

The fiscal impact of immigration on the advanced economies

Robert Rowthorn*

Abstract This paper is concerned with the advanced economies. It begins with a discussion of the demographic issues that have played such a large role in the debate on immigration. This is followed by a section on the main problems involved in estimating the fiscal impact of immigration and then a summary of the international evidence on this topic, mostly from Europe and America. Separate sections on the UK and on low-fertility countries follow. The main conclusions are as follows. Highly skilled migrants normally make a large fiscal contribution, whereas unskilled migrants are likely to impose a net cost on native taxpayers if they settle in the receiving country. However, even unskilled migrants may be net contributors if they eventually depart and make few claims on government expenditure while in the country. Most empirical studies find that the fiscal contribution of the immigrant population as a whole is quite small. The positive contribution of some migrants is largely or wholly offset by the negative contribution of others. This finding holds across a variety of countries and methodologies. Estimates of the net fiscal contribution of immigration normally lie within the range ± 1 per cent of GDP. There are a few exceptions, but these refer to countries experiencing demographic collapse and they are based on unrealistic assumptions about the inter-generational allocation of future taxes and government expenditure. With more realistic assumptions, the overall fiscal benefit of immigration is quite small, even in these countries. These findings suggest that, in general, there is no strong fiscal case for or against sustained large-scale immigration. The desirability or otherwise of large-scale immigration should be decided on other grounds.

Key words: migration, taxation, ageing, generational accounting

JEL classification: F22, H69, J11

I. Introduction

Many advanced economies have experienced an upsurge in immigration over the past 40 years. The scale of this inflow has led to popular unease about its long-run implications. It has also stimulated a debate about the costs and benefits of immigration for local taxpayers. In this debate, those who are worried about immigration have tended to emphasize its negative implications, such as welfare dependency among certain types of immigrant, especially those from poorer countries. Conversely, the supporters of immigration have stressed

*King's College, Cambridge, e-mail: rer3@econ.cam.ac.uk

doi: 10.1093/oxrep/grn025

© The Author 2008. Published by Oxford University Press.

For permissions please e-mail: journals.permissions@oxfordjournals.org

its positive implications, such as the tax revenue from highly skilled immigrants. Alongside the popular debate there has arisen an academic literature that seeks to provide a more objective and balanced assessment of the issues. The purpose of this paper is to summarize this literature and to explore some of its main themes.

The structure of the paper is as follows. First, there is a discussion of the demographic issues that play an important role in the debate over immigration. This is followed by a section on some of the measurement issues that are involved in estimating the fiscal impact of immigration. There is then a survey of the international evidence, mostly from Europe and America, regarding the fiscal contribution of immigration. This is followed by separate sections on the UK and on the fiscal impact of immigration on low-fertility countries. The paper concludes with a short summary.

II. Demographic issues

(i) Age-structure

The age-structure of advanced economies is changing under the impact of lower birth rates and longer life expectancy. The proportion of older people in the population is rising and the fiscal cost of supporting them is increasing. In principle, immigration can alleviate these effects by helping to rejuvenate the population and providing additional workers to generate tax revenue to finance pensions and welfare services for the elderly. Immigrants are typically rather young and the immediate effect of immigration is to increase the working-age population and thereby widen the potential tax-base. Immigration may also have an indirect effect on the age structure through its impact on the birth rate. Immigrants are mostly of child-bearing age and many of them come from cultures where families are relatively large. This is a major fact behind the recent increase in the UK birth rate. Provided the immigrants and their descendants can obtain employment without displacing local workers, their impact on the age structure is likely to benefit government finances.

The rejuvenating effect of a one-off injection of immigrants will normally fade in the course of time. Some of the immigrants will leave. Others will remain in the country but get old, and the fertility of their descendants will eventually fall as they assimilate to local norms. To sustain a permanent rejuvenation through immigration requires a continuing flow of new arrivals, and if they and their children remain in the country the cumulative impact on population will become very large. This is illustrated in Table 1, which presents some projections for the UK over the period 2006–81. These are based on projections produced by the Government Actuary's Department (GAD). The Department assumes in its 'principal projection' that net immigration continues indefinitely at an annual rate of 190,000. With this rate of migration, population reaches 85.3 m by the end of the period and the old-age dependency ratio reaches 0.396. The table also presents an alternative projection under which the migration inflow is much lower and is exactly equal to the outward flow of emigrants. As a result *net* migration is zero. With balanced migration of this type, population would rise to only 64.3 m in 2081 and the dependency ratio would be 0.431.¹ Comparing the two

¹ The balanced migration estimates are derived by linear interpolation from the official projections that are available on the GAD website (GAD, 2007). For details of the method see Rowthorn (2007).

Table 1: Alternative projections for the UK, 2006–81

	Population (millions)		Old-age dependency ratio	
	2006	2081	2006	2081
Principal projection	60.6	85.3	0.301	0.396
Balanced migration projection	60.6	64.3	0.301	0.431
Balanced migration projection + temporary migration	60.6	67.8	0.301	0.395

Source: Principal projection from GAD (2007); other projections by interpolation from GAD projections (see Rowthorn, 2007). Old-age dependency ratio = (pension-age population) ÷ (working-age population). Balanced migration projection assumes that net immigration is zero, i.e. that immigration = emigration.

projections, it can be seen that the immigration required to produce an 8 per cent reduction in the dependency ratio adds an extra 33 per cent to the national population over a 75-year period. Looking still further into the distance, even more immigration and further population growth would be required to maintain this modest rejuvenating effect.

(ii) Temporary migration

An alternative to permanent immigration is temporary migration, whereby foreigners return home after a spell of work in the receiving country. Migration of this type can help to rejuvenate a country without having a very large effect on long-term population growth. Table 1 indicates what happens if the ‘balanced migration projection’ described above is modified by the addition of a temporary worker programme. Under this programme 700,000 unaccompanied young workers enter the UK annually and remain in the country for exactly 5 years, after which they leave, and during which time they acquire no dependants within the country. This creates a rotating stock of 3.5m additional people of working age. The effect on total population is modest since, by assumption, the migrants have no local dependants and they eventually leave. The effect on the age structure is to reduce the old-age dependency ratio from 0.431, under the balanced migration projection, to 0.395. This is almost exactly the same as the reduction achieved through permanent migration under the principal projection. Comparing the effects of temporary and permanent migration, it is clear that temporary migration achieves a similar rejuvenating effect with a much smaller increase in population.

To the extent that population growth is seen as a problem, a temporary migration programme might seem an attractive alternative to permanent immigration. However, its benefits should be seen in perspective. The stock of temporary migrants envisaged under the above programme is many times larger than the surge of migration into the UK from Poland and other Eastern European countries following their accession to the EU in 2004.² Even so, the resulting impact on the age structure is modest. There are also negative aspects to consider. The presence of a large rotating stock of foreigner migrant workers might create difficult social and administrative problems. Competition from these migrants might harm certain types of native worker, and to ensure public acceptance of the programme some form of job reservation or compensation scheme might be required. It might also be difficult to make these migrants

² According to ONS (2008) the stock of migrants from the A8 accession countries increased by 448,000 between mid-2003 and mid-2007, from 53,000 to 501,000.

depart at the agreed time. There would be leakages as supposedly temporary migrants found ways to settle permanently in the country, by marrying locals or by using human-rights law to obstruct enforcement of the rules. In some cases, temporary migration is a spontaneous process that occurs without any formal programme, in which case the issue of enforcement does not arise. For example, many Polish migrants are now voluntarily returning home after spending a year or two in the UK.

