Analysis of the Impacts of Migration

Migration Advisory Committee

January 2012

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Chairman's Foreword

The Migration Advisory Committee (MAC) usually examines migration policy issues. These have included: limits on Tier 1 and Tier 2 migrants; criteria for settlement under Tier 2; and provision of the list of jobs and occupations where there is a labour shortage that might sensibly be filled by immigration. This report, by contrast, deals with conceptual issues and methods of investigation. Government policies require an Impact Assessment (IA). This permits comparisons of costs and benefits of, for example, a new road compared with extra safety regulations. Most new immigration policies are also subject to an IA. Our remit requires us to evaluate the present method used in immigration IAs and to suggest alternatives.

This report concentrates on three areas. First, whose welfare should be considered – the 'resident' population or that of the population plus the immigrants? Second, do immigrants displace British workers in the labour market? Third, how can less easily monetised factors – for example, congestion, crime and consumption of education and health services – be included in the calculation? It cannot be emphasised too strongly that there are no unambiguous answers to each of these three questions. They require judgement and, sometimes, guidance from democratically elected politicians – for example, on who counts as a resident for these purposes.

On the first issue, when a new motorway is being considered the IA is relatively straightforward because the UK population is assumed constant. By contrast, changes to UK immigration regulations alter the UK population. Presently, IAs do not consider this issue. They simply calculate GDP lost or gained by less or more migration. This can lead to the odd conclusion that more immigration is automatically a good thing because it raises GDP. One solution often proposed is to consider GDP per head rather than GDP. But this is not appropriate. Tier 2 migrants raise GDP per head mainly because they have higher pay and employment rates than natives. Essentially GDP per head is given a boost via a batting average effect. But it is the immigrants themselves, rather than the extant residents, who are the main gainers. Therefore we suggest that the GDP of residents should be the focus of the IA. The resident population gain via any 'dynamic' effects of skilled immigration on productivity and innovation – these exist and may be large, but they are elusive to measure.

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There is an important caveat here. We are living in troubled times for the public finances. Skilled migrants are, on average, net contributors to the public finances. HM Treasury takes total spending as fixed over a Spending Review period. Therefore from this viewpoint lower levels of skilled migration simply worsen the public finances. However, there is room for debate over whether or not this is the right way to think about immigration and the public finances.

The second issue is potential displacement of British workers by migrants. Previous academic studies differ in their conclusions on this important matter – vital to carrying out the IA. Therefore we undertook our own analysis. Our study has numerous qualifications and caveats. In particular, any link between immigration and employment of British-born people cannot be proved to be causal. Rather, it should be thought of as an association.

We find no association between working-age migrants and native employment: (i) in buoyant economic times; (ii) for EU migrants; (iii) for the period 1975-1994. By contrast, we find a negative association between working-age migrants and native employment: (i) in depressed economic times; (ii) for non-EU migrants; (iii) for the period 1995-2010. A ballpark estimate is that an extra 100 non-EU working-age migrants are initially associated with 23 fewer native people employed. Such evidence suggests that successive governments since 2008 have been right to make non-EU migration more selective. It also leads, tentatively, to the conclusion that the present assumption in IAs that none of the output lost by lower migration is made good by higher employment of British workers is sometimes wrong and needs amending.

But this possible displacement of British workers only holds for those migrants who have been here for under five years. Both EU and non-EU migrants who have been in the UK for over five years are not associated with displacement of British born workers. Between 1995 and 2010 employment of such working age migrants rose by approximately 2.1 million. The associated displacement of British born workers was, on our calculations, around 160,000 of the additional 2.1 million jobs held by migrants, or about 1 in 13.

Immigrants produce and consume health and education services, add to congestion and, potentially, impact on crime, cohesion and integration. Ideally, such effects should be monetised and incorporated into the IA. As we only had three months to write this report, we have not been able to produce definitive guidance on such impacts. But we suggest ways in which future IAs will gradually be able to incorporate such impacts to provide a more complete picture of any changes to the immigration regime.

Our analysis leads to a number of conclusions concerning IAs on migration policies:

- The focus should be on the Net Present Value (NPV) of the output of residents, however defined, rather than residents plus migrants.
- There are two crucial factors in measuring the impact of immigration on residents' output. Thus far IAs on migration policies have largely ignored such crucial factors, probably because they are difficult to measure. They are:
  (a) Dynamic effects of immigration on productivity. For example, what happens to foreign direct investment if skilled

immigration is made more difficult? Or would financial and business service firms be more likely to locate in the UK if immigration is made easier?

(b) Extra congestion, widely defined, caused by extra migrants. Examples include access to, and quality of, public services and impact on rents and house prices.

- When calculating the NPV of residents' output some estimate of any displacement of British workers by migrants (or replacement if migration is cut) needs to be made. There is no unique replacement/displacement rate: it has to be estimated case by case. But the present assumption of zero displacement is not always correct.

- The calculation of the NPV of residents' output should normally be supplemented with a discussion of the distributional consequences – immigration has variable impacts depending on which element of the resident population is under consideration.

The MAC is again indebted to its secretariat. This is our fourth major report in just over three months. It required deep thinking, analytical ability and some intense consultation. Our secretariat excelled on each matter.

Professor David Metcalf CBE

The Migration Advisory Committee and secretariat

Chair

Professor David Metcalf CBE

Members

Dr Diane Coyle OBE

Dr Martin Ruhs

Professor Jonathan Wadsworth

Professor Rob Wilson

UK Commission for Employment and Skills representative

Lesley Giles

Home Office representative

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Vanna Aldin; Samantha Allen; Anne Ball; Alex Barr; Jeremy Clarke; Ros Coles; Cordella Dawson; Stephen Earl; Emily Eisenstein; Mark Franks (head of secretariat); Jocelyn Goldthorp; Kathy Hennessy; Kyle Magee; Daniel Pease

Summary

Context (Chapters 1 and 2)

1. We were commissioned to *"research the labour market, social and public service impacts of non-EEA migration; and to advise on the use of such evidence in cost-benefit analyses of migration policy decisions"*.

2. We considered three main themes. The first was how to interpret evidence relating to the impacts of migration on the economy, public services and society within a cost-benefit analysis of migration policy decisions, as carried out by the Government in official Impact Assessments (IAs). The second and third themes had a more empirical focus on the labour market impacts of migration and, separately, the public service and social impacts of migration.

3. It was necessary to focus on a limited number of key themes to keep this commission manageable and deliverable. The themes do not capture all of the issues we could have considered. For instance, the need to ensure that the administrative burden of policy changes on employers is fully reflected in IAs was mentioned to us on several occasions in discussions relating to this report. Our lack of detailed coverage of such impacts does not indicate that we think these should not be fully and realistically set out in IAs or taken into account in making policy decisions.

4. Our focus in this report is primarily on migration through Tiers 1, 2 and 4 of the Points Based System (PBS). The Home Office has recently published IAs relating to changes to Tiers 1 and 2 and Tier 4, which we considered for our review. We also took account of the official Government guidance on IAs and the HM Treasury 'Green Book' Guidance on appraisal and evaluation in central Government.

5. Regarding **the overall approach to cost-benefit analysis,** the Green Book states that the impacts on non-UK residents and firms should be identified and quantified separately, where it is reasonable to do so, and that, generally, proposals should not proceed if there is a net cost to the UK.

6. Following an inquiry into the economic impact of immigration, House of Lords (2008) concluded that the focus of analysis should be on the effects of immigration on Gross Domestic Product (GDP) per head of the resident population, rather than on overall GDP. The House of Lords also expressed the

view that the biggest beneficiaries of international migration are migrants themselves.

7.   Previous departmental practice when attempting to quantify the labour market impact of migration has been to focus on the impact of migrants on total overall GDP, rather than on GDP per head and/or the net benefit to the resident population (however defined).

8.   Current IA practice condenses the impacts of complex migration policy changes down to a single number (the Net Present Value, or NPV). The NPV attempts to measure the net value (i.e. benefits minus costs) of a policy. In current Home Office IAs, the impact of migrant labour on output is an important component of NPV. The NPV is presented in a prominent manner. This occurs regardless of whether the NPV is likely to represent an accurate and appropriate measure of the net cost or benefit of the policy or not.

9.   In relation to **labour market impacts,** official guidance advises Government departments to consider impacts on levels of employment in terms of their supply-side impacts, which operate by altering the productive capacity of the economy.

10.   Recent Home Office IAs have, on the basis of analysis of the extant literature, assumed that migrant workers neither replace nor create additional jobs for resident workers. It is acknowledged that at a time of a low rate of economic growth there may be scope for displacement to occur, but such effects have not been quantified.

11.   Potential so-called 'dynamic effects' that could result from the impact of migration on factors such as specialisation and productivity have not been quantified in migration policy IAs on the apparent basis that, although such effects may exist and be highly important, they are difficult to measure.

12.   Regarding **public service and social impacts,** the official guidance to departments encourages quantification and monetisation of impacts where possible. But it recognises that this will not always be possible and advises that due weight be given to qualitative impacts where appropriate.

Overall approach to cost-benefit analysis (Chapter 3)

13.   Through Spending Reviews, Government budgets are, in substantial part, fixed in the short term whilst tax revenues are variable. An increase in migration will, therefore, not necessarily lead to an increase in public spending and, assuming the additional migrants work and pay taxes, will have a positive net impact on the public finances. However, even if public spending does not increase in response to a rise in migration, consumption of public services will rise and so, all else equal, the quality of those services will fall. For this reason, the impact of migration on the public finances is distinct from its economic desirability, at least in the short term.

14.   The positive impact of migration on the level of UK GDP is often cited as an argument in support of economic migration. Calculating GDP impacts on a per-

head basis can have significant implications for the apparent economic desirability of specific policies. Indeed, it is plausible that a positive impact of migration policy on GDP per head could occur alongside a negative impact on GDP.

15.   We believe that, for most migration policy purposes, impact on GDP per head is a superior decision-making metric to the impact on the level of GDP. There was broad agreement among academics that we engaged with that maximising UK GDP is not, from an economist's viewpoint, an appropriate objective for migration policy. However, GDP per head is not an ideal metric either, because it is not always an appropriate proxy for the welfare of UK residents: most of the benefits from increased GDP per head might go to the migrants themselves.

16.   When calculating (and seeking to maximise) a NPV for the purposes of a migration policy IA, we believe that the NPV should instead be based on the total welfare of the resident population. Our advice in this report is predicated on the assumption that the NPV in migration policy IAs will be calculated on such a basis in future.

17.   When considering economic, labour market, public service and social impacts, we distinguish between population effects (which assume that the relevant characteristics, such as skills, of the migrant group mirror those of the resident population) and composition effects (which account for differences in characteristics). Both population and composition

effects are ideally captured in a comprehensive cost-benefit analysis.

18.   Population effects include additional use of public services by migrants that results directly from their impact on the UK population, although to some extent this latter effect will 'wash out' because it is counter-balanced by the role some migrants play in the provision of such services and their funding of public services through the tax system. Another population effect is congestion resulting from inelastic supply. This can occur in relation to the housing market or transport networks.

19.   Composition effects include dynamic spill-over effects on the UK labour market and economy through, for example, specialisation and knowledge transfer. Such effects may have implications for productivity, trade and investment and as such are potentially highly important. But presently they are very difficult to measure.

20.   The effects that do not 'wash out' are particularly important because, to greater or lesser extents, they are relevant to all cost-benefit analyses of migration policy, regardless of the characteristics of the migrant group concerned. However, none of them can be easily captured in an NPV calculation. Also not captured are the distributional impacts of most changes to migration policy.

21.   For the above reasons, the prominent manner in which the NPV calculation is presented in IAs risks giving greater prominence to something than is justified, especially in cases where complex

policy change is being considered in the light of imperfect data.

22. The NPV can, nevertheless, be presented alongside less quantifiable or monetisable aspects of migration as a useful metric to inform policymaking. The extent of its usefulness will be contingent on the robustness of the assumptions that need to be developed and, correspondingly, the analysis and data underpinning those assumptions.

Labour market impacts (Chapter 4 and Annex)

23. Studies estimating the impact of migrants on UK wages have generally found little or no impact on average wages. However, in some studies migrants were found to increase wages at the top of the UK wage distribution and to lower wages at the bottom.

24. The evidence for the impact of migrants on employment and unemployment is mixed, with most studies estimating little or no association between migrant inflows and changes to employment or unemployment. A few studies estimate that migration is associated with a reduction in native employment or an increase in native unemployment.

25. We carried out our own analysis, examining the association between migration and native employment rates in Great Britain over the period 1975 to 2010.

26. We found a tentative negative association between working-age migrants and native employment when the economy is below full capacity, for non-EU migrants and for the period 1995-2010. As a

starting point for analysis, 100 additional non-EU migrants may cautiously be estimated to be associated with a reduction in employment of 23 native workers. But those migrants who have been in the UK for over five years are not associated with displacement of UK born workers. The change in the stock of the non-EU working age population between 2005 and 2010 was approximately 700,000. An associated displacement rate of 0.23 suggests that UK born employment was therefore 160,000 lower. Between 1995 and 2010 employment of non-British born working age people rose by approximately 2.1 million. Any associated displacement of British born workers was around 160,000 of the additional 2.1 million jobs held by migrants, or about 1 in 13.

27. It would not be appropriate to assume the same impact in a time of strong economic growth, and further research and analysis of what to assume in such circumstances would be justified.

Public service and social impacts (Chapter 5)

28. We recently commissioned and received six reports on the various public service and social impacts of migration through our external research programme, and we have drawn on these for this report.

29. Quantification and monetisation were not straightforward in any of the areas we looked at. Nevertheless, the consumption of public services, crime, and transport congestion are the areas where there is greatest scope for further conceptual

thinking, for improved data collection and for analysis to lead to reasonably robust monetary estimates of the impacts of migration.

30.   In some other areas, there is probably scope for further analysis and quantification of migration impacts, but reliable monetisation is unlikely to be possible in the near future. These are the provision of public services and the access to housing and the housing market. In terms of social cohesion and integration, there is limited scope for either robust quantification or monetisation of the impacts of migration at national level. In addition, there are many diverse impacts of migration that we have not considered at all in this report.

31.   Some key themes emerge from our examination of the evidence. First, in some areas there appears to be a common theme of migration impacts converging towards the average for UK nationals as migrants remain in the UK over time.

32.   A second theme was lack of data. Ideally, we would have better longitudinal data that allow us to track individual migrants' behaviour and consumption patterns over their lifetime. Furthermore, while some datasets exist that enable analysts to consider particular social issues, such as levels of cohesion and integration within a particular region or local authority, they do not allow analysts to isolate the specific impact of particular types of migrant. Nor do they tell us about the concentrated or localised impacts of inward migration.

33.   A third theme was the conceptual difficulties in defining the

impacts of migration. Issues included the inter-dependencies between the impacts, a lack of a counterfactual to allow us to observe what outcomes would occur with more or less migration, a lack of clear methods for dealing with unequal distribution of impacts across the UK population, and the fact that context is crucial: the characteristics of migrants will vary from case to case, as will the geographical or economic context that mediates the impacts.

Conclusions (Chapter 6)

34.   **The Net Present Value (NPV) as calculated in migration policy Impact Assessments should be based on total welfare of the 'resident' population**. Such an approach can be justified on its own merits and is also supported by the Government's official Green Book guidance (HM Treasury, 2003) on policy appraisal and evaluation.

35.   We intentionally do not precisely define what constitutes a 'resident' for these purposes. In some cases the issue will be clear-cut. In others it is more open to normative judgement. It is for the Government, not this Committee, to make such judgements.

36.   It follows from the above that **changes in wages or foregone wages received by 'non-residents' (net of tax) should not be a component of the NPV calculation**. Foregone migrant earnings were a major factor influencing the NPV calculation (minus £2.4bn in the main case) in the recent Home Office IA for changes to Tier 4 and the Post-Study Work Route of the PBS, although the extent to which implementing our recommendation

would retrospectively affect the results of that IA would depend on the definition of resident that is used.

37. The key factors that are highly relevant and would ideally be captured in the NPV calculation are:

- **'dynamic effects'** on the UK labour market and economy through facilitation of specialisation and knowledge transfer;

- **impacts on employment and employability of UK workers** who may exit or be excluded from the labour market for periods as a result of migration;

- the **net public finance and public service impact of migrants**, which would offset tax contributions and the role migrants play in providing public services against the impact on consumption of state benefits and public services; and

- what might broadly be termed as **congestion impacts** of migration, including those resulting from the impacts on transport networks and the housing market.

38. However, predicting and satisfactorily monetising consumption by non-residents of all public services is challenging. One challenge is deciding on appropriate time horizons for analysis. Another is accounting for so-called public goods, such as defence. Data on, and estimates of, consumption of services by migrants are also highly limited. Even in those areas where estimates have been produced they are subject to considerable uncertainty in terms of their short-

term and, more so, long-term reliability.

39. Furthermore, dynamic effects, despite being potentially highly important are difficult to even define precisely, let alone quantify and monetise robustly. Data and conceptual difficulties mean robust monetisation of congestion effects is also not possible. In terms of labour market impacts, we have provided some estimates in this report which can potentially be used as a basis for estimates in future cost-benefit analysis, but we have also emphasised the tentative and context-specific nature of these estimates, and the need for further analysis and consideration.

40. It is therefore clear that, on the basis of current data and knowledge, any attempt to calculate the NPV of migration policies will be subject to considerable uncertainty and likely biases.

41. In addition, unless a crude adjustment is made, a typical NPV calculation only estimates the aggregate impact of a change in migration policy. Distributional impacts of changes to migration policy are not captured, even though such impacts will often be a major consideration for policymakers.

42. **Practically, until the data and conceptual difficulties are more substantially overcome, the optimal approach may be to exclude gross (rather than net) migrant wages from the benefit side of the NPV calculation in IAs and to correspondingly exclude migrant consumption of public services from the cost side**.

43. The above approach removes one important bias, in that

it accounts for under-measurement of migrant use of public services. It also adds a potential bias in that it does not allow for the 'composition effect' whereby highly skilled migrants probably make a positive net contribution to the public finances at least in the short-term. But our approach is simpler than the current approach, yet not obviously less robust.

44.   Nevertheless, our preferred approach does not eliminate potential bias from the calculation of migration policy NPVs. This leads us to two important additional conclusions. **First, for the foreseeable future, the calculated NPV of any change to migration policy should be treated with considerable caution and given only relatively limited weight in the final decision-making process. In the case of migration policy, the current IA template gives undue prominence to the NPV calculation**.

45.   **Second, the unreliability of NPV estimates in this policy area mean that the qualitative evidence base should be given correspondingly higher weight.** This should include both those impacts which can be quantified but not monetised and those which cannot be reliably quantified.

46.   When setting out the qualitative evidence base, particular attention should be paid to: 'dynamic' economic and labour market effects; impacts on labour market outcomes for UK residents; congestion in transport networks and the housing market; the net fiscal contribution of migrants; and distributional impacts.

47.   Further consideration is also required of potential economic effects of migration through its role in influencing levels of trade, investment, tuition fees and remittances and, in particular, their impacts on the productive capacity of the economy and the welfare of UK residents.

Chapter 1   Introduction

1.1   The Migration Advisory Committee

1.1   The Migration Advisory Committee (MAC) is a non-departmental public body comprised of economists and migration experts that provides transparent, independent and evidence-based advice to the Government on migration issues. The questions we address are determined by the Government. We have advised the Government previously on issues such as:

- the design of Tier 1 and Tier 2 of the Points Based System (PBS) for managed migration (Migration Advisory Committee, 2009a and Migration Advisory Committee, 2009b) and limits on Tier 1 and Tier 2 (most recently in Migration Advisory Committee, 2010);

- occupations and job titles skilled to National Qualifications Framework (NQF)[1] level 4 and above for Tier 2 of the PBS (Migration Advisory Committee, 2011a and 2011b);

- the shortage occupation lists for use in Tier 2 (most recently in Migration Advisory Committee, 2011c);

- settlement rights for Tier 1 and Tier 2 migrants (Migration Advisory Committee, 2011d);

- transitional labour market access for citizens of new EU (European Union) accession states (most recently in Migration Advisory Committee, 2011e); and

- the minimum income threshold for sponsoring spouses/partners and dependants in order to ensure that the sponsor can support his/her spouse or civil or other partner and any dependants independently without them becoming a burden on the State (Migration Advisory Committee, 2011f).

1.2   What we were asked to do and our key themes

1.2   On 3 May 2011, The Home Secretary commissioned the Committee to "*research the labour market, social and public service impacts of non-EEA migration; and to advise on the use of such evidence in cost-benefit analyses of migration policy decisions*". This report addresses that question.

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[1] The National Qualifications Framework has now been superseded by the Qualifications and Credit Framework.

We submitted our advice to the Home Secretary in December 2011.

1.3 We identified three main themes to consider, which provide the basis for the core chapters of this report. The first theme was the conceptual and methodological issue of how evidence relating to the impacts of migration on the economy, public services and society should be interpreted within cost-benefit analysis of migration policy decisions, as carried out in official Impact Assessments (IAs). The second and third themes flow from our consideration of the first, and have a more empirical focus. These were assessments of, first, the labour market impacts of migration and, second, of the public service and social impacts of migration.

1.4 It was necessary to focus on a limited number of key themes to keep this project manageable and deliverable alongside our other commissions from the Government. They are broad and complex themes but do not capture all of the issues we could have considered. For instance, the need to ensure that the administrative burden of policy changes on employers is fully reflected in IAs was mentioned to us on several occasions in discussions relating to this report. This issue, and some others, are briefly highlighted, and our lack of detailed discussion of them does not indicate that we think they are unimportant. The Government Economic Service employs over 1,000 economists and there is scope for further analysis within

Government on the basis of our report.

1.3 What we did

1.5 We put a notice on our website stating that we had received this commission from the Government and inviting interested parties to let us have their views. We wrote to selected partners we felt would be most likely to offer relevant expertise on these issues and we have extensively engaged with the academic community seeking expert advice and feedback at various stage of our work on this commission. Throughout this report where we refer to either 'corporate partners' or just 'partners' we mean all parties with an interest in our work and its outcomes, so both private and public sector employers, trade unions, representative bodies and private individuals are all included within this term.

1.6 In July we held a workshop with academics to discuss our approach to addressing the question, focusing in particular on the conceptual and methodological issues. We also met with other experts from academia, officials from government departments and other public sector bodies to discuss this work. We discussed it both individually and collectively with members of our stakeholder panel (the British Chambers of Commerce (BCC), Confederation of British Industry (CBI), the National Health Service (NHS) and the Trades Union Congress (TUC)).

1.7 Regarding our second theme of the labour market impact of migration we conducted a

literature review and carried out our own analysis to estimate the impact of migration on employment rates of natives in Great Britain. We asked Professor Stephen Nickell (University of Oxford) and Professor Mark Stewart (University of Warwick) to peer review the econometric analysis. The main results of this analysis are presented in Chapter 4, and discussed in more detail in the Annex.

1.8   Regarding our third theme, we previously considered the economic, public service and social impacts of migration in Migration Advisory Committee (2010). In order to further advance our assessment in this report of the public service and social impacts of migration, we commissioned six research projects. These projects considered the impact on migration in the UK on:

- transport congestion;

- access to housing and the housing market;

- crime and victimisation;

- the consumption of health-, social care- and education-related services;

- the provision of public services; and

- social cohesion and integration.

1.9   The findings from these projects have fed into this report and the final reports for each of the six projects are also publicly available on our website. In September we

hosted a workshop at which the emerging findings of the six research projects on the various public service and social impacts of migration were presented and discussed. The workshop also considered how the various impacts might be considered alongside one another in an economic cost-benefit framework or, more practically, within an official Impact Assessment (IA).

1.4   Structure of this report

1.10   Chapter 2 sets out relevant context in terms of policy and information on IAs in principle and practice. Chapter 3 discusses, in conceptual terms, how migration impacts should be used within cost-benefit analysis of policy decisions. Chapter 4 discusses the impacts of migration on the labour market and Chapter 5 presents and discusses the main findings from the research projects on social and public services impacts of migration. Chapter 6 summarises our conclusions and presents our recommendations. It also sets out areas for potential future analysis and research. Annex A presents our analysis of the association between migration and native employment in Great Britain over the period 1975 – 2010.

1.5   Thank you

1.11   We are grateful to all the organisations and individuals, in particular the academics and experts, who we met with, and who took the trouble to give us their views.

Chapter 2   Context

2.1   Introduction

2.1   Our commission came in two parts. First, we were commissioned to *"research the labour market, social and public service impacts of non-EEA migration"*. On that basis, section 2.2 provides a brief overview of the Points Based System (PBS).

2.2   The second part of our commission was "*to advise on the use of such evidence in cost-benefit analyses of migration policy decisions."* In this chapter we provide factual context to that advice. In section 2.3 we discuss frameworks for cost-benefit analysis within Government and in section 2.4 we discuss specific aspects of the official guidance. In section 2.5 we discuss how those principles are applied in practice in policy Impact Assessments (IAs). Section 2.6 draws out some key points from the discussion that provide the basis for further consideration and analysis in later chapters of this report.

2.2   Immigration to the UK from outside the European Economic Area

The Points Based System

2.3   Migrants from outside the European Economic Area (EEA)

coming to the UK for the purpose of work or study must generally apply under the PBS, which consists of five tiers:

- **Tier 1**: For investors, entrepreneurs, exceptionally talented migrants and (until April 2012) the Post-Study Work Route (PSWR) for migrants who have recently graduated from UK universities.

- **Tier 2**: For skilled workers with a job offer in the UK coming through the intra-company transfer, Resident Labour Market Test (RLMT), shortage occupation, ministers of religion and sportspeople routes.

- **Tier 3**: For low skilled workers needed to fill specific temporary labour shortages. Tier 3 has never been open.

- **Tier 4**: For students.

- **Tier 5**: For youth mobility and temporary workers, allowed to work in the UK for a limited period of time to satisfy primarily non-economic objectives.

2.4   Because Tier 3 is not open and Tier 5 is designed to satisfy primarily non-economic objectives, our focus in this report is primarily on migration through

Tiers 1, 2 and 4. Recent policy changes in relation to these routes are discussed below.

Recent changes to Tier 1

2.5   In March 2011, the government announced changes to the **investor and entrepreneur routes** under Tier 1 of the PBS (UK Border Agency, 2011). From 6 April 2011, Tier 1 (General) was closed for in-country applicants (having previously been closed for out of country applicants), new requirements were introduced for the investor and entrepreneur routes and a new exceptional talent route was subsequently introduced from 9 August 2011.

2.6   The **Tier 1 exceptional talent route** is for migrants who are internationally recognised as world leaders or potential world leaders in science or the arts. A designated competent body must endorse entry through this route. This route went live on 9 August 2011. A designated competent body is an organisation that can judge whether an applicant is internationally recognised in his or her field as a world-leading talent, or has demonstrated exceptional promise and is likely to become a world-leading talent. There are four such bodies: the Royal Society, the Arts Council, the British Academy and the Royal Academy of Engineering.

2.7   There is a limit of 1,000 endorsements between 9 August 2011 and 5 April 2012 and these have been assigned to the designated competent bodies in two phases: 500 are available from 9 August to 30 November, and the second batch of 500 will be available from 1 December to 5 April 2012.

2.8   In March 2011 the Home Secretary also announced a series of policy changes to Tier 4 and the Post Study Work Route (PSWR). The PSWR, which allows students two years to seek employment in the UK after their course ended, will be closed from April 2012. Those non-EEA migrants graduating from a UK university with a recognised degree, post-graduate certificate of education, or professional graduate diploma in education will be able to switch from Tier 4 into Tier 2, subject to meeting the requirements for that tier. They will need a job offer, but the employer will not be required to demonstrate that the RLMT has been met nor will they be subject to the annual limit on Tier 2 (General). The job offer must still be in a graduate-level occupation (see below), or a graduate-level job on the shortage occupation list used under the shortage occupation route.

Recent changes to Tier 2

2.9   Following an announcement by the Home Secretary in November 2010, from 6 April 2011, Tier 2 (General), which consists of the **RLMT and shortage occupation routes**, has been subject to an annual limit for 2011/12 of 20,700 places for main out-of-country applicants.

2.10   The **intra-company transfer route** is not subject to an annual limit. Migrants paid at least £24,000 but less than £40,000 and at least the appropriate rate for their occupation (set out in the relevant UK Border Agency code

of practice) will be granted leave of up to twelve months. Those paid at least £40,000 and at least the appropriate rate for their occupation will be granted leave of up to three years and one month, with the possibility of extending for a further two years.

2.11 The RLMT and intra-company transfer routes are now also restricted to 'graduate-level' occupations. The shortage occupation route is limited to graduate-level occupations and job titles. For these purposes graduate-level is deemed by the Government to be equal to National Qualifications Framework (NQF) level 4 or above (NQF4+).

2.12 In October 2011 the Government commissioned the MAC to review aspects of Tier 2, including the level of the annual limit. We will report to the Government at the end of January 2012. The details above relate to policy as it presently stands.

Recent changes to Tier 4

2.13 Changes to Tier 4 announced in March 2011 included: an increase in the required language level for degree students; a requirement that all sponsor institutions have highly trusted status; and removal of work rights for students not at universities and publicly funded further education colleges. The changes are being phased in during 2011 and 2012.

Dependants

2.14 Successful applicants under Tiers 1 and 2 may bring dependants (children, spouses, civil partners, same sex partners and unmarried partners) into the UK if they can

prove that they can maintain them. It was announced in March 2011 that under Tier 4 only postgraduate students at universities and government sponsored students would be allowed to bring their dependants to the UK in the future.

Other routes

2.15 Certain migrants of non-EEA nationality can enter the UK through routes other than those that are part of the PBS. These routes include UK ancestry, so-called 'permit free' employment which covers some types of work that do not require either a work permit or certificate of sponsorship, and the family migration route. Non-PBS routes of non-EEA migration to the UK were discussed in Migration Advisory Committee (2010) and the family route was discussed in detail in Migration Advisory Committee (2011f). Although the primary focus of this report is on PBS migration, some of the analysis and conclusions in this report could be applied to non-PBS routes too.

2.3 Frameworks for cost-benefit analysis in Government

2.16 In 2008 the House of Lords Select Committee on Economic Affairs reported on the economic impact of immigration (House of Lords, 2008). We discuss some of the key findings below. We then discuss official guidance on cost-benefit analysis as applied in Government IAs, which aims to draw on and be consistent with the 'Green Book' (HM Treasury, 2003) guidance on appraisal and evaluation of Government

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policies. We also discuss the role of the Regulatory Policy Committee (RPC).

House of Lords inquiry into the economic impact of immigration

2.17 House of Lords (2008) aimed to address key questions about the economic impact of immigration on the resident population in the UK. The discussion was based on a critical review of existing theories and written and oral evidence from a range of individuals and institutions. The questions addressed were chosen to reflect the key themes in the immigration debate as well as the arguments made by Government over the previous ten years.

Box 2.1: Extract from House of Lords Select Committee on Economic Affairs report on the economic impacts of immigration

"*The biggest beneficiaries from international migration are migrants themselves, as employment in higher-income countries enables them to earn higher wages and incomes than in their home countries. Immigrants' families and, in some cases, the economies of their countries of origin may also benefit. However, the economic impacts of emigration remain disputed, largely because the negative effects of the brain drain need to be balanced against the potentially beneficial effects of remittances.*

Immigration creates significant benefits for immigrants and their families, and, in some cases, also for immigrants' countries of origin. *Although these effects may be given some consideration in the design of UK immigration policies**, an objective analysis of the economic impacts of immigration on the UK should focus on the impacts on the resident (or "pre-existing") population in the UK.** This includes British citizens and non-British long term-residents but excludes new immigrants and their countries of origin.*

GDP - which measures the total output created by immigrants and pre-existing residents in the UK - is an irrelevant and misleading measure for the economic impacts of immigration on the resident population. The total size of an economy is not an indicator of prosperity or of residents' living standards.

GDP per capita is a better measure than GDP because it takes account of the fact that immigration increases not only GDP but also population. However, even GDP per capita is an imperfect criterion for measuring the economic impacts of immigration on the resident population because it includes the per capita income of immigrants, which may raise or lower GDP per capita through a compositional effect. *A new immigrant with a higher average income than the average resident worker could raise GDP per capita without necessarily changing the average income of the resident population.*

Rather than referring to total GDP when discussing the economic impacts of immigration, the Government should focus on the per capita income (as a measure of the standard of living) of the resident population."

Source: Quoted from House of Lords (2008), paragraphs 47 to 51

2.18   One particularly relevant aspect of the House of Lords inquiry for this report was its consideration of the issue of how the benefits of immigration may be captured within an economic framework and, in particular, whether the contribution of migration to overall GDP was an appropriate decision-making criterion. It concluded that "*Overall GDP... is an irrelevant and misleading criterion for assessing the economic impacts of immigration on the UK. The total size of an economy is not an index of prosperity. The focus of analysis should rather be on the effects of immigration on income per head of the resident population.*" Box 2.1 sets out in more detail the basis given for this conclusion.

2.19   Roodenburg *et al.* (2003) arrived at some similar conclusions when looking at the impact of immigration on the Dutch economy concluding that as a result of immigration *"gross domestic product will increase, but this increase will accrue largely to immigrants in the form of wages"*.

2.20   Next, we consider the official guidance on cost-benefit analysis and surrounding processes which are intended to be binding on policymakers, but which do not relate specifically to migration.

Impact Assessments and the Green Book

2.21   IAs are generally required for all UK Government interventions of a regulatory nature that affect the private sector, the third sector and public services. The Governmental guidance on IAs (HM Government, 2011a and 2011b) is owned by the Department for Business, Innovation and Skills.

2.22   The IA guidance aims to draw on, and be consistent with, the HM Treasury Green Book guidance (HM Treasury, 2003). The Green Book aims to ensure consistency and transparency in the cost-benefit analysis process throughout Government. It sets out a framework for the appraisal and evaluation of all policies, programmes and projects.

2.23   Carrying out an IA requires comparison of the costs and benefits of the proposed intervention against a counterfactual or 'do nothing' alternative. Quantification of the impacts of a proposed migration policy will therefore typically involve estimation of the proposed costs and benefits relative to what would occur if the current policy continued unchanged. Typically this will begin with an analysis of the impact on the size and composition of the migrant stock resident in the UK. Then, as far as possible, all costs and benefits of that change are monetised and profiled over time.

2.24   According to the IA Toolkit (HM Government, 2011b), the IA should set out both the direct impacts (that is, those impacts that arise directly from the policy decision) and the indirect impacts (that is, those secondary effects, including those occurring over a sustained period of time) of any particular policy. It should also consider the costs and benefits of the policy in terms of whether they are:

- transient: that is to say, the cost or benefit occurs only once as a result of the policy decision;

- recurring: that is to say, the cost or benefit is repeated over the lifetime of the policy; or

- a transfer: that is to say, the effect is neither a net cost nor a net benefit because the cost experienced by one agent is offset by a resulting benefit of equal size that is experienced by another agent.

2.25 HM Government (2011b) states that there are five levels of analysis that can be undertaken in an IA.

- Level 1 is a **description of who will be affected** by the proposals.

- Level 2 is a **full description of the impacts** (positive or negative on individual groups) and the order of magnitude of this impact (e.g. low, medium or high).

- Level 3 is a **quantification** of the effect.

- Level 4 is an **estimation of the value of the impacts by monetising the effect**, which may be only partially possible (e.g. the costs can be monetised, but the benefits cannot).

- Level 5 is a **full monetisation** of all costs and benefits.

2.26 As outlined in the IA Guidance (HM Government, 2011a), it is a minimum requirement for an IA to include analysis at Level 1 and Level 2. Analysis at Levels 3 to 5 is desirable but may not always be feasible, either due to incomplete data and / or the unfeasibility of collecting the necessary data within a suitable time period and at a reasonable cost and / or the intrinsically hard-to-quantify nature of some effects. Where quantitative analysis is not possible, qualitative analysis should be carried out at the same level of rigour (HM Government, 2011a). The aggregated net costs and benefits are used as the basis for the calculation of the Net Present Value (NPV) of the policy.

