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# The macroeconomic impact of UK withdrawal from the EU

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## Abstract

We contribute to the ongoing debate about the benefits to the UK economy of membership of the European Union by assessing the macroeconomic consequences of withdrawal using simulation analyses on the NIESR macroeconomic model of the UK economy under endogenous fiscal and monetary policies. We draw on research that highlights the role of EU policies in the level of international trade and investment undertaken by Member States, and the implications of those international linkages for long-term productive potential. UK living standards would be adversely affected by withdrawal, largely due to a decline in the level of technical efficiency resulting from a lower future level of inward foreign direct investment.

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## 1. Introduction

The purpose of this paper is to contribute to the ongoing debate about the benefits to the British economy of membership of the European Union (EU) by using one of the leading macroeconomic models of the UK economy to assess the macroeconomic consequences of UK withdrawal from the EU. Although this is in some sense a debate unique to Britain, our analysis highlights factors pertinent to

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all countries who seek to evaluate the costs and benefits of participation in any wider supra-national trading area. We use a model with endogenous location decisions and endogenous technical progress and draw on research that highlights the role of EU policies in determining the scale of international trade and investment linkages of Member States and the implications of those linkages for long-term growth prospects.

The UK debate about Europe has taken many forms. In the early 1970s it was about whether the UK should leave the European Free Trade Association and loosen historical ties with the Commonwealth in order to enter a customs union with the then European Economic Community (EEC). More recently, the debate has centred over whether the UK should participate in economic and monetary union and the potential impact of further European enlargement and integration on all members of the European Economic Area (EEA). The Single Market Programme (SMP) has pushed the process of European integration forward significantly since the mid-1980s, with the eradication of internal non-tariff barriers to trade and cross-border investment and the improved contestability of national product markets having benefited all Member States.<sup>1</sup> It has also helped to generate a marked change in international trade and investment patterns, including more foreign involvement in production (Barrell and Pain, 1997).

However, these developments have come at a price; the Single European Act of 1985 which laid the groundwork for the SMP also brought a substantial extension of majority voting on matters where unanimity had previously been required. National governments have found it harder to block legislation, and the growing influence of the Community law, the *acquis communautaire*, on national economies has become increasingly apparent over time and increasingly important in the UK political debate. Furthermore, some of the potential costs of withdrawal from the EU are now widely perceived to have fallen. Moves towards a more open world trading system over the past two decades mean that any additional trade barriers facing UK exporters on withdrawal are likely to be much smaller now than they once might have been.

This has helped to reignite discussions over whether membership of the EU really matters, since some of the benefits of membership might still be available even after withdrawal, whilst some of the costs of membership could seemingly be foregone. Of course, a full analysis of EU withdrawal is a difficult and somewhat subjective task. There are few, if any, recent historical precedents for such a development. In principle, one way of proceeding might be to consider whether the gains that have resulted from EU membership would be lost. But this is hampered by the absence of any detailed quantification of the gains to the UK from EU membership during the past 3 decades, although there have been a few papers that have attempted to assess welfare effects over a shorter timescale (Miller and Spencer, 1977; Winters, 1987). In any case, some changes might be irreversible. Thus, we are forced to consider matters afresh.

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<sup>1</sup> Estimates of the impact of the SMP by the mid-1990s suggest that it had thus far raised the level of EU output by  $1-1\frac{1}{2}\%$  (European Commission, 1996; Allen et al., 1998).

Some of the issues we examine, such as the influence of European institutions and policies on location decisions and the links between location and growth prospects have not yet been considered in the debate over whether to withdraw. In recent years, there has been growing awareness that the level of output and the prospects for economic growth in imperfectly competitive open economies like the UK might be related to the knowledge, both codified and tacit, brought in through international trade and foreign direct investment (FDI). New growth theories suggest that such transfers may have permanent effects on output and the growth process by affecting total factor productivity and technical progress (TP) (Grossman and Helpman, 1991), and empirical evidence also suggests that openness to trade and FDI raises TP in the UK and other advanced economies (Bayoumi et al., 1999; Barrell and Pain, 1997, 1998).

Part of this process arises from changes in the location of activity due to foreign investments by multinational companies. Such investments provide a channel through which new ideas, working practices and technologies can arrive in host economies, as well as a means by which indigenous companies are exposed to greater competitive pressures. The location of economic activity could thus be an important endogenous influence on national growth prospects. In conjunction with the well-established evidence that European institutions and policies are an important influence on location choice, it is clear that the size of national economies has to be viewed as determined by their acquired as well as their endowed characteristics.

Our estimates of the potential macroeconomic effects of UK withdrawal from the EU are derived using a version of the NIESR macroeconomic model of the UK economy (NiDEM). We consider four broad ‘shocks’—the effects of a reduction in productive efficiency as a result of lower inward FDI, the impact of increased barriers to trade with the EU, the impact of an ex-ante fiscal windfall due to lower net transfers to the EU and the impact of lower food prices.

One important difference between our analysis and that which could be undertaken on a CGE model is that we are able to take account of the likely policy reactions of the monetary and fiscal authorities. In particular, we allow for an endogenous monetary policy, and hence, an endogenous exchange rate, with the monetary authorities setting policy in order to achieve a given inflation target. We also ensure that long-run fiscal solvency is maintained. We show that these policy rules affect the dynamics of adjustment to withdrawal and the impact on different sectors of the economy, since monetary policy is relaxed but fiscal policy is tightened. Our approach has some similarities with that employed by Bayoumi et al. (1999), who use a specially adapted version of the IMF MULTIMOD econometric model and the results from an econometric exercise of trade-related cross-country spillovers to examine the long-run influence of changes in R&D expenditure on global output.

The structure of this paper is as follows. In Section 2 we discuss the evidence linking location choice to the trade policies of the EU and attempt to quantify the potential effects on inward FDI from withdrawing from the EU and foregoing the direct benefits of the SMP. We support the picture that emerges from the existing literature with new econometric evidence that membership of the EU and participation in the SMP have had a significant positive impact on the level of fixed

capital investment undertaken by US multinational companies in a panel of European economies. In Section 3 we discuss and quantify the four macroeconomic ‘shocks’ that would follow withdrawal from the EU and the trade policies that we assume would subsequently be pursued by the UK. In Section 4 we outline the key features of NiDEM and report the main simulation results. These indicate that the level of real gross national income would be approximately  $1\frac{1}{2}$ – $1\frac{3}{4}$ % lower outside the EU than inside, with GDP at constant prices declining by  $2\frac{1}{4}$ %. Some conclusions are drawn in Section 5.

