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Employment, Wage Structure, and the Economic Cycle: Differences between Immigrants and Natives in Germany and the UK

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Non-Technical Abstract

Differences in the cyclical pattern of employment and wages of immigrants relative to natives have largely gone unnoticed in the migration literature. In this paper we show that immigrants and natives react differently to the economic cycle. Based on over two decades of micro data, our investigation is for two of the largest immigrant receiving countries in Europe which at the same time are characterised by different immigrant populations as well as different economic cycles, Germany and the UK. Understanding the magnitude, nature and possible causes of differences in responses is relevant for assessing the economic performance of immigrant communities over time. We show that there are substantial differences in cyclical responses between immigrants and natives. Our analysis illustrates the magnitude of these differences, while distinguishing between different groups of immigrants. Differences in responses may be due to differences in the skill distribution between immigrant groups and natives, or differences in demand for immigrants and natives of the same skills due to differential allocation of immigrants and natives across industries and regions. We demonstrate that substantial differences in cyclical patterns remain, even within narrowly defined groups. Finally, we estimate a more structural factor type model that, using regional variation in economic conditions, separates responses to economic shocks from a secular trend and allows us to obtain a summary measure for these differences within education groups.

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Abstract

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Keywords: Immigration, Wage Structure, Business Cycle
JEL: E32, F22, J31

1 Introduction

In this paper, we investigate the way different immigrant groups respond to the economic cycle, as compared to native born workers. The possibly differential response of immigrants even within skill groups, which has so far been largely ignored in the economic literature,[2] has potentially important implications for immigration policy, as well as for the economic adaptation of immigrant groups.

Our analysis is for two of the largest economies in Europe which at the same time host large immigrant populations: Germany and the UK. Comparing these two countries is particularly interesting as they have experienced substantially different patterns of changes in the earnings distributions of their workforces (see e.g. Katz and Autor 1999) as well as different economic performance over the last decade. Furthermore, both countries have large immigrant populations, but these are very different in terms of educational background as well as origin composition, with the UK's immigrants being more highly skilled than those to Germany. Also, both countries experienced largely different economic conditions over the last decade.

We concentrate on unemployment and wages as economic outcomes. We show hat there are substantial differences in cyclical responses between immigrants and natives in both countries. Our analysis illustrates the magnitude of these differences, distinguishing between different groups of immigrants. Further, we analyse some possible reasons. Differences in responses may be due to differences in the skill distribution between immigrant groups and natives, or differences in demand for immigrants and natives of the same skills due to different allocation of immigrants and natives across industries and regions. We demonstrate that substantial differences in cyclical patterns remain, even within narrowly defined groups. We also show that developments for the relative wage position of immigrants have been quite different in

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[2] A notable exception is recent work by Barth et al. (2004, 2006).

the UK and Germany, in particular over the last decade. We then estimate a more structural factor type model that, using regional variation in economic conditions, separates responses to economic shocks from a secular trend and allows us to obtain a summary measure for these differences within education groups. This analysis confirms the larger cyclical response of unemployment for immigrants, in particular those from non-OECD countries, in both countries.

The structure of the paper is as follows. In the next section we provide some background information about immigration to Germany and the UK, as well as on differences in economic outcomes for immigrants in these two countries. We then discuss the data we use for our analysis, and the samples that we draw. Section 3 illustrates the economic cycle and its differences in terms of GDP growth and unemployment rates in the UK and in Germany. Section 4 illustrates economic outcomes of different groups of immigrants in both Germany and the UK over the economic cycle, and compares these to outcomes of native born workers. Section 5 investigates how much of these differences is due to differences in observable characteristics, like education and age, and industry- and region allocation. Section 6 estimates a model that summarises these differences in a set of parameters that allow comparison between groups and across countries. Finally, Section 7 summarises and concludes.

2 Background and Data

2.1 Migration to Germany and the UK

Both the UK and Germany experienced large waves of immigration in the period after WWII. The first large wave of immigration into Germany was an inflow of ethnic Germans, expelled from former German territory, totalling 12m between 1945 and 1949 (see Oezcan (2004) for details). After 1955, the West-German economy experienced a strong upward swing, and immigration from Italy, Spain, Greece, Turkey, Portugal and Yugoslavia in the late 1950's and early 1960's led to a rise of foreign workers to 1.2m in 1965, and peaked in 1973 with 2.6m, or

12 percent of the total labour force. The stock of the foreign population increased from 700.000 in 1961 to around 4.0 million in 1973. The period after 1973 was characterized by family re-unification. The early 1980's saw the arrival of the first larger waves of asylum seekers. Finally, towards the end of the 1980's, and accelerated by the fall of the Berlin wall, Germany experienced a new large immigration from the East. Ethnic German immigrants (so called Aussiedler), who under Soviet rule were not allowed to move, migrated from Eastern Europe and beyond to Germany totalling 2.8 million between 1987 and 2001. In 2002 there were 7.3 million foreigners living in Germany (Statistical Office of Germany), representing 8.9 percent of the total population.[3]

Immigration legislation in the UK after WWII, embodied in the 1948 British Nationality Act and 1905 Aliens Act, distinguished formally between Commonwealth and non-Commonwealth citizens. All Commonwealth citizens notionally enjoyed unrestricted freedom to enter the UK. In the subsequent decade, immigration regulations were progressively tightened. The 1971 Immigration Act brought an end to the privileged position of Commonwealth citizens, replacing the previous distinction between aliens and British subjects with one between 'patrials' and 'non-patrials'. The 1980's and 1990's saw continuing restrictive reforms to immigration legislation.

Immigration of Commonwealth citizens was most pronounced in the two decades after the war. While the early 1950's were characterised by migration from the Caribbean, in the late 1950's a

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[3] Notice that the numbers for Germany refer to foreign individuals, not foreign-born individuals as for the UK. While official statistics in the UK define immigrants according to their country of birth (similar to the US, Canada and Australia), the distinction in most German official statistics is according to nationality. This creates some problems of comparability, as foreign nationals may include individuals who are born in Germany but have maintained their nationality, and exclude individuals that are born abroad, but were naturalised, such as the ethnic German immigrants.

growing number of immigrants arrived from the Indian subcontinent. Later migrants arrived from Pakistan and Bangladesh. Labour market shortages in the period after the war also led to recruitment of European workers, predominantly from Southern Europe, but also from Poland. After the 1971 act, an increasing fraction of immigration was due to family unification, which remained for a time largely unrestricted. Recently, immigration has increased again significantly, mainly a result of the strong British economy and, after May 2004, the allowance of free movement of labour from the new accession countries. In 2005 about 2.7 percent of the population in Britain migrated to the UK within the previous five years. In 2002 there were 4.9 million foreigners living in the UK, representing 8.3 percent of the total population (using LFS data, see also Table 2).

2.2 Data and Samples

Our analysis below is based on two large longitudinal data sets: The IABS 2 percent employment register data for Germany, and the Labour Force Survey (LFS) for the UK. Both data sets cover approximately the same period, and are sufficiently large to analyse minority populations.

The IABS

The basis for our analysis of Germany is the Employment Subsample 1975-2001 which is made available by the Institute for Employment Research (IAB). This administrative data set comprises a 2 percent subsample of all dependent employees subject to social security contributions in Germany. This includes all wage earners and salaried employees but excludes the self-employed, civil servants and the military. In 2001, 77.2 percent of all workers in the German economy were covered by social security. The data also includes all unemployed who

receive unemployment compensation.[4] The IABS does not include individuals that are out of the labour force. Because of the numerous adjustment processes in the East German labour market after German unification in 1990 and the relatively small immigrant population (the immigrant concentration in East Germany is only about 2.5 percent in 2001 compared to more than 10 percent in West Germany) we focus on West Germany throughout, excluding Berlin. For a detailed description of the data set see Bender et al. (2000).

The LFS

Our analysis for the UK is based on the British and the Northern Ireland Labour Force Surveys (LFS). The British LFS is a survey of private households living in Great Britain, carried out by the Office for National Statistics (ONS) while the Northern Ireland Labour Force Survey is carried out by the Department of Finance and Personnel. Both surveys used to be conducted biennially from 1973 to 1983 and annually between 1984 and 1991. Since the spring quarter 1992 the survey in Britain is conducted each quarter and changed to a rotating panel, with individuals included in five consecutive waves of the survey. In Northern Ireland the quarterly LFS was only introduced in the winter quarter of 1994.

Both the British and the Northern Ireland LFS collect data on a wide range of aspects of the labour market. Since 1984 the LFS uses the ILO definition of unemployment. For the years 1981 and 1983 the information in the LFS allows us to impute whether a person was ILO unemployed or not. Questions on earnings were not asked before the winter quarter of 1992/93

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[4] In 2001, 74.5% of unemployed individuals in West Germany received official unemployment compensation – mostly either unemployment benefits (*Arbeitslosengeld*) or unemployment assistance (*Arbeitslosenhilfe*) and are hence recorded in the IABS (Bundesagentur 2004). The remaining 25.5% are in most cases unemployed individuals whose entitlement for unemployment benefits has run out and they do not qualify for the means-tested unemployment assistance.

in Great Britain. In Northern Ireland this set of questions was only included in the questionnaire in 1994.

Definition of Immigrants

For the UK, immigrant status is defined by country of birth. In contrast, official data in Germany distinguishes between foreign and German citizenship rather than country of birth (following the principle of nationality by descent). In the IABS, therefore, we only observe an individual's citizenship but neither the place of birth nor the year of entry into the country. As an individual born in Germany to foreign parents does not automatically obtain German citizenship but keeps the citizenship of the parents, there is a group of people included in our sample who were born in the country but have possibly foreign citizenship. Between 1993 and 2002, the share of second generation immigrants in the 25-54 age bracket which we consider for analysis is quite small, and lies between 3.5 and 7.5 percent.[5] We are well aware that these definitional problems imply that comparisons across the countries have to be made with care. Nevertheless, we also believe that these differences will not compromise the conclusions we draw from comparisons of immigrants and natives in the two countries. For simplicity, we will in what follows refer to the foreign sample in the German data as "immigrants" and the German sample as "natives". We will use the same terminology for the foreign born and native born in the UK.