2.4 The Regulatory Policy Committee

2.27 The Regulatory Policy Committee (RPC) was established in 2009 to provide external and independent challenge on the evidence and analysis, presented in IAs, supporting the development of new regulatory measures proposed by the Government. It consists of six experts on regulation from different backgrounds in business, consumers groups, trade unions and academia. The RPC reviews all IAs accompanying regulatory proposals submitted to the Ministerial Reducing Regulation Committee (RRC), and gives its views on the IAs to RRC Ministers prior to them making final decisions on new regulatory proposals. The RPC classifies IAs as red (defined as "not fit for purpose"), amber or green and submits that classification to the relevant Government department, before the IA goes to the RRC to support their decision on clearance of the regulatory proposal.

2.5   Impact Assessment in principle

2.28   The Green Book and the IA guidance provide only limited guidance on cost-benefit analysis of migration policy. Nevertheless, some issues discussed relevant to this report are summarised in this section. Our discussion is focused around the following headings:

- The appropriate '**objective function'** or 'social welfare function' to use when calculating a NPV: the debate around GDP and GDP per head discussed above exposes some important questions about what measure of welfare the Government is attempting to maximise when it implements migration policy and the consequences for cost-benefit analysis of such policy.

- Measurement and monetisation of **labour market outcomes**: We are particularly interested for this report in estimating and valuing changes in levels and rates of employment, but also in other labour market outcomes such as earnings and hours worked.

- Measurement and monetisation of **public service impacts**: Areas of interest include measurement and valuation of the consumption of public services, including services that are directly consumed such as publicly funded healthcare and education, but also so-called 'public goods' such as national defence. The provision of public services is also of interest. For the purposes of this report, public service impacts of immigration are defined using the categorisation we used in Migration Advisory Committee (2010) so they include, but are not limited to, health-, social care- and education-related impacts.

- Measurement and monetisation of **social impacts**: Again, we follow the broad categorisation used in Migration Advisory Committee (2010) so such impacts include, but are not restricted to, those on transport congestion, access to housing and the housing market, crime and victimisation and social cohesion and integration.

- **Other issues of relevance** to analysis of migration policy: These include accounting for the impact of migration on flows of goods, services, money and capital in and out of the UK; appropriate time horizons for cost-benefit analysis; and accounting for intergenerational effects.

- **Presentation and interpretation of results**: Specifically, many impacts of migration can only be estimated rather than accurately measured and some potentially important impacts cannot be quantified at all. We looked for guidance on how, in the context of imperfect information, results should be presented and interpreted.

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Objective function

2.29 Often, in making policy decisions the Government will be concerned with achieving the best or most cost-effective outcome for a well-defined client group. In the case of migration policy it is not always self-evident whether it is the welfare of UK citizens, UK-born, current UK residents, current and future UK residents, or some measure of global welfare that the Government wishes to be maximised. As illustrated by the discussion of House of Lords (2008), the issue of whose welfare is relevant can have important consequences for assessment of the costs and benefits of immigration policy.

2.30 The Green Book states that for the impact of a government intervention to be robustly and usefully assessed, it is essential that the objective(s) of that government intervention is (are) clearly defined. Only when the objective is explicit is it possible to identify and assess the full range of options that may be available to deliver that objective. Furthermore, in a context of many diverse, and potentially competing, objectives across government, when defining the objective function of a particular government intervention it should be made clear how this is consistent with statements of government policy, departmental or agency objectives, and wider macro-economic objectives.

2.31 Generally, according to the Green Book there are two possible reasons for, or objectives of, government intervention: to correct a situation in which the free market does not or cannot deliver an economically efficient outcome (termed 'market failure'); or to redistribute wealth or resources in such a way as to improve levels of equity within the economy. Therefore, we would expect most IAs to be carried out in relation to at least one of these objectives.

2.32 The Green Book does not specifically refer to valuing the benefits of migration but does state the following: *"All impacts (including costs and benefits, both direct and indirect) on non-UK residents and firms should be identified and quantified separately where it is reasonable to do so, and if such impacts might affect the conclusions of the appraisal. Generally, proposals should not proceed if, despite a net benefit overall, there is a net cost to the UK (for instance, after taking into account environmental costs)."*

2.33 The Green Book also notes that policies might have different impacts on individuals depending on characteristics such as their income, gender, ethnic group, age, or geographical location, and recommends that the costs and benefits incurred by each of the affected groups are set out separately where this is possible It also states that "*Where it is considered necessary and practical, [cost-benefit analysis] might involve explicitly recognising distributional effects within a project's NPV*". Some guidance is provided on how to weight impacts according to relative income.

26

Labour market outcomes

2.34 The Green Book states that the impact of government intervention in terms of increasing **levels of employment** or output is usually assessed in terms of its 'additionality', or supply-side impact, which operates by altering the productive capacity of the economy. This should be measured as a net, rather than a gross, impact: that is to say, the net effect after taking into account what would have happened in the absence of the government intervention under consideration. If there is assumed to be no supply-side impact, this implies that any public spending resulting from the government intervention would be matched by a decrease in private expenditure of equal size. A non-zero supply-side impact, on the other hand, implies a net impact on economic welfare, which will need to be measured and taken into account in the assessment of impact.

2.35 The Green Book states that this net impact must be calculated with consideration of the 'leakage', 'deadweight', 'displacement', 'substitution' and 'multiplier' effects of the policy, as defined below:

- **'Leakage'** effects benefit those outside of the spatial area or group which the intervention is intended to benefit.

- **'Deadweight'** refers to outcomes which would have occurred without intervention. Its scale can be estimated by assessing what would have happened in the 'do minimum'

or 'do nothing' case (the least interventionist policy that achieves the stated objective), ensuring that due allowance is made for the other impacts which have an effect on net additionality.

- **'Displacement'** and **'substitution'** impacts are closely related. They measure the extent to which the benefits of a project are offset by reductions of output or employment elsewhere.

- **'Multiplier'** effects refer to the further economic activity, in terms of output or jobs, that results from the creation of additional local economic activity through government intervention.

2.36 According to the Green Book, the net benefit of a government intervention is equal to "the gross benefits less the benefits that would have occurred in the absence of intervention (the 'deadweight') less the negative impacts elsewhere (including 'displacement' of activity), plus multiplier effects".

2.37 In cases where the government intervention may lead to large changes in employment levels, the Green Book states that the IA should comprise a more thorough analysis of the affected labour market. This should cover the age, skills and experience of those people whose jobs are affected. These characteristics should be compared with the characteristics of the unemployed and those who have recently found employment.

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2.38 Where particular prices, such as **wages**, are expected to increase at a significantly higher or lower rate than general inflation as a result of the government intervention, the Green Book states that this relative price change should be calculated and incorporated into the IA. These price impacts should be expressed in 'real terms' or 'constant prices' (i.e. at general price level at a certain point in time). To do this, values of future costs and benefits should be deflated using a suitable forecast of inflation. For long-term future valuations, the Bank of England's annual inflation target is considered the appropriate deflator.

Public service and social impacts

2.39 The Green Book defines the social impact of the particular economic activity in terms of its costs and benefits to society as a whole. The social cost is defined as the sum of the opportunity costs of the resources used by the agent carrying out the activity, plus any additional costs imposed on society by the activity. The social benefit is defined as the sum of the benefits to the agent performing the action plus the benefit accruing to society as a result of the action. According to these definitions, all impacts, including the labour market and public service impacts discussed above are social impacts.

2.40 More in accordance with the definitions of public service and social impacts that we applied in Migration Advisory Committee (2010), are what the Green Book refers to as 'non-market impacts'

(i.e. those costs and benefits to which is not possible to attribute a market value). It contains guidance on how some of these non-market impacts might be incorporated into an IA.

2.41 Non-market impacts considered by the Green Book include health impacts, environmental impacts, and the value of preventing or reducing the likelihood of fatality and injury. The preferred approach is to estimate the market's 'willingness to pay', or 'willingness to accept', for the outcome or output of a policy intervention. This is considered to reflect consumers' value of the policy outcome as it indicates how much they would be willing to pay for it or, alternatively, how much they would need to be compensated in order to accept it. As this willingness is likely to be dependent on income levels, the valuation is obtained by averaging the willingness to pay or willingness to accept across income groups.

2.42 The Green Book outlines two approaches to monetising non-market impacts: the 'revealed preference' approach and the 'stated preference' approach. The revealed preference approach involves estimating the implicit monetary value of an impact that is revealed indirectly through an examination of consumer behaviour. For example, the value of living in an unpolluted area can be estimated by examining the relationship between house prices and pollution levels, or levels of urbanisation, across areas. The stated preference approach involves gathering data on consumers' willingness to pay for,

or accept, a policy outcome through surveys and questionnaires. As there may be little incentive to provide a correct or even realistic response to a survey or questionnaire, the revealed preference approach is generally considered preferable to the stated preference approach. However, there may not always be sufficient data to infer a monetary value using the revealed preference approach.

2.43   Where non-market impacts cannot be reliably quantified, the Green Book suggests that the IA sets out whether the government intervention is likely to have a positive or negative net impact, as well as providing a qualitative assessment of the likely size of the impact.

2.44   Another approach to monetising non-market impacts outlined in the Green Book is the valuation of time. This is useful for measuring the impact of government intervention on levels of overcrowding and congestion, for example. The Department for Transport's (DfT) approach to valuing time allocates a value depending on whether the government intervention affects an individual's working or non-working time. Under this approach, the value of working time is the opportunity cost of the time to the employer, which is equal to the marginal cost of labour. This is calculated as the gross wage rate plus non-wage labour costs such as the employer's national insurance and pension contributions. Non-working time is considered to have the same value for all members of society. Journeys to

or from work are treated as non-working time in transport appraisals.

2.45   When estimating the value of a transport policy's time impact, DfT takes into account not only the amount of time that is added to, or saved from, a journey but also the quality of the travelling conditions. As set out in the Green Book, because individuals are considered to prefer travelling in a vehicle to walking or waiting, time impacts that result in longer walking or waiting times are allocated a higher cost. Similarly, time spent on overcrowded public transport is considered more costly than time spent travelling in a private vehicle. Unreliability, measured as uncertainty around the expected journey time, is also assigned a cost. Time costs or savings are valued at the same rate per minute regardless of the extent of the time impact.

Other issues of relevance

2.46   Some other issues relevant to this report are: impacts on business; flows of money, goods, services and capital in and out of the UK; the time period over which the costs and benefits of a policy are considered; and the intergenerational effects of a policy. We discuss each of these briefly here and elsewhere in this report, albeit in less detail than for the issues outlined above.

2.47   Under the One-In One-Out Rule, government departments are required to report on the **direct net costs to business and civil society organisations**. Direct costs and benefits are those that can be identified as resulting directly from the implementation

or removal/simplification of the regulation (HM Government, 2011c).

2.48   For each administrative activity, the estimated cost is calculated by multiplying the price of the activity with the quantity. The price consists of a tariff (for example, hourly wage costs) and time (for example, the number of hours required to complete the activity). The quantity comprises the size of the population of businesses affected and the frequency that the activity must be completed each year. Therefore, if an administrative activity takes three hours to complete (time) and the hourly cost of the member of staff in the business completing it is £10 (tariff). The price is therefore (3 x £10) £30. If this requirement applied to 100,000 businesses (population) who each had to comply twice per year (frequency), the quantity would be 200,000. Hence the total cost of the activity would be (200,000 x £30) £6,000,000. Clearly the accuracy of resulting estimates will be contingent on appropriate assumptions being made about time, tariffs and frequency.

2.49   Relevant **flows of money, goods, services and capital into and out of the UK** are not limited to but could include:

- remittances in the form of money that migrants send back to their country of origin; for instance, to support their families;

- any impact that certain types migration may have on international trade or investment in the UK; and

- migrant spending on tuition fees, which can be argued to be analogous to a UK export in some senses, albeit with the service being consumed within the geographical boundaries of the UK.

2.50   The Green Book and IA guidance do not specifically discuss how such impacts should be factored into cost-benefit analyses.

2.51   Regarding **timescales**, the Green Book states that the *"costs and benefits considered should normally be extended to cover the period of the useful lifetime of the assets encompassed by the options under consideration, although, if the appraisal concerns the contractual purchase of outputs and outcomes […], the appraisal period may be different."* Therefore, as part of the IA the expected lifetime of the assets that input into the government intervention must also be considered. HM Government (2011b) states that, in the event that an appropriate appraisal period cannot be identified, the default option is to consider the costs and benefits of the policy over a 10-year period.

2.52   An annual discount rate of 3.5 per cent is used to convert all future costs and benefits into 'present values' to enable the calculation of a NPV. Discounting is a separate concept from inflation and is based on the principle that people generally prefer to consume goods and services now rather than in the future.

2.53   The Green Book also discusses **intergenerational effects** of government intervention in its consideration of irreversible risk.

Here, the Green Book makes clear that IAs should fully consider the costs of any irreversible damage that may arise from a government intervention, such as the destruction of natural environments or historic buildings. Such interventions are considered irreversible because the resource is no longer available to future generations.

Interpretation and presentation of results

2.54 A description of how to complete a IA template is provided in HM Government (2011b). The key outputs that Government departments are required to produce for an IA are as follows:

- The **'Summary: Intervention and Options' sheet** includes summary text on what the problem is under consideration, why Government intervention is necessary, what the policy objective is and what policy options are being considered.

- The **'Summary: Analysis and Evidence' sheet** sets out the monetised and non-monetised costs and benefits of the option, the resulting NPV and key assumptions, sensitivities and risks. At the very top of this sheet the specific policy option considered is described briefly. Below this, the best estimate of the NPV of the policy option is presented, along with a low and high estimate for the NPV of the policy option if a range of estimates have been produced.

- There is discretion for Government departments as to how to set out the **'Evidence Base'**. However, it is desirable that the following points are covered: problem under consideration; rationale for intervention; policy objective; description of options considered; monetised and non-monetised costs and benefits of each option; rationale and evidence that justify the level of analysis used in the IA; risks and assumptions; direct costs and benefits to business calculations; consideration of wider impacts including relevant specific impact analysis (e.g. small and medium-size enterprises and equalities); and a summary of the preferred option with a description of the implementation plan.

2.6 Impact Assessment in practice

2.55 The Green Book and IA guidance is designed to apply to a broad range of government activity. This means that, although the guidance is intended to provide a broad framework, it cannot be expected to provide detailed guidance on cost-benefit analysis of a specific policy area. Some Government departments produce their own detailed supplementary guidance. For example, the DfT publishes Transport Analysis Guidance (Web TAG) on its website.[2]

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[2] See http://www.dft.gov.uk/webtag/index.php

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2.56 In many areas of policy, including migration, formal published guidance does not exist but cost-benefit analysis will be taken forward through a combination of established approaches to particular common issues, and more ad-hoc application of economic thinking and judgement to particular circumstances. Therefore, to understand the current approaches taken, we examined two recent and relevant published Home Office IAs:

- Migration Permanent Limit (Points Based System Tier 1 and Tier 2), March 2011 (Home Office, 2011a), referred to as the 'annual limits IA' elsewhere in this chapter.

- Reform of the Points Based System Student (PBS) immigration system, June 2011 (Home Office, 2011b), referred to as the 'Tier 4 IA' elsewhere in this chapter.

2.57 In addition, we considered the IA relating to phasing out the default retirement age (DRA) (Department for Business, Innovation and Skills, 2011a). We refer to this as the 'DRA IA'. We examined it both because it considers labour market impacts of a policy in a different sphere to migration and because it was not produced by the Home Office, potentially allowing us to draw comparisons between the approaches taken by different Government departments. Such comparisons will necessarily be highly tentative, because time and resource constraints meant we did not carry out a full review of all potentially relevant IAs from across Government.

2.58 As with the Green Book and IA guidance, in no case do we aim to comprehensively summarise a whole IA, but we draw out some examples relevant to our consideration in this report. When looking at the IAs we focus on the same themes considered in section 2.5. The discussion in this chapter is factual and we do not critique the IAs that we consider.

Objective function

2.59 The IAs discussed in this chapter do not explicitly discuss how the objective function is defined. However, the IA template does require the policy objective and intended effects to be set out. For the annual limit IA, the stated policy objectives and intended effects are as follows:

- *"The policy objectives and intended effects are to reduce net migration and any adverse social impacts of migration; to augment the selectivity of the system so that the operation of the limit does not exclude the brightest and the best; to achieve the right balance in terms of those with the greatest potential benefit to the UK and the immediate need of employers to fill specific vacancies; to ensure that the limit operates in a way that is fair and, so far as possible, offers certainty to businesses and other users of the system; and to incentivise the skills system and encourage employers to give priority to the training and recruitment of resident workers to meet skill needs"* (Home Office, 2011a)

2.60 Stated policy objectives in reforming the student immigration system are to:

- *"Reduce the areas of the student route that are prone to abuse;*

- *Reduce net migration;*

- *Improve selectivity of students and Post-Study Work Route migrants to the UK, to ensure they are the brightest and the best and those making the highest economic contribution;*

- *Restore public confidence in the immigration system;*

- *Ensure that the system is robust and practical to enforce; and*

- *The intended effect is to have a simple and fair selection system that robustly controls against abuse."* (Home Office, 2011b)

2.61 Recurring themes are the Government's desire to reduce net migration, improve selectivity and ensure fairness. Those common themes aside, the annual limits IA is focused on the benefits to the economy, employers and resident workers while the Tier 4 IA concentrates on the linked aims of reducing abuse and increasing public confidence. Aside from the references to fairness, benefits to migrants themselves are not explicitly referenced in either statement of objectives.

Economic and labour market outcomes

2.62 The annual limits IA considered the impact of applying limits to Tiers 1 and 2 of the PBS, amending the qualification criteria, and some preliminary tightening of the settlement criteria for in-country migrants. It was estimated that, in the first 12 months of the policy, it would lead to a reduction relative to the counterfactual of 4,000 out-of-country and 7,000 in-country grants of leave to main applicants. The wider economic impacts, including those on the labour market, were not factored into the NPV calculation due to the difficulties in quantifying them, but were discussed in the text of the IA. Impacts of changes in both the number of grants and the composition of the migrant flow, in terms of factors such as earnings and occupations, were discussed. Key points made in terms of the potential labour market impacts were as follows:

- On the basis of the extant literature, it was assumed that non-migrant workers are not displaced from the labour market by migrants, although it was acknowledged that in a time when growth in the economy is less well established there might be scope for such displacement to occur.

- Lower levels of net migration will, all else equal, reduce the growth rate of the potential labour supply and therefore the rate of growth of overall GDP.

- Using earnings as a proxy for productivity, Tier 1 and Tier 2 migrants as a whole, excluding intra-company transferees, are just under twice as productive as the non-migrant population. However, the policy proposals in the IA would have a

disproportionately large effect on the relatively lower-earning Tier 1 and Tier 2 migrants. Therefore, any effects on trend growth of reducing the number of Tier 1 or Tier 2 migrants will be lower than if this targeting was not taking place.

- Due to competing effects including those outlined above, the impact of the policy on overall GDP per head could be either negative or positive.

- The longer-run impact of migration on the economy will depend on whether, and by how much, it raises productivity in the economy. The empirical literature suggests that the impact of migration on productivity may be mixed and heavily dependant on the type of migrant coming to the UK.

- Migrants may increase productivity either through a simple 'batting average' effect if they have higher productivity than non-migrants, or through increasing the productivity of UK workers through greater specialisation and knowledge transfer.

2.63 The combined impacts of the policy proposals set out in the Tier 4 IA was estimated to reduce the volume of Tier 4 and PSWR main applicant visas by 75,000 and in-country grants by 19,000 by 2015 relative to the 'do nothing' option. Because some students and their dependants also work in paid employment, and because the same assumption regarding

labour market displacement was made as in the annual limits IA, it was estimated that the proposals would have a negative impact on the level of GDP. The IA applied many of the same principles as the annual limits IA, but quantified and monetised the impacts of the policy proposals on economic output and included them in the NPV calculation. There were three elements to the estimated total output loss arising from the policy proposals:

- **Reduction in non-EEA students and their dependants working due to reduction in grants of Tier 4 visas**: To estimate the output loss from reduced student spending in the UK, the reduction in the stock of students was multiplied by their average pay and the employment rate for students. The average pay of students was proxied by estimates of student expenditure because the pay data for non-EU students was considered to be insufficient. Student expenditure data was estimated from UNITE (2007) and varied by type of institution. The employment rate for students was estimated from the Labour Force Survey (LFS). Dependants of students were assumed to have a constant level of expenditure regardless of type of institution. This was assumed to be at 50 per cent of the average level for main applicants, on the basis that fixed costs (e.g. accommodation) would be met by main applicant.

- **Reduction in the number of hours worked by the remaining stock of students due to tightening of work rights**: Output was proxied by expenditure as above. The number of students affected was multiplied by the estimated average output, employment rate and reduction in work hours.

- **Reduction in the number of students and their dependants staying in the UK to work after graduation due to closure of the PSWR**: The reduction in the stock of PSWR migrants (accounting for the fact that some students would still work in the UK following graduation through

other routes) was multiplied by the average pay of those PSWR migrants that were to be excluded by the policy proposals to estimate the associated output loss.

2.64 The total output loss resulting from reductions in the numbers of students, PSWR migrants and dependants working, and the contribution to the overall NPV calculation, is summarised in Table 2.1. Lost output accounts for approximately 90 per cent (i.e. £3.2bn of £3.6bn) of the total expected cost of the policy and, as such, plays a major role in generating the negative NPV of -£2.4bn.

Table 2.1: Costs and benefits in Home Office Tier 4 Impact Assessment preferred option, June 2011	
	4 year Net Present Value (discounted)
Reduced output from students and their dependants who can no longer come to the UK and reduced output from a change in student work entitlements	- £2.0bn
Reduced output from Post Study workers	- £1.2bn
Other costs	- £0.4bn
Total cost	**- £3.6bn**
Total benefits	**£1.2bn**
Net benefit	**- £2.4bn**

Source: Home Office (2011b) and House of Commons Home Affairs Committee (2011)

2.65 The other key costs that were monetised in the IA were the loss of student tuition fees to institutions, and reduced visa and CAS fee income for the UK Border Agency. The key non-monetised costs included: potential impacts on growth and the fiscal position; impacts on UK, EU and non-EU students; impacts on the UK population, impacts on social

cohesion and public opinion; wider impacts on public services; and wider impacts on the Higher Education sector.

2.66 The Home Secretary provided oral evidence to the Home Affairs Select Committee on 5 July 2011, during which she was asked for her response to the IA on the changes to Tier 4 policy. The

Home Secretary did not agree with the assumption made in the IA that no jobs done by Tier 4 migrants during their time in the UK would be filled by resident workers in the event that Tier 4 migrants did not come to the UK (in other words, that there would be no replacement of Tier 4 migrant workers from within the resident labour force).

2.67 The DRA IA cites previous work showing that participation and employment rates are far lower for older workers than younger age groups, and argues that some of this was due to older workers being forced to retire by their employer. Enabling these individuals to work by abolishing the default retirement age (DRA), it is argued, would *"add to effective labour supply in the economy, resulting in increased earnings for the individuals involved and increased profits for business and tax revenue for the exchequer."* In order to calculate the impact on labour supply, assumptions are made about the impact of the compulsory retirement age on retirement levels and, therefore, the likely impact of abolishing the DRA on labour supply. The increase in labour supply is then assigned a monetary value and included in the NPV calculation.

2.68 It is useful to compare aspects of the approach taken in the DRA and Tier 4 IAs:

- Both IAs assume in their main case that expanding the labour supply will not lead to displacement from the labour market of other workers. The DRA IA states that *"there isn't*

a fixed number of jobs in the economy and hence it is not a matter of older workers staying on in work at the expense of others". The Tier 4 IA says *"on the basis of the extant literature we assume no displacement of non-migrant workers by migrants, although in a time when growth in the economy is less well-established, there might be more scope for displacement to occur"* (although it does estimate the NPV under alternative non-zero assumptions regarding the replacement rate).

- In both cases, benefits to individuals from extra earnings (net of income tax and national insurance contributions) and benefits to the exchequer from direct taxation (aggregated as gross wages) are taken into account in the NPV calculation.

- In contrast to the Tier 4 IA, the DRA IA assumes that neither the sectoral distribution nor the productivity of affected workers differs from that of the workforce as a whole.

Public service and social impacts

2.69 Public service costs and benefits, and the scope for quantifying them, are discussed in the annual limits IA. The IA notes that *"Less migration will result in lower growth of pupil numbers in schools"*. It is noted that the impacts of migration will not be evenly spread across different geographical areas and that in some cases migrants can have more expensive needs than non-

migrant pupils; for example, where English is an additional language or where they arrive late in the academic year. In terms of healthcare it is noted that migrants of working age tend to make relatively light use of such services but, to the extent that some such migrants settle permanently, a continuing and perhaps growing pressure on public services would result. Impacts of migration on transport congestion, housing and social cohesion are also discussed, but no attempt is made to monetise these impacts.

2.70   The Tier 4 IA quantified and monetised three types of social impact: health, education and the criminal justice system. To assess each of these impacts, the reduction in migrant stock was divided into age groups. For each age group, the unit cost of a migrant was assumed to equal the unit cost of a non-migrant. For example, for the health impact, the unit cost was derived from the Hospital and Community Health Services per capita expenditure by age. Each of these unit costs was then multiplied by the relevant estimated reduction in the migrant stock arising from the policy proposals. This calculation was made for each year under consideration, applying the discount factor, to estimate the total monetised benefit. Other social impacts, such as on housing and public transport, were not quantified.

2.71   When giving evidence to the Home Affairs Select Committee on 5 July 2011, the Home Secretary stated that she did not believe that the Tier 4 IA took full

account of all costs and benefits of Tier 4 migration. She said that, in particular, the impact on the cost of public services, which she acknowledged could be difficult to measure, was not fully accounted for.

Other issues of relevance

2.72   The Tier 4 IA monetised the impact on **administration** requirements on businesses resulting from the proposed policy changes. On the one hand, the changes would represent a cost through a need for increased familiarisation, registration fees and other administration costs. On the other hand, these costs would be offset by the benefit to businesses of reduced administration costs resulting from a reduction in the number of Tier 4 and PSWR migrants. The monetised impact on familiarisation costs was proxied by estimating the amount of time that an administrative member of staff at a sponsoring body would need to spend reading and understanding the sponsorship rules and guidance in each year.

2.73   The limits IA made similar calculations to the Tier 4 IA on administration costs. It also included the set up costs of updating the IT infrastructure to enable the new policy to be administered, and administration costs to legal advisers.

2.74   Regarding **flows of money, goods, services and capital into and out of the UK,** tuition fees for foreign students are an important issue in the immigration context. The Tier 4 IA monetised the estimated loss of tuition fee income received by UK

educational institutions. It assumed that the replacement rate of non-EU students would be 80 per cent, so for every 10 non-EU migrants no longer able to study at all affected institutions, eight of their places would be filled by either EU or British nationals, or students on the Student Visitor Route.

2.75   Total tuition fee income loss over the four-year period examined was estimated by multiplying average annual tuition fees by institution by the estimated reduction in the volume of students in each year. Offsetting this loss was the estimated reduction in course provision costs, excluding capital costs and non-subject related administrative costs.

2.76   Department for Business, Innovation and Skills (2011b) also estimated the value of UK education exports in 2008/09. In that study, total exports include both EU and non-EU students, although most of the calculations were presented with these groups disaggregated. The estimates included a valuation of higher education, further education and language training exports (including tuition fees and other spending in the UK). The total value of tuition fee income was calculation by multiplying average fees by volumes of students for each year. This approach is therefore the same as in the Tier 4 IA.

2.77   The Tier 4 IA also monetised the reduction in fee income to the UK Border Agency. This was offset by an expected reduction in case processing and enforcement costs to the agency. It was estimated that over the four year appraisal period the UK Border Agency would receive around £160 million less in fee income compared to the do nothing case.

2.78   Regarding **timescales**, in the Tier 4 IA the impacts of the policy proposals were estimated over a four-year period (from financial year 2011/12 to 2014/15) because the objectives of the policy proposals were to reduce abuse of the student immigration system, and to reduce net migration, over the course of the parliament. The limits IA estimated the impacts over the same period for the same reason as above.

2.79   Intergenerational effects were not considered in any of the three IAs we have examined for this report.

Interpretation and presentation of results

2.80   Section 2.4 explains that the best estimate of the NPV of each policy option is presented in a prominent position near the top of the one-page analysis and evidence summary sheet in IAs. This is illustrated in Box 2.2 using the example of the Tier 4 IA. The implications of this are discussed later in this report.

Box 2.2: The Impact Assessment 'Summary: Analysis and Evidence' sheet from the Home Office Tier 4 Impact Assessment

Price Base Year 2010	PV Base Year 2010	Time Period Years 4	Net Benefit (Present Value (PV)) (£m)		
			Low: -3,641	High: -1,356	Best Estimate: - 2,438

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.1		1,275	4,786
High	0.1	1	581	2,183
Best Estimate	0.1		947	3,558

Description and scale of key monetised costs by 'main affected groups'
The key monetised costs over the four year period (in constant prices) are as follows: loss of student tuition fees to institutions (£170 million); reduced output from students and their dependants who can no longer come to the UK and reduced output from a change in student work entitlements (£2.0 billion); reduced output from Post Study workers (£1.2 billion); reduced visa and CAS fee income for the UK Border Agency (£160 million).

Other key non-monetised costs by 'main affected groups'
Key non-monetised costs include: potential impacts on growth and the fiscal position; impacts on UK, EU

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0		346	1,295
High	0	1	316	1,185
Best Estimate	0		299	1,119

Description and scale of key monetised benefits by 'main affected groups' The key monetised benefits over the four year period (in constant prices) are as follows: reduced course provision costs for the education sector (£75 million); reduced UKBA processing costs (£150 million); reduced costs for public services (£840 million); and resource savings (non-cashable) in enforcement costs of £45 million which may be used to combat more significant abuses of the immigration system that potentially result in harm to the UK economy and society.

Other key non-monetised benefits by 'main affected groups'
Non-monetised benefits will include: a reduction in abuse of the student route, a reduction in net migration, and a reduction in the risk of illegal working. Institutions who comply with the new legislation and

Source: Home Office (2011b)

2.7 Conclusions

2.81 Relevant **general or conceptual** points emerging from the discussion in this chapter include the following:

- The Green Book states that impacts on non-UK residents and firms should be identified and quantified separately where it is reasonable to do so, and that generally, proposals should not proceed if there is a net cost to the UK. A precise definition of 'UK resident' is not provided.

- Following an inquiry into the economic impact of immigration, House of Lords (2008) concluded that the focus of analysis should be on the effects of immigration on GDP per head of the resident population, rather than on overall GDP. The report also expressed the view that the biggest beneficiaries of international migration are migrants themselves.

- Previous departmental practice when attempting to quantify the labour market impact of migration has been to focus on the impact of migrants on total overall GDP, rather than per head and/or the net benefit to the resident population (however defined).

- Official guidance requires departments to give lower weight to real-terms future

costs and benefits than current ones.

- Based on our limited examination of Government IAs, the link between the stated objectives of the policy and the impacts quantified in the IA can sometimes be tangential.

- Current IA practice condenses the impacts of complex migration policy changes down to a single number (the NPV). The number is presented in a prominent manner. This occurs regardless of whether the NPV is likely to represent an accurate and appropriate measure of the net benefit of the policy or not.

2.82 Key points relating to the **labour market and economic impacts** of migration include the following:

- Departments are guided to consider impacts on levels of employment in terms of their supply-side impacts, which operate by altering the productive capacity of the economy.

- Recent Home Office IAs have, on the basis of analysis of the extant literature, assumed that migrant workers neither replace nor create additional jobs for resident workers. It is acknowledged that at a time of a low rate of economic growth there may be scope for displacement to occur, but such effects have not been quantified.

- Potential so-called 'dynamic effects' that could result from

the impact of migration on factors such as knowledge transfer, specialisation and productivity have not been quantified in migration policy IAs on the apparent basis that, although such effects may exist, they are difficult to measure.

2.83 Point relating to **public service and social impacts** include the following:

- The official guidance to Government departments on cost-benefit analysis encourages quantification and monetisation of impacts where possible. But it also recognises that this will not always be possible and encourages due weight to be given to qualitative impacts where appropriate.

- It is permitted to consider assessing public service and social impacts in a variety of ways, including their opportunity cost, willingness of individuals to pay for or accept the impact, or valuation of saved or lost time. The most appropriate and practical metric is likely to vary depending on the precise impact under consideration.

- Some impacts may be a transfer, in that the effect is neither a net cost nor a net benefit because a cost experienced by one agent may be offset by a resulting benefit of equal size experienced by another.

2.84 In this chapter we have considered opinion and guidance on how cost-benefit analysis of

migration policies should be carried out, current practice in terms of how it is carried out, and the reasons for that current practice. In Chapter 3 we provide our own conceptual consideration of how cost-benefit analysis of migration policies should be carried out and, as a result, what impacts migration policymakers would ideally want to quantify. Specific issues of measurement and quantification in terms of labour market impacts are then considered in Chapter 4. Chapter 5 then considers the same issues in terms of public service and social impacts. Chapter 6 brings our conceptual thinking and empirical analysis together to draw some conclusions on cost-benefit analysis of migration policy.

Chapter 3   Overall approach to cost-benefit analysis

3.1   Introduction

3.1   This chapter considers conceptual and methodological issues in relation to cost-benefit analysis of immigration policies. It begins by considering the appropriate 'objective function' or 'social welfare function' for use in such analyses. Next, it considers specific conceptual and methodological issues: first in relation to analysis of labour market and economic impacts of migration; and second regarding public service and social impacts. Some additional conceptual issues are then considered more briefly. Finally, some concluding remarks are provided.

3.2   Defining the objective function

3.2   Three potential methods for defining the objective function underpinning changes to migration policy are based on maximising: the level of GDP; GDP per head; and the total welfare of UK residents. These three methods are discussed in turn below.

Maximising the level of GDP

3.3   As discussed in Chapter 2, the approach taken in recent Impact Assessments (IAs) has been to estimate the impact of migration on GDP and to use that GDP impact as the basis for calculating the labour market component of the Net Present Value (NPV). For the time being we assume that migration does not affect the employment of resident workers. The validity and consequences of that assumption are discussed later.

3.4   In the simplest analysis a policy that reduces migration will reduce the level of GDP and therefore, if no other costs and benefits are taken into account, generate a negative NPV. To illustrate, consider a case where a new policy *deters* 1,000 additional net migrants per year (i.e. 1,000 migrants are permanently deterred between year 0 and year 1 and a *further* 1,000 are deterred between years 1 and 2 and so on). In other words, net migration each year is 1,000 lower than it would have been without policy change (i.e. relative to the baseline). This has a cumulative effect on the size of the resident population (i.e. it is 1,000 lower than it would otherwise have been in year 0 and 2,000 lower in year 1 etc). We assume that those migrants would have had an employment probability of 80 per cent and mean gross pay, in real terms, of £15,000.

Analysis of the Impacts of Migration

3.5 Looking at the first year impacts only, the policy would lead to an estimated output loss of £12m (1,000 x 0.8 x £15,000), or a NPV of minus £12m. A more sophisticated approach would accumulate the £12m GDP losses over a longer period, such as up to 10 years hence. In line with the population impacts, the GDP impacts are cumulative (i.e. before discounting, £12m in the first year, £24m in the second year and so on). Discounting the GDP losses by 3.5 per cent per year (as mandated by HM Treasury, 2003) and summing them up over 10 years leads to an NPV of minus £0.54bn. Unless it is offset by substantial negative public service and social impacts such an approach implies, almost by definition, that more migration is a good thing in economic terms. We believe that in reality things are more complex.

Maximising GDP per head

3.6 As well as labour market impacts, current Impact Assessment (IA) practice also allows wider public service and social impacts of migration to be captured in the NPV calculation, to the extent that such impacts can be estimated and monetised. In practice, as discussed elsewhere in this report, it is not possible to reliably estimate and monetise all public service and social impacts of migration.

3.7 A practical method to account for the fact that migrants consume public services as well as funding them through payment of taxes is to calculate the impact of a change in migration policy on GDP *per head* of the population.