The fiscal impact of temporary migration depends on a variety of factors in addition to its impact on the age structure. These include the skills of the migrants, their ability to find work without displacing local workers, the taxes which they and their employers pay, and the entitlements of migrants and their dependants to welfare benefits and government services. A government seeking to maximize the fiscal benefit from temporary migration would severely restrict entitlements and impose special levies on migrants or their employers. Dependants might be denied welfare benefits or be made to pay over the odds for public services that are normally free or heavily subsidized. Migrants leaving the country might be denied public pensions to which they have contributed through taxation. Migrants (or their employers) could be forced to purchase permits for entry into the country. There are clearly limits to the application of such methods. Inward migration is mostly voluntary and if the fiscal regime is too harsh, potential migrants will either stay at home or go to another country. Even so, global income disparities are so great that there is a large pool of potential migrants who would be willing to accept a harsh fiscal regime as the price of finding work in such rich areas as Europe or North America. Many people in liberal democracies would regard such an approach to migrant labour as unacceptable. They would regard it as a breach of human rights for governments to discriminate so blatantly by imposing much harsher fiscal conditions on migrants than those faced by native workers. The fact remains, however, that the more generously migrants are treated by the receiving country the less incentive there is to allow them entry. This is part of a wider discourse on migrant rights which is beyond the scope of this paper to explore. For a general discussion of this topic the reader is referred to Ruhs and Martin (2008).

(iii) Fertility

Another alternative to permanent immigration is a higher birth rate. This also leads to a larger and younger population. UN projections for the period 2005–50 imply that, for each 1 per cent extra population owing to higher fertility, the old-age dependency ratio falls by 0.64 per cent in Western Europe and 0.75 per cent in the USA by 2050.³

The fiscal implications of higher fertility are broadly similar to those of permanent immigration, although there are differences which might be important under certain conditions. For example, newly born children will take many years before they start to pay taxes and in the meantime will be a net burden on government finances. In contrast, immigrants are mostly of working age when they arrive, and provided they can find work without displacing natives they will soon make a fiscal contribution. However, many of the immigrants will have a relatively short working life in the receiving country and their cumulative tax contribution will be less than that of an equivalent native. Consider, for example, an immigrant who arrives at the age of 25 and works continuously until 60. This represents 35 years of working life in the

³ These estimates are derived by comparing the low- and high-fertility variant projections in *World Population Prospects, 2007 Revision* (UN, 2007).

receiving country, during which time the immigrant is paying income tax and social security. An equivalent native, however, may start work at the age of 18 and also work through until 60. This represents 42 years of working life. Other things being equal, the total amount of tax paid by the native worker will be greater. Given the complexity of these issues, it is difficult to generalize about the relative fiscal merits of higher fertility as compared to permanent immigration. Simulations reported in Rowthorn (2008) suggest that their long-run effects are similar.

III. Measurement issues

(i) Emigration

In measuring the fiscal impact of inward migration it is conventional to ignore outward migration. Such a procedure is justified if the two kinds of migration are causally unrelated. However, this is not always the case. Many top managers, artists and other professionals circulate internationally, spending years in various countries. Their entry into one country is often matched by the departure of natives who would otherwise have remained at home. A trans-national company may rotate its managers between countries—for example, bringing a German manager to Britain and sending a British manager to Germany—so-called ‘intra-company transfers’. Much of the high-level manpower movement into (and out of) the UK has been of this kind (Salt, 1991, 1997). In 2003, 37 per cent of foreign workers in the UK had the same employer before immigration and were likely to be ‘corporate transferees’ (Salt, 2003, Table 4.11). Such a circulation of personnel may help to raise global productivity, but its direct impact on government finances in the two countries is minor. In each case, a foreigner manager will replace a native manager, but the amounts these managers pay in tax (and absorb in public expenditure) will be very similar. Yet conventional accounting will indicate that both governments have gained substantially. In each country, the account will include the large fiscal contribution made by the highly paid foreign manager, but it will ignore the fiscal loss resulting from the departure of the native manager. This is just one of many examples in which the inward and outward migration of skilled workers are causally linked, and in which conventional accounting exaggerates the fiscal benefits of immigration because it ignores such linkages.

The inflow of foreign migrants into an area may provoke a significant outflow of local residents (Borjas *et al.*, 1997; Hatton and Tani, 2005). This may occur for a variety of reasons. Immigration may lead to population growth, loss of amenities, and higher housing costs, all of which may lead locals to depart for less crowded or cheaper locations. Locals may also leave because they do not like the cultural or racial changes which accompany large-scale immigration (‘white flight’). Many of these relocations will be to other regions within the same country, but some will be international. An analysis of the causes of Dutch emigration concluded that ‘modern day emigrants forsake their home country because of the poor quality of the perceived public domain and that they long for what Dutch consider the Good Life: nature, space and less populated surroundings’ (van Dalen and Henkens, 2007, p. 56). This finding suggests that immigration into high-income countries may encourage emigration through its impact on population size and on the quality of the perceived public domain. Depending on the nature of emigration, its fiscal effects may either offset or reinforce those arising from immigration. For example, the inflow of young migrants into a country may lead to the emigration of older natives who wish to retire to countries they find more

congenial. Both of these effects may be fiscally beneficial to natives who remain behind. The young immigrants may generate a fiscal surplus because they have a long working life ahead of them, whereas the departure of older people may reduce the demand for public expenditure on expensive items such as health and elder care.

Although potentially important, the causal link between immigration and emigration is normally ignored in the literature on the fiscal impact of migration.

(ii) Native displacement

Empirical studies of fiscal impact normally assume that native employment is unaffected by the inflow of immigrant workers. The evidence in support of this assumption is mixed. Many empirical studies find that the employment effects of immigration are small or of very short duration, and this has become the conventional wisdom in academic circles.⁴ However, there are also reputable studies which find that the impact may be large and/or of quite long duration.

In their analysis of unemployment in the European Union, Angrist and Kugler (2003) estimate that, for each 100 male immigrants, there is a loss of between 35 and 83 male native jobs. These estimates are based on statistically significant coefficients. Using census data for the UK and the ‘difference in differences’ method, Dustmann *et al.* (2003) estimate that 23–60 native jobs are lost for each 100 immigrants.⁵ These estimates are also based on statistically significant coefficients. However, using data from the Labour Force Survey, Dustmann *et al.* (2003, 2005) find smaller and less significant effects.

The issue of duration is explicitly addressed in an OECD working paper by Jean and Jiménez (2007). They find that immigration has no permanent effect on native employment, but it may have a large transitory effect lasting for some years. Their exact words are as follows:

Our estimates do not find any permanent effect of immigration, measured as the share of immigrants in the labour force, upon natives’ unemployment. An immigration inflow leaving unchanged the share of immigrants in the labour force does not even influence unemployment in the short run. Still, we find significant evidence of a transitory and delayed impact on unemployment of changes in the share of immigrants. The impact is weak when measured at the skill level: natives with skills most similar to those of immigrants do not suffer from a strong rise in their unemployment rate relative to other categories of natives. *At the aggregate level, however, the transitory impact may be substantial; its magnitude and duration largely depends on the persistence of unemployment shocks, and it may last between five and ten years.* (paragraph 37, italics added)

Five to ten years is a long time and it refers to a once-and-for-all rise in the share of immigrants in the national labour force. The share of immigrants in many European countries is currently rising and is likely to rise for some decades. If Jean and Jiménez are correct, this will have

⁴The following quotation is representative: ‘The empirical literature from around the world suggests little or no evidence that immigrants have had a major impact on native labour market outcomes such as wages and unemployment. Recent work by a number of other authors for the UK is also consistent with this view’ (Blanchflower *et al.*, 2007).

⁵These numbers are derived from the coefficients given in Table 4.1 of Dustmann *et al.* (2003).

a prolonged impact on native employment, thereby reducing the net tax revenue from native workers.

