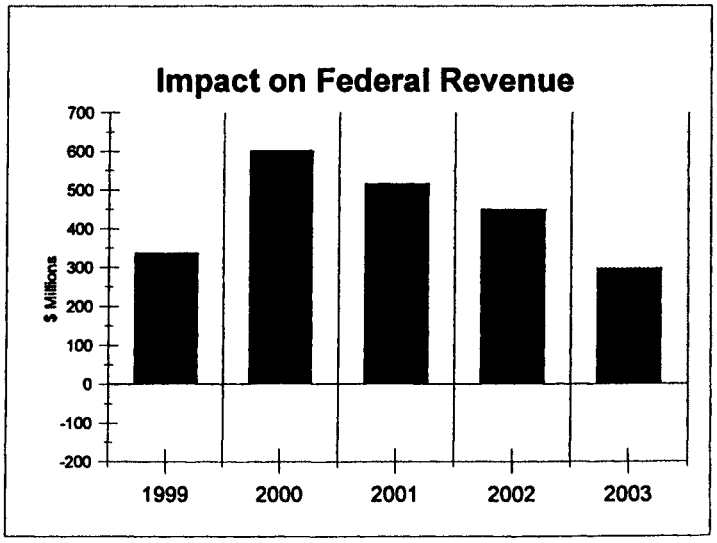
Chart 4.10

Alterations - High Base - Normal Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 33 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of 23 thousand person years. By year 5 there is a small reduction in employment relative to base, but small negative impacts would probably occur in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate - all due to an exchange rate that depreciates by almost one-quarter of one per cent by year 4.

The combination of the depreciating exchange rate and the High base gives one of the larger CPI impacts. The maximum inflation rate increase is eight one-hundredths of a per cent (in year 3). This is still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is about .25 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by almost $900 million, and the provincial balance by over $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact, especially for the balance. The reason is that federal expenditures, notably for EI, are more cyclically sensitive and provincial expenditures more sensitive to an increase in the price level.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.11 Alterations - High Base - Double Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.11. In the first year of the simulation, real GDP rises by about $1 billion (1986 dollars) or over $1.3 billion in 1996 dollars. The first- and second-year multipliers are about 1.0 and 1.4 respectively. The maximum impact on GDP, in the second year, is one-fifth of one per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is positive but small. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of unemployment higher than base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 26 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 12 thousand person years. By year 5 there is a decline in employment relative to base of about 16 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Residential spending is up primarily because of the basic shock; the extra stimulative effect of lower unemployment is more than offset by the negative effect of higher interest rates as the Bank of Canada defends the base exchange rate. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise relatively strongly in years 1 and 2 because Alterations are more import-intensive than New Construction and because this is a Double Imports experiment.

Table 4.11

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / High Base / Double Imports / Exchange Rate Target

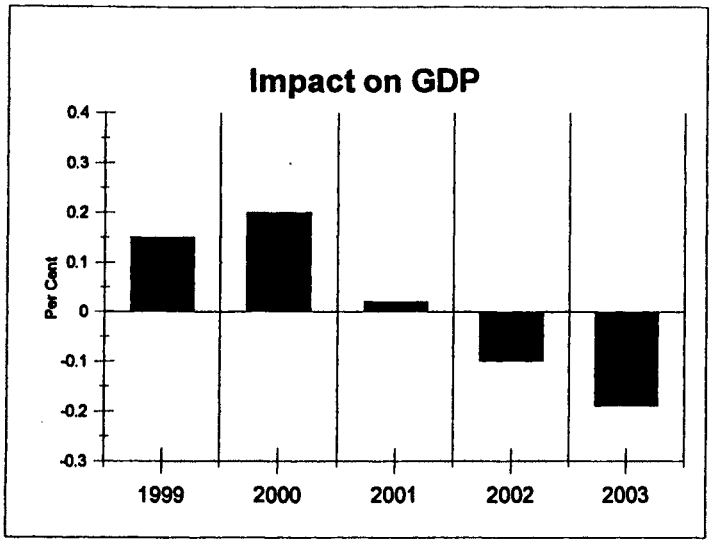
Summary of Impacts

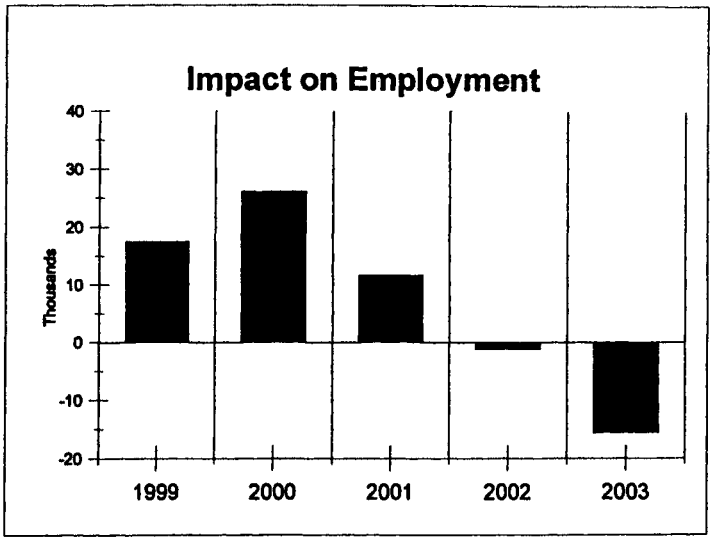
(Percentage Change; * Indicates change in levels)

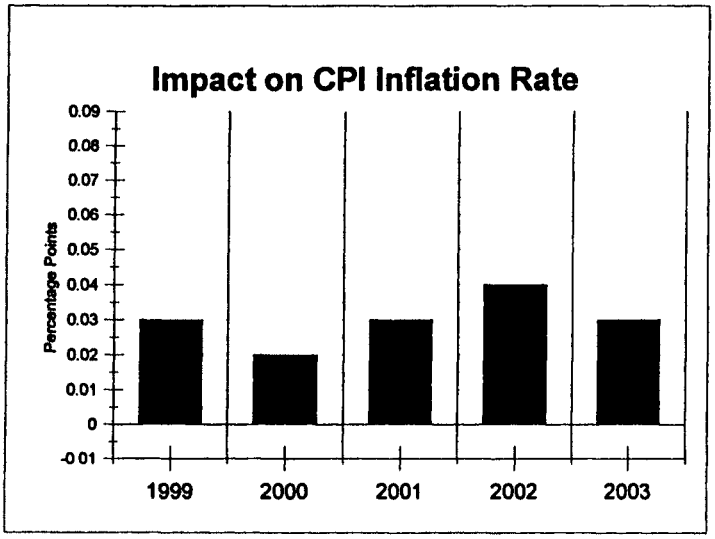
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1019	1361	175	-711	-1384
Real GDP ($96 Million) *	1311	1752	225	-915	-1781
Real Gross Domestic Product	0.15	0.20	0.02	-0.10	-0.19
Expenditure on Personal Consumption	0.15	0.30	0.20	-0.02	-0.17
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.69	0.63	-0.07	-0.08	-0.17
Residential Construction	2.92	2.84	0.08	-0.02	-0.40
Non-Residential Construction	-0.02	0.04	0.05	-0.04	-0.11
Machinery and Equipment	0.01	-0.08	-0.17	-0.12	-0.09
Exports	-0.01	-0.04	-0.05	-0.06	-0.06
Imports	0.19	0.25	0.11	0.06	0.01
Nominal GDP ($ Million) *	1719	2680	1443	486	-277
Implicit Deflator for GDP	0.04	0.09	0.12	0.15	0.16
Consumer Price Index	0.03	0.05	0.08	0.11	0.14
CPI - Inflation Rate (%) *	0.03	0.02	0.03	0.04	0.03
Unemployment Rate (%) *	-0.08	-0.12	-0.04	0.02	0.08
Employment	0.12	0.18	0.08	-0.01	-0.10
Employment ('000) *	17.5	26.1	11.7	-1.3	-15.7
Finance Co. 90-Day Paper Rate (%) *	0.08	0.09	0.01	-0.01	0.01
Industrial Bond Rate (%) *	0.09	0.10	0.02	-0.01	0.01
Average Annual Wages and Salaries	0.03	0.09	0.13	0.13	0.11
Real Annual Wages per Employee	0.00	0.04	0.05	0.01	-0.04
Productivity Change (GDP/Employee)	0.02	0.01	-0.05	-0.09	-0.08
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-755	-1195	-769	-534	-343
Cumulative Current Account as a % of GDP *	-0.01	0.08	0.21	0.29	0.33
Federal Gov't: Revenues ($ Mill)	375	601	358	129	-63
Balance (Surp(+),Def(-)) ($ Mill)	272	384	267	129	-248
Provincial Gov'ts: Revenues ($ Mill)	287	491	296	94	-33
Balance (Surp(+),Def(-)) ($ Mill)	278	443	168	-105	-272
Real Personal Disposable Income	0.08	0.15	0.06	-0.08	-0.17
Personal Savings Rate (%) *	-0.08	-0.17	-0.16	-0.05	0.00
Nominal After-Tax Corp. Profits	1.21	1.34	-0.32	-1.27	-1.13

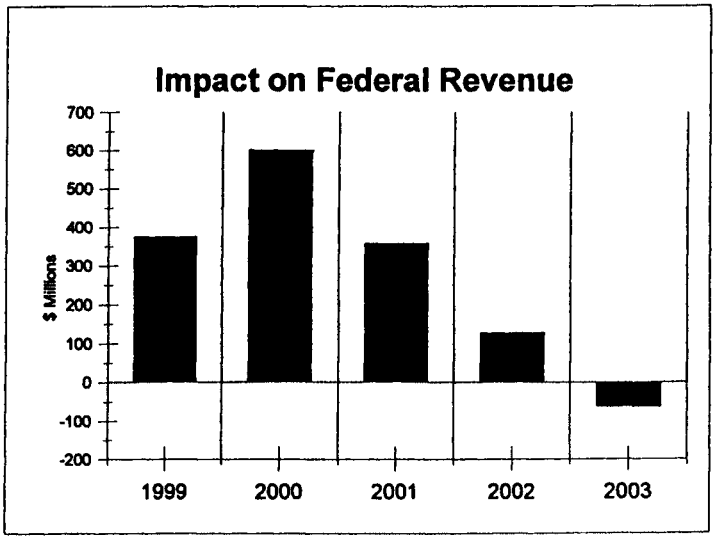
Chart 4.11

Alterations - High Base - Double Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









The additional inflation caused by this shock is relatively modest, and is generally a little lower than that of Simulation 1 due to the greater import leakage and smaller employment impact of Alterations. The additional inflation peaks in year 4 at just .04 percentage points above base. Interest rates rise a maximum of 9 basis points in the second year as, despite a smaller impact on real GDP, this experiment involves more imports and thus more downward pressure on the dollar to offset with higher interest rates.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. Because provincial spending is more sensitive to inflation, the gap between revenue and balance improvements is somewhat more pronounced for provincial governments than for the federal government.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.12 Alterations - High Base - Double Imports - Interest rate Target

Details for this simulation can be found in Table and Chart 4.12. In the first year of the simulation, real GDP rises by about $1.4 billion (1986 dollars) or $1.8 billion in 1996 dollars. Thus the first-year multiplier is about 1.4. In the second year the multiplier is 2.1 with an output shift of $2.7 billion in 1996 dollars. This is approximately three-tenths of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential (growth of about 1.5%-3% per year). In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Table 4.12

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / High Base / Double Imports / Interest Rate Target

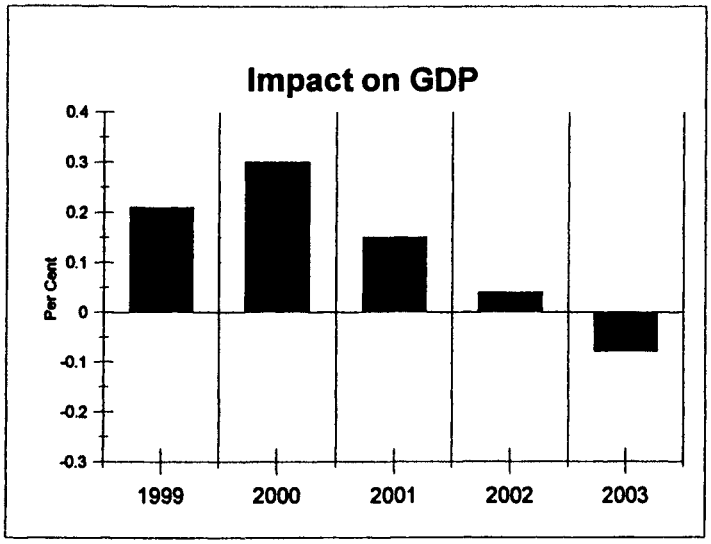
Summary of Impacts

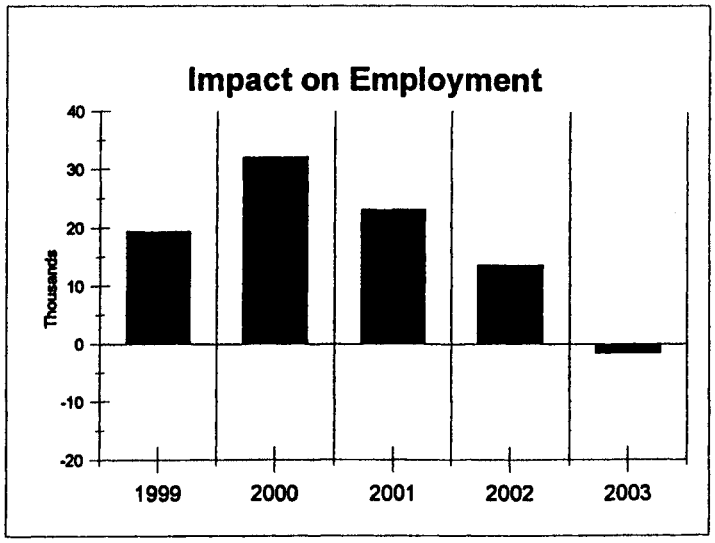
(Percentage Change; * Indicates change in levels)