Such an approach allows for the fact that alongside their impact on the level of GDP, migrants will have a direct impact on the size of the population and, therefore, consumption of public services.

3.8 Calculating GDP impacts on a per-head basis can have significant implications for the apparent economic desirability of specific policies. Indeed, it is plausible that a positive impact of migration policy on GDP per head could occur alongside a negative impact on GDP and, correspondingly, a negative NPV. This can be shown by returning to the simple numerical example discussed above. Table 3.1 below combines the same assumptions about the lost output resulting from 1,000 'deterred' migrants with an approach to estimating the impacts of migration on GDP per head as set out in Migration Advisory Committee (2010): the same policy that generated a negative NPV above has a positive, albeit small, effect on GDP per head.

3.9 We believe that, for most migration policy purposes, impact on GDP per head is a superior decision-making metric to the impact on the level of GDP. There was also broad agreement among academics we met with to discuss this commission that maximising UK GDP is not, from an economist's viewpoint, an appropriate objective for migration policy.

3.10 It is important to recognise, however, that the below calculation includes migrants in the 'population' and migrant earnings in the calculation of

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GDP. Given the GDP calculation described below is effectively an aggregation of pay effects, the reduction in GDP is, in significant part, a measure of reduced migrant welfare. To put the point differently, a migrant coming to the UK to work in a highly paid job would plausibly boost both the level of GDP and GDP per head of the whole population. Yet it does not necessarily follow that the resident population rather than the migrant will benefit even if GDP rises. As described in Chapter 2, House of Lords (2008) and other studies have reached similar conclusions.

	Table 3.1: Illustrative estimates of the one-year impact of a reduction in net migration of 1,000 on GDP and GDP per capita for a hypothetical migrant group		
	Variable	**Mid-point**	**Notes and assumptions**
A	Level GDP year 0 (£mn)	£1,404,526	Gross Domestic Product: chained volume measures, year to 2011 Q3, constant 2008 prices
B	Population effect	0.002%	% impact of 1,000 migrants on 16+ population (1,000/50,653,848)
C	Employment effect	139%	% employment rate of migrants compared to UK-born (80%/57%)
D	Productivity effect	56%	% mean earnings of migrants compared to UK-born (£15,000/£26,871)
E	Level GDP year 1 (£mn)	£1,404,504	A - [A x (B x C x D)]
F	Level population year 0 (mn)	62.262	Estimate of the total UK population from the 2009 Annual Population Survey
G	GDP per head year 0 (£)	£22,558.33	A / F
H	Level population year 1 (mn)	62.261	F - 1000
I	GDP per head year 1 (£)	£22,558.35	E / H
	Change GDP per head years 0 to 1 (%)	**0.000072%**	(I - G) / G
	Change GDP per head years 0 to 1 (£)	**£0.02**	I - G

Notes: The figures in this table are either modelling assumptions as discussed elsewhere in this chapter, or sourced from Migration Advisory Committee (2010). It has been assumed that the employment rate of the migrant group is 80 per cent and the mean annual earnings of the group is £15,000.
Source: Migration Advisory Committee calculations

3.11 In addition to simple wage effects, 'dynamic effects' resulting from specialisation and knowledge transfer were also discussed in Chapter 2. It is less clear that such benefits will be accrued by the migrant rather than the employer. The may manifest themselves in terms of increased productivity, innovation, investment or trade. But such effects are not currently included in IAs because they cannot be satisfactorily measured or estimated.

3.12 The above discussion raises the important question of whose welfare migration policy is aiming to maximise. Often, in making policy decisions, the Government will be concerned with achieving the best or most cost-effective outcome for a well defined client group. In the case of migration policy it is not always self-evident

whether it is the welfare of UK citizens, UK born, current UK residents, current and future UK residents, or some measure of global welfare that the Government wishes to maximise.

3.13   As discussed in Chapter 2, House of Lords (2008) argued that GDP per head *of the resident population* was a superior metric to the level of GDP for informing migration policy decisions. If, for convenience, we regard 'residents' as being equivalent to whichever group the Government wishes to maximise the welfare of, it follows that GDP per head of the resident population is a superior metric to simple GDP per head as calculated above. Nevertheless, it is not our preferred metric, for reasons described below.

Maximising total welfare of UK residents

3.14   We demonstrated above that switching from level of GDP (or output) as the decision-making metric to a simple GDP per head measure could actually reverse the implied economic desirability of a policy. In contrast, mathematics dictates that if we focus on the resident population, the impacts of migration policy on resident output and resident output per head will always have the same sign, because the size of the resident population is not influenced by migration policy. Focusing on total resident output is simpler, and yet just as useful for policymaking purposes as a per-head measure, so we prefer it.

3.15   An additional practical reason to favour a total output measure is that the IA template applies across all areas of government

and it may not be practical to redesign it purely to reflect the unusual ability of migration policy to influence the size of the population.

3.16   Therefore, subject to caveats discussed below, there are strong arguments for the NPV to be based on *total* welfare of the *resident* population. Such an approach can be justified on its own merits but, as described in Chapter 2, is also supported by the Government's own official Green Book guidance (HM Treasury, 2003) on policy appraisal and evaluation. **Our advice in the remainder of this report is predicated on the basis that the NPV in future migration policy IAs is calculated as a measure of impact on total resident welfare**. This raises some immediate issues, discussed below.

Issues

3.17   Above, we intentionally have not defined precisely **what constitutes a resident**. In some cases it is clear whether a person is a resident: a foreign-born individual who has obtained UK citizenship would probably be regarded by most people as a UK resident, while a citizen of a foreign country who has never lived in the UK would probably not. In some cases the issue is less clear cut. Consider, for example, a migrant under the shortage occupation route of Tier 2 who is on a path to permanent settlement, and his or her dependants. In such cases there is no unequivocal answer to the question of whose welfare 'counts' and how much. It may be

necessary to make judgements on a case-by-case basis in relation to individual IAs. Such judgements are ultimately a matter for the Government.

3.18 Nevertheless we do not think it is self-evident that migrant welfare should be given equal weight (on a per-head basis) to national welfare automatically in all IAs, even if this is only done implicitly for the want of a better weighting system. We note that, in the case of the migration IAs discussed in Chapter 2, migrant welfare did not appear prominently within the stated objectives of the policy.

3.19 The argument was put to us several times that the **impact of migration on the public finances** made the level of GDP the appropriate metric to use in migration impact assessments. Through Spending Reviews, Government budgets are, in substantial part, fixed in the short term whilst tax revenues are variable. An increase in migration will, therefore, not necessarily lead to an increase in public spending and, assuming the additional migrants work and pays taxes, will have a positive net impact on the public finances.

3.20 It does not follow from the above that impact on GDP is the right metric to inform an NPV calculation. Even if public spending does not increase in response to a rise in migration, consumption of public services will rise. All else equal, therefore, the quality of those services will be lower than it would otherwise have been. So even if migration does boost GDP and the public

finances, it does not automatically increase average welfare.

3.21 Furthermore, even if public budgets are fixed in the short term, they are not in the long term. It is plausible that public spending will increase in accordance with the rise in the population and higher tax receipts.

3.22 It is also important to note that the above discussion says little about **distribution of impacts**. The nature of migration impacts means that any policy change is likely to create winners and losers. Even if the Government wishes to maximise the welfare of 'residents', and can satisfactorily define that group, it may attach more weight to some impacts on certain residents than to others. It is conceivable that the Government's distributional or equality aims could conflict with its aims to promote economic efficiency and growth. The Green Book does discuss how to weight distributional impacts within an NPV calculation, but we believe that these are inherently normative questions to which there is no single 'right' economic answer. As described in Chapter 2, the Green Book notes that policies might have different impacts on individuals depending on their characteristics and recommends that the costs and benefits incurred by each of the affected groups are set out separately. This line of argument could reasonably be extended to suggest that separate consideration of migrants and non-migrants is justified.

3.23 The practical solution to this issue is to consider any relevant

distributional impacts alongside the NPV, and give the NPV calculation itself correspondingly appropriate weight in the final decision-making process. We return to this issue at the end of this chapter.

3.24 Finally, we note that if an output-based measure were to be used, an alternative to GDP or GDP per head would be to use Gross National Income (GNI) or GNI per head. Because GNI is defined according to ownership, it includes income receipts from the rest of the world and excludes income payments to the rest of the world. It represents a better measure of the welfare of the country's citizens if the Government's objective is to maximise the welfare of its "citizens" rather than those of its "residents". However, in practice, it should be noted that UK GDP and GNI tend to be of similar size.

3.3 Labour market impacts

3.25 Here we consider specifically how labour market impacts may be captured in a cost-benefit framework. We then consider the theory regarding the impact of migration on resident workers, and the implications for what empirical evidence may be relevant to our work.

Labour market impacts in a cost-benefit framework

3.26 As explained in Chapter 2, HM Treasury (2003) states that the impact of government intervention in terms of increasing levels of employment or output is usually assessed in terms of its additionality or supply-side impact, which operates by altering the productive capacity of the economy. In practice, as detailed above, a change to productive capacity of the economy resulting from the employment of an additional migrant is typically currently estimated by taking the migrant's gross earnings and scaling them up to account for other costs to the employer.

3.27 Assuming the migrant is classified as a non-resident, the implication of our preferred objective function is that ideally the net impact on the exchequer (both indirect and direct taxes minus any state benefits received) would contribute to the NPV in place of gross earnings. This net exchequer contribution can then potentially be offset against consumption of public services, as discussed in section 3.4.

3.28 In addition, both according to the presently used NPV methodology and our proposed one, any impacts on the productive capacity of the resident workforce need to be taken into account. The discussion in section 3.2 assumed, for simplicity, that migration had no impact on labour market outcomes, namely employment and earnings, of resident workers. This assumption is consistent with the NPV calculations carried out in support of the Tier 4 IA discussed in Chapter 2. Below we consider whether, and under what circumstances, theory tells us that the impact of migration on resident labour market outcomes will be zero, or otherwise.

Theory regarding impacts on resident workers

3.29 The so-called 'lump of labour fallacy' dictates that there are a fixed number of jobs in the economy. Because this is a fallacy, it follows that an increase (fall) in work-related migration will not lead automatically to a reduction (rise) in the employment of non-migrants (or natives). This is because an increase in the supply of labour can lead to a rise in demand for such labour. There are various potential mechanisms via which the demand for labour may be expected to increase following an increase in migration. Migrants may consume goods and services in the UK, invest money in the economy and contribute directly to the demand for labour by setting up new businesses and hiring workers. Employers may also respond to inflows of migrants by expanding production in sectors which utilise migrant-specific skills. Existing residents may employ migrants to perform tasks which they previously did not employ anybody to carry out, such as childcare, gardening or cleaning.

3.30 Dustmann and Glitz (2005) considers a simple economy where there is a free flow of capital between countries. If the skill distribution of immigrants is equal to that of natives, immigration does not change relative wages, as it does not affect the relative supply of skills. Output increases, but there are no effects on wages and employment. This is a standard theoretical result, and is consistent with, but does not prove, the theory that migration

neither displaces native workers from the labour market nor leads to the creation of additional jobs for migrant workers.

3.31 In practice, demand for labour may not adjust instantaneously to an inflow of migrant workers, meaning that in the short-term there may be impacts on the pay or employment outcomes for the resident workforce. For example, firms may initially respond to changes in the demand for their goods by running down inventories rather than increasing their demand for labour. Therefore, increased competition for jobs may have the short-term effect of reducing wages or wage growth. This may increase resident voluntary unemployment if some are unwilling to work at the new wages. Migration may also lead to increased involuntary unemployment of residents if wages do not fully adjust to the change in labour supply and firms hire migrant workers in preference to native applicants.

3.32 The extent and magnitude of any short-term effects may vary across the economic cycle of the country receiving the migrant labour. Labour demand may rise more slowly in a situation where the economy is experiencing low or negative growth and it is more difficult to obtain finance to start new businesses or expand existing ones, leading to an inelastic supply of capital.

3.33 If we relax the assumption that the skill composition of migrant workers is identical to that of the resident workforce migrants may compete for employment in certain occupations more than

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others. The impact will be unequally distributed among occupations and native groups. It is possible that low-skilled migrants will be more likely to compete for jobs with natives than high-skilled migrants, since high-skilled individuals generally work in occupations requiring more specialised skills. Highly - skilled migrants in particular may complement native labour by introducing new ideas or practices, potentially increasing the productivity of native workers or boosting innovation, trade or investment.

3.34   Firms may accommodate migrants by changing their production technologies such that they better complement the skills of incoming migrants. Lewis (2004) investigated this mechanism by studying the impact of an influx of unskilled labour to Miami in 1980 on computer usage at work. The author found that such computer usage was lower following the unexpected increase in migration, suggesting that firms accommodated the large influx of unskilled labour by adopting less skill-intensive technologies (or delaying the adoption of more skill-intensive technologies).

3.35   In the long-term the supply of capital will be elastic and demand for labour will adjust in response to migration. Native wages and employment rates may revert to the level they would have been at in the absence of the migration as the simple theoretical model predicts. The economy may react to more unskilled immigration by expanding production in sectors that use such workers more

intensively. Nevertheless, employees who withdraw from the labour market may become permanently discouraged. Dustmann and Glitz (2005) points out that if some goods are not traded on international markets this will affect the ability of the economy to respond to changes in the composition of the workforce by altering the output mix. Such rigidities may mean that short-term effects of migration actually persist in the longer-term.

Implications

3.36   At the beginning of this section, we identified two labour market impacts of migration that we believe are particularly relevant for the purposes of cost-benefit analysis of migration policies: the impact on the exchequer and the impact on labour market outcomes for resident workers.

3.37   If the migrant group affected by a proposed policy was deemed sufficiently similar in its composition to the resident workforce, the IA could focus on identifying the 'population effect' which results from a single change in the size of the population. In this case a key impact of migration is likely to be on the exchequer, although some impacts on resident workers cannot be ruled out.

3.38   If the migrant group of interest differs sufficiently in its characteristics from the resident population we may observe an additional 'composition effect'. This could further influence the public finance position, in that more highly skilled migrants will typically earn more and therefore contribute more per-head to the

exchequer: as detailed in Migration Advisory Committee (2010), migrants through Tier 2 of the Points Based System (PBS) almost certainly make, on average, a positive net contribution to the public finances. The composition of the migrant labour force could also influence labour market outcomes for resident workers, as discussed above. Importantly, the impacts on residents may differ across the skill distribution.

3.39   To summarise, economic theory shows that a range of labour market outcomes may result from policies that facilitate or allow (or deter, or prevent) particular types of migration. The actual labour market impacts of migration are, therefore, an empirical issue and are likely to vary over time. Empirical analysis of such impacts is discussed in Chapter 4. The above discussion demonstrates that useful empirical analysis would examine the impacts of migration on resident workers in both the short-term and the long-term and across different points of the economic cycle.

3.4   Public service and social impacts

3.40   In this section we discuss in a theoretical and conceptual sense how public service and social impacts may be captured in a cost-benefit framework.

Public service impacts

3.41   We define public service impacts as the effects of migration on both delivery and consumption of public services. As with labour markets, these impacts can be regarded as consisting of a combination of population and composition effects.

3.42   In the simplest analysis, the population effect in terms of public services would be counterbalanced by the contribution migrants make to the exchequer, leading to a net impact of zero: on the one hand, migrants consume public services; but, on the other, migrants work in the provision of public services and fund these services through their taxes.

3.43   Although it provides a useful starting point, the above result is contingent on strong assumptions. First, as before, for the purposes of isolating the population effect we assume that the composition of the relevant migrant population is identical to that of the resident population. Second, we assume that the public finances are in balance over the period of consideration, rather than the Government running a long-term budget deficit or surplus. There may also be short-term population effects if the supply of public services takes time to adapt to a change in the population brought about by migration.

3.44   The composition effect accounts for the fact that, in many cases, the migrant group of interest will vary significantly in its characteristics from the resident population. For instance, migrants through Tier 2 of the PBS are less likely to use healthcare services in the short-term because they tend for the most part to be in their 20s and 30s. On the other hand, the same group is of child-bearing age, meaning that their dependants may have a

significant impact on consumption of education services. Tier 2 migrants may also work disproportionately in either the public or private sectors and be clustered in particular public service occupations. For such reasons, once again, migrant impacts of this nature are ultimately an empirical issue. Analysis of public service impacts is discussed in Chapter 5, focusing in particular on health-, social care- and education-related services.

Social impacts

3.45 The social impacts of migration are potentially varied and complex. We do not aim to cover them all, and in this report we focus in particular on crime and victimisation (i.e. being a victim of crime), access to housing and the housing market, social cohesion and integration and transport congestion. Quantification of such impacts is considered in Chapter 5. Here we comment briefly on how such issues may be considered within a cost-benefit framework, again distinguishing between population and composition effects.

3.46 Regarding **crime and victimisation**, a substantial addition to the population will, all other things equal, lead to a higher level of crime than there would otherwise have been. However, migrants will also be victims of crime. The population effect of migration on crime experienced by the resident population will be zero because increasing the size of the population does not in itself increase the crime rate. It is the

composition effect (i.e. whether the relevant migrant group is more or less likely to commit crime than the resident population) that is most important for the purposes of cost-benefit analysis.

3.47 Migrants may affect the **access to housing and the housing market**. If housing supply adjusted fully and immediately in response to a change in demand resulting from a change in the size of the population there would be no impact on resident welfare, so a key consideration is likely to be the extent to which the supply of housing is actually responsive to such demand changes, and the length of the lag periods involved. The composition of migrants is likely to vary in comparison to the resident population in terms of its propensities to inhabit social, rented or purchased housing. This compositional effect will have potentially important distributional impacts. Whilst it may be possible to estimate the prevalence and magnitude such effects, it would not be straightforward to factor them into an NPV calculation.

3.48 **Social cohesion and integration** is a highly complex issue. It may be possible to estimate and quantify some social cohesion and integration impacts resulting from a change in migration policy but it is clear from the outset that such estimates can paint only a partial picture. It would not make sense to attempt to factor social cohesion and integration impacts into an NPV calculation, but it does not automatically follow that there is no value in trying to measure them and assess their magnitude. Their full importance may not be economic.

3.49 Regarding **transport congestion**, migrants use roads and public transport, but also fund them through taxes and fares. In certain circumstances, therefore, the population effect of migrants on transport congestion could be zero but, as with housing, this result depends on the extent to which the supply of transport (e.g. rail and road capacity) will respond to a change in demand. In the short-term at least, an increase in migration is likely to lead to increased transport congestion and vice versa. There will, additionally, be composition effects if, as is likely, patterns of transport use by migrants differ from those of the resident population.

3.5 Other issues

3.50 As described in Chapter 1, in this report we have taken the approach of looking in depth at some aspects of cost-benefit analysis of migration policy rather than attempting to cover all aspects of it. Nevertheless, in this section we briefly discuss some other issues emerging from this review which would usefully be considered further.

Administrative costs to employers

3.51 In our discussions with business and business representatives in relation to MAC reviews, concern is often expressed that migration policy is changed without due recognition of the costs incurred by businesses from doing so. The argument is often put that regular changes to migration policy impose administrative costs and burdens on businesses and that these should be fully recognised in IAs. Although we did not

examine the detail of how to carry out such a calculation, we agree that such factors represent a genuine economic cost and should be realistically assessed and included in any comprehensive cost-benefit analysis of a change to migration policy. The approach recommended in the guidelines looks sound but, as discussed in Chapter 2, is ultimately contingent on realistic assumptions being made about the impacts of policy change on business time and other factors.

Flows of goods, services, money and capital in and out of the UK

3.52 Chapter 2 highlighted the issue of potential economic effects of migration through its role in influencing levels of trade, investment, tuition fees and remittances. As with labour market impacts, the impacts on the productive capacity of the economy and the welfare of UK residents are again the critical issues in terms of informing the NPV calculation. There are three questions that need to be addressed. First, does (or would) the type of migration being considered have an identifiable impact on flows of goods, services, money or capital into or out of the UK? Second, by what mechanism would a change in those flows have a net impact on the productive capacity of the UK economy? Finally, what is the expected net impact on the welfare of UK residents?

3.53 In particular, given the large share of non-EEA migration to the UK accounted for by students under Tier 4 of the PBS, and frequently

cited claims that tuition fees from such students make an important contribution to the UK economy, we believe there is scope for further examination by the Department for Business, Innovation and Skills and the Home Office of whether and to what extent foreign student tuition fees boost the UK economy and, crucially, how UK residents ultimately benefit from that.

Time horizons and intergenerational effects

3.54 The issues of appropriate time horizons and accounting for intergenerational effects was raised in Chapter 2. We note that the Home Office Impact Assessment of the changes to Tier 4 had only a four year time horizon, which seems to be a short period of consideration for a policy with potential long-term impacts, and is below the recommended default standard of 10 years. We recognise that a balance needs to be struck between completely capturing net benefits over time and avoiding spurious accuracy. Also, the process of discounting means that costs and benefits in the distant future will have relatively little impact on the GDP. A sensible way of striking a balance between these competing pressures would be to calculate the NPV over a relatively short time horizon (say, 5 or 10 years) and to note any longer term considerations alongside the NPV and, importantly, give such factors appropriate weight in the decision making process.

3.6   Conclusions

3.55 When calculating (and seeking to maximise) a NPV for the purposes of a migration policy IA, we believe there is a strong argument for the objective function or social welfare function being based on the *total* welfare of the *resident* population. Our advice above and in the remainder of this report is predicated on the assumption that the NPV in future migration policy IAs is calculated on such a basis.

3.56 We intentionally do not define 'residents' precisely. This is a matter of judgement for the Government. But for our purposes the term is intended to capture those individuals with whose welfare the Government is concerned to the extent that it would want to factor it into a cost-benefit analysis of a potential change to UK migration policy.

3.57 When considering economic, labour market, public service and social impacts we distinguish between population effects (which assume that the relevant characteristics, such as skills, of the migrant group mirror that of the resident population) and composition effects (which account for differences in characteristics). Both sets of effects are ideally captured in a comprehensive cost-benefit analysis, but we note that when looking at population effects in isolation some effects may largely or entirely 'wash out'. For example, it is possible that:

- the population effect on outcomes for the UK labour force will be zero, or close to zero, particularly in the long-term;

- use of public services by migrants will be counterbalanced by the role some migrants play in the provision of such services and their funding of public services through the tax system; and

- a change in net migration could influence the level of total crime in the UK but have no impact on the crime rate or the likelihood that a UK resident would have crime committed against them.

3.58 Some other population impacts cannot be expected to fully wash out. These include:

- dynamic spill-over effects on the UK labour market and economy through specialisation and knowledge transfer (such effects may particularly not wash out in the case of selective migration through, for example, Tier 2 of the Points Based System as opposed to migration from within the EU);

- impacts on the ability of UK resident to access social or rented housing or to buy their own property;

- impacts on social cohesion and integration; and

- impacts on congestion of public transport networks.

3.59 Those population effects that do not wash out are particularly important because, to greater or lesser extents, they are relevant to all cost-benefit analyses of migration policy, regardless of the characteristics of the migrant group concerned. They are also linked by another common theme: none can be easily captured in an

NPV calculation. Also not easy to capture are the distributional impacts of most changes to migration policy, even though such impacts will often be a major consideration for policymakers.

3.60 We conclude, therefore, that the NPV should be given only limited weight as an input into the policymaking process. This opinion was supported by views expressed at our meetings with leading academics and at our academic workshop on migration impacts in September 2011. The prevalent view was that monetised estimates of some of the impacts of non-EEA migration on transport congestion and the consumption of health-, social care- and education-related services could be attempted, although these are likely to be subject to various assumptions. Academics we consulted agreed it is not possible to monetise, or even quantify, all of the impacts of migration.

3.61 The prominent manner in which the NPV calculation is presented in the IA 'Summary: Analysis and Evidence' sheet, highlighted in Chapter 2, and the limited space for qualitative evidence on the same summary sheet, risk giving greater prominence to the NPV calculation than is justified in cases where complex policy change is being considered in the light of imperfect data. There is also a risk of giving insufficient prominence to non-economic or simply less tangible factors.

3.62 The Scottish Government also wrote to us in relation to this work, expressing, among other points, a view on this matter that complements ours: "*Whilst the*

economic costs and benefits of migration, for example costs to public services and income generated by taxation, can be estimated in numerical terms, the wider benefits of migration are much harder to quantify in the same way. For example: how migration has enriched our culture and society; developed international relations with other countries; and benefited the international image of Scotland. We would therefore ask the MAC to take this into account when considering the 'cost-benefit analysis of migration policy decisions' as equal weighting should be given to these less tangible benefits alongside purely economic and measurable arguments."

3.63 Therefore, although this section has considered how, conceptually, an NPV may best be calculated it does not follow that it is advisable to use it or present it as the sole decision-making metric. The NPV can, nevertheless, potentially be presented alongside less quantifiable or monetisable aspects of migration as a useful metric to inform policymaking. The extent of its usefulness will be contingent on the robustness of the assumptions that need to be developed and, correspondingly, the analysis and data underpinning those assumptions. Chapters 4 and 5, therefore, present our analysis of the labour market, public service and social impacts of migration.

Chapter 4   Labour market impacts

4.1   Introduction

4.1   This chapter presents estimates for the impacts of migrants on the UK labour market from both past studies and our own analysis. First, we summarise the findings from past empirical studies. Second, we present the key results from our analysis of the association between migrants and native employment in Great Britain over the period 1975 to 2010. Detailed results from our analysis are presented in Annex A of this report. Third, we summarise the findings from this chapter and suggest potential assumptions for the impacts of migrants on the UK labour market that could be used to estimate the costs and benefits of proposed migration policies.

4.2   Literature review

4.2   This section summarises the findings from past empirical studies for the impacts of migrants on the UK labour market. We consider in turn evidence for the impact of migrants on:

- average wages;
- the wage distribution;
- employment;
- unemployment; and
- native mobility.

4.3   Tables 4.2, 4.3, 4.4 and 4.5 (at the end of this chapter) summarise the key findings for the impacts of migrants on average wages, the wage distribution, employment and unemployment in the UK respectively. For each study we have reviewed, these tables present the geographic coverage, the time period analysed, the main data source, the methodology employed and the estimated impact. To compare results from different studies, we have estimated the impact of an increase of 10,000 migrants on the UK labour market. These estimates provide a useful means of assessing the results form different studies. However the reader is cautioned against directly comparing them because:

- The estimates do not correct for a number of differences between studies, such as definitions of migrants (e.g. working age or all ages, A8 national[3] or foreign national); definitions of groups affected (e.g. total UK population or native population); regions; and time periods.

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[3] The A8 countries are Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

- Each underlying theoretical model is different and as a consequence the results produced may not be directly comparable.

4.4 When estimating the impact of migrants on the UK labour market there are typically two approaches; namely through static models (where the model does not include lagged variables), or dynamic models (where the model does incorporate lagged variables). It is assumed in static models that there is no difference between the short-term and long-term impacts of migrants, whereas dynamic models allow for changes in the impact of migrants over time. The majority of the studies reviewed in this chapter present static models for the impact of migrants on the UK labour market.

4.5 An important difficulty for any study into the causal effects of migration is isolating the direction of the causality. Identifying a correlation between unemployment and migration could be as consistent with a hypothesis that changes in migration lead to changes in unemployment, as it could be with a hypothesis that changes in migration are affected by changes in the job prospects of potential migrants. Different studies take different steps to address this issue: some use instrumental variables in their models and others use models believed to be less prone to the problem. Consideration of the relative effectiveness of these precautions is important when looking at the causal effect of migration.

4.6 We have classified the methodologies of these studies depending on whether they have employed the spatial correlation approach, the skill-cell correlation approach or a combination of both (referred to as 'hybrids'). The spatial correlation approach involves dividing individuals into regions. It is assumed in this approach that migrants in a given region only compete for jobs with other individuals in the same region. This approach allows researchers to estimate the impact of migrants on labour market outcomes by comparing these outcomes across regions with large and small changes in the migrant population.

4.7 The skill-cell correlation approach involves dividing individuals into skill-cells based on their characteristics; for example, by age and qualifications. It is assumed in this approach that migrants primarily compete for jobs with natives in the same skill-cell. As before, this approach allows researchers to estimate the impact of migrants on labour market outcomes by comparing these outcomes across skill-cells with large and small changes in the migrant population. Individuals may be less likely to move between skill-cells than they are to move between geographic regions, for example, due to the cost of re-skilling. As a consequence, the skill-cell correlation approach is therefore seen as one method which potentially increases the likelihood of identifying a causal effect of migration. However, the skill-cell correlation approach may underestimate the impact of migrants on the UK labour market

if migrants work in lower-skilled occupations than natives with similar characteristics.

4.8   Table 4.2 presents estimates for the impact of migrants on **average wages** in the UK. The majority of studies estimate that migrants had little impact on average wages, differing in their assessments of whether migrants raised or lowered average wages. The results from Dustmann *et al.* (2005), Dustmann *et al.* (2008), Lemos and Portes (2008), Nickell and Saleheen (2008), Reed and Latorre (2009) and Nathan (2011) suggest that an increase of 10,000 in the number of migrants in the UK increased average wages by between -£2 and +£2 per year.

4.9   Table 4.3 presents estimates for the impact of migrants on the **wage distribution** in the UK. The majority of these studies find that migrants increased wages at the top of the wage distribution but reduced wages at the bottom.

4.10   Dustmann *et al.* (2008) used UK data from 1997 to 2005 to estimate the impact of working-age migrants on the UK wage distribution. The results from this paper suggest that an increase of 10,000 working-age migrants in the UK decreased average wages by approximately £1 per year for the bottom 10 per cent of earners, but increased average wages for the median earner and the top 10 per cent of earners by approximately £4 per year and £5 per year respectively.

4.11   Nickell and Saleheen (2008) used data for Great Britain from 1992 to 2006 to estimate the impact of migrants on average wages by

occupation group and by occupation. Their results suggest that an increase of 10,000 migrants working in semi-skilled or unskilled occupations reduced average wages in that occupation by around £8 per year, and that an equivalent increase in the number of migrants working in skilled production occupations reduced average wages by around £15 per year. Migrants were found to have had little or no impact for other occupation groups. Considering the impact by occupation, an increase of 10,000 migrants working in caring personal services is estimated to have reduced average wages in this occupation by approximately £25 per year.

4.12   Manacorda *et al.* (2006) used data for Great Britain from 1975 to 2005 to estimate the impact of migration on the relative wages of natives and resident migrants and on the relative wages of native university graduates and native high school graduates. The results from this study suggest that newly-arrived migrants increased the differential between the average wages of natives and resident migrants by 5.5 per cent over the period 1975 to 2005. Newly-arrived migrants are found to have had little impact on the average wages of natives but to have reduced the average wages of resident migrants. Furthermore, the results from this study suggest that newly-arrived migrants increased the differential between the average earnings of native university graduates and native high school graduates by 0.4 per cent over the same period.

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4.13 Table 4.4 presents estimates for the impact of migrants on **employment** in the UK. Most studies conclude that migrants had little or no impact on native employment rates, even though some found that migrants were associated with a small reduction in native employment rates. Some studies explain the finding that migrants appear to have little impact on native employment by assuming that wages adjust in order to ensure no employment effects.

4.14 Dustmann *et al.* (2005) used data from 1983 to 2000 to estimate the impact of working-age migrants on native employment rates in Great Britain. The authors concluded that working-age migrants had little or no impact on overall native employment rates over this period. However, they found that working-age migrants were associated with a reduction in the employment rates of natives with intermediate qualifications (O-level qualifications or equivalent). The results from this study suggest that, on average, an increase of 100 in the number of working-age migrants in Great Britain was associated with a reduction in the number of natives with intermediate qualifications in employment by approximately 20. No statistically significant effects were found for the graduate and unqualified natives.

4.15 Jean and Jimenez (2007) used data for 18 OECD countries, including the UK, for the period 1984 to 2003 to estimate whether migrants affected the employment rates of male natives. Based on their results estimated over all countries pooled together, we

estimate that an increase of 100 working-age migrants in the UK was associated with a reduction in the number of male natives in employment of around 13 in the first year, but no association with male native employment in subsequent years. It may, however, be inappropriate to use the results from this study to estimate displacement in the UK since the authors use pooled data for 18 countries.

4.16 Reed and Latorre (2009) estimated the association between foreign nationals' National Insurance Number applications as a percentage of the working-age population and changes in employment rates by local authority in 2007. They concluded from their results that there is little evidence that migrants affected UK employment rates in this year.

4.17 Nathan (2011) used data for UK cities from 1994 to 2008 to estimate the impact of migrants on native employment rates. The author's results suggest that a one percentage point rise in the fractionalisation index (a measure of migrant diversity) decreased the average native employment rates by approximately 0.7 per cent. The association was negative and statistically significant for low-skilled and intermediate-skilled natives, but statistically insignificant for high-skilled natives. However, this study is concerned with the impact of migrants on urban economies; therefore, its results are not directly comparable with the other UK-wide studies.

4.18   Table 4.5 presents estimates for the impact of migrants on **unemployment** in the UK. Studies that focused on A8 national migrants generally found no impact of these migrants on native unemployment. However, a few studies focusing on the impact of all foreign-born migrants found tentative evidence that migrants were associated with a small rise in unemployment in the UK.

4.19   The majority of the studies estimating the impact of A8 migrants found that they had little or no impact on UK unemployment (Gilpin *et al.* (2006), Lemos and Portes (2008) and Lemos (2010)). Only Portes and French (2005) estimated that A8 migrants increased UK unemployment over the period 2003 to 2004. However, this study was updated in Gilpin *et al.* (2006), which concluded that A8 migrants had little or no impact on UK unemployment between 2004 and 2005.

4.20   Of the studies which estimate the impact of all foreign-born migrants on unemployment in Great Britain, Dustmann *et al.* (2005) estimated that migrants had little or no overall impact on unemployment rates of British natives over the period 1983 to 2000. Nevertheless, the authors estimated that migrants were associated with an increase in the unemployment rate of natives with intermediate qualifications. Their results suggest that an increase of 100 working-age migrants in Great Britain is associated with an increase of approximately 10 unemployed natives with intermediate qualifications. No statistically significant effects were found for graduate and unqualified natives.

4.21   Jean and Jimenez (2007) used data for 18 OECD countries including the UK for the period 1984 to 2003 to estimate the impact of migrants on native unemployment rates. Their results suggest that an increase of 100 working-age migrants in the UK in year 1 is associated with an increase in the number of unemployed natives in years 2 and 3 of around 34, and no association with native unemployment in later years. As mentioned before, the results from this study are not directly comparable with other UK-wide studies since the authors use pooled data for 18 countries including the UK.

4.22   We also consider the impact of migrants on **native mobility** in the UK; that is the extent to which natives relocate in different regions in response to international migrant inflows to their regions. Most studies estimate that any crowding-out effect is likely to be small. For example, Hatton and Tani (2003) used UK data for 11 regions for the period 1982 to 2000 to estimate the impact of international migrants on native mobility. They estimate that, for every 100 international migrants that entered a given region there was a net outflow of around 14 natives over this period.

4.23   Lemos and Portes (2008) estimated the impact of A8 migrants on native mobility in the UK for the period 2004 to 2006. Using data at district, county and regional level they estimate that

inflows of A8 migrants to a given region resulted in small net outflows of natives to other regions.

4.24   Giulietti (2009) used census data from 2001 to estimate the impact of net inflows of international migrants to a given local authority district on net outflows of natives and earlier migrants from that district. The author finds that, on average, for every 100 international migrants that entered a given local authority, there was a net inflow of approximately 40 natives and a net outflow of approximately 30 earlier migrants. This suggests that international migrants complement native labour but may be substitutes for earlier migrants.

4.3   MAC analysis of the impact of migrants on native employment

4.25   We have undertaken our own analysis to estimate the association between migration and the native employment rate in Great Britain over the period 1975 to 2010 using data from the Labour Force Survey (LFS). We define natives as UK-born individuals. Importantly, our analysis incorporates more recent data than those used in the studies discussed above, covering the recent UK recession. Details of the analysis undertaken and the results obtained can be found in the annex to this report.