Given prevailing academic orthodoxy about labour displacement, it is not surprising that fiscal studies normally take as their baseline assumption that immigration has no impact on native employment. However, this does not explain why they fail to explore the implications of modifying this assumption. If immigration does have a prolonged negative impact on native employment, the resulting loss of tax revenue and additional welfare expenditure could be substantial.

(iii) Static and dynamic approaches

There are two main approaches to the issue of fiscal accounting: static and dynamic. The static, or cross-section, approach takes a particular group of people who are classified as 'immigrants' (or 'migrants') and calculates the taxes they pay and the amount of government expenditure they absorb in a given period of time, typically a year. The difference between taxes and expenditure is their net fiscal contribution. The 'dynamic' approach is a forward-looking procedure which considers the entire stream of future taxes and expenditures associated with a particular cohort or stream of immigrants and their descendants. Such taxes and expenditures may be discounted back to the base year and summed to give a total known as the net present value (NPV). This total is the future net fiscal contribution of the immigrants and their descendants expressed as a capital sum. The dynamic approach has certain advantages for policy purposes because it is forward-looking and can be used to estimate the contribution of immigrants who have not yet arrived. However, it may be difficult to apply in practice because it requires so many diverse assumptions about the future behaviour of fertility, employment, productivity, tax rates, and government expenditure. In practice, therefore, the static approach may still be useful.

(iv) Who is an immigrant?

Static estimates of fiscal impact designate a certain group of people as immigrants and then calculate the amount of tax they pay and how much government expenditure they absorb. Deciding who is an immigrant for this purpose is not a simple matter. On a strict interpretation, an immigrant is any resident who was born abroad. Such a definition would normally overstate the fiscal contribution of immigrants because it would exclude government expenditure on their locally born children. In practice no study uses such a narrow definition. For example, Smith and Edmonston (1997, ch. 6) estimate the fiscal contribution of all US households with an immigrant head. This includes children and other dependants who are resident in the household. It also includes the native spouse of an immigrant head of household, but excludes the immigrant spouse of a native head of household. In their study of UK immigration, Gott and Johnson (2002) take a more individualist approach and classify as an immigrant anyone who is foreign-born, or who is a child under 16 and has two parents who are foreign-born or a lone parent who is foreign-born. They classify as natives all children aged 16+ who were born in the UK and also children under 16 who were born in the UK and have at least one native parent. There are arguments for and against the various definitions, and the choice of which definition to use is often heavily influenced by the information that is available.

(v) Public goods

No matter what approach is chosen, static or dynamic, certain decisions must be taken with regard to the allocation of government expenditure on goods and services. In some cases, the total cost of providing recipients with a given level of utility is roughly proportional to the number of recipients involved. For accounting purposes, such expenditures can be allocated on a simple *pro-rata* basis. However, not all expenditure is of this type. For example, immigration may lead to conflict and congestion, and to preserve the *status quo* may require a disproportionate rise in expenditure on such items as policing and infrastructure. Conversely, the cost of providing a given level of a service, such as defence, may be only loosely related to population size and at the margin may be unaffected by immigration. An army of 100,000 may be able to defend a country of 70m just as well as a country of 60m. Such items are known as ‘public goods’. In the case of public goods, an increase in the labour force owing to immigration has the beneficial affect of allowing fixed costs to be spread over a greater number of taxpayers.

(vi) Government solvency

To preserve government solvency in the future most dynamic fiscal analyses assume that the following *inter-temporal budget constraint* must be satisfied:

$$D_0 + \sum_{i=1}^{i=\infty} \frac{E_i}{(1+R)^i} - \sum_{i=1}^{i=\infty} \frac{T_i}{(1+R)^i} = 0 \quad (1)$$

where D_0 is government net debt in the base year, T_i and E_i are government tax revenue and expenditure (excluding interest payments) in year i , and R is a discount rate. All items are measured in constant prices. An alternative approach is to specify some long-run target value for the debt-to-GDP ratio (see Smith and Edmonston, 1997). Mathematically, this can be expressed as follows:

$$\lim_{t \rightarrow \infty} \left(\frac{D_t}{Y_t} \right) = \left(\frac{D}{Y} \right)^* \quad (2)$$

The relationship between the above solvency conditions depends on a number of parameters.⁶ Let r be the post-tax real interest rate on government borrowing and g the rate of economic growth. Suppose that g and r are constant and that $R = r$. Suppose also that $r > g$. Under assumptions, condition (2) implies condition (1).

Alternatively, continue to assume that $R = r$ but suppose that $r < g$. It is now possible to satisfy condition (2) without satisfying condition (1). For example, it is sufficient to assume that taxes and expenditure are chosen so as to satisfy the following relationship:

$$\frac{T_i - E_i}{Y_i} = \frac{r - g}{1 + g} \left(\frac{D}{Y} \right)^* \quad \text{for } i > 0. \quad (3)$$

Such a fiscal policy will eventually stabilize the debt–GDP ratio at the desired level, but it will not satisfy the inter-temporal budget constraint. Since $r < g$ the right-hand side of the

⁶The propositions which follow are established in an appendix.

above equation is negative and the government therefore has a primary deficit. Expenditure permanently exceeds tax revenue. Such a situation is known in the literature as a 'Ponzi Game'.

In the dynamic approach it is normally assumed that taxes and expenditure will eventually be adjusted so as to ensure that the appropriate solvency condition is satisfied. The adjustments required to achieve this result will depend on the type of immigration and its time profile. The equivalent procedure in the static approach is to make a notional adjustment to current tax or expenditure rates so as to produce a sustainable budget deficit or surplus. Some static estimates fail to make this adjustment and hence give a misleading picture of the fiscal contribution of immigrants.

IV. International evidence

The fiscal impact of immigration depends on the types of immigrant concerned and their manner of insertion into the local economy. Highly educated, skilled or talented immigrants, provided they gain suitable employment and do not displace native workers, normally make a positive fiscal contribution. They pay more in taxes than they absorb in government expenditure. Even unskilled immigrants may make a positive fiscal contribution provided they get jobs and do not displace local workers, and provided they and their families do not make large demands on the welfare state in the form of transfer payments and public services. At the other end of the spectrum are migrants who receive public support but do not pay tax because they are without gainful employment. Many asylum seekers and female spouses are in this category. So, too, are the children and aged relatives of working migrants.

In countries where there has been large-scale immigration over a fairly long period of time, the stock of migrants and their descendants normally contains a wide spread of different types and age groups. This explains why, as we shall see, estimates of the fiscal contribution of the immigrant population as a whole are typically quite small. The positive contribution of some migrants is largely or wholly offset by the negative contribution of others. This finding holds across a variety of countries and methodologies. Estimates of the net fiscal contribution of past immigration normally lie within the range ± 1 per cent of GDP. This is also the conclusion of most, but not all, forward-looking estimates of the potential contribution of future immigration. The exceptions are reviewed in a separate section. The following evidence is mainly concerned with permanent immigrants, although some of the static (cross-section) estimates also include temporary migrants.

(i) The USA

The fiscal contribution of immigrants has been most extensively studied in the United States. Borjas (1994), Huddle (1993), and Passel (1994) use a static accounting framework to compute the government surplus from all immigrants residing in the USA in 1993. They find this annual surplus to be $-\$16$ billion, $-\$40$ billion, and $\$27$ billion, respectively.⁷ These are equivalent to -0.2 per cent, -0.6 per cent, and $+0.4$ per cent of GDP, respectively.

⁷ These estimates are taken from a survey in Storesletten (2000).