## 2. European integration and multinational location decisions

The eradication of internal tariff barriers following the formation of the European Community in 1957 and the subsequent adoption of a common external tariff prompted considerable study of whether FDI was diverted into the region. Studies using data for the US, the primary source of inward investment in postwar Europe, suggested that in the 1960s there was some investment diversion within Europe from the leading non-EEC recipients, notably the UK, to EEC members (United Nations, 1993). In contrast, the relative performance of the UK in attracting inward FDI improved significantly after entry into the EEC in 1973 (Blair, 1987; United Nations, 1993), helped by the fact that foreign firms who wished to use the UK as a base for exporting to other EEC markets no longer faced the common external tariff.

A similar picture has been observed in Spain and Portugal, with inward FDI rising significantly after their accession into the EU in 1986 (Bajo-Rubio and Sosvilla-Rivero, 1994; Barrell and Pain, 1999). Investment in Austria, Sweden and Finland also strengthened markedly in the 1990s, following their decision to participate in the EEA and then to accede into the EU itself.<sup>2</sup> In a study of the location of US manufacturing FDI in nine Western European countries since the mid-1960s, Barrell and Pain (1998) find that entry into the EU had a significant positive impact on the stock of FDI in the UK, Ireland, Spain and Sweden.

There may be other trade policy instruments that also impede market access and hence affect location choice. The general decline in tariff levels on industrial goods over the past 30 years has been offset by increasing reliance on non-tariff barriers, such as technical standards and anti-dumping duties. These now form an important part of the external trade policy of the European Union. Barrell and Pain (1999) illustrate the extent to which the use of contingent protection by the EU and the US has changed the behaviour of Japanese firms, with a switch from exporting to production in the host region. As increasing use was made of anti-dumping procedures in the 1980s, FDI flows from Japan into Europe rose independently of other factors. The key objective was to locate within the EU to gain access to the regional wide market. Other European economies outside the EU gained significantly less investment. Particular locations within the EU were chosen on the basis of their

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<sup>2</sup> Inward FDI into Spain and Portugal averaged 1.03% of GDP per annum during 1981–1985, and 2.04% of GDP per annum during 1986–1990. Inward FDI into Austria, Finland and Sweden averaged 0.6% of GDP per annum during 1986–1990, but 1.64% of GDP per annum during 1991–1997.

cost competitiveness with other EU locations, with the UK gaining the largest share of such investments. In this instance national characteristics, such as the structure of the UK labour market, did affect the level of inward FDI, but only because supra-national policies encouraged Japanese firms to invest within Europe.<sup>3</sup>

Recognition of the importance of non-tariff barriers led to the introduction of the Single Market Programme in the EU in the late 1980s and the subsequent elimination of many internal barriers to cross-border trade and investment. Market segmentation was reduced in service sectors as well as manufacturing ones. Econometric evidence suggests that, after allowing for other determinants of foreign direct investment decisions, the SMP has had a significant positive impact on the level of both extra-EU FDI in Europe (Dunning, 1997) and intra-EU FDI by UK and German companies (Pain, 1997; Pain and Lansbury, 1997).

It is of interest to ask whether EU integration has also had a significant impact on the location and scale of the activities undertaken by multinational companies in Europe. To test this, we undertake a panel data analysis of the factors determining the level of the fixed capital investments of US-owned manufacturing affiliates in the same nine countries used by Barrell and Pain (1998) in their study of the factors determining the location of foreign direct investment.<sup>4</sup> We use annual data for 1967–1995. The nine locations are Belgium, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden and the United Kingdom.

The model attempts to capture the diverse range of influences on both the decision to transfer financial assets abroad (FDI) and the fixed investment decision, drawing on Barrell and Pain (1998) and Young (1999). Conventional supply-side effects are captured through the inclusion of measures of market size and growth, relative factor prices in the host country and costs in the host relative to other potential hosts. Three relative cost variables are included, manufacturing unit labour costs in the US relative to a weighted average of costs in Europe, and unit labour costs and the user cost of capital in the host economy relative to those elsewhere in Europe.<sup>5</sup> The user cost of capital is based on that used in Young (1999).

Affiliates are assumed to produce output for the wider European market and hence EU industrial production is used as the measure of market size. We also allow for potential agglomeration effects by including two variables found important by Barrell and Pain (1998). The first is a measure of market size, given by the ratio of national GDP to EU GDP (at constant 1990 PPPs), and the second is a measure of the relative size of the research base. This is proxied using a 5-year moving average of the stock of manufacturing patents granted in the US to host country residents compared to the total stock of patents granted to all EU residents. A similar 5-year cumulative moving average of the stock of patents granted to domestic

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<sup>3</sup> Barrell and Pain (1999) did not find that cost differentials between individual EU economies and Japan were an important factor in the decisions of Japanese companies to locate in Europe.

<sup>4</sup> Foreign direct investment is only one means of financing fixed capital investment by affiliate companies. Funds can also be raised from capital markets in the host economy for instance.

<sup>5</sup> We do not have information on the total production costs of US foreign affiliates, and so we cannot form an average total cost variable of the kind used in Young (1999). We also found that the user cost of capital in the US was not significant when added to the model reported below.

Table 1

The determinants of fixed capital investments by US manufacturing affiliates in Europe. Dependent variable:  $\Delta \ln(\text{INV}_j)_t$

$\ln(\text{INV}_{j,t-1}/\text{OUTPUT}_{t-1})$	-0.4311 (11.2)
$\Delta \ln(\text{OUTPUT}_t)$	1.0284 (2.9)
$\ln(\text{RELCOST1}_{j,t-1})$	-0.1513 (1.7)
$\ln(\text{RELCOST2}_{j,t-1})$	0.3518 (4.3)
$\ln(\text{RELCOST3}_{t-1})$	-0.4103 (2.1)
$\ln(\text{RELFACP}_{j,t-1})$	-0.1277 (2.7)
EUDUM <sub>t</sub>	0.3342 (4.0)
EEADUM <sub>t</sub>	0.1226 (2.8)
SIZE <sub>j,t-1</sub>	5.7537 (2.3)
PATSHARE <sub>j,t-1</sub>	1.9280 (2.5)
$\ln(\text{PATENTS}_t)$	0.0970 (0.8)
Sample Period	1967–1995
$\bar{R}^2$	0.430
Standard Error	0.182
No. of Observations	261
Serial Correlation	Chi-Sq(1)=0.32
Heteroscedasticity	Chi-Sq(1)=1.58

*Notes:* Standard errors reported in parentheses. Heteroscedasticity test based on regression of squared residuals on time trend, see Barrell and Pain (1999).

