

# UK Economic Growth Performance in a European Context: Has EU Membership Made Much Difference?

Nicholas Crafts

## 1 Introduction

The growth performance of the UK economy has varied considerably during the post-war period both in absolute terms and, perhaps more significantly, relative to its European peer group. Clearly, many relevant aspects of the economic environment have changed since the early 1950s. Here we focus on the implications of EU membership for growth outcomes. Of itself, this will surely have varied both across countries and over time and could potentially affect growth differentials.

The proximate sources of growth can be found in rates of increase of factor inputs including capital, human capital and hours worked, and of the productivity of those inputs. At a deeper level, economics highlights the importance of micro-foundations of growth in terms of the key role played by the incentive structures which inform decisions to invest, to innovate and to adopt new technology and which depend on an economy's institutions and its policy framework but are also influenced by circumstances beyond policymakers' control such as the scope for catch-up growth. Obviously, there are a large number of supply-side policies that affect growth performance. These include areas such as

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N. Crafts (✉)

CAGE, University of Warwick, Coventry CV4 7AL, UK

e-mail: [n.crafts@warwick.ac.uk](mailto:n.crafts@warwick.ac.uk)

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competition, education, infrastructure, innovation, regulation and taxation. Moreover, even for EU members, to a large extent these are decided by domestic governments. Nevertheless, openness is an important part of the picture.

The key idea with which to approach the post-war European experience is catch-up growth. The leader throughout has been the USA but for much of the period since 1950 Western European countries were reducing productivity gaps with that country. It is well known that these gaps provide an opportunity to grow faster than the leader. However, catch-up growth is not automatic but depends on institutions and policy frameworks. It is useful to distinguish between catch-up growth in far-from-the-frontier and close-to-the-frontier economies. In the former, rapid total factor productivity (TFP) growth can be obtained by reducing productive and allocative inefficiency and by importing technology. In the latter, stronger competition in product markets and high-quality education become more important (Aghion and Howitt 2006), as the impetus to growth may be expected to switch at least partly from imitation to invention. The process of catch-up growth typically entails a series of ongoing reforms with the danger that at some point the political economy of the next step in modernization becomes too difficult.

In terms of short-run static effects, trade liberalization can improve allocative efficiency and/or productive efficiency, i.e. given existing costs, factors of production are deployed more efficiently or production costs are lowered. Insofar as freer trade increases competition in product markets (through actual or potential entry), it may have both effects as market power is reduced and price-cost margins fall while managers of firms are pressured to reduce costs to the minimum feasible (principal-agent problems are reduced). In terms of long-run dynamic effects, according to endogenous growth models, it is possible that the growth rate will rise as a result of economic integration. In a basic AK model, if investment (or more generally the rate of growth of the capital stock) responds positively, there is no tendency for diminishing returns to erode this initial effect so there is a 'permanent' impact on growth. Perhaps more plausibly, if a larger market and/or more competition in product markets ensues from economic integration this may raise the rate of innovation and TFP growth. Even so, in a perhaps more realistic

(semi-endogenous) growth model, the trade liberalization impact on the growth rate would be a transitory phenomenon reflecting a move to a higher level of output rather than faster trend growth.<sup>1</sup>

As we shall see, the most acute phase of British relative economic decline was from the 1950s to the 1970s. Given these insights from growth economics, the subsequent improvement in growth performance suggests that EU membership could have had favourable effects. Support for such an interpretation was recently voiced in Bank of England (2015) which stressed the favourable impact of the greater openness associated with EU membership for the dynamism of the British economy without, however, providing any explicit quantification of its magnitude. However, an obvious alternative hypothesis is that the improved performance was a response to domestic policy reforms, in particular those associated with the Thatcher governments (Crafts 2014). Moreover, those in favour of Brexit might argue that, at least in recent times, European economic integration has had a negative impact by constraining policy innovations that would be good for growth while the positive effects are now exhausted.

Against this background, this paper addresses the following questions: First, what difference has the European Union made to growth outcomes in member countries? Second, in particular, how much has EU membership affected economic growth in the UK? Third, what might be the implications of Brexit for UK growth?

## **2 European Economic Integration, Trade and Growth: An Overview**

We start with a brief descriptive outline of the process of post-war European economic integration. As Sapir (2011) has reminded us, this can usefully be approached using the ideas of Balassa (1961). Balassa distinguished between different degrees of increasingly deep economic integration working up from free trade area to customs union, in which there is also pooling of sovereignty in a common external trade policy, to common market, within which factors of production can move freely,

to economic union, in which some economic policies are harmonized, to complete economic integration, where there is political union with a supra-national authority.

In 1958, the European Economic Community was formed by the original six countries following the signing of the Treaty of Rome in 1957. The signatories pledged to lay the foundations of 'ever closer union' among the peoples of Europe and Article 2 committed members to form a customs union, to establish a common market and to harmonize policies. Article 3 spelt out what this would comprise including a common external tariff, a common agricultural policy, the abolition of barriers to trade and of obstacles to freedom of movement of capital and labour, a competition policy regime, and the coordination of policies to avoid balance of payments disequilibria. In contrast, the European Free Trade Association was set up in 1960 with the much more limited aim of establishing a free trade area. The EEC customs union was achieved in 1968 but the common market took much longer and awaited the Single European Act which addressed non-tariff barriers to trade, liberalized trade in services and ended capital controls and was (less than fully) implemented from 1992. The Maastricht Treaty of 1992 was a significant step towards economic union and paved the way to a single currency which further reduced trade costs as well as eliminating exchange rate instability; the Euro started in 1999, initially with 11 countries. Complete economic integration is still out of reach.

Over time, the membership of the EEC/EU expanded considerably through successive enlargements while that of EFTA has shrunk with defections to the EEC/EU. In 1973, the UK and two of its close trading partners, Denmark and Ireland, joined the EU. In the 1980s, the newly democratic Greece, Portugal and Spain acceded and in 1995, following the establishment of the European Single Market, Austria, Finland and Sweden left EFTA to join the EU. In 2004, 8 former communist-bloc transition economies joined the EU together with Cyprus and Malta followed by further transition economies accessions by Bulgaria and Romania in 2007 and Croatia in 2013, while a number of these new members were admitted into the Eurozone soon after accession.