Samples used for Analysis

To account for group differences in a parsimonious way that allows comparability across Germany and the UK, we distinguish two groups of immigrants in our analysis of the two countries, those from OECD and those from non-OECD countries. We expect immigrants from OECD countries to be endowed with human capital that is more suited to the requirements of the

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[5] Source: Tabulations provided by the Statistical Office in Germany.

host countries' labour markets. Current OECD member countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Australia, Japan, Korea, Mexico, New Zealand, United States, Canada, the Czech Republic, Hungary, Slovakia, Poland, and Turkey.

As we use two different data sources for our analysis, the outcome measures used here are not fully comparable. In particular, the definition of the state of unemployment is different in the two data sets. In Appendix 1 we describe in more detail our outcome measures wages and unemployment.

Composition of Immigrant Populations

Reflecting the different migration histories of Germany and the UK, the composition of their immigrant populations differs considerably. In Table 1 and Table 2 we display the composition of the OECD and non-OECD immigrant populations for both countries for the years: 1981, 1991, and 2001.

[Tables 1 and 2 about here]

The figures for Germany suggest that in 1981, one in four immigrants was from a non-OECD country; in 2001, one in three immigrants was from a non-OECD country. For the UK, OECD and non-OECD immigrants were roughly equal in share in 1981; like in Germany, the fraction of non-OECD immigrant has relatively increased by 2001, with a share of 4.6 percent in the overall population, compared to 3.2 percent for non-OECD immigrants.

The composition of both groups differs considerably between the two countries. While for Germany, the largest OECD group is Turkish, it is immigrants from Ireland for the UK. While the Turkish group remains fairly constant in relative size for Germany, the Irish group drops considerably both in percentages as well as in total numbers (from about 600,000 in 1981 to 520,000 in 2001). Immigrants from India, Pakistan and Bangladesh make up most of the non-

OECD group in the UK in 2001, while it is immigrants from Former Yugoslavia, Asia, and Africa for Germany.

Individual Characteristics

In Table 3 and Table 4 we report some key characteristics for natives and immigrants for the years 1981 and 2001, where, as before, we distinguish between the immigrant population by OECD and non-OECD origin. For Germany (Table 3), we distinguish between three educational levels: Individuals who have no post-secondary education (low education); individuals who have post-secondary vocational training (intermediate education); and individuals who have a college education (high education). For the UK (Table 4) we aggregate qualifications into the same three broad classes (low, intermediate, high). Similar to the classification in the German data, the first class refers to people without any post-secondary education. As intermediate education we code GCE A Level or equivalent, GCSE grades A*-C or equivalent and other qualifications. High education comprises individuals holding a degree, for instance university degree, and other higher education.

[Tables 3 and 4 about here]

Table 3 and Table 4 show that the percentage of college graduates among natives in Germany is far lower than in the UK. This is due to the different classification in both the German and the UK data, as a large part of professional training that is offered by colleges in the UK is offered by the apprenticeship system in Germany. In both countries, the percentage of college educated in the labour force has dramatically increased among natives. Interesting is the different educational background of immigrants compared to natives in Germany and the UK: While in Germany the percentage of college educated in the immigrant population is substantially lower than in the native born population, in the UK the percentage of those with a college education is higher for immigrants, in both 1981 and 2001, and among OECD as well as

non-OECD immigrants. Overall, immigrants in Germany are considerably lower educated than in the UK. In both countries but particularly in Germany, the percentage of individuals in the lowest educational category is higher among immigrants.

While in 2001 about 1 in 6 Germans have no post-secondary education, this is the case for more than 1 in 2 immigrants, with similar percentages for OECD and non-OECD immigrants. Further below we report mean log real wages distinguishing between males and females. For Germany, the difference in real wages in 1981 between natives and OECD immigrants is about 11 percent for males, and 2 percent for females, increasing to 25 percent for males and 15 percent for females in 2001.[6] Non-OECD immigrants seem to be more disadvantaged than immigrants from OECD countries. This suggests a dramatic deterioration for immigrants over the two decades. For the UK, wage data are only available from 1992 onwards. The data for the year 2001 show that male immigrants earn on average similar wages than natives while female immigrants earns on average 16 percent more than native women. The performance of immigrants from OECD countries is particularly remarkable. Men and women earn on average 19, respectively 22 percent higher wages than their native counterparts.

Between 1981 and 2001, unemployment rates for German men (women) have increased from 3.4 (4.8) percent in 1981 to 6.8 (5.8) in 2001. For immigrants, the unemployment rate of men (women) increased from 5.0 (7.4) in 1981 to 11.8 (11.1) in 2001, suggesting a quite dramatic increase in the unemployment gap between natives and immigrants: For males the gap has increased from 47 percent to 74 percent.[7]

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[6] We compute percent differences as $e^{\Delta \ln w} - 1$ where $\Delta \ln w$ is the difference in log wages between natives and immigrants.

[7] These unemployment rates are lower than the official unemployment rates for West Germany – 4.5 (6.9) percent in 1981 and 8.6 (7.9) percent in 2001 – because of our sample selection; in particular, we focus on the population aged 25-54 in which unemployment is relatively low.

For the UK, unemployment has gone down over the period in overall terms. As for Germany there is a substantial difference in the unemployment gap between immigrants and natives in 2001: for males the overall difference is 83 percent compared to only about 35 percent in 1981. For the UK, it is the non-OECD immigrants that are mainly responsible for this difference.

In the bottom row of Table 3 and Table 4 we present the normalised Herfindahl index to measure regional concentration of natives and immigrants.[8] This index takes on numbers between zero (individuals are perfectly equally distributed across regions) and one (complete concentration in one region). For Germany, the index is 0.08 for natives, and 0.11 for immigrants for both 1981 and 2001. The higher values for immigrants are driven by their stronger concentration in North Rhine-Westphalia and Baden-Wuerttemberg where more than 50 percent of the immigrant population lives, compared to 44.6 percent of the native population. Overall, however, immigrants in Germany are not particularly concentrated in certain areas relative to the native population, and concentration has been remarkably stable between 1981 and 2001. This is in stark contrast to the UK. Here the index is 0.01 for natives and 0.11 for immigrants in 1981, increasing to 0.02 and 0.15 in 2001 respectively. This suggests a much stronger concentration for immigrants, which has increased (relative to natives) over the period from 1981 to 2001. Concentration is particularly strong for immigrants from non-OECD countries. About 40 percent of non-OECD immigrants live in London as compared to only 8 percent of the native born.

To summarise it appears that over the last two decades the economic conditions of immigrants relative to natives have considerably deteriorated in terms of unemployment in both Germany and the UK. In Germany, the average wages of immigrants have at the same time

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[8] The index is defined as $H = \left(\sum_{i}^{N} s_i^{2} - 1/N \right) / \left(1 - (1/N)\right)$, where s_i is the share of individuals, either natives, OECD or non-OECD immigrants, living in region i, and N is the overall number of regions.

dramatically decreased relative to natives. There is hardly any overall wage gap between immigrants and natives in the UK; if at all, wages seem to be higher for immigrants. Therefore, while there seem to be some common developments in the two countries with respect to unemployment, the large disadvantage of immigrants with respect to wages is a particular feature of Germany. This could be related to the different skill structure: The tables above suggest that immigration to Germany is predominantly low skilled, while it closely resembles the skill structure of natives in the UK.

3   Macroeconomic Conditions in Germany and the UK

Before we discuss the way employment and wages of immigrants and natives react to the economic cycle in these two countries in the next section, we briefly illustrate their macroeconomic conditions over time. In Figure 1 we present GDP growth and unemployment rates for Germany (left graph) and the UK (right graph). Time series are provided by the Statistical Office and the OECD for Germany and the UK, respectively. For the years prior to re-unification data for Germany refer to West Germany and from 1991 to unified Germany. The shaded areas indicate recessions in the respective economy.[9]

[Figure 1 about here]

In general, recessions in Germany and the UK occur simultaneously. A noticeable exception was the recession of the early 1990's which hit the German economy about one year later than the UK. This was due to the huge demand for consumption and investment goods after the German re-unification. The figures seem to indicate that both Germany and the UK experienced considerable increases in unemployment in the early-mid 1980's recession, with

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[9] The dates used in the construction of Figure 1 are those published by the Economic Cycle Research Institute (ECRI) and by the Business Cycle Dating Committee of the Centre for Economic Policy Research (CEPR).

some improvement towards the end of the decade. The early 1990's recession led again to an increase in unemployment in both countries. However, while unemployment figures started coming down shortly after this recession in the UK, this is not the case for Germany where unemployment continued to rise throughout the decade, with a small temporary decrease towards the end of the 1990's/early 2000's. Since the recession of the early 1990's the British economy grows at a steady pace of approximately 2.8 percent per year in real terms and the unemployment rate has continuously declined to a level of less than 5 percent in 2004. In Germany, unemployment has steadily increased over the entire period, reaching about 11 percent in 2004. Furthermore economic growth was sluggish with an average annual growth rate of about 0.9 percent.

4 Economic Outcomes and the Economic Cycle

4.1 Unemployment

[Figure 2 about here]

In Figure 2 we display unemployment rates of natives and immigrants from OECD and non-OECD countries for Germany and the UK. For Germany, the figures show that at the start of the 1980's unemployment rates were very similar for natives and the two groups of immigrants for both males and females. The 1980's recession led to a larger increase in unemployment for immigrants, but in the successive recovery phase unemployment drops slightly faster for the two immigrant groups. In the 1990's recession, unemployment grows considerably faster for immigrants than it does for natives, leading to a quite dramatic difference in unemployment between natives and both groups of immigrants. Unemployment among OECD immigrants is lower throughout than unemployment among non-OECD immigrants. Towards the end of the 1990's unemployment of immigrants seems again to drop more rapidly than unemployment of natives, but, compared to the early 1980's, there remains a large difference between the two

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immigrant groups and natives. The cyclical patterns are similar for males and females although, interestingly, while unemployment is higher for non-OECD men than for OECD men, it is the opposite for women: OECD women experience higher unemployment rates than non-OECD women. The figures suggest a strong cyclical development in unemployment *differences* between immigrants and natives.