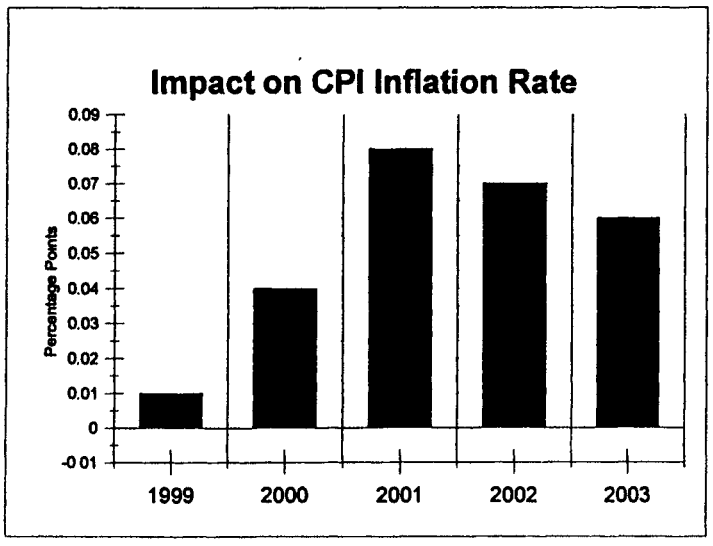
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1421	2117	1059	283	-568
Real GDP ($96 Million) *	1828	2725	1363	365	-731
Real Gross Domestic Product	0.21	0.30	0.15	0.04	-0.08
Expenditure on Personal Consumption	0.07	0.18	0.19	0.07	-0.06
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.81	0.94	0.24	0.06	-0.11
Residential Construction	3.17	3.42	0.50	0.13	-0.27
Non-Residential Construction	0.05	0.13	0.10	0.00	-0.07
Machinery and Equipment	0.09	0.20	0.17	0.05	-0.06
Exports	0.04	0.09	0.08	0.06	0.04
Imports	0.08	0.15	0.12	0.08	0.05
Nominal GDP ($ Million) *	1761	3126	2644	2418	1931
Implicit Deflator for GDP	-0.01	0.03	0.12	0.20	0.26
Consumer Price Index	0.00	0.05	0.12	0.20	0.25
CPI - Inflation Rate (%) *	0.01	0.04	0.08	0.07	0.06
Unemployment Rate (%) *	-0.09	-0.15	-0.10	-0.05	0.02
Employment	0.13	0.22	0.15	0.09	-0.01
Employment ('000) *	19.4	32.1	23.1	13.6	-1.7
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.03	0.12	0.20	0.25	0.28
Real Annual Wages per Employee	0.03	0.07	0.07	0.06	0.03
Productivity Change (GDP/Employee)	0.07	0.08	-0.01	-0.05	-0.06
Exchange Rate (US $/Cdn $)	-0.11	-0.20	-0.22	-0.24	-0.23
Balance on Current Account ($ Mill) *	-329	-493	-248	-108	-3
Cumulative Current Account as a % of GDP *	-0.04	-0.03	0.03	0.05	0.07
Federal Gov't: Revenues ($ Mill)	321	580	511	457	313
Balance (Surp(+),Def(-)) ($ Mill)	433	821	729	554	247
Provincial Gov'ts: Revenues ($ Mill)	246	482	461	425	345
Balance (Surp(+),Def(-)) ($ Mill)	247	415	260	94	-102
Real Personal Disposable Income	0.10	0.17	0.09	0.01	-0.06
Personal Savings Rate (%) *	0.03	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	0.99	1.23	0.38	-0.10	-0.44

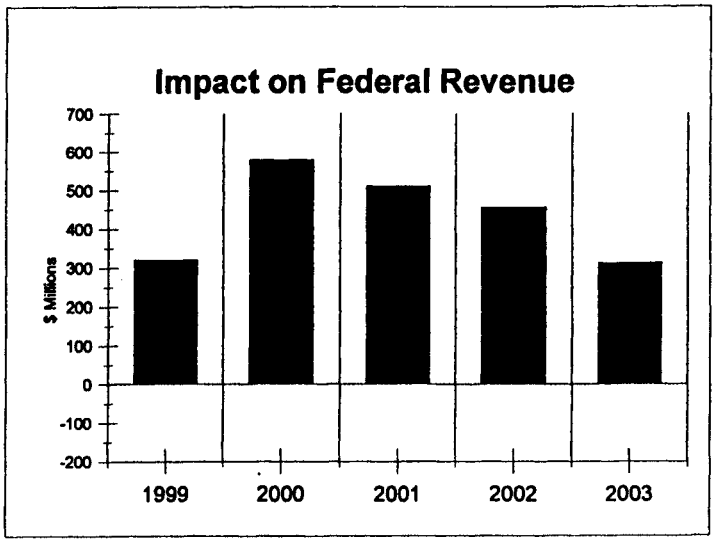
Chart 4.12

Alterations - High Base - Double Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 32 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of 23 thousand person years. By year 5 there is a small reduction in employment relative to base, but small negative impacts would probably occur in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate - all due to an exchange rate that depreciates by almost one-quarter of one per cent by year 4.

The combination of the depreciating exchange rate and the High base gives one of the larger CPI impacts. The maximum inflation rate increase is eight one-hundredths of a per cent (in year 3). This is still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is about .25 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by over $900 million, and the provincial balance by over $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact, especially for the balance. The reason is that federal expenditures, notably for EI, are more cyclically sensitive and provincial expenditures more sensitive to an increase in the price level.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.13 Alterations - Low Base - Normal Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.13. In the first year of the simulation, real GDP rises by about $1.2 billion (1986 dollars) or $1.5 billion in 1996 dollars. The first- and second-year multipliers are about 1.2 and 1.6 respectively. The maximum impact on GDP, in the second year, is almost one-quarter of one per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the GDP effect is just under $500 million. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of output below base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 27 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 14 thousand person years. By year 5 there is a decline in employment relative to base of about 10 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Residential spending is up primarily because of the basic shock; the extra stimulative effect of lower unemployment is largely, but not completely, offset by the negative effect of higher interest rates as the Bank of Canada defends the base exchange rate. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise relatively strongly in years 1 and 2 because Alterations are more import-intensive than New Construction.

Table 4.13

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / Low Base / Normal Imports / Exchange Rate Target

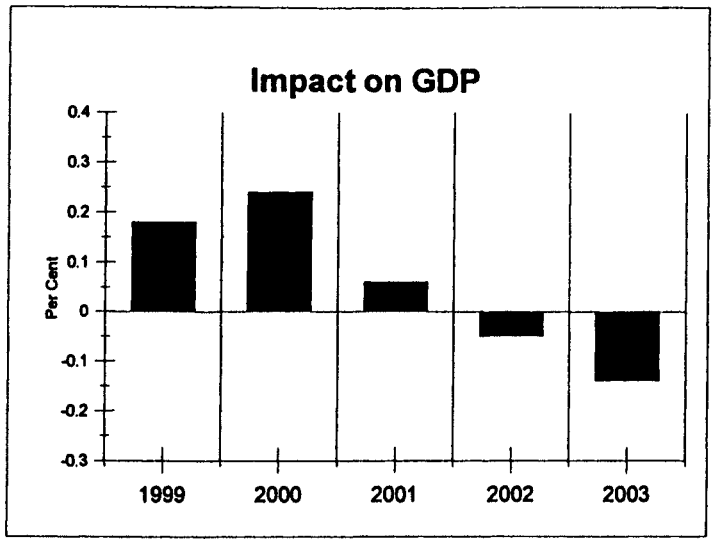
Summary of Impacts

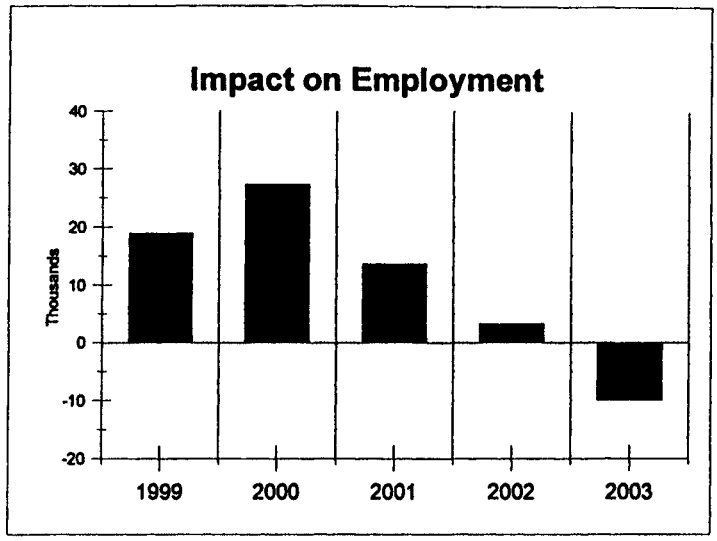
(Percentage Change; * Indicates change in levels)

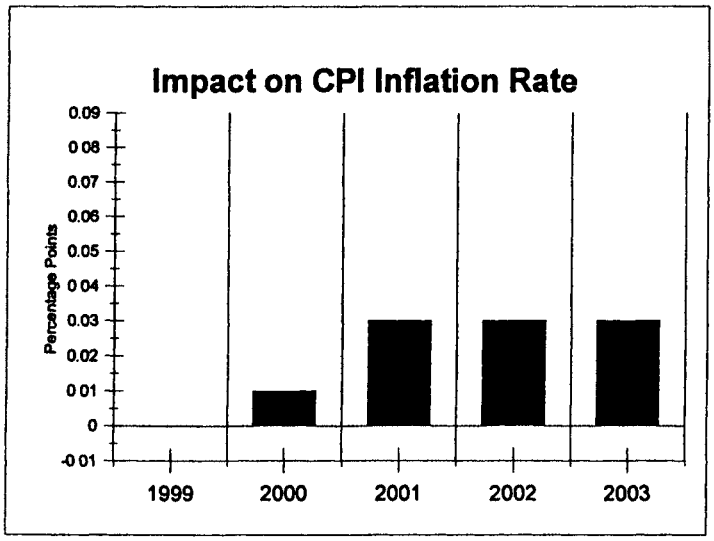
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1169	1581	438	-327	-963
Real GDP ($96 Million) *	1505	2035	563	-421	-1240
Real Gross Domestic Product	0.18	0.24	0.06	-0.05	-0.14
Expenditure on Personal Consumption	0.12	0.26	0.21	0.01	-0.14
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.82	0.82	0.01	-0.04	-0.12
Residential Construction	3.20	3.19	0.12	0.02	-0.28
Non-Residential Construction	0.00	0.04	0.03	-0.05	-0.12
Machinery and Equipment	0.05	0.04	-0.04	-0.06	-0.06
Exports	0.00	-0.01	-0.02	-0.03	-0.03
Imports	0.14	0.21	0.10	0.05	0.00
Nominal GDP ($ Million) *	1590	2389	1143	265	-433
Implicit Deflator for GDP	0.00	0.03	0.06	0.07	0.09
Consumer Price Index	0.00	0.00	0.03	0.05	0.08
CPI - Inflation Rate (%) *	0.00	0.01	0.03	0.03	0.03
Unemployment Rate (%) *	-0.09	-0.13	-0.06	-0.01	0.05
Employment	0.13	0.19	0.10	0.02	-0.07
Employment ('000) *	18.9	27.3	13.7	3.3	-10.0
Finance Co. 90-Day Paper Rate (%) *	0.05	0.07	0.01	-0.01	0.00
Industrial Bond Rate (%) *	0.06	0.08	0.02	-0.01	0.00
Average Annual Wages and Salaries	0.02	0.06	0.08	0.08	0.08
Real Annual Wages per Employee	0.02	0.05	0.05	0.02	-0.01
Productivity Change (GDP/Employee)	0.04	0.04	-0.03	-0.07	-0.07
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-547	-918	-636	-412	-210
Cumulative Current Account as a % of GDP *	-0.02	0.05	0.17	0.24	0.28
Federal Gov't: Revenues ($ Mill)	336	511	262	48	-121
Balance (Surp(+),Def(-)) ($ Mill)	323	450	273	157	-148
Provincial Gov'ts: Revenues ($ Mill)	251	409	218	38	-78
Balance (Surp(+),Def(-)) ($ Mill)	269	422	184	-36	-193
Real Personal Disposable Income	0.11	0.18	0.07	-0.05	-0.13
Personal Savings Rate (%) *	-0.01	-0.10	-0.14	-0.05	0.01
Nominal After-Tax Corp. Profits	0.96	0.98	-0.42	-1.67	-1.87

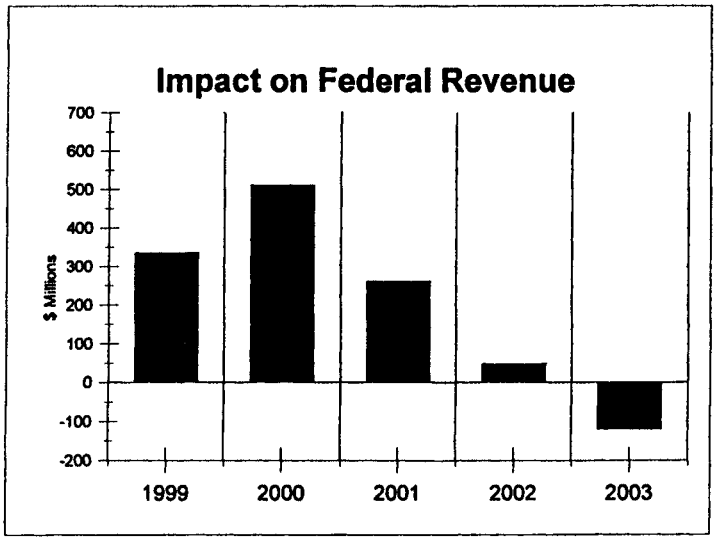
Chart 4.13

Alterations - Low Base - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









The additional inflation caused by this shock is relatively modest, and is generally a little lower than that of Simulation 1 due to the greater import leakage and smaller employment impact of Alterations. The additional inflation peaks in year 4 at only .03 percentage points above base. Interest rates rise a maximum of 7 basis points in the second year as, despite a smaller impact on real GDP, this experiment involves more imports and thus more downward pressure on the dollar to offset with higher interest rates.