The process of economic integration entailed substantial reductions in trade costs and increased the volume of trade. In both these respects, the EU was much more effective than the alternatives of EFTA or GATT membership. This can be inferred from estimates of the determinants of trade flows based on gravity models, as, for example, in Baier et al. (2008). Two countries both in the EU are estimated to trade with each other by an additional 72–127% compared with countries not in a trade agreement.<sup>2</sup> Their estimates imply that, compared with EFTA membership, being in the EU raised trade by 33%.<sup>3</sup>

Although some endogenous growth models imply that trade liberalization can raise the rate of economic growth, the evidence for European economic integration does not support this prediction. Badinger (2005) approached the issue through growth regressions. He made an index of the level of European integration for each EU15 country from 1950–2000 and in a panel-regression setting with suitable controls examined its relationship with growth and with investment. The integration index, which took account both of GATT liberalization and European trade agreements, shows that 55% of the protectionism of 1950 was eliminated between 1958 and 1975, a figure which then rose steadily to 87% by 2000. The results of the regressions were that changes in integration were positive for growth but that the level of integration had no effect while changes in integration had somewhere between half and three-quarters of their impact through investment with the remainder coming from changes in TFP. For the EU15 as a whole, real GDP in 2000 was estimated to be 26.1% higher than if there had been no economic integration after 1950 with the impact for the UK very similar at 25.5%.

The implication of the results in Badinger (2005) is that European economic integration has had a sizeable impact on the level of income but has not had a permanent effect on the rate of growth. This amounts to rejecting the endogenous growth hypothesis. This is line with recent investigations of the impact of trade liberalizations using difference-in-difference approaches (Estevadeordal and Taylor 2013) but goes against the hopeful predictions of some economists in the 1980s.<sup>4</sup>

A recent method to infer the implications of accession to the EU in the style of ‘with-without’ comparisons is available in the synthetic

counterfactuals method of Campos et al. (2014). This compares growth in each post-EU accession country with growth in a weighted combination of other countries which did not accede and which are chosen to match the accession country before its entry to the EU as closely as possible. A difference-in-differences analysis is then performed to compare the actual and synthetic control series for each country. The results are that EU accession typically has had a substantial and statistically significant impact on growth relative to the counterfactual of staying out. For countries which joined the EU between 1973 and 1995, the average impact of EU membership after 10 years is estimated to have been a 6.4% income gain with the UK showing an 8.6% gain. It seems quite probable that the 10-year impact understates the total since the Single Market surely added to the initial effect during later years and the total cumulative effect is estimated by Campos et al. (2014) to be 23.7%.<sup>5</sup>

An alternative and better-known approach is to use a gravity model to find the implication of EU membership for the volume of trade and then to quantify the effect of expanded trade on the level of income using the estimated relationship in Feyrer (2009) which itself is an improved version of the well-known Frankel and Romer (1999) model.<sup>6</sup> This uses an econometric approach to capture impacts working through improved productivity and a larger capital stock which far exceed traditional welfare triangle gains from improved resource allocation. Feyrer concludes that the elasticity of income to trade is probably between 0.5 and 0.75. The gravity model estimates in Baier et al. (2008) imply that EU15 trade in 2000 was at least 71.6% higher than if there had been no trade agreement with the implication that total EU trade was raised by 25.4%. Based on the lower bound of Feyrer's estimated elasticity, the EU had a positive impact on GDP of 12.7%.

Similarly, this method predicts that EU membership raised UK trade relative to the counterfactual by 33.0% after 15 years. In 1988, EU trade was 51.4% of total so the implication is that joining the EU had raised UK trade by 17.1%. Taking the lower bound of Feyrer's estimated elasticity, this would have raised UK GDP by 8.6%. It should be noted that this is much larger than any reasonable estimate of the membership fee that the UK has paid for EU membership. The main components of this are budgetary transfers, notably including the costs of the Common

Agricultural Policy, and costs of badly designed regulations which have typically amounted to 0.5% and 0.9%, respectively (Crafts 2016).<sup>7</sup> The ex-post benefit-cost ratio of the decision to join the EU appears to have been very favourable.

In sum, there are two main points that emerge from this review of the evidence. First, it is clear that the EU has been exceptionally successful in creating trade. This implies that it has been effective at reducing trade costs and achieving a relatively deep level of economic integration. Second, economic integration and the additional trade that it has generated has been a powerful force that has raised European income levels significantly. However, while the evidence for a levels effect on income from trade liberalization is convincing, there is no reason to believe that economic integration raised the long-run trend growth rate in Europe.

### **3 The Golden Age of European Growth, 1950–1973**

This was a halcyon period when Western Europe was catching up the USA (c.f. Tables 1, 2). During this era of strong  $\beta$ -convergence, which came to an end with the first oil crisis, both real per person and real GDP per hour worked (labour productivity) grew much faster in most European countries than in the USA. The UK experienced relatively slow growth which is only partly explained by its relatively high income level in 1950. A *prima facie* case for British ‘growth failure’ is provided by France and West Germany not just catching up but overtaking the UK by 1973.

The Golden Age was a period of macroeconomic stability, notable for the relative absence of financial crises, which followed the traumas of two world wars and the great depression. Some have seen this as an episode of fast growth based on a reversion to the pre-1914 trend line (Janossy 1969) but econometric analysis shows that it was clearly more than this (Mills and Crafts 2000). That said, countries with relatively large scope for post-war reconstruction such as West Germany found that this stimulated their growth in the 1950s (Temin 2002). TFP growth was

**Table 1** Rates of growth of real GDP/person and real GDP/hour worked (% per year)

	Y/P	Y/HW
<b>1950–1973</b>		
France	4.02	5.29
Germany	5.00	5.91
Ireland	3.03	4.06
Italy	4.93	5.93
UK	2.42	2.81
USA	2.45	2.57
<b>1973–1995</b>		
France	1.65	2.67
Germany	1.76	2.86
Ireland	2.88	3.37
Italy	2.22	2.30
UK	1.76	2.40
USA	1.81	1.27
<b>1995–2007</b>		
France	1.75	1.75
Germany	1.56	1.70
Ireland	2.59	3.10
Italy	1.18	0.49
UK	2.55	2.17
USA	2.16	2.21
<b>2007–2014</b>		
France	−0.21	0.44
Germany	0.93	0.45
Ireland	−1.45	1.65
Italy	−1.63	−0.11
UK	0.00	−0.12
USA	0.20	1.05

*Note* Germany is West Germany prior to 1995; Ireland is GNP after 1973. *Source* The Conference Board (2015)

very rapid during the Golden Age especially in countries with low initial productivity levels. This was based to a large extent on reductions in inefficiency (Jerzmanowski 2007), especially based on the structural change associated with the shift of labour out of agriculture.<sup>8</sup> At the same time, technology transfer speeded up as American technology became more cost-effective in European conditions and obstacles to technology transfer were reduced (Nelson and Wright 1992).