4.26   The key problem for studies considering the impact of migration on the native employment rate is that of endogeneity. For example, a negative correlation between the

native employment rate and the migrant stock is consistent with the hypothesis that migrants reduce the native employment rate, but also consistent with the hypothesis that migrants move to regions with lower employment rates. It is therefore difficult to measure the impact of migration on the native employment rate accurately.

4.27   This study attempts to address the problem of endogeneity by controlling for time-invariant differences in the native employment rate across regions which may affect the location choices of natives and migrants. Nevertheless, our results may still be influenced by endogeneity bias due to regional labour demand shocks, measurement error, or simultaneity of migrant location choice and local area economic performance. Our findings should therefore be considered as estimating the *association* between migration and the native employment rate rather than the *impact* of migration on the native employment rate.

4.28   We have adopted a 5 per cent significance level in this study, which is typical for econometric studies. Results which are not statistically significant at the 5 per cent level have been disregarded to reduce the likelihood of over-interpreting results which may well be statistical anomalies.

4.29   Below, we summarise the key results from our analysis of the the association between migration and the native employment . We then compare our results against those obtained in similar studies.

Results

4.30   Table 4.1 presents our key results (also summarised in the annex, Table A.13) for the associations between inflows of working-age migrants and changes in native employment in the same year.

4.31   Our results suggest that a one-off increase of 100 in the inflow of working-age non-EU born

migrants is associated with a reduction in native employment of 23 over the period 1995 to 2010. Our results indicate that inflows of working-age EU migrants did not have a statistically significant association with native employment over this period.

Table 4.1: MAC estimates for the associations between 100 additional working-age migrants and native employment

Migrant group	1975-2010	1975-1994	1995-2010	Positive output gap (economic upturn)	Zero or negative output gap (economic downturn)
All foreign-born migrants	0(-)	0(-)	-23**	0(-)	-30*
Non-EU born migrants only	0(-)	0(-)	-23**	0(-)	-27*
EU (exc. British) migrants only	0(-)	0(-)	0(-)	0(-)	0(-)

Note: All estimates are for the associations between 100 working-age migrants by country of birth and the number of UK-born individuals in employment in Great Britain. Working age is defined as 16 to 59 for women and 16 to 64 for men. These estimates are taken from model 4 in Tables A.1, A.2, A.3, A.4, A.5 and A.6 of the annex. ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level (2-tailed significance levels). 0(-) means that the result is not statistically significant but that the sign of the estimated coefficient is negative.

Source: MAC analysis using data from the LFS and OECD (2011).

4.32   Further, we estimated the association between inflows of migrants and changes to native employment when the output gap was positive and when the output gap was zero or negative. A positive output gap is associated with an economic boom whereas a negative output gap is associated with slow economic growth or an economic downturn.

4.33   We estimate that an inflow of 100 foreign-born working-age migrant is associated with a reduction in native employment of approximately 30 in the same year when the output gap was zero or negative. In addition, we estimate the association to be statistically insignificant when the output gap

is positive. This result seems sensible, since migrants are more likely to compete with natives for jobs during an economic downturn when native unemployment is high and job vacancies are low.

4.34   Other results in the Annex to this report tentatively suggest that it is only recent migrants (those who have been in the UK for under five years) that are associated with possible displacement. Those migrants here for over five years are not shown to be associated with any displacement of British workers.

4.35   Furthermore, we find tentative evidence that any reduction in native employment associated with migrant inflows is equal to an

increase in native employment associated with equivalent migrant outflows.

Comparison with other studies

4.36   We estimate that an increase of 100 foreign-born working-age migrants in the UK was associated with a reduction of 23 natives in employment for the period 1995 to 2010. For comparison, estimates from Jean and Jimenez (2007) suggest that an increase of 100 working-age migrants in the UK was associated with a reduction in native employment of approximately 13 in the same year (see Table 4.4). These estimates are not directly comparable, since they differ in terms of the definitions of the methodology employed, the time periods and the regions analysed, and other data differences. Nevertheless, the similarity between our results and those from Jean and Jimenez (2007) provide some support for our findings.

4.37   Our results also corroborate those from Gilpin *et al.* (2006), Lemos and Portes (2008), and Lemos (2010) which find that A8 migrants had little or no impact on the UK unemployment rate. We estimate that EU migration had little or no impact on the native employment rate, even when testing the relationship over the periods 1975 to 1994 and 1995 to 2010 separately.

4.38   We are unaware of any studies that have estimated whether the impact of migration on the UK labour market differs over the economic cycle. Peri (2010) estimated the impact of migration on native employment in the US

over the period 1994 to 2008, considering whether the impact changed depending on whether the output gap was positive or negative. He estimated that migration had little or no impact on the native employment rate when the output gap was positive, but that migration had a small, negative short-term impact on the native employment rate when the output gap was negative. This result is consistent with the findings from our analysis.

4.4   Conclusions

4.39   This chapter has presented estimates of the impacts of migration on the UK labour market from past studies and from our own analysis. Previous studies found that migrants had little or no impact on average wages. However, migrants are found to increase wages at the top of the UK wage distribution and to lower wages at the bottom of the distribution. Most studies estimating the impact of migrants on employment and unemployment in the UK find little or no association between migrant flows and changes to employment or unemployment. However, a few studies estimate that migration is associated with a small reduction in native employment or a small increase in native unemployment.

4.40   Our own analysis of the association between migration and the native employment rate in Great Britain over the period 1975 to 2010 suggests that an increase in the number of working-age migrants is associated with a reduction in the native employment rate over the period 1995 to 2010. We also find that

working-age migrants are associated with a reduction in native employment rates when the output gap is negative or zero, normally associated with slow economic growth or an economic downturn, but no such effect is identified when the output gap is positive.

4.41 The assumptions made in any individual government Impact Assessment (IA) will, in part, depend on the policy under consideration and the labour market context. However, as a broad starting point, the following assumptions may be appropriate.

4.42 First, it may be assumed that migration has no impact on average wages, but that migration increases wages at the top of the wage distribution and lowers wages at the bottom of the wage distribution. Researchers might use the results estimated in Dustmann *et al.* (2008) for the impact of migration on the wage distribution (presented in Table 4.2).

4.43 Second, as a starting point for analysis, 100 additional non-EU migrants may cautiously be estimated to be associated with a reduction in employment of 23 native workers. But this possible displacement should not be assumed to last forever: those migrants who have been in the UK for over five years are not associated with displacement of British born workers.

4.44 Our simple approach, as set out above, could legitimately be applied in periods of either economic growth or contraction. Nevertheless, our analysis shows a statistically significant impact of

migration on native employment in an economic downturn but not in an upturn. The implications of this finding for specific future IAs may be worthy of further consideration.

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Table 4.2: Empirical studies estimating the impact of migrants on UK average wages

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on average wages (MAC estimates)	Data used in MAC estimates
Dustmann et al. (2005)	Great Britain	1992-2000	LFS	Spatial correlation approach	Change in UK-born average wages by year and region	Ratio of non-UK-born to UK-born in the working-age population by year and region	Not significant	No statistically significant effect of non-UK-born on UK-born average wages	Little or no impact on average wages	None
Dustmann et al. (2008)	Great Britain	1997-2005	LFS	Hybrid	Log average wages by earnings, region and year	Ratio of non-UK-born to UK-born in the working-age population by earnings, region and year	0.2 to 0.3	A 1 percentage point increase in the non-UK-born/UK-born ratio increased average wages by approximately 0.2 to 0.3 per cent	Between +£1.60 and +£2.30 per year	UK average gross wage, £26,510 per year (ONS, 2010). UK-born working-age population, 34.1m; and non-UK-born working-age population, 6.1m (Q2 2011 LFS)
Lemos and Portes (2008)	UK	2004-2006	WRS	Spatial correlation approach	Log average hourly wages in first differences by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	Not significant	No statistically significant impact of A8 nationals on UK-born average wages	Little or no impact on average wages	None
Nickell and Saleheen (2008)	Great Britain	1992-2006	LFS, ASHE and NES	Hybrid	Log average wages by occupation, region and year	Non-UK-born share working in a given occupation by region and year, lagged by one year	-0.04	An increase of 1 percentage points in the non-UK-born share of the workforce in a particular occupation reduced average wages of that occupation by approximately 0.04 per cent in the subsequent year	-£0.36 per year	Total population in employment, 29.1m (Q2 2011 LFS). UK average gross wage £26,510 per year (ONS, 2010)
Reed and Latorre (2009)	UK	2000-2007	LFS	Hybrid	Change in log average wages by occupation, region and year	Change in the non-UK-born share of the working-age population by occupation, region and year	-0.3	A 1 percentage point increase in the non-UK-born share of the working-age population reduced the average wage by approximately 0.3 per cent	-£2.00 per year	UK average gross wage, £26,510 per year (ONS, 2010). UK working-age population, 40.1m (Q2 2011 LFS)
Lemos (2010)	Wales	2004-2006	WRS	Spatial correlation approach	Log average hourly wages in first differences by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	3.4	A 1 percentage point increase in the ratio of A8 national WRS inflows to the working-age population increased average wages by approximately 3.4 per cent	+£22.50 per year	UK average gross wage, £26,510 per year (ONS, 2010). Working-age population, 40.1m (2011 Q2, LFS)
Nathan (2011)	UK cities	1994-2008	LFS	Spatial correlation approach	Log average hourly wages of UK-born by region and year	Fractionalisation index (measure of diversity by nationality) by region and year	Not significant	No significant impact of change in non-UK-born share of population on the average wages of the UK-born	Little or no impact on average wages	None

Note: The following acronyms have been used in this table: Labour Force Survey (LFS); Worker Registration Scheme (WRS); Annual Survey of Hours and Earnings (ASHE); and New Earnings Survey (NES). The estimates for the impact of 10,000 additional migrants may not be directly comparable between studies. For example, studies differ in terms of the definition of migrants (e.g. working-age migrants or all migrants), the coverage of wages, employment rates or unemployment rates (e.g. those of natives or the total UK population), and both the regions and time periods included in the analysis. All results presented are statistically significant at the 5 per cent level.
Source: MAC analysis of Dustmann et al (2005); Dustmann et al (2008); Lemos and Portes (2008); Nickell and Saleheen (2008); Reed and Latorre (2009); Lemos (2010); Nathan (2011); ONS (2010a); and Labour Force Survey (2011 Q2).

Table 4.3: Empirical studies estimating the impact of migrants on the UK wage distribution

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on the UK wage distribution (MAC estimates)	Data used in MAC estimates
Manacorda *et al.* (2006)	Great Britain	1975-2005	GHS, LFS	Skill-cell correlation approach	Log ratio of average wages of UK-born to non-UK-born by age, education and year	Log ratio of UK-born to non-UK-born by age, education and year	-0.16	A 1 per cent increase in the UK-born/non-UK-born ratio decreased the ratio of average wages of the UK-born and non-UK-born by 0.16 per cent	Not known	None
Dustmann *et al.* (2008)	Great Britain	1997-2005	LFS	Hybrid	Log average wages by earnings, region and year	Ratio of non-UK-born to UK-born in the working-age population by earnings, region and year	-0.5 for the 1st decile of the wage distribution, 0.6 for the median and 0.4 for the 9th decile	A 1 percentage point increase in the non-UK-born/UK-born ratio decreased average wages by approximately 0.5 per cent in the 1st decile of the wage distribution; increased average wages by approximately 0.6 per cent in the 5th decile of the wage distribution; and increased average wages by approximately 0.4 per cent in the 9th decile of the wage distribution	-£1.00 per year for the 1st decile of the wage distribution; +£3.70 per year for the 5th decile of the wage distribution; and +£5.40 per year for the 9th decile of the wage distribution	UK average gross wage: 1st decile, £6,480 per year; 5th decile, £21,221 per year; and 9th decile, £46,428 per year (ONS, 2010). UK-born working-age population, 34.1m; and non-UK-born working-age population, 6.1m (Q2 2011 LFS)
Lemos and Portes (2008)	UK	2004-2006	WRS	Spatial correlation approach	Log average hourly wages in first differences by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	Not significant for the 1st to the 5th decile of the wage distribution; results not reported for higher deciles	No statistically significant impact of A8 nationals on wages across the wage distribution	Little or no impact on wage distribution	None
Nickell and Saleheen (2008)	Great Britain	1992-2006	LFS, ASHE and NES	Hybrid	Log average wages by occupation, region and year	Non-UK-born share working in a given occupation by region and year, lagged by one year	-0.5 for semi-skilled and unskilled service occupations; -0.2 for skilled production occupations; statistically insignificant impact on managers, and professionals, and semi-skilled and unskilled production occupations. -0.3 for caring and personal service occupations	An increase of 1 percentage point in the non-UK-born share of the workforce in an occupation reduces average wages as follows: 0.5 per cent for semi/unskilled service occupations; 0.2 per cent for skilled production occupations; and 0.3 per cent for caring and personal service occupations	-£7.80 for semi/unskilled occupations; -£15.00 for skilled production occupations; -£25.30 for caring and personal service occupations	Total workforce in semi/unskilled service occupations, 7.0m; total workforce in skilled production occupations, 2.9m; average gross weekly wage in semi/unskilled service occupations, £210; average gross weekly wage in skilled production occupations, £416 (2011 Q2 LFS). Total workforce in caring personal service occupations, 1.53m; average gross annual wage in caring personal service occupations, £12,908 (ONS, 2010b)

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Table 4.3: Empirical studies estimating the impact of migrants on the UK wage distribution

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on the UK wage distribution (MAC estimates)	Data used in MAC estimates
Lemos (2010)	Wales	2004-2006	WRS	Spatial correlation approach	Log average hourly wages in first differences by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	4 and 5 for the 6th and 7th deciles of the wage distribution respectively. No statistically significant impact for the bottom half of the wage distribution	A 1 percentage point increase in the ratio of A8 national WRS inflows to working-age population increases average wages in the 6th and 7th deciles of the by approximately 4 per cent and 5 per cent respectively. No impact for the bottom half of the wage distribution	Little or no impact for the bottom half of the wage distribution; +£25.10 for the 6th and +£37.20 for the 7th deciles of the wage distribution	UK average gross wage: 6th decile, £25,146 per year; and 7th decile, £29,833 per year (ONS, 2010). Working-age population, 40.1m (2011 Q2, LFS)
Nathan (2011)	UK cities	1994-2008	LFS	Spatial correlation approach	Log average wages of the UK-born by region and year	Fractionalisation index (measure of diversity by nationality) by region and year	Not significant for any skill group	No significant impact of change in the fractionalisation index across the wage distribution of the UK-born	Little or no impact on average wages	None

Note: The following acronyms have been used in this table: and Labour Force Survey (LFS); Worker Registration Scheme (WRS); Annual Survey of Hours and Earnings (ASHE); and New Earnings Survey (NES). The estimates for the impact of 10,000 additional migrants may not be directly comparable between studies. For example, studies differ in terms of the definition of migrants (e.g. working-age migrants or all migrants), the coverage of wages, employment rates or unemployment rates (e.g. those of natives or the total UK population), and both the regions and time periods included in the analysis. All results presented are statistically significant at the 5 per cent level.
Source: MAC analysis of Manacorda *et al.* (2006); Dustmann et al (2008); Lemos and Portes (2008); Nickell and Saleheen (2008); Lemos (2010); Nathan (2011); ONS (2010); Labour Force Survey (2011 Q2); and ONS (2010b)

Table 4.4: Empirical studies estimating the impact of migrants on UK employment

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on UK employment (MAC estimates)	Data used in MAC estimates
Dustmann *et al.* (2005)	Great Britain	1983-2000	LFS	Spatial correlation approach	Change in the UK-born employment rate by year and region	Ratio of non-UK-born to UK-born in the working-age population by region and year	No significant impact overall; -0.2 for UK-born with intermediate qualifications	No statistically significant effect of non-UK-born on overall UK-born employment rates. A 1 percentage point increase in the non-UK-born / UK-born ratio for working-age individuals with intermediate qualifications reduced the employment rate of the UK-born with intermediate qualifications by 0.2 percentage points	Little or no overall impact on the UK-born overall; -2,000 for the UK-born with intermediate qualifications	None
Jean and Jimenez (2007)	18 OECD countries including the UK	1984-2003	LFS for 18 OECD countries	Spatial correlation approach	Employment rates of UK-born males by country and year	Lagged change in the non-UK-born share in the working-age population by country and year	-0.3 for lag 0; statistically insignificant for higher lags	A 1 percentage point rise in the non-UK-born share of the working-age population decreased the UK-born male employment rate by 0.3 percentage points in the first year, but has no long term impact on the UK-born male employment rate	-1,300 in year 1; little or no impact in subsequent years	Working-age population, 40.1m; male UK-born working-age population, 17.0m (2011 Q2, LFS)
Reed and Latorre (2009)	UK	2007	DWP administrative data and LFS	Spatial correlation approach	Change in employment rates	Ratio of National Insurance Numbers allocated to the non-UK-born and the working-age population by local authority	Estimated coefficient not reported; low correlation between change in employment rates and ratio of National Insurance Number allocations to the non-UK-born and the working-age population	Little evidence that the non-UK-born affected UK employment rates	Little or no impact on UK-born employment	None
Nathan (2011)	UK cities	1994-2008	LFS	Spatial correlation approach	Log UK-born employment rate by region and year	Fractionalisation index (measure of diversity by nationality) by region and year	-0.7 overall; -1.0 on intermediate-skilled UK-born; -0.7 on low-skilled UK-born; no statistically significant impact on high-skilled UK-born	A 1 percentage point rise in the fractionalisation index decreased the average UK-born employment rate by approximately 0.7 per cent, the intermediate-skilled UK-born employment rate by 1.0 per cent, and the low-skilled UK-born employment rate by 0.7 per cent. No significant impact was found on the employment rate of the high-skilled UK-born.	Not known	None

Note: The following acronyms have been used in this table: Worker Registration Scheme (WRS), Labour Force Survey (LFS); Department for Work and Pensions (DWP) and the Organisation for Economic Co-operation and Development (OECD). The estimates for the impact of 10,000 additional migrants may not be directly comparable between studies. For example, studies differ in terms of the definition of migrants (e.g. working-age migrants or all migrants), the coverage of wages, employment rates or unemployment rates (e.g. those of natives or the total UK population), and both the regions and time periods included in the analysis. All results presented are statistically significant at the 5 per cent level.
Source: MAC analysis of Dustman et al (2005); Jean and Jimenez (2007); Reed and Latorre (2009); Nathan (2011); and Labour Force Survey (2011 Q2).

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Table 4.5: Empirical studies estimating the impact of migrants on UK unemployment

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on UK unemployment (MAC estimates)	Data used in MAC estimates
Dustmann *et al.* (2005)	Great Britain	1983-2000	LFS	Spatial correlation approach	Change in UK-born unemployment rate by year and region	Ratio of non-UK-born to UK-born in the working-age population by region and year	No significant impact overall; 0.1 for UK-born with intermediate qualifications	No statistically significant effect on the overall UK-born unemployment rate. A 1 percentage point increase in the non-UK-born / UK-born ratio for working-age individuals with intermediate qualifications increased the unemployment rate of the UK-born with intermediate qualifications by 0.1 percentage points	Little or no overall impact on unemployment; +1,000 for the UK-born with intermediate qualifications	None
Portes and French (2005)	UK	2003-2004	WRS	Spatial correlation approach	Change in the Jobseeker's Allowance claimant rate by region and year	Ratio of A8 national WRS registrations to total working-age population by region and year	0.09	A 1 percentage point rise in the ratio of A8 national WRS inflows to the working-age population resulted in a 0.09 percentage point increase in the Jobseeker's Allowance claimant rate	+900	None
Gilpin *et al.* (2006)	UK	2004-2005	WRS	Spatial correlation approach	Change in the Jobseeker's Allowance claimant rate by region and year	Ratio of A8 national WRS inflows to total working-age population by region and year	Not significant	No statistically significant effect of A8 nationals on the Jobseeker's Allowance claimant rate	Little or no overall impact on unemployment	None
Jean and Jimenez (2007)	18 OECD countries including the UK	1984-2003	LFS for 18 OECD countries	Spatial correlation approach	Unemployment rates of the UK-born by country and year	Lagged change in the non-UK-born share of the working-age population by country and year	0.4 for lags 1 and 2; statistically insignificant for other lags	A 1 percentage point rise in the non-UK-born share of the working-age population in year 1 increased the UK-born unemployment rate by 0.4 percentage points in years 2 and 3, but had no impact on the UK-born unemployment rate in subsequent years	+3,400 in the second and third years; little or no impact in subsequent years	UK-born working-age population, 34.1m; and non-UK-born working-age population, 6.1m (2011 Q2, LFS)
Lemos and Portes (2008)	UK	2004-2006	WRS	Spatial correlation approach	Ratio of change in JSA claimants to working-age population by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	Not significant	No statistically significant effect of A8 nationals on the Jobseeker's Allowance claimant rate	Little or no overall impact on unemployment	None

Table 4.5: Empirical studies estimating the impact of migrants on UK unemployment

Study	Coverage	Time period	Main data source	Methodology	Dependant variable	Migration variable	Estimated coefficient on migration variable	Interpretation of result	Impact of 10,000 additional migrants on UK unemployment (MAC estimates)	Data used in MAC estimates
Lemos (2010)	Wales	2004-2006	WRS	Spatial correlation approach	Ratio of change in JSA claimants to working-age population by region and year	Ratio of A8 national WRS inflows to working-age population by region and year	Not significant	No statistically significant effect of A8 nationals on the Jobseeker's Allowance claimant rate	Little or no overall impact on unemployment	None

Note: The following acronyms have been used in this table: Worker Registration Scheme (WRS), Jobseeker's Allowance (JSA), Labour Force Survey (LFS) and the Organisation for Economic Co-operation and Development (OECD). The estimates for the impact of 10,000 additional migrants may not be directly comparable between studies. For example, studies differ in terms of the definition of migrants (e.g. working-age migrants or all migrants), the coverage of wages, employment rates or unemployment rates (e.g. those of natives or the total UK population), and both the regions and time periods included in the analysis. All results presented are statistically significant at the 5 per cent level.
Source: MAC analysis of Dustman et al (2005); Portes and French (2005); Gilpin et al. (2006); Jean and Jimenez (2007); Lemos and Portes (2008); Lemos (2010); and Labour Force Survey (2011 Q2).

Chapter 5   Public service and social impacts

5.1   Introduction

5.1   This chapter reviews the available evidence on the public service and social impacts of those migrants who come to the UK from outside the European Economic Area (EEA). We considered the public service and social impacts of migration previously as part of a commission from the Government to advise on the first annual limits on Tiers 1 and 2 of the Points Based System (PBS) (Migration Advisory Committee, 2010). In that report our commission required that we focus only on the impacts of migration through Tiers 1 and 2 of the PBS. Therefore, it is necessary for our consideration in this report to be broader.

5.2   Compared to the literature on the economic and labour market impacts of migration, the evidence on the public service and social impacts is relatively undeveloped. Consequently, we decided to commission a series of projects through our external research programme that sought to expand and develop the existing knowledge base and debate around the public service and social impacts of migration. The findings of these research projects are discussed in this chapter, and the projects themselves have been published alongside this report[4]. These projects do not consider all types of non-EEA economic migration in the same level of detail. For example, they tend to consider migration through Tiers 1 and 2 of the PBS in greater detail than migration through Tier 4, although many of the findings could also be applied to an analysis of that tier of the PBS. Further research into the specific impacts of student migration would be a valuable addition to the current evidence base.

5.3   In this chapter we also discuss whether and how individual public service and social impacts of non-EEA economic migration might be considered within an economic cost-benefit framework that could be used to inform migration policy decisions. In Chapter 6 we consider how these impacts might be considered alongside the economic and labour market impacts of migration in Impact Assessments (IAs).

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[4] All research projects commissioned by the MAC are published on the research page of our website:
http://www.ukba.homeoffice.gov.uk/aboutus/workingwithus/indbodies/mac/mac-research/

5.2 Considering the public service and social impacts of migration

5.4 In Migration Advisory Committee (2010) we focussed our consideration of the public service impacts of migration on the effects on both **the delivery and consumption of services in health-, social care- and education-related services**. We focussed our consideration of the social impacts of migration on the effects on **housing**, **crime**, **transport congestion**, and **social cohesion and integration**. We acknowledged that it is possible to consider many other impacts of migration as being public service or social impacts. We justified our decision to focus on these six impacts on the basis that, in our opinion, they covered the largest and farthest-reaching public service and social impacts of skilled and highly skilled economic migration from outside the EEA (i.e. through Tiers 1 and 2 of the PBS). We believe that this is still the case. Therefore, in this report we continue to focus our consideration on the six public service and social impacts of migration that we first looked at in Migration Advisory Committee (2010).

5.5 Migration Advisory Committee (2010) said that it was not possible to fully and accurately estimate the public service and social impacts migration through Tiers 1 and 2, either on an impact-by-impact basis or collectively. Instead, we considered the available literature alongside evidence on the profile and characteristics of Tier 1 and Tier 2 migrants to provide some tentative conclusions about the public and service impacts of migration through those tiers. We use these conclusions as a starting point for our consideration of the public service and social impacts of non-EEA migration more generally.

5.6 As discussed in Chapter 3, a considerable part of migrants' impact can be explained not by the fact that they are migrants, but rather by the fact that they are additions to the UK population (the 'population effect'). In this sense, their impact is the same as an increase in the UK-born population of an identical magnitude: they will inevitably contribute to the demand for public services, generate congestion, commit crime, and so on. They will also pay taxes and work in the provision of essential public services.

5.7 The remainder of migrants' impact will be driven by the fact that they do not have identical characteristics to the UK population as a whole. The average migrant may differ from the average existing UK resident in terms of his or her personal characteristics, as well as in terms of his or her incentives and motives while in the UK. An individual's status as a migrant in the UK may also affect his or her access to the UK labour market (e.g. by being tied to a sponsoring employer) and to certain parts of the welfare system. We term the result of the difference between the average migrant and the average existing member of the UK population the 'composition effect'.

5.8 Due to the concentration of migrants in particular regions, locations and occupations in the UK, their public service and social impacts are likely to be concentrated in specific areas of the country and the labour market. Their impacts may also be more significant in areas with little previous experience of migration than in those areas that have experienced, and adapted to, inflows of migrants in the past. The longer-term impact of migration largely depends on the duration of migrants' stay in the UK.

5.3 New analysis of the public service and social impacts of migration

5.9 The research projects we commissioned sought to improve existing knowledge of, and to advance the existing debate around, the six public service and social impacts of migration that we considered in Migration Advisory Committee (2010). Thus projects considered the impacts of migration on:

- transport congestion;

- access to housing and the housing market;

- crime and victimisation;

- the consumption of health-, social care- and education-related public services;

- the provision of UK public services; and

- social cohesion and integration.

5.10 In commissioning these six projects we asked that, where possible, the research teams

considered separately the specific impact of economic migrants from outside the EEA. We defined economic migrants as those coming to the UK with the primary purpose of working or studying, including their dependants. As mentioned above, these projects do not consider migration through Tier 4 in the same level of detail as migration through Tiers 1 and 2, although many of their findings could also be applied to an analysis of Tier 4. The specific impacts of student migration would be an interesting and valuable area for future research.

5.11 The questions that we asked the researchers to address can be broadly separated into four key areas. These were as follows:

- How can the existing literature help us to understand the impacts of migration?

- What does new analysis of relevant data tell us about the impacts of migration?

- What are the implications of the results of this new analysis for understanding, estimating, quantifying and monetising the overall impact of migration, and for informing migration policy decisions?

- What are the current limitations to analysing and measuring the impacts of migration, and how might we overcome them?

5.12 We discussed these issues with the research teams and invited academic and migration experts at two workshops that we hosted in July and September 2011. The ideas and advice that were put to us at these workshops have, alongside the findings of our

research programme, greatly informed our thinking for this report.

5.13   Due to the nature of available datasets it is easier to isolate the specific effect of economic migration for some of the impacts listed above than it is for others. For example, the UK Labour Force Survey (LFS), which records migrants' country of birth and occupation in the UK, makes it relatively uncomplicated to consider the contribution that non-EEA economic migrants make to the provision of public services. On the other hand, surveys that consider levels and perceptions of social cohesion and integration rarely, if ever, consider the specific impact of particular groups of migrants. Any difficulties or limitations of this nature that researchers faced are set out in their research reports.

5.14   In commissioning researchers to consider how the various public service and social impacts of migration might be considered within an economic cost-benefit framework, we encouraged them to attempt to quantify these impacts. We recognise that, in the case of all impacts considered in this chapter, this is subject to at least some degree of difficulty: conceptually, it may be difficult to identify or even define all of the impacts of migration that need to be measured and, even if these conceptual issues can be overcome, datasets that contain all of the variables required to isolate the specific impacts of migration are rarely, if ever, available.

5.15   Nevertheless, some of the research projects discussed later in this chapter have attempted to quantify and / or monetise the relevant impact of migration. To do so it has been necessary for researchers to make a range of assumptions, some of which are not likely to hold in reality. The assumptions made for each project are set out in the relevant project reports. While the monetisation of the various public service and social impacts discussed in this chapter is a useful conceptual exercise that may help policymakers consider how current IAs might be improved, it would not be sensible to interpret any of the monetary estimates presented in this chapter or in the various project reports as the final word on such matters. It is important to emphasise that we present these monetary estimates in the context of a discussion of how potentially to conceptualise and implement cost-benefit analysis of migration policy decisions. The estimates should not be interpreted without these important caveats.

5.16   In the remaining sections of this chapter we focus on what the findings of the six projects we commissioned imply for our response to the specific question that we have been asked by the Government, namely *"to advise on the use of such evidence* [on the public service and social impacts of migration] *in cost-benefit analyses of migration policy decisions"*. To avoid unnecessary repetition, unless otherwise stated, all data quoted in these sections are taken from the research project we commissioned on the relevant

public service or social impact of migration.

5.4 The impact of migration on transport congestion

5.17 In Migration Advisory Committee (2010) we said that PBS Tier 1 and 2 migrants, as additional members of the UK population, will contribute to total congestion of the transport network, at least in the short term. Furthermore, they are likely to generate more congestion than the average UK-born individual, reflecting the fact that they are more likely to be employed and more likely to work in London. The extent to which either the population or composition effects of migration matter in the long term depends on the extent to which they are offset by the other impacts of migration: if migrants' use of the UK transport network is fully offset by their contribution to the provision and expansion of that network, then in the long run there will be no additional congestion (or net cost) as a result of migration.

5.18 The research we commissioned into the impact of non-EEA economic migration on transport congestion (Tsang and Rohr, 2011) found that non-EEA migrants are significantly more likely to live in large metropolitan areas than the average UK national. Largely, this is because these areas offer greater employment opportunities to migrants, but it can also be explained, at least in part, by the fact that their transport networks (in particular, public transport networks) are likely to be more developed. The authors found that

migrants tend to make higher use of non-car-driving modes of transport, including public transport, walking, cycling or car sharing, in the years immediately following their arrival in the UK.

5.19 This concentration of non-EEA economic migrants in metropolitan areas means that their impacts will also be disproportionately concentrated in these areas. The largest impact will be felt in London, where 40 per cent of all non-EEA nationals reside, compared to 11 per cent of all UK nationals. This explains, at least in part, why new migrants are less likely to use cars, and more likely to travel by bus, underground or overground train, bicycle and by foot, than the average UK national. However, the report found evidence that this difference in behaviour between non-EEA migrants and UK-born individuals may reduce over time, as migrants' behaviour assimilates to that of natives. Therefore, a key factor when quantifying this impact of migration, and incorporating it into an economic cost-benefit analysis, is the expected duration of the migrant's stay in the UK.

5.20 Tsang and Rohr (2011) also found that, on average, migrants make fewer journeys than the average UK-born individual. This is due to the fact that they make fewer non commute journeys (such as shopping, visiting friends and family, and holidays) than the average UK-born person. However, the authors found that migrants make more work-related journeys than the average UK-born individual, reflecting the fact

that their rate of employment is higher.

5.21 The authors of that report attempted to monetise the impact of migration on the UK transport network by making various assumptions about Tier 1 and Tier 2 migrants' characteristics and behaviour and by incorporating these assumptions into existing costing models (for example, those used by the Department for Transport (DfT)). Examples of the assumptions made include that Tier 1 and Tier 2 migrants' behaviour can be proxied by the behaviour of all non-EEA migrants and that all Tier 1 and Tier 2 migrants are in employment. In reality, assumptions such as these are unlikely to be precise, but the shortcomings of the existing datasets mean that they are necessary for the purpose of making monetary estimates. As a result, while the magnitude of the impacts of Tier 1 and Tier 2 migrants on various modes of transport presented in Tsang and Rohr (2011) may be useful to policymakers, we (and the authors of that report) would urge caution against interpreting these results as anything more than a broad and approximate indication of the potential costs of migration through Tiers 1 and 2 on the transport network. The estimates are presented in Table 5.1. As described below, the figures for car use are calculated on a very different basis to those for bus, rail and underground, and this needs to be borne in mind when interpreting this table.

5.22 In the case of car use, the estimated impacts presented in Table 5.1 include a range of costs

relating to environmental issues, congestion and road accidents. Indirect taxation on road users is also considered. The impacts associated with migrants' use of public transport are restricted to benefits through fare payment and the cost of migrants' consumption of subsidies. The authors acknowledged that congestion is likely to be an issue on all modes of public transport, but they did not include it in all cases because this effect is very difficult to quantify.

5.23 For each mode of transport presented in Table 5.1, two monetary estimates of the marginal impact of a Tier 1 or Tier 2 migrant are presented. The first of these assumes that the displacement rate (that is, the proportion of jobs currently filled by Tier 1 and Tier 2 migrants that would have been filled by UK-born individuals in the absence of migration) is zero, while the second assumes that the displacement rate is 100 per cent. In reality, the displacement rate is likely to be somewhere between 0 and 100 per cent, as we discussed in the previous chapter. The impact of the marginal Tier 1 or Tier 2 migrant is estimated to be higher when there is no displacement because this implies that all migrant journeys are additional journeys that would not have occurred in the absence of migration. On the other hand, a positive displacement rate implies that some UK-born individuals are no longer making work-related journeys. Therefore, it is assumed that the *additional* impact on the transport network that occurs as a result of migration is lower.

Table 5.1: Estimated impact of a Tier 1 or Tier 2 migrant's travel in the UK (£ per migrant per year, 2009/10 prices)		
	Marginal impact of a Tier 1 or Tier 2 migrant (£ per migrant per year, 2009/10 prices)	
	Assuming 0 per cent displacement rate[1]	Assuming 100 per cent displacement rate[2]
Car[3]	-2,368[3]	-1,767[3]
Bus	76	52
Rail	109	50
Underground	40	35

Notes: The monetary values reported are only approximations and are based on a wide range of assumptions that are not likely to be precise in reality. The estimates reported may be useful to policymakers in as far as they may provide an order of magnitude of the impacts of migration across various modes of transport. They are subject to considerable ranges of uncertainty.

(1) A displacement rate of 0 per cent assumes that all jobs filled by Tier 1 and Tier 2 migrants are additional jobs in the UK economy that would not exist in the absence of migration.

(2) A displacement rate of 100 per cent assumes that all jobs filled by Tier 1 and Tier 2 migrants would be filled by UK-born workers in the absence of migration.

(3) Unlike the estimated marginal impact of a Tier 1 or Tier 2 migrant's consumption of bus, rail and underground services presented in this table, the estimated marginal impact of car consumption takes into account the cost of congestion. It was not possible for Tsang and Rohr (2011) to account for the cost of congestion of the public transport network when producing their estimates. This may explain, at least in part, why the estimated marginal impact of car use varies considerably from the estimated marginal impact of the use of the public transport network. As a result of this methodological difference, the estimated marginal impact of car use is not directly comparable to the other estimates, and should not be treated as such.

Source: Tsang and Rohr (2011).

5.24 Ignoring the exact values of the monetary estimates, the results in Table 5.1 suggest that Tier 1 and Tier 2 migrants have a negative impact on the road network through their use of cars. This impact is less negative than the impact of the average UK-born individual (not shown in Table 5.1) due to the lower propensity of migrants to travel by car, at least initially. Their impact on bus, rail and underground services is estimated to be slightly positive. However, as discussed above, these estimates have been calculated primarily on migrants' payment of fares and consumption of subsidies. They do not represent a full quantification of all impacts because, for example, it is not possible to quantify the impact of migration on the congestion of public transport networks for all modes of transport.