For the UK, the figures suggest differences between immigrants from non-OECD countries and natives already in 1981. Unemployment for OECD immigrants is quite similar to that of natives, with slightly higher cyclical variation. Like for Germany, the 1980's recession has a larger impact on non-OECD immigrants, but unemployment drops faster for immigrants in the subsequent recovery phase. In 1990, differences in unemployment between immigrants and natives are at the smallest level over the period between 1981 and 2005. However, the early 1990 recession sees unemployment of immigrants rising considerably faster than of natives. In the subsequent recovery phase, unemployment goes down slightly faster for immigrants, but remains higher for immigrants. Overall, the figures for the UK suggest a similar pro-cyclical pattern in the difference in unemployment rates between natives, and the two groups of immigrants.

4.2   Wages

[Figure 3 about here]

In Figure 3 we display the development of real log wages. Again we distinguish between males and females. Although there was hardly any difference in unemployment between the different groups in Germany in 1980, there is a wage differential of about 11 (6) percent in favour of native men (women) relative to OECD immigrants, and 12 (5) percent relative to non-OECD immigrants. During the first recession, this differential does not increase. However, there is a dramatic increase in the wage differential from the early 1990's onwards. For non-OECD immigrant men it increased from about 15 percent in 1990 to 36 percent in 2000 – which

corresponds to an increase of the absolute wage differential by 114 percent. The increase is less dramatic for OECD immigrants. For females the pattern is similar, although the differences between both natives and OECD immigrants and natives and non-OECD immigrants are smaller.

For the UK we only observe wages in the LFS after 1991. This is the decade where we saw most dramatic divergence in log wages between immigrants and natives for Germany, but also a much more favourable economic development in the UK. Real wages increased steadily between 1992 and 2001 with an average wage growth rate of 1.7 (2.5) percent per year for native men (women) (compared to only 0.3 (0.8) percent in Germany), 2.4 (2.7) percent for OECD immigrant men (women) (-0.2 (0.7) percent in Germany) and 1.0 (3.1) percent for non-OECD immigrant men (women) (-1.2 (0.2) percent in Germany). In both countries non-OECD immigrant men have thus slower wage growth than their native counterparts; in Germany they even experience negative wage growth. In the UK, wages of OECD immigrants are slightly above those of natives, and non-OECD immigrants. We do not observe the same deterioration in relative wages for immigrants in the UK as we saw for Germany.

5 Adjusting for Composition

Part of the differences in the labour market outcomes of immigrants and natives which we illustrate in the previous section could be due to differences in their composition. In this section we investigate this in more detail. We analyse whether, and to what extent differences in outcomes over the business cycle can be explained by differences in skills, age structure, industry allocation or regional allocation. We do this by sequentially conditioning out differences between natives and the two groups of immigrants. In particular, we estimate the following model:

$$y_{it}^g = X_{it}^g \alpha + \sum_{\substack{g=natives, \\ OECD, \\ Non-OECD}} \sum_{t=t_1}^{t_2} \gamma_t^g T_t^g + e_{it}^g$$

where y_{it}^g is the outcome of interest for individual i belonging to group g (natives, OECD immigrants, non-OECD immigrants) in period t, X_{it}^g is a vector of additional controls, like education, age etc., and e_{it}^g is an error term. T_t^g represents the interaction of the group indicator g with year dummies for each year t. The parameters γ_t^g estimated for these interaction terms measure the average outcome y for group g in period t, conditional on observables X_{it}^g. Simple re-parameterisation allows estimating the differences in outcomes over time relative to a reference group. We estimate the following model by choosing as the reference group the native German, respectively UK born:

$$y_{it}^g = X_{it}^g \alpha + \sum_{\substack{g=OECD, \\ Non-OECD}} \sum_{t=t_1}^{t_2} \gamma_t^g T_t^g + \sum_{t=t_1}^{t_2} \gamma_t \, d_t + e_{it}^g$$

d_t are here year dummies for each year t. When restricting α to zero, the estimated parameters γ_t^g are the group mean labour market outcomes of OECD/non-OECD immigrants relative to the native population (picked up by γ_t) as we have illustrated in the figures in the last section. By sequentially adding education and age, regional, and, for Germany, industry controls, we eliminate differences in estimates of economic outcomes between our groups that may be due to differences in these observable characteristics. We plot the resulting estimates of γ_t^g in the figures below. This amounts to comparing immigrants and natives who are identical in observables. In the initial estimations without controls, illustrated by the solid line, the only variable included in X_{it}^g (apart from a constant term) is an indicator for the sex of the individual. In the next step, represented by the dashed line, we add age, age squared and interactions of our education groups and year dummies. Finally, in the last step, illustrated by the dotted line, we also include interactions of region and year and, in the case of Germany, industry and year dummies. Unfortunately, the LFS data does not allow to condition on industry allocation since

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information on industry affiliation is not available for a large proportion of the unemployed - up to 40 percent of the observations in many years. Notice that we assume that all three groups respond in the same way to changes in the X_{it}^g, so there are no group-specific α coefficients (although we allow α to vary with time by using interactions of education, region and industry dummies with year dummies).

5.1 Unemployment

[Figure 4 about here]

In the upper panel of Figure 4 we show the unemployment rates of OECD and non-OECD immigrants relative to the unemployment rates of natives for Germany. The solid line is the unconditional differential; the dashed and dotted lines control for differences in age and education structure, and differences in age, education, industry and regional allocation between immigrants and natives, as explained above.

The figures suggest that conditioning on age and education reduces the unemployment differential between Germans and immigrants in both groups; however, there remains a large difference, and the cyclical pattern is clearly visible. Conditioning on industry structure and regional allocation in addition does not systematically change these differences apart from non-OECD immigrants during the period 1985 to 1995 where it tends to increase the unemployment differential and to some extent smoothen the cyclical pattern. The figures that separate men and women look very similar to the pooled figure and can be found in Appendix 2.

In the lower panel in Figure 4 we display the conditional and unconditional unemployment differentials for the UK. The differences between the conditional and unconditional patterns are much smaller than in Germany. That is not surprising, as the age and education structure of immigrants in the UK resembled quite closely the native population, as we have shown above. Furthermore, although immigrants are highly concentrated in London, this is

not an area with particularly different unemployment rates. Overall, we see again considerable differences between OECD and non-OECD immigrants, as well as the cyclical pattern in the early 1980's and 1990's which is particularly pronounced for the group of non-OECD immigrants.

5.2 Wages

[Figure 5 about here]

In Figure 5 we display the unconditional and conditional log wage differentials for Germany and the UK. Again, the solid line depicts the unconditional differentials as we have already discussed in the last section. As for unemployment, we see a reduction in the wage differential between the two immigrant groups and natives for Germany when we condition on age and education, suggesting that part of the differential is due to differences in the age and education composition in the two populations. This is not surprising as we find large educational differences between groups in Table 3. However, there remain substantial differences, in particular for non-OECD immigrants. For this group the differential decreases further when taking account of differences in industrial and regional allocation. This suggests that non-OECD immigrants are particularly affected by the cycle not only because they have low educational achievements, but also because they have an unfavourable industry- and regional allocation. Conditioning on these, and until up to 1990, the wage differential actually vanishes. However, after 1990, controlling for education, age, industry structure, and regional allocation can only account for around 50 percent of the widening wage gap between natives and non-OECD immigrants, still leaving a gap of more than 10 percent unexplained in 2000. The gap between Germans and OECD immigrants on the other hand remains at about 5 percent after also controlling for industrial and regional allocation. For separate graphs for men and women see Appendix 3.

In the lower panel of Figure 5 we display the conditional log wage differentials for the UK. The difference to Germany is quite striking. Conditioning on age and education does not affect the differential between natives and OECD immigrants; it does however turn the differential between non-OECD immigrants and natives negative. This is the opposite of what we find for Germany, and suggests that non-OECD immigrants would worsen their relative wage position in comparison to natives if they had the same age and education structure. The slight overall wage advantage of non-OECD immigrants turns into a substantial disadvantage when keeping individual characteristics the same. Moreover, the wage differential relative to natives worsens further when we condition on region effects: Over the period we consider, the wage disadvantage turns from being close to zero to between 10 and 15 percent. This is due to immigrants being predominantly living in high-wage London.

To summarise, our findings in the last section suggest that for both Germany and the UK, unemployment probabilities of immigrants are more sensitive to the economic cycle than those of the natives. Conditioning on individual characteristics and regional and (in the case of Germany) industry allocation reduces this differential slightly, but the stronger pro-cyclical pattern for immigrants remains. Interesting is the common pattern in both countries, despite the different skill composition of their immigrant populations.

For wages, differences between the two countries are partly due to the different composition of immigrants and natives. The differences in average wages in 2000 between immigrants from non-OECD countries and natives in Germany and the UK are similar after conditioning on composition and regional allocation: In both countries, non-OECD immigrants face a substantial wage disadvantage when compared to native workers. This is very different from the unconditional differentials, where non-OECD immigrants have roughly similar average wages in the UK than natives, while the differential is much larger in Germany, due to different composition and regional allocation of these groups in the two countries. On the other side,

before the early 1990's, the conditional wage differential was close to zero in Germany, but already negative in the UK. Over the last decade, we observe a stark diverging trend in particular for Germany, but not for the UK, where wages of immigrants and natives seem to move largely in parallel. Compared to the pattern for the unemployment rate, the differential cyclical responsiveness of immigrants and natives is less pronounced when looking at their wages.