**Table 2** Real GDP/head (UK = 100 in each year)

	USA	Germany	Ireland	France	Italy
1950	137.8	61.7	49.8	74.7	50.5
1973	138.8	109.4	57.1	106.6	88.4
2007	133.1	107.2	112.8	98.8	97.7
2014	134.9	114.2	100.8	97.3	86.0

*Notes* Estimates refer to West Germany from 1950–1973. Ireland is based on GNP in 2007 and 2014. Purchasing power parity estimates in \$1990GK for 1950 and 1973 and in \$2014EKS from Penn World Table for 2007 and 2014. *Source* The Conference Board (2015)

In some countries, especially in Northern Europe, catch-up during the Golden Age was promoted by the development of corporatist ‘social contracts’ which were based on bargaining equilibria between capital and labour that featured wage restraint in return for high investment (Eichengreen 2007). These arrangements, which also typically entailed a high level of coordination in wage bargaining, were an important stimulus to investment, which allowed new technology to be installed, and growth (Gilmore 2009). This can be seen as an enhancement of ‘social capability’ under Golden Age conditions. In other countries, for example, Italy, growth was promoted by industrialization based on elastic supplies of labour and undervalued currencies which underpinned investment and allowed the realization of internal and external economies of scale in the industrial sector (Crafts and Magnani 2013). In both cases, there would later be difficulties arising from the institutional legacy, either of the reforms that they had undertaken or of the reforms that they had failed to make.

The evidence suggests that European economic growth was accelerated in these years by trade liberalization which acted to raise the long-run income level. The starting point was the European Payments Union which emerged from the conditionality of the Marshall Plan; a gravity model analysis confirms that the EPU had a large positive effect on trade levels (Eichengreen 1993). The subsequent establishment of the European Economic Community increased trade considerably. Using a gravity model, Bayoumi and Eichengreen (1995) estimated that intra-EEC trade among the original six members was increased by 3.2%

per year between 1956 and 1973 implying that membership of the EEC may have raised income levels by 4–8% by 1970 (Eichengreen and Boltho 2008), and the annual growth rate of real GDP per person by at most 0.5% points. This was a useful bonus but quite modest (about 1/8) relative to the overall growth rate. The total long-term effect of reductions in trade protection, including reduction of external tariffs through GATT, raised European income levels by nearly 20% by the mid-1970s, with a peak effect of perhaps 1% per year (about  $\frac{1}{4}$  overall growth), according to the estimates in Badinger (2005).

During these years, Britain experienced its fastest-ever economic growth but at the same time relative economic decline proceeded at a rapid rate vis-a-vis its European peer group such that by the end of the period Britain had been overtaken by seven other countries in terms of real GDP per person and by nine others in terms of labour productivity. UK growth was slower by at least 0.7% points per year compared with any other country including those who started the period with similar or higher income levels. The proximate reasons for relatively slow labour productivity growth were weak capital per worker and TFP growth compared with more successful economies like West Germany. Maddison (1996) attempted a decomposition of the sources of TFP growth, and he concluded that the shortfall in Britain could not be explained away by lower scope for catch-up or the structure of the economy although clearly very rapid TFP growth in countries like West Germany did reflect reconstruction, reductions in the inefficient allocation of resources and lower initial productivity (Temin 2002).

Britain did not achieve the transformation of industrial relations that happened elsewhere in Europe which implied a considerable growth penalty. When it is not possible to write binding contracts, either the absence of unions or strong corporatist trade unionism would have been preferable to the idiosyncratic British system. This can readily be understood in terms of the Eichengreen model or an extension of it to incorporate endogenous innovation. In Britain, it was generally not possible to make the corporatist deals to underpin investment and innovation because bargaining took place with multiple unions or with shop stewards representing subsets of a firm's workforce who could not internalize the benefits of wage restraint. This exposed sunk-cost

investments to a ‘hold-up’ problem.<sup>9</sup> In the terminology of Hall and Soskice (2001), the UK was a ‘liberal market economy’, whereas a ‘co-ordinated market economy’ was the foundation of the Eichengreen model.

Failure successfully to reform industrial relations was a major shortcoming of British governments from the 1950s through the 1970s. However, throughout this period there were continual efforts to persuade organized labour to accept wage moderation in the interests not only of encouraging investment but even more to allow low levels of unemployment without inflation at a time when politicians believed that this was crucial to electoral success after the interwar trauma. At worst, this was tantamount to allowing a *de facto* trade union ‘veto’ on economic reforms. In any event, British supply-side policy, which was shaped by the post-war settlement instigated under Labour but largely accepted by the Conservatives, was unhelpful towards growth in several respects. These included a tax system characterized by very high marginal rates described by Tanzi (1969) as the least conducive to growth of any of the OECD countries in his study, missing out on benefits from trade liberalization by retaining 1930s protectionism into the 1960s (Oulton 1976), a misdirected technology policy that focused on invention rather than diffusion (Ergas 1987), an industrial policy that ineffectively subsidized physical investment (Sumner 1999) and slowed down structural change by protecting ailing industries through subsidies (Wren 1996) and tariffs (Greenaway and Milner 1994).

A key feature of the Golden Age British economy was the weakness of competition in product markets which had developed in the 1930s and intensified subsequently. Competition policy was largely ineffective, protectionism continued through the 1960s, and market power was substantial. The evidence on lack of competition and British productivity performance during the Golden Age both shows an adverse effect and also that this worked at least partly through industrial relations and managerial failure (Crafts 2012). Proponents of UK entry into the EEC were basically aware of these issues and saw the increase in competition that it would entail as an antidote to weak productivity performance (Williamson 1971).

The weakness of competition in product markets had potential implications for productivity performance through its interaction with institutions. First, Britain entered the post-war period with an idiosyncratic and unreformed system of industrial relations characterized by craft control, multi-unionism, legal immunities for trade unions and strong but decentralized collective bargaining reflected in increasing trade union density and the proliferation of shop stewards (Crouch 1993). These arrangements in conditions of full employment and weak competition gave trade unions bargaining power and rents to extract while exposing sunk-costs investment to ‘hold-up’ problems.

Second, corporate governance in post-war Britain was notable for a strongly increasing tendency to the separation of ownership and control, where dominant ownership interests became much less common, which also made it a real outlier within Europe. This reflected the demise of family control, the dilution of equity holdings through mergers, and a tax system which discouraged individual but favoured institutional investors (Cheffins 2008). Given that the market for corporate control through takeovers did not work effectively as a constraint (Cosh et al. 2008), the weakness of competition allowed considerable scope for managerial underperformance.