Both federal and provincial revenues and balances are still improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.14 Alterations - Low Base - Normal Imports - Interest Rate Target

Details for this simulation can be found in Table and Chart 4.14. In the first year of the simulation, real GDP rises by about $1.5 billion (1986 dollars) or $1.9 billion in 1996 dollars. Thus the first-year multiplier is about 1.5. In the second year the multiplier is almost 2.2 with an output shift of $2.8 billion in 1996 dollars. This is approximately one-third of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential. In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 33 thousand extra person-years - and momentum and lags carry many of these gains through to

Table 4.14

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / Low Base / Normal Imports / Interest Rate Target

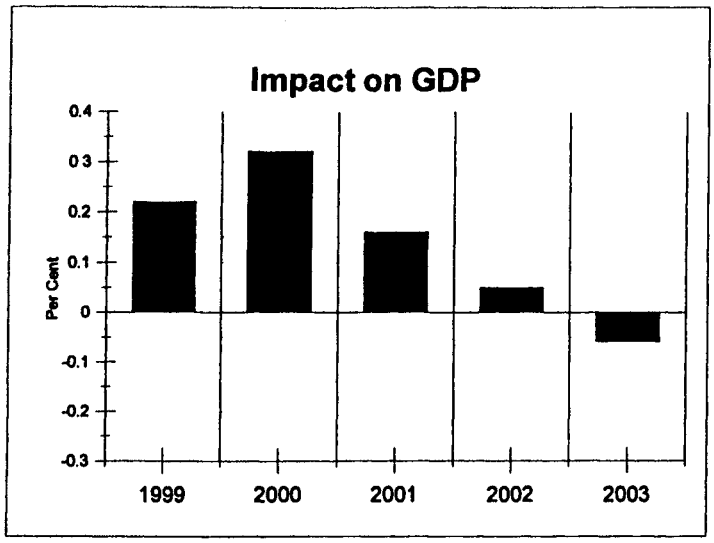
Summary of Impacts

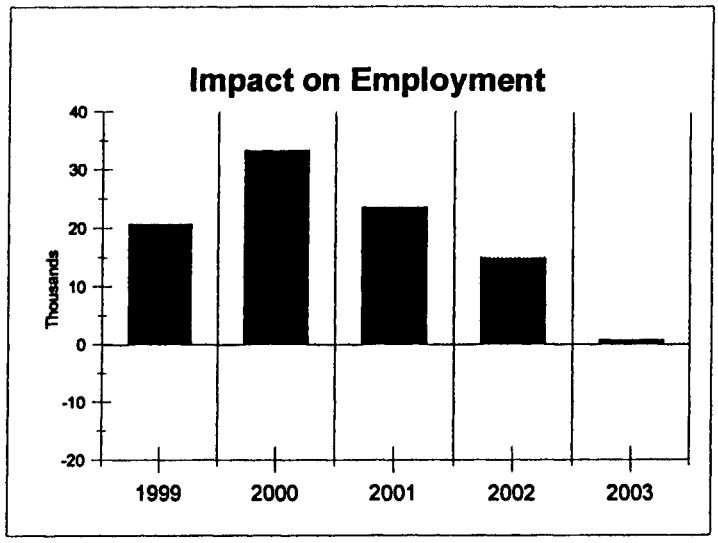
(Percentage Change; * Indicates change in levels)

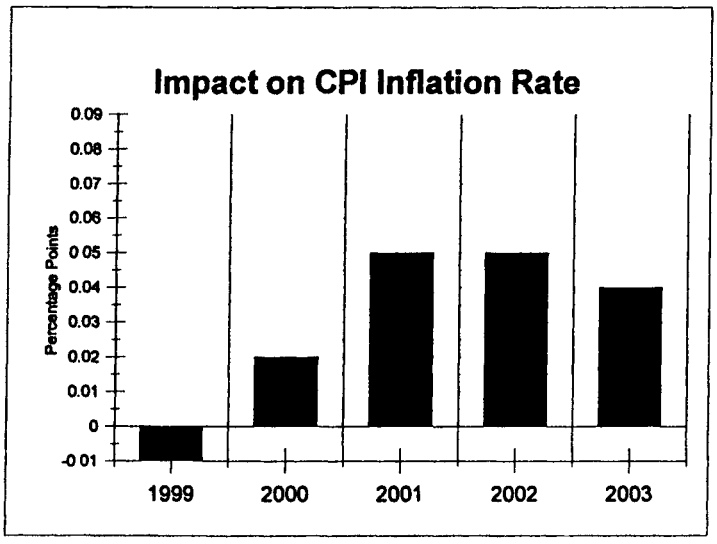
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1466	2161	1075	345	-411
Real GDP ($96 Million) *	1886	2782	1384	444	-529
Real Gross Domestic Product	0.22	0.32	0.16	0.05	-0.06
Expenditure on Personal Consumption	0.08	0.20	0.19	0.07	-0.05
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.90	1.05	0.24	0.06	-0.10
Residential Construction	3.39	3.66	0.47	0.11	-0.26
Non-Residential Construction	0.06	0.14	0.12	0.01	-0.08
Machinery and Equipment	0.09	0.21	0.18	0.06	-0.04
Exports	0.03	0.07	0.08	0.06	0.04
Imports	0.07	0.13	0.10	0.06	0.03
Nominal GDP ($ Million) *	1782	2952	2086	1568	955
Implicit Deflator for GDP	-0.02	0.00	0.07	0.11	0.15
Consumer Price Index	-0.01	0.02	0.07	0.11	0.15
CPI - Inflation Rate (%) *	-0.01	0.02	0.05	0.05	0.04
Unemployment Rate (%) *	-0.10	-0.15	-0.10	-0.06	0.01
Employment	0.15	0.23	0.16	0.10	0.01
Employment ('000) *	20.7	33.3	23.5	14.8	0.7
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.02	0.08	0.13	0.16	0.18
Real Annual Wages per Employee	0.03	0.06	0.06	0.04	0.02
Productivity Change (GDP/Employee)	0.07	0.08	-0.01	-0.05	-0.06
Exchange Rate (US $/Cdn $)	-0.09	-0.16	-0.17	-0.18	-0.16
Balance on Current Account ($ Mill) *	-271	-415	-176	3	110
Cumulative Current Account as a % of GDP *	-0.04	-0.03	0.03	0.05	0.06
Federal Gov't: Revenues ($ Mill)	329	535	388	282	126
Balance (Surp(+),Def(-)) ($ Mill)	475	863	723	535	244
Provincial Gov'ts: Revenues ($ Mill)	247	439	346	258	159
Balance (Surp(+),Def(-)) ($ Mill)	264	430	256	99	-68
Real Personal Disposable Income	0.11	0.17	0.09	0.01	-0.06
Personal Savings Rate (%) *	0.04	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	1.08	1.26	0.22	-0.54	-1.09

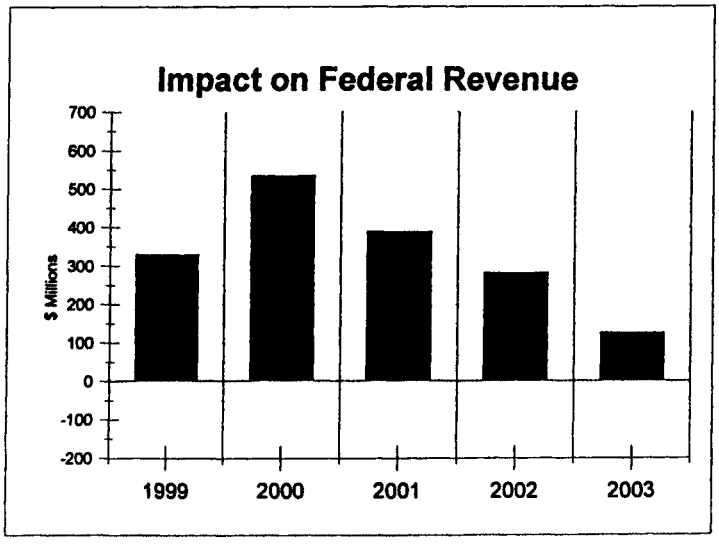
Chart 4.14

Alterations - Low Base - Normal Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









year 3, with an increase of almost 24 thousand person years. By year 5 employment has essentially returned to base-case levels, but small negative impacts would probably occur in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate - all due to an exchange rate that depreciates by just under .2% by year 4.

Despite the depreciating exchange rate, the fact that this is the Low base keeps CPI impacts largely in check. The maximum inflation rate increase is five one-hundredths of a per cent (in years 3 and 4). This is still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is only about .15 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by almost $900 million, and the provincial balance by over $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact, especially for the balance. The reason is that federal expenditures, notably for EI, are more cyclically sensitive and provincial expenditures more sensitive to an increase in the price level.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.15 Alterations - Low Base - Double Imports - Exchange Rate Target

Details for this simulation can be found in Table and Chart 4.15. In the first year of the simulation, real GDP rises by about $1.0 billion (1986 dollars) or $1.3 billion in 1996 dollars. The first- and second-year multipliers are about 1.0 and 1.4 respectively. The maximum impact on GDP, in the second year, is just over one-fifth of one per cent, where potential GDP growth in any one year is generally estimated to be about 2.5% - 3%. In year 3, when the direct stimulus has disappeared, a small amount of momentum is carried over and the real GDP effect is $400 million. In years 4 and 5, the higher real wages that were built up in years 1-3 are unwound through a period of output below base. Indeed, this adjustment also overshoots and the real wage is below base by year 5. Experience shows us that a damped oscillating process will continue in years thereafter.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 25 thousand extra person-years - and momentum and lags carry many of these gains through to year 3, with an increase of almost 13 thousand person years. By year 5 there is a decline in employment relative to base of about 9 thousand; this has already started to pull the real wage below base and in subsequent years will yield an improvement in employment back towards base and a recovery of demand and output.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is actually stronger in year 3 than in year 1. Residential spending is up primarily because of the basic shock; the extra stimulative effect of lower unemployment is almost completely offset by the negative effect of higher interest rates as the Bank of Canada defends the base exchange rate. Non-residential and Machinery investment eventually fall below base due to lagged higher interest rates and a smaller positive effect on corporate earnings as the wage share of income builds through increased employment and higher wage rates. Finally, exports fall as in Simulation 1 because the exchange rate is fixed but domestic prices rise, lowering competitiveness. Imports rise relatively strongly in years 1 and 2 because Alterations are more import-intensive than New Construction and this is a Double Imports simulation.