*Variable definitions:*  $\text{INV}_j$  fixed capital investment in location  $j$  at constant prices (\$1990),  $\text{OUTPUT}$ : EU industrial production (1990)=100),  $\text{RELCOST1}_j$ : unit labour costs in host location relative to other European locations,  $\text{RELCOST2}_j$ : user cost of capital in host location relative to other European locations,  $\text{RELCOST3}$ : unit labour costs in US relative to Europe,  $\text{RELFACP}_j$ : relative capital-labour costs in host, EUDUM: dummy for EU membership, EEADUM: dummy for Single Market and EEA membership, SIZE: ratio of host GDP to EU GDP, PATSHARE: ratio of host country manufacturing patents to all host country patents, PATENTS: cumulated stock of US patents.

manufacturers in the US is used to proxy the level of US firm-specific assets. The impact of European integration is captured using dummy variables for membership of the EU and participation in the SMP. The EU dummy is set to unity when a country is a member of the EU and zero otherwise. The SMP dummy is set to unity from 1987 onwards for all countries apart from Sweden, which is assumed to participate in the Single Market following the EEA Agreement in 1992.

The panel data results are reported in Table 1. Country-specific fixed effects are included, but not shown in the Table. A data acceptable long-run unit output elasticity is imposed [Wald(1)=2.73]. Diagnostic statistics reported at the foot of the Table fail to reveal any obvious mis-specification. As Barrell and Pain found for US FDI, centrifugal and centripetal forces both have an important influence on the location of activity. The relative size of the national market and research base appear to matter, with the greater potential for agglomeration economies increasing the scale of fixed investment, but so do the relative costs of different locations. There is also a significant negative effect from relative capital-labour costs in the host economy.

The coefficients on the two European dummies are both positive and well-determined. The combined experience of the UK, Ireland, Spain and Sweden thus

suggests that the level of fixed capital investments by US multinational affiliates in these countries rose significantly after their entry into the EU. Equally, it is clear that the level of fixed capital investments in all of the host economies has been significantly higher than might otherwise have been expected since the start of the SMP in 1987. This reinforces the evidence that integration with Europe has played a significant part in stimulating inward investment into the UK. Withdrawing from the EU, and possibly from the EEA as well, would put some of these gains at risk.

Of course, it is not the case that all foreign firms would disappear overnight if the UK were to leave the EU. As the results in Table 1 make clear, many other factors affect the location of economic activities. The existence of sunk costs and agglomeration economies may mean that decisions to disinvest are not the exact opposite of decisions to make an initial investment. The most likely scenario, and the one assumed in the simulations below, is that the growth of new inward FDI is much slower than it might otherwise be. In effect, this can be characterised as foreign investors failing to modernise and extend the scale of many of their existing investments. The size of the effects we consider is calibrated from the findings of published econometric studies for the determinants of FDI decisions of US, Japanese and German companies. Although similar findings might apply to inward FDI from other countries, there is no direct econometric evidence of this and so we do not allow for any such effects in this study.<sup>6</sup>

For the US, we use the results of Barrell and Pain (1998) for the stock of manufacturing FDI. The long-run solution to their model, which includes a dummy variable for EU membership, implies that withdrawal from the EU would eventually reduce the real value of the investment stock by almost two-thirds if all other factors stay unchanged.<sup>7</sup>

For Japan, we use the results of Barrell and Pain (1999) for the manufacturing and non-manufacturing sectors. These models are for the annual flow of FDI expressed as a proportion of EU GDP. Two separate changes can be quantified from their results—the impact of leaving the EU and the impact of being outside the EEA and thus potentially subject to any non-tariff trade barriers imposed by the EU. The model estimates the impact of non-tariff barriers by using the cumulative (discounted) number of anti-dumping cases initiated by the EU authorities since 1980. Using the 1999 value of EU GDP, withdrawing from the EU is estimated to reduce inward FDI by £1.6 billion per annum; being outside the EU protective wall is estimated to reduce inward FDI by £1.5 billion per annum.

For Germany, we use the results in Pain and Lansbury (1997) for the stock of German FDI in five manufacturing and two service industries. This study used

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<sup>6</sup> Another unknown is whether there are linkages between FDI in different sectors. For example, the initial stimulus to FDI in service sectors is sometimes provided by the extent of the activities of home country manufacturing clients in foreign markets (Gross et al., 2001). Such linkages raise the possibility that investments in both sectors may move if something changes the desired location of one of them.

<sup>7</sup> Their model also includes the agglomeration variables and relative labour costs variables used in Table 1. These might also change if the UK withdrew from the EU, but this is not taken into account here. The reported coefficients in Table 1 imply that the level of real fixed capital investment by US-owned manufacturing affiliates would also eventually decline by 54%, other things being equal.

dummy variables to estimate the sensitivity of FDI to the SMP, with the value of the dummies varying across sectors according to their sensitivity to the SMP measures. Using the implied long-run coefficients and the stock of inward FDI from Germany at the end of 1997 implies that withdrawal from the SMP would eventually reduce the stock of FDI in the UK manufacturing, distribution and financial services sectors by £950 million, £1.7 billion and £1.3 billion, respectively.

In total, the changes assumed for the US, Japan and Germany imply that the total stock of inward manufacturing FDI would eventually be approximately one-third lower than would otherwise have been the case if the UK withdrew from the EU. The stock of inward FDI in distribution and financial services would be approximately 10% lower.<sup>8</sup> We assume that the impact of EU exit on the FDI stock emerges gradually over a 10-year period. As we describe below, the lower level of inward FDI will reduce the likely long-term level of potential output in all 3 sectors.

It has been suggested that withdrawal from the EU could stimulate inward FDI into the UK since the UK would be free to remove Union legislation that was believed to add to business costs (Jamieson and Minford, 1999). One example might be the measures associated with the so-called ‘Social Chapter’. Since relative costs of production are one of the factors influencing location choice, as shown in Table 1, reducing labour costs might raise inward investment.

However, it is unlikely that this effect will be large. First, the impact of higher business costs depends on their eventual incidence. Studies of wage formation in Europe point to the long-run absence of ‘wedge’ effects (Layard et al., 1991), so that the eventual incidence of higher employers’ taxes is on the employee not the employer. Second, the SMP has coincided with a rapid growth of new investments by British companies into continental Europe. In the manufacturing sector at the end of 1999, the level of outward FDI by UK companies in EU locations was almost four times the size of inward FDI by EU-located firms, in spite of the supposed advantages offered by the more flexible labour market in the UK. This does not suggest that the Social Chapter and the myriad of different labour market regulations in many European countries are seen by large multinational firms as obstacles that add significantly to location costs, and hence, there is no reason to expect that withdrawal from the EU would bring sizeable new inward investments from these firms. Finally, outside the EU the UK would still have to compete directly with other economies, such as those in Central Europe, which have lower labour costs, reasonably skilled workforces and good access to Western European markets.