6   Differential Responses to Economic Shocks across Groups

We now estimate a more structural model to summarise the evidence we have provided in the last sections, and to quantify the differential response of both different skill groups and natives and immigrants within skill groups. This will also enable us to distinguish between permanent changes in responses over time (which we capture by a time trend), and differences in responses to economic shocks. For example, the large increase in the wage gap between immigrant groups and natives that we observe in Germany since the 1990's is likely to be more a secular trend rather than a differential response to economic shocks.

We implement this decomposition using a parsimonious factor structure. The idea of our approach is similar to Hoynes (2000). We utilise differences in economic shocks across regions and over time to identify the relative response of different education- and population groups to such shocks, conditional on region effects and a time trend. Our outcome variables are unemployment and wages. This allows us to asses the magnitude by which the groups react differently to economic shocks, and test whether these differences are statistically significant.

More formally, consider the following outcome equation:

$$y_{jrt}{}^g = a_j^g + b_j^g t + c_j^g f_{rt} + \mu_r + v_{jrt}$$

where y_{jrt} is the labour market outcome (average log wages or unemployment rates) of skill group j (defined by education and sex) in region r in time period t. The index g distinguishes between different groups of immigrants and natives workers. The skill specific labour market outcome is a function of a fixed group and skill effect a_j^g, a group and skill specific time trend b_j^g, a fixed region effect μ_r, and a measure of the region specific business cycle f_{rt}. Importantly, the common factor f_{rt} is assumed to be identical for all skill and immigrant groups. The coefficient c_j^g then gives the responsiveness of group g (immigrants or natives) with skill level j to the business cycle fluctuations in region r at time t. To eliminate fixed group and skill effects, we estimate the above equation in first differences:

$$\Delta y_{jrt}{}^g = b_j^g + c_j^g \Delta f_{rt} + \Delta v_{jrt}$$

In our data there is no natural measure for business cycle shocks, that is, for the common factor f_{rt} and hence for Δf_{rt}. One may think of taking the unemployment rate as a measure of business cycle shocks, but in that instance left- and right-hand side variables would be mechanically linked. In the absence of such a measure we proceed by treating the shock as unobserved and estimate each Δf_{rt} as the parameter on the interaction term of year t and region r, T_{rt}.[10] Denote these parameters as β_{rt}. Our final estimation model is then given by:

$$\Delta y_{jrt}{}^g = b_j^g + c_j^g \beta_{rt} T_{rt} + \Delta v_{jrt} \qquad (1)$$

The parameter of interest is c_j^g, measuring the effect of local labour market shocks on group g in skill group j. These c_j^g are only identified after normalisation. We therefore set c_j^g equal to one for the base group, which we choose to be native male workers with college

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[10] The model of this section is thus a variant of a dynamic factor model which recently have become quite popular in empirical macroeconomics. For a survey of dynamic factor models see Breitung and Eickmeier (2005).

education in Germany, and native male workers with a degree in the UK. In addition, the intercept for this reference group b_j^g is set to zero in estimation, so the intercepts for the other groups are interpreted as the average trend for group g with skill level j relative to the trend for the reference group.

In this model, identification is obtained by our assumption that the labour market specific shock β_{rt} is identical for all groups g and skill levels j. Due to our normalisation (b_j^g=0 and c_j^g=1 for the reference group) our estimates of β_{rt} are simply the expected change in the outcome variable of the reference group in region r and year t. Notice that in this model we have interactions of two coefficients, c_j^g and β_{rt}, so the model is non-linear in the coefficients which renders OLS inappropriate for estimation, and we use Nonlinear Least Squares to estimate it.

We now return to our original question. Suppose that the differential response to the economic cycle, as we have shown in the figures above is only due to different skill compositions of the native and the immigrant population, and that the cycle affects both groups (immigrants and natives) equally. In this case, for a given skill group j, the parameter c_j^g should be the same for immigrant and native workers. For instance, for high skilled immigrant male workers the estimates should be, as for the reference group, equal to one. This is a testable hypothesis. If these skill specific parameters are not the same across natives and migrant groups (within skill groups), then this provides evidence that business cycle shocks affect immigrants differently than natives.

[Tables 5 and 6 about here]

Table 5 and 6 report our NLS estimation results of Equation (1) for Germany and the UK. For the latter we pool two years together in order to sustain a sufficient number of observations

per skill and origin group for each of the 11 UK regions we use in our analysis.[11] We report the estimated parameters c_j^g for the unemployment rates for each of our 18 skill groups (2 gender, 3 education, 3 nationality/origin) in Germany and the UK in columns (1) and (2), and the respective parameters for wages in columns (3) and (4). The results for the skill specific trend coefficients b_j^g are reported in Appendix 4 (Table 7). We report the standard errors underneath the coefficient estimates where stars (*) are used to indicate that a coefficient is statistically different from one (the parameter of the base group) at the 5 percent level. We also test the hypothesis that responses of the two immigrant groups are different from those of native workers *within* skill groups. Significant differences in estimates at the 5 percent level are marked with a (+).

6.1   Unemployment

Table 5 reports results for males, and Table 6 for females. We first concentrate on males. Columns (1) and (2) report results for unemployment. For both the UK and Germany, there is a clear tendency that the lower the educational attainment, the stronger the cyclical fluctuations in the unemployment rate. For instance, for native men in Germany, the estimate increases from 1 for the reference group with college education to 2.41 for those with intermediate education, to 4.68 for those with low education. This suggests that the unemployment response to macro shocks for the low educated is stronger by factor 4 than for the highly educated men. The numbers for the UK are remarkably similar, with point estimates of 2.56 for the intermediate and 3.58 for the low educated men.

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[11] We distinguish the three constituent countries Wales, Scotland, and Northern Ireland and, in the case of English regional units, we aggregate to the level of Government Office Regions, which are London, South East, South West, West Midlands, North West, North East, Yorkshire and the Humber, East Midlands, and East.

Within skill groups, there seems to be a higher responsiveness of unemployment for immigrants than for natives. For Germany, native men with intermediate education respond 2.41 times stronger to business cycle shocks than native German men with college education; however, OECD immigrants in the same education category react stronger by factor 4.19, and non-OECD immigrants by factor 5.81. Both estimates for immigrants are significantly different from that of natives within the same skill group. For the low-educated group, OECD immigrants react similar in magnitude to shocks than natives (always compared to native men with high education), with point estimates of 4.79 and 4.68 respectively. Non-OECD immigrants react stronger, with a point estimate of 6.98; this estimate is again significantly different from that of native men in the same skill group.

For the UK, natives and OECD immigrants with medium qualifications react very similarly to shocks with estimates of 2.56 and 2.69, respectively. On the other hand, non-OECD immigrants react significantly stronger than both of these groups, with a point estimate of 3.82. For the group of low educated workers, point estimates suggest again that both groups of immigrants respond stronger than their native counterparts (4.92 respectively 4.90 vs. 3.58 for natives); however, estimates are not significantly different between groups.

For women, we report results in Table 6. Estimates confirm the overall pattern that we find for men, with perhaps slightly smaller differences across skill groups, but with immigrants reacting stronger to shocks than natives. Again, non-OECD immigrants seem to be particularly sensitive to economic shocks, especially in the UK.

6.2 Wages

We now turn to wages, and we report results in the last two columns of Table 5 (males) and Table 6 (females). For Germany the numbers in column (3) suggest that the wage fluctuations over the business cycle are larger for the intermediate and still larger for the low skilled when

compared to the estimates of the high skilled reference group, with all coefficients being significantly different from one. Within skill groups, though, we do not find statistically significant differences in the responsiveness of wages to economic shocks between natives and immigrants. The large divergence in the conditional wage gap between immigrants and natives that we have seen in the figures above is therefore unlikely to be due to differences in the response to shocks. Inspecting the trend coefficients which we display in Table 7 in Appendix 4, these become more negative the lower the educational attainment is, implying a deterioration of the relative wages of low skilled workers. Furthermore, the relative downward trend is significantly stronger for male non-OECD immigrants among the medium and low educated as compared to natives within the same skill category.

Results for men in the UK are displayed in the last column (4) of Table 5. There seems to be no clear differences across skill groups in the response to economic shocks. This may be due to the fact that wage data are only available since 1992, and that the British economy experienced a steady growth over most of the last decade. Like for Germany, there is little evidence for differential response to economic shocks between immigrants and natives within skill categories. Only the estimate for non-OECD immigrants with intermediate education is significantly higher than its native counterpart. Other than for Germany, Table 7 in Appendix 4 do not suggest large differences in time trends across groups – perhaps not surprising after inspection of the figures in Appendix 3.

For females, results are reported in Table 6. The reference group is still highly educated males. For Germany, low educated women react more strongly to business cycle shocks than the reference group but less so than equally educated males. For both countries, there is little evidence of large differences between immigrants and natives within skill groups. For Germany, only low educated non-OECD women react significantly differently than their native counterpart; in this case they show a lower responsiveness to economic shocks. For the UK, none

of the estimated parameters of immigrants is significantly different from the respective coefficients of the natives and only the coefficient of women who immigrated to the UK from a OECD country is significantly different from one (the coefficient of the reference group).

7   Summary and Conclusion

In this paper, we analyse differences in the response of immigrants and natives to the economic cycle. Our investigation is for Germany and the UK. Both countries are among the largest economies in Europe, and have large immigrant populations. However, they differ in the skill- and origin composition of their immigrant communities, as well as the development of wage inequality over the last decades, and economic growth over the last 10 years. We commence by illustrating the magnitude of differences in cyclical responses for the two countries, distinguishing between immigrants from OECD countries, and immigrants from non-OECD countries. We then analyse reasons for observed differences. Our analysis is based on two longitudinal data sets, both covering the period from 1980 onwards: For the UK, we use the LFS of Britain and Northern Ireland. For Germany, we use a 2 percent sample from the Social Security Records.