Table 4.15

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / Low Base / Double Imports / Exchange Rate Target

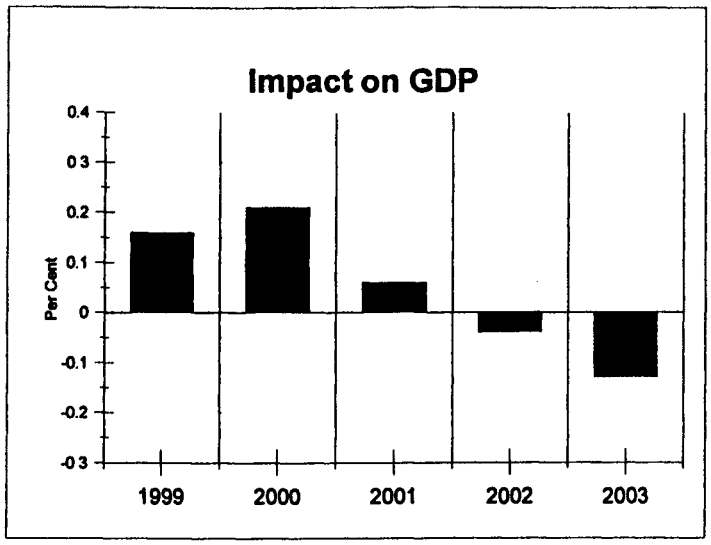
Summary of Impacts

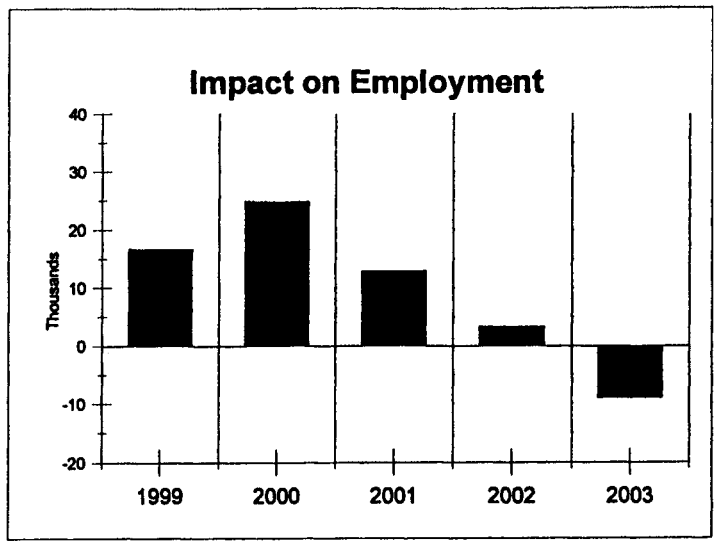
(Percentage Change; * Indicates change in levels)

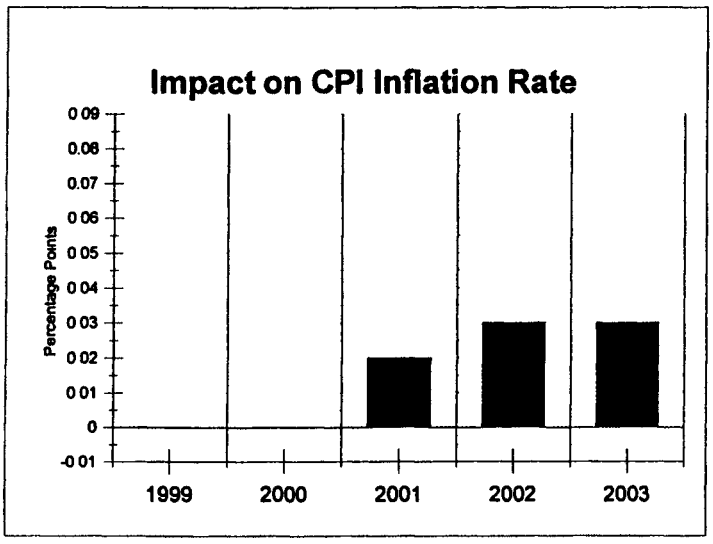
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1015	1401	407	-305	-911
Real GDP ($96 Million) *	1306	1803	524	-392	-1172
Real Gross Domestic Product	0.16	0.21	0.06	-0.04	-0.13
Expenditure on Personal Consumption	0.12	0.26	0.18	-0.01	-0.14
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.78	0.76	0.00	0.00	-0.10
Residential Construction	3.11	3.09	0.15	0.10	-0.26
Non-Residential Construction	-0.01	0.02	0.03	-0.03	-0.11
Machinery and Equipment	0.02	-0.02	-0.07	-0.04	-0.03
Exports	-0.01	-0.01	-0.02	-0.02	-0.03
Imports	0.18	0.22	0.08	0.04	0.01
Nominal GDP ($ Million) *	1451	2162	1018	199	-431
Implicit Deflator for GDP	0.01	0.03	0.05	0.06	0.08
Consumer Price Index	0.00	0.00	0.02	0.05	0.08
CPI - Inflation Rate (%) *	0.00	0.00	0.02	0.03	0.03
Unemployment Rate (%) *	-0.08	-0.11	-0.05	-0.01	0.05
Employment	0.12	0.17	0.09	0.02	-0.06
Employment ('000) *	16.7	24.8	12.9	3.3	-9.1
Finance Co. 90-Day Paper Rate (%) *	0.07	0.08	0.00	-0.01	0.01
Industrial Bond Rate (%) *	0.08	0.09	0.00	-0.02	0.01
Average Annual Wages and Salaries	0.02	0.05	0.07	0.07	0.06
Real Annual Wages per Employee	0.02	0.05	0.05	0.02	-0.01
Productivity Change (GDP/Employee)	0.03	0.03	-0.03	-0.07	-0.06
Exchange Rate (US $/Cdn $)	0.00	0.00	0.00	0.00	0.00
Balance on Current Account ($ Mill) *	-685	-1034	-603	-393	-224
Cumulative Current Account as a % of GDP *	0.00	0.08	0.20	0.26	0.30
Federal Gov't: Revenues ($ Mill)	323	479	229	27	-116
Balance (Surp(+),Def(-)) ($ Mill)	245	337	248	168	-159
Provincial Gov'ts: Revenues ($ Mill)	239	380	187	17	-78
Balance (Surp(+),Def(-)) ($ Mill)	255	395	161	-48	-182
Real Personal Disposable Income	0.10	0.16	0.06	-0.05	-0.13
Personal Savings Rate (%) *	-0.03	-0.10	-0.13	-0.04	0.01
Nominal After-Tax Corp. Profits	0.95	0.91	-0.51	-1.64	-1.69

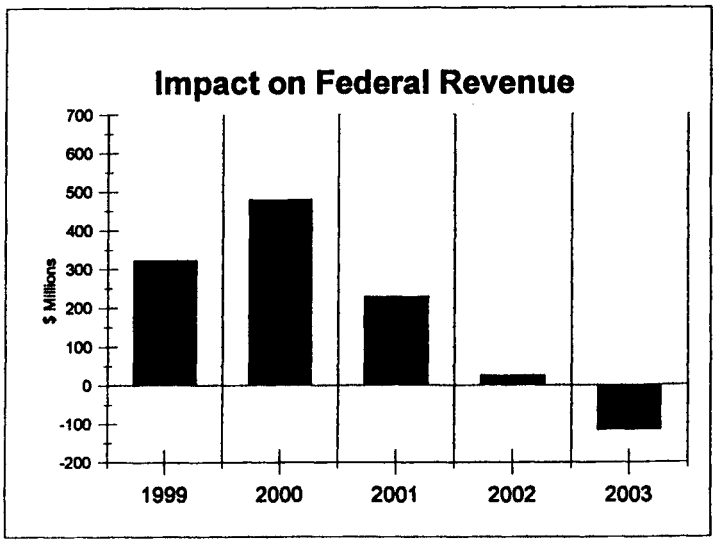
Chart 4.15

Alterations - Low Base - Double Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









The additional inflation caused by this shock is quite modest, and is generally a little lower than that of Simulation 1 due to the greater import leakage and smaller employment impact. The additional inflation peaks in year 4 at only .03 percentage points above base. Interest rates rise a maximum of 8 basis points in the second year as, despite a smaller impact on real GDP, this experiment involves more imports and thus more downward pressure on the dollar to offset with higher interest rates.

Both federal and provincial revenues and balances are improved by the housing demand shock, with the federal balance exceeding base in all but year 5 and the provincial balance exceeding base in all but the last two years. The maximum effect on federal revenues is almost $500 million in year 2, and the maximum effect on provincial revenues is almost $400 million.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.2.16 Alterations - Low Base - Double Imports - Interest rate Target

Details for this simulation can be found in Table and Chart 4.16. In the first year of the simulation, real GDP rises by about $1.4 billion (1986 dollars) or $1.8 billion in 1996 dollars. Thus the first-year multiplier is about 1.4. In the second year the multiplier is almost 2.1 with an output shift of $2.7 billion in 1996 dollars. This is approximately three-tenths of a per cent of GDP in that year, or one-tenth or more of growth that would be expected from the economy at potential. In year 3, when the direct stimulus has disappeared, the momentum built in from the previous two years still pushes GDP $1 billion (86$) above base. As the momentum dissipates and the economy is left with an "overhang" of inflation and a real wage above base, GDP falls closer to base levels (in year 4) and then below base in year 5. In subsequent years GDP would fall perhaps further below base - as required to induce some unemployment to pull down real wages to sustainable levels - and then move in damped oscillations to base.

Employment moves as GDP, but with a lag. The maximum employment gain is in the second year - at 32 thousand extra person-years - and momentum and lags carry many of these gains through to

Table 4.16

** $ 1 Billion Increase in Housing Construction 1999-2000 **
Alterations / Low Base / Double Imports / Interest Rate Target

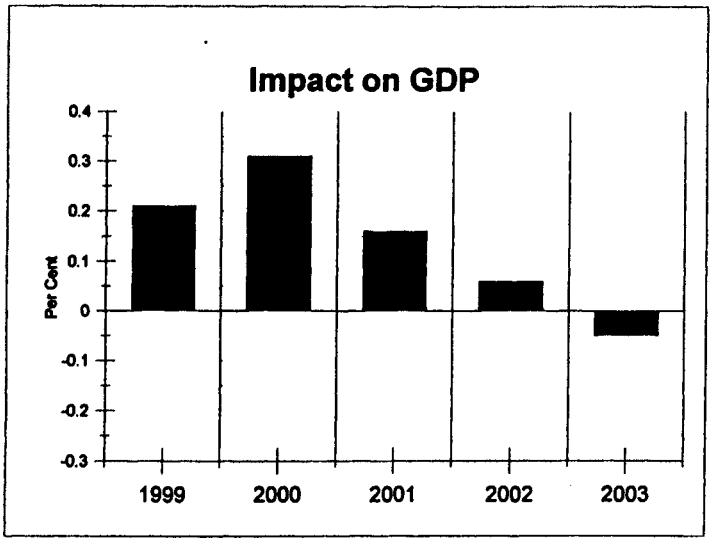
Summary of Impacts

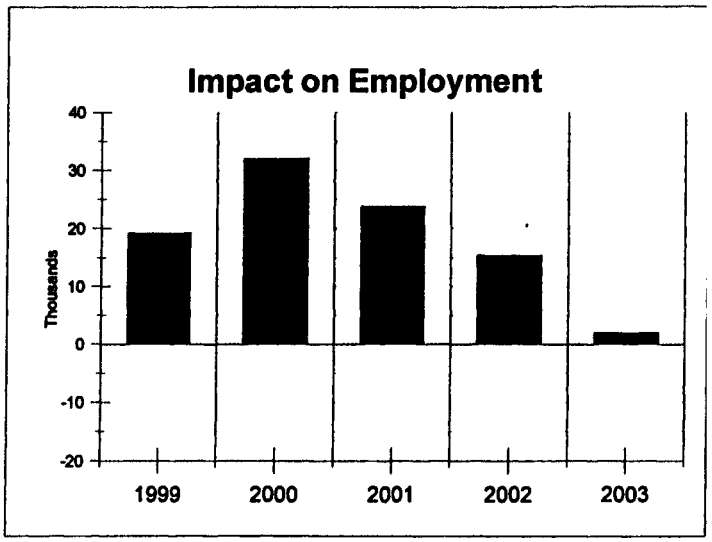
(Percentage Change; * Indicates change in levels)

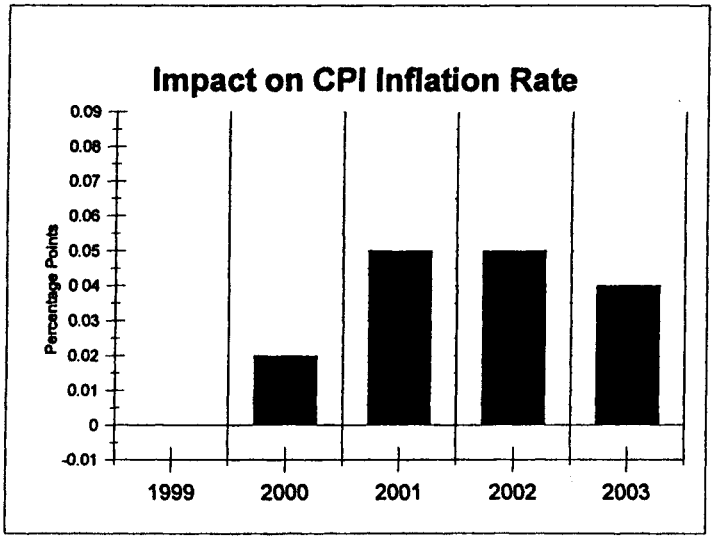
	1999	2000	2001	2002	2003
Real GDP ($86 Million) *	1397	2076	1072	395	-340
Real GDP ($96 Million) *	1798	2671	1380	508	-437
Real Gross Domestic Product	0.21	0.31	0.16	0.06	-0.05
Expenditure on Personal Consumption	0.07	0.18	0.18	0.07	-0.05
Expenditure by Governments	0.00	0.00	0.00	0.00	0.00
Investment Expenditure	0.89	1.04	0.24	0.07	-0.09
Residential Construction	3.36	3.63	0.48	0.13	-0.23
Non-Residential Construction	0.06	0.14	0.12	0.01	-0.07
Machinery and Equipment	0.08	0.20	0.17	0.06	-0.04
Exports	0.04	0.09	0.09	0.07	0.04
Imports	0.09	0.15	0.10	0.06	0.03
Nominal GDP ($ Million) *	1698	2834	2072	1619	1036
Implicit Deflator for GDP	-0.02	0.00	0.06	0.11	0.15
Consumer Price Index	0.00	0.02	0.07	0.11	0.15
CPI - Inflation Rate (%) *	0.00	0.02	0.05	0.05	0.04
Unemployment Rate (%) *	-0.09	-0.15	-0.10	-0.06	0.00
Employment	0.14	0.23	0.17	0.11	0.01
Employment ('000) *	19.2	32.0	23.8	15.4	2.0
Finance Co. 90-Day Paper Rate (%) *	0.00	0.00	0.00	0.00	0.00
Industrial Bond Rate (%) *	0.00	0.00	0.00	0.00	0.00
Average Annual Wages and Salaries	0.02	0.08	0.12	0.16	0.18
Real Annual Wages per Employee	0.03	0.06	0.06	0.04	0.02
Productivity Change (GDP/Employee)	0.07	0.08	-0.01	-0.05	-0.06
Exchange Rate (US $/Cdn $)	-0.11	-0.19	-0.18	-0.19	-0.17
Balance on Current Account ($ Mill) *	-327	-454	-145	25	117
Cumulative Current Account as a % of GDP *	-0.03	-0.02	0.04	0.06	0.06
Federal Gov't: Revenues ($ Mill)	313	514	384	290	141
Balance (Surp(+),Def(-)) ($ Mill)	447	824	711	543	267
Provincial Gov'ts: Revenues ($ Mill)	233	420	342	264	171
Balance (Surp(+),Def(-)) ($ Mill)	247	407	250	104	-56
Real Personal Disposable Income	0.10	0.16	0.09	0.01	-0.06
Personal Savings Rate (%) *	0.03	-0.01	-0.09	-0.06	-0.01
Nominal After-Tax Corp. Profits	1.10	1.24	0.22	-0.43	-0.99