Using a similar framework, Lee and Miller (1998) estimate the net fiscal contribution of all existing immigrants and their concurrent descendants in the USA in 1994. This group constituted 15.5 per cent of the national population, and between them they provided a fiscal surplus equal to \$23.5 billion, or 0.35 per cent of GDP. This estimate is based on the favourable assumption that none of the cost of debt interest and 'public goods' is allocated to the immigrant community. Public goods are defined as national defence, expenditures on veterans, and research on health, science, space, and technology. If this assumption is substantially modified, the immigrant contribution becomes negative.

In a later paper Lee and Miller (2000) estimate the effect of raising net immigration into the United States by 100,000 per year while maintaining the age and skill composition of the current stream. Taking federal, state, and local taxes and expenditure into account, the overall fiscal impact is initially negative but gradually becomes positive after about 20 years as the children of immigrants enter the labour market. However, the beneficial effect is never more than 0.4 per cent of total tax revenue. The authors conclude that 'the overall fiscal consequences of altering the volume of immigration would be quite small and should not be a consideration for policy' (Lee and Miller, 2000, p. 353).

Auerbach and Oreopoulos (2000) use a dynamic model to estimate the fiscal impact of halting all further immigration into the United States. The answer depends on a number of factors, of which the most important are the treatment of defence expenditure and the allocation of the fiscal burden across generations. On one set of assumptions, the ending of immigration would produce a bonus equivalent to an immediate proportionate reduction in all taxes of 3.8 per cent and a similar increase in all transfers.⁸ On another set of assumptions, the ending of immigration would mean an additional burden in the form of a 1.9 per cent increase in the taxes paid by future generations and a similar reduction in transfers. These amounts are equivalent to a gain equal to +1.5 per cent and -0.8 per cent of GDP respectively.

The above estimates refer to immigration as a whole. There are also a number of estimates referring to the impact of particular types of immigration. Smith and Edmonston (1997, ch. 6, Tables 6.3 and 6.4) estimate that the average native-headed household in California in 1996 paid \$3,611 more in taxes than it received in government expenditure. This fiscal surplus includes all local, state, and federal taxes and expenditure except for defence. For households headed by an immigrant from Latin America the figure was -\$7,206 and for all other identified immigrant groups it was positive. The study also provides estimates for New Jersey that are broadly similar.

Smith and Edmonston (1997, ch. 7, Table 7.5) use a dynamic model to estimate the impact of future immigration by education level. The NPV of the average immigrant is equal to \$80,000. The corresponding figures by educational level are as follows: less than high school, -\$13,000; high school, \$51,000; more than high school, \$198,000. A striking feature of these results is the distinction between first-generation immigrants and their descendants. In all cases, the descendants generate a large fiscal surplus, but in the lower categories the first-generation immigrants pay less in tax than they absorb in government expenditure. For example, first-generation immigrants without a high-school education have an NPV equal

⁸ The figures cited here are based on Table 2 of Auerbach and Oreopoulos (2000). If all generations share the burden of adjustment and defence is not regarded as a public good, the change in taxes and transfers owing to halting immigration is -3.8 per cent (= -2.5 per cent - 1.3 per cent). If future generations shoulder the entire burden of adjustment and defence is a public good, the change in taxes and transfers owing to halting immigration is +1.9 per cent (= 9.2 per cent - 7.3 per cent). These were converted to percentages of GDP using national accounts data for 1998.

to $-\$89,000$, but their descendants are assumed to be more educated and have an NPV of $\$76,000$. The sum of these quantities is $-\$13,000$. All of these estimates assume that, at some time in the near future, there will be a fiscal reform in which taxes are increased and/or benefits cut.

Much lower figures are obtained by Storesletten (2000), who gives an estimate of $\$7,400$ for the NPV of the average immigrant into the USA. This average conceals a wide variation across different kinds of immigrant. The NPVs for the average low-, medium-, and high-skilled legal immigrants are $-\$36,000$, $-\$2,000$, and $\$96,000$, respectively. These estimates assume that there will be no future change in tax or benefit rates, which explains why they are so much lower than the corresponding estimates obtained by Smith and Edmonston. In a sensitivity exercise, Smith and Edmonston show that, if there is no change in taxes and benefits, the NPV of the average immigrant is equal to $-\$15,000$ instead of $\$80,000$ (Table 7.6).

(ii) Continental Europe and certain other countries

Results for Europe are mostly similar to those for the United States. Weber and Straubhaar (1996) consider foreigners with permanent and annual residence permits who constituted 9.5 per cent of Swiss households in 1990. Using the static approach, they estimate that this group made an annual fiscal contribution to the rest of the population equal to US\$460 m, which is equivalent to +0.2 per cent of GDP.

Wadensjö (1999) considers the fiscal contribution of immigrants in Denmark from two groups of countries. Group 1 consists of Western Europe, North America, and Australia and New Zealand; group 2 consists of all the rest. He finds that the average immigrant from group 1 countries made a net contribution in 1996 equal to 12,300 kroner (US\$2,100 at the 1996 exchange rate), whereas the corresponding figure for immigrants from group 2 countries is $-63,700$ kroner ($-\$11,000$). For second-generation immigrants with both parents immigrants from group 2 countries the figure is $-10,700$ kroner ($-\$1,850$). Roodenburg *et al.* (2003) and Ter Rele (2003) obtain similar results for the Netherlands. Their findings are summarized as follows: 'Taking into account the fact that immigrants usually have families, their long-term fiscal impact turns out to be practically zero. Thus, immigration will not solve the budgetary problem' (Roodenburg, 2003, p. 3).

This conclusion is echoed in two gloomy papers by Fehr *et al.* (2004a,b) dealing with immigration into the USA, the EU, and Japan. These papers argue that the countries concerned will all require large tax increases to preserve fiscal viability in the future. However, they also find that:

Increased immigration also proves to be a false elixir, if our model is to be believed. Even an immediate and sustained doubling of immigration—an extreme response by most policy makers standards—does very little to mitigate the fiscal stresses facing the developed world. (Fehr *et al.*, 2004a)

Pederson (2002) uses a dynamic model to estimate the effect of reducing immigration into Denmark by 50 per cent from 1999 onwards. This leads to a substantial fall in the Danish population over the following century, but has a small positive effect on *per capita* income and government finances. There is also an improvement in government finances equal to 0.4 per cent of GDP. Thus, on average, immigration into Denmark imposes a cost on the existing population. Other analyses of the Danish situation also come to unpromising conclusions (Schultz-Nielsen, 2001).

Ekberg (1999) reports that the net contribution of immigrants in Sweden was positive during the 1950s, 1960s, and 1970s, but has become negative in recent years. This development is due to the deteriorating employment situation amongst immigrants. At all times the immigrant contribution has been small and in 1994 was around -0.9 per cent of gross national product. This deterioration in the fiscal contribution is similar to that observed in the United States and in each case is due to the deteriorating labour-market performance of immigrants (Borjas, 1990).

Storesletten (2003), also using a dynamic model, estimates that the *average* immigrant into Sweden represents a net government loss of 175,000 SEK (US\$26,000), which is equivalent to 7,250 SEK (US\$1,080) annually.⁹ The author concludes that, on average, immigrants represent a 'large burden on the public coffers'. This conclusion seems rather exaggerated. With an immigrant share of 10 per cent in the national population, Storesletten's estimate would imply a net fiscal cost of supporting immigrants equal to 0.36 per cent of GDP.¹⁰

Other studies yield mixed results. Weber and Straubhaar (1996) survey 13 studies covering a variety of advanced economies, of which five studies find that the net fiscal contribution of immigrants is positive, two find it is negative, and six report it is neutral or that no general statement is possible. Reports commissioned by the Australian and New Zealand governments find that immigration has a positive fiscal effect. However, these findings are not very informative because they refer only to central government and exclude many forms of public expenditure (Access Economics, 2001; Immigration Research Programme, 1999). They ignore the fact that immigration may impose a large fiscal burden at the local or state level (for the USA, see Rothman and Espenshade, 1992; Lee and Miller, 1998).

