

The Effects of International Integration on Macroeconomic Policy Effectiveness

Finn Ostrup and Lars Oxelheim

Copenhagen Business School and University of Lund

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The paper considers how the capability of national policy makers to use macroeconomic policy instruments is affected by international integration. The possibility of using macroeconomic policies is seen as depending on a number of factors, most importantly the number of policy instruments, the effects of these instruments on economic goals, and the constraints on the use of policy instruments. Contrary to the widely held view of international integration reducing the effectiveness of macroeconomic policies, it is argued that international integration in many areas increase the capability of using macroeconomic policy instruments. Thus, international integration creates a number of new policy instruments. A formal analysis of monetary, fiscal, and structural policies shows that it depends on the sources of international integration and on the monetary regime whether international integration reduces or raises the prospects of using macroeconomic policy instruments.

1 Introduction

It is widely argued in the literature that international integration reduces the effectiveness of macroeconomic policy instruments which are used at the national level, thus making it harder for national policy makers to reach macroeconomic goals such as high production and low inflation. One claim is that national demand policies, e.g. monetary and fiscal policies, become less effective in more open economies as a larger share of a given demand increase spills over into imports, thus making it harder to affect national production through an impact on domestic demand.

This paper discusses to what extent international integration does in fact change national authorities' capability of using macroeconomic policy instruments. In dealing with this issue, the paper takes a broad perspective. Three questions related to the effectiveness of macroeconomic policy instruments are considered: (i) the effect of instruments on macroeconomic goals, (ii) the number of policy instruments, and (iii) the uncertainty related to the effects of policy instruments on macroeconomic goals. It is regarded as desirable seen from the perspective of national authorities' capability of reaching macroeconomic goals that there is a large number of policy instruments relative to macroeconomic goals and that policy instruments have a large effect on macroeconomic goals. It is further desirable seen from the perspective of attaining macroeconomic goals that there is little uncertainty surrounding the effects of macroeconomic instruments on goals, implying that the effects of policy intervention is known with greater certainty.

Section 2 surveys the literature. *Section 3* analyses on the basis of formal economic analysis how the authorities' capability of using monetary, fiscal, and structural policies is affected by international integration. *Section 4* considers the effects of international integration on a number of other policy instruments. *Section 5* discusses the financial and political constraints relating to budgetary deficits. *Section 6* examines the uncertainty which is associated with the use of policy instruments. *Section 7* considers how more efficient financial markets may reduce allocational costs associated with monetary policy. *Section 8* gives a summary and conclusion. The analysis in section 3 is based on the derivations in the *appendix*.

2 The literature

International integration is generally viewed in the literature as causing changes in the economic structure that reduce the authorities' capability of using macroeconomic policy instruments. Different effects may, however, arise from the international integration of goods markets and from the international integration of financial markets. In the following, we will highlight some of the main points which have been raised in the literature.

With respect to the possibility of using *fiscal policy*, it is generally agreed in the literature that fiscal policy becomes less effective as a means to influence production when there is a rise in the integration of goods markets. Thus, in the case of more open goods markets, a larger share of the demand stimulus which results from a more expansive fiscal policy is being directed towards foreign goods, implying that an expansive fiscal policy to a larger extent spills over into imports while causing a smaller rise in domestic production.¹ With respect to the impact of financial

¹ See Cooper (1977). Begg et al. (1993) stress that integration will cause a larger part of the effect from fiscal policy to fall in other countries. This works to reduce the incentive to pursue an expansive fiscal policy. The incentive to pursue

integration on the authorities' capability of using fiscal policy, different effects may arise. Financial integration is, on the one side, seen as reducing the room for budgetary deficits because investors operating in the international financial markets will require a premium on their lending to governments which run a budget deficit. This tends to tighten the constraints on fiscal policy.² Financial integration may, however, at the same time make it easier to pursue an expansive fiscal policy because governments can raise finance from a larger number of lenders.³

In economic models based on imperfect substitution between domestic and foreign goods, e.g. in the Mundell-Fleming model, an expansive fiscal policy causes a real appreciation, implying a rise in domestic prices relative to foreign prices. The real appreciation causes a rise in purchasing power for domestic individuals relative to other countries and tends also to dampen the rise in consumer prices as foreign goods become cheaper relative to domestic goods. Both these effects are seen to create an incentive for policy makers to pursue an expansive fiscal policy in open economies.⁴ This real appreciation effect pre-supposes that domestic and foreign goods are imperfect substitutes, implying that goods markets are imperfectly integrated. If domestic and foreign goods become closer substitutes, less scope for price differentials exists between goods produced in different countries, thus making it more difficult to affect the real exchange rate. In the case of perfect integration of goods markets, purchasing power parity (PPP) prevails and there is no possibility of changes in the real exchange rate.

an expansive fiscal policy is, however, at the same time strengthened because an expansive fiscal policy in the case of integrated financial markets no longer causes a rise in the interest rate as in a closed economy.

² The financial market discipline on governments is emphasised by a large number of writers. Panic (1988) emphasises that countries in an open economic environment must pursue convergent monetary and fiscal policies if they want to avoid financial instability. Hutton (1996) argues that the "...rapidly developing global capital market wanted tight control of budget deficits and the dismantling of exchange controls that would enlarge the power of finance over industry..." (p. 28). The risk of currency crises as a constraint on the national economic policy is stressed by a large number of other writers, see e.g. Soros (1998). Soros (1998) argues that it will be necessary to reduce financial instability if the world capitalist system is to survive. There is thus a choice between either (i) an international financial regulation or (ii) an increase in the financial regulation implemented at the national level which would end the present integrated financial system. The discipline is also stressed by Gray (1998) and by Schmidt (2002). Scharpf (1999) argues that it decreases the effectiveness of fiscal policy that the real interest rate is determined under financial integration is determined in the international market, the national policy makers thus losing the possibility of alleviating budgetary costs of public debt through a reduction of the real interest rate, brought about by a more expansive monetary policy.

³ For a discussion, see Garrett (1998a). Garrett (1998a) draws the general conclusion regarding international integration that "...there are good reasons to believe that the policy constraints generated by these relationships are weaker and less pervasive than is often presumed..." (p. 805). The Economist (1995) writes: "...global integration has changed the rules of macroeconomic policy...dramatically. But the effect has not been to alter the underlying constraints on policy. Mainly, it has changed the timing and the severity of the consequences if those constraints are ignored...In monetary policy, the size and sophistication of currency markets have compressed the timing and increased the severity. In fiscal policy, the timing has been relaxed - the global capital market often lets countries borrow more, more cheaply than they otherwise could. However, since this can allow deficits to run further out of control, the eventual punishment may often be worse. As a result of these changes, macroeconomic policy is more difficult to get right than it used to be. The fact remains that, in all these respects, global integration has left governments with about as many economic powers as they ever had..." (p. 14). See also The Economist (1997).

⁴ See Casella and Feinstein (1989). The impact of fiscal policy on the real exchange rate is further emphasised by Brociner and Levine (1992) and by Levine and Pearlman (1992) as reasons for a coordination of fiscal policy between countries. The same finding is derived in Andersen, Rasmussen and Sørensen (1996) who conclude that there is an incentive to pursue a too expansive fiscal policy in an open economy. See also the analysis in section 4.4.

With respect to *monetary policy*, the room for manoeuvre is being determined by the 'The Inconsistent Trinity'.⁵ According to the 'Inconsistent Trinity', the authorities can reach two out of three desirable objectives: (i) a fixed exchange rate, (ii) capital mobility, and (iii) monetary policy autonomy.⁶ It follows from the 'Inconsistent Trinity' that national authorities in the case of perfect capital mobility are unable to pursue an independent monetary policy when there is a fixed exchange rate while policymakers under a floating exchange rate retain the possibility of using monetary policy even in the case of perfect capital mobility.

With respect to the impact of goods market integration on monetary policy, it is argued in the literature that more integrated goods markets worsen the trade-off between production and inflation faced by national policymakers. This can be explained as follows. An expansive monetary policy tends to cause a real depreciation, implying a rise in domestic prices relative to foreign prices calculated in the same currency. This real depreciation implies a loss of purchasing power relative to foreign countries and raises consumer price inflation. The effect of the real depreciation on purchasing power and on consumer prices is increased when a larger share of consumption consists of foreign goods, implying a worsening in the trade-off faced by policy makers between production and inflation. National authorities become less inclined to pursue an expansive monetary policy when there is a rise in goods market integration as such an expansive policy causes a bigger price increase at a given rise in production.⁷

Under a fixed-but-adjustable exchange rate regime, national authorities can use exchange rate adjustments as an instrument to affect production. Exchange rate adjustments are generally seen as becoming less effective when economies are open. Devaluations in open economies tend, for

⁵ The 'Inconsistent Trinity' has first been suggested by Oxelheim (1990).

⁶ The underlying rationale is explained by Obstfeld (1998) as follows: "...An open capital market deprives a country's government of the ability simultaneously to target its exchange rate and to use monetary policy in pursuit of other economic objectives. As an example, consider Austria, which for more than two decades has pegged the exchange rate between its currency, the schilling, and the German mark...equality of interest rates...means that Austria cannot conduct a monetary policy independent of Germany's; both Austria's exchange rate and interest rate will be determined exogenously...Austria can regain an independent monetary policy in two ways. If it could prohibit any cross-border financial transactions, Austria would cut off the arbitrageurs and decouple its interest rate from Germany's, but could still maintain a fixed exchange rate. In that case, Austria might unilaterally lower its interest rates, for example, but investors no longer would have the right to move funds from Vienna to Frankfurt in response to the resulting return differential...the limitations that open capital markets place on exchange rates and monetary policy is often summed up by the idea of the "inconsistent trinity", or...the "open-economy trilemma"...that is, a country cannot simultaneously maintain fixed exchange rates and an open capital market while pursuing a monetary policy oriented toward domestic goals..."(p. 14). Grilli and Milesi-Ferretti (1995) write: "...capital controls may allow a country to pursue an independent monetary policy for a given period of time..." (p. 518). Eichengreen et al. (1998) write: "...Since Mundell and Fleming, it has been well understood that a small country with a fixed exchange rate and freely mobile capital cannot pursue an independent monetary policy. Any attempt to set domestic interest rates above or below international levels will be offset by an inflow or outflow of funds. It follows that it is not possible to use monetary policy to stabilize the business cycle..." (p. 41). Eichengreen, Tobin and Wyplosz (1995) write: "...The incompatibility of pegged exchange rates, international capital mobility and national monetary autonomy is a basic postulate of open economy macroeconomics..." (p. 162). Dooley (1996) emphasises that capital restrictions make monetary policy more effective. 'The Inconsistent Trinity' is further emphasised by Clarida (1999), Eichengreen, Tobin and Wyplosz (1995), Krugman (1998b), and by Obstfeld (1998). It is also emphasised by Cerny (1999), Drucker (1993), Goodman and Pauly (1993), Pauly (2000), and by Strange (1994). The Economist (1999b) refers to "...the impossible trinity of integration, regulation and sovereignty..." (p. 17).

⁷ This argument is presented in Rogoff (1985). Rogoff (1985) sees the worsening of the employment-inflation trade-off as positive because it reduces the authorities' incentive to pursue an expansive monetary policy. An expansive monetary policy would, due to time inconsistency, lead to a higher inflation while unemployment lies at the exogenously determined natural level.

example, to cause price and wage increases which counter the initial improvement in competitiveness which results from a devaluation. With a rise in openness, these price and wage increases become more important, thus making it harder to improve a country's competitiveness through devaluations.⁸ It is further argued that governments for political reasons may find it difficult to use the exchange rate instrument. Large devaluations may, for example, imply large political costs.⁹

According to Garrett and Lange (1991), international economic integration reduces the effectiveness of both 'Keynesian' and 'monetarist' fiscal and monetary policies. Analysing the changes in the effectiveness of macroeconomic policies that result from a rise in capital mobility, Frieden (1991) finds capital mobility to limit policy options because it will be impossible to maintain a fixed exchange rate while capital mobility under a floating exchange rate makes it impossible to affect the national interest rate. It is, however, still possible under full capital mobility to affect production and unemployment through changes in the exchange rate.

In an analysis of capital mobility, Frieden (1991) finds that national monetary policies have changed from operating primarily from operating via interest rates to operating via exchange rates. Capital mobility has no implications for governments' ability to use policies aimed at specific industrial sectors, e.g. the subsidisation of particular industries. Neither does capital mobility affect the government's ability to impose health and safety standards.

Alesina and Roubini (1992) demonstrate that rational macroeconomic cycles are less frequent in small, very open economies. Alesina and Roubini (1992) take this as evidence that policy instruments become less effective in a small open economy, reducing the scope for policy makers to create political business cycles.

According to Eichengreen (1994), the exchange rate stability under the Bretton Woods System was possible only because countries maintained capital restrictions, thus giving higher priority to monetary policy autonomy and exchange rate stability than to the free movement of capital. After 1973, a larger weight has been attached to the goal of free capital mobility while the objective of exchange rate stability has been given less priority. Obstfeld (1995) emphasises how governments have maintained some freedom of manoeuvre with respect to exchange rate policy. Evidence of this is found in the British devaluation in 1992 which led to rapid economic adjustment. The United Kingdom would have been forced to undergo a difficult economic adjustment, implying a reduction of wages over a prolonged period, if there had been no devaluation.¹⁰

Also the political science literature emphasises how international integration reduces the effectiveness of macroeconomic policies. Milner and Keohane (1996a, 1996b) emphasise how

⁸ This was first suggested by McKinnon (1963). In a survey of optimum currency areas, de Grauwe (1994) concludes: "...The ability of a country to affect output and employment by exchange rate changes is certainly a function of its openness...The major difference between open and relatively closed countries has to do with the supply shifts that follow a devaluation. More than a relatively closed country, a very open economy will quickly be faced with the problem that a devaluation just raises the domestic price level without affecting its output. Thus, for a very open economy the exchange rate is a particularly ineffective instrument. Relinquishing this instrument, therefore, involves little loss..." (p. 55).

⁹ See Webb (1991, 1995).