### 3. The potential economic changes from leaving the European Union

In this section we describe the four separate factors that we include in the model-based analysis of the potential economic changes that might occur as a result of withdrawal from the EU and explain the reasoning behind the assumptions we

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<sup>8</sup> These reductions are equivalent to a reduction of  $\pounds 21\frac{1}{4}$  billion (or just under 13%) in the whole economy inward FDI stock as of the end of 1997.



make. Some of these issues are also considered by Flam (1995) and Keuschnigg and Kohler (1996), albeit from the perspective of entering the EU rather than from leaving it.

### 3.1. Foreign direct investment, technical progress and exports

A series of recent empirical papers have shown that foreign-owned companies in the UK have helped to raise productivity levels, both because their average productivity is higher than that of UK-owned firms and because there are spillovers that raise the productivity of domestic firms. The importance of inward investment for technical change in the UK manufacturing sector was first emphasised and modelled in Barrell and Pain (1997). To illustrate the methodology employed, consider a two-factor CES production function, with technical progress (TP) assumed to be labour augmenting at rate  $\lambda$ , over time  $t$ . Under constant returns to scale, the first-order condition that the marginal product of each input should equal its real price can be used to derive a long-run log-linear labour demand equation of the form:

$$\ln(L_t/Q_t) = \text{constant} - (1 - \sigma)\lambda t - \sigma \ln(W_t/P_t) \quad (1)$$

where  $L$  denotes employee hours,  $Q$  value added output,  $\sigma$  is the elasticity of substitution, and  $W$  and  $P$  denote labour costs per employee hour and value added prices. The coefficient on the real producer wage provides a direct point estimate of the elasticity of substitution, allowing the TP parameter(s) to be identified. If there are positive net spillovers from inward investment, then TP will be positively related to the lagged aggregate stock of foreign-owned assets in the host economy (SFDI). Letting other factors that affect TP be captured by an exogenous deterministic time trend (TIME), then:

$$\lambda t = \lambda_T \text{TIME} + \lambda_F \ln(\text{SFDI}/P)_{t-i} \quad (2)$$

In this specification TP will grow at a constant rate if foreign assets do. The TP parameters can be estimated jointly with those of the labour demand equation by substituting Eq. (2) into Eq. (1). Allowance can also be made for adjustment lags arising from factors such as hiring and firing costs by estimating a non-linear dynamic equilibrium-correction model for employment in which the factor demand expression implied by the combination of the marginal productivity condition Eq. (1) and the TP function Eq. (2) is embedded as the long-run steady-state solution:

$$\begin{aligned} \Delta \ln(L_t) = & \beta_0 + \beta_1 \Delta \ln(Q_t) \\ & + \beta_2 [\ln(L_{t-1}/Q_{t-1}) + \sigma \ln(W_{t-1}/P_{t-1}) + \lambda_1 \text{TIME} + \lambda_2 \ln(\text{SFDI}_{t-1})] \\ & + \varepsilon_t \end{aligned} \quad (3)$$

where  $\lambda_1 = (1 - \sigma)\lambda_T$  and  $\lambda_2 = (1 - \sigma)\lambda_F$ .

Using a model of this form Hubert and Pain (2000, 2001) find that the stock of inward FDI has had a statistically significant effect on the level of TP, and hence labour productivity, in the manufacturing, financial services and distribution sectors of the UK economy, but has not affected public services or transport and

communications. They also report that these findings appear to be robust to the presence of other potential determinants of TP such as imports and domestic R&D expenditures. Their evidence does not indicate that inward FDI is the only source of technical change in the UK economy, but it does indicate that it is an important and significant one. We use their results in the simulation analyses reported below.

A 1% change in the (constant price) stock of manufacturing FDI is estimated to eventually change the level of labour-augmenting TP in the manufacturing sector by 0.32% (S.E. 0.085). A 1% change in the (constant price) stock of distribution and financial services inward FDI is estimated to eventually change the level of labour-augmenting TP in those sectors by 0.135% (S.E. 0.064). It is important to note that we consider a permanent change in the level of inward FDI rather than the rate of growth. As is clear from Eq. (2) this affects only the level of TP and hence we would not expect to see a permanent decrease in the growth rate of the UK economy in the simulation exercise.<sup>9</sup>

Foreign investors may also generate changes in the variety and quality of goods produced within a country, factors which are important determinants of trade performance. The cross-country evidence points to a positive impact from inward FDI on host country export performance in most European countries, including the UK (Barrell and Pain, 1997; Pain and Wakelin, 1998). This is reflected in the merchandise exports equation in the modified version of NiDEM we use, with the long-run parameters on inward FDI and price competitiveness taken from Pain and Wakelin (1998). A 10% rise in the constant-price stock of inward FDI raises the volume of exports by 0.75%, all other things being equal. Thus, export performance will be adversely affected by the loss of FDI, as well as by the imposition of any additional trade barriers. The relative price elasticity is  $-1.3\%$ .

### 3.2. UK–EU trade policy

Membership of the EU gives UK exporters tariff-free access to the EEA. The EU applies a common external tariff on all imports from outside the EEA. Thus UK exporters might be subject to an additional tariff following withdrawal from the EU, at least until a customs union or free trade agreement (FTA) could be negotiated. Tariff levels have generally come down over time and will be reduced further as a result of agreements reached in the Uruguay Round negotiations and bilateral agreements between the EU and her trading partners.

Taking the EU ‘most favoured nation’ (MFN) tariff levels for 1996 reported in table 7 of Hoeller et al. (1998) and weighting them by the commodity composition of UK exports to the EU would imply an average tariff level of 6.7% on UK exports to the EU. As the EU grants some form of preferential market access to the majority of its trading partners, particularly in Europe, it might be argued that the UK would not be subject to MFN tariff rates following withdrawal. However, this ignores that fact that the majority of EU imports enter on a MFN basis. Sapir (1998) estimates that in 1996 bilateral trade between the EU and the 6 countries

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<sup>9</sup> This is also true of the model used by Bayoumi et al. (1999).

with MFN treatment<sup>10</sup> represented only 34½% of EU imports. Despite this, the share of imports enjoying preferential treatment that year was only 30%, implying that 70% of products actually entered on a MFN basis. Sapir argues that this reflects a combination of non-dutiable imports and administrative rules. Quotas are applied to some products and others have to satisfy rules-of-origin requirements to gain preferential treatment. Hence, an assumption that MFN rates may be applied to UK exports, at least initially, does not appear unreasonable.<sup>11</sup>

Withdrawal from the EU customs union would also increase the administrative burden associated with exporting to the EU by reintroducing border controls and the associated paperwork to provide the detailed information needed to satisfy requirements over factors such as rules-of-origin and technical standards. Prior to their abolition in the SMP, the costs of such measures in the EU and EFTA were estimated to be equivalent to approximately 2% of transaction values (Hine, 1994; Keuschnigg and Kohler, 1996). Recent estimates made by the Swiss government suggest that the controls imposed by the EU because of differences in technical standards in the EU and Switzerland amount to between ½ and 1% of the total value of transactions (DFA/DEA, 2000). Rules-of-origin paperwork will impose additional costs.