5.25 A key factor in measuring the impact of migration on transport services is the capacity and / or willingness to increase the provision of those services in response to an increase in demand. For some services, such as buses, it may be possible to increase supply relatively quickly and cheaply. For others, such as rail and underground services, and the provision of roads for car use, changes in supply may occur much more slowly and at considerably greater expense.

This may be particularly true in large metropolitan areas where scope for expanding existing networks is likely to be more limited. This last point is particularly relevant to the measurement of the impact of migration through Tiers 1 and 2, as these migrants tend to be concentrated in London and the South East.

5.26 Although the current monetary estimates of the impacts of migration through Tiers 1 and 2 presented in Table 5.1 should not be regarded as precise, the fact that they have been estimated indicates that it may be possible, in time, to quantify more satisfactorily the impact of non-EEA migration on the transport network and to incorporate this impact into an economic cost-benefit framework. To do this satisfactorily would require further research into a suitable methodology, as well as the collection of more targeted datasets.

5.5 The impact of migration on access to housing and the housing market

5.27 The main findings of the report we commissioned into the impact of migration on access to housing and housing market (Whitehead et al., 2011) broadly confirmed the findings of the existing literature and the tentative conclusions we drew in Migration Advisory Committee (2010). The impacts of non-EEA economic migration are concentrated in certain areas of the UK, particularly London, and the long-term impact depends largely on the duration of migrants' stay in the UK. The

commissioned work concentrated on Tier 1 and particularly Tier 2 migrant. It did not directly consider the impact of migration through Tier 4 on the housing market, which may differ from the impacts discussed in this section.

5.28 Given that the PBS was not fully operational before 2009, Whitehead et al. (2011) identified a sub-sample of migrants from the 2006-2009 Annual Population Surveys (APS) that could reasonably be considered equivalent to the current Tier 2 based on their individual characteristics. The report found that a high proportion (more than 70 per cent) of households headed by a 'Tier 2' migrant equivalent initially lived in the private rented sector. Only 20 per cent were owner occupiers, compared to 68 per cent of all households in England, and only 3 per cent of Tier 2 migrant-type households were in social housing. Migrants' behaviour was also found to tend towards the national average for similar households gradually as their length of stay in the UK increased. After six years in the UK, rates of owner occupation among Tier 2 migrant-type households had risen to 45 per cent (two thirds of the average) and the proportion of those in social housing to 5 per cent. But half of all such households were still private tenants.

5.29 The authors found that Tier 2 migrant-type households and their dependants tended to consume less housing than average. This was because they are less likely to live in smaller households (defined as those households

comprising a single person or a couple) relative to the UK-born population. Forty-six per cent of households headed by a Tier 2 migrant were classified as small households, compared to 64 per cent of all households in England.

5.30   Strong assumptions are required to produce a quantitative measure of the impact of new economic migration from outside the EEA on demand for private rental and owner occupied housing in the UK. Whitehead et al. (2011) used administrative data to form an estimate, suggesting that 30,346 Tier 1 and Tier 2 migrants (including intra-company transferees, but excluding dependants) would enter the UK during 2011/12. This was calculated as the sum of visas issued, or limits where applicable, for every route in Tier 1 and 2 multiplied by a 'scaling factor' used to translate visa numbers into migrant inflows, where migrants are defined only as those individuals coming to the UK for at least 12 months. From that number, on past evidence, some 22,700 households would be formed in the first year but exits would reduce this to 12,500 households remaining after 5 years. Assuming the same rate of visa issuance, additional households to 2017 were therefore estimated at around 112,000. Over the same period some 1.5 million additional households are projected to form in England alone. So a tentative assessment would be that Tier 1 and 2 migrant-type households account for less than 8 per cent of additional demand in numbers terms – and a considerably

smaller proportion in terms of the quantity of housing demanded.

5.31   The long-term impact of this additional demand depends largely on the responsiveness of housing supply. Citing the low responsiveness of housing supply to changes in prices and demand that has been observed over the last few years, the authors argued that the impact of positive net migration through Tiers 1 and 2 is more likely to be on house prices and particularly private rents than on the quantity of housing supplied. These impacts are likely to be small but concentrated in London and a few areas in southern England but also in parts of Scotland.

5.32   The assumption that non-EEA economic migrants contribute to increased demand for housing at the same rate as additional UK-born individuals, which was used to calculate the estimated impact presented in the previous paragraph, is probably unrealistic. As discussed above, Tier 2 migrants are found to be less likely to form small households. Furthermore, the authors found that Tier 2 migrants are more likely to live in multi-adult households. These findings imply that the impact of non-EEA economic migration on the demand for, and thus cost of, housing in the UK is lower than the impact of an increase in the UK-born population of similar magnitude.

5.33   Nevertheless, the estimate calculated in Whitehead *et al.* (2011) (namely, that migration through Tiers 1 and 2 will add 8 per cent to the additional annual

demand for housing, which in turn will lead to an increase in housing costs) could be used as an upper-bound estimate for the impact of non-EEA economic migration on the housing market. The impact of Tier 4 migrants would be additional to this. In theory, and assuming that the relationship between migration and housing demand by such migrants is linear, this estimated impact could then be used to calculate the additional cost of housing for a UK-born individual resulting from a policy that would increase or reduce economic migration from outside the EEA. Assuming that this positive net migration does not stimulate an increase in the supply of housing, this small increase in housing costs would be the net result. However, as discussed in Chapter 3, incorporating this estimated impact into a Net Present Value (NPV) calculation would not be straightforward.

5.6 The impact of migration on crime and victimisation

5.34 To improve the existing evidence base on the impact of non-EEA economic migration on crime and victimisation (that is, being the victim of a crime) in the UK, Bell and Machin (2011) first estimated the relationship between recent inflows of work permit migrants to the UK (Tier 2 and predecessor routes since 2005) and property and violent crimes. They found that there was no statistically significant relationship between recent inflows of skilled migrants and violent crime per capita. Recent inflows of skilled migrants were found to have lowered the rate of property crime per head

because these migrants are less likely to commit property crime than the average UK-born individual: a one per cent increase in the proportion of the UK population that are work permit or Tier 2 migrants was estimated to lead to an approximate 0.1 per cent fall in the per capita rate of property crime (for the whole UK population, including migrants).

5.35 The second stage of the analysis in Bell and Machin (2011) drew broad conclusions about the relationship between self-reported crime and personal characteristics. The findings of this analysis were consistent with existing literature, which shows that being more highly educated, in employment or education, having a higher income and being female are all associated with lower rates of self-reported crime. We drew on these findings in Migration Advisory Committee (2010) to conclude, tentatively, that the selection mechanism of the PBS would mean that, on average, recent Tier 1 and Tier 2 migrants have exhibited a lower propensity to commit crime than the average existing UK resident.

5.36 Once differences in individual characteristics were taken into account, Bell and Machin (2011) found that migrants were 7.0 per cent less likely to report having been arrested and 4.8 per cent less likely to report being a defendant. The authors also found that the probability of arrest rises as the duration of migrants' stay in the UK increases, but that it remains lower than that for the average UK-born individual in the long term (i.e. migrants' behaviour converges, but does not perfectly

assimilate, to the behaviour of the UK-born population).

5.37 Policymakers may wish to treat analysis of self-reported data with caution, and this fact was acknowledged by Bell and Machin (2011). While it is possible that migrants do indeed exhibit a lower propensity to commit crime, there are other explanations for the negative relationship between migrant status and offending observed in Bell and Machin (2011). The report argued that this could be the result of differences in the willingness of migrants and UK-born individuals to self-report criminal activity, for example. Additionally, it might also be explained by the fact that migrants only report those arrests that have occurred in the UK, where they have resided for a relatively short period of time, despite having been previously arrested in their home country.

5.38 Monetisation of the estimated impact of skilled migration from outside the EEA on crime and victimisation in the UK would require a wide-ranging set of parameters of the costs of violent and property crimes, imprisonment and enforcement. Assuming these are obtainable, it might be possible to formulate the cost of crime associated with recent migrants using the initial estimates produced by Bell and Machin (2011). These could also be used to estimate the cost of future migration flows, assuming that future migrant flows have identical characteristics, on average.

5.39 A set of estimates of the total economic and social cost of crime

have previously been produced by the Home Office (see Home Office, 2000). Revised estimates of the costs of crime against individuals and households were subsequently published in Home Office (2005). These estimates are updated on an annual basis to account for inflation and changes in real income, with the most recent publication occurring in September 2011 (see Home Office, 2011c). The average cost of a crime comprises the cost of anticipating the crime (e.g. buying insurance or taking action to safeguard against being the victim of crime), the cost of the consequences of the crime, and the cost of the response to the crime. Together these cover many of the physical and emotional costs to the victim, the cost of the loss of output and property and the costs to the criminal justice system and public services (e.g. in providing courts and prisons). The unit cost estimates produced correspond to British Crime Survey estimates of total crime, in recognition of the fact that, for a number of reasons, police-recorded crime statistics do not capture total crime (i.e. not all crimes are reported to the police).

5.40 The Home Office does not produce unit cost estimates for every undesirable activity (for example, the costs of antisocial behaviour are not estimated), and unit costs exclude the emotional cost of the fear of crime and the costs to friends and family (e.g. of homicide cases). Nevertheless, where estimates do exist it may be possible to consider these estimates in conjunction with the findings of Bell and Machin (2011) to incorporate the impact of

migration on crime within a cost-benefit framework.

5.41 Adopting a more forward-looking approach would require the quantifiable estimation of a relationship between a specified set of characteristics and the rates of various crimes. It would also require knowledge of the demographic profile and characteristics of future migration flows to estimate the criminal cost of their coming to the UK. This approach is also disadvantaged by the possibility of lower rates of accurate self-reporting among the migrant community.

5.42 Overall, Bell and Machin (2011) provided a set of estimates that could be used to estimate the cost of crime associated with future migrant flows. The methods used are subject to various disadvantages. Nevertheless, if a data source can be found that provides accurate information on the criminal activity and demographic profile of specific migrant groups, and that does not rely on self-reporting, one of the approaches identified by the authors could feasibly be used to incorporate the impact of migration on crime into an economic cost-benefit framework. As far as we are aware, at present no such dataset is in existence or in the process of being collected.

5.43 Individual policies and their impacts should be considered on a case-by-case basis. Nevertheless, as a default, given the lower propensity of PBS migrants to commit crime and the possibility that further selectivity in the PBS will reduce this propensity yet further, it may be

most sensible, in the absence of comprehensive data, for policymakers to conclude that migration through the PBS has zero impact on the likelihood of a member of the existing UK population being a victim of crime. There is some evidence to suggest that positive net migration through the PBS may in fact reduce overall rates of crime in the UK, although it is not possible at present to award a non-zero value to this impact of migration with any degree of certainty.

5.7 The impact of migration on the consumption of public services

5.44 We commissioned the National Institute of Economic and Social Research (NIESR) (2011a) to improve the existing evidence base on the demand-side impact of migration on health-, social care- and education-related public services. Specifically, we asked that the authors consider migrants' impact on the consumption and cost of education services for those aged 17 and under, health services, personal social care services and adult, children and families' social services.

5.45 We discussed these impacts of migration through Tiers 1 and 2 in Migration Advisory Committee (2010). On the basis that these migrants tend to be young, healthy, highly educated, highly skilled and in employment, we said that these migrants are likely to consume below-average levels of health and social care services relative to the average existing UK resident, at least in the short term. Their consumption of these

services, as well as education services, will be strongly influenced by the number and age of the dependants that they will eventually bring to the UK, which may not necessarily be known at their time of arrival. The fact that Tier 1 and Tier 2 migrants tend to earn good incomes and have an above-average propensity to be employed by multinational firms suggests that at least some of these migrants and their dependants are likely to consume privately- rather than publicly-provided health and education services. Their impact on the consumption of public services, like the impact of all migrants on the consumption of these services, will also be offset by their contribution to the exchequer.

5.46 NIESR (2011a) used a top-down analytical approach to produce monetary estimates of the impacts of migration on the consumption of health-, social care and education-related public services. To do this the authors analysed the Annual Population Survey (APS) household dataset, which identifies families (comprising the head of the household, his or her partner or spouse, and any children living at home). The dataset records country of birth and date of entry to the UK, thus allowing the authors to identify migrants, but it does not record the type of visa (or PBS route) used by the migrant to enter the UK. The authors defined migrants as all adults born abroad. Children were given the same migrant status as their parents on the basis that migrants' children, whether born abroad or in the UK, are almost always in the UK

because of their parents' decision to migrate. Whether or not this is the correct way to identify children as migrants is a matter for debate.

5.47 NIESR (2011a) identified specific types of migrant on the basis of their characteristics: for example, Tier 1 and Tier 2 migrants were identified as those non-EEA economic migrants who were not students and who were employed in a 'Tier 1 or Tier 2 occupation' (that is, one of the 3-digit Standard Occupational Classification (SOC) 2000 occupations for which at least 1 per cent of all Tier 1 and Tier 2 visas are issued).

5.48 In producing estimates of the costs of public service consumption by Tier 1 and 2 migrants the authors considered the characteristics of these migrants and made the assumption that new migrants and members of the existing UK population who have identical characteristics exhibit identical consumption patterns. Differences in consumption patterns were assumed to arise only where migrants or members of the existing UK population differed in terms of personal characteristics that are known to have a significant impact on public service consumption. The authors acknowledged that this approach is not perfect as there are many factors that may contribute to service consumption but which cannot be identified within existing datasets: for example, migrant status itself could affect levels of consumption, as low proficiency in English and poor knowledge of how to access public services in

the UK may be associated with lower levels of consumption.

5.49 A summary of the estimated costs of migrant consumption that were produced by NIESR (2011a) is shown in Table 5.2. This table shows that annual expenditure on education services per adult non-EEA economic migrant and per adult Tier 1 or 2 migrant in 2009/10 were broadly similar to the equivalent figure for the non-migrant population, but higher than per-adult education expenditure for all migrants who arrived in the UK in the last five years.

Table 5.2: Estimated cost of the consumption of UK education, personal social and health services by various sub-groups of the migrant population in the UK (£ per head of the adult population, 2009/10 prices)			
	£ consumption per adult migrant per year, 2009/10 prices		
	Education services	Personal social services	Health services
Non-migrants	1,662	720	2,765
All migrants	2,216	708	2,450
Migrants arrived in last 5 years	1,403	508	1,717
Non-EEA economic migrants (wide definition)	1,695	540	1,757
Tier 1 and Tier 2 migrants (wide definition)	1,676	544	1,734

Notes: The definitions of Tier 1 and 2 migrants are 'wide' in that they include those migrants with partners from whom they could have derived the right to work in the UK.
The monetary values reported are only approximations and are based on a range of assumptions that may not always hold in reality. The estimates reported may be useful to policymakers in as far as they may provide an order of magnitude of the impacts of migration across various modes of transport. They are subject to considerable ranges of uncertainty.
Source: NIESR (2011a).

5.50 Expenditure on personal social services is reported largely by client group, for example children and families, adults, and the elderly. Therefore, because Tier 1 and 2 migrants and all non-EEA economic migrants tend to be younger than the average existing UK resident, the authors found that per-adult expenditure on these migrant groups in 2009/10 was lower, on average, than for the average adult in the non-migrant population.

5.51 Finally, the authors estimated that annual health expenditure per adult Tier 1 and 2 migrant and per adult non-EEA economic migrant was considerably lower in 2009/10 than it was for the average adult in the non-migrant population. Again, this is because expenditure was allocated according to the age of the consumer (with cost of consumption being considerably higher for older age groups), and because migrants tend to be younger than non-migrants, on average.

5.52 For all three public services considered, the estimates produced by NIESR (2011a) suggest that consumption by the

average Tier 1 and 2 migrant is less expensive than consumption by the average migrant. The characteristics and demographic profile of Tier 1 and 2 migrants are likely to explain why this result is observed, at least in the short term. The authors acknowledged that the analytical methods they used cannot test whether this observed difference between Tier 1 and 2 migrants and other migrant and non-migrant groups will persist as each cohort ages, or whether this effect is simply a short-term phenomenon driven by the various migrant groups being at different stages of their lives, and different stages of family formation, on average.

5.53 The report authors also expressed the view that all of the estimates of the annual cost of public service consumption by migrants are likely to be upper-bound estimates. This is because, as we set out earlier in this section, their analytical approach made the assumption that differences in consumption patterns between migrants and non-migrants were driven only by differences in their individual characteristics. For all of these services, the key characteristic used to estimate an individual's consumption was age. However, as discussed in Migration Advisory Committee (2010) and NIESR (2011a), it would be reasonable to expect that at least some individuals in these migrant groups may consume privately- rather than publicly-provided health and education services, although the same point applies to the resident population. Furthermore, it might be reasonable to expect that, on average, migrants will have a

lower propensity to consume some of these services, at least in the short term, as both their English language proficiency and knowledge of how to access these services is likely to be poorer than that of the average UK resident.

5.54 Because of the range of assumptions made in calculating these monetary estimates, we would strongly recommend that none of them is considered fully accurate or interpreted as being the final word on the impact of non-EEA migration on the consumption of health-, social care- and education-related services. Furthermore, as these estimates are based on a static analysis that does not consider the cost of consumption over an individual's lifetime, their use in forward-looking analyses of the impacts of migration will be limited.

5.55 Nevertheless, these monetary estimates may provide some indication of the short-term impact of non-EEA migration on the consumption of UK public services relative to that of other migrant groups and the non-migrant population. Furthermore, the approach adopted in NIESR (2011a) highlights that, particularly if improvements are made to the availability of data, it might be possible in future to monetise these impacts of migration, and thus to develop an approach that allows these impacts to be balanced against the other quantifiable impacts of migration within an economic cost-benefit framework.

5.8 The impact of migration on the provision of UK public services

5.56 We commissioned Dustmann and Frattini (2011) to add to the evidence base on the impact of migration on public service provision, drawing a distinction between the separate impacts of migration from within and outside the EEA as far as this is possible. Previously, we considered the specific impact of migration through Tiers 1 and 2 on the provision of these services and said that migration through these routes has helped to alleviate key skills shortages in some public service occupations and in some regions and localities in the UK, at least in the short term (Migration Advisory Committee, 2010). In turn, this may have helped to relieve pressure on wages in these sectors, as well as the overall cost of service provision. The longer-term impact will depend, at least in part, on the effect this has on incentives to upskill and train the existing resident workforce.

5.57 Dustmann and Frattini (2011) found that migration contributed over half of all growth in the UK population and UK employment levels between 1995 and 2010. Migration was found to have made a greater contribution to the growth of employment in the private sector (77 per cent of the growth in private sector employment was due to migration) than in the public sector (29 per cent of employment growth due to migration). Relative to all UK-born individuals, migrants were found to be less likely to be employed in the public

sector: in 2010 approximately 26 per cent of all employment of UK-born individuals was in the public sector, compared to only 21 per cent of all employment of migrants. However, 23 per cent of all non-EEA migrants employed in the UK were in public sector employment, which suggests that the average non-EEA migrant makes a greater contribution to the provision of UK public services than the average EEA migrant.

5.58 Non-EEA migrants were found to make a disproportionately large contribution to the provision of public services in three UK regions: in East Anglia, non-EEA migrants constitute 6.0 per cent of the working-age population yet 8.6 per cent of all public sector employees. In the South East, 8.6 per cent of the working-age population is non-EEA migrants, compared to 9.1 per cent of all public sector employees; and in the South West the respective proportions are 4.5 per cent of the population and 5.0 per cent of all public sector employment. In all other regions the proportion of the total population that is non-EEA migrants is at least as high as the proportion of public sector workers in that region that are non-EEA migrants.

5.59 Non-EEA migrants' contribution to the provision of UK public services was also found to be concentrated in particular subsectors: using pooled LFS data between 2008 and 2010 the authors found that non-EEA migrants represent 11.2 per cent of all public sector employees in the health sector while constituting 9.6 per cent of the

total working-age population. On the other hand, non-EEA migrants were found to be under-represented in all other subsectors of public sector employment.

5.60 Analysis of the LFS also suggests that non-EEA migrants employed in the public sector tend to be disproportionately employed in the more highly skilled occupational groupings of the 1-digit level of SOC 2000. Sixty-four per cent of all public sector employees from outside the EEA were employed in the most highly skilled occupational groupings (managers and senior officials; professional occupations; and associate professional and technical occupations) compared to 52 per cent of public sector employees born in the UK. These three occupational groupings contain most of the 4-digit SOC occupations that we have previously identified as being skilled to level 4 or above of the National Qualifications Framework (NQF) (see Migration Advisory Committee (2011a)) which is, in turn, the current skill requirement for Tier 2 of the PBS.

5.61 Dustmann and Frattini (2011) also looked at the characteristics of non-EEA migrants employed in the public sector in the UK to consider whether these characteristics can tell us anything about the specific impact that non-EEA migrants have on the quality and scope of UK public services. On average, non-EEA migrants employed in the public sector were found to be younger and better educated (proxied by the age at which the individual leaves education) than the average UK-

born public sector employee: the average UK-born individual employed in the public sector is 43 years old and left full-time education at 19 years old, while the average non-EEA migrant in the public sector is 41 years old and left full-time education at age 21. The fact that non-EEA migrants leave full-time education later than UK-born individuals, on average, may be a consequence of different education systems across countries rather than of differences in the level of education received. But, particularly in the case of recent inflows of non-EEA economic migrants into the UK, who have been subject to the entry criteria of the PBS, it is likely that these migrants have above-average levels of education.

5.62 While Dustmann and Frattini (2011) provided some new information about the size of the contribution that non-EEA migrants make to the provision of some public services in the UK, the report did not attempt to quantify or monetise the impact of non-EEA migration on these services. To do so, the authors argued, would require a conceptual framework and datasets that currently do not exist. The LFS, while providing a good snapshot of non-EEA migrants' activity in the UK labour market, is not a repeated cross-sectional survey and thus does not allow us to follow individual migrants over the entire duration of their stay in the UK. Because it is not possible to know whether migrants employed in the public sector later switch occupations or sectors, or leave the UK labour market altogether, it is not

possible to quantify or monetise the overall contribution that an individual migrant makes to the provision of UK public services. A first step towards overcoming this shortfall in the current evidence base would be to develop a detailed longitudinal survey of all migrants employed in the public sector, or at least to permit analysts access to longitudinal datasets recorded for the purposes of social security.

5.63   A more fundamental conceptual problem exists, however, in so far as it is not clear to Dustmann and Frattini (2011) that all impacts of migration on public services can be quantified or even identified. While it is clear how migrants' impact on the wages and employment levels of UK-born individuals employed in the public sector could be measured, effects such as changes in the quality and scope of service provision are more complex. It may be difficult to agree universally on the best objective measure of quality.

5.64   The relationship between migration and training of resident workers is also a complex conceptual matter that needs to be considered. On the one hand, bringing a skilled migrant to the UK may save on training costs and free up resources to invest in training elsewhere or in other aspects of public service. On the other, this can be viewed as a missed opportunity to raise the human capital of the existing UK workforce. Even understanding the nature of such relationships is a highly complex matter. Monetising them within a cost-benefit framework would be more so.

5.65   The final limitation to considering the impact of migration on the provision of public service identified by Dustmann and Frattini (2011) is that the true impact of migration can only be calculated by comparing the observed public service outcomes with those that would have occurred in the absence of migration, i.e. the counterfactual. This represents a hypothetical situation that must be constructed, and doing so to consider the public service impact of non-EEA migrants would require that policymakers make strong assumptions about the effects of a mass 'resignation' or 'absence' of non-EEA migrants, e.g. on wages, on productivity, and on the quality and scope (however measured) of public service provision. As we have previously recognised (see Migration Advisory Committee, 2010), attempting to measure the impact of migration is further complicated by the fact that employers might respond to an absence of non-EEA migrants by replacing them with migrants from within the EEA.

5.66   If a satisfactory counterfactual situation could be constructed then the potential may exist to improve further the quantification of the contribution of migrants to the provision of public sector services. Indeed, some impacts, for example those on wages, have already been monetised by some academic literature. This would involve further research and the development of wider datasets that incorporate more public sector outcomes, as well as the agreement of a suitable methodology. Dustmann and Frattini (2011) argued strongly

that this is not possible at present. Given the findings of that paper and the data limitations we are minded to conclude that, for the foreseeable future, it will not be possible to monetise fully these impacts of migration. However, it is possible, to some extent, to predict and consider some potential impacts on public service provision that could occur as a result of a change in migration policy on a case-by-case basis.

5.9 The impact of migration on social cohesion and integration

5.67 Of all of the public service and social impacts of migration through Tiers 1 and 2 that we considered in Migration Advisory Committee (2010), we felt least able to provide a firm conclusion on the overall impact on social cohesion and integration. Principally, this was because we felt that there was insufficient evidence in the existing literature to enable us to define and accurately measure the impacts of migration on social cohesion and integration. Moreover, we felt that, while Tier 1 and 2 migrants exhibit some characteristics that may be positively correlated with strong levels of integration, at least relative to all migrants (e.g. high employment rate and good English language skills), it is still plausible that locally concentrated surges of migration may have a negative impact on levels of social cohesion. Therefore, on balance we said that it was not possible to estimate with any degree of confidence the likely impact of Tier 1 and 2 migrants on social cohesion and integration.

5.68 To advance the existing evidence base and debate in this area we commissioned Saggar *et al.* (2011) to research the impacts of migration on social cohesion and integration and to consider whether, ultimately, it might be possible to consider these impacts of migration within an economic cost-benefit framework. The authors developed definitions of social cohesion and integration that we adopt for the purposes of this report: **social cohesion** relates to how individuals and groups get along with each other at a local, or neighbourhood, level; **integration**, meanwhile, occurs at a national level and relates to how groups perform relative to society as a whole.

5.69 By examining survey data on indicators of social cohesion and integration in the UK alongside data on those regions and localities where migrants are concentrated, the authors provided some broad conclusions about the relationship between migration and social cohesion and integration. First, the authors found that, according to the main available survey measures of integration, some migrants appear to be better integrated and engaged in society than some members of the UK-born population. Specifically, many migrant groups were found to have more trust in British political institutions, and to express higher levels of belonging to Britain, than the average UK-born individual with no migrant heritage, at least in the short term. This higher level of trust is not found to persist: over time the attitudes of migrants are found to assimilate to the more negative attitudes of the UK-

born population, but migrant minorities retain a higher sense of belonging to Britain even when they are long established in the country.

5.70 On cohesion, the report found that the primary negative influences on survey respondents' perceptions of their local area is the level of social deprivation rather than by the level of new migration. Deprived areas often also have high levels of existing diversity, but the statistical analysis suggests it is economic deprivation rather than ethnic diversity which is negatively related to social cohesion. This finding corroborates similar UK-based research on this subject (see, for example, Sturgis et al (2011); Letki (2008) and Laurence and Heath (2008)). Thus it would follow that new migration waves have little direct impact on levels of social cohesion in the short term, although they may have an indirect impact if they affect the pre-existing levels of deprivation.

5.71 Despite these findings about the impact of all migration, Saggar *et al.* (2011) identified various limitations to measuring the specific impact of non-EEA migration, which is the specific question that we have been asked to consider. We set out these limitations in the remainder of this section.

5.72 The most feasible approach to measuring the impact of migration on social cohesion and integration is an analysis of national and regional surveys, which typically ask respondents for their opinions on perceived levels of cohesion and integration in their area

without investigating the specific impact of particular migrant groups. Saggar *et al.* (2011) found that the correlation between EEA and non-EEA migrant flows into a local authority is very strong (in other words, local authorities with large numbers of EEA migrants also tend to have large numbers of non-EEA migrants). Therefore, the first difficulty in considering the impact of non-EEA migration on social cohesion and integration is that survey evidence is likely to be influenced by respondents' perceptions of the effects of all migration.

5.73 A second, more practical limitation to considering in isolation the impact on non-EEA migration on social cohesion and integration is the absence of one comprehensive dataset (Saggar *et al.*, 2011). The authors noted that the most extensive dataset on social cohesion and integration was the Citizenship Survey, which was previously conducted by the Home Office and the Department for Communities and Local Government before being discontinued from March 2011. Therefore, whilst it might be possible to use this dataset for backward-looking analyses of the impacts of migration, it is not an ideal instrument for considering the impact of future migration flows from outside the EEA. It may be possible to perform some forward-looking analysis using other datasets, such as the Understanding Society study and the British Social Attitudes survey, but these are all subject to various limitations. Saggar *et al.* (2011) argued that improvements in data collection, both in terms of including a broader range of

measures of cohesion and integration and in terms of investigating the effects of disaggregated subsets of migrants, would be a key step in understanding the impacts of migration on levels of social cohesion and integration.

5.74 In addition to the data constraints, the authors discussed various conceptual issues that make it difficult to consider the effect of non-EEA migration on social cohesion and integration as a standalone impact within an economic cost-benefit framework. First, non-EEA migrants are a diverse group, meaning any attempt to consider the impact of this group as a whole may provide very little information about any individual group of non-EEA migrants. This is important because any attempt to apply the aggregated impact of previous flows of non-EEA migrants to an IA that considers future flows may be meaningless if past and future flows vary significantly in term of their composition. This is sometimes likely to be the case in reality, particularly in a context in which migration policy changes over time.

5.75 Second, the perceived impact of non-EEA migration may vary depending on the measure of integration or cohesion that is considered. For example, if participation in the UK labour market is regarded as a positive indicator of integration, Indian males (whose labour market participation rate is higher than that of the UK-born population) will be perceived to have integrated better than Black African males (whose participation

rate in the UK labour market is below that of the UK-born population). Conversely, measuring integration on the basis of rates of intermarriage would mean that Black African males are perceived to have integrated much more effectively than Indian males (Saggar *et al.*, 2011). Thus universal agreement on the most suitable objective measure of both integration and social cohesion would be required before these impacts of migration could possibly be quantified, monetised and, ultimately, incorporated within an economic cost-benefit framework as standalone impacts of migration.

5.76 As a consequence of these conceptual issues and the limited evidence available at present, Saggar *et al.* (2011) argued that it is currently not possible to put a numerical value on the impact of non-EEA migration on social cohesion and integration that is significantly different from zero. Therefore, if policymakers were to feel compelled to quantify these impacts as standalone impacts of migration in the near future, the most sensible valuation of this impact at present would be zero.

5.77 The findings of Saggar *et al.* (2011) do, however, suggest that there may be some scope to amend the current approach to considering these impacts of migration within IAs, and these alternative options may be helpful to policymakers when evaluating current practices. At present, due to the inability to quantify these impacts of migration, their consideration in IAs tends to be limited to a qualitative discussion. This makes it difficult to consider

these impacts meaningfully alongside the quantifiable impacts of migration when evaluating policy options. To make these impacts more directly comparable, one approach may be to consider the impacts on social cohesion and migration not as standalone impacts of migration, but rather as additional effects that occur as a result of other impacts of migration.

5.78 For example, as at least some of the impacts of non-EEA migration on public services, crime, housing and transport are likely to affect public perceptions of the effect of migration on cohesion and integration, it might be more appropriate to adjust the monetary value placed on some or all of these impacts to account for the additional effects that they have on levels and perceptions of social cohesion. Determining the correct value of any such weighting, and which impacts it should be applied to, presents its own conceptual issues, and further research would be needed before this approach could be adopted in practice. Furthermore, this approach implicitly assumes that the other public service and social impacts of migration can be monetised accurately within a cost-benefit framework. As we have discussed throughout this chapter, for various reasons this may not be feasible for some or all of these impacts, at least in the short term.

5.10 Conclusions

5.79 In this chapter we have discussed whether and how it might be possible to consider the public service and social impacts of non-

EEA migration within an economic cost-benefit framework and, for the purposes of the Government, within an IA used to evaluate migration policy options. In doing so we have drawn on the findings of the six research projects on the various public service and social impacts of migration that we commissioned through our external research programme, and which we have published alongside this report.

5.80 The impacts of migration on the areas we have looked at can be subdivided according to the two categories we set out in Chapter 3: their effects on the size and on the composition of the UK population. For example, an increase in the level of consumption of public services that arises from positive net migration may have no visible impact in the long run if it is offset by migrants' contribution to those services, through tax payments and employment in the provision of public services. On the other hand, if migration alters the composition of services being consumed (for example, by increasing the demand for English as an additional language (EAL) provision in schools), then this impact may be felt by all consumers of those services in the longer term.

5.81 In none of the areas we have looked at is quantification and monetisation straightforward. Nevertheless, the areas where there is greatest scope for further conceptual thinking, data collection and analysis to lead to reasonably robust monetary estimates of the impacts of migration are the **consumption**

of public services, **crime and victimisation**, and **transport congestion**. Of these three areas, the first and the third are probably the top priorities for further research, as it is likely that the impact of PBS migration on crime rates experienced by the existing resident population is relatively small, at least at the national level.

5.82 In some other areas, there is probably scope for further analysis and quantification of migration impacts, but reliable monetisation is unlikely to be possible in the near future. These are the **provision of public services** and **housing**. In terms of **social cohesion and integration**, there is limited scope for either robust quantification or monetisation of the impacts of migration at national level.

5.83 Some key themes emerge from our examination of the evidence: first, in some areas there appears to be a common theme of migration impacts converging towards the average for UK nationals as migrants remain in the UK over time. This was identified as a theme, for instance, in the analysis carried out for us on crime, housing and transport congestion. A similar pattern of behaviour could plausibly occur in relation to the other impacts we looked at as well.

5.84 A second theme was lack of data. Ideally, we would have better longitudinal data that allow us to track individual migrants' behaviour and consumption patterns over their lifetime. In the absence of these data, it may be the case that consideration is necessarily limited to a static

analysis of past migration flows. Furthermore, while some datasets exist that enable analysts to consider particular social issues, such as levels of cohesion and integration within a particular region or local authority, they do not allow analysts to isolate the specific impact of particular types of migrant. For some impacts, such as those on the consumption of public services, it may even be difficult to isolate the impact of any migration as migrant status is not recorded consistently at the point of delivery.

5.85 A third theme was genuine conceptual as well as data difficulties in defining the impacts of migration. Issues include inter-dependencies between the impacts (e.g. the link between crime and social cohesion), a lack of a counterfactual, a lack of clear methods for dealing with unequal distribution of impacts across the UK population, and the fact that past impacts are not necessarily a good guide to the future: the characteristics of migrants will vary from case to case, as will the geographical or economic context that mediates the impacts.

5.86 Finally, there are many diverse impacts of migration that we have not considered at all in this report. These include, for example, the effects on the use of public services such as libraries and job centres, on levels of littering, and on the variety of goods and services available on UK high streets. Quantifying and monetising these impacts of migration will be subject to a range of caveats, assumptions and limitations, but all of these impacts would need to be examined and, ultimately,

measured fully when conducting a comprehensive IA on the public service and social impacts of migration.

5.87 For the reasons discussed above, and because the existing evidence base does not consider the public service and social impacts of all types of non-EEA migration in the same level of detail, for the foreseeable future any cost-benefit analysis of the impacts of migration can only be partial. This has important implications for how the NPV calculation should be presented and interpreted within a cost-benefit analysis of proposed Government policy changes. This issue is discussed further in Chapter 6.

Chapter 6   Conclusions

6.1   Migration impacts and use in cost-benefit analyses

6.1   We were commissioned to "*research the labour market, social and public service impacts of non-EEA migration; and to advise on the use of such evidence in cost-benefit analyses of migration policy decisions*". Our conclusions are summarised below, with the key points highlighted in bold.

Calculating the Net Present Value

6.2   Our first conclusion is that **the Net Present Value (NPV) as calculated in migration policy Impact Assessments should be based on total welfare of the 'resident' population**. Such an approach can be justified on its own merits and is also supported by the Government's official Green Book guidance (HM Treasury, 2003) on policy appraisal and evaluation.