¹⁰ Obstfeld (1995a) writes: "...economies with moderate inflation and diversified production capabilities still retain some latitude for effective discretionary monetary policy actions, especially in response to unexpected events..." (pp. 132-133).

international integration undermines the autonomy and effectiveness of macroeconomic policies. This is especially important for left-wing governments which are more inclined to pursue expansive economic policies. Capital mobility is more important for limiting domestic policy autonomy than trade openness. The decrease in the effectiveness of macroeconomic policies is further underlined by Sandholtz (1993) who writes: "...technological changes and regulatory liberalization were creating a world in which capital could flow across borders more easily and quickly than ever before. This produced a significant external constraint on national monetary policies, as high inflation in one country would lead to outward capital flows and downward pressure on the currency..." (p. 5). Horsman and Marshall (1994) point to the failed attempt in France to pursue Keynesian macroeconomic management in the beginning of the 1980s as evidence that nation-states have lost autonomy with respect to monetary policy. Ruggie (1996) argues that financial integration makes it necessary to maintain a fixed exchange rate to increase investors' confidence about the stability of national economic policy. Due to the depth of financial markets and the speed with which transactions can be moved around, Wriston (1997) sees states as no longer being capable of controlling exchange rates. Jones (1999) writes: "...Perhaps the most sobering lesson for modern-day central bankers is their reduced effectiveness in controlling massive global capital flows and related financial asset price bubbles. In today's environment of market deregulation, financial innovation, integrated global financial markets, and advanced information processing and communications technology, there is a massive pool of liquid, mobile capital that relentlessly seeks out countries where business activity generates the highest possible return for a given degree of perceived risk..." (p. 1505).¹¹

Several writers emphasise that it has become increasingly difficult to maintain an economic system, often referred to as 'neo-corporatism', in which wages and macroeconomic policies are determined through negotiation between on the one side the authorities and on the other side labour market partners. Thus, according to Schmidt (1995), it has become increasingly difficult to maintain a corporatist model as companies feel less bound to national compromises.¹² Cerny (2000) sees globalisation as undermining the 'European neocorporatist model' which is characterised by: (i) organised labour, (ii) conservative monetary policy, (iii) the promotion of extensive training for workers, and (iv) a universal banking system. There are consequences especially for those economies - e.g. Germany, Austria, and Sweden - which have relied on neocorporatist practices.¹³

¹¹ It is further emphasised by Panic (1988) that economic integration reduces the effectiveness of economic policies. Razin and Rose (1994) write: "...Countries which reduce international barriers to movements in either goods or capital sacrifice domestic autonomy in the hope of a higher standard of living..." (p. 48). Spillover effects from the use of policy instruments in one country to other countries is used in Begg et al. (1993) as a justification why it is useful for countries to abandon a national macroeconomic policy setting and instead opt for a centralised policy setting, e.g. at the European level. According to Scharpf (1999), this reduces the effectiveness of monetary policy: "...if national interest rates are now increased above the international level to combat inflation, the effect will be counteracted by capital inflows, while a revaluation of the currency will increase imports and reduce export competitiveness. In either case, therefore, the desired policy impact will be weakened by the countervailing effects of capital mobility, whereas the undesired side effects will be stronger than they used to be. As a consequence, central banks have everywhere revoked their commitment to Keynesian full employment policies, and are now primarily concerned with maintaining price stability..." (p. 88). The ineffectiveness of national economic policies is further underlined by Gill (1993), Martin (1994), and Schmidt (1995).

¹² Schmidt (1995) writes: "...The problem is that the traditional "class compromise" that has helped to explain the stability of corporatist polities no longer works in a world of capital mobility and financial integration, where labor rightly sees business as less bound to it, morally or economically, and where business can obtain concession from both labor and government without the traditional compromise..." (p. 87).

¹³ Cerny (2000) argues: "...The flexibility and openness of Anglo-Saxon capital markets, the experience of Anglo-American élites with international and transnational business and their willingness to go multinational, the corporate structure of American and British firms and their (relative) concern with profitability and shareholder returns rather than

According to Garrett (1998b, 2000), it depends on the position of trade unions whether neo-corporatism and other interventionist policies are effective. Thus, in countries with a high degree of unionisation, the costs related to government intervention can be offset by a reduction in wages or by an upgrading of workers' skills through active labour market policies. Due to the effectiveness of interventionist policies in countries with a high extent of unionisation, governments are not under pressure in these countries to adapt neo-liberal economic policies.

3 The effectiveness of macroeconomic policies: A formal analysis

Based on an economic framework with short-term nominal rigidity, it is analysed in the following how international integration affects the impact which three macroeconomic policy instruments have on economic goals. The three policy instruments are: (i) monetary policy, (ii) fiscal policy, and (iii) structural policies operating at the macro level, e.g. measures to improve the functioning of labour markets. In the analysis, three types of monetary regime are considered: (i) a floating exchange rate regime where the authorities use monetary policy discretely to optimise their preferences, in the following referred to as policy discretion, (ii) a floating exchange rate regime where the authorities use monetary policy to pursue a target of low inflation and high employment, in the following referred to as inflation targeting, and (iii) a monetary union, implying a fixed exchange rate regime relative to foreign countries. In *section 3.1*, the question is raised whether it serves any point to undertake a formal analysis. *Section 3.2* sets out the economic structure while *section 3.3* specifies the authorities' policy behaviour. *Sections 3.4-3.6* examine how economic policies are determined respectively under policy discretion, under inflation targeting, and in a monetary union. *Section 3.7* considers to what extent monetary policy has an effect on the long-term equilibrium. *Section 3.8* considers various modifications of the basic framework. *Section 3.9* brings a conclusion. The specification of economic structure and of economic welfare used in the analysis builds on the derivations in the *Appendix*.

3.1 Is formal analysis necessary?

As discussed above, it is widely argued in the literature that policies which affect production through the demand channel – e.g. monetary and fiscal policies – become less effective in affecting domestic production when economies become more open. According to this view, in the case of a more open economy a given rise in domestic demand engineered by an expansive macroeconomic policy – e.g. by a reduction in taxation – will to a larger extent spill over into import demand while there will be a smaller increase in domestic demand and thus also a smaller effect on domestic production from a given demand stimulus. For this reason, national policy makers are seen as being more reluctant to use expansive demand policies when economies are more open.

We may question this traditional line of argumentation which sees openness as reducing the effectiveness of demand policies for three fundamental reasons.

traditional relationships and market share, the enthusiasm with which American managers have embraced lean management and downsizing, and the relative flexibility of the US and UK labour forces, combined with an arm's length state tradition in both countries – all of these factors are widely thought to have fought off the strategic state challenge and to have led eventually to more competitive states today..." (p. 304).

First, in the view of openness as undercutting the effectiveness of national demand policies there is no specification of the goals which national policymakers want to achieve. National policy makers may, for example, pursue other goals than production and it is possible that a given demand stimulus, even if it has less impact on production, have a bigger impact on such other goals. In the analysis below, not only the effects of policy instruments on production are examined but also on the effects on other economic goals.

As a second objection, it is not specified how the national policy makers value economic goals. If we are to assess how the authorities' incentive to pursue demand-oriented policies is changed by more open markets, it is, however, not unimportant how the utility which policymakers derive from a given rise in production, or from the attainment of other goals, is determined. This can be explained as follows. The relevant measure for the utility which results from production, is usually the growth rate of production. Thus, economic performance is measured in terms of the growth rate which is achieved in a country while there is seldom mentioning in economic reports, in policy statements or elsewhere of the total addition to production which is reached in a country. If, however, economic performance is measured in terms of growth rates – and not in terms of absolute additions to production – a rise in the import share of domestic production does not affect the utility derived from production – i.e. the production growth rate - which results from a given demand stimulus. As the import share does not impact on the utility of production, it further follows that it has no effect on the authorities' inclination to use demand policies. Or to put it more concretely. If it is possible through a certain change in a policy instrument to bring about a certain percentage change in domestic demand, the percentage increase in production which follows from such a percentage change in domestic demand (and thus from a given change in the policy instrument), does not depend on the share of imports in production if this is a fixed percentage of production. Thus, if a fixed percentage of domestic demand spills over into imports, a 3 percent change in domestic demand will always cause a 3 percentage increase in production regardless of the import share.¹⁴ The import share is thus unimportant for the production growth which can be reached from a certain change in domestic demand and thus from a given change in the policy instrument.

Finally, as a third objection against the claim of demand policies becoming less effective in more open economies, there is no specification of the costs related to the use of policy instruments. The use of policy instruments implies costs of different kinds. An unfinanced expansive fiscal policy may, for example, cause a rising debt burden which gives rise to a later reduction in living standards. In order to assess how the authorities' incentive to implement expansive demand policies is affected by more open economies, it is necessary to specify such costs which arise in connection with the use of policy instruments.

Thus, in order to make the claim that national policy makers are less inclined to use demand-oriented macroeconomic policies in an open economy than in a closed economy, it is necessary

¹⁴ This can be explained more formally as follows. Let us assume the following relationship between production and domestic demand: $Y = (I - \varphi)D$ where Y is production, φ the import share, and D is domestic demand. We assume that I is a policy instrument with a given impact on domestic demand which is unrelated to economic openness. The impact of the policy instrument I on the log of production can then be determined as follows. Taking the log of production gives: $y = \log(I - \varphi) + \log(D)$. The impact of instrument I on the log of production is given as: $\delta y / \delta I = \delta \log(D) / \delta I$. If $\delta \log(D) / \delta I$ is independent of economic openness, then the effectiveness of the policy instrument measured in terms of the capacity to reach a rise in the log of production (and thus in the growth of production), is also unaffected by the economy's openness.

explicitly to spell out the macroeconomic goals which policymakers want to attain and the costs which are related to policy instruments. In order to assess these factors, it is necessary to proceed on the basis of an explicitly stated economic framework which builds on a specification of the economic structure and of the authorities' preferences.

3.2 The economic structure

We consider a small open economy which faces a large economy (the rest of the world). An assumption is made of a fixed capital stock. We consider how economic policy is determined in the short term where the authorities act on the basis of a nominal rigidity. It is assumed that the authorities make decisions on the basis of prices which are pre-set for one period. At the beginning of each period, prices are adjusted on the basis of the 'New-Keynesian Phillips-curve' which implies that the price setting in a given period is affected by the future expected price increase. It is the basic assumption underlying the New-Keynesian Phillips-curve that firms have the opportunity to adjust the price in the future but the exact time when such a price change is possible, is unknown to the firm.

Based on the 'New-Keynesian Phillips-curve', the price change in the current period depends on the expected change in the price level in the future period, a higher future expected price change making the firm more inclined to raise the price level already in the present period. In addition, the price change depends on the output gap, i.e. the difference between output and potential output. This gives the price change in the current period as

$$(1) \quad p - p_{-1} = a(p_{+1} - p) + b(y - y') - \Lambda, \quad a > 0, \quad b > 0,$$

where p is the price on goods produced in the home country (logarithmic value), y production (logarithmic level), y' potential production (logarithmic level), and Λ the effect of structural policy. All variables relate to the current period unless otherwise indicated. p_{-1} is the price level in the previous period while p_{+1} is the price level in the next period. The coefficient a expresses how the price change in the current period is affected by the price change in the subsequent period while the coefficient b expresses how the price change in the current period is affected by the output gap.

Equation (1) specifies that the price change in the current period is positively affected by (i) the future price change, and (ii) the output gap. Λ shows the effect of structural policies. Structural measures, shown by a rise in Λ , lower the price increase which follows from a given expected future price increase and from a given output gap. Structural policies may, for example, take the form of measures which increase the flexibility of labour markets or which increase competition in product markets.

Re-writing (1), we derive the future price increase as a function of the current price increase and of the output gap in the current period:

$$(2) \quad p_{+1} - p = \frac{1}{a}(p - p_{-1}) - \frac{b}{a}(y - y') + \frac{1}{a}\Lambda.$$

It follows from (2) that the future price increase is positively affected by a higher price increase in the current period and negatively affected by a rise in the output gap. Structural measures increase the future price increase.

We assume that there is imperfect substitution between home and foreign goods. Based on the derivations in the appendix, we derive the following relationship which expresses equilibrium in the market for goods produced in the home country:

$$(3) \quad y = z(d, x, g),$$

$$z_d = \frac{\partial z}{\partial d} = 1 - \varphi > 0, \quad z_x = \frac{\partial z}{\partial x} = A\varphi > 0, \quad z_g = \frac{\partial z}{\partial g} = \varphi \frac{1}{1 - g} > 0,$$

$$A = \theta + (\theta - 1)(1 - \varphi) > 1, \quad 0 \leq \varphi \leq 1, \quad \theta > 1,$$

where the function $z(\cdot)$ is a relationship which expresses how the demand for home country goods depends on domestic demand, government spending relative to production, and the real exchange rate. d is domestic demand (logarithmic value) and x the real exchange rate (logarithmic value) while g is government spending relative to production. The real exchange rate x is defined as the number of home currency units per foreign currency units. This means that a rise in x expresses a real depreciation of the domestic currency while a reduction in x implies a real appreciation. The parameter φ reflects the individual's preference for foreign goods while $1 - \varphi$ is the preference for home goods. θ is the elasticity of substitution across domestic and foreign goods. A is a term which is a positive function of the substitution between home and foreign goods. In the case with perfect substitution between home and foreign goods, A converges towards infinity.

It follows from (3) that the demand for home country goods is a function of (i) the real exchange rate X , (ii) domestic demand d , and (iii) government spending relative to production g . It follows that the demand for home goods is increased by a real depreciation which reflects a rise in the price of foreign goods relative to home goods expressed in the domestic currency. A real depreciation is reflected by a rise in X . The demand for home goods is further increased by a rise in domestic demand. Domestic demand consists of private consumption, government purchases of goods and services, and capital investment. A rise in these demand components raises the demand for home goods. It is finally assumed by (3) that a rise in government spending relative to production increases the demand for home goods. This is because government spending consists to a large extent of home goods. A shift in the composition of domestic demand with a larger share of domestic demand consisting of government spending thus implies a rise in the demand for home goods.