If the total additional costs of exporting to the EU were 8.7% (a tariff level of 6.7% plus administrative costs of 2%), then given that approximately 57% of all UK merchandise exports presently go to the EU, this translates into an ex-ante 5% rise in the effective relative price of UK merchandise exports.<sup>12</sup> The size of the EU economy makes it likely that the EU has an element of market power, so that the price of UK exports in the EU market will not rise by the full amount of the tariff. In effect UK exporters will have to bear some proportion of the tariff, and the home price of exportables will be lower than the EU price, generating an ex-ante deterioration in the terms of trade.

In an exercise of this kind, much depends upon assumptions about the hypothetical trade policies that would be pursued by the UK following withdrawal. The UK would have the freedom to impose import tariffs on products from the EU if it so wished, although the extent to which it could do so is limited by global trade agreements and the WTO. We have not allowed for the imposition of additional tariffs on imports in this study. Nor do we allow for the possibility of retaliation by the EU to dissuade other countries from pursuing withdrawal.

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<sup>10</sup> The US, Canada, Japan, Australia, New Zealand and Taiwan.

<sup>11</sup> The use of tariff levels that applied in 1996 may generate an over-estimate of future barriers, although it is difficult to obtain a comprehensive data set of the kind reported in Hoeller et al. (1998) for subsequent years. USITC (2000) use 1995 tariff levels for instance. However, the *Trade Policy Review of the European Union*, issued by WTO in 2000, notes that the average MFN tariff rate applied by the EU on non-agricultural products in 1999 was still 4.2% and that on agricultural products was 17.3%. It is also the case that the precise level of tariffs will have little bearing on the long-run impact of withdrawal on output, although it will affect the speed of adjustment to the long-run.

<sup>12</sup> UK exporters may also face some non-tariff barriers in the EU. In 1996, approximately 19% of EU tariff lines were also affected by some form of non-tariff barrier (Hoeller et al., 1998 Table 9), although it is difficult to quantify the tariff-equivalent value of these, and so we do not allow for them in this study.

The UK might of course seek to retain membership of the EEA. In one sense this would be attractive; the UK would continue to benefit in full from the SMP as the *acquis communautaire* applies throughout the EEA, and would gain the freedom to depart from the common external tariff of the EU if it so wished. However, membership of the EEA runs into the problem of ‘regulation without representation’ (Rollo, 1995) as the UK would have little input into the decision-making process in the EU, but be forced to accept the outcomes of that process. Against a background of growing political complaints about the legislation which is already passed as a result of majority-voting in the EU it seems more plausible to assume that the UK would not withdraw into the EEA, and would thus be subject to some EU (and EEA) trade and investment barriers on leaving the EU. These, of course, could be minimised through negotiation (and possible threats of retaliation), but negotiations take time, particularly over non-tariff barriers. Switzerland, which chose to remain outside the EEA in 1992, took a long time to conclude a set of bilateral agreements with the EU (DFA/DEA, 2000). Negotiations began in December 1994 and took four years to complete, and the agreement has started to come into force only from 2001.

A further possibility is that the UK seeks to become a member of NAFTA (USITC, 2000; Jamieson and Minford, 1999). We do not pursue this here, although if it occurred part of the higher costs facing UK exporters into the EU would be offset by lower costs for UK exporters to North America. However, moving from a customs union to a free-trade area would not be completely without cost, and the net benefits from lower tariffs in the NAFTA economies may be small. The USITC estimates that tariff eliminations would raise UK GDP by less than 0.01% following entry into NAFTA, assuming that the UK does not face additional trade barriers with the EU, although they do not allow for factors such as the endogeneity of location.

### 3.3. *Agricultural policy and agricultural imports.*

The Common Agricultural Policy (CAP) is one of the key components of the EU and the total level of expenditure by the European Commission. The primary effect of the policy has been to hold agricultural prices in the EU at levels which, on average, have been above the prices charged on world markets. Full analysis of the effects of this policy is beyond the scope of this study. However, most governments in developed economies seek to give some protection to their agricultural sectors and there is no reason to assume that the UK government would fail to do likewise even after withdrawal from the EU. Thus, we assume that the UK government maintains the same level of direct agricultural subsidies to producers upon withdrawal, although these would now be paid directly by the government rather than out of the EU budget.

We also assume that tariff levels on imported agricultural products would be lowered towards the average levels applied in other major economies. Comparing the EU regime with that in the US implies that the price of such imports might drop by approximately 20% (Hoeller et al., 1998). Based on the composition of

UK imports in 1998, this would reduce the aggregate price of imported non-manufactured goods by  $5\frac{1}{4}\%$  and reduce revenue from import duties by £1 billion per annum. In NiDEM, this reduction in import prices feeds automatically into domestic retail prices and raises the real incomes of consumers.

### 3.4. Budgetary policy

On average, the net annual payment by the UK to the EU over the period 1991–1999 was £2.6 billion. We assume that withdrawal would lead to the British government taking over responsibility for payments made by the EU to the UK. In 1999, these totalled £6.9 billion, including £2.7 billion in agricultural subsidies, whilst the UK contributed £10.5 billion to the EU.<sup>13</sup> We also assume that the government leaves indirect tax rates unchanged, with the tax revenue that would have been paid to the EU being used to finance domestic expenditure.

In total, we assume that withdrawal means that net public expenditure is £3 billion per annum lower than would otherwise be the case, after taking account of the lower level of import duties on agricultural products. There are many different uses to which this windfall ‘gain’ might be put. Given that there are likely to be some short-term employment costs associated with withdrawal from the EU, it seems reasonable to assume that additional expenditure might be used to try and alleviate these. Thus, in the simulations we allow for a reduction in employers’ national insurance contributions worth £2 billion per annum with the remaining £1 billion per annum being used to reduce direct taxes on household incomes.