6.3   We intentionally do not define precisely what constitutes a 'resident' for these purposes. In some cases the issue will be clear-cut. In others it is more open to normative judgement. It is for the Government, not our Committee, to make such judgements, although they should be made transparently. **The issue of who constitutes a 'resident' for the purposes of migration policy Impact Assessments should be explicitly addressed in the published assessment**. In the discussion below the term 'resident' refers to whichever group of individuals' welfare the Government wishes to maximise when it develops and implements new migration policy.

6.4   It follows from the above that **changes in wages or foregone wages received by 'non-residents' (net of tax) should not be a component of the NPV calculation.** Foregone migrant earnings were a major factor influencing the NPV calculation in the recent Home Office IA of changes to Tier 4 of the Points Based System (PBS) and the Post-Study Work Route (PSWR) (Home Office, 2011b).

6.5   **The key factors that are highly relevant and would ideally be captured in the NPV calculation are**:

- **'dynamic effects'** on the UK labour market and economy through specialisation and knowledge transfer;

- **impacts on employment and employability of UK workers** who may exit or be excluded from the labour market for

periods as a result of migration;

- the **net public service impact of migrants**, which would offset tax contributions and the role migrants play in providing public services against the impact on consumption of state benefits and public services; and

- what might broadly be termed as **congestion impacts** of migration, including those resulting from the impacts on transport networks and the housing market.

6.6 **Dynamic effects**, despite being potentially highly important, are difficult to even define precisely, let alone quantify and monetise robustly. Although a small number of academic studies have tried to isolate such effects, data and conceptual difficulties mean robust monetisation of congestion effects is also not possible.

6.7 We have examined the **impacts on employment and employability of UK workers.** As a starting point for analysis, 100 additional non-EU migrants may cautiously be estimated to be associated with a reduction in employment of 23 native workers. But those migrants who have been in the UK for over five years are not associated with displacement of UK born workers. The change in the stock of the non-EU working age population between 2005 and 2010 was approximately 700,000. An associated displacement rate of 0.23 suggests that UK born employment was therefore 160,000 lower. Between 1995 and 2010 employment of non-British

born working age people rose by approximately 2.1 million. Any associated displacement of British born workers was around 160,000 of the additional 2.1 million jobs held by migrants, or about 1 in 13.

6.8 Regarding **net public service impacts**, migrant tax contributions can be measured or predicted relatively accurately, based on predicted or actual earnings. However, data on, and estimates of, consumption of services by migrants are highly limited. Even in those areas where estimates have been produced, they are subject to considerable uncertainty in terms of their short-term and, more so, long-term reliability. Furthermore, consumption of some public services has not been considered at all in this report, such as use by migrants of libraries or job centres and consumption of public goods such as national defence.

6.9 Similarly, some social impacts of migration can be expected to 'wash out'. For example, a change in net migration could influence the level of total crime and victimisation in the UK but have no impact on the crime rate or the likelihood that a UK resident would have crime committed against them. On the other hand, some **congestion impacts** that cannot be expected to fully wash out include those on the ability of UK residents to access social or rented housing or to buy their own property and on congestion of public transport networks.

6.10 On balance it is clear that, on the basis of current data and knowledge, any attempt to calculate the NPV of migration

policies will be subject to considerable uncertainty and likely biases.

6.11 Furthermore, unless a crude adjustment is made, a typical NPV calculation typically only estimates the aggregate impact of a change in migration policy. Not captured are the distributional impacts of most changes to migration policy, even though such impacts will often be a major consideration for policymakers. Experiences of migration at the national and local levels may differ considerably. For example, while Tier 1 and 2 migrants exhibit some characteristics that may be positively correlated with strong levels of integration (e.g. high employment rate and good English language skills), it is still plausible that locally concentrated surges of migration may have a negative impact on levels of social cohesion.

6.12 We stated above that changes in wages or foregone wages received by 'non-residents' (net of tax) should not be a component of the NPV calculation. In contrast, the non-resident tax contribution should in principle be offset against expected non-resident consumption of state benefits and public services in the NPV calculation.

6.13 Therefore, **ideally, impacts of changes in migration policy on the cost of providing public services and state benefits should be monetised and included in the NPV calculation.**

6.14 **Practically,** until the data and conceptual difficulties are more substantially overcome, **the optimal approach may be to exclude gross (rather than net) migrant wages from the benefit side of the NPV calculation in IAs and to correspondingly exclude migrant consumption of public services from the cost side.**

6.15 The above approach removes one important bias, in that it accounts for under-measurement of migrant use of public services. It also adds a potential bias in that it does not allow for a 'composition effect' whereby highly skilled migrants probably make a positive net contribution to the public finances, at least in the short-term. But our approach has the benefit of being simpler than the current approach, yet is not obviously less robust.

The qualitative evidence base

6.16 In the case of migration policy, the current IA template gives undue prominence to the NPV calculation. The unreliability of NPV estimates in this policy area mean that **the qualitative evidence base should be given correspondingly higher weight. This should include both those impacts which can be quantified but not monetised and those which cannot be reliably quantified.**

6.17 In setting out the qualitative evidence base, particular attention should be paid to those factors that will not 'wash out'. These will include the dynamic effects, labour market impacts and congestion effects in transport and housing discussed above. They will also include composition effects on funding, provision and consumption of public services. Distributional impacts of particular interest to the Government should

also be set out, potentially including, but not necessarily limited to, differential impacts according to local area, gender, income, age group or ethnicity.

Developing the evidence base

6.18   Currently there are substantial data limitations. Ideally, we would have better longitudinal data that allow us to track individual migrants' behaviour and consumption patterns over their lifetime. Furthermore, while some datasets exist that enable analysts to consider particular social issues, such as levels of cohesion and integration within a particular region or local authority, they do not allow analysts to isolate the specific impact of particular types of migrant. Nor do they tell us about the concentrated or localised impacts of inward migration.

6.19   An additional issue is the conceptual difficulties in defining the impacts of migration. Issues include the inter-dependencies between the impacts, a lack of a counterfactual to allow us to observe what outcomes would occur with more or less migration, a lack of clear methods for dealing with unequal distribution of impacts across the UK population, and the fact that context is crucial: the characteristics of migrants will vary from case to case, as will the geographical or economic context that mediates the impacts.

6.20   There is scope for further thinking and analysis to develop more robust estimates of the impacts of migration. Some areas offer particular scope for further conceptual thinking, data collection and analysis. **The**

scope for further analysis is particularly significant in relation to: the consumption of public services; crime; transport and congestion; and, possibly, the dynamic spill-over impacts on productivity and associated factors.

6.21   **In some other areas, there is probably scope for further analysis and quantification of migration impacts, but reliable monetisation is unlikely to be possible in the near future.** These are the provision of public services and housing. There is limited scope for either robust quantification or monetisation of the impacts of migration on social cohesion and integration at national level.

Other issues

6.22   There are a few additional issues which we have considered in less depth in this report, but which nevertheless are important:

- Regarding the argument **that regular changes to migration policy impose administrative costs and burdens on businesses,** we did not examine the detail of how to carry out such a calculation, but agree that such factors represent a genuine economic cost and should be realistically assessed and be fully accounted for and included in any comprehensive cost-benefit analysis of a change to migration policy.

- In relation to potential economic effects of migration through its role in **influencing levels of trade, investment,**

tuition fees and remittances, the impacts on the productive capacity of the economy and the welfare of UK residents are again critical issues. It is appropriate to ask: first, does or would the type of migration being considered have an identifiable impact on flows of money into or out of the UK? Second, by what mechanism would a change in those flows have an impact on the productive capacity of the UK economy? Finally, what is the expected net impact on the welfare of UK residents?

- In making the choice of appropriate **time horizons and accounting for intergenerational effects** a balance needs to be struck between completely capturing net benefits over time and avoiding spurious accuracy. A sensible way of striking this balance would be to calculate the NPV over a relatively short time horizon (say, 5 or 10 years) and to note any longer-term considerations alongside the NPV and, importantly, give such factors appropriate weight in the decision-making process.

6.2   Other MAC work

6.23   The Government has asked that we consider at what level should the limit on Tier 2 (General) be set for 2012, taking account of the economic, labour market, social and public service impacts of the limit; and of the uptake of Tier 2 (General) and intra-company transferee visas in 2011/12. They also asked some additional questions in relation to associated Tier 2 policies on skill levels, intra-

company transfers, and the Resident Labour Market test. Our call for evidence in relation to this commission closed on 21 December 2011. The Government has asked that we report by the end of January 2012.

6.24   We operate our own small research programme, which we use to commission research projects relating to our work. Through this programme we commissioned six projects on the public service and social impacts of migration. The six project reports, which as detailed in Chapter 5 we have used to inform our thinking for this report, have been published on our website alongside it.

6.25   We have also commissioned a project to the National Institute of Economic and Social Research that sought to identify skills that might be considered strategically important to the UK economy and to examine the relationship between these skills and skilled economic migration from outside the European Economic Area (EEA) (National Institute of Economic and Social Research, 2011b). Another project has been commissioned to Christian Dustmann, Tommaso Frattini and Ian Preston (Dustmann *et al.*, 2011) to analyse whether sub-national or regional shortages of skilled labour can be sensibly addressed by economic migration from outside the EEA using a national shortage occupation list. These projects relate to various strands of the MAC's work and were not commissioned specifically to inform this report. We will publish both of them on our website in early 2012

Analysis of the Impacts of Migration

The association between migrants and native employment

A.1 Introduction

A.1 This annex presents our analysis of the association between migrants and native employment rates in Great Britain between 1975 and 2010. The following issues are considered in this analysis:

- The association between foreign-born migrants, non-EU migrants and EU migrants and the employment rates of natives (individuals born in the UK) over the period 1975 to 2010.

- The association between foreign-born migrants, non-EU migrants and EU migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010.

- The association between foreign-born migrants, non-EU migrants and EU migrants and native employment rates over the UK economic cycle when the output gap was positive and when the output gap was negative or zero.

- The association between short-term and long-term foreign-born migrants and native employment rates over the period 1975 to 2010.

A.2 First, we present an overview of the data employed in this analysis. A range of data plots are then presented indicating correlations between migrants and native employment rates. These associations are then tested more rigorously using econometric analysis. The results from this study are then compared to the findings from Dustmann *et al.* (2005), which used a similar methodology to estimate the association between migrants and native employment rates over the period 1983 to 2000. Finally, we present potential avenues for developing our analysis and draw out the main findings from this annex.

A.2 Data

A.3 This analysis adopts the spatial correlation approach to estimate the association between migrants and native employment rates. This approach requires the country to be divided into regions. It is then assumed that migrants within a given region only compete for jobs with natives in the same region. This assumption allows us to compare changes in native employment rates in regions with

large changes in the stock of migrants against changes in native employment rates in regions with small changes in the stock of migrants. We also control for factors which might explain differences in native employment rates between regions and over time.

A.4   This analysis uses average annual data for Great Britain from 1975 to 2010 from the Labour Force Survey (LFS). This study divides Great Britain into the following 11 regions: North East; Yorkshire and the Humber; East Midlands; East Anglia; Greater London; South East; South West; West Midlands; North West; Wales; and Scotland. LFS data are biennial for the period 1975 to 1983 and annual for the period 1983 to 2010.

A.5   Migrants can be defined by country of birth or nationality. We identify individuals by their country of birth. By using country of birth we will include British citizen born abroad and foreign-born individuals who subsequently acquired British citizenship.

A.6   Migrants and natives are therefore defined as foreign-born and UK-born individuals respectively, while non-EU and EU migrants are defined as non-EU-born and EU-born individuals. Therefore, when we refer to "natives" in this annex we mean non-migrants. We have considered the impact of EU/non-EU born migrants as

opposed to the impact of migrants born in EEA/non-EEA countries[5].

A.7   This analysis considers the association between short-term and long-term migrants and native employment rates. Short-term migrants are defined as those who have resided in the UK for less than five years, while long-term migrants are assumed to be those who have resided in the UK for five years or more. This period has been selected because non-EU migrants entering the country via work routes leading to settlement must have resided in the country for at least five years before becoming eligible to settle.

A.3   Data plots

A.8   This section presents a range of data plots for the change in native employment rates against the change in the ratio of migrants to natives in the working-age population (the 'migrant/native ratio') by region and by year. The working-age population is defined as 16 to 64 for men and 16 to 59 for women. These plots present data in changes rather than in levels to remove any region-specific factors common to both native employment rates and the migrant/native ratio. It is only possible to infer short-term associations from these data plots, since the data points represent the change in the migrant/native ratio and the

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[5] In addition to the EU countries, the EEA includes Iceland, Liechtenstein and Norway, which have relatively small populations compared to the EU. As a consequence, we expect any findings relevant for EU/non-EU migrants to be equivalently relevant for EEA/non-EEA migrants.

changes in native employment rates over the same year.

A.9 Data plots for the following relationships are presented at the end of this annex showing the change in native employment rates against:

- the change in the migrant/native ratio over the period 1975 to 2010 (Figure A.1);

- the change in the ratio of non-EU migrants to natives in the working-age population (the 'non-EU/native ratio') and the change in the ratio of EU migrants to natives in the working-age population (the 'EU/native ratio') over the period 1975 to 2010 (Figures A.2 and A.3 respectively);

- the change in the migrant/native ratio over the periods 1975 to 1994 and 1995 to 2010 (Figures A.4 and A.5 respectively);

- the change in the migrant/native ratio when the output gap was positive and when the output gap was negative or zero over the period 1975 to 2010 (Figures A.6 and A.7 respectively); and

- the change in the ratio of short-term migrants to natives in the working-age population (the 'short-term migrant/native ratio') and the change in the ratio of long-term migrants to natives in the working-age population (the 'long-term migrant/native ratio') over the period 1983 to 2010 (Figures A.8 and A.9 respectively).

A.10 Even if these data are found to be correlated, the lines of best fit cannot necessarily be interpreted as the impact of migrants on native employment rates. First, correlation may be spurious and therefore not causal. Second, the migrant/native ratio and the native employment rate may be endogenous. For example, a negative correlation between the native employment rate and the migrant/native ratio is consistent with the hypothesis that migrants reduce native employment rates, but also consistent with the hypothesis that migrants move to regions with lower employment rates. Third, the estimated coefficients from the lines of best fit may be biased since we do not control for other factors affecting native employment rates such as the age and qualifications of natives, region and year. More rigorous econometric analysis is undertaken in section A.5 to address these issues.

A.11 Throughout this annex, we assume that estimated coefficients with 2-tail p-values less than 5 per cent are statistically significant, whereas those with 2-tailed p-values greater than 5 per cent are considered statistically insignificant. How to interpret the statistical significance of our results is discussed in greater detail in section A.4.

A.12 Figure A.1 presents the change in the native employment rate against the change in the migrant/native ratio over the period 1975 to 2010. The line of best fit is downward sloping but the estimated slope coefficient is

statistically insignificant over this period.

A.13   Figures A.2 and A.3 present the change in the native employment rate associated with changes in the non-EU/native ratio and the EU/native ratio respectively over the period 1975 to 2010. Both figures demonstrate negative correlation between the variables, with higher negative correlation between the change in the non-EU/native ratio and the change in native employment rates. Nevertheless, the estimated slope coefficients for both lines of best fit are statistically insignificant.

A.14   We also consider the change in the native employment rate associated with a change in the migrant/native ratio over the periods 1975 to 1994 and 1995 to 2010 respectively (Figures A.4 and A.5). Both figures demonstrate negative correlation between the variables, with higher negative correlation over the period 1995 to 2010. The estimated slope coefficient is statistically insignificant for the period 1975 to 1994 but statistically significant at the 5 per cent level for the period 1995 to 2010.

A.15   Figures A.6 and A.7 present the change in the native employment rate associated with a change in the migrant/native ratio when the UK output gap was positive and when the output gap was negative or zero respectively over the period 1975 to 2010. The output gap is the difference between actual output (measured by GDP) and potential output (the hypothetical equilibrium level of GDP at which the total demand for goods and services equals the total supply). A positive output gap is therefore normally associated with an economic boom whereas a negative output gap is associated with a slow economic growth or an economic downturn. Estimates for the UK output gap from 1975 to 2010 have been obtained from the Organisation for Economic Co-operation and Development (OECD, 2011).

A.16   The data are found to be negatively correlated in both Figures A.6 and A.7, with higher negative correlation when the output gap was zero or negative. The estimated slope coefficient is statistically insignificant when the output gap was positive but statistically significant at the 1 per cent level when the output gap was zero or negative.

A.17   Figures A.8 and A.9 present the change in the native employment rate associated with a change in the short-term migrant/native ratio and a change in the long-term migrant/native ratio respectively. These plots include data from 1983 to 2010 since the LFS only recorded individuals' length of residence in the UK from 1983. These variables are negatively correlated for both short-term and long-term migrants, with higher negative correlation for short-term migrants. The estimated slope coefficient is statistically significant for short-term migrants at the 1 per cent level but statistically insignificant for long-term migrants.

A.18   In summary, these data plots indicate that changes to the migrant/native ratio were negatively correlated with

changes in native employment rates over the period 1975 to 2010. This negative correlation was found to be highest over the period 1995 to 2010 and when the output gap was zero or negative, and in both cases the estimated slope coefficients on the lines of best fit were statistically significant at the 5 per cent level. We now test these associations more rigorously using econometric analysis.

A.4 Model specification

A.19 This section presents the regression model specifications we adopted to estimate the association between migrants and native employment rates. Our methodology is similar to the spatial correlation approach presented in Dustmann *et al.* (2005), but differs in the following respects:

- This analysis divides Great Britain into 11 regions rather than the 17 used in Dustmann *et al.* (2005). The reason for this is that while Dustmann *et al.* (2005) estimated the association between foreign-born migrants and native employment rates, this analysis also considers this association for non-EU and EU migrants separately. It is therefore necessary to divide Great Britain into fewer regions to ensure that sample sizes by region are sufficiently large for this analysis to be robust. The grossed-up sample sizes for the stock of natives in employment and the working-age populations of natives, non-EU and EU migrants by year and region

are almost all greater than 10,000 for a given year and region (with the exception of two data points). Given that the ONS recommends reporting figures from the LFS with grossed-up sample sizes of 10,000 or above, we consider that the sample sizes of data used here are sufficiently large to allow robust analysis.

- LFS data for the period 1975-2010 are used in this analysis, whereas Dustmann *et al.* (2005) used LFS data for the period 1983 to 2000.

- Dustmann *et al.* (2005) included explanatory variables for the mean ages of natives and immigrants, divided by 100. This analysis instead includes explanatory variables for the ratio of the population aged 25-49 against those aged 16-24 and for the ratio of the population aged 50-64 against those aged 16-24. Since employment rates are generally higher for individuals aged 25-49 than for those aged 16-24 or 50-64, including separate variables for different age groups is likely to improve the fit of the model.

- Dustmann *et al.* (2005) included explanatory variables for the highest qualifications of the working-age population by region and year. Individuals were divided into graduates, individuals with intermediate qualifications (those with O-levels but no higher) and unqualified individuals. This analysis includes controls for age of leaving full-time

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education rather than highest qualification, due to the difficulty of comparing UK and foreign qualifications in the LFS. Individuals have therefore been divided into graduates (those leaving full-time education at age 21 or above), those with intermediate qualifications (leaving full-time education between ages 17 and 20) and those with low qualifications (leaving full-time education aged 16 or below).

- Dustmann *et al.* (2005) included instruments for the qualification regressors, whereas this analysis does not.

- Finally, Dustmann *et al.* (2005) instrumented the migrant/native ratio with the migrant/native ratio lagged by three years, whereas this study instruments the migrant/native ratio (and equivalent ratios for non-EU, EU, short-term and long-term migrants) using the same ratio(s) lagged by 12 months. This issue is discussed in greater detail below.

A.20   We use the following regression model specifications to estimate the association between migrants and native employment rates:

$$y_{it} = \alpha_0 + \alpha_1 x_{it} + \alpha_2 D_{it} + \alpha_3 \lambda_t + \alpha_4 \mu_i + \varepsilon_{it}$$

and

$$dy_{it} = \beta_0 + \beta_1 dx_{it} + \beta_2 dD_{it} + \beta_3 \lambda_t + \beta_4 \mu_i + \varepsilon_{it}$$

A.21   The variables included in this expression are as follows:

- y_{it} is the native employment rate in region i and year t. The native employment rate is calculated as the stock of natives in employment divided by the native working-age population in region i and year t.

- x_{it} is the migrant/native ratio in region i and year t. This is calculated as the ratio of foreign-born migrants to natives in the working-age population in region i and in year t. Alternatively, separate regressors are included for the non-EU/native ratio and the EU/native ratio, or for the short-term migrant/native ratio and the long-term migrant/native ratio.

- D_{it} is a vector of variables for the demographics of individuals in region i and year t. These include the ratio of individuals aged 25-49 against those aged 16-24; the ratio of individuals aged 50-64 against those aged 16-24; the ratio of individuals with intermediate qualifications against those with low qualifications in the working-age population; and the ratio of graduates to individuals with low qualifications in the working-age population.

- λ_t is a dummy variable for year t.

- μ_i is a dummy variable for region i (not included in all of the regression models).

- d is the difference operator e.g. $dy_{it} = y_{it} - y_{it-1}$.

A.22 We tested whether the working-age population of natives by region and year should be included as an additional regressor. The inclusion of this regressor is found to have little impact on the estimated coefficient for the migrant/native ratio. Moreover, this regressor was found to be statistically insignificant and therefore was not included in our model specification.

A.23 All of the regressions are estimated with clustered standard errors to take account for correlations of native employment rates within regions (but not between regions).

A.24 We have tested a range of model specifications to analyse whether the estimated association between migrants and native employment rates is sensitive to the chosen specification. First, we have estimated the regression in levels, both with and without regional fixed effects (models 2 and 1 respectively). We expect the estimated coefficients on the migrant/native ratio to be positive in the model without regional fixed effect terms if migrants generally move to regions with high native employment rates. Second, we estimate the model in first differences, both with and without regional fixed effect terms (models 4 and 3 respectively). Third, we estimate an instrumental variable regression in levels, instrumenting the migrant/native ratio (or equivalent ratios) with the same ratio(s) lagged by 12 months (model 5).

A.25 Lagged migrant stocks are often used as instruments for current migration stocks in similar empirical studies, since migrants typically move to regions with large stocks of migrants of the same nationality. Lags of the migrant/native ratio are appropriate instruments if they are closely correlated with the current migrant/native ratio but uncorrelated with current native employment rates conditional on the current migrant/native ratio.

A.26 We have used the 12 month lag of the migrant/native ratio as an instrument for the current migrant/native ratio. However, we estimate that the coefficient on the migrant/native ratio changes significantly when the lag length for the instrument of the migrant/native ratio increases (discussed in section A.6). As a consequence, the estimates from the instrumental variable regressions for the association between migrants and native employment rates are not robust to changes to the lag length of the instruments.

A.27 Of the five model specifications detailed above, model 4 is our preferred specification: estimating the regression in first differences including regional fixed effect terms. This preference was also shared by the two respected labour market econometricians that peer reviewed this annex. We consider that it is preferable to specify the model in differences rather than in levels since this reduces the likelihood of obtaining spurious correlation. In addition, including regional fixed effect terms in model 4 controls for time-invariant regional differences in

the growth of native employment rates.

A.28 Model 4 controls for potential endogeneity bias by including regional fixed effect terms and variables for the age and qualifications of individuals in the working-age population. Including regional fixed effect terms controls for time-invariant differences in native employment rates between regions which may affect the chosen locations of both migrants and natives. Including variables for the ages and qualifications of individuals in the working-age population in a given region and year controls for the influence of these factors on the chosen locations of migrants and natives.

A.29 However, model 4 does not control for potential endogeneity bias to the estimated coefficient on the migrant/native ratio caused by labour demand shocks which are not equal for all regions in a given year. These shocks may affect the chosen locations of newly-arrived migrants, and may influence some resident migrants and natives to change regions.

A.30 The estimated coefficient on the migrant/native ratio in model 4 can be interpreted as the percentage point change in the native employment rate associated with a 1 percentage point increase in the migrant/native ratio. The denominators in both the native employment rate and the migrant/native ratio are the working-age population of natives by region and year. Therefore, the estimated coefficient on the migrant/native ratio can also be interpreted as the change in the stock of natives in employment

associated with an increase of 1 in the stock of working-age migrants in the population.

A.31 As stated in section A.3, we regard estimated coefficients with 2-tail p-values less than 5 per cent as statistically significant (a standard assumption for econometric studies). Estimated coefficients with 2-tail p-values greater than 5 per cent are regarded as statistically insignificant.

A.32 To explain the meaning of statistical significance, assume that the estimated coefficient on a given dependent variable is δ and it has a two-tail p-value of 1 per cent. The p-value implies that there is a 1 per cent probability of obtaining an estimated coefficient at least as extreme as δ (i.e. greater than or equal to δ or less than or equal to $-\delta$) if the true, unknown value of δ is zero. If this probability is lower than or equal to 5 per cent, we would reject the hypothesis that the true, unknown value of δ is zero and accept that the estimated value for the coefficient is the preferred estimate.

A.33 By contrast, if the two-tail p-value on the coefficient is 50 per cent rather than 1 per cent, there is a 50 per cent probability that this coefficient estimate could have been observed if the true, unknown value of δ is zero. In such case, it is good practice to assume that the true value of δ is zero rather than the estimated value. This approach reduces the likelihood of over-interpreting results which may well be statistical anomalies. Throughout this annex we report whether

results are statistically significant at the 5 per cent or 1 per cent levels.

A.5 Results

A.34 This section presents the regression output for the following associations:

- The association between foreign-born migrants and native employment rates over the period 1975 to 2010 (Table A.1).

- The associations between non-EU and EU migrants and native employment rates over the period 1975 to 2010 (Table A.2).

- The associations between foreign-born migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010 (Table A.3).

- The associations between non-EU and EU migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010 (Table A.4).

- The associations between foreign-born migrants and native employment rates when the output gap was positive and when the output gap was negative or zero (Table A.5).

- The associations between non-EU and EU migrants and native employment rates when the output gap was positive and when the output gap was negative or zero (Table A.6).

- The associations between short-term and long-term foreign-born migrants and

native employment rates over the period 1983 to 2010 (Table A.7).

A.35 Key results are summarise in table A.13. We then present further analysis we have undertaken and robustness checks for some of the key results.

The association between foreign-born migrants and native employment rates over the period 1975 to 2010

A.36 Table A.1 presents the results from the regressions of native employment rates on the migrant/native ratio and a series of control variables over the period 1975 to 2010. The coefficient on the migrant/native ratio turns from positive to negative when regional fixed effects are included in the model (models 1 and 2 respectively). This suggests that migrants generally located to regions with higher native employment rates. The results from model 4 indicate that the estimated coefficient on the migrant/native ratio was negative but statistically insignificant over this period.

The associations between non-EU and EU migrants and native employment rates over the period 1975 to 2010

A.37 Table A.2 presents the results of the regressions of native employment rates on the non-EU/native ratio, the EU/native ratio and a series of control variables over the period 1975 to 2010. Considering the results from model 4, the estimated coefficients on both the non-EU/native ratio and the EU/native ratio were negative but statistically insignificant over this period.

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The associations between foreign-born migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010

A.38　Table A.3 re-estimates the regression models from Table A.1 over the periods 1975 to 1994 and 1995 to 2010. This allows us to ascertain whether the association between foreign-born migrants and native employment rates has changed over time.

A.39　The results from models 3 and 4 indicate that the coefficient estimates on the migrant/native ratio were negative but statistically insignificant over the period 1975 to 1994. By contrast, these estimated coefficients become larger in absolute terms and statistically significant at the 1 per cent level over the period 1995 to 2010. The estimated coefficients from model 4 suggest that an increase of 100 in the stock of foreign-born working-age migrants was associated with an average reduction of the stock of natives in employment by 23 over the period 1995 to 2010.

A.40　We have performed an F-test to ascertain whether the difference between the estimated coefficients on the migrant/native ratio for the period 1975 to 1994 and 1995 to 2010 is statistically significantly different. Our test indicates that we cannot reject the hypothesis that they are statistically significantly different, suggesting that the association between migrants and native employment rates may have been the same over both time periods.

A.41　It is perhaps surprising that the association between migrants and native employment may have

remained unchanged over the periods 1975 to 1994 and 1995 to 2010 even though the estimated coefficient on the migrant/native ratio was statistically insignificant over the period 1975 to 1994 but statistically significant over the period 1995 to 2010. A potential explanation for this is that net migration of foreign nationals was higher over the period 1995 to 2010 than the period 1975 to 1994 (see Figure A.10). As a consequence, we may be more likely to estimate a statistically significant association between migrants and native employment rates over the period 1995 to 2010.

The associations between non-EU and EU migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010

A.42　We have also estimated the associations between non-EU and EU migrants and native employment rates over the periods 1975 to 1994 and 1995 to 2010 to ascertain whether the associations has changed over time (Table A.4).

A.43　Considering the results from models 3 and 4, the estimated coefficients on the EU/native ratio are statistically insignificant for both periods. By contrast, the estimated coefficients on the non-EU/native ratio were statistically insignificant for the period 1975 to 1994 but statistically significant at the 1 per cent level over the period 1995 to 2010. The estimated coefficient from model 4 suggest that, on average, an increase of 100 in the stock of working-age non-EU migrants is associated with a reduction of the

stock of natives in employment by 23 over the period 1995 to 2010.

A.44 The estimated coefficients on the non-EU/native ratio and the EU/native ratio are almost the same in models 3 and 4 for each time period. In addition, we estimate that the differences between these estimated coefficients are not statistically significant for either time period. This suggests that we cannot reject the possibility that the association between non-EU migrants and native employment rates was the same as that for EU migrants.

A.45 Again, it seems surprising that the association between non-EU migrants and native employment rates could be the same as that for EU migrants even though the estimated coefficients on the EU/native ratio are statistically insignificant. A potential explanation for this is that net migration of EU-national migrants was smaller than that of non-EU-national migrants in every year from 1975 to 2010 (see Figure A.10). It is therefore plausible that we are less likely to estimate a statistically significant association between EU migrants and native employment rates than we are for non-EU migrants.

The associations between foreign-born migrants and native employment rates when the output gap was positive and when the output gap was negative or zero

A.46 Table A.5 presents the results from re-estimating the regression models in Table A.1 dividing the data into years when the UK output gap was positive and when the output gap was negative or

zero. The results from models 2, 3 and 4 indicate that the estimated coefficients on the migrant/native ratio are negative but statistically insignificant when the output gap was positive. However, the estimated coefficients become greater in absolute terms and statistically significant at the 5 per cent level when the output gap was negative or zero.

A.47 Considering the results from model 4, when the output gap was negative or zero an increase of 100 in the stock of working-age foreign-born migrants is associated with a reduction of the stock of natives in employment by 30 over the period 1975 to 2010.

A.48 We estimate that the difference between the estimated coefficients on the migrant/native ratio is not statistically significantly different when the output gap was positive and when it was negative or zero. However, the difference is only marginally statistically insignificant.

The associations between non-EU and EU migrants and native employment rates when the output gap was positive and when the output gap was negative or zero

A.49 Table A.6 presents estimates for the associations between non-EU and EU migrants and native employment rates over years when the UK output gap was positive and when it was negative or zero. The results from models 2, 3 and 4 indicate that the estimated coefficients on both the non-EU/native ratio and the EU/native ratio are negative but statistically insignificant when the output gap was positive. However, the estimated coefficients on the

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non-EU/native ratio are statistically significant at the 5 per cent level when the output gap was zero or negative in these models. The estimated coefficient from model 4 suggests that, on average, an increase of 100 in the stock of working-age non-EU migrants was associated with a reduction of the stock of natives in employment by 27, on average, between 1975 and 2010 when the output gap was negative or zero.

A.50   We have also tested whether there is a statistically significant difference between the estimated coefficients on the non-EU/native ratio and the EU/native ratio when the output gap was positive and when the output gap was zero or negative. In both cases we find that the difference between the estimated coefficients on the non-EU/native ratio and the EU/native ratio are not statistically significantly different.

The associations between short-term and long-term foreign-born migrants[6] and native employment rates over the period 1983 to 2010

A.51   Table A.7 presents the results from the regressions of native employment rates on the short-term migrant/native ratio, the long-term migrant/native ratio and a series of control variables over the period 1983 to 2010. The estimated coefficient on the long-term migrant/native ratio is negative and statistically

insignificant in model 4. The estimated coefficient on the short-term migrant/native ratio from model 4 is larger in absolute terms but statistically insignificant. We estimate that the difference between the estimated coefficients on the short-term migrant/native ratio and the long-term migrant/native ratio is not statistically significant.

A.52   On balance, however, across all model specifications there is a stronger level of statistical support for an impact of short-term migrants on the native employment rate than long-term migrants.

A.53   The small sample sizes for the migrants' length of residence in the UK reported in the LFS are likely to generate measurement errors in the data, resulting in attenuation bias for the estimated coefficients. This would have the effect of biasing the estimated coefficients on the short-term migration/native ratio and the long-term migrant/native ratio towards zero, reducing the likelihood of obtaining statistically significant results.

Robustness checks

A.54   In this section we present the results from a variety of robustness checks to ascertain whether the results are affected by alterations to the model specification or removal of outliers from the data. Ideally, we should like to perform robustness checks for all of the statistically significant results presented in Table A.13. However, due to time limitations we have only performed robustness checks for two of these results: the associations

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[6] Short-term migrants are defined as those who have resided in the UK for less than 5 years. Long-term migrants are defined as those who have resided in the UK for at least 5 years.

between non-EU and EU migrants and native employment rates over the period 1995 to 2010 (Table A.4), and the association between non-EU and EU migrants and native employment rates when the output gap was zero or negative (Table A.6).

A.55 We have undertaken the following robustness checks. First, we have removed outliers from the data which may bias the estimated coefficients (Table A.8). Twenty outliers have been removed from each dataset: the top and bottom 5 observations for the change in the non-EU/native ratio and the change in the EU/native ratio.

A.56 Second, Table A.9 specifies the relationship in logs rather than in levels. The purpose of this is to test whether the estimated associations between foreign-born migrants and native employment rates are similar assuming linear and non-linear relations between these variables.

A.57 Third, Table A.10 presents estimates for these relationships weighting the data by working-age population. The purpose of this is to place lower weight on regions with smaller working-age populations, since the data for these regions are likely to be subject to greater sampling error. By weighting the data by the working-age population, we reduce the likelihood that the estimated coefficients will be subject to attenuation bias.

A.58 Fourth, Table A.11 estimates these relationships but including the non-EU/native ratio and EU/native ratio lagged by one year instead of current values of these ratios. The rationale for this

is to reduce the likelihood that the estimated coefficients on the non-EU/native ratio and the EU/native ratio are affected by endogeneity bias, since past flows of migrants and natives to and from a region are unlikely to be affected by current shocks to the demand for labour.

Robustness checks for the associations between non-EU and EU migrants and native employment rates over the period 1995 to 2010

A.59 The results from model 4 of Table A.8 indicate that the estimated coefficients on both the non-EU/native ratio and the EU/native ratio are negative but statistically insignificant when outliers are removed from the data. This suggests the association between migrants and native employment rates is greatest for regions experiencing large changes in stocks of migrants (primarily Greater London, which accounted for 11 of the 20 outliers removed).

A.60 Considering model 4 in Table A.9, the estimated coefficients on the logged working-age non-EU migrant population and the logged working-age EU migrant population are both statistically insignificant. This suggests that the estimated negative association between non-EU migrants and native employment rates is not robust to changes in the model specification.

A.61 Table A.10 presents estimates for the associations weighting the data by working-age population. The results from model 4 indicate that the estimated coefficient on the non-EU/native ratio is negative and statistically significant at the 1 per cent level whereas the

estimated coefficient on the EU/native ratio is statistically insignificant. Moreover, weighting the data by working-age population has little impact on the estimated coefficient on the non-EU/native ratio. Our results therefore appear to be robust to weighting the data by the working-age population.

A.62 The results from Table A.11 indicate that the estimated coefficients on both the non-EU/native ratio and the EU/native ratios lagged by 12 months are both negative but statistically insignificant. This suggests that our results may not be robust to endogeneity bias, or alternatively that migrant inflows in a given year are not associated with changes in native employment in the following year.