Two factors reflect goods market integration in (3). First, a rise in goods market integration caused by a stronger preference for foreign goods is similar to an increase in the parameter φ , implying that a larger share of consumption consists of foreign goods. In the case where $\varphi = 1$, consumers only derive utility from foreign goods and all consumption consists of foreign goods. There is thus no preference for domestic goods. In the case where $\varphi = 0$, consumers only derive utility from home country goods and all consumption consists of domestic goods. There is thus no imports. Second, a rise in goods market integration can be caused by a rise in the substitution

between home goods and foreign goods, implying a rise in θ and thus also in A . There is perfect substitution between home country and foreign goods when θ , and thus A , approaches infinity.

We assume that domestic demand, being equal to the sum of private consumption, capital investment, and government spending, is a function of production, the real interest rate, and of government spending relative to production. This gives

$$(4) \quad d = d(y, g, r),$$

$$0 < d_y = \frac{\partial d}{\partial y} < 1, \quad d_g = \frac{\partial d}{\partial g} > 0, \quad d_r = \frac{\partial d}{\partial r} < 0,$$

where the function $d(\cdot)$ is a relationship which expresses how domestic demand depends on production, government expenditure relative to production, and on the real interest rate. r is the real return on domestic securities, in the following referred to as the domestic real interest rate.

Equation (4) expresses domestic demand as a function of (i) production y , (ii) the real interest rate r , and (iii) fiscal policy, shown by g . We assume that there is equilibrium on the government budget, implying that government spending is equal to the total tax revenue. A rise in g thus reflects a rise in the size of the government budget, reflecting an equal rise in government spending and in taxation relative to production. The combined effect on domestic demand of such a rise in both government spending and taxation is positive and can be taken to reflect a more expansive fiscal policy.

We finally turn to the financial markets. Investors in the home country and in the foreign country can invest in securities which are issued by home and by foreign firms to cover the financing of capital investments. These securities are referred to as respectively domestic securities and foreign securities. The equilibrium on the market for domestic securities is specified as

$$(5) \quad (1-h)\omega S + \frac{1}{N}h\omega X S^* = I, \quad \omega = \omega(r-r^*), \quad S = sY,$$

$$S = sY, \quad S^* = sY^*, \quad s > 0, \quad 0 \leq h < 1, \quad Y^* = NY,$$

where S is domestic saving, S^* foreign saving, I capital investment, ω the share of saving placed in domestic securities, s saving relative to production, h the share of saving which is placed in securities issued by firms from other country, and r^* is the foreign real interest rate. The functional relationship $\omega(\cdot)$ is a relationship which shows the share of saving which is placed in domestic securities. N is the size of the foreign country relative to the home country.

Equation (5) represents equilibrium in the market for domestic securities. Domestic securities are issued to finance investment. This is shown by the right-hand side of (5). The demand for domestic securities from investors in the home country is shown by the first term on the left-hand side of (5). This demand is determined by domestic saving, shown by S , and by the real return on domestic securities relative to the return on foreign securities, shown by the functional relationship ω which reflects how the share of saving placed in domestic securities rises with a rise in the real return on domestic securities relative to foreign securities. Saving is taken to be a fixed share of production,

implying that $S = sY$ where s is saving relative to production. The demand from home country investors for domestic securities is further determined by the parameter h which shows the share of home country saving which is placed in foreign securities regardless of the real interest rate differential between domestic and foreign securities. The second term on the left-hand side shows the demand for domestic securities which originates from saving in the foreign country. The domestic currency value of foreign saving is equal to XS^* . It is further assumed that foreign investors invest a proportional smaller share of their saving in domestic securities. This means that when the foreign country is N times larger than the domestic country, the demand for domestic securities must correspond to the share $1/N$ of foreign saving. We assume that the home country and the foreign country have the same economic structure except for size.

We consider a situation where countries have the same structure except for size. In this case, the domestic real interest rate is initially equal to the foreign real interest when policy makers make decision on policy instruments. To simplify, we may further assume that there is a home currency preference in the sense that home country investors only place in domestic securities when the domestic real interest rate is equal to the foreign real interest rate, implying that $\omega = I$ when $r = r^*$ while $h = 0$. Using that $h = 0$ and using from national accounts definitions that capital investment is equal to domestic demand with the deduction of production and with the addition of saving, the condition for securities market equilibrium specified by (5) can be re-written as¹⁵

$$(6) \quad \omega = \left(\frac{D}{Y}\right)\frac{1}{s} - \frac{1}{s} + 1, \quad \omega = \varpi(r - r^*), \quad I = D - Y + S,$$

where D is domestic demand

Equation (6) shows that the share of saving which is placed in domestic securities is a function of domestic demand relative to production, shown by D/Y .

It finally results from (6) that the domestic real interest rate depends on the foreign real interest rate and on domestic demand relative to production, that is

$$(7) \quad r = r^* + \Phi, \quad \Phi = \Phi(d - y), \quad \Phi_d = \frac{\partial \Phi}{\partial (d - y)} > 0,$$

where the function $\Phi(\cdot)$ is a relationship which expresses how the real interest rate on domestic securities relative to the real interest rate on foreign securities is affected by the net supply of domestic securities, being equal to domestic demand relative to production. As domestic demand relative to production also determines the balance-of-payments current account, it results from (7) that the domestic real interest rate is determined by the net deficit on the balance-of-payments current account, a rise in the net deficit causing a rise in the real interest rate.

Equation (7) represents equilibrium on the market for domestic securities. It follows from (7) that the real interest rate on domestic securities is increased if there is (i) a rise in the foreign real interest rate r^* , and (ii) a rise in domestic demand relative to production, shown by $d - y$. A rise in

¹⁵ It follows from national accounts definitions that domestic demand (D) = private and government consumption + capital investment (I). As production (Y) = private and government consumption + saving (S), it follows that $D = Y - S + I$. From this it further results that $I = D - Y + S$.

the net deficit on the balance-of-payments current account corresponds to a rise in capital investments relative to savings. This implies that there is a rise in issues of domestic securities relative to the home country demand for domestic securities, represented by domestic saving. This tends to raise the domestic real interest rate.

In (7) a rise in financial integration is reflected by a closer substitution between domestic and foreign securities. This means that the domestic real interest rate is less affected by changes in the supply of domestic securities relative to the demand for domestic securities, implying that Φ_j becomes smaller. In the case of perfect financial integration, the domestic real interest rate is determined only by the foreign real interest rate. This corresponds to the case where $\Phi_j = 0$. In the opposite case with no financial integration, there is no possibility of cross-border purchases and sales of domestic securities, implying that domestic demand is equal to domestic production, i.e. $d = y$. This corresponds to the case where $\Phi_d \rightarrow \infty$.

The domestic real interest rate is by definition equal to the nominal interest rate with the deduction of the future price increase on domestic goods. This gives:

$$(8) \quad i = r + (p_{+1} - p),$$

where i is the nominal interest rate.

It is finally assumed that the money demand is a positive function of production and of the price level while it is negatively affected by a rise in the nominal interest rate. Equilibrium on the money market is given as

$$(9) \quad m = y + p - \zeta(i),$$

where m is the money supply (logarithmic value). $\zeta(\cdot)$ is a relationship which expresses how the demand for money depends on the nominal interest rate.¹⁶

3.3 The authorities' policy behaviour

Equations (2)-(4) and (7)-(9) constitute an economic system consisting of six economic relationships with six endogenous variables: (i) production y , (ii) the future inflation, expressed as the price increase on home goods over the next period $p_{+1} - p$, (iii) domestic demand d , (iv) the real exchange rate x , (v) the real interest rate r , and (vi) the nominal interest rate i . The authorities set policy instruments after the price has been preset for the rest of the period by the firms. We can thus treat the price level in the current period as exogenously given when we analyse the incentives which face the authorities when they make decisions on policy instruments.

In the economic system consisting of (2)-(4) and (7)-(9), the authorities dispose of three policy instruments: (i) monetary policy which affects the economy through changes in the money supply m , (ii) fiscal policy, shown by g , and (iii) structural policy which works to improve economic efficiency, reflected by a rise in λ .

¹⁶ Due to the assumption that the authorities adjust the money supply to reach a specific nominal interest rate to affect macroeconomic variables, the specification of the money market equilibrium plays no role in the analysis.

The money supply may be adjusted discretely or may follow a certain monetary policy rule. We analyse three monetary regimes. Under *policy discretion*, the authorities determine monetary policy to optimise their preferences. There is a floating exchange rate. The authorities control the nominal interest rate while the money supply is taken to be endogenously determined. Under *inflation targeting*, the nominal interest rate is adjusted in accordance with a specific policy rule. There is a floating exchange rate. Finally, in a *monetary union*, there is a fixed exchange rate regime and the nominal exchange rate is thus exogenously determined.

We assume that the authorities are benevolent when they set policy instruments discretely. Under policy discretion, this implies that all policy instruments are determined with the view to optimise the utility of representative households. Under the two monetary regimes where monetary policy is used to maintain a specific rule – i.e. inflation targeting and the fixed exchange rate regime – the authorities set other policies than monetary policy – i.e. structural and fiscal policies - to optimise the utility of representative households.

The households' utility is seen as depending on three macroeconomic variables: (i) home country production, (ii) the real exchange rate, and (iii) the real interest rate. A higher production increases utility by raising the real income and thus the consumption possibilities for domestic households. A real appreciation, reflected by a reduction in x , causes an increase in the purchasing power of domestic households with respect to purchases of foreign goods, making domestic households better off with respect to purchases of foreign goods. Finally, with respect to the real interest rate, no unambiguous conclusion can be reached concerning the effect on utility. A higher real interest rate lowers capital investment, thus reducing production and consumption possibilities in future periods. This represents a negative effect on utility. A higher real interest rate increases, however, also the real return on saving, thus providing domestic households with better future consumption possibilities.¹⁷

We assume that the households' utility depends on the logarithmic levels of respectively production and of the real exchange rate. This implies that the authorities – when they evaluate the success of their policy setting – look at the percentage changes in production and in the real exchange rate which result from changes in policy instruments.¹⁸ This seems to be realistic. As noted above, policy evaluations generally take place in terms of percentage changes. Thus, policy makers evaluate success in terms of the growth rate in production or in terms of the percentage change in the exchange rate, e.g. the rate of depreciation vis-à-vis foreign currencies.

In the case where the authorities can set policy instruments discretely, we consider a case where the authorities use policy instruments to optimise preferences which are given as

$$(10) \quad V = y - \varphi x - vr - \psi(j) = 0, \quad \psi_j = \frac{\partial \psi}{\partial j} > 0, \quad \psi_{jj} = \frac{\partial^2 \psi}{\partial j^2} > 0, \quad v > 0, \quad j = i, \Lambda, g,$$

where V expresses the authorities' preferences while j represents policy instruments. $\psi(\cdot)$ is a function which expresses other factors that affect the authorities' preferences than utility. The parameter ψ_j shows the effect of the policy instrument on these other effects with ψ_{jj} showing how

¹⁷ A derivation of the households' utility is found in the appendix.

¹⁸ See the appendix for a derivation.

this effect is affected by a further rise in a policy instrument. The parameter ν reflects how utility is affected by the real exchange rate.

Relation (10) expresses how the authorities' preferences depend on the three macroeconomic variables which reflect the households' utility: (i) domestic production y , (ii) the real exchange rate x , and (iii) the real interest rate r . In addition, the authorities' preferences may be affected by other effects. It is assumed that these other effects imply costs which rise more than proportionately with the instrument being used to a larger extent.

In the specification of preferences given by (10), it is assumed that the authorities place a weight on the real exchange rate which is equal to the share of foreign goods in consumption, i.e. corresponding to the parameter φ which is the share of foreign goods in consumption.¹⁹ In the specification of preferences given by (10) it is further assumed that the authorities derive negative utility from a higher real interest rate. This seems to be in accordance with the policy experience where a lower real interest rate is usually seen as being beneficial. As discussed above, this is, however, not unambiguous as a lower real interest rate also has a negative effect through a worsening of savings possibilities. The fourth term in the preferences specified by (10) expresses negative effects which are related to a larger use of the policy instrument, for example negative effects in relation to a bigger work effort related to a production increase brought about through policy intervention. It is assumed that such negative effects related to the use of policy instruments rise more than proportionally with the policy instrument.

Economic integration affects the authorities' preferences. Thus, a rise in goods market integration caused by a stronger preference for foreign goods means that a larger part of consumption is covered through imports, implying a rise in φ . This causes a rise in the impact which the real exchange rate has on utility. There will, for example, be a bigger increase in households' purchasing power from a given real appreciation when a larger share of consumption consists of foreign goods. Financial integration means that a smaller share of saving takes place in domestic securities, implying that there will be a smaller cost in the form of a deterioration of saving possibilities when there is a reduction in the domestic real interest. We may thus expect a rise in financial integration to cause a rise in the weight which the authorities attach to reaching a lower real interest rate, implying that financial integration causes ν to rise.

The authorities make decisions on policy instruments in such a way that the preferences specified by (10) are optimised. Optimising (10) with respect to a policy instrument j gives the following condition:

$$(11) \quad \frac{\partial V}{\partial j} = \frac{\partial y}{\partial j} - \varphi \frac{\partial x}{\partial j} - \nu \frac{\partial r}{\partial j} - \psi_j = 0,$$

where, and ψ_j shows the effect of policy instruments on the other factors which affect welfare.

It follows from the condition expressed by (11) that decisions on policy instruments depend on the effects of the policy instrument on the three macroeconomic goals, i.e. production, the real exchange rate, and the real interest rate. A higher level of welfare is realised when there is a larger effect of policy instruments on the macroeconomic goals, implying that $\delta y/\delta j$, $\delta x/\delta j$, and $\delta r/\delta j$ are

¹⁹ See the appendix for a derivation.

increased. It is thus desirable seen from the perspective of reaching a high welfare that policy instruments have a big impact on macroeconomic goals, implying that there is a large effectiveness of policy instruments. International integration can affect welfare positively or negatively by either increasing or reducing the effectiveness of policy instruments with respect to their impact on the three macroeconomic goals. It will be examined in the next sections how international integration impacts on the effects which policy instruments have on respectively the logarithms of production and the real exchange rate and on the domestic real interest rate.