### 3.5. Other issues

It would be an extremely difficult task to capture all possible factors in an exercise of this kind. However, it is worth highlighting two factors which are not considered explicitly below—the potential impact of product market segmentation and the potential loss of economies of scale. Either of these could raise the costs of withdrawal from the EU.

In theory, the integration process in Europe should improve product market contestability by eliminating restrictions on market access; in turn this should be associated with lower price–cost margins and higher economic welfare. Allen et al. (1998) use a CGE model to estimate that the impact of the SMP on price–cost margins has raised UK GDP by 1.11%. Greater competition may also help to reduce technical inefficiencies (Nickell, 1996). There is a possibility that such gains could be at risk if the UK was to withdraw from the EEA. However, the resulting additional degree of market segmentation would depend primarily on whether the UK chose to erect barriers that reduced the contestability of its domestic market. As we assume that it does not, it is reasonable to assume that the competition effects from withdrawal will be small. If the UK chose instead to introduce technical standards that differed significantly from those imposed in the EEA, then the adverse competitive effects might be greater.

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<sup>13</sup> See *United Kingdom National Accounts*, 2000, Table 12.2.

The NiDEM model has separate demand and supply relationships for six sectors of the UK economy. Each sector has a production function with constant returns to scale, so that withdrawal does not generate lower scale economies, in contrast to some related exercises undertaken on calibrated CGE models (for example, Allen et al., 1998) which assume increasing returns to scale. If these were significant, then our analysis would be likely to underestimate the possible effects of withdrawal. However, studies using longitudinal data sets indicate that the empirical evidence for increasing returns is not strongly based (Bartelsman and Doms, 2000).<sup>14</sup>

#### **4. The macroeconomic impact of withdrawal**

In this section we evaluate the overall macroeconomic effects of EU withdrawal using simulations on the National Institute model of the UK economy (NiDEM), comparing the outcome with a baseline case of no exit. We first provide a brief overview of the salient properties of the model. A full description can be found in NiDEM (2000).

##### *4.1. The NiDEM model*

NiDEM is theoretically coherent and quantified by means of empirical estimation over recent historical experience. In contrast to some small theoretical or calibrated models of the economy its complete specification ensures that important features of the economy are not omitted. The model embodies extensive forward-looking behaviour in the private sector as well as in financial markets. This means that changes in the expectations of future events have an immediate impact on current behaviour. The properties of the model have been described and evaluated frequently in the model comparison exercises undertaken by the publicly-funded Macroeconomic Modelling Bureau at the University of Warwick (Church et al., 2000).

In the version of the model used here, private sector consumption is based on the life cycle model. Households receive labour income from firms, property income through the financial system and transfers from the government to whom they pay income and other taxes. Household optimisation implies an Euler equation determining consumption across time. This is solved out as a function of current wealth and current and future post-tax, non-property income. A proportion of households are assumed to be financially constrained and spend according to their current non-property income. The remainder spend according to their permanent non-property income, as given by the present discounted value of expected future income. Current wealth is affected by forward-looking asset prices.

Fixed capital investment responds to the gap between the expected return on capital and its user cost, using an approach derived from Bond and Meghir (1994). Final expenditure is allocated across different products using a version of the dynamic demand system estimated by Pain and Westaway (1996), so that expendi-

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<sup>14</sup> Using a panel of 11 two-digit manufacturing industries in the UK, Hubert and Pain (2000) obtain evidence of increasing returns to scale. However, in all cases, the hypothesis of constant returns cannot be rejected.

ture on any given product depends on the composition of demand as well as relative prices. Hence, a change in the price of tradeable goods will affect the demand for non-tradeables, even if total expenditure does not change.

The model embodies the same broad approach to the labour market as that of Layard et al. (1991). Demand ‘shocks’ remain an important determinant of activity in the short run. The price and wage equations reflect forward-looking optimising behaviour, but do not clear the product and labour markets continuously. Nominal rigidities from wage contracts and price setting (Roberts, 1995) are such that the period of adjustment to demand shocks can be protracted. However, in the long-run, employment and unemployment are determined solely by supply side factors. The employment and pricing relationships in the model are derived consistently from a CES production function with constant returns to scale linking sectoral output to employment and the capital stock in 6 different sectors of the economy. Long run economic growth is determined by the growth of the labour force and by the rate of TP, which varies across different sectors. TP is normally exogenous, but in this instance is endogenised as described in Section 3.

The effects of shocks to the economy have to be viewed in the context of the policy environment in which they take place. NiDEM includes a fully integrated government sector so that fiscal policy can be adjusted to meet a number of possible objectives. Here we assume that the fiscal authorities adjust effective tax rates on household incomes in order to ensure fiscal solvency, as discussed by Pain et al. (1997). Monetary policy is set to ensure that consumer price inflation remains at a medium-term target level of  $2\frac{1}{2}\%$ , reflecting official practice in the UK. Hence an unanticipated slowdown in activity or prices is met by a fall in nominal short-term interest rates. The present exchange rate is determined by interest rate differentials and expectations of the future exchange rate, and so the exchange rate will ‘jump’ if interest rates change. The size of the jump depends upon the interest differential that opens up.

#### *4.2. The overall macroeconomic impact*

In order to clarify the effects of the different components of the withdrawal package, we first describe our estimate of its overall impact and then discuss variants in which a key assumption is changed. To illustrate the importance of the policy framework in which the exercise is undertaken, and in particular the role of endogenous monetary policy, we also report the outcome if it were assumed that interest rates and the exchange rate did not change. All simulations are carried out over a 30-year base.

The key results when allowing for a gradual build-up of the impact of withdrawal on inward investment are summarised in Figs. 1–5. GDP at constant prices is ultimately  $2\frac{1}{4}\%$  lower as a consequence of EU withdrawal, as shown in Fig. 1, irrespective of the monetary policy assumption. This simply reflects the model property that the real side of the economy is independent of monetary policy in the long run. The long-run impact of withdrawal on UK GDP is comparable to the estimate of a gain of 2.6% in GDP made by Keuschnigg and Kohler (1996) in their

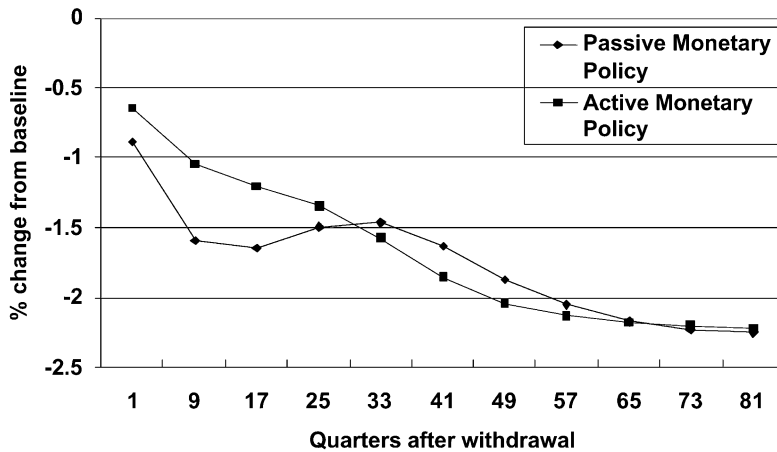


Fig. 1. The impact on UK GDP at constant prices.

analysis of the impact on the Austrian economy of entry into the EU, and the gain of 2% of GDP in the estimates of the impact of the recent Bilateral Agreements between Switzerland and the EU cited in DFA/DEA (2000).