## 4 After the Golden Age, Before the Crisis

After the early 1970s, growth slowed down markedly right across Europe. The end of the Golden Age had a number of unavoidable aspects including the exhaustion of transitory components of fast growth such as post-war reconstruction, reduced opportunities to redeploy labour out of agriculture, narrowing the technology gap and diminishing returns to investment. Moreover, the USA itself experienced a productivity growth slowdown. All in all, the scope for catch-up growth was considerably reduced although by no means eliminated. There were big reductions in the contributions of capital deepening and, especially, TFP growth to labour productivity growth (Crafts and Toniolo 2008).

Although there were unavoidable reasons why productivity growth slowed down and European countries generally continued to narrow the

productivity gap with the USA, it is clear that productivity performance could have been better after the Golden Age. What accounted for this undue slowdown in productivity growth? One very obvious point is that the fragility of the Eichengreen wage moderation/high investment equilibrium was revealed and it did not generally survive the turbulence of the 1970s, a time when union militancy and union power rose dramatically, as did labour's share of value added, and the rewards for patience fell in conditions of greater capital mobility, floating exchange rates and greater employment protection. At the same time, the corporatist model of economic growth was becoming less appropriate in economies which now needed to become more innovative and less imitative in achieving productivity growth, as Eichengreen (2007) himself has pointed out.

The period from the mid-1960s to the early 1980s was notable for a substantial increase in social protection. This took the place through a general expansion of social transfers financed to a considerable extent by 'distortionary' taxation and, in some countries, increases in employment protection. This can be seen as a legacy effect of corporatist social contracts interacting with the turbulent macroeconomic conditions of the 1970s. Financing this expansion of government outlays by a different tax mix would have been considerably better for growth (Johansson et al. 2008); the similar estimates of Kneller et al. (1999) indicate that the average 10% point increase in the share of direct tax revenues in GDP between 1965 and 1995 could have entailed a fall in the growth rate of about 1% point.

Moreover, high levels of employment protection (if enforced) slow down the process of creative destruction and the labour force adjustment that it entails. The difference in employment protection between France and the USA could account for a difference of 0.5% points per year in labour productivity growth in the 1980s and 1990s according to the estimates in Caballero et al. (2004). This is echoed in recent research. The process of creative destruction clearly works much less well in many European countries than in the USA, as is witnessed by processes of entry and exit of firms and the much stronger growth rate of successful American start-ups (Encaoua 2009). A corollary of this is that, on average, countries in the European Union, especially in Southern

Europe, are much inferior to the USA in shifting employment away from less productive towards more productive firms and this may account for as much as 20% points of the labour productivity gap between the EU and the USA. Barriers to entry and strict employment protection legislation disproportionately reduce the efficiency of labour allocation in high turnover and more innovative sectors (Andrews and Cingano 2014).

It is also relevant to look at the progress that European countries made in the upgrading needed as they moved closer to the frontier, in particular with regard to education and competition the areas stressed by Aghion and Howitt (2006). A measure of cognitive skills shown, based on test scores, correlates strongly with growth performance (Hanushek and Woessmann 2012), and it is striking that even the top European countries were well behind Japan and South Korea. Woessmann et al. (2007) show that the variance in outcomes in terms of cognitive skills is explained by the way the schooling system is organized rather than educational spending.

Strict product market regulation (PMR) has raised mark-ups and lowered entry rates, thus reducing competitive pressure on managers with adverse impacts on both investment and innovation (Griffith and Harrison 2004; Griffith et al. 2010), and reduced European TFP growth relative to the USA in the late twentieth century by around 0.75% points on average based on the estimates in Nicoletti and Scarpetta (2005). Similarly, in many European countries competition policy was much weaker than in the USA. The analysis in Buccirossi et al. (2013) found that this held back TFP growth.

The growth rate of real GDP per hour worked increased in the USA between 1973–1995, and between 1995–2007 from 1.27 per year to 2.21% per year. The acceleration in American productivity growth was underpinned by ICT. In contrast, as is reported in Table 1, the rate of labour productivity growth fell between these two periods in France, Germany and Italy and in each of these countries was lower than the USA after 1995 so that, rather than catching up, now they were falling behind. Growth accounting comparisons suggest that, on the whole, European countries were less successful in taking advantage of the opportunities of the ICT revolution with significantly adverse consequences for productivity performance relative to the USA.

Restrictive regulation of labour and product markets and, in some cases, shortfalls in human capital explain Europe's sluggish take-up of ICT (CETTE and Lopez 2012).<sup>10</sup> This reflects shortcomings in domestic policy rather than at the EU level.

Italy has experienced major obstacles to the rapid diffusion of ICT for which it was not well positioned. The effective assimilation of this new technology has been hindered by the small size of firms, oppressive regulation, and shortfalls in human capital by comparison with the European leaders in the take-up of ICT, as microeconomic studies of Italian manufacturing confirm. The take-up of ICT has been strongly correlated with firm size and changes in organizational structure (Fabiani et al. 2005). Managerial selection processes which are insufficiently meritocratic have exacted a heavy cost in the context of the reorganization required to get the productivity pay-off from ICT (Pellegrino and Zingales 2014). Bugamelli and Pagano (2004) found that many firms appeared to be constrained in their ICT investment by the adjustment costs it entailed, especially if their workforce has relatively low levels of human capital. These reflect regulatory burdens which, because they are fixed costs, bear very heavily on the small- and medium-size firms that have been central to Italy's distinctive variety of capitalism.

More fundamentally, Italy's very weak growth performance since 1995 (c.f. Table 1) indicates an inability to make the reforms necessary to sustain catch-up growth in a close-to-frontier economy. In particular, this includes a failure to strengthen competition policy adequately (Buccirossi et al. 2013) and to improve the quality of Italian education (Bertola and Sestito 2013) and is underlined by Italy's dismal showing in the World Bank's *Doing Business* and *Governance Matters* rankings (Crafts and Magnani 2013). Resource misallocation has increased substantially since the mid-1990s and has undermined productivity growth (Calligaris et al. 2016). Italy epitomizes Europe's problem with expediting creative destruction; exit of low productivity firms is much too slow. Participation in the Single Market and joining the Euro were not adequate substitutes for an effective domestic supply-side policy.