We demonstrate substantial differences in the origin and skill composition of the immigrant population in Germany and the UK. While immigrants to the UK are, overall, similarly or even better educated than the native born, immigration to Germany is largely unskilled. In both countries, unemployment is higher in the immigrant population, in particular when considering immigrants from non-OECD countries. While there are substantial differences in average unconditional earnings between immigrants and natives in Germany, this seems not the case for the UK, where wages are on average similar or even higher for both immigrant groups. In the UK, the regional distribution of immigrants is more concentrated than that of the native born while in Germany natives and immigrants are similarly distributed across regions.

When considering the cyclical development of unemployment for immigrants from OECD and non-OECD countries, it appears that immigrants react more pro-cyclically than natives in both countries, and for both immigrant groups. These differences reduce in size, but remain significant for both countries even after conditioning on individual characteristics like age and education, regional distribution, and (in the case of Germany) industry allocation.

For wages, we find that in Germany, the unconditional average wages of both groups of immigrants have dramatically decreased relative to natives since the early 1990's. There is hardly any overall wage gap between immigrants and natives in the UK; if at all, wages seem to be higher for immigrants. However, when we control for composition and regional allocation, we find that this leads to a significant drop in the relative wage position of immigrants in the UK, and to an improvement in the relative gap between the two groups in Germany. Interestingly, eliminating composition effects leads to a similar wage gap in 2000 between non-OECD immigrants and natives for Germany and the UK. However, while the conditional gap is fairly constant for immigrants in the UK over the last decade, it was close to zero in Germany in 1990, and has increased to about 5 and 12 percent for OECD and non-OECD immigrants respectively. Therefore, while there seems to be a common pattern in the two countries with respect to differences in unemployment responses across groups, as well as differences in conditional average wages in the early 2000's, the wage gap since the early 1990's has sharply increased in Germany.

We then estimate a structural factor type model, where we use differences across regions in the exposure to economic shocks to provide a summary measure of the magnitude of differences between skill- and origin groups in the responsiveness to shocks, conditional on a secular trend. This enables us to distinguish between differences in changes over time (which we capture by a time trend) and differences in responses to economic shocks. These results suggest that for both the UK and Germany, individuals are more responsive to economic shocks, the

lower their educational attainment, with roughly similar differences between countries. When distinguishing further between immigrants and natives within educational cells, we find that overall immigrants, and in particular those from non-OECD countries, are more responsive to shocks than natives for both Germany and the UK. For wages, we find again that, and in particular for Germany, lower skilled workers react more sensitively to shocks than the highly skilled; however the magnitude of these differences is much lower than for unemployment. There is not much evidence for both countries that within skill groups and after accounting for secular trends immigrants react differently to economic shocks compared to natives. The large increase in the gap in wages between immigrants and natives that in Germany we mentioned earlier is mainly captured by a secular trend, rather than differential responses to economic shocks. The trend effects are significantly larger for both groups of immigrants than for natives for Germany. For the UK, where our wage series is based on little over a decade of data only, we find no evidence for skill group specific responses to economic shocks.

What do we conclude from all this? Our results suggest larger responses of immigrants than natives to economic shocks within skill groups. These differences are particularly pronounced for non-OECD immigrants, and evident for both countries, despite their rather different immigrant populations. On the other hand, despite largely different secular changes in the relative wage gap between immigrants and natives in the UK and Germany, we find little evidence in both countries that wage responses of immigrants to shocks are different than those of natives within skill groups. It therefore seems that changes in the demand for labour over the economic cycle affects immigrant workers and in particular those from non-OECD countries, more than natives. Interesting is the similarity in this pattern for the UK and Germany, despite their differences in immigrant populations and economic conditions. There are a number of possible reasons for that. Immigrants may be less "insiders" than natives, with less permanent employment contracts, and lower dismissal costs. Immigrants may also be discriminated against,

with employers singling them out when economic conditions deteriorate, but re-employing them when the situation improves. Our finding that there is not much evidence for differential wage reactions may suggest that there is no differential adjustment at this margin. However, if those immigrants who are laid off in an economic downturn are predominantly drawn from the lower end of the productivity distribution, selection may distort our analysis on wages, leading to an increase in the observed average wages of those immigrants who remain employed.

Our analysis has implications for other areas of research. In the literature on the economic assimilation of immigrants[12] it is often implicitly assumed that immigrants and natives react to macro shocks in the same way, at least within skill groups. Work by Borjas (1995, 1999) assumes as an identification strategy for immigrant cohort effects the same response of immigrants and natives to the economic cycle, conditional on observed characteristics. In two recent papers, Barth et al. (2004, 2006) point out that differences in the response of immigrants as compared to natives to macroeconomic conditions invalidates Borjas' (1995) identification assumption. They propose as an alternative identification strategy to parameterise time effects as a function of local labour market conditions. Our analysis in this paper supports their argument. Although we find little evidence that macro shocks around a trend affect wages of immigrants and natives differently within skill groups, we find large differences in trends for Germany, which would lead to different time period effects in straightforward earnings regressions. Our analysis adds a further concern. As we point out above, the strong cyclical pattern in the difference in unemployment rates between immigrants and natives within skill groups may lead to differential selection between immigrants and natives over the economic cycle. This may in

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[12] See for instance Borjas (1995) and for the US, Baker and Benjamin (1994) and McDonald and Worswick (1998) for Canada, Edin et al. (2000) for Sweden, Friedberg (2000) for Israel, Bell (1997) and Chiswick (1980) for the UK and Barth et al. (2002) for Norway; for papers investigating immigrants' employment and unemployment dynamics see e.g. Chiswick et al. (1997) and Chiswick and Hurst (2000) for the US, Wheatley Price (2001) and Frijters et al. (2003) for the UK, or Husted et al. (2001) for Denmark.

turn lead to a bias in estimated coefficients of typical human capital variables, and estimates of the ensuing assimilation profile. The sign and magnitude of the bias will depend on the cyclicality of the period that is considered, and the differences in response of the different groups.

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9 Appendix

Appendix 1: Data Samples

Germany

The sample population for the analysis on Germany comprises all dependent employees as well as the registered unemployed. In order to avoid issues of differential labour market entries and early retirement, we restrict our sample to the population aged 25 to 54. Self-employed individuals, who make up 8.4 percent of the foreign and 10.0 percent of the German workforce in 2001 (Institut für Mittelstandsforschung 2003) as well as civil servants and the military are excluded from the analysis. Throughout the analysis we will consider two labour market outcomes for Germany: the unemployment rate and average daily wages.

Some explanation is necessary with regard to the construction of our unemployment rate for West Germany. The IABS includes two groups of individuals: first, employees who are subject to social security contributions and, second, unemployed persons who are recipients of official unemployment compensation. The rate of unemployment that can be derived using the IABS is then the number of these unemployed over the total number of unemployed plus employees.

The second important labour market outcome variable we use are daily wages of full time workers. These are taken directly from the IABS and adjusted to real 1995 prices using the consumer price index for all private households. All wages (or log wages) are reported in Euros. Wage records in the IABS are top coded at the social security contribution ceiling. We impute wages above that ceiling using a method suggested by Gartner (2004). The IABS is a unique data source, both in its accurateness and its sample size that allows an examination of wage changes over a longer period.
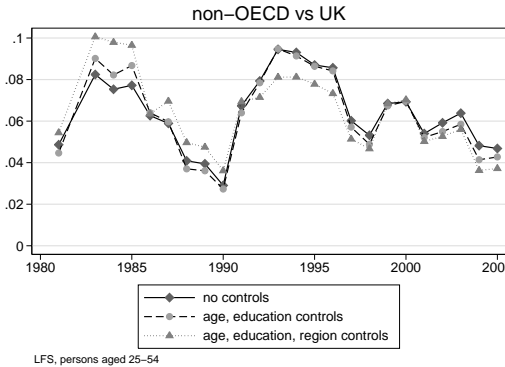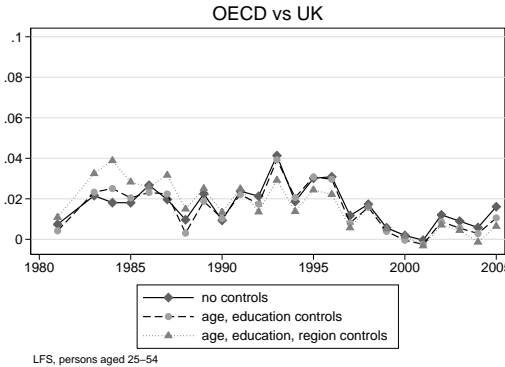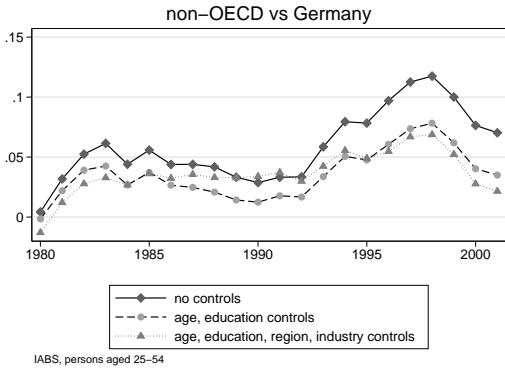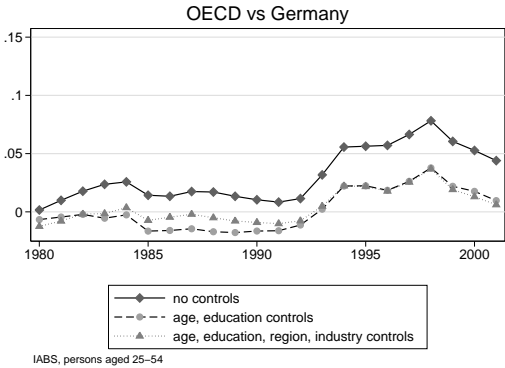
UK

The UK Labour Force Survey allows defining unemployment according to the ILO definition of unemployment. The ILO definition defines an individual as unemployed if he/she is without work during the reference period, but available for work, and actively seeking work. Hence, in the LFS individuals who are actively seeking work but are not eligible for official unemployment compensation are counted as unemployed while the IABS does not cover this group of people at all. On the other hand individuals who are not available for work or are not actively seeking employment but receive unemployment benefits are not included in the number of unemployed persons in the LFS but are in the IABS.[13] In order to make unemployment rates in both Germany and the UK as closely comparable as possible in this analysis, we exclude the self-employed and people on government schemes from our analysis. The reported unemployment rates may therefore slightly deviate from the numbers in official publications.