The biggest positive effect on utility is reached if international integration causes such changes in the effectiveness of a policy instrument that it is possible through a given change in the instrument to reach at the same time a larger increase in production, a larger real appreciation, and a larger reduction in the real interest rate. In the case where $\psi_{jj} > 0$, it results that the authorities make more use of a policy instrument if it is possible through a given change in the instrument to reach at the same time a larger increase in production, a larger real appreciation, and a larger reduction in the real interest rate. A larger use of the policy instrument also implies that there will be a bigger increase in the households utility.

3.4 Policy discretion

In the case of policy discretion, the authorities set the nominal interest rate to optimise their preferences, specified by (10). In the following, we analyse how international integration impacts on the effects which the three policy instruments have on macroeconomic variables and on the authorities' inclination to use the policy instruments. The effects of goods market integration caused by a closer substitution between home and foreign goods and by a stronger preference for foreign goods are shown respectively in *table 1* and in *table 2*. The effects of financial integration are shown in *table 3*.

(i) Monetary policy

Combining the 'New-Keynesian Phillips-curve' specified by (2) with the expression for the real interest rate shown by (8) gives the relationship between the nominal interest rate and production as

$$(12) \quad i = r - \frac{1}{a}(p - p_{-1}) - \frac{b}{a}(y - y') + \frac{1}{a}\Lambda.$$

In (12), the price in the current period, i.e. p , is determined by the output gap in the previous period, thus being exogenously given to the authorities when they decide on macroeconomic policy instruments. A rise in the nominal interest rate relative to the real interest rate thus causes a rise in the future price increase. This implies a reduction in the output gap and thus in production in the current period. It follows from (12) that production is affected by monetary policy, working through the interest rate channel, by structural policy, and by the policy instruments which affect the real interest rate. A rise in the real interest rate at a given nominal interest rate is equal to a reduction in the future price increase. Such a lowering of the future inflation increases production, cf. (2).

We derive from (12) in combination with (3)-(4) and (7) the impact which a change in the nominal interest rate has on the macroeconomic variables that affect welfare:

$$(13) \quad \frac{\partial y}{\partial i} = d_r \left[B - \frac{b}{a} d_r \right]^{-1} < 0,$$

$$\varphi \frac{\partial x}{\partial i} = d_r \left[\frac{1 - (1 - \varphi)(d_y + B)}{A} \right] \left[B - \frac{b}{a} d_r \right]^{-1} < 0, \quad 1 - (1 - \varphi)(d_y + B) > 0,$$

$$\frac{\partial r}{\partial i} = B \left[B - \frac{b}{a} d_r \right]^{-1} > 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0,$$

where B is a term.

It follows from (13) that a more restrictive monetary policy, represented by a rise in the nominal interest rate, lowers production and causes a rise in the real interest rate. It depends on the economic structure whether a more restrictive monetary policy causes a real appreciation, expressed by a reduction in x , or a real depreciation. In the following we comment on the case where $(1 - \varphi)(d_y + B) < 1$. In this case a tighter monetary policy leads to a real appreciation. The condition $(1 - \varphi)(d_y + B) < 1$ is more likely to be met when there is a rise in goods market integration caused by a stronger preference for foreign goods φ and when there is a rise in financial integration, reflected by a reduction in B , cf. below.

How does international integration affect the effects which a more expansive monetary policy has on the macroeconomic variables which determine utility? A rise in goods market integration caused by closer substitution between home and foreign goods raises the value of A while a rise in goods market integration caused by a stronger preference for foreign goods increases φ . It follows from (13) that goods market integration has no impact on the effects which monetary policy has on production and on the real interest rate. This is because production and the real interest rate are determined only by the condition for financial equilibrium (7), by the condition for the real interest rate (8), and by the condition for price adjustment (12). As goods market integration only affects the condition for goods market equilibrium, it results that goods market integration does not affect the effects of monetary policy on production and on the real interest rate. It results from (13) that a rise in the substitution between home and foreign goods tends to diminish the change in the real exchange rate which results from a more expansive monetary policy. Insofar as a more expansive monetary policy causes a real depreciation, the size of this real depreciation is diminished by a closer substitution between home and foreign goods, reflected by a rise in A , and the authorities thus have a stronger incentive to pursue an expansive monetary policy. In the case where a rise in goods market integration is caused by a weaker preference for home goods, implying a rise in φ , it follows that a more expansive monetary policy will lead to a bigger real depreciation, implying that the incentive to pursue an expansive monetary policy is weakened. We thus derive that the authorities' inclination to pursue an expansive monetary policy is strengthened by goods market integration which increases the substitution between home and foreign goods while it is weakened by a stronger preference for foreign goods.

With respect to financial integration, Φ_d shows the impact which a given change in the balance-of-payments deficit, and thus in the net supply of domestic securities, has on the domestic real interest rate. A rise in financial integration is reflected by a reduction in Φ_d , implying that a given change in the supply of domestic securities has a smaller effect on the real interest rate. In the case of perfect financial integration, $\Phi_d = 0$. This corresponds to the term B being equal to zero. In the case of no financial integration, $\Phi_d \rightarrow \infty$. This implies that the term B converges towards one. The term B thus lies between zero and one, with a rise in financial integration being reflected by a reduction in the value of B .

It results from (13) that a rise in financial integration, implying a reduction in B , means that a given lowering in the nominal interest rate causes a bigger rise in production. This means that the effectiveness of monetary policy with respect to affecting production is increased when there is a rise in financial integration. It also follows that a rise in financial integration reduces the size of the real depreciation which follows from a more expansive monetary policy, implying that the incentive to pursue a more expansive monetary policy becomes stronger also for this reason. Finally, with respect to the effect of a more expansive monetary policy on the real interest rate, it follows from (13) that a rise in financial integration means that a lower nominal interest rate leads to a smaller reduction in the real interest rate. As a lower real interest rate is seen as positive by the authorities, this tends further to weaken the incentive to pursue an expansive monetary policy.

It may seem surprising that changes in the nominal interest rate in the case of financial integration have a bigger effect on production, implying that monetary policy becomes more effective with respect to affecting production. The mechanism can be explained as follows. In the case of a higher nominal interest rate, it follows from (12) that there will be a reduction in production. In the case of imperfect financial integration, a reduction in production will cause a rise in the balance-of-payments deficit which tends to increase the real interest rate. This means that a given rise in the nominal interest rate under imperfect financial integration will cause a rise in the real interest rate which diminishes the impact of the higher nominal interest rate on production. The biggest effect on production will be reached under perfect financial integration when the real interest rate is unchanged in (12), implying that a given tightening of monetary policy in the form of a higher nominal interest rate spills over fully into a reduction in production.

(ii) Structural policy

We derive from (3)-(4), (7), and (12) the impact of structural policy on the three macroeconomic variables which affect utility:

$$(14) \quad \frac{\partial y}{\partial \Lambda} = -d_r \frac{1}{a} \left[B - \frac{b}{a} d_r \right]^{-1} > 0,$$

$$\varphi \frac{\partial x}{\partial \Lambda} = -d_r \frac{1}{a} \left[\frac{1 - (1 - \varphi)(d_y + B)}{A} \right] \left[B - \frac{b}{a} d_r \right]^{-1} > 0, \quad 1 - (1 - \varphi)(d_y + B) > 0,$$

$$\frac{\partial r}{\partial \Lambda} = -B \frac{1}{a} \left[B - \frac{b}{a} d_r \right]^{-1} < 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0.$$

It follows from (14) that a structural policy which works to increase economic efficiency, increases production and causes a fall in the real interest rate. In the case where where $(1 - \varphi)(d_y + A) < 1$, an efficiency-enhancing structural policy causes a real depreciation. This is because a rise in production caused by structural policy must cause a fall in the price of domestic goods relative to foreign goods in order to establish equilibrium on the goods market. In the following we comment on the case where structural policy creates a real depreciation.

The effects of structural policy correspond to those which result from an expansive monetary policy except that effects are multiplied by the term $1/a$. In the case where structural policies cause a real depreciation, it results that the size of this real depreciation is reduced by goods market integration caused by closer substitution between home and foreign goods, implying that closer substitution between home and foreign goods strengthens the incentive to undertake structural policies. Conversely, the size of the real depreciation is increased by a stronger preference for foreign goods, implying that the incentive to undertake structural policies is weakened by goods market integration caused by a stronger preference for foreign goods. A rise in financial integration means that a bigger rise in production and a bigger real depreciation will follow from a given structural policy while there will be a smaller fall in the real interest rate. It follows that the inclination to use structural measures to increase production becomes stronger with a rise in goods market integration as there will be a smaller real depreciation. It depends on the economic structure and on preferences how the inclination to make use of structural policies is affected by financial integration.

(iii) *Fiscal policy*

It results from (3)-(4), (7), and (12) that an expansive fiscal policy has the following impact on the macroeconomic variables which affect utility:

$$(15) \quad \frac{\partial y}{\partial g} = d_g B \left[B - \frac{b}{a} d_r \right]^{-1} > 0,$$

$$\varphi \frac{\partial x}{\partial g} = -\frac{1}{A} \left[d_g (1 - \varphi) + \frac{1}{1 - g} \varphi \right] + \left[\frac{d_g B}{A} \right] \left[1 - (1 - \varphi) \left(d_y + \frac{b}{a} d_r \right) \right] \left[B - \frac{b}{a} d_r \right]^{-1},$$

$$\frac{\partial r}{\partial g} = d_g B \frac{b}{a} \left[B - \frac{b}{a} d_r \right]^{-1} > 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0.$$

It follows from (15) that a more expansive fiscal policy tends to raise production and the real interest rate while it depends on the economic structure how a more expansive fiscal policy affects the real exchange rate. These effects can be explained as follows. It follows from (15) that a more expansive fiscal policy raises the real interest rate. This is because a more expansive fiscal policy increases the balance-of-payments deficit, thus raising the supply of domestic securities relative to

foreign securities. This increases the real interest rate. At a given nominal interest rate, determined by monetary policy, it follows from (12) that a rise in the real interest rate is matched by a reduction in future inflation. This tends to increase production, cf. (12). With respect to the impact of a more expansive fiscal policy on the real exchange rate, there are two effects. First, a more expansive fiscal policy increases domestic demand, thus causing a larger pressure on the market for domestic goods and thus tending to raise the price of domestic goods relative to foreign goods, working to cause a real appreciation. A second effect arises because a more expansive fiscal policy increases the real interest rate. The rise in the real interest rate tends to reduce the demand for domestic goods and thus to cause a real depreciation.

It follows from (15) that goods market integration has no impact neither on determination of production nor of the real interest rate. A rise in goods market integration caused by a closer substitution between home and foreign goods reduces the impact of fiscal policy on the real exchange rate while it depends on the economic structure how a stronger preference for foreign goods affects the effect of fiscal policy on the real exchange rate.

A rise in financial integration causes a reduction in B . This means that the effect of an expansive fiscal policy on the real interest rate - and thus also on production - becomes smaller when there is a rise in financial integration. It further follows from (15) that a rise in financial integration works to increase the size of the net real appreciation which results from an expansive fiscal policy. The case of perfect financial integration corresponds to the case where $B = 0$. In this case, fiscal policy is unable to affect production and the real interest rate while a more expansive fiscal policy causes a real appreciation.

It results from the discussion that it depends on the economic structure how the authorities' incentive to make use of an expansive fiscal policy is changed by goods market integration and by financial integration. In the case where an expansive fiscal policy leads to a real appreciation, the incentive to pursue an expansive fiscal policy is weakened by goods market integration caused by a closer substitution between home and foreign goods which decreases the size of the real appreciation. With respect to a rise in financial integration, it depends on the authorities' weighing between on the one side a smaller rise in production and on the other side side a bigger real net appreciation and a smaller rise in the real interest rate how the authorities' incentive to pursue an expansive fiscal policy is affected.

Table 1 The impact of goods market integration caused by closer substitution between home and foreign goods on effectiveness of macroeconomic policy instruments under policy discretion¹

	Effect on production	Effect on real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
More expansive monetary policy (reduction in nominal interest rate) (i)	No change	Smaller real depreciation ³	No change	Stronger inclination to use expansive monetary policy ³
Structural policy measures which raise productivity (A)	No change	Smaller real depreciation ³	No change	Stronger inclination to use expansive monetary policy ³
Expansive fiscal policy (g)	No change	Depends on economic structure	No change	Depends on economic structure and on preferences ⁴

1. The table shows how a rise in goods market integration caused by a closer substitution between home and foreign goods impacts on the effectiveness of macroeconomic policy instruments with respect to affecting production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (13)-(15).

2. The effect of goods market integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a larger real appreciation, and from a larger fall in the real interest rate.

3. This is under the assumption that an expansive monetary policy and structural policy measures cause a real depreciation, implying that $(1 - \varphi)(d_y + A) < 1$. If $(1 - \varphi)(d_y + A) > 1$, an expansive monetary policy and structural policies cause a real appreciation. A closer substitution between home country and foreign goods reduces the size of this real appreciation, thus weakening the incentive to pursue an expansive monetary policy and to pursue structural policies.

4. In the case a more expansive fiscal policy causes a real appreciation, a rise in goods market integration decreases the size of the real appreciation which can be reached by an expansive fiscal policy. This implies that a rise in goods market integration weakens the authorities' incentive to pursue an expansive fiscal policy. In the case a more expansive fiscal policy causes a real depreciation, a rise in goods market integration decreases the size of the real depreciation, thus strengthening the incentive to pursue an expansive fiscal policy.

Table 2 The impact of goods market integration caused by stronger preference for foreign goods on effectiveness of macroeconomic policy instruments under policy discretion¹

	Effect on production	Effect on utility derived from change in real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
More expansive monetary policy (reduction in nominal interest rate) (i)	No change	Bigger real depreciation ³	No change	Weaker inclination to pursue expansive monetary policy
Structural policy measures which raise productivity (A)	No change	Smaller real depreciation ³	No change	Stronger inclination to pursue structural policy
Expansive fiscal policy (g)	No change	Depends on economic structure	No change	Depends on economic structure and on preferences ⁴

1. The table shows how a rise in goods market integration caused by a stronger preference for foreign goods impacts on the effectiveness of macroeconomic policy instruments with respect to affecting production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (13)-(15).