Although their findings are rather disparate, most of the studies surveyed in this section are more pessimistic about the fiscal impact of low-skilled immigration than are their US equivalents. This may be because they refer to countries with a more generous welfare state than the USA and hence more public expenditure on low-paid immigrants and their dependants.

V. The United Kingdom

The first systematic study of the fiscal impact of migration into the UK was for the Home Office (Gott and Johnson, 2002). This study was concerned with the fiscal contribution of the migrant population as a whole in the tax year 1999/2000. Migrants were defined as foreign-born residents of the UK plus dependent children with two foreign-born parents or living with a foreign-born lone parent. According to this definition, migrants constituted 8.4 per cent of the UK population in the period concerned and generated a combined fiscal surplus of £2.5 billion. This study was later updated and slightly modified by the Institute for Public Policy Research (IPPR) (Srisankarajah *et al.*, 2005).

The IPPR study estimates that in the tax year 2003/4 migrants paid £41.2 billion in tax and consumed £41.6 billion in benefits and government services, giving a net fiscal contribution of approximately $-\text{£}0.4$ billion. This calculation can be queried on a number of grounds. Table 2 illustrates how the calculations might be adjusted to accommodate some of these queries.

⁹ Conversion to US dollars at the 1996 exchange rate, US\$1 = 6.706 SEK.

¹⁰ Swedish GDP was 1,772 billion SEK and population was 8.827 m in 1995. If immigrants are 10 per cent of the population, the total net cost of supporting them is 6.4 billion SEK = 0.36 per cent of GDP.

Table 2: Alternative estimates of the fiscal impact of migrants in the UK

	2003/2004				
	Tax £ billion	Expenditure £ billion	Balance £ billion	% GDP	% Individual consumption
Original (IPPR)	41.2	41.6	-0.4	-0.04	-0.06
<i>Unfavourable adjustments:</i>					
Asylum support		1.0			
Ethnic relations and support		0.6			
Excess medical costs (HIV only)		0.3			
Children of mixed parentage		4.9			
<i>Favourable adjustments:</i>					
Defence		-3.0			
Balanced budget	4.9				
Sub-totals					
<i>After unfavourable adjustments only</i>	<i>41.2</i>	<i>48.5</i>	<i>-7.3</i>	<i>-0.64</i>	<i>-1.14</i>
<i>After favourable adjustments only</i>	<i>46.0</i>	<i>38.6</i>	<i>7.5</i>	<i>0.66</i>	<i>1.17</i>
Total after all adjustments	46.0	45.4	0.6	0.05	0.09

Note: Columns may not add because of rounding.

(i) Adjustments

The IPPR study excludes a number of migration-related costs to the taxpayer. Some of these are associated with the control of the national borders and the processing of residence applications by asylum seekers and other migrants. Since the IPPR study is concerned with the existing stock of migrants, it is correct to exclude such items. However, there are also a number of missing items that have a strong case for inclusion. Some of these are favourable to migrants and some are not.

The unfavourable items are:

- *Asylum support.* The cost of supporting asylum seekers and refugees within the UK is approximately £1 billion (Sriskandarajah *et al.*, 2005, Appendix 2). This item does not include the costs of border control and regulating migration which appear elsewhere in the government accounts.
- *Ethnic relations and support.* Modern immigration has made Britain a racially and ethnically diverse society. There is now a public-sector bureaucracy specifically devoted to the regulation of race relations, combating discrimination, and promoting the advancement of ethnic minorities. Coleman (2007) estimates that the direct cost of these activities to the taxpayer is £0.6 billion.¹¹ His estimate includes some expenditure that is related to members of ethnic minorities who are not classified as migrants in the present analysis (i.e. individuals born in the UK and over 18 years of age). However, it also excludes indirect costs arising from public-sector compliance with the regulations and the extra costs to the educational system arising from the linguistic and cultural diversity of the school population. The figure shown in Table 2 assumes that these errors cancel out.
- *Excess medical costs.*¹² The health of the migrant population varies widely across different ethnic groups. In general, they are similar to the rest of the population.

¹¹ This figure is derived by summing a number of distinct items listed by Coleman.

¹² The term 'excess medical costs' refers to expenditure in excess of the *per capita* amount for the national population as a whole.

However, there are some costly ailments that are far more common among immigrants than natives. Foreign-born persons accounted for 71 per cent of tuberculosis cases in England, Wales, and Northern Ireland in 2004 (Health Protection Agency, 2006, ch. 2, Figure 2); they also accounted for 88 per cent of new HIV diagnoses amongst heterosexuals during the period 2000–4 (Health Protection Agency, 2006, pp. 49 and 54). The ‘excess’ cost of treating migrants with HIV infection acquired through sex between men and women is around £0.3 billion.¹³

- *Children of mixed parentage.* Like its predecessor, the IPPR study assigns public expenditure on children with foreign-born parents to the migrant population. However, the entire expenditure on children with mixed parentage (one foreign-born and one UK-born) is ascribed to the non-migrant population. To be consistent, such expenditure should be split equally between the migrant and non-migrant population. This requires the allocation to migrants of an additional £4.9 billion of government expenditure.¹⁴

The favourable items are:

- *Defence.* The IPPR study ascribes to migrants their *pro-rata* share of defence expenditure. However, it can be argued that defence should be excluded because the armed forces are a public good whose benefits to the existing population are largely unaffected by the entry of migrants. To allow for this we eliminate defence from the list of expenditures allocated to migrants. This reduces expenditure on migrants by £3 billion.¹⁵
- *Balanced budget.* The period to which the IPPR estimate refers was rather special. In 2003/4 the government had a fiscal deficit and even the non-migrant population paid less in taxes than they received in government expenditure. To correct for this distortion we assume that taxes on all UK residents are raised by a uniform percentage just sufficient to eliminate the government deficit. This increases the amount of tax paid by migrants by £4.9 billion.¹⁶

¹³ This estimate is derived as follows. The total number of persons receiving care for HIV infection acquired through sex between men and women was 25,754 in 2006 (Health Protection Agency, 2007, Table 1). Migrants account for 88 per cent of HIV infection acquired in this fashion but constitute only 8.4 per cent of the UK population. (The former figure refers only to persons born abroad and excludes dependent children born in the UK.) If the incidence of heterosexual HIV infection were uniform across the population, the number of migrants receiving care would be 2,163 ($= 0.084 \times 25,754$), whereas the actual number is 22,664 ($= 0.88 \times 25,754$). The difference 20,500 is the ‘excess’ number of migrants receiving care. Coleman (2007) cites a figure of £15,000 for the average cost of treating a patient with HIV/AIDS in 2000–3 (as estimated by the House of Commons Select Committee on Health). Thus, the ‘excess’ cost of treating migrants with HIV infection acquired through sex between men and women is around £0.3 billion ($= £15,000 \times 20,500$).

¹⁴ This adjustment is derived from paragraph 38 of Migration Watch UK (2006).

¹⁵ Total expenditure on defence in 2003/4 was £31.4 billion. The IPPR study allocates this in proportion to the share of migrants and non-migrants in the population.