From the 1970s through the 1990s, the impetus to economic growth from European integration continued, notably, through enlargements which expanded membership to 15 countries by 1995 and the

inauguration of the European Single Market. The synthetic counterfactuals method suggests that the impact of EU accession on economic growth varied considerably across countries but was generally positive (c.f. Table 3) and, in some cases, provided a significant boost to growth. Harrison et al. (1994), working with a CGE model that allows for increasing returns in some sectors, changes in price-cost markups and capital stock adjustment projected that competition and scale effects resulting from the Single Market would raise EU GDP by 0.7% and the total impact on EU GDP of the Single Market would be 2.6%.<sup>11</sup> Ex-post studies have suggested similar effects; for example, Ilzkovitz et al. (2007) estimated GDP had been raised by 2.2% by 2006. Establishing a true Single Market in services could probably double this impact by reducing barriers to entry but governments still have considerable discretion to maintain these barriers notwithstanding the Services Directive (Badinger and Maydell 2009). A recent estimate is that this implementation of this directive has so far raised EU GDP by about 0.8% whereas full implementation would triple this (Monteagudo et al. 2012).<sup>12</sup>

An important aspect of regional trade agreements like the Single Market is that they reduce non-tariff barriers to trade, for example, from regulatory divergence, between trading partners and provide the underpinning for increasingly complex supply chains with stages of production situated in several different locations (Baldwin 2012). In the EU, this is reflected in high shares of value added accruing from producers in other

**Table 3** Post-accession differences between level of actual and synthetic GDP per person (%)

	After 5 years	After 10 years	Total
Denmark	10.3	14.3	23.9
Ireland	5.2	9.4	48.9
United Kingdom	4.8	8.6	23.7
Greece	-11.6	-17.3	-19.8
Portugal	11.7	16.5	18.4
Spain	9.3	13.7	19.8
Austria	4.5	6.4	7.2
Finland	2.2	4.0	4.4
Sweden	0.8	2.4	3.2

Source Campos et al. (2014)



EU countries in the output of final manufactures—in over half of EU countries this fraction was over 20% in 2008 (Los et al. 2015).

The impetus from European integration in this period also came from European Monetary Union. The initial impact on growth was probably positive but much less dramatic than early estimates suggested. The currency union effect on trade volumes was initially thought to be very large but better econometrics and the opportunity to examine the actual impact of EMU now suggests that trade volumes probably were only ‘mildly stimulated’ (Glick and Rose 2015) with the implication that any trade effect on GDP is likely to have been, at best, modest.<sup>13</sup> Clearly, the Eurozone crisis has entailed large GDP losses and may even have adversely affected trend growth so that the recent contribution of European economic integration to medium-term growth performance may even have been negative.<sup>14</sup>

However, it is important not to forget the one very obvious success story from the late twentieth century. It was about 15 years after acceding to the EU that Irish economic growth took off into very rapid (and belated) catch-up growth during its Celtic Tiger phase which lasted until the early twenty-first century (c.f. Table 1). This picture is reflected in Table 3 which suggests that Ireland dramatically outperformed the synthetic counterfactual economy after the first 10 years. This success clearly was predicated on being within the EU but also was based on the development of appropriate supply-side policies to exploit this opportunity.

A central aspect of the Celtic Tiger economy was the prominence of foreign direct investment (FDI). ‘Export-platform’ FDI transformed Ireland’s revealed comparative advantage, dominated production in high-skill and knowledge-intensive sectors, and by 2000 accounted for almost half of manufacturing employment and 80% of manufacturing exports (Barry 2004). Rapid TFP growth was underpinned by a large ICT production sector based on FDI. Ireland developed a sophisticated industrial policy to select projects for financial support through the Industrial Development Agency and made investments in telecommunications and college education that were conducive to FDI (Buckley and Ruane 2006). Nevertheless, the most important factor in Ireland’s success in attracting FDI was the combination of its corporate tax regime

together with EU membership (Slaughter 2003).<sup>15</sup> As trade costs fell, the impact of low taxes on FDI appears to have been accentuated significantly, and their relative importance for location compared with proximity to demand increased (Romalis 2007).

EU membership was a necessary but not sufficient condition for the Irish growth model. Both prior to the late 1980s and from the turn of the twenty-first century to the crisis, Irish performance was mediocre at best, reflecting domestic policy errors. Ireland had a malfunctioning labour market and was in macroeconomic disarray prior to a successful stabilization in the late 1980s. Successful economic reform subsequently delivered rapid growth in employment from a combination of large reductions in unemployment, a reversal of net migration flows, and rising labour force participation, especially of women. The NAIRU fell considerably in the context of wage moderation under the auspices of social partnership and increases in human capital per worker (Bergin and Kearney 2004; Walsh 2004). An elastic labour supply underpinned investment and productivity growth (Barry 2002). However, post-2000 Irish TFP growth can only be described as very disappointing. Beyond reduced scope for catch-up, the reasons for this include a reduced contribution from ICT production, a large shift towards construction and non-market services which together accounted for 35.2% of employment by 2007, and excessive capital deepening which contributed to negative TFP growth in manufacturing.<sup>16</sup> The first was largely unavoidable as the weight of the ICT sector declined but the other two reflected policy errors. The loss of international competitiveness, which was a big factor in a major reduction in export growth (Nkusu 2013) and held back output and employment growth in manufacturing, reflected pro-cyclical fiscal policy and, in particular, growth of public consumption (Lane 2009). The construction boom was fuelled by an explosion of mortgages and loans to property development (Whelan 2014).

The post-Golden Age reaction to poor economic performance in the UK was Thatcherism. In many respects, this did represent a sharp break with the earlier post-war period after 1979 and this was certainly true of supply-side policies relevant to growth performance. Reforms of fiscal policy were made including the restructuring of taxation by increasing VAT while reducing income tax rates and to restrain the growth of public

expenditure notably by indexing transfer payments to prices rather than wages while aiming to restore a balanced budget. Industrial policy was downsized as subsidies were cut and privatization of state-owned businesses was embraced while deregulation, including most notably of financial markets with 'Big Bang' in 1986, was promoted. Legal reforms of industrial relations further reduced trade union bargaining power which had initially been undermined by rising unemployment. In general, these changes were accepted rather than reversed by Labour after 1997.