The main factor behind the lower volume of output in the simulation is the reduction in TP arising from the lower level of inward FDI. The various sectors of the economy are affected in different ways by EU withdrawal. Manufacturing is particularly hard hit by the reduction in TP as well as by the effects of lower product variety and higher tariffs on exports. Manufactured exports fall by over

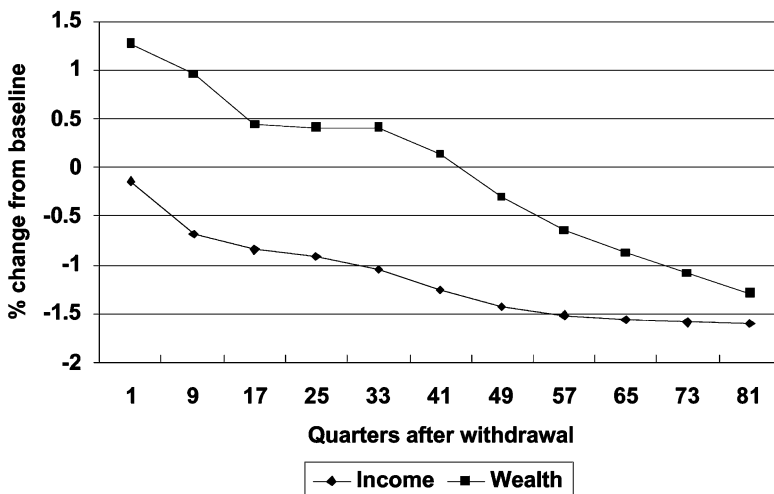


Fig. 2. The impact on real gross national income and national wealth.



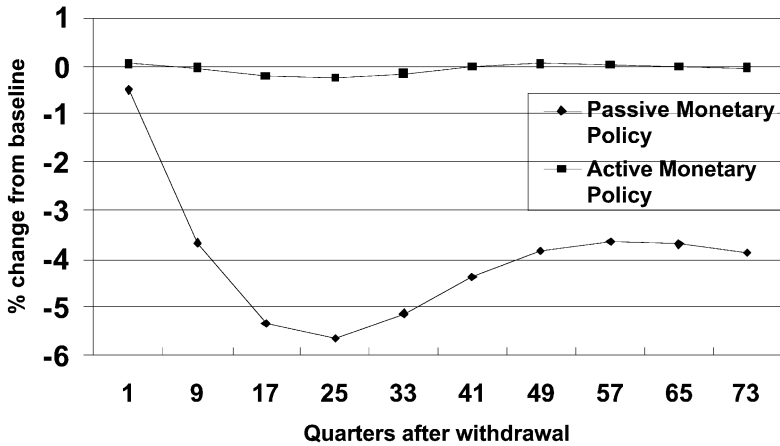


Fig. 3. The impact on the consumer price level.

7½% in the long run. Domestic manufacturing output is reduced significantly compared to the baseline, with a shift in domestic demand towards non-tradeables.

The size of the initial decline in output clearly depends on the monetary policy stance. When policy is endogenous and forward-looking, the nominal effective exchange rate depreciates on announcement of withdrawal by 2½%. At their peak response, short-term interest rates are approximately 25 basis points below base, although they eventually return to their base levels. Allowing for an endogenous policy helps to cushion the short-term impact of withdrawal because monetary conditions are eased. Although it does not affect the long-run impact on the real

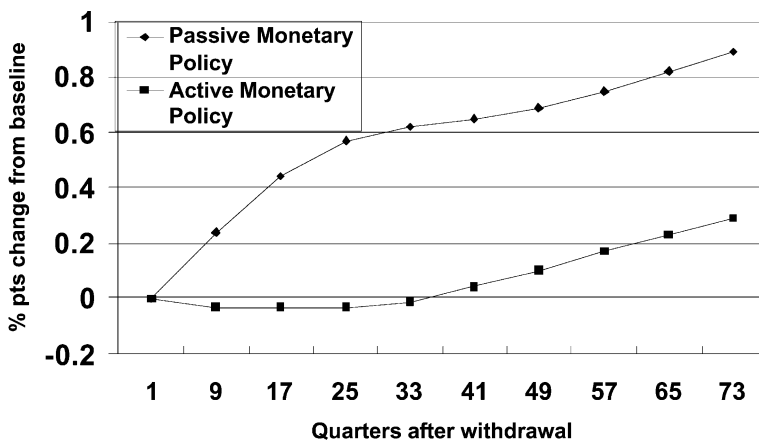


Fig. 4. The impact on the effective tax rate.

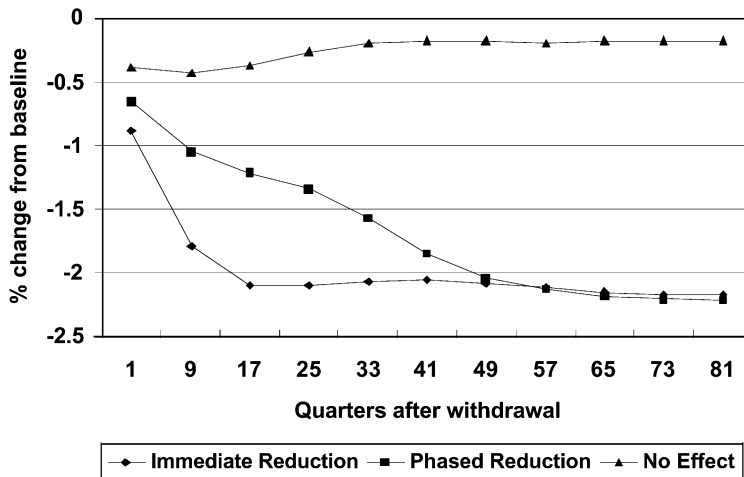


Fig. 5. The impact on real GDP of different FDI assumptions (per cent).

economy, it does affect the long-run impact on the consumer price level, as shown in Fig. 3.