¹⁶ In 2003/4 there was a budget deficit of £48.5 billion. The balanced-budget adjustment shown in Table 1 assumes that this deficit is eliminated by means of a uniform 11.8 per cent increase in the amount of tax paid by migrants and non-migrants. The extra tax paid by the two groups is equal to £4.9 billion and £43.6 billion respectively. An alternative procedure is as follows. After the adjustments shown in the upper section of Table 1 (i.e. excluding the balanced budget adjustment), the ratio of taxes to government expenditure is 90.3 per cent for migrants and 89.4 per cent for non-migrants. As a result, migrants pay £0.4 billion more in taxes than they would do if their tax–expenditure ratio were the same as that of non-migrants. This can be taken as a measure of their net fiscal transfer to the non-migrant population. It is the same as our final estimate of the net fiscal contribution of migrants.

Depending on which adjustments are included, the net fiscal contribution of migrants ranges between $-\text{£}7.3$ billion and $+\text{£}7.5$ billion. These figures may seem large in absolute terms, but they are small in relation to the economy as a whole. They are equivalent to approximately ± 0.65 per cent of GDP and ± 1.15 per cent of individual consumption. When all adjustments are included, the net contribution of migrants is close to zero at $\text{£}0.4$ billion, which is equal to 0.04 per cent of GDP and 0.07 per cent of individual consumption.

(ii) Other items

In addition to the above items, there is a case for extending the definition of migrant to include the older children of immigrants, who are on average net taxpayers. Unfortunately, this is not feasible using existing information. There should also be an adjustment for migrant crime. Coleman (2007) estimates that the annual cost of ‘excess’ crime committed by ethnic minorities is equal to $\text{£}3.1$ billion.¹⁷ An examination of his sources suggests that most of the cost of this crime is born by the victims, and the direct cost to the exchequer is relatively small, perhaps $\text{£}0.6$ billion. Moreover, much of this ‘excess’ crime is committed by UK-born black Caribbean males who are sufficiently old to be classified as non-migrants by the IPPR. There is also the issue of national security. Counter-terrorism activity is currently directed mainly against Islamic groups and individuals of predominantly ethnic-minority, immigrant, or asylum-seeker origin. Almost 90 per cent of the MI5 budget of $\text{£}200$ m is devoted to counter-terrorism (*The Times*, 9 August 2006). There must also be considerable, but unknown, costs from the same cause for the enhanced police presence and other security staff at airports and elsewhere, and the costs of screening passengers and those entering public buildings. It is unlikely that the inclusion of additional adjustments to cover these various items would have much effect on the overall picture.

VI. Generational accounting and the spectre of demographic collapse

The evidence reviewed above suggests that the fiscal impact of immigration is relatively small, normally in the range ± 1 per cent of GDP. However, there are a few studies which report large positive estimates. These estimates have a number of features in common. They all refer to countries experiencing demographic collapse and a rapid ageing of their populations because of a dramatic fall in birth rates, they are all based on a method known as ‘generational accounting’, and they all make unrealistic assumptions about the inter-generational allocation of the fiscal burden. With more realistic assumptions about fiscal allocation, the estimated contribution of immigration is much smaller, even for countries facing demographic collapse. The findings of these studies are summarized in Table 3.

All of the studies shown in Table 3 find that, sooner or later, a fiscal reform will be required in order to maintain government solvency in the face of an ageing population. Tax rates

¹⁷ The term ‘excess crime’ refers to crime in excess of the *per capita* amount for the national population as a whole.

Table 3: Change in taxes required for fiscal sustainability

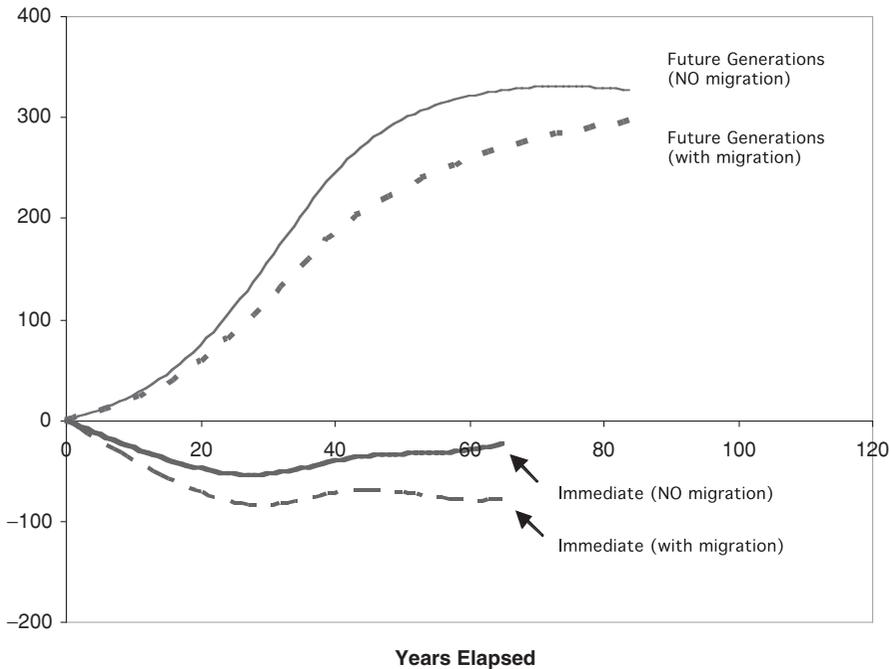
	All burden on future generations	Taxes raised immediately
EU^a		
Base case	+ 27.0 percentage points	
Double immigration	+ 24.6 percentage points	
Italy^b		
Zero immigration	+ 24.8%	
50,000 immigration p.a.	+ 20.2%	
Germany^c		
Zero immigration	+ \$203,200 lifetime tax bill	
200,000 immigration p.a.	+ \$135,000 lifetime tax bill	
Spain^d		
Zero immigration	+ 47.8%	+ 8.8%
60,000 immigration p.a.	+ 34.5%	+ 7.9%
Austria^e		
Base case	+ 71.2%	+ 14.5%
Extra 10,000 immigration p.a.	+ 65.6%	+ 13.8%

Sources: ^aFehr *et al.* (2004a, Table 10, Social security and wage taxes); identical numbers are given in Table 4 of Fehr *et al.* (2004b). ^bMoscarola (2001, Table 2, Low demographic scenario). ^cBonin *et al.* (2000, p. 16). ^dCollado *et al.* (2004, Table 3). ^eMayr (2004, Table 3).

may have to be increased or transfers cut.¹⁸ The table shows the scale of the required tax increase on the assumption that there is no other change. A similar result can be obtained by keeping taxes the same and cutting transfers. The size of the required tax increase and the estimated contribution of immigrants depend on how the burden is spread between generations. If fiscal reform is implemented immediately, then present generations bear most of the cost of adjustment, and the required increase in tax rates is comparatively small. The fiscal contribution of immigrants is also comparatively small in this case. An alternative approach is to assume that the cost of adjustment is borne entirely by future generations. This means that there is no change in the tax rate levied on anyone who is already alive in the base year when the reform is announced. Their entitlements to government transfers are also unaffected. Under these conditions, the burden on future native generations is much greater. The contribution of immigrants is also much greater, since future immigrant generations, like their native counterparts, will be heavily taxed.

The assumption that only future generations pay is unrealistic. In the initial decades, it leads to an explosion of government debt and interest payments that would never be allowed to occur in practice. The explosion comes about because net tax revenue shrinks rapidly in the initial decades as present generations retire from the workforce, whereas government expenditure remains at a high level. To finance its rising deficit the government must borrow heavily and incur a rapidly growing burden of interest payments. Under the 'future generations only' scenario, government borrowing is eventually brought under control as future native and immigrant generations reach working age and start to pay taxes. However, this only occurs after a very long delay. It is 60–70 years before future native and immigrant generations come on stream in sufficient numbers to generate the primary fiscal surplus required to stabilize government finances. By this time government debt is gigantic. It is the need to

¹⁸ Another option not explored in these studies is to widen the tax base by increasing the employment rate among working-age people or raising the retirement age.