Robustness checks for the associations between non-EU and EU migrants and native employment rates when the output gap was negative or zero

A.63 The results from model 4 in Table A.8 indicate that the estimated coefficients on the non-EU/native ratio and the EU/native ratio were both negative but statistically insignificant when outliers are removed from the data. Again, this suggests that the association between migrants and native employment rates is greatest for regions experiencing large changes in stocks of migrants.

A.64 Table A.9 presents results for the association between migrants and native employment in years when the output gap was zero or negative, specifying the association in logs rather than in levels. The estimated coefficients on the logged working-age non-

EU migrant population and the logged working-age EU migrant population are both negative but statistically insignificant. This suggests that our estimates are not robust to alterations in the model specification.

A.65 The results from model 4 in Table A.10 indicate that the estimated coefficient on the EU/native ratio was negative but statistically insignificant when weighting the data by the working-age population. By contrast, the estimated coefficient on the non-EU/native ratio was negative and statistically significant at the 1 per cent. Moreover, weighting the data has little impact on the estimated coefficient on the migrant/native ratio, suggesting that our results are robust to weighting the data by the working-age population.

A.66 The results from Table A.11 indicate that the estimated coefficients on the 12 month lag of the non-EU/native ratio and the EU/native ratio are not statistically significant.

Summary of robustness checks

A.67 These results suggest that the association between migrants and native employment rates is greatest for regions experiencing large changes in stocks of migrants. In addition, our results are robust to weighting the data by working-age population. However, our results are not robust to alterations to the model specification (estimation in logs rather than in levels). Furthermore, our results are not robust to substituting the non-EU/native ratio and the EU/native ratio with the same ratios lagged

by 12 months. This suggests that our results may not be robust to endogeneity bias, or alternatively that migrant inflows in a given year are not associated with changes in native employment in the following year.

Further analysis

A.68 In addition to the results presented above, we have also estimated the association between changes to the migrant stocks in past years and changes to current native employment rates over the period 1975 to 2010. The purpose of this is to estimate whether the estimated negative association between migrants and natives persists over time.

A.69 We have re-estimated the model 4 regression from Table A.1 replacing the current migrant/native ratio with lags of the migrant/native ratio. We estimate that the coefficient on lag 4 is -0.087, which is statistically significant at the 1 per cent level, and that the coefficient on lag 5 is 0.131 and statistically significant at the 5 per cent level. Lags 1, 2 and 3 are found to be statistically insignificant. Given that the estimated coefficients on lags 4 and 5 roughly cancel out, we believe it is reasonable to infer that inflows of migrants in a given year are associated with a reduction in native employment in the same year, but not associated with changes in native employment in the subsequent five years.

A.70 In the long term, we expect migrants' contribution to the demand for labour to increase native employment, offsetting the

initial reduction in native employment. The spatial correlation approach may underestimate this dynamic impact, since it requires the assumption that migrants only influence native employment rates in the same region. By contrast, the consumption of goods and services by a migrant may contribute to job creation for natives living in regions other than the migrant's home region. As a consequence, there is scope for further work to estimate the dynamic association between migrants and native employment rates.

A.71 We have also estimated the association between migrants and native employment rates by qualification level, running separate regressions for individuals with low qualifications, intermediate qualifications and graduates (defined in section A.4). The rationale for this is to determine whether the association between migrants and native employment rates differs for different qualification groups. For each of these groups we find that migrants had a statistically insignificant association with native employment rates. There is scope to investigate this further in future work, for example: grouping individuals into two rather than three qualification groups or grouping individuals by occupation.

A.72 Further, we have estimated the association between migrants and native employment rates for the period 1975 to 2010, separating the data into regions and years in which the stock of migrants increased and when the stock

remained constant or decreased. The purpose of running these regressions is to estimate whether the displacement of natives from employment when migrants entered a region is symmetric to the replacement of natives in employment when migrants leave.

A.73 Using the model 4 specification, the estimated coefficient on the migrant/native ratio is 0.037 when the stock of migrants rose but -0.121 when the stock of migrants remained constant or fell. Both estimates are found to be statistically insignificant, and the difference between these estimates is found to be statistically insignificant. This suggests that we have no reason to believe that displacement of natives when migrant stocks increased differed from the replacement of natives into employment when migrant stocks fell over the period 1975 to 2010.

A.74 The estimated coefficients in these regressions are likely to be biased since we are splitting the sample by net migration: a potentially endogenous variable. There is therefore further scope to investigate whether replacement and displacement are symmetric.

A.75 In addition, we tested the association between non-EU migrants and employment rates of EU migrants but did not find a statistically significant association.

A.6 Comparison with Dustmann *et al.* (2005)

A.76 The methodology adopted in this analysis is similar to that adopted by Dustmann *et al.* (2005). To provide further validation for our results, we have attempted to re-

estimate the results from Dustmann *et al.* (2005) as accurately as possible using our dataset to observe whether we obtain similar results. The only differences between the methodology adopted in Dustmann *et al.* (2005) and our methodology to replicate these results are as follows:

- First, Dustmann *et al.* (2005) divides Great Britain into 17 regions whereas this analysis divides the country into 11 regions.

- Second, these two studies group individuals into qualification bands using different criteria (see the section A.4 for details).

A.77 In Dustmann *et al.* (2005), the instrumental variable approach is accepted as the preferred methodology to estimate the association between migrants and native employment rates. Dustmann *et al.* (2005) estimate the coefficient on the migrant/native ratio to be -0.070, which is statistically insignificant. The authors therefore conclude that migrants had little or no overall association with native employment rates over the period 1983 to 2000.

A.78 We estimate the coefficient on the migrant/native ratio to be -0.656 using the same 3-year lag length for the instrument of the migrant/native ratio, which is also statistically insignificant. However, our results also suggest that the estimated coefficient on the migrant/native ratio is highly sensitive to the choice of lag length for the instrument. For

example, we estimate that a 1-year lag length changes the estimated coefficient on the migrant/native ratio to 1.453. We therefore consider the results from the regression in differences to be more robust than the results from the instrumental variable regression, although estimation in differences does not eliminate the problem of endogeneity bias entirely.

A.79 Table A.12 presents the results from Dustmann *et al.* (2005) and our estimates to replicate these results for the regression in first differences. We estimate the coefficient on the migrant/native ratio to be -0.165, which is almost the same as the estimate of -0.154 in Dustmann *et al.* (2005). Both estimates are statistically insignificant.

A.7 Future work

A.80 There are a number of potential avenues for developing the analysis presented.

A.81 First, further analysis may be undertaken to investigate the issues presented here. For example, it may be valuable to estimate the association between short-term and long-term non-EU and EU migrants and native employment rates. There is also scope for further work to estimate the dynamic association between migrants and native employment rates, the association between migrants and native employment rates by qualification groups or occupation groups, and whether replacement and displacement are symmetric.

A.82 Second, the analysis presented in this annex could be replicated

using population data rather than sample data from the LFS. The rationale for this is that sample data are subject to sampling error which may bias the results. By contrast, population data contain all data observations and therefore are not affected by sampling error. In addition, using population data makes it possible to divide the country into a higher number of regions without biasing the results. This implies that regional differences in native employment rates can be controlled for at a more localised level, potentially improving the fit of the regression model.

A.83 For example, data for Jobseeker's Allowance claimants could be used to estimate unemployment rates and data for National Insurance Number (NINo) allocations to overseas nationals could be used for the locations of migrants by nationality. A potential disadvantage of using these data is that NINo data do not record migrants' current locations, only the locations in which the NINos were initially granted. We therefore cannot use NINo data to estimate outflows of migrants or movements of migrants between regions. In addition, data for Jobseeker's Allowance claimants are not split by nationality; hence it would not be possible to estimate the association between migrant and native employment rates, only the association between migrant and overall employment rates. Finally, data for Jobseeker's Allowance claimants are only available back to 1983 and data for NINo allocations are only available from 2002.

A.84 Third, the association between migrants and native employment rates could be estimated using the skill-cell correlation approach rather than the spatial correlation approach. This approach involves dividing all individuals in the country into skill-cells based on their characteristics, for example by age and qualifications. Regressions could then be estimated for native employment rates by skill-cell on the ratio of migrants to natives of working age in that skill-cell and a range of control variables, including dummy variables for each of the skill-cells. The rationale for this approach is that it groups together individuals who are likely to compete for jobs, providing an alternative methodology to estimate the association between migrants and native employment rates than grouping individuals by region (the spatial correlation approach).

A.85 A potential disadvantage of this approach is that migrants have been observed to work in lower-skilled occupations than might be expected given their age and qualifications. As a result, the skill-cell correlation approach may underestimate the association between migrants and native employment rates unless the criteria used to divide individuals into skill-cells are appropriate. Alternatively, additional regressors might be included in the model to allow for labour market substitution between individuals in different skill-cells.

A.8   Conclusions

A.86 This annex presents our empirical analysis of the association between migrants and native employment rates in Great Britain over the period 1975 to 2010.

A.87 The key problem for studies considering the impact of migrants on native employment rates is that of endogeneity. For example, a negative correlation between the native employment rates and migrant stocks is consistent with the hypothesis that migrants reduce native employment rates, but also consistent with the hypothesis that migrants move to regions with lower employment rates. It is, therefore, difficult to measure the impact of migrants on native employment rates accurately.

A.88 This study attempts to overcome the problem of endogeneity by estimating the association between the annual change in native employment rates and the annual change in the ratio of migrants to natives in the working-age population. Estimating the relationship in annual changes controls for time-invariant differences in native employment rates between regions which may affect the location choices of natives and migrants. Nevertheless, our results may still be influenced by endogeneity bias due to regional labour demand shocks. Our findings here should therefore be considered as estimating the 'association' between migrants and native employment rates rather than the impact of migrants on native employment rates.

A.89 We have adopted a 5 per cent significance level in this study, which is typical for econometric studies. Results which are not

statistically significant at the 5 per cent level have been disregarded to reduce the likelihood of over-interpreting results which may well be statistical anomalies.

A.90 Table A.13 presents our key results for the associations between migrants and natives in the same year. Where coefficients are not significant at the 5 per cent level, we present them as zero, but present the sign of the (insignificant) coefficient.

A.91 Our results indicate that a rise in the inflow of foreign-born migrants in Great Britain is associated with a reduction in native employment rates over the period 1995 to 2010, and this result is statistically significant at the 1 per cent level. We estimate that an increase of 100 in the stock of foreign-born working-age migrants is associated with a reduction in the native in employment of approximately 23, over the period 1995 to 2010.

A.92 We also find that a rise in the stock of non-EU migrants is associated with a reduction in native employment rates over this period, and again this result is statistically significant at the 1 per cent level. Our results suggest that an increase of 100 in the stock of non-EU working-age migrants is associated with a reduction of 23 in the stock of natives in employment over the period 1995 to 2010.

A.93 We estimate that foreign-born migrants do not have a statistically significant association with native employment rates over the period 1975 to 1994. Similarly, we estimate that EU migrants do not have a statistically significant

association with native employment rates over any of the time periods considered.

A.94 Further, we estimated the association between migrants and native employment rates when the output gap was positive and when the output gap was zero or negative. A positive output gap is associated with an economic boom whereas a negative output gap is associated with a slow economic growth or an economic downturn.

A.95 We estimate that foreign-born migrants are associated with a reduction in native employment rates when the output gap was zero or negative. Our results suggest that, on average, an increase of 100 in the stock of foreign-born working-age migrants is associated with a reduction of 30 in the stock of natives in employment when the output gap was zero or negative. This result is statistically significant at the 5 per cent level. We estimate a similar result for non-EU migrants.

A.96 Our results suggest that the association between migrants and native employment rates is statistically insignificant when the output gap was positive. We are unable to reject the hypothesis that the association between migrants and native employment rates is the same when the output gap was positive and when it was zero or negative.

A.97 We, therefore, find tentative evidence that the association between migrants and native employments rates was higher in years when the output gap is zero or negative compared to years when the output gap was positive.

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This is because migrants are more likely to compete for jobs with natives during an economic downturn when native unemployment is high and job vacancies are low.

A.98 Finally, our results suggest that the displacement of natives from employment when migrant stocks increased is not statistically different from the replacement of natives into employment when migrant stocks fell for the period 1975 to 2010.

A.99 We present some options for further work to investigate the issues highlighted in our analysis.

Figure A.1: Annual change in the native employment rate against the annual change in the migrant/native ratio, 1975-2010
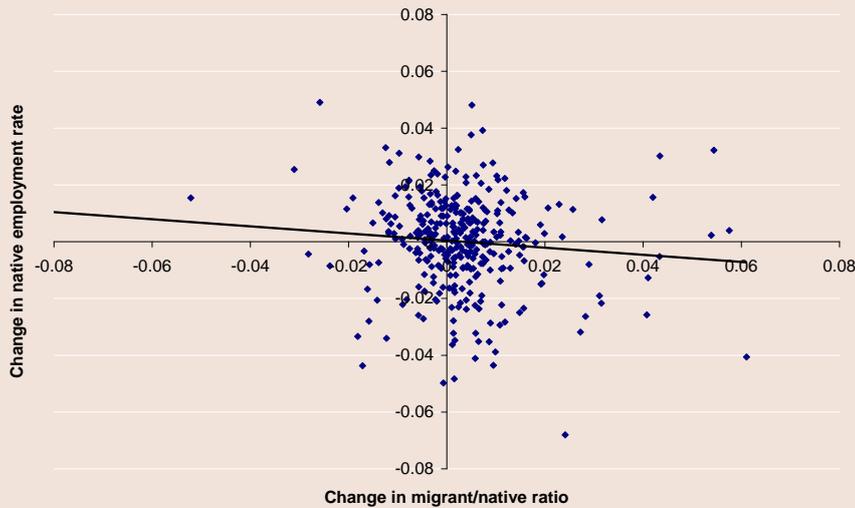
Line of best fit: y=0.0004-0.1251x
S.E.   (0.0009) (0.0679)
P-val   (0.700) (0.066)
R-squared=0.0099

Correlation=-0.0995
Observations=341
Source: LFS, biennial 1975-1983, annual 1983-2010.

Figure A.2: Annual change in the native employment rate against the annual change in the non-EU/native ratio, 1975-2010
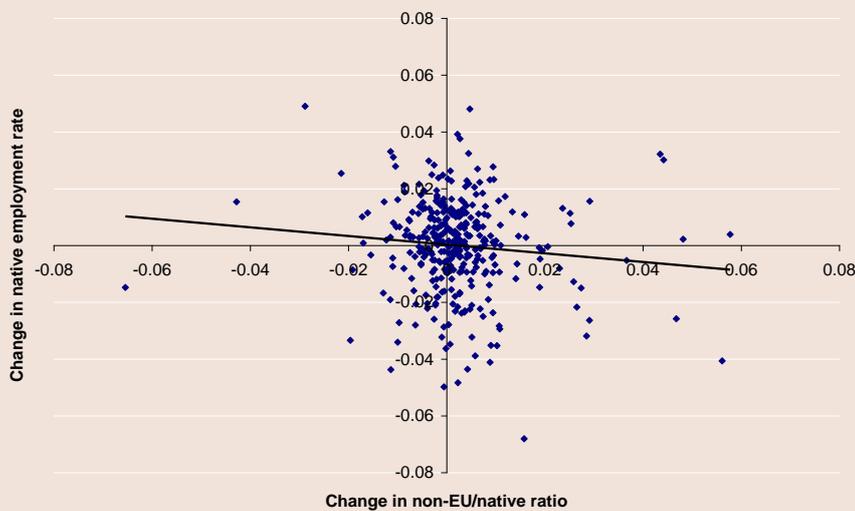
Line of best fit: y=0.0003-0.1523x
S.E.   (0.0009) (0.0791)
P-val   (0.734) (0.055)
R-squared=0.0108

Correlation=-0.1040
Observations=341
Source: LFS, biennial 1975-1983, annual 1983-2010.

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Figure A.3: Annual change in the native employment rate against the annual change in the EU/native ratio, 1975-2010
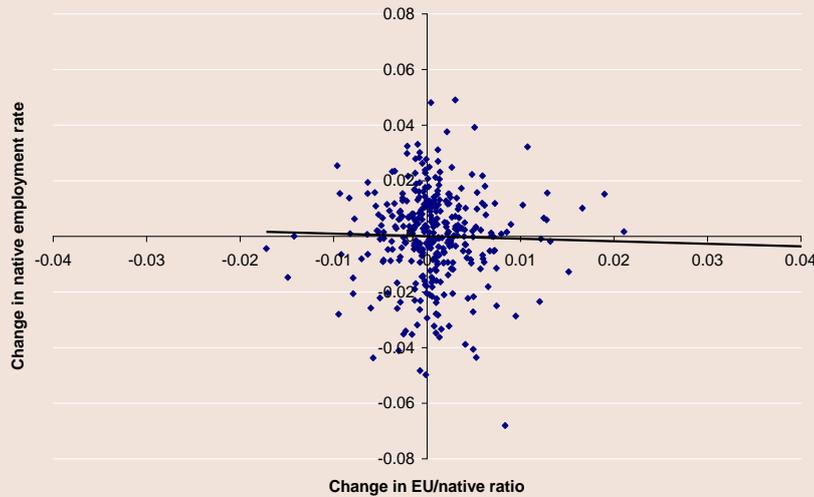
Line of best fit: y=0.0000-0.0915x	Correlation=-0.0281
S.E. (0.0009) (0.1767)	Observations=341
P-val (0.949) (0.605)	Source: LFS, biennial 1975-1983, annual
R-squared=0.0008	1983-2010.

Figure A.4: Annual change in the native employment rate against the annual change in the migrant/native ratio, 1975-1994
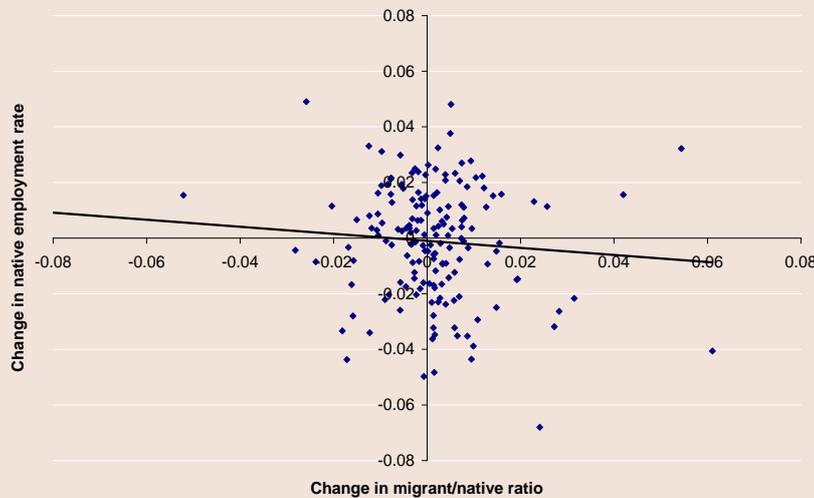
Line of best fit: y=-0.0010 -0.1266x	Correlation=-0.0879
S.E. (0.0016) (0.1123)	Observation=165
P-val (0.517) (0.262)	Source: LFS, biennial 1975-1983, annual
R-squared=0.0077	1983-1994.

Figure A.5: Annual change in the native employment rate against the annual change in the migrant/native ratio, 1995-2010
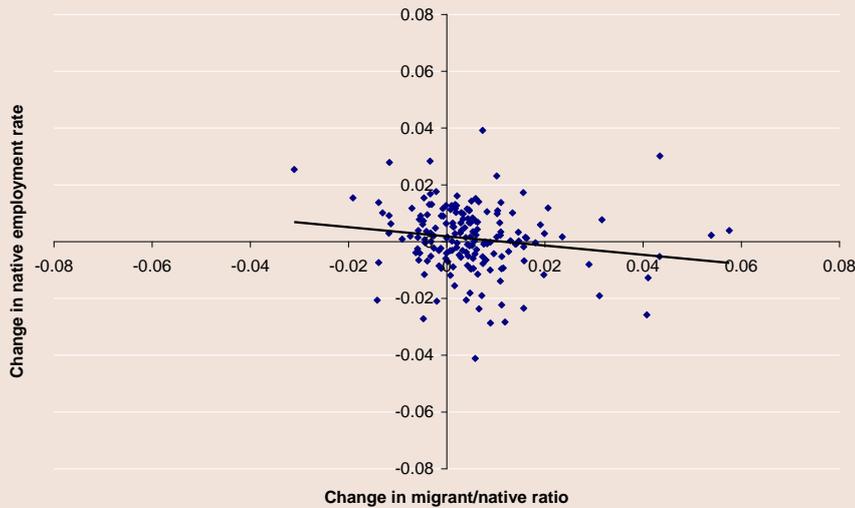
Line of best fit: y=0.0018-0.1619x
S.E.   (0.0009) (0.0741)
P-val   (0.053) (0.030)
R-squared=0.0267

Correlation=-0.1635
Observations=176
Source: LFS, 1995-2010.

Figure A.6: Annual change in the native employment rate against the annual change in the migrant/native ratio, positive output gap
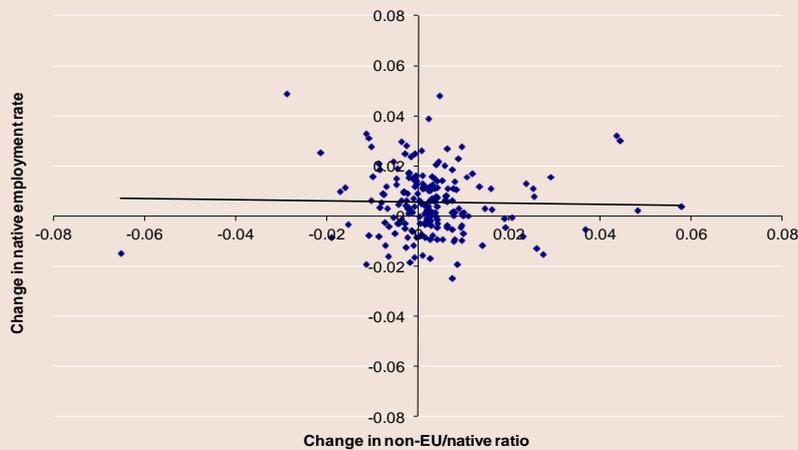
Line of best fit: y=0.0055 -0.0226x
S.E.   (0.0009) (0.0742)
P-val   (0.000) (0.762)
R-squared=0.0005

Correlation=-0.0217
Observations=198
Source: LFS, 1977; 1979; 1986; 1987; 1988; 1989; 1990; 1997; 1998; 1999; 2000; 2001; 2003; 2004; 2005; 2006; 2007; and 2008.

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Figure A.7: Annual change in the native employment rate against the annual change in the migrant/native ratio, negative or zero output gap
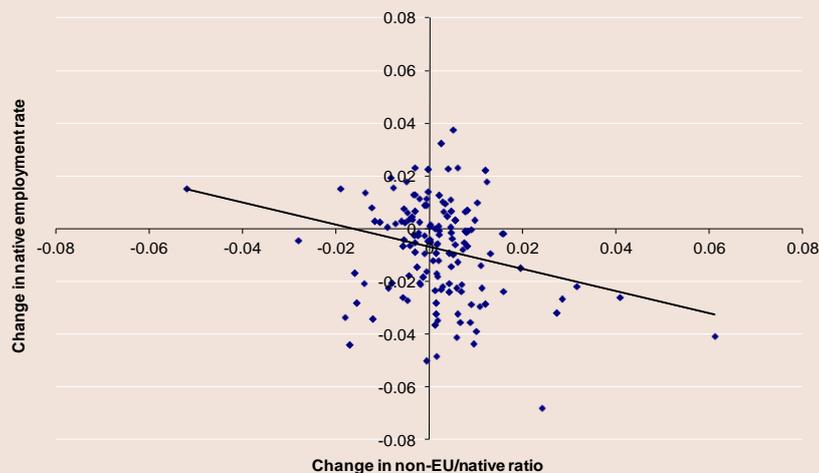
Line of best fit: y=-0.0069-0.4190x
S.E.   (0.0015) (0.1295)
P-val   (0.000) (0.002)
R-squared=0.0691

Correlation=-0.2629
Observations=143
Source: LFS, 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Figure A.8: Annual change in the native employment rate against the annual change in the short-term migrant/native ratio, 1983-2010
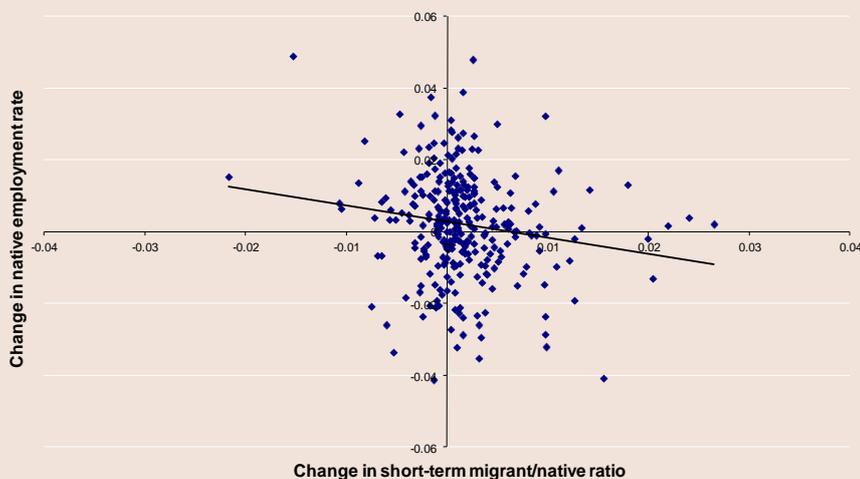
Line of best fit: y=0.0028-0.4506x
S.E.   (0.0009) (0.1589)
P-val   (0.001) (0.005)
R-squared=0.0265

Correlation=-0.1354
Observations=297
Source: LFS, 1983-2010.

Figure A.9: Annual change in the native employment rate against the annual change in the long-term migrant/native ratio, 1983-2010
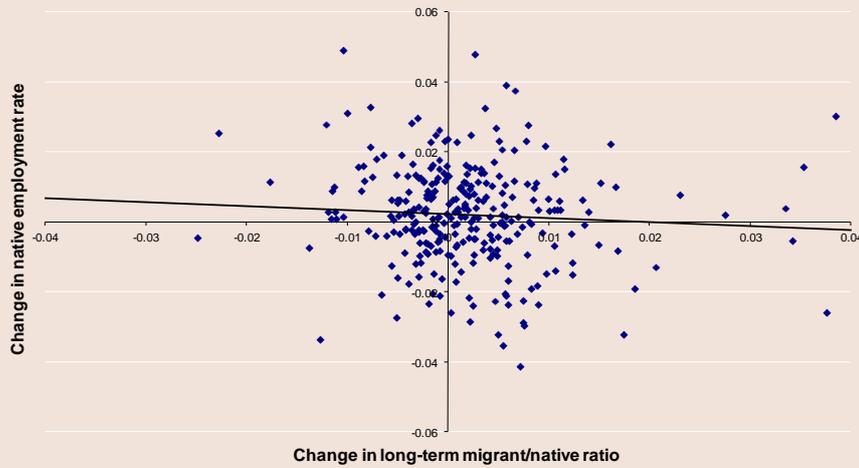
Line of best fit: y=0.0023-0.1137x
S.E.   (0.0009) (0.0811)
P-val   (0.006) (0.162)
R-squared=0.0066

Correlation=-0.0813
Observations=297
Source: LFS, 1983-2010.

Figure A.10: Net migration of long-term migrants by nationality, 1975-2010
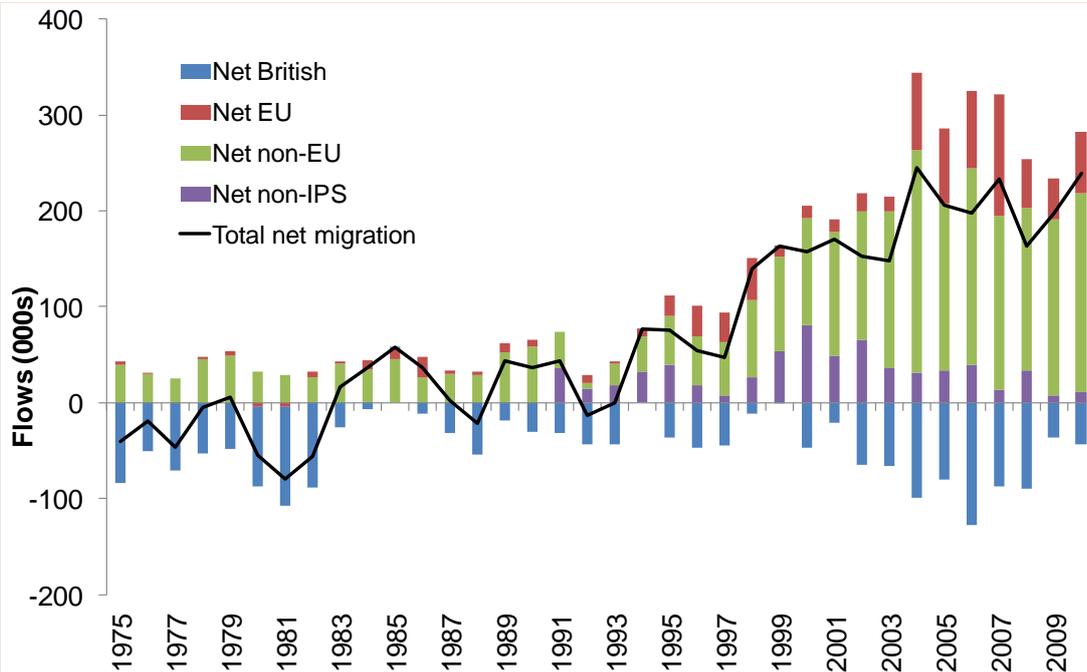
Notes: Long-term migrants are defined in the International Passenger Survey (IPS) as those individuals who intend to change their place of residence for a year or more. Non-IPS components are based on provisional Long- Term International Migration (LTIM) figures minus provisional IPS figures.

EU includes EU15 from 1975 to 2003; EU15, A8, Malta, Cyprus from 2004 to 2006; and EU15, A8, Malta, Cyprus, Bulgaria and Romania from 2007 to 2010. British citizens are not included in EU and are grouped separately. LTIM data for 2010 are provisional.

Source: Office for National Statistics (2008); Office for National Statistics (2010a); Office for National Statistics (2011)

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Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Migrant/native ratio	0.071	0.057	0.243	-0.300**	0.083	0.005	-0.140*	0.055	0.029	-0.115	0.061	0.086	-0.433*	0.158	0.021
25-49/16-24 age ratio	0.146*	0.057	0.028	-0.004	0.023	0.869	0.041**	0.006	0.000	0.044**	0.005	0.000	0.004	0.023	0.876
50-64/16-24 age ratio	-0.115	0.088	0.219	0.004	0.032	0.893	-0.059**	0.008	0.000	-0.066**	0.011	0.000	-0.014	0.019	0.496
Intermediate/low qualification ratio	0.362**	0.092	0.003	0.102	0.064	0.142	0.110**	0.033	0.008	0.108**	0.034	0.009	0.082	0.063	0.224
Graduate/low qualification ratio	-0.502**	0.136	0.004	0.054	0.052	0.324	0.055	0.045	0.247	0.088	0.049	0.102	0.119	0.098	0.251
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	352			352			341			341			341		
R-squared	0.648			0.909			0.634			0.642			0.914		

Table A.1: Summary statistics from the regressions of native employment rates on the migrant/native ratio and other control variables by region and by year, 1975-2010

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the migrant/native ratio with the same ratio lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010

Table A.2: Summary statistics from the regressions of native employment rates on the non-EU/native ratio, the EU/native ratio and other control variables by region and by year, 1975-2010

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Non-EU/native ratio	-0.022	0.117	0.858	-0.317*	0.101	0.011	-0.159*	0.062	0.029	-0.137	0.065	0.062	-0.402	0.181	0.051
EU/native ratio	0.430	0.474	0.386	-0.243	0.283	0.409	-0.070	0.097	0.484	-0.036	0.116	0.760	-0.523	0.723	0.486
25-49/16-24 age ratio	0.147*	0.057	0.027	-0.003	0.023	0.898	0.041**	0.006	0.000	0.044**	0.005	0.000	0.002	0.024	0.930
50-64/16-24 age ratio	-0.125	0.093	0.206	0.001	0.035	0.968	-0.060**	0.009	0.000	-0.067**	0.012	0.000	-0.008	0.034	0.814
Intermediate/low qualification ratio	0.349**	0.092	0.004	0.101	0.062	0.133	0.112**	0.035	0.009	0.110*	0.035	0.011	0.083	0.063	0.217
Graduate/low qualification ratio	-0.496**	0.129	0.003	0.054	0.050	0.299	0.058	0.045	0.234	0.091	0.050	0.097	0.117	0.095	0.246
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	352			352			341			341			341		
R-squared	0.65			0.909			0.635			0.642			0.914		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression instruments the non-EU/native ratio and the EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region.
Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010

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Table A.3: Summary statistics from the regressions of native employment rates on the migrant/native ratio and other control variables by region and by year, 1975-2010

1975-1994

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Migrant/native ratio	0.151	0.081	0.092	-0.400	0.196	0.069	-0.105	0.107	0.351	-0.089	0.107	0.423	-1.210	0.653	0.093
25-49/16-24 age ratio	0.212*	0.078	0.021	0.017	0.057	0.774	0.067*	0.023	0.016	0.081*	0.027	0.015	0.094	0.119	0.447
50-64/16-24 age ratio	-0.393*	0.146	0.022	-0.034	0.102	0.747	-0.106**	0.024	0.001	-0.133**	0.039	0.006	-0.143	0.201	0.493
Intermediate/low qualification ratio	0.564**	0.161	0.006	0.240	0.118	0.070	0.140	0.067	0.062	0.138	0.066	0.063	0.172	0.115	0.166
Graduate/low qualification ratio	-1.140**	0.305	0.004	-0.126	0.253	0.629	0.145	0.115	0.235	0.189	0.095	0.076	0.217	0.181	0.258
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			165			165			165		
R-squared	0.681			0.897			0.726			0.747			0.870		

1995-2010

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Migrant/native ratio	0.036	0.078	0.649	-0.228*	0.100	0.045	-0.228**	0.055	0.002	-0.231**	0.054	0.002	-0.304	0.145	0.063
25-49/16-24 age ratio	0.111	0.067	0.130	-0.007	0.029	0.823	0.034**	0.010	0.005	0.034**	0.010	0.006	0.000	0.029	0.999
50-64/16-24 age ratio	-0.028	0.082	0.736	0.020	0.053	0.708	-0.042*	0.019	0.049	-0.041	0.019	0.061	0.010	0.054	0.852
Intermediate/low qualification ratio	0.277**	0.075	0.004	0.076	0.050	0.163	0.089**	0.026	0.007	0.092**	0.028	0.007	0.077	0.049	0.145
Graduate/low qualification ratio	-0.331**	0.100	0.008	0.053	0.057	0.372	0.031	0.047	0.520	0.026	0.056	0.654	0.082	0.069	0.262
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			176			176			176		
R-squared	0.615			0.920			0.414			0.424			0.919		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the migrant/native ratio with the same ratio lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010

Table A.4: Summary statistics from the regressions of native employment rates on the non-EU/native ratio, the EU/native ratio and other control variables by region and by year, 1975 to 1994 and 1995 to 2010

1975-1994

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Non-EU/native ratio	0.026	0.135	0.848	-0.399	0.243	0.132	-0.164	0.076	0.057	-0.141	0.076	0.094	-1.233	0.882	0.192
EU/native ratio	0.620	0.709	0.402	-0.406	0.411	0.347	0.126	0.332	0.712	0.113	0.338	0.745	-2.450	2.555	0.360
25-49/16-24 age ratio	0.214*	0.076	0.019	0.017	0.057	0.773	0.067*	0.023	0.015	0.081*	0.027	0.014	0.126	0.173	0.484
50-64/16-24 age ratio	-0.393*	0.144	0.021	-0.034	0.100	0.740	-0.106**	0.024	0.001	-0.133**	0.038	0.005	-0.192	0.280	0.508
Intermediate/low qualification ratio	0.536**	0.155	0.006	0.240	0.122	0.079	0.133	0.061	0.055	0.132	0.061	0.054	0.198	0.133	0.168
Graduate/low qualification ratio	-1.112**	0.277	0.002	-0.126	0.250	0.624	0.160	0.103	0.151	0.201*	0.090	0.050	0.247	0.252	0.349
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			165			165			165		
R-squared	0.682			0.897			0.728			0.748			0.841		