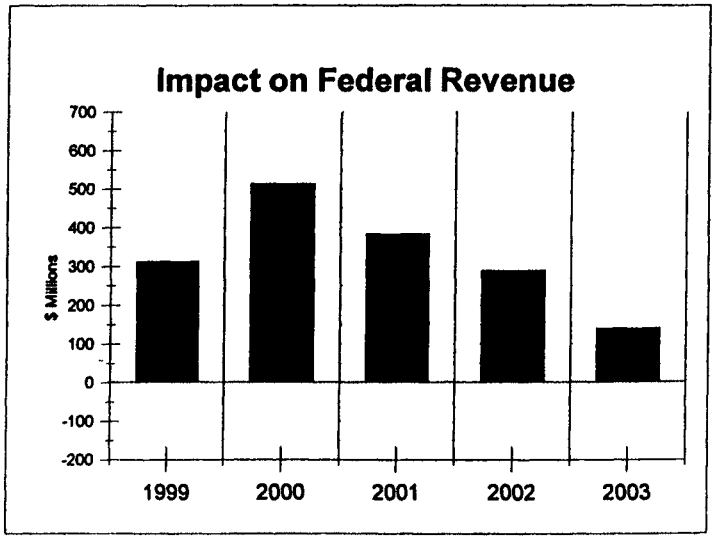
Chart 4.16

Alterations - Low Base - Double Imports - Interest Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









year 3, with an increase of almost 24 thousand person years. By year 5 employment has essentially returned to base-case levels, but small negative impacts would probably occur in later years to pull down the real wage - which in year 5 is still somewhat above base.

The components of GDP show generally a similar result to Simulation 1. Consumption responds with a lag and is as strong in year 3 as in year 2. Residential spending gets extra stimulation in this experiment, beyond the original shock, because the Bank of Canada is keeping interest rates from rising. Non-residential and Machinery investment are also higher due to lower interest rates and enhanced profits and activity. Finally, exports rise through the simulation period and imports do not rise as much as in simulations with a fixed exchange rate - all due to an exchange rate that depreciates by just under .2% for most of the simulation period.

Despite the depreciating exchange rate, the fact that this is the Low base keeps CPI impacts largely in check. The maximum inflation rate increase is five one-hundredths of a per cent (in years 3 and 4). This is still small relative to the Bank's target inflation bands. By year 5 of the simulation, the CPI price level is only about .15 per cent higher than base.

Both federal and provincial revenues and balances are improved by the housing demand shock. At maximum impact, in year 2, the federal balance is improved by just over $800 million, and the provincial balance by over $400 million. Thereafter, as the economic impact wears off, the improvements in revenues and balance are eroded, with the impact on the provincial balance becoming negative by year 5. The provincial impact is generally smaller than the federal impact, especially for the balance. The reason is that federal expenditures, notably for EI, are more cyclically sensitive and provincial expenditures more sensitive to an increase in the price level.

For a detailed explanation of the major patterns of movement in the simulation, see the discussion of Simulation 1 above.

4.3 New Construction vs. Alterations - Relative Impact

We turn now to examine the importance of the various alternative assumptions embodied in the range of simulations presented above. The first to be considered is the relative impact of assuming that the additional housing stimulus is in the form of New Construction vs. Alterations to the existing housing stock.

The different direct and indirect inputs from these two types of construction are compared in Table 4.17 for High and Low Base cases and for Normal and Double imports. As can be seen, New Construction is somewhat less import intensive than Alterations, using about 14% less imports under the Normal imports assumption, and about 16% less under the Double imports assumption. Because there is less direct and indirect import leakage from New Construction, it generates more GDP at factor cost (7-12%) and more employment (14-16%) than Alterations. Generally, then, we expect a larger total impact from New Construction than from Alterations, but not a vastly different one.

A comparison of total impacts on the main indicators is presented in Table 4.18 and Chart 4.17. The table presents four of the possible eight comparisons (2 Base Cases x 2 Import Levels x 2 Monetary Targets), but these are sufficient to tell if the differences between New Construction and Alterations differ seriously with any of our other assumption types. Chart 4.17 compares the two construction types for the case of High Base; Normal Imports and Exchange Rate target only.

As can be seen, our prediction of relatively mild differences between the two impacts is borne out, and it is true that New Construction generates slightly more GDP and employment - at least in the initial years. Since the negative impacts on GDP and employment in years 4 and 5 are the result of reactions to the positive impacts of the first two years, it should be no surprise that a larger positive impact in the first two years leads to a larger negative impact in the last two years. The CPI inflation impact is also slightly larger for New Construction in the initial years - as would be expected from the slightly-higher economic activity generated - and lower in the later years. Impacts on federal revenues also follow this pattern.

Table 4.17 Comparing Inputs for Construction Type

New Construction vs. Alterations

	High Base; Normal Imports		High Base; Double Imports		Low Base; Normal Imports		Low Base; Double Imports	
Percentage Difference	1999	2000	1999	2000	1999	2000	1999	2000
Residential Investment ($86)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($86)	7.5	7.5	12.3	12.3	7.9	10.0	12.8	12.6
Imports ($86)	-14.3	-14.3	-16.4	-16.3	-14.1	-14.9	-16.3	-16.2
Employment	12.7	12.2	16.7	15.9	12.3	12.4	17.0	16.4
Residential Investment ($)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($)	3.6	3.5	7.5	7.1	3.5	3.4	7.5	7.0
Imports ($)	-14.8	-14.8	-16.4	-16.3	-14.6	-14.4	-16.2	-16.2
Wages and Salaries ($)	9.7	10.0	14.3	14.5	9.7	9.8	14.5	14.5
Ind. Taxes less Subs. ($)	18.8	19.3	22.1	22.1	19.1	19.2	22.1	22.4
Unincorporated Income ($)	26.4	26.4	27.2	27.1	26.9	26.8	27.6	27.6

Table 4.18 Comparing Simulation Results for Construction Type

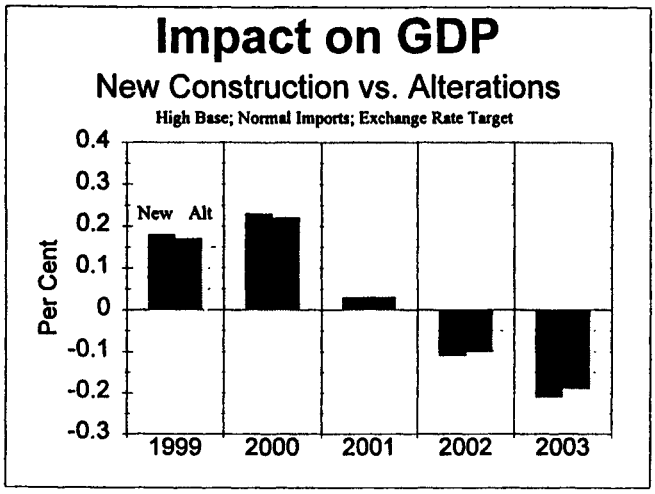
		1999	2000	2001	2002	2003
High Base - Normal Imports - Exchange Rate Target						
Real GDP - % Change	New Constr.	0.18	0.23	0.03	-0.11	-0.21
	Alterations	0.17	0.22	0.03	-0.10	-0.19
	Diff	0.01	0.01	0.00	-0.01	-0.02
Employment - Ch in '000	New Constr.	21.4	30.4	12.7	-1.8	-18.1
	Alterations	19.3	28.2	12.5	-1.1	-16.5
	Diff	2.1	2.2	0.2	-0.7	-1.6
CPI Inflation - Ch in % pts	New Constr.	0.02	0.04	0.04	0.03	0.02
	Alterations	0.02	0.03	0.04	0.03	0.03
	Diff	0.00	0.01	0.00	0.00	-0.01
Fed. Revenue - Ch in $Mill	New Constr.	397	660	415	159	-84
	Alterations	377	626	397	156	-67
	Diff	20	34	18	3	-17
High Base - Normal Imports - Interest Rate Target						
Real GDP - % Change	New Constr.	0.22	0.32	0.14	0.02	-0.10
	Alterations	0.22	0.32	0.15	0.03	-0.09
	Diff	0.00	0.00	-0.01	-0.01	-0.01
Employment - Ch in '000	New Constr.	22.7	35.2	22.5	12.0	-4.5
	Alterations	20.8	33.2	22.6	12.8	-3.0
	Diff	1.9	2.0	-0.1	-0.8	-1.5
CPI Inflation - Ch in % pts	New Constr.	0.01	0.05	0.08	0.07	0.05
	Alterations	0	0.04	0.08	0.07	0.06
	Diff	0.01	0.01	0	0	-0.01
Fed. Revenue - Ch in $Mill	New Constr.	363	635	525	448	285
	Alterations	338	603	517	451	298
	Diff	25	32	8	-3	-13

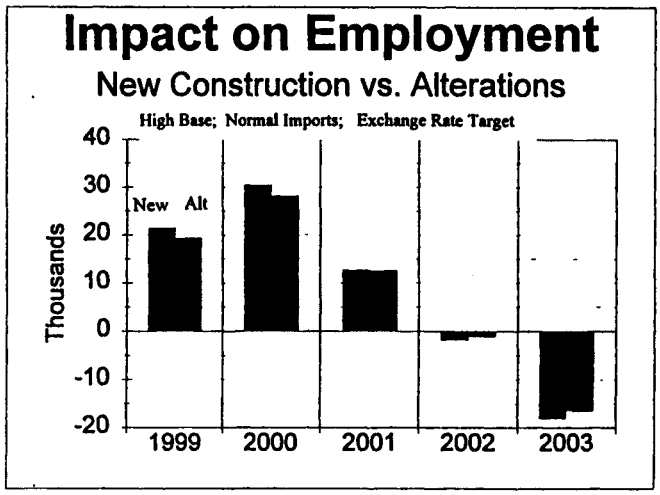
Table 4.18 Cont'd Comparing Simulation Results for Construction Type

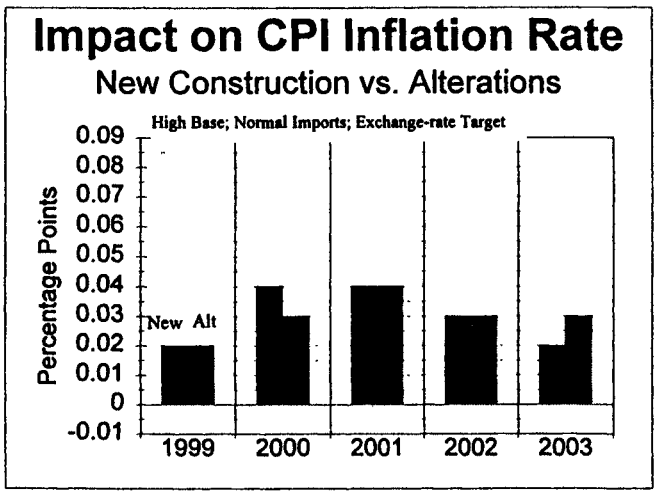
		1999	2000	2001	2002	2003
High Base - Double Imports - Exchange Rate Target						
Real GDP - % Change	New Constr.	0.16	0.21	0.02	-0.11	-0.20
	Alterations	0.15	0.20	0.02	-0.10	-0.19
	Diff	0.01	0.01	0.00	-0.01	-0.01
Employment - Ch in '000	New Constr.	19.8	28.6	12.1	-2	-17.4
	Alterations	17.5	26.1	11.7	-1.3	-15.7
	Diff	2.3	2.5	0.4	-0.7	-1.7
CPI Inflation - Ch in % pts	New Constr.	0.03	0.03	0.03	0.04	0.03
	Alterations	0.03	0.02	0.03	0.04	0.03
	Diff	0	0.01	0	0	0
Fed. Revenue - Ch in $Mill	New Constr.	395	639	384	138	-80
	Alterations	375	601	358	129	-63
	Diff	20	38	26	9	-17
Low Base - Normal Imports - Exchange Rate Target						
Real GDP - % Change	New Constr.	0.19	0.25	0.06	-0.06	-0.15
	Alterations	0.18	0.24	0.06	-0.05	-0.14
	Diff	0.01	0.01	0	-0.01	-0.01
Employment - Ch in '000	New Constr.	20.9	29.6	13.9	2.7	-11.3
	Alterations	18.9	27.3	13.7	3.3	-10.0
	Diff	2.0	2.3	0.2	-0.6	-1.3
CPI Inflation - Ch in % pts	New Constr.	0.00	0.01	0.03	0.03	0.03
	Alterations	0.00	0.01	0.03	0.03	0.03
	Diff	0.00	0.00	0.00	0.00	0.00
Fed. Revenue - Ch in $Mill	New Constr.	358	542	272	47	-135
	Alterations	336	511	262	48	-121
	Diff	22	31	10	-1	-14