Figure 1: Government debt: with tax reform (% GDP)

Source: Rowthorn (2008).

service and stabilize this debt which explains why the tax rate on future generations is so high. The behaviour of government debt under a scenario of this type is illustrated in Figure 1. Although theoretically possible, it is unlikely that the government would in practice be able to borrow on the scale envisaged during the initial decades of the ‘future generations only’ scenario. The build-up of debt would be so rapid that the government would soon be forced to act. Taxes on existing generations would have to be raised or their entitlements to government expenditure cut back. Either way, there would have to be a radical change in the government policy of borrowing to shield existing generations at the expense of future generations.

The above observations indicate why it is unrealistic to assume that only future generations pay the cost of fiscal adjustment. It is this assumption which underlies the claim that very large tax increases are required to ensure government solvency in low-fertility countries. It also explains why the estimated fiscal contribution of immigrants in these countries is so large. Under the more realistic assumption that present generations share in the cost of adjustment, a much smaller tax increase is required to ensure government solvency, and immigration has much less impact on post-reform tax rates.

VII. Concluding remarks

This paper has been concerned with the fiscal impact of immigration on the existing inhabitants of the advanced economies, on which there is now a significant academic literature. The most striking feature of this literature is the degree of consensus. Despite their different

methodologies and different countries, most studies find that highly skilled migrants normally make a large fiscal contribution, whereas unskilled migrants are likely to impose a cost on native taxpayers if they settle in the receiving country. Even unskilled migrants may be net contributors if they eventually depart and make few claims on the welfare state while in the country. The contribution of migrants depends on their age and degree of integration in the labour market. If they fail to get a job, or if they remain in the country and are near to retirement age when they arrive, their fiscal contribution will be negative, no matter how skilled they are.

There is also the issue of diversity. In countries where there has been mass immigration over a fairly long period of time, the stock of migrants and their descendants normally contains a wide spread of different types and age groups. This explains why estimates of the fiscal contribution of the immigrant population as a whole are typically quite small. The positive contribution of some migrants is largely or wholly offset by the negative contribution of others. This finding holds across a variety of countries and methodologies. Estimates of the net fiscal contribution of past immigration normally lie within the range ± 1 per cent of GDP. This is also the conclusion of most, but not all, forward-looking estimates of the potential contribution of future immigration. There are a few exceptions, but these refer to countries experiencing demographic collapse and they are based on unrealistic assumptions about the inter-generational allocation of taxation and government expenditure. With more realistic assumptions, the fiscal contribution of immigration is relatively small even in these countries.

The above findings suggest that, in general, there is no strong fiscal case for or against sustained large-scale immigration. The desirability or otherwise of mass immigration should be decided on other grounds. There is a fiscal case for temporary migration, but large-scale temporary migration programmes are notoriously difficult to implement, especially in liberal democracies where enforcement is inhibited by human-rights law.

Appendix: The solvency conditions

The following equation is satisfied identically:

$$\frac{D_t}{(1+r)^t} = D_0 + \sum_{i=1}^{i=t} \frac{E_i}{(1+r)^i} - \sum_{i=1}^{i=t} \frac{T_i}{(1+r)^i}. \quad (\text{A1})$$

Suppose that output Y is growing at a constant rate g . Then, $Y_t = (1+g)^t Y_0$ and

$$\frac{D_t}{Y_t} = \left(\frac{1+r}{1+g} \right)^t \frac{1}{Y_0} \left[D_0 + \sum_{i=1}^{i=t} \frac{E_i}{(1+r)^i} - \sum_{i=1}^{i=t} \frac{T_i}{(1+r)^i} \right]. \quad (\text{A2})$$

If $r > g$ the right-hand side of this equation will explode without limit unless the term in square brackets goes to zero. Thus, for sustainability the following condition must be satisfied:

$$D_0 + \sum_{i=1}^{i=\infty} \frac{E_i}{(1+r)^i} - \sum_{i=1}^{i=\infty} \frac{T_i}{(1+r)^i} = 0. \quad (\text{A3})$$

If $R = r$ this condition is identical to the 'inter-temporal budget constraint' given in equation (1).

To see what happens when $r < g$, assume that taxes and expenditure satisfy equation (3) of the text, i.e.

$$\frac{T_i - E_i}{Y_i} = \frac{r - g}{1 + g} \left(\frac{D}{Y} \right)^* \quad \text{for } i > 0. \quad (\text{A4})$$

Government debt satisfies the following difference equation

$$D_t = (1 + r)D_{t-1} + E_t - T_t. \quad (\text{A5})$$

Since $Y_t = (1 + g)^t Y_0$ equations (A4) and (A5) imply that

$$\frac{D_t}{Y_t} = \left(\frac{1 + r}{1 + g} \right) \frac{D_{t-1}}{Y_{t-1}} - \frac{r - g}{1 + g} \left(\frac{D}{Y} \right)^*. \quad (\text{A6})$$

For $r < g$ the ratio D_t/Y_t converges to the desired limit $(D/Y)^*$. Moreover,

$$D_0 + \sum_{i=1}^{i=t} \frac{E_i}{(1+r)^i} - \sum_{i=1}^{i=t} \frac{T_i}{(1+r)^i} = D_0 - \frac{r-g}{1+g} \left(\frac{D}{Y} \right)^* \sum_{i=1}^{i=t} \frac{Y_t}{(1+r)^i}. \quad (\text{A7})$$

Noting that $Y_t = (1 + g)^t Y_0$ it follows that

$$D_0 + \sum_{i=1}^{i=t} \frac{E_i}{(1+r)^i} - \sum_{i=1}^{i=t} \frac{T_i}{(1+r)^i} = D_0 + \left(\frac{D}{Y} \right)^* Y_0 \left(\left(\frac{1+g}{1+r} \right)^t - 1 \right). \quad (\text{A8})$$

Since $r < g$, the right-hand side of the above equation increases without limit as t goes to infinity. Hence the sum on the left-hand side does not converge to zero and the inter-temporal budget constraint (A3) is not satisfied.

References

- Access Economics (2001), 'Impact of Migrants on the Commonwealth Budget', Summary Report, 2000–01 Update, Canberra, Department of Immigration and Multicultural Affairs.
- Angrist, J. D., and Kugler, A. D. (2003), 'Protective or Counter-Productive? Labour Market Institutions and the Effect of Immigration on EU Natives', *The Economic Journal*, **113**(488), F318–22.
- Auerbach, A., and Oreopoulos, P. (2000), 'The Fiscal Effects of US Immigration: A Generational-accounting Perspective', in J. Poterba, (ed.), *Tax Policy and the Economy*, 14, 123–56.
- Blanchflower, D., Saleheen, J., and Shadforth, C. (2007), 'The Impact of Recent Migration from Eastern Europe on the UK Economy', Bank of England, available at <http://www.bankofengland.co.uk/publications/speeches/2007/speech297.pdf>
- Bonin, H. B. (2001), 'Fiskalische Effekte der Zuwanderung nach Deutschland: Eine Generationenbilanz', Discussion Paper No. 305, April, Bonn, IZA.
- Raffelhüschen, B., and Walliser, J. (2000), 'Can Immigration Alleviate the Demographic Burden', *FinanzArchiv*, **57**(1), 1–21.
- Borjas, G. J. (1990), *Friends or Strangers: The Impact of Immigrants on the US Economy*, New York, Basic Books.
- (1994), 'The Economics of Immigration', *Journal of Economic Literature*, **32**, December, 1667–717.
- Freeman, R. B., and Katz, L. F. (1997), 'How Much Do Immigration and Trade Affect Labor Market Outcomes?', *Brookings Papers on Economic Activity*, 1, 1–67.
- Coleman, D. (2007), 'The Economic Impact of Immigration', Submission to the House of Lords Select Committee on Economic Affairs, November.
- Rowthorn, R. (2004), 'The Economic Effects of Immigration into the United Kingdom', *Population and Development Review*, **30**(4), 579–622.