As noted above, from the winter quarter 1992/93 (1994) onwards, the LFS for Britain (Northern Ireland) also contains information on wages of employees. The LFS does not report earnings of self-employed which, however, does not pose further problems since we exclude the self-employed to improve the comparability of our results for Germany and the UK. Wage data used in the subsequent analysis are hourly wages in pounds sterling where prices are adjusted to 1992 prices using the consumer price index.
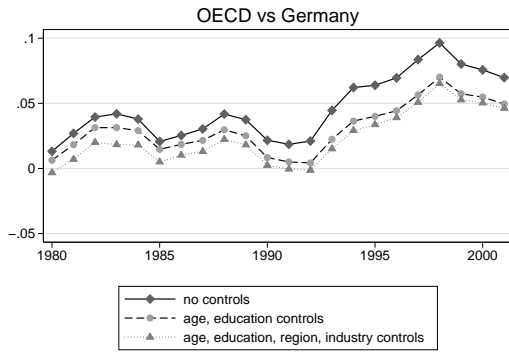
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[13] It should be noticed that a sizeable fraction of the German labour force above 55 falls under this category. Based on the ILO definition of unemployment these individuals would not be classified as unemployed. This is one reason why we restrict our analysis to individuals below the age of 55.

Appendix 2: Conditional Unemployment Differentials by Sex

Men

OECD vs Germany	non−OECD vs Germany

Legend (OECD vs Germany and non−OECD vs Germany):
- no controls
- age, education controls
- age, education, region, industry controls

IABS, persons aged 25–54

OECD vs UK	non−OECD vs UK

Legend (OECD vs UK and non−OECD vs UK):
- no controls
- age, education controls
- age, education, region controls

LFS, persons aged 25–54

Women

OECD vs Germany

non–OECD vs Germany

no controls
age, education controls
age, education, region, industry controls

IABS, persons aged 25–54

OECD vs UK

non–OECD vs UK

no controls
age, education controls
age, education, region controls

LFS, persons aged 25–54

36

Appendix 3: Conditional Log Wage Differentials by Sex

Men

OECD vs Germany

non–OECD vs Germany

OECD vs UK

non–OECD vs UK

Women

OECD vs Germany

non–OECD vs Germany

- no controls
- age, education controls
- age, education, region, industry controls

IABS, persons aged 25–54

OECD vs UK

non–OECD vs UK

- no controls
- age, education controls
- age, education, region controls

LFS, persons aged 25–54
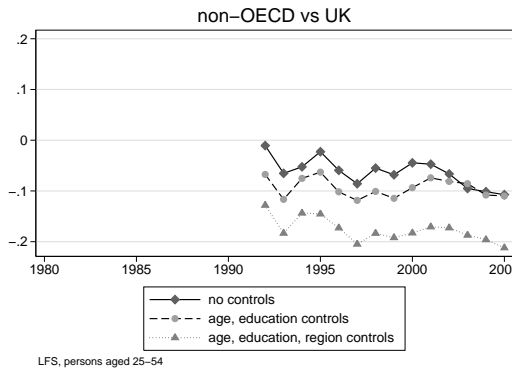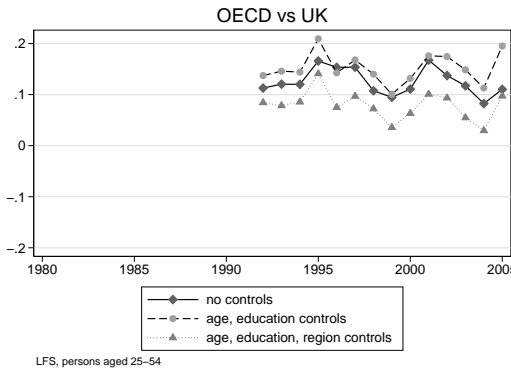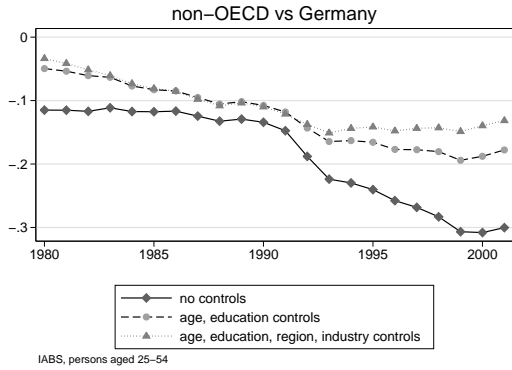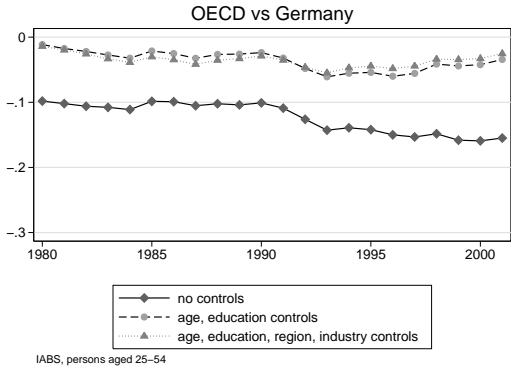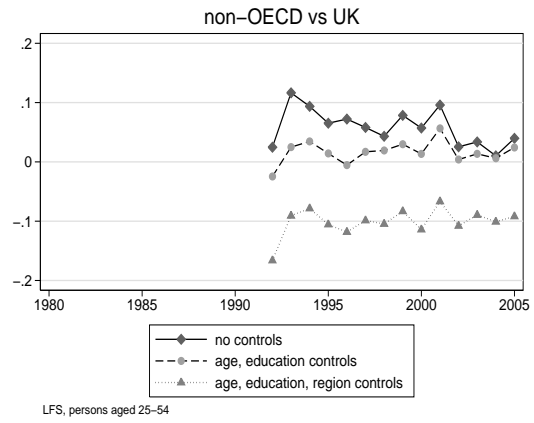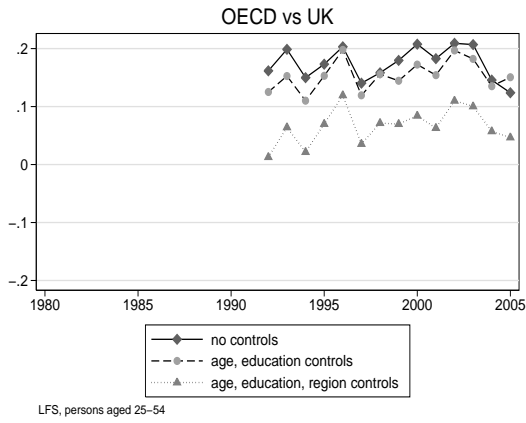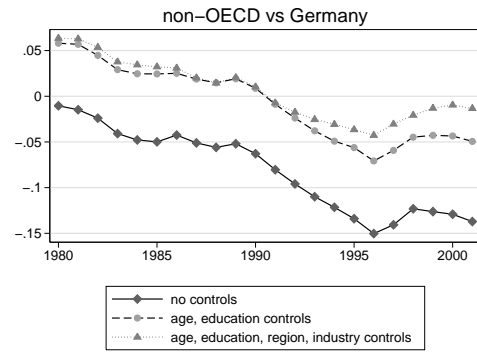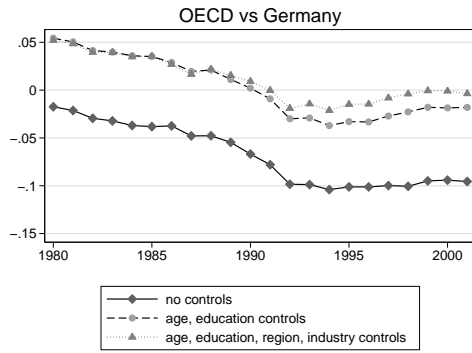
Appendix 4

[Table 7 here]

Table 1: OECD and Non-OECD immigrants, Germany

Citizenship	1981	1991	2001
OECD			
Share (in %)	6.8	6.3	5.8
Of which (in %)			
Turkey	39.5	42.1	43.9
Italy	20.8	14.9	15.5
Greece	9.3	8.8	8.7
Poland	0.5	3.7	3.9
Other	29.9	30.5	28.0
Non-OECD			
Share (in %)	2.2	2.2	2.8
Of which (in %)			
Former	70.2	61.9	47.9
Asia	13.3	18.5	23.0
Africa	7.9	9.7	12.4
Former Soviet	0.1	1.4	6.8
Other	8.5	8.5	9.9

Source: IABS, all observations (men & women, all ages)

Table 2: OECD and Non-OECD immigrants, UK

Citizenship	1981	1991	2001
OECD			
Share (in %)	2.7	2.7	3.2
Of which (in %)			
Ireland	40.8	38.2	27.5
Germany	12.3	12.8	13.5
USA	6.9	7.6	8.4
Australia	3.8	3.8	5.4
Other	36.2	37.6	45.2
Non-OECD			
Share (in %)	3.3	3.5	4.6
Of which (in %)			
India	24.0	19.9	15.2
Pakistan	9.3	12.2	9.8
Bangladesh	1.8	4.5	6.2
Jamaica	9.7	6.3	5.4
Other	55.2	57.1	63.4