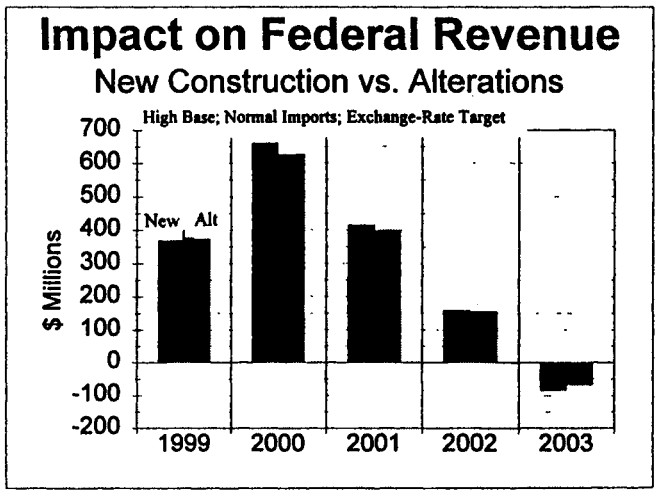
Chart 4.17

New Construction vs. Alterations
High Base - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









The differences between the impacts on GDP and employment are the smallest when the interest rate is the target of monetary policy. This is because, under the exchange rate target, not only do Alterations have a smaller direct shock, bu their higher imports also put greater downward pressure on the dollar, requiring a slightly higher interest rate response, which further reduces GDP and employment impacts. When the interest rate is the target of monetary policy and does not change, then this negative effect for Alterations is not present; instead, the exchange rate depreciates more than under New Construction and this *adds* to induced impacts under Alterations, bringing the impacts closer.

The differences in impacts on GDP and employment appear to be the largest when the Double Imports assumption is used under the Exchange Rate monetary target. As Table 4.17 shows, it is under Double Imports that the output, employment and import differences are the largest between the two construction types, and the exchange-rate target further emphasizes these movements through its impact on interest rates.

Finally, the differences in inflation between the two construction types are the lowest when the Low base case is used, since it minimizes inflation impacts relative to the High base case.

All in all, however, the differences between the two construction types are not absolutely large, rarely amounting to over 10% of the impact of the shock itself.

4.4 Impact of Assuming Higher Import Content

Table 4.19 shows the per cent differences between inputs developed by Informetrica when the "Normal" and "Double" import contents are assumed. The "Normal" import case has about 28-30% less imports, 13-18% more GDP and 10-15% more employment in direct and indirect effects than the "Double" import case. The difference is more pronounced for Alterations than for New Construction, but there is virtually no difference between High and Low base in direct+indirect

Table 4.19 Comparing Inputs for Import Contents

Normal Imports vs. Double Imports

Percentage Difference	New Construction; High Base		New Construction; Low Base		Alterations; High Base		Alterations; Low Base	
	1999	2000	1999	2000	1999	2000	1999	2000
Residential Investment ($86)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($86)	13.3	13.3	14.1	16.2	18.4	18.3	19.3	19.0
Imports ($86)	-28.1	-28.0	-28.0	-28.6	-29.8	-29.7	-29.8	-29.6
Employment	9.9	9.4	10.1	10.3	13.8	13.0	14.8	14.2
Residential Investment ($)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($)	12.3	11.4	12.3	11.3	16.5	15.4	16.7	15.2
Imports ($)	-28.1	-27.2	-27.8	-26.5	-29.4	-28.5	-29.2	-28.0
Wages and Salaries ($)	11.0	10.9	11.7	11.5	15.6	15.4	16.6	16.2
Ind. Taxes less Subs. ($)	6.0	6.1	5.8	5.6	8.9	8.6	8.5	8.4
Unincorporated Income ($)	1.4	1.3	1.3	1.2	2.0	1.9	1.8	1.8

impacts. Generally, we would expect somewhat higher real impacts from the Normal imports case, since there is less direct and indirect import leakage.

Table 4.20 and Chart 4.18 compare total impacts under the two import assumptions. As can be seen, the assumption of Double import content invariably reduces the impact on GDP and employment in the first two or three years, with the result that the impact is usually not as negative in the last two years. Still, the difference is rarely more than 15% of the actual impact. The effect is more pronounced when the exchange rate is targeted by monetary policy. In this case, the Bank of Canada must raise interest rates to defend the Canadian dollar when it comes under pressure from the higher imports. Thus the Double import case has both a smaller direct effect on GDP and also reduces the induced effect through causing a higher interest rate. When the interest rate is the target of monetary policy, and the exchange rate depreciates in response to higher imports, then the difference between the two assumptions is much smaller - although still slightly in the favour of "Normal" imports (see the second simulation set in Table 4.20).

Despite the higher real impacts under "Normal" imports, it will be noted that in simulations with an exchange rate target and under the High base, the inflation impact in the first year is actually lower (see simulations 1 and 4 in Table 4.20). The reason for this is that interest rate increases in FOCUS have a mild positive effect on inflation in the year they occur - the result of increasing inventory carrying costs, which are in turn "marked up" like unit labour costs. Because the Double imports put greater pressure on the dollar and call forth greater interest-rate increases, despite their smaller real impacts, they also create slightly more inflation in the short run.

Finally, note that the differences for federal revenues for the two import assumptions are always very small. Changes in federal revenues are due both to changes in real activity and changes in the price level. For the two import assumptions, differences in real impacts are to some extent offset by differences in inflation, leading to a very small difference in impacts on federal revenue.

Table 4.20 Comparing Simulation Results for Import Content

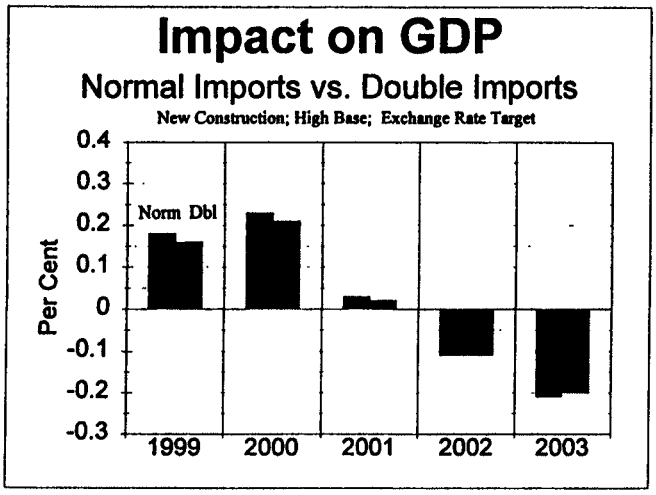
		1999	2000	2001	2002	2003
New Construction - High Base - Exchange Rate Target						
Real GDP - % Change	Normal Imports	0.18	0.23	0.03	-0.11	-0.21
	Double Imports	0.16	0.21	0.02	-0.11	-0.20
	Diff	0.02	0.02	0.01	0.00	-0.01
Employment - Ch in '000	Normal Imports	21.4	30.4	12.7	-1.8	-18.1
	Double Imports	19.8	28.6	12.1	-2	-17.4
	Diff	1.6	1.8	0.6	0.2	-0.7
CPI Inflation - Ch in % pts	Normal Imports	0.02	0.04	0.04	0.03	0.02
	Double Imports	0.03	0.03	0.03	0.04	0.03
	Diff	-0.01	0.01	0.01	-0.01	-0.01
Fed. Revenue - Ch in $Mill	Normal Imports	397	660	415	159	-84
	Double Imports	395	639	384	138	-80
	Diff	2	21	31	21	-4
New Construction - High Base - Interest Rate Target						
Real GDP - % Change	Normal Imports	0.22	0.32	0.14	0.02	-0.10
	Double Imports	0.22	0.31	0.14	0.03	-0.09
	Diff	0.00	0.01	0.00	-0.01	-0.01
Employment - Ch in '000	Normal Imports	22.7	35.2	22.5	12.0	-4.5
	Double Imports	21.5	34.2	22.9	12.6	-3.4
	Diff	1.2	1.0	-0.4	-0.6	-1.1
CPI Inflation - Ch in % pts	Normal Imports	0.01	0.05	0.08	0.07	0.05
	Double Imports	0.01	0.05	0.08	0.07	0.05
	Diff	0	0	0	0	0
Fed. Revenue - Ch in $Mill	Normal Imports	363	635	525	448	285
	Double Imports	349	616	520	453	298
	Diff	14	19	5	-5	-13

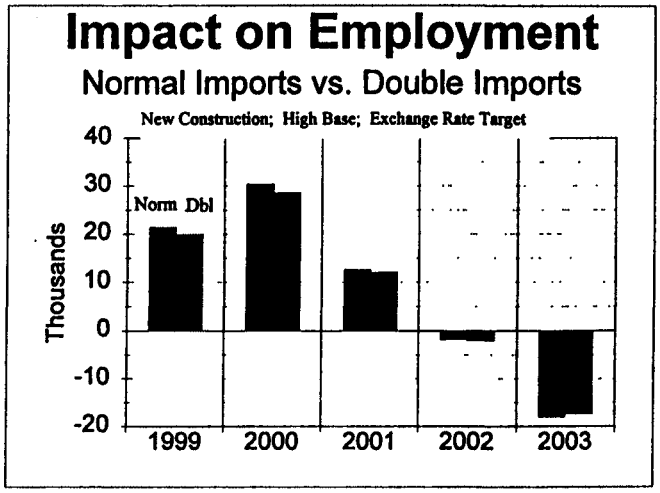
Table 4.20 cont'd Comparing Simulation Results for Import Content

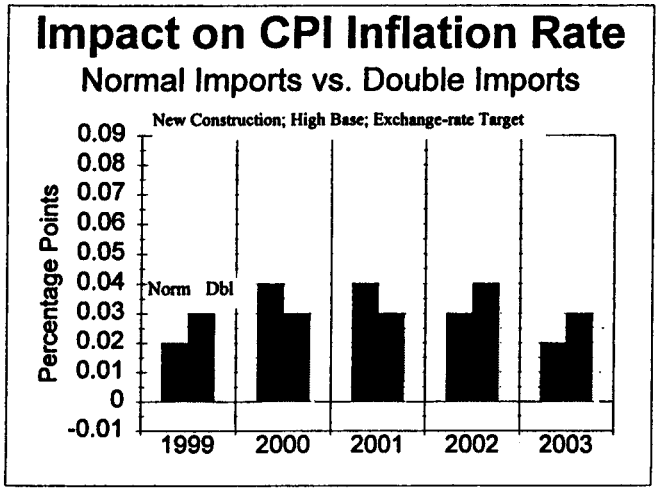
		1999	2000	2001	2002	2003
New Construction - Low Base - Exchange Rate Target						
Real GDP - % Change	Normal Imports	0.19	0.25	0.06	-0.06	-0.15
	Double Imports	0.17	0.23	0.06	-0.05	-0.14
	Diff	0.02	0.02	0	-0.01	-0.01
Employment - Ch in '000	Normal Imports	20.9	29.6	13.9	2.7	-11.3
	Double Imports	18.9	27.0	12.9	2.7	-10.4
	Diff	2.0	2.6	1.0	0.0	-0.9
CPI Inflation - Ch in % pts	Normal Imports	0	0.01	0.03	0.03	0.03
	Double Imports	0	0.01	0.02	0.03	0.03
	Diff	0	0	0.01	0	0
Fed. Revenue - Ch in $Mill	Normal Imports	358	542	272	47	-135
	Double Imports	347	515	245	31	-128
	Diff	11	27	27	16	-7
Alterations - High Base - Exchange Rate Target						
Real GDP - % Change	Normal Imports	0.17	0.22	0.03	-0.10	-0.19
	Double Imports	0.15	0.20	0.02	-0.10	-0.19
	Diff	0.02	0.02	0.01	0.00	0.00
Employment - Ch in '000	Normal Imports	19.3	28.2	12.5	-1.1	-16.5
	Double Imports	17.5	26.1	11.7	-1.3	-15.7
	Diff	1.8	2.1	0.8	0.2	-0.8
CPI Inflation - Ch in % pts	Normal Imports	0.02	0.03	0.04	0.03	0.03
	Double Imports	0.03	0.02	0.03	0.04	0.03
	Diff	-0.01	0.01	0.01	-0.01	0.00
Fed. Revenue - Ch in $Mill	Normal Imports	377	626	397	156	-67
	Double Imports	375	601	358	129	-63
	Diff	2	25	39	27	-4

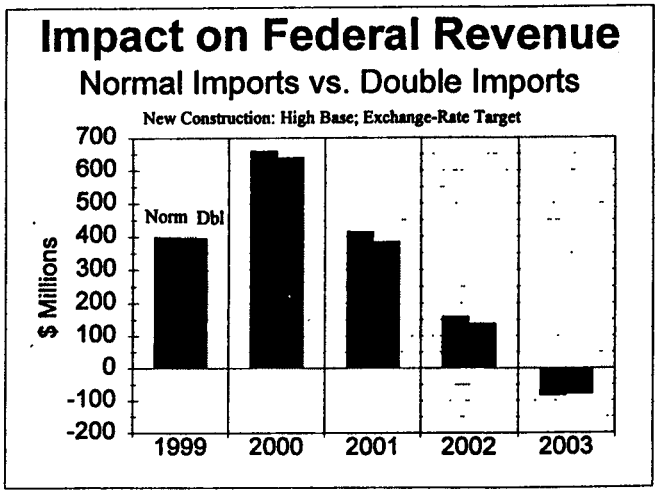
Chart 4.18

Normal Imports vs. Double Imports
New Construction - High Base - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









4.5 High and Low Employment Base Cases - Relative Impact

Table 4.21 shows the per cent differences between inputs developed by Informetrica under the "High" and "Low" base cases. As can be seen, the differences for the key elements of GDP, imports and employment are invariably very small. The largest difference, still under 10%, is for the relatively small category of unincorporated income. The fact that there are almost no differences in inputs is not generally a problem however. Indeed, a more standard Input-Output calculation might have yielded no difference between bases at all - especially for real variables.