- Collado, M. D., Iturbe-Ormaetxe, I., and Valera, G. (2004), 'Quantifying the Impact of Immigration in the Welfare State', *International Tax and Public Finance*, **11**, 335–53.
- Dustmann, C., Fabbri, F., and Preston, I. (2005), 'The Impact of Immigration on the British Labour Market', *The Economic Journal*, **115**, November.
- Wadsworth, J. (2003), 'The Local Labour Market Effects of Immigration in the UK', Home Office Online Report 06/03.
- Ekberg, J. (1999), 'Immigration and the Public Sector: Income Effects for the Native Population in Sweden', *Journal of Population Economics*, **12**, 278–97.
- Fehr, H., Jokish, S., and Kotlikoff, L. (2004a), 'The Developed World's Demographic Transition—The Roles of Capital Flows, Immigration, and Policy', forthcoming in R. Brooks and A. Razin (eds), *The Politics and Finance of Social Security Reform*, Cambridge, Cambridge University Press.
- (2004b), 'The Role of Immigration in Dealing with the Developed World's Demographic Transition', Working Paper 10512, National Bureau of Economic Research
- GAD (2007), UK Government Actuary's Department Projections Database, available at http://www.gad.gov.uk/Demography_Data/Population/Index.asp?dp=Current+projections&subYear=Proceed
- Gott, C., and Johnson, K. (2002), 'The Migrant Population in the UK: Fiscal Effects', Home Office Research, Development and Statistics Directorate Occasional Paper No. 77, London, Home Office.
- Hatton, T. J., and Tani, M. (2005), 'Immigration and Inter-regional Mobility in the UK, 1982–2000', *The Economic Journal*, **115**, November.
- Health Protection Agency (2006), 'Migrant Health. Infectious Diseases in Non-UK Born Populations in England, Wales and Northern Ireland, A Baseline Report—2006', November, London, Health Protection Agency.
- (2007), 'Number of Persons Accessing HIV-related Care: Survey of Prevalence of HIV Infections Diagnosed (SOPHID)', National Data Tables, available at http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1203064764730
- Huddle, D. (1993), 'The Net National Cost of Immigration', Houston, Rice University, mimeo.
- Immigration Research Programme (1999), *Fiscal Impacts of Migrants to New Zealand*, Department of Labour, New Zealand.
- Jean, S., and Jiménez, M. (2007), 'The Unemployment Impact of Immigration in OECD Countries', Economics Department Working Paper No. 563, Paris, Organization for Economic Cooperation and Development.
- Lee, R., and Miller, T. (1998), 'The Current Fiscal Impact of Immigrants: Beyond the Immigrant Household', in J. Smith and B. Edmonston (eds), *The Immigration Debate*, Washington, DC, National Academy Press.
- (2000), 'Immigration, Social Security, and Broader Fiscal Impacts', *American Economic Review: Papers and Proceedings*, **90**(2), 350–4.
- Mayr, K. (2005), 'The Fiscal Impact of Immigrants in Austria: A Generational Accounting Analysis', *Empirica*, **32**(2), 181–216.
- Migration Watch UK (2006), 'The Fiscal Contribution of Migrants (Revised)', Briefing Paper No. 1.10, August, available at http://www.migrationwatchuk.com/Briefingpapers/economic/1_10_Fiscal_Contribution_of_Migrants_Aug_06.asp
- Moscarola, F. C. (2001), 'The Effects of Immigration Inflows on the Sustainability of the Italian Welfare State', CEPR Working Paper 6/01, Turin, Center for Research on Pensions and Welfare Policies.
- ONS (2008), Reply on 16 January by Karen Dunnell, Director of the Office for National Statistics, to a written Parliamentary Question by James Clappison MP, Office for National Statistics.
- Passel, J. S. (1994), 'Immigration and Taxes, A Reappraisal of Huddle's The Cost of Immigrants', Washington, DC, The Urban Institute, mimeo.
- Pederson, L. H. (2002), 'Ageing, Immigration, and Fiscal Sustainability', DREAM, Copenhagen, mimeo.
- Roodenburg, H. J. (2003), 'Immigration', CPB Report 2003/2, The Hague, CPB.
- Euwals, R., and Ter Rele, H. (2003), *Immigration and the Dutch Economy*, The Hague, CPB Special Publications, available at <http://www.cpb.nl/eng/pub/cpbreeksen/bijzonder/47/bijz47.pdf>
- Rothman, E. S., and Espenshade, T. J. (1992), 'Fiscal Impacts of Immigration to the United States', *Population Index*, **58**(3), 381–415.
- Rowthorn, R. E. (2007), 'The Economic Impact of Immigration', Submission to the House of Lords Select Committee on Economic Affairs, November.

- Rowthorn, R. E. (2008), 'The Fiscal Effects of Immigration: A Critique of Generational Accounting', Working Paper No. 27, Oxford Centre for Population Research, Oxford University.
- Ruhs, M., and Martin, P. (2008), 'Numbers vs Rights: Trade-offs and Guest Worker Programs', *International Migration Review*, **42**(1), 249–65.
- Salt, J. (1991), *Current and Future International Migration Trends Affecting Europe*, Report to the Council of Europe Fourth Conference of European Ministers Responsible for Migration Affairs, Luxembourg, September, Strasbourg, Council of Europe.
- (1997), 'International Movements of the Highly Skilled', International Migration Unit Occasional Papers No. 3, Paris, Organization for Economic Cooperation and Development.
- (2003), *International Migration and the United Kingdom*, Report of the United Kingdom SOPEMI Correspondent, London, Migration Research Unit, Department of Geography, University College London.
- Schultz-Nielsen, M. L. (2001), *The Integration of Non-Western Immigrants in a Scandinavian Labour Market: The Danish Experience*, Copenhagen, Statistics Denmark.
- Smith, J., and Edmonston, B. (eds) (1997), *The New Americans: Economic, Demographic and Fiscal Effects of Immigration*, Washington, DC, National Research Council, National Academy Press.
- Sriskandarajah, D., Cooley, L., and Reed, H. (2005), *Paying their Way: The Fiscal Contribution of Immigrants in the UK*, London, IPPR, April.
- Storesletten, K. (2000), 'Sustaining Fiscal Policy through Immigration', *Journal of Political Economy*, **108**(2), 300–24.
- (2003), 'Fiscal Implications of Immigration—A Net Present Value Calculation', *Scandinavian Journal of Economics*, **105**(3), 487–506.
- Ter Rele, H. (2003), 'The Fiscal Impact of Immigration', CPB Report 2003/2, The Hague, CPB, 23–8.
- UN (2007), *World Population Prospects: 2007 Revision*, United Nations, Department of Economic and Social Affairs, Population Division, New York.
- Van Dalen, H. P., and Henkens, K. (2007), 'Longing for the Good Life: Understanding Emigration from a High-income Country', *Population and Development Review*, **33**(1), 37–66.
- Wadensjö, E. (1999), 'Economic Effects of Immigration', In D. A. Coleman and E. Wadensjö, *Immigration to Denmark: International and National Perspectives*, Aarhus, Aarhus University Press, 290–328.
- Weber, R., and Straubhaar, T. (1996), 'Immigration and the Public Transfer System: Some Empirical Evidence for Switzerland', *Weltwirtschaftliches Archiv*, **132**(2), 330–55.