Thatcherism was a partial solution to the problems which led to underperformance in the Golden Age, in particular, those which had arisen from weak competition. The reforms encouraged the effective diffusion of new technology rather than greater invention and worked more through reducing inefficiency than promoting investment-led growth. Nevertheless, under the auspices of 'Thatcher and Sons' relative productivity performance improved and labour productivity growth compared favourably with that of other large European countries after the mid-1990s (c.f. Table 1). Clearly, there have been continuing weaknesses in supply-side policy (Crafts 2015). The most obvious is in innovation policy which is reflected in a low level of R & D (Frontier Economics 2014) but education, infrastructure (LSE Growth Commission 2013), land-use planning regulation (Cheshire and Hilber 2008) and the tax system (Mirrlees et al. 2011) also give significant cause for concern while British capital markets remain notably short-termist with a bias against long-term investment (Davies et al. 2014). Addressing these issues well has generally been 'too difficult' politically even though the 'trade-union veto' has long gone.

Before, during and after Thatcher, government policy moved in the direction of increasing competition in product markets. In particular, protectionism was discarded with liberalization through GATT negotiations, entry into the European Community in 1973, the retreat from industrial subsidies and foreign exchange controls in the Thatcher years, and the implementation of the European Single Market legislation in the 1990s. Trade liberalization in its various guises reduced price-cost margins (Hitiris 1978; Griffith 2001). The average effective rate of protection fell from 9.3% in 1968 to 4.7% in 1979, and 1.2% in 1986 (Ennew

et al. 1990), subsidies were reduced from £9bn (at 1980 prices) in 1969 to £5bn in 1979 and £0.3bn in 1990 (Wren 1996), and import penetration in manufacturing rose from 20.8% in 1970 to 40.8% by 2000. The downward trend in the markup from the 1970s onwards appears to have intensified further after the early 1990s (Macallan et al. 2008). Anti-trust policy was notably strengthened by the Competition Act of 1998 and the Enterprise Act of 2003 which increased the independence of the competition authorities, removed the old ‘public-interest’ defence, and introduced criminal penalties for running cartels.

If accession to the EU raised UK GDP by around 8% (c.f. Sect. 2 above), then a major component of this must have come from increased competition in product markets. A computable general equilibrium (CGE) exercise using a model incorporating imperfect competition and scale economies found that the static effects of reductions in market power would have contributed a welfare gain equivalent to 2.1% of GDP (Gasiorek et al. 2002). However, in addition there were favourable impacts on productivity performance consequent on stronger competition and entry threats in product markets. A difference-in-differences analysis found that there was a substantial boost to productivity in sectors which experienced a large reduction in protection (Broadberry and Crafts 2011).<sup>17</sup> Reductions in market power effectively addressed long-standing obstacles to productivity performance from weak management and industrial relations problems in British firms. Nickell et al. (1997) estimated that, for firms without a dominant external shareholder (the norm for big British firms at this time), a reduction in supernormal profits from 15 to 5% of value added would raise TFP growth by 1% point. Increases in competition resulting from the European Single Market raised both the level and growth rate of TFP in plants which were part of multi-plant firms and thus most prone to agency problems (Griffith 2001). The 1980s saw a surge in productivity growth in unionized firms as organizational change took place under pressure of competition (Machin and Wadhvani 1989) and derecognition of unions in the context of increases in foreign competition had a strong effect on productivity growth by the late 1980s (Gregg et al. 1993). This goes a long way to explain the boost to growth found by Campos et al. (2014) or the higher income level predicted by the Feyrer (2009) method.<sup>18</sup>

Three important points that emerge from this review deserve to be highlighted. First, although European economic integration has played a useful role, it has generally been a junior partner in promoting economic growth compared with other influences on productivity performance. Second, in countries where economic growth has been lacklustre in recent times and catch-up of the USA has stalled, there are many ways to address this by improving supply-side policy.<sup>19</sup> The constraints on doing so lie primarily in domestic politics not in restrictions imposed by membership of the European Union. Third, it should be recognized that in the context of the 1970s and early 1980s joining the EU was an integral part of the Thatcher reform programme through its positive effects on competition, as is reflected in strong British support for the legislation to establish the European Single Market.

## 5 Implications of Brexit

The general assumption in studies of the economic impact of Brexit is that it will entail an increase in trade costs for the UK. In turn, this will imply a reduction in trade volumes and, accordingly, an adverse impact on productivity. The magnitudes of these effects depend on the details of the new trading arrangements that are assumed to supersede EU membership and on model specifications. Two points of clarification are useful at this point. First, it should be recognized that the most important trade costs these days are imposed not by tariffs but by non-tariff measures such as regulations and border costs (Anderson and van Wincoop 2004).<sup>20</sup> Outside the EU Single Market, the UK would potentially be exposed to such costs as well as the common external tariff on trade with the EU. If the UK is outside the customs union, it will also face significant compliance costs from implementing rules-of-origin legislation (CEPR 2013). Second, the UK could seek to negotiate a trade agreement to continue to participate in the Single Market perhaps on a similar basis to Norway, but this would almost certainly entail continuing to pay some of the membership fee in terms of a budgetary contribution together with acceptance of some regulations and, crucially, free movement of people. If establishing control over migration is the reason

for Brexit, then that means accepting trade costs which accrue from being outside the Single Market.

Several papers have recently estimated the long-term economic impact of Brexit in terms of a level effect on GDP, and their results are summarized in Table 4. The methodology is typically based on a gravity model estimate of the trade effects of various alternatives to EU membership ranging from remaining in the Single Market à la Norway to trade on an MFN basis as a WTO member. The trade effect is then converted into an impact on GDP using Feyrer's elasticity to obtain the implications for productivity (LSE) or a macroeconomic model (NIESR) or a combination of the two (HMT). NIESR's basic modelling assumes no impact via productivity but an effect of this kind is added in the case of the WTO<sup>a</sup> estimates. Not surprisingly, the impacts depend on what replaces EU membership with the smallest losses accruing if the UK stays in the Single Market and the largest in the absence of new trade agreements.<sup>21</sup> In every case, GDP is reduced by Brexit and by a quite significant amount once productivity losses are taken into account. Even though tariff levels are lower than when the UK was previously outside the EU, much of the gains that EU membership has brought might be lost. On these estimates, the benefit-cost ratio of Brexit does not look promising—this is a very expensive way to save a net budgetary contribution of about 0.5% of GDP.