2. The effect of goods market integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a larger real appreciation, and from a larger fall in the real interest rate.

3. An expansive monetary policy causes a real depreciation when $(1 - \phi)(d_y + A) < 1$. If $(1 - \phi)(d_y + A) > 1$, an expansive monetary policy causes a real appreciation. The size of this real appreciation is increased by a stronger preference for foreign goods, implying that a stronger preference for foreign goods also in this case strengthens the inclination to pursue an expansive monetary policy.

4. In the case a more expansive fiscal policy causes a real appreciation, a rise in goods market integration decreases the size of the real appreciation which can be reached by an expansive fiscal policy. This implies that a rise in goods market integration weakens the authorities' incentive to pursue an expansive fiscal policy. In the case a more expansive fiscal policy causes a real depreciation, a rise in goods market integration decreases the size of the real depreciation, thus strengthening the incentive to pursue an expansive fiscal policy.

Table 3 The impact of financial integration on the effectiveness of macroeconomic policy instruments under policy discretion¹

	Effect on production	Effect on real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
More expansive monetary policy (reduction in nominal interest rate) (i)	Bigger rise in production	Smaller real depreciation ³	Smaller fall in real interest rate	Depends on economic structure and on preferences ⁴
Structural policy measures which raise productivity (A)	Bigger rise in production	Smaller real depreciation ³	Smaller fall in real interest rate	Depends on economic structure and on preferences ⁴
Expansive fiscal policy (g)	Smaller rise in production	Bigger real net appreciation	Smaller rise in the real interest rate	Depends on economic structure and on preferences ⁴

1. The table shows how a rise in financial integration impacts on the effectiveness of macroeconomic policy instruments with respect to their effects on production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (13)-(15).

2. The effect of financial integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a real appreciation, and from a fall in the real interest rate.

3. An expansive monetary policy causes a real depreciation when $(1 - \phi)(d_y + A) < 1$. If $(1 - \phi)(d_y + A) > 1$, an expansive monetary policy causes a real appreciation. The size of this real appreciation is increased by financial integration, implying that financial integration also in this case implies a stronger incentive to pursue an expansive monetary policy due to the real exchange rate effect.

4. The bigger rise in production and the smaller real depreciation which results from an expansive monetary policy and from structural policy, induces the authorities to make more use of an expansive monetary policy and of structural policy measures while the smaller fall in the real interest induce the authorities to make less use of an expansive monetary policy and of structural policy measures which raise productivity.

3.5 Inflation targeting

In the case of inflation targeting, the authorities use monetary policy to pursue a rule which implies a certain trade-off between on the one side the output gap and on the other side the difference between future inflation and a target for inflation. It is examined below how changes in goods market integration and in financial integration under such a monetary regime affect the authorities' incentive to use policy instruments under inflation targeting. *Table 4* and *table 5* give an overview of the effects which result from goods market integration caused by respectively stronger preference for foreign goods and closer substitution between home and foreign goods while *table 6* shows the effects which follow from a rise in financial integration.

(i) Monetary policy

The authorities adjust the money supply to reach a certain trade-off between on the one side the output gap and on the other side the difference between future inflation and a target for inflation. This can be represented as the optimisation of preferences which are given as

$$(16) \quad V = -(y - y')^2 - \chi(\pi_{+1} - \pi')^2, \quad \pi = p^C - p_{-1}^C, \quad p^C = p + \phi x, \quad \pi' \geq 0, \quad \chi > 0,$$

where π is inflation and π' is the monetary authority's target for inflation. The parameter χ represents the weight which the monetary authority attaches to the goal of reducing inflation relative to the goal of minimising the output gap.

Relation (16) specifies that the authorities want (i) to minimise the output gap, i.e. the difference between production y and potential production y' , and (ii) to minimise the difference between future inflation, expressed as π_{+1} , and a target for inflation, given as π' .

In (16), inflation is represented by the rise in consumer prices. The level of consumer prices is equal to a weighted average of the price level on domestic production, given by p , and the price level on foreign production relative to domestic production, expressed by the real exchange rate x . When the real exchange rate is expected not to change between the future and the current period, inflation is equal to the rise in domestic prices, implying that $\pi_{+1} = p_{+1} - p$. Assuming that there is such an expectation of an unchanged future real exchange rate, optimising (16) with respect to production and using (2), gives the following policy rule for the monetary authority's conduct of monetary policy:

$$(17) \quad -(y - y') + \chi \frac{1}{a}(p_{+1} - p) - \chi \frac{b}{a} \pi' = 0.$$

In (17) we can further use the expression for future inflation given by (2). This gives the following relationship which expresses production as a function of the inflation target and of structural policy:

$$(18) \quad y - y' = -\chi \frac{b}{a} \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \pi' + \chi \frac{b}{a} \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \Lambda + b\chi(p - p_{-1}).$$

In (18), the price level in the current period is pre-set. This means that production is determined only by the inflation target and by structural policy. A higher target for inflation causes a reduction in production while structural measures which raise efficiency, increase production.

Combining (18) with (3)-(4) and (7) gives the impact on macroeconomic variables which results from a change in the inflation target

$$(19) \quad \frac{\partial y}{\partial \pi'} = -\chi \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} < 0,$$

$$\varphi \frac{\partial x}{\partial \pi'} = -\chi \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \left[\frac{1 - (1 - \varphi)(d_y + B)}{A} \right] < 0, \quad 1 - (1 - \varphi)(d_y + B) > 0,$$

$$\frac{\partial r}{\partial \pi'} = \chi \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \left(\frac{B}{d_r} \right) < 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0.$$

It results from (19) that a higher target for inflation eads to lower production and to a rise in the real interest rate while there is a real appreciation, shown by a reduction in x . Neither goods market integration nor financial integration impacts on the effect which changes in the inflation target have on production. A rise in goods market integration caused by closer substitution between domestic and foreign goods diminishes the size of the real appreciation which results from a higher inflation target, thus making the authorities less inclined to raise the inflation target. A rise in goods market integration caused by a stronger preference for foreign goods, corresponding to a rise in φ , increases the size of the real appreciation which follows from a higher inflation target, implying that the authorities' incentive to raise the inflation target is strengthened. A rise in financial integration corresponds to a reduction in the term B . With respect to the effects of a rise in financial integration, it tends to strengthen the authorities' incentive to raise the inflation target that financial integration increases the size of the real appreciation which results from a higher inflation target. A rise in financial integration tends, however, on the other side to reduce the fall in the real interest rate increase which results from a higher inflation target. This last effect tends to weaken the authorities' incentive to raise the inflation target.

(ii) *Structural policy*

The effects of structural policy on the three macroeconomic variables which affect utility, are found from (18) in combination with (3)-(4) and (7) as

$$(20) \quad \frac{\partial y}{\partial \Lambda} = \chi \frac{1}{a} \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} > 0,$$

$$\varphi \frac{\partial x}{\partial \Lambda} = \chi \frac{1}{a} \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \left[\frac{1 - (1 - \varphi)(d_y + B)}{A} \right] > 0, \quad 1 - (1 - \varphi)(d_y + B) > 0,$$

$$\frac{\partial r}{\partial \Lambda} = -\chi \frac{1}{a} \left(\frac{b}{a} \right) \left[1 + \chi \left(\frac{b}{a} \right)^2 \right]^{-1} \left(\frac{B}{d_r} \right) > 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0.$$

It follows that efficiency-enhancing structural measures increase production and the real interest rate while there is a real depreciation. The effects correspond to those which follow from a relaxation of the inflation target but with the opposite sign, cf. (19). The incentive to implement structural policy measures is thus strengthened by a rise in goods market integration caused by closer substitution between home and foreign goods while goods market integration caused by a stronger preference for foreign goods weakens the incentive to implement efficiency-enhancing structural measures. It depends on the economic structure and on preferences whether a rise in financial integration weakens or strengthens the incentive to use structural policies.

(iii) Fiscal policy

It follows from (3)-(4), (7), and (18) that the effects of an expansive fiscal policy on the macroeconomic variables are given as

$$(21) \quad \frac{\partial y}{\partial g} = 0,$$

$$\varphi \frac{\partial x}{\partial g} = -\frac{\varphi}{A} \left(\frac{1}{1-g} \right) - \frac{d_g}{A} (1-B)(1-\varphi) < 0,$$

$$\frac{\partial r}{\partial g} = -\left(\frac{d_g}{d_r} \right) B \geq 0,$$

$$B = -\frac{\Phi_d d_r}{1 - \Phi_d d_r}, \quad 0 \leq B \leq 1, \quad 0 < d_y < 1, \quad d_r < 0, \quad \Phi_d \geq 0.$$

Equation (21) shows fiscal policy to have no impact on production which is determined only by the inflation target and by structural policy, cf. (18). It further follows that a more expansive fiscal policy causes a real appreciation and a rise in the real interest rate.

A rise in goods market integration caused by a closer substitution between home and foreign goods reduces the size of the real appreciation which follows from an expansive fiscal policy and thus weakens the incentive to pursue an expansive fiscal policy. Assuming that $d_g < 1$, it results that a rise in goods market integration caused by a stronger preference for foreign goods implies that there will be a bigger real appreciation from an expansive fiscal policy and therefore strengthens the incentive to pursue an expansive fiscal policy. and it therefore depends on the economic structure while there is no impact on the rise in the real interest rate. This means that a rise in goods market integration weakens the authorities' incentive to pursue an expansive fiscal policy. A rise in financial integration, reflected by a reduction in B , tends to increase the size of the real appreciation which results from a more expansive fiscal policy. A rise in financial integration works at the same time to reduce the size of the increase in the real interest rate which follows from a more expansive fiscal policy. A rise in financial integration thus strengthens the incentive to pursue an expansive fiscal policy.

Table 4 The impact of goods market integration caused by closer substitution between home and foreign goods on the effectiveness of macroeconomic policy instruments under inflation targeting¹

	Effect on production	Effect on real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
Expansive monetary policy (rise in inflation target) (π')	No change	Smaller real appreciation	No change	Weaker inclination to raise inflation target
Structural policy measures which increase productivity (A)	No change	Smaller real depreciation	No change	Stronger inclination to use structural policy
Expansive fiscal policy (g)	No effect	Smaller real appreciation	No change	Weaker inclination to pursue expansive fiscal policy

1. The table shows how a rise in goods market integration caused by a closer substitution between home and foreign goods impacts on the effectiveness of macroeconomic policy instruments with respect to affecting production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (19)-(21).

2. The effect of goods market integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a real appreciation, and from a fall in the real interest rate.

Table 5 The impact of goods market integration caused by stronger preference for foreign goods on the effectiveness of macroeconomic policy instruments under inflation targeting¹

	Effect on production	Effect on utility derived from change in real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
Expansive monetary policy (rise in inflation target) (π')	No change	Bigger real appreciation	No change	Stronger inclination to raise inflation target
Structural policy measures which increase productivity (A)	No change	Bigger real depreciation	No change	Weaker inclination to use structural policy
Expansive fiscal policy (g)	No effect	Bigger real appreciation	No change	Stronger inclination to pursue expansive fiscal policy

1. The table shows how a rise in goods market integration caused by a stronger preference for foreign goods impacts on the effectiveness of macroeconomic policy instruments with respect to affecting production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (19)-(21).

2. The effect of goods market integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a real appreciation, and from a fall in the real interest rate.

Table 6 The impact of financial integration on the effectiveness of macroeconomic policy instruments under policy discretion¹

	Effect on production	Effect on real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
Monetary policy (change in inflation target) (π')	No change	Bigger real appreciation	Smaller fall in real interest rate	Depends on economic structure and on preferences ³
Structural policy measures which raise productivity (A)	No change	Bigger real depreciation	Smaller reduction in real interest rate	Weaker inclination to use structural policy
Expansive fiscal policy (g)	No effect	Bigger real appreciation	Smaller rise in real interest rate	Stronger inclination to pursue expansive fiscal policy

1. The table shows how a rise in financial integration impacts on the effectiveness of macroeconomic policy instruments with respect to their effects on production, the real exchange rate, and the real interest rate. The effects of policy instruments on macroeconomic variables are shown by (19)-(21).

2. The effect of financial integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a real appreciation, and from a fall in the real interest rate.

3. The effect on the authorities' incentive to set a higher inflation target or implement structural policies depends on a weighing between on the one side the effect on the real exchange rate and on the other side the effect on the real interest rate.

3.6 Monetary union

We finally examine the case where the authorities maintain a fixed exchange rate vis-à-vis the foreign currency. There is no possibility of exchange rate adjustment. We consider the effects of policy instruments on macroeconomic variables when there is a change in goods market integration. The effects of goods market integration caused by a stronger preference for foreign goods are shown in *table 7*.

In the case of a fixed exchange rate regime, the authorities adjust the money supply to maintain the fixed rate. We further assume that the fixed exchange rate creates a perfectly integrated financial market. This is expressed as:

$$(22) \quad s = \bar{s}, \quad i = i^*,$$

where s is the nominal exchange rate, and i^* is the foreign nominal interest rate.

Relation (22) represents a fixed exchange rate regime, the money supply being adjusted to maintain a fixed nominal exchange rate and the domestic nominal interest rate being equal to the foreign nominal interest rate. As the price level in the current period is preset and as also the nominal exchange rate is fixed, it follows that the real exchange rate cannot be affected by macroeconomic policy instruments.

Combining (22) with (i) the New-Keynesian Phillips curve expressed by (2), (ii) the relationships which express equilibrium in the goods market, shown by (3) and (4), and (iii) the definition of the

real interest rate given by (8), we derive the following relationships which determine production and the real interest rate in a monetary union

$$(23) \quad i^* = r + \frac{b}{a}(p - p_{-1}) - \frac{b}{a}(y - y') + \frac{1}{a}\Lambda,$$

$$(24) \quad y = z(d, x, g), \quad d = d(y, g, r), \quad x = \bar{x},$$

$$z_d = 1 - \varphi > 0, \quad z_x = \varphi A > 0, \quad z_g = \varphi \frac{1}{1 - g} > 0, \quad 0 < d_y < 1, \quad d_g > 0, \quad d_r < 0.$$

The two relationships (23) and (24) determine production and the real interest rate as functions of (i) structural policy, and (ii) fiscal policy.