Source: LFS, all observations (men & women, all ages)

Table 3: Individual characteristics, Germany

IABS (persons aged 25-54)	1981				2001			
	Natives	Immigrants	OECD	Non-OECD	Natives	Immigrants	OECD	Non-OECD
Education								
Low education	25.4	66.0	68.7	58.9	16.3	53.1	52.9	53.7
Intermediate education	69.0	30.4	27.8	37.3	73.4	41.0	41.2	40.6
High education	5.6	3.6	3.5	3.8	10.2	5.8	5.9	5.7
Mean age								
All	39.2	37.6	37.8	37.0	39.3	38.0	37.8	38.4
Mean log daily wage (in 1995 €)								
Men	4.30 (0.26)	4.20 (0.26)	4.20 (0.25)	4.18 (0.27)	4.45 (0.37)	4.23 (0.43)	4.28 (0.40)	4.12 (0.46)
Women	3.90 (0.45)	3.88 (0.32)	3.87 (0.33)	3.88 (0.31)	4.15 (0.49)	4.01 (0.50)	4.02 (0.51)	3.98 (0.48)
Unemployment/labour force rate								
Men	3.4	5.0	4.4	6.5	6.8	11.8	11.1	13.5
Women	4.8	7.4	7.7	6.7	5.8	11.1	12.4	8.7
Regional concentration (Herfindahl index)								
All	0.08	0.11	0.11	0.12	0.08	0.11	0.11	0.10

Note: See text for definition of unemployment rate. Standard deviations in parenthesis.

Table 4: Individual characteristics, UK

LFS (persons aged 25-54)	1981				2001			
	Natives	Immigrants	OECD	Non-OECD	Natives	Immigrants	OECD	Non-OECD
Education								
Low education	47.2	48.7	48.7	48.8	14.5	18.3	12.0	21.6
Intermediate education	38.8	31.3	32.4	30.5	58.5	52.8	56.7	50.7
High education	14.0	20.0	19.0	20.7	27.0	28.9	31.2	27.7
Mean age								
All	38.7	38.4	39.8	37.4	39.5	38.4	37.6	38.8
Mean log hourly wage (in 1992 £)								
Men					2.10 (0.54)	2.12 (0.65)	2.27 (0.65)	2.03 (0.59)
Women					1.82 (0.52)	1.97 (0.56)	2.02 (0.59)	1.92 (0.54)
Unemployment rate								
Men	8.6	11.8	9.3	13.4	4.6	8.0	4.5	10.0
Women	6.8	8.6	7.3	9.8	3.6	6.5	4.7	7.7
Participation rate								
Men	96.7	92.8	93.9	92.0	91.6	86.7	89.6	85.2
Women	63.2	58.6	62.9	54.7	77.4	62.3	70.5	57.7
Regional concentration (Herfindahl index)								
All	0.01	0.11	0.08	0.15	0.02	0.15	0.11	0.18

Note: See text for definition of unemployment rate. Standard deviations in parenthesis.

Table 5: Estimation Results, Group Specific Effect c_j^g, Men

IABS/LFS (persons aged 25-54)	Unemployment Rate		Log Wages	
	(1)	(2)	(3)	(4)
	Germany	**UK**	**Germany**	**UK**
High education				
Non-immigrant	1	1	1	1
OECD	1.831	1.411	1.281	1.039
	(0.692)	(0.264)	(0.328)	(0.949)
non-OECD	1.973	1.660*+	-0.729*+	0.323*+
	(1.231)	(0.180)	(0.810)	(0.130)
Intermediate education				
Non-immigrant	2.407*	2.556*	1.580*	0.976
	(0.470)	(0.136)	(0.099)	(0.097)
OECD	4.192*+	2.689*	1.350*	1.501
	(0.957)	(0.562)	(0.176)	(0.502)
non-OECD	5.805*+	3.816*+	1.870*	1.460*+
	(1.422)	(0.312)	(0.181)	(0.169)
Low education				
Non-immigrant	4.680*	3.580*	2.341*	1.136
	(0.914)	(0.202)	(0.143)	(0.147)
OECD	4.792*	4.917*	2.075*	2.417
	(0.937)	(1.225)	(0.193)	(0.885)
non-OECD	6.979*+	4.904*	2.294*	1.214
	(1.359)	(0.805)	(0.224)	(0.476)
Observations	3,409	2,371	3,408	1,152
R2	0.610	0.514	0.585	0.410

Note: Regression estimated using nonlinear weighted least squares, using the cells' population as the weights. The sample covers men and women aged 25 to 54 from 1982 to 2001 for Germany and from 1981 to 2005 for the UK. In the case of the UK two years are pooled together such that for the unemployment rates we generate two-year intervals starting with years 1981, 1983 and so on. For the wage regression for the UK, data is only available from the fourth quarter of 1992 onwards. We therefore form two-year clusters 1992/1993, 1994/1995 and so on. As the regional unit we use the ten West German states ("*Länder*") and for the UK the eleven regional units listed in the text. For details on the construction of the outcome variables, see the text. Cluster-robust standard errors are in parentheses. A (*) indicates the parameter is different from one at the 5 percent level. A (+) indicates that the parameter is different from the respective parameter of the native group at the 5 percent level.

Table 6: Estimation Results, Group Specific Effect c_j^g, Women

| IABS/LFS (persons aged 25-54)	Unemployment Rate		Log Wages	
	(1)	(2)	(3)	(4)
	Germany	**UK**	**Germany**	**UK**
High education				
Non-immigrant	1.490	0.489*	1.739*	0.909
	(0.566)	(0.083)	(0.155)	(0.109)
OECD	2.165	0.560	0.882	1.586
	(1.130)	(0.235)	(0.983)	(0.329)
non-OECD	-0.466	0.095*	-0.797	0.289
	(1.345)	(0.234)	(1.390)	(0.414)
Intermediate education				
Non-immigrant	1.477	0.825	1.419*	1.151
	(0.299)	(0.089)	(0.087)	(0.099)
OECD	2.239*+	1.040	1.111	1.814*
	(0.540)	(0.219)	(0.231)	(0.379)
non-OECD	2.366*+	1.919*+	1.770	1.292
	(0.606)	(0.219)	(0.435)	(0.311)
Low education				
Non-immigrant	2.412*	1.424*	2.108*	1.147
	(0.488)	(0.180)	(0.136)	(0.128)
OECD	4.192*+	0.713	1.786*	1.543
	(0.951)	(0.649)	(0.187)	(0.434)
non-OECD	2.815*	2.501	1.639*+	1.538
	(0.879)	(0.803)	(0.176)	(0.399)
Observations	3,409	2,371	3,408	1,152
R2	0.610	0.514	0.585	0.410

Note: See Table 5.

Table 7: Estimation Results, Time Trend Effect $b_j^g * 100$

IABS/LFS (persons aged 25-54)	Unemployment Rate		Log Wages	
	(1)	(2)	(3)	(4)
	Germany	UK	Germany	UK
Men				
High education				
Non-immigrant	0	0	0	0
OECD	0.110*+	-0.076	-0.561	0.796
	(0.055)	(0.098)	(0.349)	(3.678)
non-OECD	0.102	-0.041	0.731	2.170*+
	(0.114)	(0.125)	(0.996)	(0.717)
Intermediate education				
Non-immigrant	0.150*	-0.261*	-0.951*	0.665
	(0.030)	(0.065)	(0.118)	(0.447)
OECD	0.323*+	-0.193	-0.954*	-2.506
	(0.054)	(0.104)	(0.173)	(1.771)
non-OECD	0.396*+	-0.378*	-2.118*+	-1.694*+
	(0.081)	(0.126)	(0.181)	(0.845)
Low education				
Non-immigrant	0.448*	-0.412*	-2.370*	-0.307
	(0.056)	(0.103)	(0.184)	(0.562)
OECD	0.515*+	-0.395	-1.989*+	-6.048
	(0.060)	(0.304)	(0.220)	(3.379)
non-OECD	0.507*	-0.317	-3.123*+	-1.044
	(0.102)	(0.221)	(0.267)	(2.364)
Women				
High education				
Non-immigrant	-0.139*	-0.163*	-0.315	0.754
	(0.033)	(0.027)	(0.178)	(0.486)
OECD	0.160	-0.108	0.410	-1.541+
	(0.185)	(0.163)	(1.117)	(1.157)
non-OECD	-0.037	-0.120	-0.340	2.846
	(0.313)	(0.110)	(1.572)	(1.843)
Intermediate education				
Non-immigrant	0.028	-0.368*	-0.422*	0.980*
	(0.021)	(0.041)	(0.107)	(0.472)
OECD	0.195*+	-0.314*	-0.649*	-1.849
	(0.045)	(0.088)	(0.228)	(1.835)
non-OECD	0.173*+	-0.342*	-1.470*+	0.092
	(0.076)	(0.094)	(0.476)	(1.476)
Low education				
Non-immigrant	0.274*	-0.213*	-1.542*	0.603
	(0.033)	(0.052)	(0.161)	(0.588)
OECD	0.477*+	-0.442*	-1.936*+	-0.725
	(0.071)	(0.197)	(0.216)	(1.762)
non-OECD	0.246*	-0.092	-1.955*+	-1.820
	(0.080)	(0.336)	(0.222)	(1.942)
Observations	3,409	2,371	3,408	1,152
R2	0.610	0.514	0.585	0.410

Note: See Table 5. In this table, however, a (*) indicates that the parameter is different from zero at the 5 percent level.