Total impacts for High and Low bases are compared for four simulation sets in Table 4.22, and for the case of New Construction; Normal Imports; Exchange-Rate target in Chart 4.19. As can be seen, real output impacts are invariably smaller under the High base than the Low base. This is true not only in the first two years: in the later years of the simulation the difference widens in favour of the Low base. Note, however, that even for the Low base the impact of the housing shock eventually turns negative; it is simply much less negative than under the High base case.

This difference in real impacts is as we would have expected, given the non-linearities of the Phillips Curve in FOCUS as described in earlier sections. When the base unemployment rate is high to begin with, an improvement in employment has less effect on wages, and hence prices. With less effect on wages, the demand for labour is higher and higher employment helps increase the multiplier. Under the exchange-rate monetary target the lower inflation puts less downward pressure on the dollar and requires less of an interest-rate increase to defend it, further helping to extend the real impact. Because of this latter effect, the difference between the High and Low cases is more pronounced in the case of the exchange-rate target (compare simulations 1 and 2 in Table 4.22).

Although the differences in GDP impacts are as we would have expected, there is something of a surprise in that, for the first two years, the High base actually generates slightly higher employment than the Low base. This is partly the result of the direct and indirect inputs fed to the model. As can be seen in Table 4.21, direct and indirect employment impacts under the High base are generally

Table 4.21 Comparing Inputs for Economic Conditions in the Base

	High Base vs. Low Base							
	New Construction; Normal Imports		New Construction; Double Imports		Alterations; Normal Imports		Alterations; Double Imports	
Percentage Difference	1999	2000	1999	2000	1999	2000	1999	2000
Residential Investment ($86)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP at Factor Cost ($86)	0.5	-1.6	1.3	1.0	0.9	0.7	1.7	1.2
Imports ($86)	-2.7	-1.3	-2.5	-2.0	-2.4	-1.9	-2.4	-1.8
Employment	1.7	1.7	1.9	2.6	1.3	2.0	2.2	3.0
Residential Investment ($)	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
GDP at Factor Cost ($)	-1.0	-0.8	-0.9	-1.0	-1.0	-0.9	-0.9	-1.1
Imports ($)	-2.9	-2.9	-2.5	-2.0	-2.6	-2.5	-2.4	-1.8
Wages and Salaries ($)	0.2	1.3	0.8	1.9	0.1	1.1	1.0	1.9
Ind. Taxes less Subs. ($)	-4.3	-4.4	-4.4	-4.9	-4.1	-4.5	-4.4	-4.6
Unincorporated Income ($)	-5.7	-6.9	-5.7	-7.0	-5.3	-6.6	-5.5	-6.7

Table 4.22 Comparing Simulation Results for Base-Case Conditions

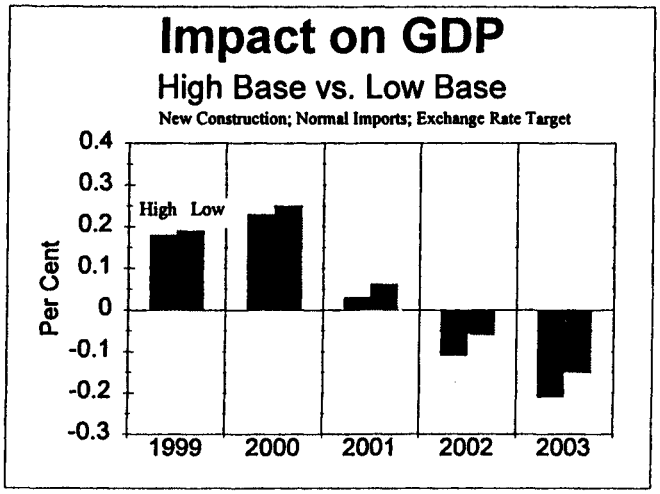
		1999	2000	2001	2002	2003
New Construction - Normal Imports - Exchange Rate Target						
Real GDP - % Change	High Base	0.18	0.23	0.03	-0.11	-0.21
	Low Base	0.19	0.25	0.06	-0.06	-0.15
	Diff	-0.01	-0.02	-0.03	-0.05	-0.06
Employment - Ch in '000	High Base	21.4	30.4	12.7	-1.8	-18.1
	Low Base	20.9	29.6	13.9	2.7	-11.3
	Diff	0.5	0.8	-1.2	-4.5	-6.8
CPI Inflation - Ch in % pts	High Base	0.02	0.04	0.04	0.03	0.02
	Low Base	0	0.01	0.03	0.03	0.03
	Diff	0.02	0.03	0.01	0	-0.01
Fed. Revenue - Ch in $Mill	High Base	397	660	415	159	-84
	Low Base	358	542	272	47	-135
	Diff	39	118	143	112	51
New Construction - Normal Imports - Interest Rate Target						
Real GDP - % Change	High Base	0.22	0.32	0.14	0.02	-0.10
	Low Base	0.23	0.33	0.15	0.04	-0.07
	Diff	-0.01	-0.01	-0.01	-0.02	-0.03
Employment - Ch in '000	High Base	22.7	35.2	22.5	12.0	-4.5
	Low Base	22.6	35.2	23.5	14.1	-0.5
	Diff	0.1	0.0	-1.0	-2.1	-4.0
CPI Inflation - Ch in % pts	High Base	0.01	0.05	0.08	0.07	0.05
	Low Base	0	0.03	0.05	0.05	0.04
	Diff	0.01	0.02	0.03	0.02	0.01
Fed. Revenue - Ch in $Mill	High Base	363	635	525	448	285
	Low Base	353	564	389	275	113
	Diff	10	71	136	173	172

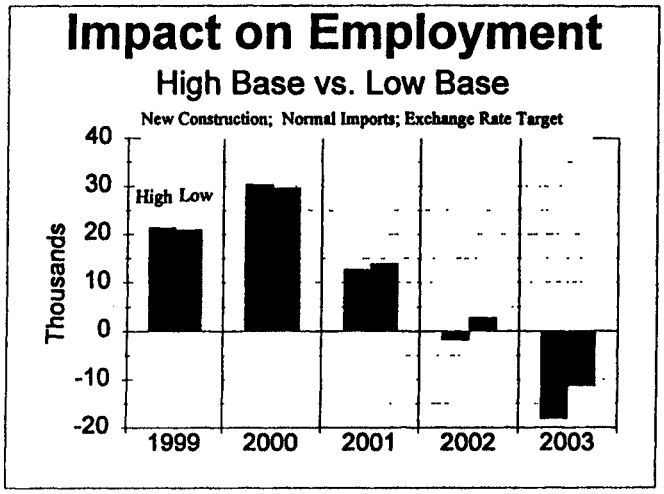
Table 4.22 cont'd Comparing Simulation Results for Base-Case Conditions

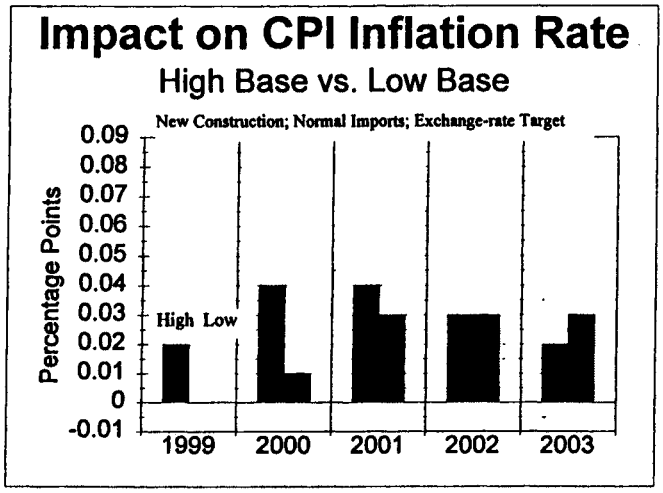
		1999	2000	2001	2002	2003
New Construction - Double Imports - Exchange Rate Target						
Real GDP - % Change	High Base	0.16	0.21	0.02	-0.11	-0.20
	Low Base	0.17	0.23	0.06	-0.05	-0.14
	Diff	-0.01	-0.02	-0.04	-0.06	-0.06
Employment - Ch in '000	High Base	19.8	28.6	12.1	-2.0	-17.4
	Low Base	18.9	27.0	12.9	2.7	-10.4
	Diff	0.9	1.6	-0.8	-4.7	-7.0
CPI Inflation - Ch in % pts	High Base	0.03	0.03	0.03	0.04	0.03
	Low Base	0	0.01	0.02	0.03	0.03
	Diff	0.03	0.02	0.01	0.01	0
Fed. Revenue - Ch in $Mill	High Base	395	639	384	138	-80
	Double Imports	347	515	245	31	-128
	Diff	48	124	139	107	48
Alterations - Normal Imports - Exchange Rate Target						
Real GDP - % Change	High Base	0.17	0.22	0.03	-0.10	-0.19
	Low Base	0.18	0.24	0.06	-0.05	-0.14
	Diff	-0.01	-0.02	-0.03	-0.05	-0.05
Employment - Ch in '000	High Base	19.3	28.2	12.5	-1.1	-16.5
	Low Base	18.9	27.3	13.7	3.3	-10.0
	Diff	0.4	0.9	-1.2	-4.4	-6.5
CPI Inflation - Ch in % pts	High Base	0.02	0.03	0.04	0.03	0.03
	Low Base	0.00	0.01	0.03	0.03	0.03
	Diff	0.02	0.02	0.01	0.00	0.00
Fed. Revenue - Ch in $Mill	High Base	377	626	397	156	-67
	Low Base	336	511	262	48	-121
	Diff	41	115	135	108	54

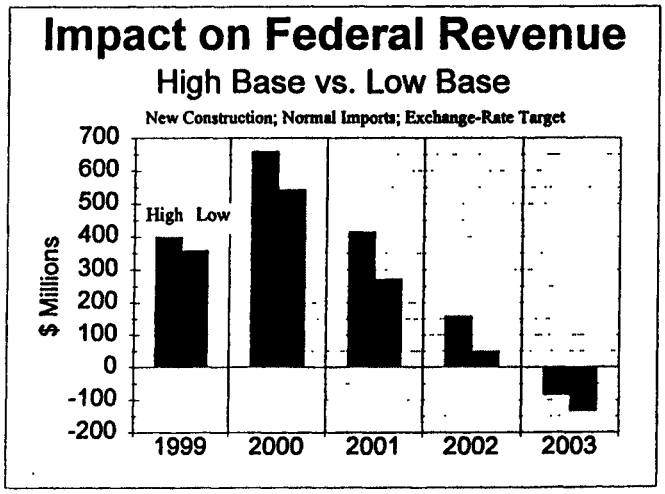
Chart 4.19

High Base vs. Low Base
New Construction - Normal Imports - Exchange Rate Target
** $1 Billion Increase in Housing Construction 1999-2000 **









about 2% greater under the High base than under the Low base. The differences in employment inputs are, in fact, all that is needed to explain the differences in employment impacts for the Interest-Rate target case. For the Exchange-Rate target cases, an additional effect is at work. In these cases, the interest rate must rise to defend the dollar and it must rise more in the face of the higher inflation forthcoming under the High base case. The rise in interest rates raises the deflator for private GDP at factor cost. The real wage that enters the demand for labour is the ratio of after-tax wages to this private GDP at factor cost deflator. In the early years of the simulation the deflator rises proportionally more than wages, giving a slight boost to employment. In later years, however, and especially after the initial shock has passed, the higher wage effect under the High case predominates, and employment impacts are lower along with GDP impacts.