First considering the effects on production and on the real interest rate of *structural policy* measures which raise efficiency, we derive from (23) and (24):

$$(25) \quad \frac{\partial y}{\partial \Lambda} = -(1 - \varphi) \frac{1}{a} d_r \left[1 - (1 - \varphi) \left(d_y + \frac{b}{a} d_r \right) \right]^{-1} > 0,$$

$$\frac{\partial r}{\partial \Lambda} = -[1 - d_y(1 - \varphi)] \left[1 - (1 - \varphi) \left(d_y + \frac{b}{a} d_r \right) \right]^{-1} < 0.$$

It follows from (25) that an efficiency-enhancing structural policy increases production. The rise in production increases future inflation, thus causing a lowering of the real interest rate. A rise in goods market integration caused by a closer substitution between domestic and foreign goods does not affect the effects of policy instruments. A rise in goods market integration caused by a stronger preference for foreign goods, reflected by a rise in φ , reduces the rise in production and increases the fall in the real interest rate which result from structural policy. It thus depends on the economic structure and on preferences whether a rise in goods market integration strengthens the authorities' incentive to implement a productivity-enhancing structural policy.

The impact of *fiscal policy* on production and on the real interest rate can be found from (23) and (24) as

$$(26) \quad \frac{\partial y}{\partial g} = \left[\varphi \frac{1}{1 - g} + (1 - \varphi) d_g \right] \left[1 - (1 - \varphi) \left(d_y + \frac{b}{a} d_r \right) \right]^{-1} > 0,$$

$$\frac{\partial r}{\partial g} = \frac{b}{a} \left[(1 - \varphi) d_g + \varphi \frac{1}{1 - g} \right] \left[1 - (1 - \varphi) \left(d_y + \frac{b}{a} d_r \right) \right]^{-1} > 0.$$

It follows from (26) that an expansive fiscal policy raises production. As a higher production in the current period leads to an expectation of a lower future price increase, it follows that there must be a smaller difference between the nominal interest rate and the real interest rate. As the nominal

interest rate is determined as equal to the foreign rate, it follows that a more expansive fiscal policy raises the real interest rate.

It follows from (26) that a closer substitution between home and foreign goods has no effect on the effectiveness of fiscal policy. It depends on the economic structure whether a rise in goods market integration caused by a stronger preference for foreign goods, implying rise in φ , increases or reduces the rise in production which can be reached from a more expansive fiscal policy. This may seem surprising as it is usually argued that a rise in openness decreases the effectiveness of fiscal policy as a means to raise production, cf. the discussion in section 2. The effect can be explained as follows. It tends, on the one side, to diminish the impact of fiscal policy on the demand for domestic goods that a larger share of a given rise in domestic demand spills over into foreign goods. This is the effect which is usually stressed in the literature. A stronger preference for foreign goods causes, however, at the same time government spending to have a larger impact on goods demand because government spending consists only of home country goods. It depends on the economic structure which of these two effects is the stronger. With respect to the effect on the real interest rate, it also depends on the economic structure whether a stronger preference for foreign goods φ leads to a bigger or smaller rise in the real interest rate. No unambiguous conclusion can therefore be reached whether a rise in goods market integration caused by a stronger preference strengthens or weakens the authorities' incentive to pursue an expansive fiscal policy.

Table 7 The impact of goods market integration caused by stronger preference for foreign goods on the effectiveness of macroeconomic policy instruments in a monetary union¹

	Effect on production	Effect on real exchange rate	Effect on real interest rate	Effect on authorities' preferences ²
Structural policy measures which raise productivity (A)	Smaller rise in Production	No effect	Bigger fall in real interest rate	Depends on economic structure and on preferences ³
Expansive fiscal policy (g)	Depends on economic structure	No effect	Depends on economic structure	Depends on economic structure and on preferences

1. The table shows how a rise in goods market integration caused by a stronger preference for foreign goods impacts on the effectiveness of macroeconomic policy instruments with respect to affecting production, the real exchange rate, and the real interest rate. The effects are shown by (25) and (26).

2. The effect of goods market integration on the authorities' inclination to use policy instruments provided that the authorities derive positive utility from higher production, from a real appreciation, and from a fall in the real interest rate.

3. The incentive to undertake structural measures which increase productivity, is strengthened if the authorities attach a higher priority to the bigger fall in the real interest rate than to the smaller rise in production.

3.7 Other sources of economic integration

The analysis in sections 3.4-3.6 above has examined the effects of international integration when international integration is caused by (i) a closer substitution between domestic and foreign goods, implying that there is a rise in the elasticity of demand with respect to prices charged by domestic producers relative to prices charged by foreign producers, (ii) a stronger preference for foreign goods, and (iii) a rise in the sensitivity of placements in financial assets issued by home country agents (domestic securities) to changes in the return on these financial assets relative to foreign financial assets. International integration may, however, be caused by other factors: (a) a reduction in transport costs and other costs related to cross-border transactions, and (b) a rise in the inclination to place in foreign financial assets at a given differential between the real return on domestic financial assets and the return on foreign financial assets. These other factors have other effects on the effectiveness of macroeconomic policy instruments than those derived in the analysis above.

Lower transport costs have different effects on the economic structure and thus on the effectiveness of macroeconomic policy instruments. One effect arises because a reduction in transport costs makes home country goods more competitive on the foreign market, thus tending to raise the demand for home country goods. An opposite effect arises, however, because a reduction in transport costs lowers the demand for home country goods due to the reduction in the demand for transport services. It depends on the relative strength of these two opposite effects how a reduction in transport costs affects the demand for goods produced in the home country and thus the goods market equilibrium. Transport costs have no effect on the other structural relationships which form part of the economic system which has been analysed in sections 3.2. As there is no clear conclusion regarding the effect of transport costs on the economic structure, it is also uncertain how changes in transport costs affect the effects which macroeconomic policy instruments have on economic goals.

The analysis in sections 3.4-3.6 above has been based on the assumption that domestic residents hold only domestic securities when the real interest rate in the home country equals the real interest rate in the foreign country. In the case where domestic residents hold part of their wealth also in foreign financial assets in the case of a uniform return on domestic and foreign securities, implying a *weakening of the preference for domestic securities*, it results that the real exchange rate comes to affect also domestic demand because changes in the real exchange rate will change the wealth of domestic residents and thus also private consumption. This increases the effect of policy instruments on macroeconomic variables. As a real depreciation of the domestic currency increases the purchasing power of that part of financial wealth which is placed in foreign assets, it follows that a real depreciation increases the demand for domestic goods not only because they become more competitive relative to foreign goods but also because the real depreciation increases domestic residents' purchasing power due to the larger value of the domestic residents' foreign assets. A rise in financial integration which causes domestic residents to hold a larger part of their saving in foreign assets, thus causes a real depreciation to have a bigger effect on the demand for domestic goods, making real exchange rate changes more powerful in affecting the real economy.

3.8 Beggar-thy-neighbour effects from economic policies

Self-oriented national authorities can reach advantages at the cost of other countries by pursuing policies which causes a real appreciation and which lowers the real interest rate relative to other countries. It may be asked whether the incentive for such beggar-thy-neighbour policies is increased with a rise in economic integration. Different conclusions follow in the case of the different types of economic integration. Thus, goods market integration caused by a closer substitution between home and foreign goods reduces the possibility of changes in the real exchange rate. This also limits the possibility of beggar-thy-neighbour policies whereby self-oriented national authorities attempt to reach a real appreciation. Conversely, a rise in financial integration means that the real interest rate comes to be determined to a larger extent by the foreign real interest rate. This implies that national authorities to a larger extent neglects the real interest rate implications of economic policies, implying that the potential scale of beggar-thy-neighbour policies increases. Finally, with respect to goods market integration caused by a stronger preference for foreign goods, there are different effects on the utility which can be derived from real exchange rate changes, and it thus depends on the specific context how it affects the potential size of beggar-thy-neighbour policies.

3.9 Other specifications of the economic structure

The discussion of economic policy effects in section 3.4-3.6 above was conducted on the basis of an economic structure based on the ‘New Keynesian Phillips-curve’ which implies a slow price adjustment. It was further based on a logarithmic specification of the households’ utility and on the assumption that the authorities want to optimise welfare which is increased by a higher production, by a real appreciation, and by a reduction in the real interest rate.

In the Mundell-Fleming model it is assumed that there is a fixed nominal wage or a fixed nominal price level. It is well-known from this model that production is determined only by monetary policy when there is a floating exchange rate, fiscal policy having an impact only on the real exchange rate. As the condition for money market equilibrium is unaffected by economic integration, it follows in this model setting that the effectiveness of monetary policy with respect to affecting production is unchanged when there is a change in economic integration. It is uncertain to what extent economic integration affects the authorities’ inclination to use other economic policies.

3.10 Conclusion from the formal analysis

It has been analysed on the basis of a standard economic model – based on the ‘New-Keynesian Phillips-curve’ - how the authorities’ incentive to use economic policy instruments to affect macroeconomic goals changes when there is a change in goods market integration or in financial integration. Three policy instruments – monetary policy, structural policy, and fiscal policy - have been examined in the context of three different monetary regimes: (i) a floating exchange rate regime where policy instruments are set discretely to optimise the authorities’ preferences, (ii) inflation targeting, and (iii) a monetary union. An overview of the effects of international integration has been presented in tables 1-7. It follows from the analysis that there is no foundation for the view – often found in the literature - that economic integration in general undermines the effectiveness of macroeconomic policy instruments with respect to affecting macroeconomic goals. It follows from the analysis that goods market integration caused by a closer substitution between home and foreign goods has no effect neither on the determination of production nor on the determination of the real interest rate in any of the three monetary regimes considered. Goods

market integration caused by a stronger preference for foreign goods neither affects production nor the real interest rate in the two regimes involving floating exchange rates – policy discretion and inflation targeting – while there is an effect on production and the real exchange rate in a monetary union. In the case of the monetary union, it depends, however, on the economic structure whether the effectiveness of policy instruments in affecting production and the real interest rate is increased or reduced. A rise in financial integration affects how policy instruments influence production under policy discretion but not under inflation targeting nor in a monetary union. Financial integration decreases under the floating exchange rate regimes the effect of policy instruments on the real interest rate. In some cases, economic integration tends to weaken benevolent authorities' inclination to use policy instruments while in other cases benevolent authorities' incentive to use economic policies is strengthened.

4 The effectiveness of other policy instruments

Section 3 above examines how international integration affects the effectiveness of monetary, fiscal policies and structural policies. International integration may, however, also impact on a number of other policy instruments. It is discussed in *section 4.1* that international integration creates a number of new policy instruments due to the possibility of affecting cross-border flows of goods and capital. *Section 4.2* discusses the credit channel of monetary policy. *Section 4.3* looks at the impact of economic integration on savings and investments incentives. *Section 4.4* discusses the effectiveness of neo-corporatism. *Section 4.5* brings a conclusion.

4.1 New policy instruments arising from international integration

International integration makes it possible to influence the economy by affecting cross-border flows of goods, services, and finance. This creates a range of new possibilities for government intervention. A distinction can be made between six types of policy instruments:

- (1) *policy instruments which regulate the size of cross-border flows*: Examples of such policy intervention include ceilings on imports on goods and services. In the financial area, it is possible through capital restrictions to impose limits on outflows or inflows of certain categories of financial assets. Ceilings may, for example, be established on ingoing direct foreign investment or on the amount of domestic securities which can be bought by foreign residents;
- (2) *policy instruments which change the price on domestic goods relative to foreign goods*: A change in the relative price between domestic and foreign goods can be achieved through exchange rate changes, through tariffs, through taxes on goods and services, or through regulation which favours national producers. A change in relative prices can also be reached through incomes policy and/or through price controls. If such policies are successful they can raise domestic competitiveness relative to trading partners and thus to a rise in production;
- (3) *policy instruments which change the cost of foreign borrowing or the return on foreign financial assets relative to domestic financial assets*: Examples include capital restrictions which raise the cost of foreign borrowing. It may, for example, be required that deposits are held at low or zero interest in the central bank in the case of capital inflows. Withholding taxes

also represent an obstacle to capital import, first because of the administrative costs, and second because many foreigners are untaxed on their capital income because they operate from tax havens. Tax rules concerning the treatment of foreign investment income may represent a de facto subsidy or taxation of foreign investment;

- (4) to the extent that there are differences in the formation of expectations between domestic and foreign residents, policy intervention may have a *different effect on agents resident in different countries*, thus affecting cross-border flows through a signalling effect. Monetary policy may, for example, affect domestic and foreign agents differently, thus having an impact on capital flows and also on interest rate formation;
- (5) *sterilised intervention*: Sterilised intervention implies that the authorities intervene in the market for domestic securities by buying/selling domestic securities against a corresponding sale/purchase of foreign securities. Such intervention only affects macroeconomic variables to the extent that there is imperfect financial integration. In the case of perfect financial integration, domestic securities are perfect substitutes to foreign securities and there is the same return on the two kinds of securities. Transactions whereby the stock of domestic securities is diminished or increased relative to foreign securities therefore cannot affect the return on these securities. In the case of a financially closed economy the sale and purchase of domestic securities against a corresponding purchase/sale of foreign securities is impossible as there are no cross-border financial transactions;
- (6) the *tax regime for domestic corporations with foreign activities and for foreign corporations with activities in the domestic country* gives national policy makers the possibility to affect the location of multinational companies' activities. The tax regime for multinational business activities thus represents a policy instrument which is additional to other instruments through which the government can affect employment.²⁰

The possibility of these new policy instruments based on cross-border flows tends to increase policy options. Such an increase in policy instruments improves the authorities' possibility of reaching welfare goals if there are costs related to the use of policy instruments and if these costs rise more than proportionately with the use of the instrument.