Some caveats to these conclusions should be noted. First, the gravity-model evidence does not explicitly cover the case of a former EU member which means that the estimated impact on trade of leaving the EU is not known and there is an element of guesswork in implementing a calculation similar to that of footnote 3 above. History does seem to influence trade volumes and, implicitly, trade costs (Eichengreen and Irwin 1998). This suggests that the adverse impact on trade may be lower than the conventional calculations assume.<sup>22</sup> Second, the post-entry trade effect on productivity that the UK experienced in the 1970s and 1980s came largely from increased competition at a time when this addressed a major weakness in supply-side policy. Brexit will probably not have an equal and opposite effect. The UK has addressed some of its problems of corporate governance and industrial relations, and it has a much more effective competition policy regime. On the eve of the UK's

entry into the EU, UK (EU) tariffs on manufactures averaged 10% (8%) compared with an average for the common external tariff at 4% today. It is possible that Brexit could be accompanied by a move to unilateral free trade as some of its proponents would advocate (Minford 2015). So, there must be some doubt about the ‘dynamic effects’ assumed in the studies summarized in Table 4.

An alternative approach explicitly models the static trade effects and considers the ‘membership fee’ implications of various permutations of Brexit, although without considering the longer term effects that might accrue through capital stock adjustments or TFP impacts. Table 5 sets out some of these estimates. Neither of these studies covers every component of the possible costs and benefits and, of course, different assumptions and modelling techniques have been employed. Nevertheless, some points emerge quite strongly.

First, it is potentially quite costly to leave the EU without negotiating a new trade agreement and taking positive action to reduce barriers to non-EU trade and to deregulate. Here, reducing the membership fee by about 0.5% of GDP through ending fiscal transfers runs the risk of reducing the level of GDP by as much as 2.75% as the economy faces increased tariff and non-tariff barriers to trade. The costs might be more serious if, over time, regulatory divergence between the UK and the EU increases and/or the UK misses out on future deepening of economic integration inside the EU. Conceivably, this might cost a further 2.0% of GDP each year.

Second, proactive use of the freedom to change policy outside the EU could deliver significant benefits that might partly offset the initial costs

**Table 4** Recent estimates of the long-term impact of Brexit (%)

	LSE	HMT			NIESR			
		EEA	FTA	WTO	EEA	FTA	WTO	WTO <sup>a</sup>
Trade	-12.6	-9.0	-16.5	-20.5	-13.5	-15.5	-25.0	-22.0
GDP	-7.9	-3.8	-6.2	-7.5	-1.8	-2.1	-3.2	-7.8

*Notes* Original estimates in Dingra et al. (2016), HM Treasury (2016) and Ebell and Warren (2016). The NIESR estimates do not allow for ‘dynamic effects’ on productivity except in the column labelled WTO<sup>a</sup>. *Source* adapted from Ebell and Warren (2016)

of Brexit. These might arise firstly from abolishing regulations relating to social issues, employment, health and safety, environment and climate change. One estimate of the maximum feasible annual gain is 1.3% of GDP (Booth et al. (2015)). In addition, aggressive liberalization of non-EU trade whether by unilateral measures or trade agreements could increase GDP by another 0.75% so that the initial annual GDP loss might be reduced to about 0.7% of GDP.<sup>23</sup>

Third, a better version of Brexit from a purely economic perspective would be to negotiate a trade agreement with the EU that would retain access to the Single Market on EEA terms. This would significantly reduce the losses from trade costs on EU trade but would, on the other hand, probably mean accepting a significant budgetary contribution and constraints on deregulation. Booth et al. (2015) estimate that, if supplemented by freer non-EU trade and feasible deregulation, a permutation along these lines could even produce an overall positive outcome of as much as 1% to GDP annually. However, if this package is only available with free movement of people, it might not be in the politically feasible set on exit.

An important omission from Table 5 is that it does not take account of switching costs. The most important of these would come through increased uncertainty which could be expected to reduce investment. Given the difficulty in establishing what Brexit will actually entail, this could be quite prolonged. Over an initial period of 3 years this might cost around 3% of GDP (Emmerson et al. 2016). It is also worth noting that these two studies do not take into account the possibility that regulation has economic impacts going beyond compliance costs.

Regulations which affect decisions to invest or innovate can impair productivity performance and thus impose welfare losses far in excess of compliance costs (Crafts 2006). In this regard, however, it should be recognized that the UK has persistently been able to maintain very light levels of regulation in terms of key OECD indicators such as PMR and EPL for which high scores have been shown to have significant detrimental effects (Barnes et al. 2011). In 2013, the UK had a PMR score of 1.09 and an EPL score of 1.12, the second and third lowest in the OECD, respectively. Land-use planning regulations do have seriously adverse implications for productivity but they result from domestic



**Table 5** Welfare effects of Brexit (%GDP)

	Dingra et al. (1)	Booth et al. (1)	Dingra et al. (2)	Booth et al. (2)
Fiscal transfers	+0.31	+0.53	+0.09	+0.22
Regulation				+0.7 to +1.3
Tariff barriers to EU trade	-0.14	-0.95	+0.00	
Non-tariff barriers to EU trade: initial	-0.73	-1.81	-0.34	-1.03
Non-tariff barriers to EU trade: future	-2.05		-1.03	
Reduced barriers to non-EU trade			+0.30	+0.75
Total	-2.61	-2.23	-0.98	+0.64 to +1.24

*Notes* Dingra et al. (1) and Booth et al. (1) assume UK exits single market; Dingra et al. (2) and Booth et al. (2) assume that UK has a Norway-type relationship with the single market and pays fiscal transfers to ensure market access.

Future costs of non-tariff barriers to EU trade in Dingra et al. accrue from missing out on benefits of further development of EU single market. I have divided the NTB costs into 'initial' and 'future' based on the relative proportions reported in an earlier version of this paper. *Sources* Booth et al. (2015) and Dingra et al. (2016)

policymaking rather than an EU directive. In this vein, it is noticeable that the regulations which it may be politically feasible to remove in the event of Brexit do not include anything which might make a significant difference to productivity performance (Booth et al. 2015).<sup>24</sup>

If Brexit were necessary to allow radical changes to policies which affect the growth rate, then an economic case in favour might be made. Is this an omission in the studies considered in Tables 4 and 5? After all, as was noted earlier, there is much that could be done to improve UK supply-side policy, for example, in the areas of education, infrastructure, innovation and the tax system. However, reforms are not precluded by EU membership. The obstacles to better policy lie in Westminster not Brussels and are related to British politics rather than constraints imposed by the EU. Whereas 40 years ago entry into the EU did help to improve supply-side policy by strengthening competition, today there is no problem area to which Brexit is required to provide an answer.