As for impacts on CPI inflation, we would have predicted that these would be higher under the High base, and this is almost invariably the case in the results shown in Table 4.22. One exception is the last year of the first simulation, for which the inflation effect is actually smaller under the High base than under the Low base - reversing the previous years. The explanation is that the real GDP impact under the High base is much more negative by year 5 and is pulling inflation down. In fact, it will be noted that differences in inflation impacts are narrowing between the High and Low bases by the fifth year in all the simulations. In effect, under the High base the faster response of wages to employment causes the entire oscillating adjustment process to have a shorter cycle than under the Low base. By year 5, the High base is adjusting faster to the output shock of years 1 and 2 and has pushed the inflation rate to or below (for simulation 1) the inflation rates under the Low base.

Finally, it will be observed that federal revenues are almost invariably *higher* under the High base than the Low base, despite weaker real economic impacts. This is because federal expenditures (especially with a major component fixed in real terms and some other components indexed) is more sensitive to the higher inflation generated under the High base case.

4.6 Exchange-Rate Target vs. Interest-Rate Target - Relative Impact

There is, of course, no difference in direct and indirect inputs for the monetary target assumptions. These assumptions only affect the induced responses of the macroeconomy. Differences between the two monetary response assumptions are highlighted for four simulations in Table 4.23, and for the simulation with New Construction; High Base and Normal Imports in Chart 4.20.

As can be seen, the choice of monetary response assumption yields the largest differences in impacts of the four alternatives sets tried. The differences can be substantial and are roughly the same size across the other alternatives. By year 2, for example, for New Construction; High base; Normal Imports, the interest-rate target gives almost an additional one-tenth of a per cent impact on GDP over the exchange-rate target - or, alternatively, about a 50% increase in impact. The effect lingers through later years: by year 5 the downturn caused by the temporary housing shock is much shallower with the interest-rate target than with the exchange-rate target. The differences in impact can be even more dramatic in later years for employment: Note that the interest-rate target yields an extra 5000 jobs in year 2, but job gains under the interest-rate target persist until year 4 (when the economy is up 12,000 jobs vs. a loss of 2,000 under the exchange-rate target) and there are comparatively small losses in year 5 - although greater job losses are likely in later years as the excess real wage built up under the shock must be eroded. In effect, the interest-rate target elongates the cyclical response of induced effects in the model, especially for employment, prolonging the induced positive impacts and delaying the major negative impacts past a five-year horizon.

Of course, the price to be paid for the extra impact under the interest-rate target is additional inflation. Differences in impacts on CPI inflation are greatest in years 3 and 4 of the shock, where the impacts under the interest-rate target are roughly double those of the exchange-rate target. Nonetheless, the CPI inflation impacts obtained for the shock we are modelling are small, never exceeding one-tenth of one percentage point in any year.

Table 4.23 Comparing Simulation Results for Monetary Targets

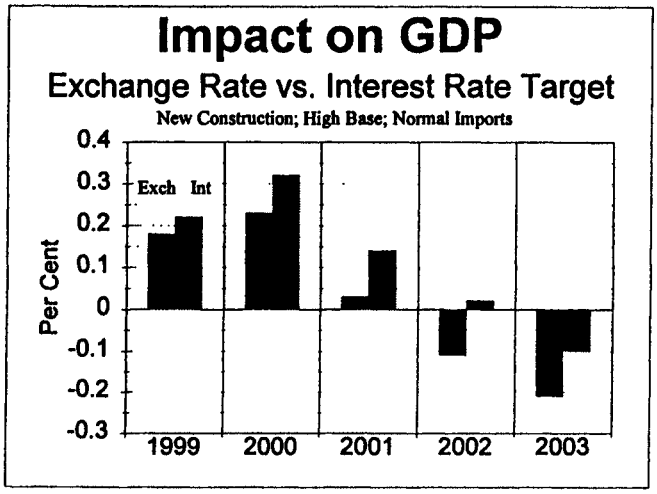
		1999	2000	2001	2002	2003
New Construction - High Base - Normal Imports						
Real GDP - % Change	Exchange Rate Target	0.18	0.23	0.03	-0.11	-0.21
	Interest Rate Target	0.22	0.32	0.14	0.02	-0.10
	Diff	-0.04	-0.09	-0.11	-0.13	-0.11
Employment - Ch in '000	Exchange Rate Target	21.4	30.4	12.7	-1.8	-18.1
	Interest Rate Target	22.7	35.2	22.5	12.0	-4.5
	Diff	-1.3	-4.8	-9.8	-13.8	-13.6
CPI Inflation - Ch in % pts	Exchange Rate Target	0.02	0.04	0.04	0.03	0.02
	Interest Rate Target	0.01	0.05	0.08	0.07	0.05
	Diff	0.01	-0.01	-0.04	-0.04	-0.03
Fed. Revenue - Ch in $Mill	Exchange Rate Target	397	660	415	159	-84
	Interest Rate Target	363	635	525	448	285
	Diff	34	25	-110	-289	-369
New Construction - High Base - Double Imports						
Real GDP - % Change	Exchange Rate Target	0.16	0.21	0.02	-0.11	-0.20
	Interest Rate Target	0.22	0.31	0.14	0.03	-0.09
	Diff	-0.06	-0.10	-0.12	-0.14	-0.11
Employment - Ch in '000	Exchange Rate Target	19.8	28.6	12.1	-2.0	-17.4
	Interest Rate Target	21.5	34.2	22.9	12.6	-3.4
	Diff	-1.7	-5.6	-10.8	-14.6	-14.0
CPI Inflation - Ch in % pts	Exchange Rate Target	0.03	0.03	0.03	0.04	0.03
	Interest Rate Target	0.01	0.05	0.08	0.07	0.05
	Diff	0.02	-0.02	-0.05	-0.03	-0.02
Fed. Revenue - Ch in $Mill	Exchange Rate Target	395	639	384	138	-80
	Interest Rate Target	349	616	520	453	298
	Diff	46	23	-136	-315	-378

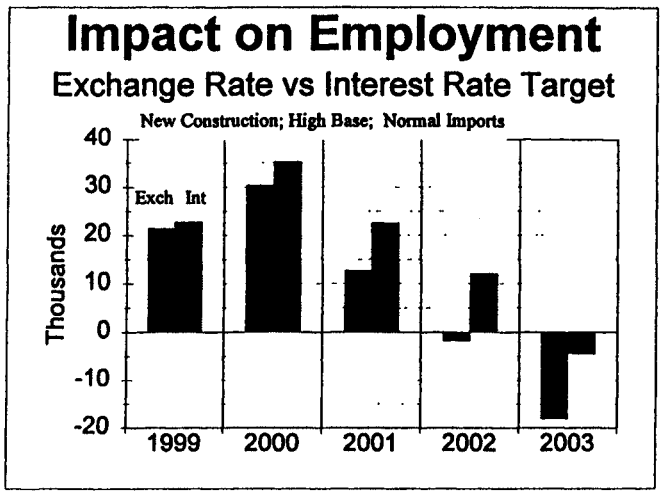
Table 4.23 cont'd Comparing Simulation Results for Monetary Targets

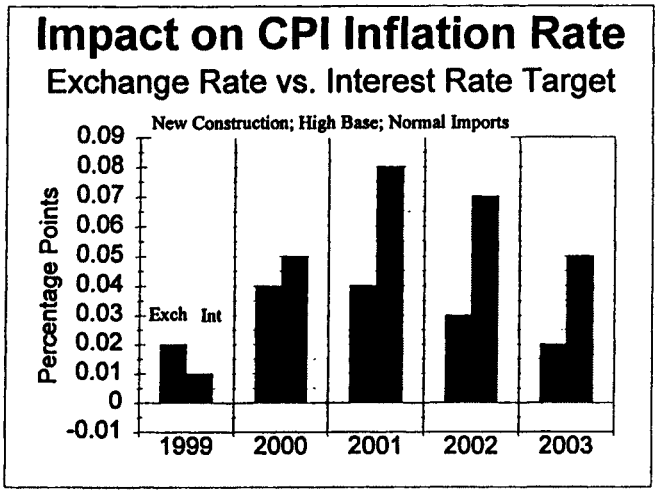
		1999	2000	2001	2002	2003
New Construction - Low Base - Normal Imports						
Real GDP - % Change	Exchange Rate Target	0.19	0.25	0.06	-0.06	-0.15
	Interest Rate Target	0.23	0.33	0.15	0.04	-0.07
	Diff	-0.04	-0.08	-0.09	-0.10	-0.08
Employment - Ch in '000	Exchange Rate Target	20.9	29.6	13.9	2.7	-11.3
	Interest Rate Target	22.6	35.2	23.5	14.1	-0.5
	Diff	-1.7	-5.6	-9.6	-11.4	-10.8
CPI Inflation - Ch in % pts	Exchange Rate Target	0	0.01	0.03	0.03	0.03
	Interest Rate Target	0	0.03	0.05	0.05	0.04
	Diff	0	-0.02	-0.02	-0.02	-0.01
Fed. Revenue - Ch in $Mill	Exchange Rate Target	358	542	272	47	-135
	Interest Rate Target	353	564	389	275	113
	Diff	5	-22	-117	-228	-248
Alterations - High Base - Normal Imports						
Real GDP - % Change	Exchange Rate Target	0.17	0.22	0.03	-0.10	-0.19
	Interest Rate Target	0.22	0.32	0.15	0.03	-0.09
	Diff	-0.05	-0.10	-0.12	-0.13	-0.10
Employment - Ch in '000	Exchange Rate Target	19.3	28.2	12.5	-1.1	-16.5
	Interest Rate Target	20.8	33.2	22.6	12.8	-3.0
	Diff	-1.5	-5.0	-10.1	-13.9	-13.5
CPI Inflation - Ch in % pts	Exchange Rate Target	0.02	0.03	0.04	0.03	0.03
	Interest Rate Target	0.00	0.04	0.08	0.07	0.06
	Diff	0.02	-0.01	-0.04	-0.04	-0.03
Fed. Revenue - Ch in $Mill	Exchange Rate Target	377	626	397	156	-67
	Interest Rate Target	338	603	517	451	298
	Diff	39	23	-120	-295	-365

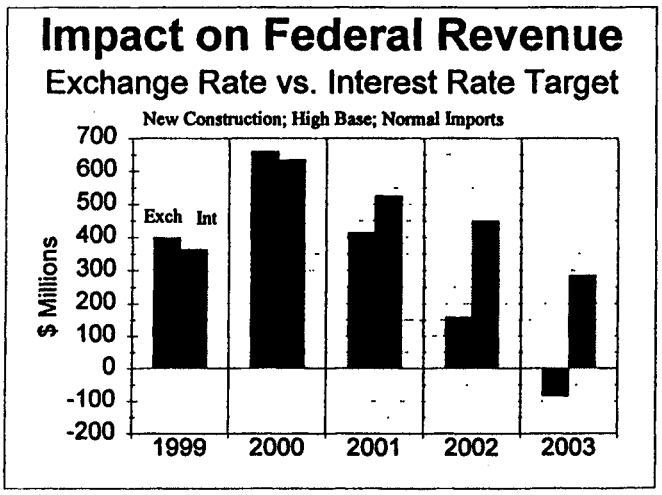
Chart 4.20

Exchange Rate vs. Interest Rate Target
New Construction - High Base - Normal Imports
** $1 Billion Increase in Housing Construction 1999-2000 **









Finally, since there is higher impact on both output and inflation under the interest-rate target, it is no surprise that generally federal revenues are much higher under this alternative, especially in later years when differences in the price and activity levels have become more pronounced[8].

5. Conclusions

The simulations have shown that a temporary increase in housing activity can have important induced effects on the economy, and that stimulus of this sort could be considered as a weapon of countercyclical fiscal policy during a slump or recession. We have also found that the stimulus takes up to a year to gather momentum and can persist in effect a year or more after the stimulus is removed. For countercyclical policy, therefore, it is important that a housing stimulus be introduced *early* or, as much as possible, in anticipation of the downturn. If the housing stimulus is introduced well after the downturn has begun, the lags in its operation could perhaps overheat a recovery.

We have also found that a temporary stimulus of this kind develops its *own* contractionary aftershock within 3 to 4 years (or somewhat longer under the interest-rate target). If the object of countercyclical policy is to soften recessions and also to suppress booms in recovery, then a temporary housing stimulus works on *both*, since the shock creates first positive and then negative stimulus to GDP and employment.

The simulations indicate only relatively small differences in impacts when New Construction is compared to Alterations or even when possible "double" import contents are considered. The higher import content of Alterations, or of increased import content in either type of construction, does weaken the multiplier, but not drastically. This is especially the case when the Bank of Canada is pursuing something like the interest-rate target. In this case, increased import content means a bigger depreciation of the exchange rate, which has its own favourable effects on real output and employment.

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[8]In years 1 and 2, the exchange-rate target sometimes generates slightly more federal revenue. This is because the exchange rate target generates relatively more activity through net exports via an exchange-rate depreciation, and changes in net exports have no effect on federal GST revenues.

Naturally, the simulations have shown that the state of the underlying economy matters for the impacts of a temporary housing shock. The higher the base level of the unemployment rate, the more the housing shock will be turned into extra real output and employment, and the less into extra inflation.

Finally, the simulations show that the impacts of a temporary housing shock cannot be considered in a policy vacuum: the impacts can vary significantly with the policy stance of the Bank of Canada. The more the Bank is prepared to accept additional stimulus, and the inflation it can bring, the larger the impacts will be. The simulations show that, for a $ 1 billion (86$) shock to housing, the inflation forthcoming in a high-unemployment environment is modest, even if the Bank of Canada fully accommodates the shock.