A rise in international integration may in general be seen as increasing the effectiveness of the instruments which are based on cross-border flows. Thus, in the case where international integration is caused by a closer substitution between domestic and foreign goods, it would be possible through only a small rise in domestic competitiveness to achieve a large increase in exports and a large reduction in imports, thus causing a big boost to the demand for domestic products. Correspondingly, in a world where corporations are internationally mobile, it will be possible through only small changes in, for example, the domestic tax regime to attract a large number of multinational corporations to the country. With respect to financial integration, a rise in financial integration makes cross-border financial flows more sensitive to changes in the relative return on domestic and foreign financial assets and it will be possible through only small changes in the return on domestic financial assets to reach, for example, a big capital inflow. It thus requires a smaller change in the relative price between domestic and foreign goods and/or in the relative return

²⁰ Jun (1995) demonstrates that the tax rules applying to an income earned in a subsidiary has a considerable impact on a company's cost of capital.

between domestic and foreign financial assets to reach a given change in the flows of goods, services, or finance when economic integration increases. For this reason, it may be easier to achieve a rise in domestic production when there is a large extent of international integration.

Some of the policy instruments set out above increase national welfare at the cost of lower welfare in other countries. It may be argued that this causes an inefficient resource allocation. A welfare case in favour of trade discrimination can, however, be made on the basis of new trade theory which highlights factors that can make a protection of national industries beneficial.²¹ Thus, protection makes it possible to reach an efficient minimum scale in a national industry which can make the industry internationally competitive.²² In the case of imperfect competition, protection can also be used to shift profit from foreign producers to either national producers or to the treasury in the home country.²³ It may finally stimulate innovation that corporations can be sure to keep some return from a given innovative effort when a market is protected from foreign competition.²⁴

4.2 The credit channel of monetary policy

Monetary policy can affect the real economy through two channels. As a first channel, changes in the money supply can be used to affect the macroeconomic variables which bring about equilibrium in the money market. This mechanism is at the center of the economic framework in section 3.2 where the authorities through changes in the money supply bring about a certain interest rate. As analysed in sections 3.4-3.6, changes in the interest rate affect macroeconomic goals. As a second channel ('the credit channel'), monetary policy can affect macroeconomic goals through an impact on lending from banks or from other financial institutions which are in a monopoly position relative to borrowers with respect to the provision of finance. Borrowers rely on the financial institutions for the funding of investment projects or for the funding of consumption. This means that borrowers have to curtail spending plans in the case where the financial institutions raise financing costs or cut back on lending. The monopoly position of financial institutions with respect to the provision of financial funds can be explained by asymmetric information. Financial institutions acquire information about the customers with whom they transact, making it possible to provide financial funds at a lower rate than other financial institutions which have no prior information about a borrower. Borrowers face a higher cost when they raise finance from the providers of finance with whom they have not previously transacted.²⁵

²¹ General discussions are found in Grossman and Helpman (1995) and in Stegemann (1996). Stegemann (1996) concludes negatively with respect to the general possibility of using trade policy: "...the economics profession's critical response has established that the policy implications of models of strategic trade policy are not robust enough to serve as a basis for real-world policies. Moreover, empirical work has not succeeded in identifying situations where strategic trade policy could have increased an intervening country's national welfare significantly. Therefore, the normative implications of trade policy have changed only slightly. Economic theory now recognises a few new special cases in which free trade is not a country's optimal policy, yet, it is generally impossible for policy-makers to identify the special circumstances and to devise interventions that will actually increase their jurisdiction's welfare..." (p. 98). Krugman (1994) is also sceptical towards the use of trade policy in the United States seen from perspective that the United States is a relatively closed economy in which trade policy would have little effect on production.

²² See Krugman (1995).

²³ See Brander (1995), Brander and Krugman (1983), and Brander and Spencer (1984). Brander (1995) concludes with respect to the possibilities of trade policy: "...Perhaps the most robust finding in the analysis of strategic trade policy is that imperfect competition of the oligopoly type almost always creates apparent unilateral incentives for intervention..." (p. 1447).

²⁴ See Grossman and Helpman (1995) for a discussion.

²⁵ See Bernanke and Blinder (1988) and Bernanke and Gertler (1989).

The authorities can use the credit channel to affect the real economy if two conditions are met: (i) the authorities can affect financial institutions' provision of finance, and (ii) borrowers are constrained in their possibility of raising finance from other sources than the financial institutions which are influenced by the authorities. Financial integration tends to undercut both of these two conditions, thus undermining the effectiveness of the credit channel. With respect to the first condition (i), it reduces the authorities' capability of affecting domestic financial institutions that financial institutions can raise funds through the international financial markets. With respect to the second condition (ii), borrowers gain access to foreign lenders when controls on capital flows are abolished, thus widening their possibilities of raising finance from other financial sources and thus making borrowers less dependent on domestic financial institutions which are controlled by the authorities.

Financial integration further promotes the development of financial firms with a specialised knowledge. Such firms may specialise in the finance of certain sectors or in the provision of special types of finance, e.g. venture capital or exotic financial instruments. Such specialised financial firms with an international coverage enjoy an information advantage in their specialised fields and may thus provide finance on more favourable terms than domestic financial institutions which are controlled by the domestic authorities. It also weakens the informational advantage of domestic financial institutions if international integration causes more uniform national business cycles or leads to greater similarity with respect to accounting standards and regulation in individual countries.

It further reduces the effectiveness of the credit channel that financial integration increases the efficiency of markets for corporate securities, thus making it more profitable for non-financial enterprises to raise finance through the securities markets instead of relying on banks for lending. Such a process of financial disintermediation undermines the monopoly position of banks with respect to finance.

While financial integration undercuts the effectiveness of the credit channel by improving the possibility of finance from foreign sources and by creating the basis for more efficient securities markets and thus for financial disintermediation, several factors indicate that the credit channel may still be effective in spite of financial integration and it is even possible that the credit channel may have become more important.

First, it requires a certain number of buyers and sellers to create an efficient market for securities. Thus, only corporations of a certain size can exploit this opportunity. The credit channel may therefore still be effective in relation to the finance of small and medium-sized enterprises and in relation to the finance of households. As there has been a very substantial increase especially in households' financial transactions, the credit channel may for this reason have become effective with respect to affecting the macroeconomy.

Second, the creation of more efficient international securities markets may divert trade from national securities markets. Agents who have previously operated in national securities markets, may use less resources to trade and analyse the national securities while more resources are used for the international markets. This could set in train a self-reinforcing process where liquidity is reduced in national markets while it is increased in international markets. Such a process constrains the financing possibilities especially for small and medium-sized domestic firms which are too

small to raise finance through the international securities markets. The reduction of liquidity in national markets may make it more attractive to raise finance through domestic banks and other domestic financial institutions, implying that the effectiveness of the credit channel is increased. It is also possible that small and medium-sized enterprises to a larger extent will rely on internal funds for the finance of investment projects.

Even with a rise in financial integration, it is likely that central banks retain the capability to affect the conditions under which domestic financial institutions can obtain funding and it is even possible that central banks are in a stronger position to affect the funding of domestic financial institutions. Thus, the role of central banks as providers of finance to domestic financial institutions has become more important with the spread of floating exchange rate regimes based on inflation targeting since 1992. The resulting rise in exchange rate fluctuations has made it more risky for domestic financial institutions to rely on international sources for finance. The greater frequency of bank crises since the 1980s means that domestic financial institutions are more dependent on central banks as ultimate lenders. It adds to the importance of national central banks as providers of finance that international investors during financial crises, e.g. during the South East Asian crisis in 1997-98, tend to withdraw suddenly, thus making it more difficult for national financial institutions to rely on international finance as a stable source of finance.

Considering the effects discussed above, it is difficult to reach an unambiguous conclusion whether financial integration has diminished the effectiveness of the credit channel. Some of the factors indicate a stronger role for the credit channel. Under all circumstances, it is likely that information asymmetries will persist even under financial integration and some effectiveness for the credit channel may therefore be retained.

Until the 1980s, the credit channel played a major role in monetary policy. Widespread use was made of ceilings on lending from financial institutions to certain sectors or for specific purposes. In several countries, the authorities still use the credit channel as a mechanism for affecting the macroeconomy. In Denmark, changes in the access to mortgage credit have turned out to be a powerful instrument in affecting economic activity. Most recently, Denmark experienced in 2004-06 a strong economic growth with a surge in private consumption after a relaxation in the access to mortgage credit which went into effect in October 2003.

4.3 Savings and investment incentives

Governments affect savings or investments through a number of incentives, e.g. through tax credits and other provisions in the tax system or through grants. International financial integration tends to increase the effectiveness of such incentives, making it possible with a given loss of tax revenue or with a given increase in government spending to reach a bigger increase in savings or investments. This can be explained as follows. In the case of imperfect financial integration, the real interest rate is determined to bring about equilibrium between a country's savings and a country's investments. In this case, there is a reduction in the real interest rate when the authorities through incentives boost savings. This reduction in the real interest rate tends to depress savings, thus countering the effect of the scheme to increase savings and thus reducing the effectiveness of the scheme. In the case of perfect financial integration, the real interest rate is determined by the foreign real interest rate and national savings incentives thus spill over fully into a rise in savings, having no impact on the real interest rate. Due to this rise in the effectiveness of schemes to affect savings, national

authorities may be more inclined to use savings incentives when there is perfect financial integration.

Similarly, under imperfect financial integration schemes to promote investments cause a rise in the real interest rate which reduces the total effect on investments which can be reached at a given loss of tax revenue or at a given government spending. It again follows that imperfect financial integration reduces the authorities' inclination to make use of investment incentives. Under perfect financial integration, schemes to boost investments have no impact on the real interest rate, giving rise to a bigger increase in investments at a given loss of government revenue or at a government expenditure.

4.4 The possibility of 'neo-corporatism'

As discussed in section 2, several writers argue that international integration makes it more difficult to maintain a 'neo-corporatist' model where economic policy instruments and wages are determined through joint negotiations between the authorities and the labour market partners.

For two reasons, we may, however, question whether international integration does in fact undercut the possibility of neo-corporatist policy-making. First, it is not obvious that there has been a reduction in the power of the state relative to business which would make it more difficult for the state to enforce negotiated solutions. Second, as international integration makes the demand for domestic products more sensitive to changes in the cost of domestic products relative to foreign products, the effectiveness of incomes policies as a means to affect domestic production tends to be increased by international integration.

Other factors unrelated to international integration can account for the abandonment of a neo-corporatist policy approach. Thus, developments in technology have called for larger flexibility and thus also for a decentralisation of wage negotiations. Moreover, centrally negotiated wages strengthen the position of trade unions and may for this reason be disagreeable to neo-liberal governments.

4.5 Conclusion with respect to other policy instruments

Various conclusions follow from the discussion of other policy instruments. On the one side, international integration creates a number of new possibilities for government intervention because governments can affect the cross-border flows of goods and finance through trade and capital restrictions, through the taxation of foreign activities, and through policies which affect a country's competitiveness relative to foreign countries. A rise in international integration tends to increase the effectiveness of these policy instruments. International integration also tends to increase the effectiveness of incentives which aim to affect savings and investments. International integration may, however, undermine the effectiveness of the credit channel of monetary policy, thus making it more difficult to affect macroeconomic variables through the use of e.g. credit restrictions. The outcome with respect to the credit channel is, however, uncertain as other factors – e.g. a larger exchange rate variation due to the adoption of inflation targeting regimes – tend to increase the effectiveness of the credit channel. There is no reason to think that international integration has eroded the effectiveness of neo-corporatist solutions.

5 The effectiveness of government deficit finance

Governments can, at least for temporary periods, finance spending through deficits, usually financed through the issue of interest-bearing securities. This may be desirable e.g. in situations where the economy experiences temporary disturbances. It may further allow governments time to undertake better planned cutdowns in spending or changes in taxation. It is usually claimed that financial integration implies a relaxation of the government's budgetary constraint because it becomes possible for governments to raise finance on the broader and more efficient international markets. In the following, it will be considered more closely how international financial integration may change the constraints faced by governments which finance deficits through the issue of debt. It will be assumed that government debt takes the form of interest-bearing securities. *Section 5.1* discusses the return required by investors on government securities. *Section 5.2* looks at the possibility of bail-out from other countries while *section 5.3* considers the political constraints on a policy of deficit finance. *Section 5.4* brings a conclusion.

5.1 The government's financing cost

Several factors affect the return which is required by investors when they place in government securities in internationally integrated financial markets relative to the case where financial markets are closed. It is assumed that investors have the opportunity of being able alternatively to invest in financial assets which are issued either by corporations, e.g. corporate bonds or equities, or by financial institutions.

One effect arises because governments which increase the supply of government securities in financially closed national markets, affect the total supply of government securities relative to the amount of other financial assets in investors' portfolios. Due to this rise in the amount of government securities relative to other financial assets in investors' portfolios, a rise in the issue of government securities causes investors to require a higher return from placing in government securities. When governments raise finance in the larger international financial markets, an increase in the supply of government securities to finance a budgetary deficit has little effect on the total amount of outstanding government securities at the world level. This means that a rise in the supply of national government securities has little, or no, effect on the return required by investors for raising the share of government securities in their portfolios. Small national governments which raise finance in the large international markets, can thus raise finance without affecting the return on government securities relative to other financial assets which is determined at the world level. This corresponds to the effect described in the literature. This effect tends to relax the government's financing constraint.

Another effect arises, however, because investors operating in the international market have access to a larger set of investment possibilities. This makes it possible by investing in claims on foreign agents to avoid the risk related to a national government's default. Investors operating in international financial markets will therefore require a premium which fully reflects the default risk when they invest in claims issued by a national government. In the case of a financially closed market where investors can invest only in claims on national agents, it will be impossible to avoid the risk related to a government's default by investing in other assets. Thus, investors run a risk in

relation to a national government's default not only when they acquire claims on a government, but also when they acquire claims on other national agents (financial institutions or corporations). This is because, in the case where there is a risk of a national government defaulting, the government may raise taxes on corporations and financial institutions, thus increasing the risk of default for these agents. A government may also through a reduction in spending trigger an economic crisis which will hurt national firms and households. A further possibility for a government in financial distress is to resort to inflation. This would reduce the real value of monetary claims acquired not only on the government but also on other national agents. Thus, due to the lack of foreign investment possibilities it is impossible in a financially closed national market to avoid the risk related to a government's default. Investors who invest in government securities, will therefore not require an extra premium which reflects the risk of government default. Governments thus face a higher financing cost when they raise finance in international markets. This effect tends to impose stricter discipline on governments when there is financial integration.