## 6 Conclusions

The EU has been a highly successful trade agreement and has raised trade volumes substantially. In turn, this has raised income levels in member countries. Reductions in trade costs have had a transitory impact on the growth rate as income levels adjusted but have probably not had a lasting impact on the trend rate of growth. The stimulus provided by European integration has been significant but, even so, it has been a junior partner to other sources of growth. The success or failure of EU member countries in achieving economic growth has depended primarily on their design and re-design of supply-side policies as the cases of Ireland and Italy clearly demonstrate.

Joining the EU had a positive on the level of GDP in the UK. A reasonable estimate is that the impact was in excess of 8% and that this was several times the annual membership fee which the UK had to pay through budgetary transfers and the costs of unwanted regulation. A key aspect of accession to the EU was that it contributed significantly to strengthening competition at a time when this was important in addressing management and industrial relations problems that were undermining UK productivity performance. This was not an alternative to but an integral part of Thatcherism as a response to relative economic decline.

Brexit will probably be quite costly in terms of an adverse levels effect on UK GDP although the magnitude of this impact is debatable and depends on the alternative trade agreements that are negotiated. A radical reform of supply-side policy could improve UK growth performance but this is not prevented by EU membership. In particular, there is no reason to believe that leaving the EU will lead to a bonfire of growth-inhibiting regulations.

## Notes

1. For example, the model proposed by Fernald and Jones (2014) and Jones (2002) to interpret long-run American growth performance and prospects has this property.
2. The estimated magnitudes are sensitive to precise specification but the EU effect is always large.
3. Calculated based on the estimated coefficients in Baier et al. (2008, Table 6, column 3). Both countries in the EU increases trade by  $e^{0.54}-1$  but one country in EU and the other in EFTA by  $e^{0.14}-1$ . If a country stays outside the EU, its trade with EU members is reduced by  $(e^{0.14}-e^{0.54})/e^{0.54} = 33.0\%$ .
4. For example, Baldwin (1989) argued that the Cecchini Report could be massively underestimating the impact of the European Single Market because the static efficiency gain that it expected would raise the output to capital ratio, and hence for any given savings rate the growth of the capital stock. In a constant returns setting, this could permanently raise the growth rate of GDP perhaps by as much as 0.9% points per year. Sadly, this does not seem to have been the outcome.
5. It seems fair to suppose that the reliability of these estimates decreases as the length of the post-accession period increases.
6. An estimated relationship of the effect of greater trade exposure on income reported by Frankel and Romer (1999) was used by HM Treasury in its analysis of the impact of the UK adopting the Euro, see below.
7. In common with the mainstream economics literature, this estimate of the 'membership fee' assumes that migration has not entailed net costs, see Crafts (2016).
8. For Italy, this may have contributed as much as 1.7% points per year to Golden Age growth based on the decomposition proposed by Broadberry (1998). In France and West Germany, the contributions were smaller (0.52 and 0.77% points, respectively) but still significant (Crafts and Toniolo 2008).
9. In the endogenous innovation framework, the 'hold-up' arises when after a successful innovation workers use their bargaining power to extract a share of the profits. This reduces the incentive to innovate and thus the rate of growth. The more unions are involved in the bargaining, the more profits are reduced. The problem can be eliminated if a

- binding contract prevents renegotiation or there is no union or if a cooperative equilibrium is achieved with a single union. For a formal model and empirical evidence, see Bean and Crafts (1996).
10. The main impact of ICT on economic growth comes through its use as a new form of capital equipment rather than through TFP growth in the production of ICT equipment. This is because users get the benefit of technological progress through lower prices and as prices fall more of this type of capital is installed. In a country with no ICT production, adapting the neoclassical growth model to embody a production function with two types of capital (ICT capital and other capital) shows that the steady state rate of growth will be TFP growth divided by labour's share of income plus an additional term which depends on the rate of real price decline for ICT capital multiplied by the share of ICT capital in national income (Oulton 2012). The ICT capital deepening contribution to labour productivity growth during 1995–2007 in France, Germany and Italy was 0.3, 0.5 and 0.2% per year, respectively, compared with 0.9% in the USA (Van Ark 2011).
  11. This is well below the optimistic projections of the Cecchini Report issued by the European Commission which projected 4.8–6.4% of GDP before any impact from capital stock adjustment but is in line with other academic ex-ante studies (Badinger and Breuss 2011, Table 14.3).
  12. This does not include any impact from capital stock adjustment.
  13. Glick and Rose (2015) conclude that results on the trade effects of the Euro are very sensitive to econometric methodology and that all estimates have to be treated with great caution.
  14. A recent review of potential output growth by Havik et al. (2014) concluded that trend growth is now much lower than pre-crisis (1.1% per year vs. 2.0% per year for the EA12). This decline in trend GDP growth is mainly driven by reduced labour productivity growth which in turn reflects weaker trend TFP growth.
  15. It is clear from the literature that the semi-elasticity of FDI with respect to the corporate tax rate is quite high, perhaps of the order of  $-2.5$  or even  $-3.5$  (OECD 2007). At the start of the Celtic Tiger period, the Irish tax rate for manufacturing FDI was easily the lowest in Europe and a study by Gropp and Kostial (2000) suggested that the stock of American manufacturing investment in Ireland was about 70% higher than if Ireland had had a tax rate equivalent to the next lowest in the EU.

16. The data in EUKLEMS show that in non-ICT manufacturing the capital to labour ratio grew at 9.6% per year during 2001–2007 while TFP growth averaged –1.3% per year.
17. Sectors which experienced a reduction of 10% points or more in the effective rate of protection saw an additional increase of 1.4% points in the rate of labour productivity growth in 1979–1986 over 1968–1979.
18. It also implies that Williamson (1971) was basically right in his assessment of the possibility of benefits from entry into the EEC but nevertheless significantly underestimated their magnitude.
19. See, for example, the analyses in Barnes et al. (2011) and Varga and in't Veld (2014) for quantification of the possible effects of a selection of reforms.
20. For example, the USA faces non-tariff barriers equivalent to a tariff of 14.7% on its exports to the EU (Dingra et al. 2016).
21. This matches the evidence from gravity models of the relative success of the EU and other trade agreements in increasing trade volumes.
22. An interesting example is the ending in 1979 of the long-standing currency union between Ireland and the UK. Econometric analysis suggests that this had no effect at all on trade (Thom and Walsh 2002) even though, on balance, the literature predicts that a significant reduction was to be expected.
23. Minford (2015) argues that the gains from moving to unilateral free trade would be 4% of GDP. This does not seem to be a credible estimate since it is based on modelling techniques which are inconsistent with the trade-creating impact of the EU and the role of distance in trade; see Sampson et al. (2016).
24. The most likely candidates are in the area of social employment and climate change laws.

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