Figure 1: GDP Growth and Unemployment Rates, Germany and UK
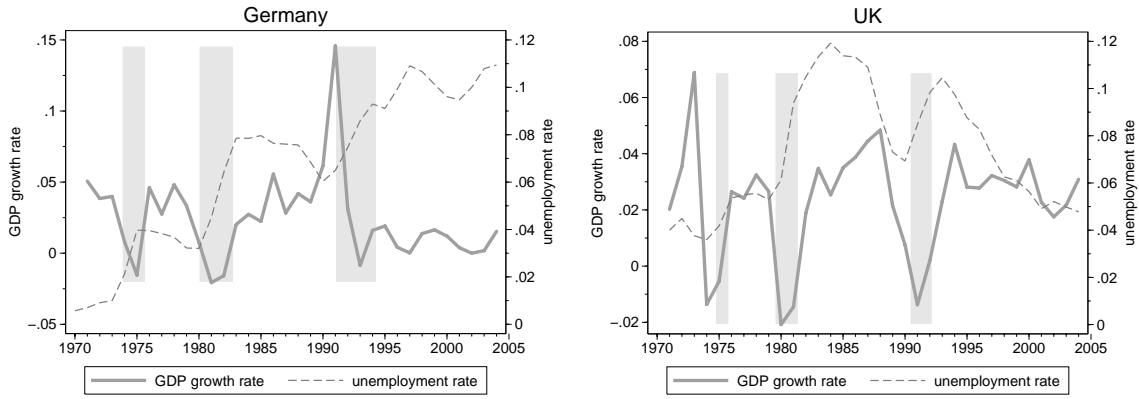
Source: (Germany) Statistisches Bundesamt. As from 1991 data refer to both the West and the East of Germany. (UK) OECD. Business cycle dating: Economic Cycle Research Institute.

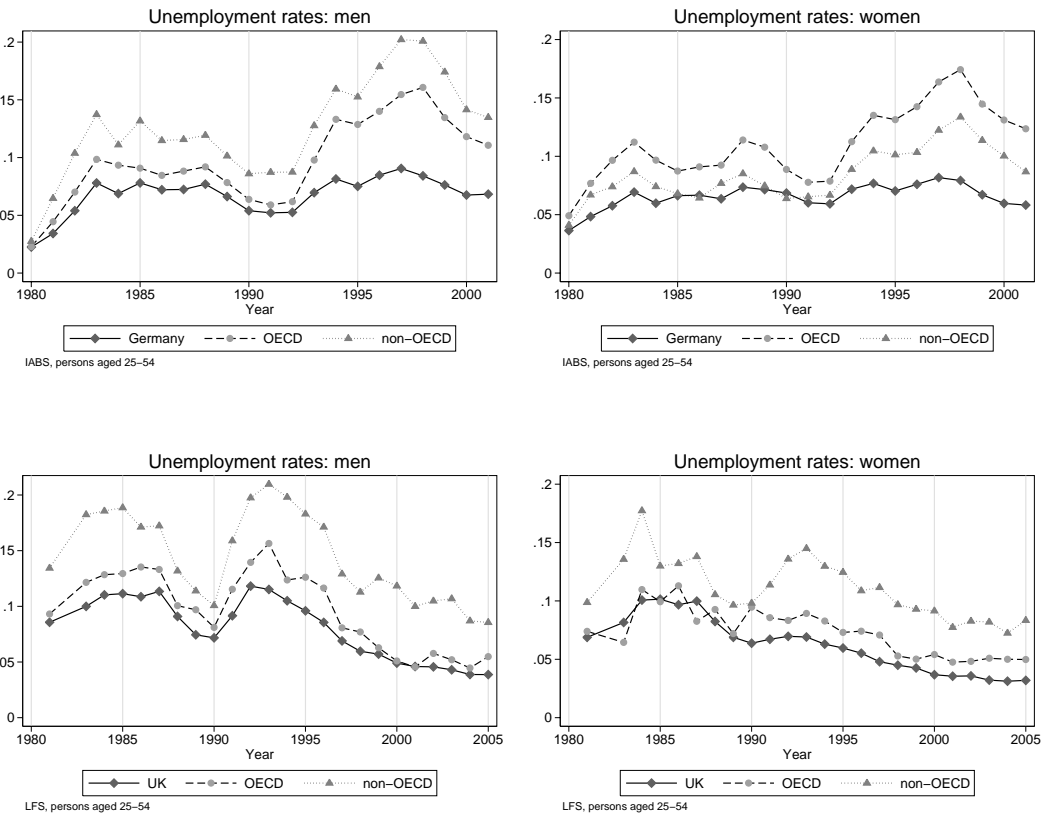**Figure 2: Unemployment, Males and Females, Germany and UK**
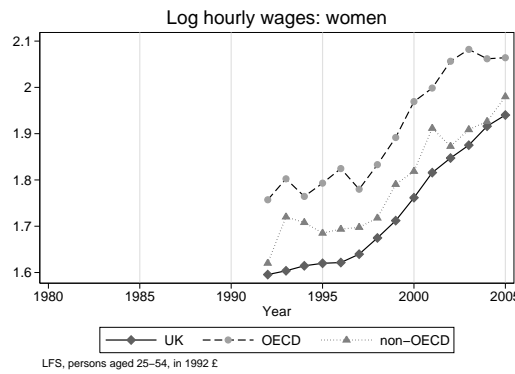
Figure 3: Log Wages, Males and Females, Germany and UK

Log daily wages: men

IABS, persons aged 25–54, in 1995

Log daily wages: women

IABS, persons aged 25–54, in 1995

Log hourly wages: men

LFS, persons aged 25–54, in 1992 £

Log hourly wages: women
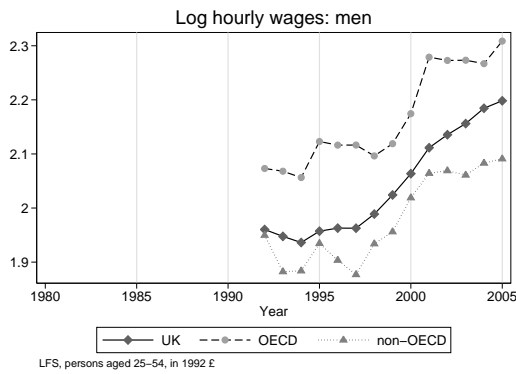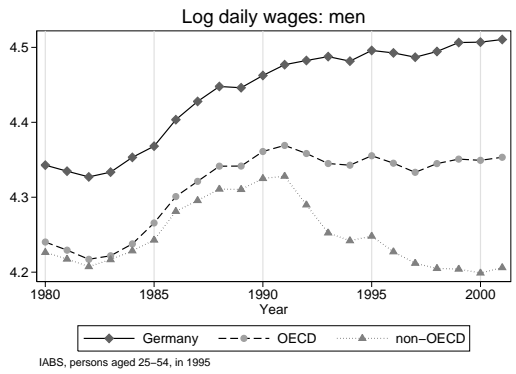
LFS, persons aged 25–54, in 1992 £

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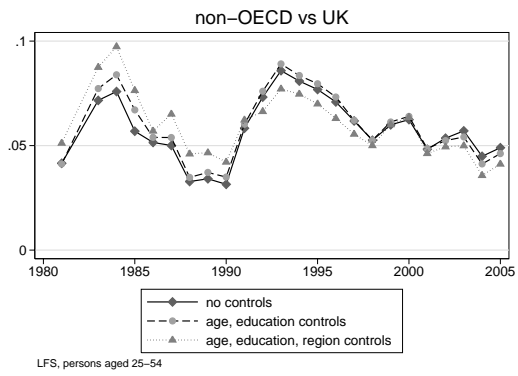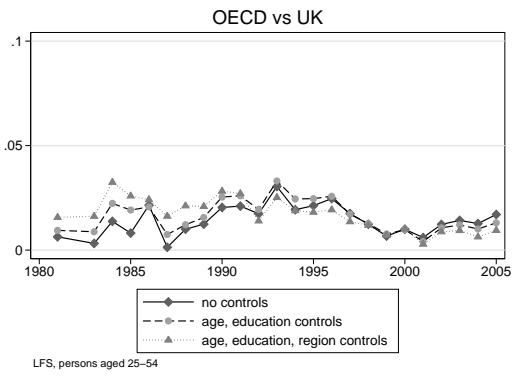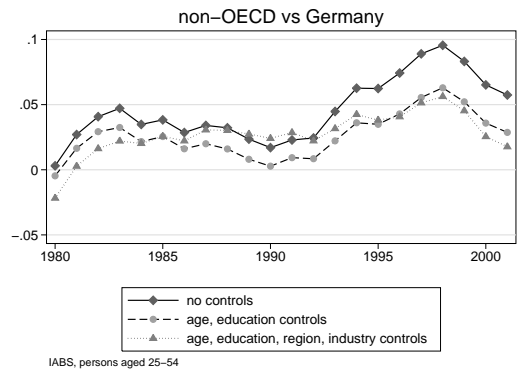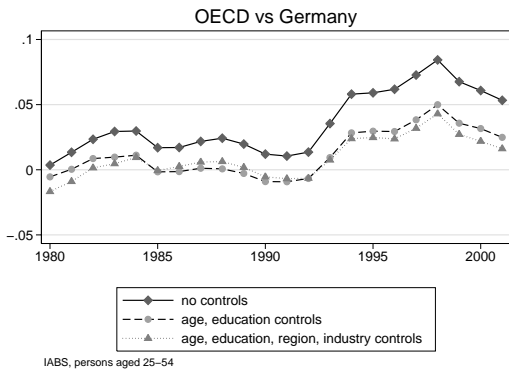**Figure 4: Conditional Unemployment Rate Differentials. Germany and UK**

Figure 5: Conditional Log Wage Differentials, Germany and UK

OECD vs Germany

no controls
age, education controls
age, education, region, industry controls

IABS, persons aged 25–54

non–OECD vs Germany

no controls
age, education controls
age, education, region, industry controls

IABS, persons aged 25–54

OECD vs UK

no controls
age, education controls
age, education, region controls

LFS, persons aged 25–54

non–OECD vs UK

no controls
age, education controls
age, education, region controls

LFS, persons aged 25–54

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