1995-2010

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
Non-EU/native ratio	0.102	0.106	0.359	-0.157	0.115	0.202	-0.224**	0.060	0.004	-0.230**	0.058	0.003	-0.024	0.350	0.946
EU/native ratio	-0.267	0.187	0.183	-0.435	0.270	0.139	-0.244	0.160	0.158	-0.238	0.176	0.206	-0.919	0.801	0.278
25-49/16-24 age ratio	0.112	0.067	0.125	-0.009	0.030	0.773	0.034**	0.009	0.005	0.034**	0.010	0.006	-0.012	0.039	0.757
50-64/16-24 age ratio	-0.020	0.081	0.810	0.031	0.056	0.590	-0.042	0.020	0.062	-0.041	0.021	0.078	0.052	0.078	0.516
Intermediate/low qualification ratio	0.281**	0.077	0.004	0.076	0.049	0.153	0.089*	0.029	0.013	0.092*	0.031	0.013	0.078	0.056	0.193
Graduate/low qualification ratio	-0.324**	0.099	0.008	0.052	0.063	0.427	0.031	0.046	0.517	0.026	0.055	0.651	0.058	0.083	0.499
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			176			176			176		
R-squared	0.617			0.921			0.414			0.424			0.916		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the non-EU/native ratio and the EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010

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Table A.5: Summary statistics from the regressions of native employment rates on migrant/native ratio and other control variables by region and by year, output gap positive and output gap zero or negative, 1975-2010

	Positive output gap (economic boom)														
Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Migrant/native ratio	0.138	0.070	0.079	-0.253	0.140	0.101	-0.048	0.073	0.527	-0.014	0.087	0.873	-0.463	0.222	0.063
25-49/16-24 age ratio	0.140*	0.048	0.015	0.001	0.032	0.970	0.036**	0.011	0.006	0.040**	0.009	0.001	0.017	0.036	0.647
50-64/16-24 age ratio	-0.088	0.067	0.221	-0.010	0.039	0.806	-0.056**	0.018	0.010	-0.066**	0.016	0.002	-0.043	0.044	0.359
Intermediate/low qualification ratio	0.382**	0.085	0.001	0.125*	0.066	0.090	0.111**	0.031	0.005	0.103**	0.028	0.004	0.114	0.060	0.088
Graduate/low qualification ratio	-0.562**	0.123	0.001	0.004	0.076	0.958	0.028	0.044	0.545	0.071	0.045	0.144	0.094	0.102	0.379
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	198			198			198			198			198		
R-squared	0.589			0.882			0.318			0.342			0.878		
Output gap zero or negative (economic downturn)															
Migrant/native ratio	0.006	0.040	0.876	-0.396**	0.088	0.001	-0.308**	0.096	0.009	-0.302*	0.101	0.013	-0.395	0.215	0.097
25-49/16-24 age ratio	0.167	0.075	0.052	-0.004	0.031	0.904	0.041*	0.015	0.021	0.041*	0.015	0.018	-0.014	0.028	0.640
50-64/16-24 age ratio	-0.174	0.132	0.215	0.035	0.059	0.561	-0.059*	0.021	0.017	-0.062*	0.026	0.041	0.048	0.043	0.298
Intermediate/low qualification ratio	0.351**	0.109	0.009	0.041	0.111	0.717	0.108	0.059	0.100	0.114	0.061	0.091	-0.003	0.110	0.980
Graduate/low qualification ratio	-0.477*	0.160	0.014	0.140	0.122	0.280	0.093	0.051	0.101	0.111	0.060	0.095	0.172	0.163	0.315
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	154			154			143			143			143		
R-squared	0.645			0.924			0.740			0.750			0.942		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the migrant/native ratio with the same ratio lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was positive in the following years: 1977; 1979; 1986; 1987; 1988; 1989; 1990; 1997; 1998; 1999; 2000; 2001; 2003; 2004; 2005; 2006; 2007; and 2008. The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, and OECD (2011)

Table A.6: Summary statistics from the regressions of native employment rates on the non-EU/native ratio, the EU/native ratio and other control variables by region and by year, output gap positive and output gap zero or negative, 1975 to 2010

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Positive output gap (economic boom)															
Non-EU/native ratio	0.058	0.106	0.596	-0.266	0.160	0.127	-0.090	0.085	0.313	-0.067	0.091	0.480	-0.449	0.280	0.140
EU/native ratio	0.439	0.375	0.269	-0.215	0.366	0.570	0.087	0.086	0.332	0.164	0.117	0.189	-0.489	0.967	0.624
25-49/16-24 age ratio	0.141*	0.048	0.016	0.002	0.032	0.957	0.038**	0.011	0.005	0.042**	0.009	0.001	0.016	0.036	0.660
50-64/16-24 age ratio	-0.097	0.075	0.227	-0.012	0.041	0.775	-0.058**	0.018	0.009	-0.069**	0.015	0.001	-0.040	0.056	0.489
Intermediate/low qualification ratio	0.372**	0.081	0.001	0.125*	0.067	0.092	0.122**	0.033	0.004	0.117**	0.031	0.003	0.113*	0.062	0.095
Graduate/low qualification ratio	-0.557**	0.117	0.001	0.005	0.076	0.954	0.028	0.046	0.556	0.074	0.045	0.131	0.092	0.076	0.255
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	198			198			198			198			198		
R-squared	0.591			0.882			0.321			0.347			0.878		
Output gap zero or negative (economic downturn)															
Non-EU/native ratio	-0.103	0.172	0.565	-0.434**	0.103	0.002	-0.285*	0.114	0.031	-0.273*	0.115	0.038	-0.338	0.280	0.256
EU/native ratio	0.445	0.782	0.582	-0.268	0.304	0.399	-0.420	0.241	0.112	-0.438	0.261	0.124	-0.733	0.544	0.208
25-49/16-24 age ratio	0.168*	0.075	0.048	-0.002	0.030	0.946	0.043*	0.016	0.026	0.043*	0.016	0.021	-0.014	0.029	0.641
50-64/16-24 age ratio	-0.186	0.133	0.192	0.029	0.055	0.615	-0.058*	0.021	0.020	-0.061*	0.026	0.044	0.060	0.040	0.167
Intermediate/low qualification ratio	0.334*	0.119	0.019	0.034	0.115	0.775	0.115	0.059	0.081	0.123	0.060	0.068	0.010	0.123	0.934
Graduate/low qualification ratio	-0.470*	0.153	0.012	0.142	0.121	0.265	0.082	0.054	0.162	0.099	0.068	0.175	0.179	0.178	0.338
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	154			154			143			143			143		
R-squared	0.647			0.924			0.741			0.751			0.940		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the non-EU/native ratio and the EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was positive in the following years: 1977; 1979; 1986; 1987; 1988; 1989; 1990; 1997; 1998; 1999; 2000; 2001; 2003; 2004; 2005; 2006; 2007; and 2008. The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, and OECD (2011)

Analysis of the Impacts of Migration

Table A.7: Summary statistics from the regressions of native employment rates on the short-term migrant/native ratio, the long-term migrant/native ratio and other control variables by region and by year, 1983-2010

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
Short-term migrant/natives ratio	-0.794	0.749	0.314	-0.654**	0.184	0.005	-0.497*	0.265	0.091	-0.436	0.242	0.102	-0.570	0.375	0.159
Long-term migrant/native ratio	0.232	0.181	0.229	-0.035	0.107	0.750	-0.012	0.119	0.919	-0.006	0.113	0.958	-0.298	0.489	0.556
25-49/16-24 age ratio	0.179*	0.061	0.015	0.001	0.024	0.956	0.032**	0.007	0.001	0.033**	0.007	0.001	0.008	0.027	0.767
50-64/16-24 age ratio	-0.141	0.087	0.136	-0.033	0.019	0.122	-0.043**	0.009	0.001	-0.046**	0.009	0.001	-0.046	0.026	0.108
Intermediate/low qualification ratio	0.332*	0.101	0.008	0.057	0.076	0.465	0.112**	0.033	0.007	0.113**	0.034	0.008	0.058	0.069	0.425
Graduate/low qualification ratio	-0.425*	0.145	0.015	0.038	0.062	0.553	0.049	0.043	0.281	0.077	0.048	0.140	0.100	0.142	0.495
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	308			308			297			297			297		
R-squared	0.683			0.937			0.556			0.563			0.929		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. Short-term foreign-born individuals are defined as those who have resided in the UK for less than 5 years. Long-term foreign-born individuals are defined as those who have resided in the UK for at least 5 years. The instrumental variable (IV) regression is estimated in levels and instruments the short-term migrant/native ratio and the long-term migrant/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region.

Source: MAC secretariat analysis using LFS data, 1983-2010

Table A.8: Summary statistics from the regressions of native employment rates on the migrant/native ratio and other control variables by region and by year, outliers removed, 1995-2010 and years when the output gap was zero or negative

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
1995-2010															
Non-EU/native ratio	0.173	0.100	0.115	-0.258	0.162	0.143	-0.160	0.143	0.290	-0.135	0.162	0.425	-0.248	0.351	0.496
EU/native ratio	-0.195	0.354	0.594	-0.229	0.347	0.525	-0.048	0.300	0.876	-0.011	0.300	0.971	-0.594	0.516	0.277
25-49/16-24 age ratio	0.123	0.071	0.114	-0.012	0.034	0.741	0.040*	0.015	0.022	0.043*	0.014	0.011	-0.007	0.034	0.844
50-64/16-24 age ratio	-0.032	0.080	0.695	0.055	0.068	0.432	-0.046	0.029	0.137	-0.050	0.028	0.101	0.056	0.069	0.433
Intermediate/low qualification ratio	0.322**	0.094	0.006	0.087	0.050	0.115	0.099**	0.027	0.004	0.111**	0.029	0.004	0.098*	0.044	0.047
Graduate/low qualification ratio	-0.422**	0.085	0.001	0.014	0.080	0.864	-0.020	0.056	0.729	-0.005	0.064	0.937	0.034	0.090	0.714
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	156			156			156			156			156		
R-squared	0.644			0.930			0.418			0.441			0.928		
Zero or negative output gap (economic boom)															
Non-EU/native ratio	0.028	0.187	0.884	-0.488**	0.123	0.003	-0.205	0.186	0.294	-0.207	0.215	0.358	-0.739**	0.168	0.001
EU/native ratio	0.162	0.815	0.847	-0.771*	0.300	0.028	-0.313	0.299	0.319	-0.340	0.317	0.310	-0.997	0.603	0.129
25-49/16-24 age ratio	0.169*	0.074	0.047	0.000	0.016	0.987	0.038	0.023	0.121	0.039	0.024	0.135	0.019	0.024	0.446
50-64/16-24 age ratio	-0.175	0.114	0.156	0.030	0.023	0.213	-0.051*	0.019	0.023	-0.053*	0.023	0.042	0.014	0.021	0.501
Intermediate/low qualification ratio	0.365*	0.141	0.027	0.188*	0.067	0.019	0.119	0.059	0.072	0.120	0.064	0.089	0.174*	0.063	0.020
Graduate/low qualification ratio	-0.524*	0.216	0.035	-0.089	0.071	0.239	0.082	0.070	0.264	0.074	0.080	0.378	-0.064	0.065	0.351
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	134			134			128			128			128		
R-squared	0.682			0.952			0.736			0.744			0.954		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as individuals leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression instruments the non-EU/native ratio and the EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Twenty outliers have been removed from the data: the top and bottom 5 observations for the change in the non-EU/native ratio and the change in the EU/native ratio. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, and OECD (2011)

Analysis of the Impacts of Migration

Table A.9: Summary statistics from the regressions of the stock of natives in employment on the stocks of working-age non-EU and EU migrants and other control variables by region and by year, dependent variable and all independent variables in natural logarithms, 1995-2010 and years when the output gap was zero or negative

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
1995-2010															
Non-EU migrant working-age population	0.052	0.028	0.094	0.005	0.017	0.792	-0.013	0.010	0.218	-0.014	0.012	0.249	0.090	0.284	0.758
EU migrant working-age population	0.036	0.020	0.112	0.008	0.009	0.430	0.002	0.008	0.839	0.001	0.008	0.879	-0.023	0.155	0.884
Native working-age population	1.220**	0.224	0.000	0.976**	0.198	0.001	1.079**	0.155	0.000	1.066**	0.187	0.000	0.929	0.437	0.059
Population aged 25-49	-0.393*	0.161	0.035	-0.235**	0.090	0.026	0.123	0.163	0.468	0.202	0.200	0.338	-0.147	0.336	0.671
Population aged 50-64	0.008	0.175	0.966	-0.028	0.123	0.823	-0.082	0.041	0.075	-0.058	0.042	0.193	0.082	0.367	0.828
Working-age population with intermediate qualifications	0.168**	0.046	0.004	0.060	0.041	0.177	0.050	0.025	0.068	0.051	0.026	0.078	0.047	0.052	0.391
Working-age population with graduate qualifications	-0.074	0.073	0.336	0.050	0.033	0.157	0.020	0.020	0.357	0.018	0.022	0.437	0.020	0.114	0.861
Graduate/low qualification ratio	0.052	0.028	0.094	0.005	0.017	0.792	-0.013	0.010	0.218	-0.014	0.012	0.249	0.090	0.284	0.758
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			176			176			176		
R-squared	0.996			0.999			0.588			0.598			0.999		
Zero or negative output gap (economic boom)															
Non-EU migrant working-age population	0.057*	0.022	0.029	0.025	0.018	0.187	-0.008	0.015	0.589	-0.010	0.015	0.530	0.054	0.107	0.622
EU migrant working-age population	0.024	0.020	0.254	0.003	0.014	0.851	-0.003	0.008	0.662	-0.004	0.009	0.634	-0.031	0.054	0.583
Native working-age population	1.586**	0.212	0.000	1.421**	0.187	0.000	1.241**	0.296	0.002	1.220**	0.310	0.003	1.157**	0.315	0.004
Population aged 25-49	-0.306*	0.113	0.022	-0.166*	0.054	0.012	0.113	0.192	0.570	0.102	0.207	0.633	-0.187	0.088	0.060
Population aged 50-64	-0.462*	0.172	0.023	-0.110	0.117	0.367	-0.119	0.059	0.074	-0.120	0.064	0.091	0.034	0.167	0.844
Non-EU migrant working-age population	0.171*	0.057	0.013	0.047	0.039	0.259	0.055	0.031	0.110	0.056	0.033	0.122	0.106	0.059	0.100
EU migrant working-age population	-0.075	0.066	0.280	0.002	0.030	0.941	0.043**	0.011	0.003	0.044**	0.012	0.003	0.014	0.054	0.801
Graduate/low qualification ratio	0.057*	0.022	0.029	0.025	0.018	0.187	-0.008	0.015	0.589	-0.010	0.015	0.530	0.054	0.107	0.622
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	154			154			143			143			143		
R-squared	0.995			0.999			0.842			0.847			0.999		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression instruments the non-EU migrant, EU migrant and native working-age populations with the same stocks lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, and OECD (2011)

Table A.10: Summary statistics from the regressions of native employment rates on the migrant/native ratio and other control variables by region and by year, weighting observations by regional working-age population, 1995-2010 and years when the output gap was zero or negative

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
1995-2010															
Non-EU/native ratio	0.052	0.114	0.660	-0.111	0.100	0.290	-0.202**	0.058	0.006	-0.214**	0.055	0.003	0.043	0.375	0.912
EU/native ratio	-0.131	0.159	0.427	-0.298	0.269	0.294	-0.314*	0.140	0.049	-0.328	0.157	0.063	-0.697	0.948	0.479
25-49/16-24 age ratio	0.095	0.064	0.171	-0.019	0.027	0.500	0.028*	0.012	0.042	0.028	0.013	0.063	-0.028	0.045	0.545
50-64/16-24 age ratio	-0.005	0.080	0.950	0.040	0.055	0.479	-0.024	0.027	0.401	-0.021	0.030	0.498	0.072	0.100	0.487
Intermediate/low qualification ratio	0.269**	0.057	0.001	0.078	0.062	0.234	0.083*	0.030	0.020	0.086*	0.031	0.020	0.062	0.081	0.462
Graduate/low qualification ratio	-0.286*	0.114	0.031	0.039	0.070	0.587	0.037	0.047	0.447	0.027	0.054	0.631	0.043	0.088	0.633
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			176			176			176		
R-squared	0.692			0.924			0.478			0.485			0.920		
Zero or negative output gap (economic boom)															
Non-EU/native ratio	-0.131	0.127	0.326	-0.434**	0.071	0.000	-0.318**	0.089	0.005	-0.307**	0.090	0.007	-0.172	0.407	0.682
EU/native ratio	0.463	0.561	0.428	-0.042	0.254	0.873	-0.383	0.218	0.110	-0.396	0.234	0.122	-0.694	0.600	0.275
25-49/16-24 age ratio	0.123	0.072	0.117	-0.011	0.034	0.746	0.026	0.015	0.125	0.029	0.015	0.088	-0.035	0.036	0.353
50-64/16-24 age ratio	-0.114	0.121	0.368	0.038	0.060	0.536	-0.054*	0.021	0.024	-0.063*	0.026	0.037	0.085	0.064	0.217
Intermediate/low qualification ratio	0.318**	0.087	0.005	-0.013	0.115	0.912	0.099	0.067	0.170	0.110	0.068	0.140	-0.017	0.125	0.895
Graduate/low qualification ratio	-0.367	0.140	0.025	0.160	0.118	0.205	0.079	0.058	0.199	0.092	0.072	0.231	0.155	0.199	0.453
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	154			154			143			143			143		
R-squared	0.684			0.918			0.726			0.771			0.934		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression instruments the non-EU/native ratio and EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, OECD (2011)

Table A.11: Summary statistics from the regressions of native employment rates on the non-EU/native ratio, the EU/native ratio and other control variables by region and by year, non-EU/native ratio and EU/native ratio lagged by 12 months, 1995-2010 and years when the output gap was zero or negative

Variables	(1) OLS with no region fixed effects			(2) OLS with region fixed effects			(3) Differences			(4) Differences with region fixed effects			(5) IV		
	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val	Coeff	StdE	P-val
1995-2010															
Non-EU/native ratio lagged by 12 months	0.037	0.099	0.713	-0.140	0.096	0.177	-0.068	0.048	0.191	-0.045	0.076	0.566	-0.242	0.208	0.272
EU/native ratio lagged by 12 months	0.109	0.241	0.660	-0.360	0.225	0.141	0.002	0.141	0.990	0.042	0.161	0.800	-0.166	0.873	0.853
25-49/16-24 age ratio	0.110	0.067	0.129	-0.019	0.030	0.544	0.030**	0.009	0.007	0.032**	0.008	0.004	-0.011	0.032	0.740
50-64/16-24 age ratio	-0.027	0.081	0.748	0.041	0.053	0.451	-0.037	0.020	0.096	-0.039	0.019	0.074	0.027	0.065	0.684
Intermediate/low qualification ratio	0.277**	0.079	0.006	0.072	0.049	0.177	0.074*	0.032	0.043	0.078*	0.032	0.036	0.063	0.059	0.306
Graduate/low qualification ratio	-0.341**	0.106	0.009	0.048	0.057	0.417	0.011	0.038	0.773	0.025	0.054	0.651	0.057	0.079	0.490
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	176			176			176			176			176		
R-squared	0.616			0.919			0.376			0.389			0.918		
Zero or negative output gap (economic boom)															
Non-EU/native ratio lagged by 12 months	-0.071	0.132	0.605	-0.167	0.090	0.093	-0.055	0.092	0.562	0.011	0.104	0.920	-0.125	0.128	0.352
EU/native ratio	0.215	0.570	0.714	-0.612	0.304	0.072	-0.015	0.211	0.943	-0.016	0.234	0.947	-0.871	0.480	0.099
25-49/16-24 age ratio	0.182*	0.080	0.046	-0.029	0.032	0.392	0.046*	0.018	0.024	0.044*	0.018	0.035	-0.029	0.034	0.400
50-64/16-24 age ratio	-0.188	0.134	0.188	0.074	0.061	0.254	-0.052	0.024	0.055	-0.056	0.026	0.060	0.081	0.061	0.210
Intermediate/low qualification ratio	0.343*	0.116	0.014	-0.001	0.112	0.991	0.077	0.076	0.335	0.090	0.079	0.281	-0.002	0.120	0.986
Graduate/low qualification ratio	-0.476*	0.153	0.011	0.118	0.123	0.362	0.082	0.053	0.157	0.109	0.064	0.119	0.129	0.148	0.403
Year fixed effects included?	Y			Y			Y			Y			Y		
Region fixed effects included?	N			Y			N			Y			Y		
Observations	143			143			143			143			143		
R-squared	0.658			0.940			0.711			0.722			0.939		

Note: Low, intermediate and graduate qualifications are based on age of leaving full-time education. Low qualifications are defined as leaving full-time education aged 16 or lower. Intermediate qualifications are defined as leaving full-time education aged 17 to 20. Graduate qualifications are defined as leaving school aged 21 and above. The instrumental variable (IV) regression is estimated in levels and instruments the non-EU/native ratio and EU/native ratio with the same ratios lagged by 12 months. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value). ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. Standard errors clustered by region. Data for the UK output gap obtained from OECD (2011). The output gap was zero or negative in the following years: 1975; 1981; 1983; 1984; 1985; 1991; 1992; 1993; 1994; 1995; 1996; 2002; 2009; and 2010.

Source: MAC secretariat analysis using LFS data, biennial 1975-1983, annual 1983-2010, and OECD (2011).

Table A.12: Summary statistics from the regressions of the annual change in native employment rate on the annual change in the migrant/native ratio and other control variables by region and by year, 1983-2000

Variables	Dustmann et al. (2005) estimates			MAC estimates		
	Coeff	StdE	P-val (MAC estimates)	Coeff	StdE	P-val
Migrant/native ratio	-0.154	0.083	0.07	-0.165	0.076	0.056
Graduate/low qualification ratio	0.048**	0.014	0.00	0.186	0.083	0.049
Intermediate/low qualification ratio	0.006	0.013	0.65	0.133*	0.043	0.011
Mean native age/100	0.170	0.255	0.49	-0.977*	0.375	0.026
Mean migrant age/100	-0.007	0.056	0.90	-0.047	0.066	0.491
Year fixed effects included?	Y			Y		
Region fixed effects included?	N			N		
Observations	289			198		
R-squared	N/A			0.653		

Note: This table compares results from Dustmann et al. (2005) against those generated by the MAC for the association between migrants and native employment rates. The figures estimated by Dustmann et al. (2005) differ from those estimated by the MAC for the following reasons. First, Dustmann et al. (2005) divided Great Britain into 17 regions whereas the MAC divides the country into 11 regions. Second, Dustmann et al. (2005) defines low qualifications as no formal qualifications, intermediate qualifications as up to O-level qualifications or equivalent and graduate qualifications as above O-level qualifications. The MAC defines low qualifications as leaving full-time education aged 16 or lower, intermediate qualifications as leaving full-time education aged 17 to 20 and graduate qualifications as leaving full-time education aged 21 and above. Both regressions have been estimated in first differences and standard errors have been clustered by region. Two-tail p-values for the results presented in Dustmann et al. (2005) have been estimated by the MAC. ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level. The following abbreviations are used in this table: Coeff (coefficient); StdE (standard error); and P-val (2-tailed p-value).

Source: Dustmann et al. (2005); MAC secretariat analysis using LFS data, 1983-2000

Table A.13: MAC estimates for the associations between 100 additional working-age migrants and the stock of natives in employment					
Migrant group	**1975-2010**	**1975-1994**	**1995-2010**	**Positive output gap (economic upturn)**	**Zero or negative output gap (economic downturn)**
All foreign-born migrants	0(-)	0(-)	-23**	0(-)	-30*
Non-EU born migrants only	0(-)	0(-)	-23**	0(-)	-27*
EU (exc. British) migrants only	0(-)	0(-)	0(-)	0(-)	0(-)
Note: All estimates are for the associations between 100 working-age migrants by country of birth and the stock of UK-born individuals in employment in Great Britain. Working age is defined as 16 to 59 for women and 16 to 64 for men. These estimates are taken from model 4 in Tables A.3, A.4, A.5 and A.6 of this annex. These estimates are for the associations between migrants and native employment rates in the same year. ** indicates statistical significance at the 1 per cent level and * indicates statistical significance at the 5 per cent level (2-tailed significance levels). 0(-) means that the result is not statistically significant.					
Source: MAC analysis using data from the LFS and OECD (2011).					

Abbreviations

APS	Annual Population Survey
BCC	British Chambers of Commerce
CBI	Confederation of British Industry
DfT	Department for Transport
DRA	Default Retirement Age
EAL	English as an Additional Language
EEA	European Economic Area
EU	European Union
GDP	Gross Domestic Product
GNI	Gross National Income
IPS	International Passenger Survey
IA	Impact Assessment
LFS	Labour Force Survey
LTIM	Long-Term International Migration
MAC	Migration Advisory Committee
NHS	National Health Service
NIESR	National Institute of Economic and Social Research
NINo	National Insurance Number
NPV	Net Present Value
NQF	National Qualifications Framework
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
PBS	Points Based System
PSWR	Post-Study Work Route
RLMT	Resident Labour Market Test
RPC	Regulatory Policy Committee
RRC	Reducing Regulation Committee

SOC   Standard Occupational Classification

TUC   Trade Union Congress

UK   United Kingdom

References

Bell, B., and Machin, S. (2011). *The impact of migration on crime and victimisation.* A report prepared by LSE London for the Migration Advisory Committee.

Department for Business, Innovation and Skills (2011a). *Phasing out the Default Retirement Age Impact Assessment,* January 2011, Available at: http://www.bis.gov.uk/assets/biscore/employment-matters/docs/p/11-634-phasing-out-default-retirement-age-impact-assessment.pdf

Department for Business, Innovation and Skills (2011b). *Estimate of the value of UK education exports in 2008/09*, BIS Research Paper Number 46, June 2011, Available at: http://www.bis.gov.uk/assets/biscore/higher-education/docs/e/11-980-estimating-value-of-education-exports.pdf

Dustmann, C., Fabbri F. and Preston, I. (2005).*The impact of immigration on the UK labour market.* CReAM discussion paper series 0501, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.

Dustmann, C. and Frattini, T. (2011). *The impact of migration on the provision of UK public services*. A report prepared for the Migration Advisory Committee.

Dustmann, C., Frattini, T. and Preston, I. (2008). *The effect of immigration along the distribution of wages.* CReAM discussion paper series 0803, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.

Dustmann, C., Frattini, T., and Preston, I. (2011). *Can immigration constitute a sensible solution to sub-national and regional labour shortages?*. A report prepared for the Migration Advisory Committee.

Dustmann C. and Glitz A. (2005). *Immigration, Jobs and Wages: Theory, Evidence and Opinion*, Centre for Economic Policy Research (CEPR) and Centre for Research and Analysis of Migration (CReAM)

Gilpin, N., Henty, M., Lemos, S., Portes, J. and Bullen, C. (2006). *The impact of free movement of workers from Central and Eastern Europe on the UK labour market*. Department for Work and Pensions, Working Paper No 29.

Giulietti, C. (2009). *Immigration andDisplacement across Local Labour Markets.* Centre for Population Change Working Paper 2/2009

Hatton, T., Tani, M. (2003). *Immigration and inter-regional mobility in the UK, 1982-2000.* Economic Journal, Vol. 115, No. 507

Analysis of the Impacts of Migration

HM Government (2011a). *Impact Assessment Guidance: When to do an Impact Assessment*, http://www.bis.gov.uk/assets/biscore/better-regulation/docs/i/11-1111-impact-assessment-guidance.pdf

HM Government (2011b). *IA toolkit: When to do an Impact Assessment*, http://www.bis.gov.uk/assets/biscore/better-regulation/docs/i/11-1112-impact-assessment-toolkit.pdf

HM Government (2011c). One-In, One-Out (OIOO) Methodology. Available at: http://www.bis.gov.uk/assets/biscore/better-regulation/docs/o/11-671-one-in-one-out-methodology.pdf

HM Treasury (2003*). The Green Book: Appraisal and Evaluation in Central Government*, The Stationery Office

Home Office (2000). *The economic and social costs of crime.* Home Office Research Study 217. Available at: http://webarchive.nationalarchives.gov.uk/20110218135832/rds.homeoffice.gov.uk/rds/pdfs/hors217.pdf

Home Office (2005). *The economic and social costs of crime against individuals and households 2003/04.* Home Office Online Report 30/05. Available at: http://webarchive.nationalarchives.gov.uk/20100413151441/http://www.homeoffice.gov.uk/rds/pdfs05/rdsolr3005.pdf

Home Office (2011a). *Migration Permanent Limit (Points Based System Tier 1 and Tier 2)*, Impact Assessment, Home Office, March 2011

Home Office (2011b). *Reform of the Points Based System Student (PBS) immigration system*, Impact Assessment, Home Office, June 2011

Home Office (2011c). *Revisions made to the multipliers and unit costs of crime used in the Integrated Offender Management Value for Money Toolkit*, September 2011. Available at: http://www.homeoffice.gov.uk/publications/crime/reducing-reoffending/IOM-phase2-costs-multipliers?view=Binary

House of Commons Home Affairs Committee (2011). *Student Visas: Follow–up*, Eleventh Report of Session 2010–12, The Stationary Office, London.

House of Lords (2008). *The Economic Impact of Immigration.* Select Committee on Economic Affairs, 1st report of session 2007-08. HL Paper 82-1. London: Stationery Office. The Stationery Office Limited, London. Available at: http://www.publications.parliament.uk/pa/ld200708/ldselect/ldeconaf/82/82.pdf

Jean, S. and M. Jimenez (2007). *The Unemployment Impact of Immigration in OECD Countries*, OECD Economics Department Working Papers, No. 563, OECD Publishing. http://dx.doi.org/10.1787/162425722235

Kangasniemi, M., Mas, M., Robinson, C. and Serrano, L. (2009). *The economic impact of migration – Productivity analysis for Spain and the UK*. Munich Personal RePEc Archive, Paper No 17212.

Laurence, J. and Heath, A. (2008). *Predictors of community cohesion: multilevel modelling of the 2005 Citizenship Survey*. Report for the Department for Communities and Local Government. Available at: http://www.communities.gov.uk/documents/communities/pdf/681539.pdf

Lemos, S., (2010). *Labour market effects of Eastern European* migration in Wales*, University of Leicester, UK

Lemos, S. and Portes, J. (2008). *The impact of migration from the new EU member states on native workers*. Department for Work and Pensions, London.

Letki, N. (2008). *Does diversity erode social cohesion? Social capital and race in British neighbourhoods*. Political Studies 56(1): 99-126.

Lewis, E. (2004). *How did the Miami labour market absorb the Mariel migrants?*, Federal Reserve Bank of Philadelphia, Working Paper No 04-3, January 2004

Manacorda, M., Manning, A. and Wadsworth, J. (2006). *The impact of immigration on the structure of male wages: theory and evidence from Britain*. IZA Discussion Paper No. 2352, Bonn.

Migration Advisory Committee (2009a). *Analysis of the Points Based System: Tier 1*. Migration Advisory Committee, London. December 2009.

Migration Advisory Committee (2009b). *Analysis of the Points Based System: Tier 2 and dependents.* Migration Advisory Committee, London. August 2009.

Migration Advisory Committee (2010). *Limits on Tier 1 and Tier 2 for 2011/12 and supporting policies.* Migration Advisory Committee, London. November 2010.

Migration Advisory Committee (2011a). *Analysis of the Points Based System: List of occupations skilled to NQF level 4 and above for Tier 2.* Migration Advisory Committee, London. February 2011.

Migration Advisory Committee (2011b). *Analysis of the Points Based System: Revised UK shortage occupation list for Tier 2 comprising jobs skilled to NQF level 4 and above*. Migration Advisory Committee, London. March 2011.

Migration Advisory Committee (2011c). *Skilled shortage sensible - full review of the recommended shortage occupation lists for the UK and Scotland*. Migration Advisory Committee, London. September 2011.

Migration Advisory Committee (2011d). *Report on settlement of skilled migrant workers.* Migration Advisory Committee, London. November 2011.

Migration Advisory Committee (2011e). *Report on restrictions for workers from Bulgaria and Romania.* Migration Advisory Committee, London. November 2011.

Migration Advisory Committee (2011f). *Review of the minimum income requirement for sponsorship under the family migration route*. Migration Advisory Committee, London. November 2011.

Nathan, M., (2011). *The long term impacts of migration in British cities: Diversity, Wages, Employment and Prices*. SERC Discussion Paper 67.

Nathan, M. and Lee, N. (2011). *Does cultural diversity help innovation in cities? Evidence from London firms.* SERC Discussion Paper 69.

National Institute of Economic and Social Research (2011a). *Impact of migration on the consumption of education and children's services and the consumption of health services, social care and social services*. A report prepared by the National Institute of Economic and Social Research for the Migration Advisory Committee.

Analysis of the Impacts of Migration

National Institute of Economic and Social Research (2011b). *Skilled immigration and strategically important skills in the UK economy.* A report prepared for the Migration Advisory Committee.

Nickell, S. and Saleheen, J. (2008). *The impact of immigration on occupational wages: evidence from Britain.* Working Paper No. 08-6, Federal Reserve Bank of Boston.

Office for National Statistics (2008). *Long-term International Migration estimates from the International Passenger Survey: 1975-1990.* Available at: http://www.ons.gov.uk/ons/search/index. html?newquery=long-term+international+migration

Office for National Statistics (2010a). *Long-term International Migration estimates from the International Passenger Survey: 1991-2009.* Available at: http://www.ons.gov.uk/ons/publications/r e-reference-tables.html?edition=tcm%3A77-228078

Office for National Statistics (2010b). *2010 Annual Survey of Hours and Earnings.* Available at: http://www.ons.gov.uk/ons/publications/r e-reference-tables.html?edition=tcm%3A77-238620

Office for National Statistics (2011). *Provisional Estimates of Long-Term International Migration Tables: 1991 – Dec 2010.* Available at: http://www.ons.gov.uk/ons/taxonomy/ind ex.html?nscl=International+Migration

Organisation for Economic Co-operation and Development (2011). OECD.StatExtracts. Available at: http://stats.oecd.org/Index.aspx

Peri, G. (2010). *The impact of immigrants in recession and economic expansion.* Migration Policy Institute.

Portes, J. and French, S. (2005). *The impact of free movement of workers from Central and Eastern Europe on the UK labour market: early evidence*, DWP Working Paper No. 18.

Reed, H. and Latorre, M. (2009). *The economic impacts of migration on the UK labour market.* IPPR Economics of Migration Working Paper 3. Institute for Public Policy Research, London.

Roodenburg H., Euwals R. and ter Rele H. (2003). *Immigration and the Dutch Economy*, CPB Netherlands Bureau for Economic Policy Analysis

Saggar, S., Somerville, S., Ford, R., and Sobolewska, M. (2011). *The impacts of migration on social cohesion and integration.* A report prepared for the Migration Advisory Committee.

Tsang, F., and Rohr, C. (2011). *The impact of migration on transport and congestion.* A report prepared by RAND Europe for the Migration Advisory Committee.

UK Border Agency (2011). *Statement of Policy: Changes to Tier 1 of the Points Based System.* UK Border Agency. London, March 2011

UNITE (2007). *The Student Experience Report.* Available at: http://www.unite-group.co.uk/Attachments/000171/Studen t%20Experience%20Report%202007.pdf

Whitehead, C., Gordon, I., Scanlon, K., Travers, T., and Edge, A. (2011). *The impact of migration on access to housing and the housing market.* A report prepared by LSE London for the Migration Advisory Committee.