An alternative measure of national income, real gross national income, which measures UK GDP net of transfers and property income payments to the rest of the world and values it at consumer prices (Sefton and Weale, 1996), falls by 1.6% in the long run, as shown in Fig. 2. The combined effects of the drop in GDP and the deterioration in the terms of trade are partially offset by a lower level of transfer and property income payments to overseas. With an endogenous exchange rate the terms of trade, as measured by the ratio of export to import prices in sterling terms, ultimately decline by approximately  $1\frac{1}{2}\%$ , with lower export prices more than offsetting lower import prices on basic commodities.

A further indication of the extent to which the costs of withdrawal build-up over time is provided by the real value of national wealth. We define this as the sum of tangible plus intangible assets, plus the net overseas assets held by UK residents and the stock of notes and coins.<sup>15</sup> The response of real wealth is also shown in Fig. 2. For the first few years it is above base levels, largely because the initial depreciation of the nominal exchange rate raises the sterling value of net overseas assets. Over time, this effect is outweighed by a gradual decline in the domestic stock of fixed capital reflecting the permanent drop in the level of output. After 20 years, real national wealth is 1.3% below base levels.

The impact of withdrawal on the household sector is accentuated by the imposition of fiscal solvency. Whilst government finances are improved in the short run by withdrawal, in the longer term the effective direct tax rate needs to be raised to

<sup>15</sup> Nominal assets such as net overseas assets, notes and coins and the value of the residential housing stock were converted into constant prices using the same consumption price deflator used to generate real gross national income.

ensure that the government remains solvent for given levels of expenditure. This is because the permanent reduction in output has a permanent effect on the level of revenue unless effective tax rates rise. In the scenario with endogenous monetary policy the effective tax rate rises by 0.2 percentage points, as shown in Fig. 4. The higher burden of taxation reduces household disposable non-property income by more than the fall in national income.

The effect of EU withdrawal on employment is relatively small in relation to the change in output. After twenty years it is within 0.1% of the baseline level. In the short term, there is downward pressure on employment as the economy contracts. The extent of the fall depends on how monetary policy operates. If policy is relaxed as the economy contracts, then the maximum decline in employment is approximately 75,000. If interest rates and the exchange rates do not fall, then employment would fall by approximately 160,000 after three years as a result of UK exit from the EU. The reason for the relatively small decline in employment in spite of a large shock to output is that wages fall in real terms as the labour market slackens. This makes labour relatively more attractive to companies, compensating for the effect of lower demand. It is also the case that with lower labour-saving technical progress, firms need relatively more labour for each unit of output. This is brought out in a reduction of productivity per hour of approximately 2%.

#### *4.3. Withdrawal with alternative inward investment effects*

There are a number of components to the package described above and they do not all work in the same direction. The reduction in import prices and the ending of net contributions to the EU budget improve the welfare of UK consumers, but higher tariffs against UK goods and services and a loss of inward FDI adversely affect welfare. In terms of the effect on GDP, the most important factor in the simulation is the effect of withdrawal from the EU (and the EEA) on FDI and hence TP. To illustrate this, and also the separate impact of the other ‘shocks’ considered, we recalculate the impact of withdrawal under two alternative assumptions about the impact on FDI. In the first, we assume that the full impact is immediate, rather than gradually accumulating over a decade. In the second we assume that there is no direct impact on FDI, although it can still vary over the economic cycle with lower demand in the UK making the UK a less attractive place in which to locate. Both variants are with an endogenous monetary policy.

The differing impacts on real GDP are illustrated in Fig. 5. As we would expect, the long-run impact on GDP in the simulation in which the stock of inward FDI drops immediately upon announcement of withdrawal, is identical to that when withdrawal is phased in over time.<sup>16</sup> However, in the short-term, the costs are greater, and the level of output is 2% below baseline after three years. Because the decline in output emerges earlier, the tax base is lower than in the simulation with phased withdrawal, and the effective tax rate is now raised by 0.5 percentage points

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<sup>16</sup> The version of the NiDEM model used here does not include an allowance for agglomeration economies of the sort used in the empirical exercise in Section 2. If it did, the sharper initial decline in UK GDP might generate a further additional decline as agglomeration economies were lost.

in order to ensure fiscal solvency. As a result, the level of household consumption falls by more in this simulation than before. Real national wealth also declines more sharply, and after 20 years is now 1.6% below base levels.

In the simulation with no direct FDI losses there is still a short-term decline in GDP of just under 0.5% at its peak. This primarily reflects the adverse effects stemming from the higher costs of exporting into the European market. UK GDP subsequently returns towards base levels as a lower price level helps eventually to restore the competitiveness of domestic producers. However, there is still a small negative effect on output even after twenty years. This is consistent with a switch in the composition of demand away from the relatively high productivity manufacturing sector towards lower productivity non-manufacturing sectors as a result of the rise in the relative price of tradeable goods. The supply-side mechanism that ensures a lower level of productivity is that the initial drop in output also generates a drop in the real stock of inward FDI, which in turn lowers the level of TP. Real national wealth also declines slightly, and is 0.1% below base after 20 years.

## **5. Conclusions**

Quantifying the impact of withdrawal from the EU on the UK economy is a very difficult task given the range of factors that need to be considered and the absence of any detailed estimates of the overall benefits received from three decades of membership. Our analysis in this paper highlights two main points. First, despite the large number of jobs now associated with the production of the goods and services that Britain currently sells to the EU, there is no reason to suppose that unemployment would rise significantly if the UK were to withdraw from the EU. Withdrawal could cause disruption to the economy, but it is most unlikely that export sales to EU markets would cease completely, and monetary policy can be relaxed. In the longer-term, flexible wages and prices would help employment to recover.

However, this does not mean that withdrawal from the EU would be without long-term costs. The process of European integration means that the evolution of European institutions and policies now plays an increasingly important role in determining the international trade and investment patterns of individual member states. There is clear evidence that these policies and institutions have a significant bearing on the location of economic activity. The resulting linkages have important implications for long-term growth prospects, because the degree of international openness is a significant determinant of the level of technical progress, and hence, total factor productivity in the UK economy. Our analysis suggests that withdrawal from the EU would mean that the level of output in the UK economy would be  $2\frac{1}{4}\%$  lower permanently than it otherwise would have been. This estimate is uncertain, and may be argued to err on the side of caution, but it is broadly equivalent to the gains that other EU economies are estimated to have made from participating fully in the European integration process.

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