As a third effect, international integration may affect the probability that a government defaults on its debt obligations. As mentioned above, governments have a number of possibilities to avoid default, e.g. heavier taxation, a reduction in spending, and higher inflation. The probability of government default thus depends on the extent to which governments are willing to use these other means. It is likely that governments are more willing to default in the case where claims on the government are owned especially by foreigners who do not form part of the political constituency. This tends to raise the default risk when there is financial integration.

A fourth effect on a government's financing constraint arises because international integration changes investors' preferences regarding placements in government securities and in assets issued by corporations. If we take the point of departure in a capital-asset pricing model (CAPM), the return required by investors on a financial asset is determined by the correlation between on the one side the return on the asset in question and on the other side the return which can be obtained by investors on their total portfolio. In a market which is financially closed, this means that the return on a specific financial asset is determined by the correlation between on the one side the return on the asset and on the other side the return on a national portfolio while in an internationally integrated market the return on a financial asset is determined by the correlation between the return on the asset and the return on the international market portfolio. Due to different products and due to differences in production structures and in national business cycles, there are considerable differences between corporations in different countries. It is therefore likely that the returns on financial assets issued by corporations in different countries show less correlation than the returns on the government securities which are issued by different national governments. Due to the possibility of portfolio diversification, international financial integration thus increases the relative attractiveness of corporate financial assets, causing a lowering in the required return on corporate financial assets relative to government securities. This effect tends to raise the return on government securities, implying that governments face tighter financing constraints as a result of financial integration.

In conclusion, several factors with opposite effects tend to affect the real return required by investors from placements in government securities. It is thus uncertain how financial integration affects the financing constraint faced by governments.

5.2 The possibility of bail-out

It has been argued in the discussion on European monetary unification that a monetary union strengthens the incentive for other union members to come to the rescue of a member state which faces financial difficulties. The other member countries of a monetary union are seen as having a self-interest in bailing out a member country which faces financial difficulties because investors from the other union countries, due to the removal of exchange rate uncertainty, have placed in the government securities which are issued by the member state facing financial trouble.²⁶

The argument of a country being bailed out by other countries would seem to apply not only to a monetary union but to all countries in a financially integrated area. In order to avoid losses among national investors, the authorities in investor countries wish to avoid a situation where there is a non-fulfillment of financial obligations by debtor governments. In a financially integrated area, governments are therefore inclined to bail out a governments in financial trouble. This possibility of support from other countries strengthens the incentive for governments to resort to debt finance of government spending.

5.3 The political interest in government deficits

One may see a country's budgetary deficit as being determined through a political process in which several groups interact, each pursuing their own interests in regard to budgetary deficits.

There is a general inclination to finance government spending through a budgetary deficit because all groups share an interest in holding down taxes. All groups may at the same time benefit from a rise in government spending. The burden related to the re-payment of government debt will, at least to some extent, fall on future generations. Thus, while the benefits arising from lower taxes and/or from higher government spending are experienced by current voters, costs are transferred, wholly or partly, through government debt to future generations.

Investors further benefit from a budgetary deficit which is financed through the issue of government securities because government securities constitute an opportunity for investment. The possibility of placing in government securities may be seen as particularly valuable because markets for government securities tend to be more efficient than markets for corporate securities, first due to the larger size of markets for government securities, and second because it is easier to evaluate the default risk on government securities than on corporate securities. Investors may reduce the default risk on corporate securities by investing through mutual funds but the management of mutual funds may give rise to a number of problems, most importantly lack of discipline on investment managers due to asymmetric information.

Assuming that the size of the budgetary deficit is determined by these two interests, that is, the general interest to increase government spending while holding down taxation and the interest of investors who view government securities as an attractive outlet for investments, it follows that financial integration reduces the political backing behind policies which imply budgetary deficits.

²⁶ The argument was first suggested in the Delors Report (Committee for the Study of Economic and Monetary Union, 1989) and in Lamfalussy (1989). It has subsequently met with wide approval. De Grauwe (1990) writes: "...Even if the European countries were to solemnly declare never to bail out member-states, it is unlikely that they would stick to this rule if a member-country faced the prospect of being unable to service its debt. Thus, the monetary union leads to excessive budget deficits of the member states..." (p. 2). See also the discussion in Buiter and Kletzer (1990).

This is because investors with financial integration have a larger range of investment opportunities, being able to invest also in securities issued by foreign governments and thus being less dependent on the investment possibilities created by national governments through their borrowing operations. In the case of financial integration, governments may thus expect less backing from domestic investors to policies which imply a budgetary deficit. This tends to strengthen the fiscal discipline on governments, making it politically more difficult to pursue expansive fiscal policies in the case of financial integration.

It further tends to raise the political pressure on governments to avoid deficit finance in internationally integrated financial markets that a rise in the debt of a national government tends to raise the default risk of national corporations and national financial institutions, implying that a rise in national government debt translates into a higher risk premium required by international investors when they place in financial assets issued by national corporations and financial institutions. This is because a government which experiences financing difficulties, may resort to heavier taxation, cut-downs in government spending or a rise in inflation as means to counter the difficulties. As explained above, all these three instruments increase the default risk for national corporations and financial institutions, thus making it more difficult for these agents to raise finance in the international markets. It is likely that national corporations and financial institutions will resist such a reduction in their credit worthiness which takes place when a governments resort to debt finance in the case of international financial integration, thus putting pressure on a government to abstain from debt finance. This tends to increase the financial discipline on national governments when there is international financial integration.

In the case of goods markets integration, a rise in taxation causes a bigger loss of market shares and thus in production when governments make use of heavier taxation as a means to avoid a default. This also tends to raise the default risk for national corporations and financial institutions when there is a rise in international integration, inducing them to put stronger pressure on a national government to avoid deficits.

5.4 Conclusion with respect to the government's financing constraint

In the discussion above, three factors relating to a government's financing constraint have been analysed: (i) the return required by investors when they invest in government securities, (ii) the possibility of bail-out from other countries, and (iii) the political backing behind a policy of deficit finance. With respect to (i), no unambiguous conclusion could be reached as financial integration affects the return required by investors through a number of channels which work in opposite directions. With respect to (ii), a rise in financial integration tends to weaken the financing constraint faced by the government due to the prospect of other countries bailing out governments which experience payments difficulties. Finally, with respect to (iii) the conclusion was reached that there will more political pressure on national governments to abstain from deficits when there is international financial integration. Thus, with a rise in financial integration it is likely that there will be less political backing behind a policy of deficit finance because investors with a rise in financial integration have more possibilities of placing saving in other financial assets, diminishing the interest of investors in government securities issued by the national government.

6 Uncertainty related to the use of policy instruments

A rise in the uncertainty surrounding the effects of policy instruments tends to increase the political costs related to changes in economic policy instruments. A rise in the complexity of economic structures makes it more difficult to forecast the effects of policy changes, increasing the uncertainty with respect to the effects of policy instruments and thus making policy makers more reluctant to use macroeconomic policies.

It is conceivable that the complexity of economic models, and thus the uncertainty surrounding the effects of policy changes, is reduced both with a rise in goods market integration and with a rise in financial integration. Thus, in the case of imperfect integration of goods markets, it increases the complexity of economic models that both domestic production and the real exchange rate are determined by the demand for goods produced in the home country, cf. the analysis in section 3. In the case of imperfect integration of securities markets, it further increases the complexity of the economic structure that macroeconomic variables are determined also by the condition for equilibrium in the market for securities issued by domestic corporations and financial institutions and by the government. It is conceivable that there is considerable uncertainty in particular concerning the demand and supply of financial assets. Thus, empirical investigations show a bigger variation in financial variables than in real variables.

It tends to increase the uncertainty related to macroeconomic policies that a rise in the efficiency of financial markets caused by international financial integration makes it possible to finance consumption through borrowing or through drawing on financial assets. This makes it possible to sustain a desired level of consumption in spite of a rise in the interest rate. Consumption will thus be affected to a larger extent by expectations and consumer confidence which may be difficult to affect by policy makers.

International integration affects the money demand function insofar as foreigners hold bank deposits or legal tender in other currencies or in foreign banks, implying that there is currency substitution.²⁷ Currency substitution may increase the uncertainty concerning monetary policy – and thus diminish its effectiveness - for several reasons. First, under a floating exchange rate regime currency substitution may increase the fluctuation in the demand for money due to frequent re-evaluations concerning the profitability of holding a foreign currency. In addition, if domestic monetary authorities stick to a target of a specific growth in the money supply without considering the fluctuations in foreigners' demand for domestic money, monetary policy turns out to become either overly restrictive or overly expansive due to changes in the foreigners' money holdings.²⁸ Second, currency substitution means that changes in the supply of money engineered by the domestic monetary authorities have effects in the foreign countries where the currency in question is held. An expansion in the money supply can, for example, cause inflation in other countries where residents hold the currency in question.²⁹

²⁷ Currency substitution was introduced by Miles (1978) who writes: "...Multinational corporations have strong incentives to diversify the currency composition of their cash balances in order to facilitate their endeavors in various countries. Even individuals and businesses that are clearly domiciled in a particular country often have transactions or precautionary or even speculative motives for diversifying the currency composition of their money holdings..." (Miles, 1978, p. 428). A discussion on currency substitution took place notably around 1990. Surveys are found in Giovannini and Turtelboom (1994) and in Thomas and Wickens (1991).

²⁸ This corresponds to McKinnon (1981) who argues that shifts between currencies will cause fluctuations in the money demand function, making a fixed exchange rate policy the optimal policy to follow.

²⁹ This is stressed by Miles (1978).

It may further contribute to uncertainty concerning the demand for money that agents with a rise in financial integration to a larger extent hold foreign securities, implying that the demand for money is affected not only by the return on domestic securities but also by the return on foreign securities. This makes it more difficult to evaluate the demand for money, in turn leading to a rise in the uncertainty faced by the domestic monetary authorities and thus diminishing the effectiveness of monetary policy.³⁰

Currency substitution was especially seen as a problem around 1990. Several factors suggest that it is a smaller problem now and we may question whether it seriously impairs the effectiveness of monetary policy. First, several investigations throughout the 1980s failed to show a large significance.³¹ With the fall in inflation in all industrial countries throughout the 1990s, the differences between countries with respect to the return on bank deposits have narrowed considerably since the 1980s. It is thus likely that currency substitution is less common now than in the 1980s. Second, the problem is not relevant for countries which use a short-term interest rate as the principal monetary instrument. These countries passively adjust the money supply to the demand which corresponds to the interest rate that the authorities set. Fluctuations in money demand thus have no importance for these countries.

7 Allocational costs related to monetary policy

International financial integration tends to increase the efficiency of financial markets. This tends to reduce the costs in terms of a mis-allocation of resources which are associated with monetary policy. Thus, if there is an efficient market for the allocation of funds between banks in the form of efficient markets for short-term financial assets, the effects of a more restrictive monetary policy are spread evenly over banks. This makes it possible to pursue a more restrictive monetary policy without adverse effects on resource allocation.

8 Summary and conclusion

The paper has examined how changes in economic integration affect the effectiveness of macroeconomic policies. The main findings can be summarised as follows.

Taking the point of departure in a standard model for a small open economy based on gradual price adjustment, it has been examined how international integration affects the effectiveness of monetary, fiscal, and structural policies. It is the conclusion that it depends on a variety of factors –

³⁰ In most studies of currency substitution it is investigated whether the foreign interest rate can affect the money demand in a country. This is in effect a test of international financial integration and falls outside the definition of currency substitution given by Miles (1978). Thomas and Wickens (1991) speak of foreign money holdings as 'pure currency substitution'. Giovannini and Turtelboom (1994) distinguish between direct currency substitution and indirect currency substitution, the latter being defined as investors switching between non-monetary financial assets denominated in different currencies.

³¹ Giovannini and Turtelboom (1994) reach the following conclusion based on a number of studies: "...the empirical evidence...is not conducive in establishing the influence of foreign interest rates or expected exchange rate changes on domestic money demand. Where statistically significant cross-elasticities have been found, they are usually much smaller than the elasticity with respect to the domestic interest rates..." (p. 421). De Vries (1994) concludes that investors seldom hold money holdings.

most importantly the monetary regime and the cause of integration - how international integration affects macroeconomic policy effectiveness. In several cases, conflicting effects are at work. There is no support in the analysis for the view that international integration generally reduces the effectiveness of macroeconomic policies.

It tends to increase national policymakers' capability of reaching economic goals that a range of new policy instruments become available as a result of economic integration. Thus, the international exchange of goods, services and finance makes it possible to use a number of new policy instruments which affect cross-border flows or a country's competitiveness relative to other countries. Such policy instruments include not only exchange rate changes, trade policy instruments, and capital controls but also sterilised intervention and various tax instruments. Moreover, the effectiveness of monetary policy is increased by the creation of more efficient markets for securities due to financial integration which makes it possible to reduce negative allocational effects which may be related to monetary policy. Income policies may also become more effective because wage restraint has a bigger effect on production when domestic and foreign goods are close substitutes. National policymakers' inclination to use macroeconomic policy instruments may also become stronger because international integration tends to reduce the complexity of the underlying economic structure and because international integration provides for larger price rigidity. International integration finally tends to increase the effectiveness of schemes which provide incentives for saving and investment.

Several effects arising from financial integration tend to diminish the effectiveness of policy instruments. Thus, it becomes more difficult to affect economic activity through the credit channel of monetary policy because financial integration weakens the monopoly position of domestic financial institutions with respect to lending. More efficient financial markets may also make consumption more dependent on expectations and consumer confidence which may be difficult to affect for policy makers. It is uncertain how financial integration affects the government's financing constraint and thus the effectiveness of deficit finance. Several effects tend to raise the financing costs faced by governments when there is a rise in financial integration while other effects have the opposite effect.

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