Immigration, Wage Inequality and unobservable skills in the U.S. and the UK

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Abstract

The existing literature on immigrant assimilation mainly examines the effects of observable skills. Unlike most previous work, this paper focuses on the analysis of unobservable skills of both immigrants and natives.
Using data from Current Population Survey for the U.S. and Labour Force Survey for UK between 1994 and 2006 I seek to reconsider whether the rise in immigration observed in those countries can help reconcile one of the 1990s challenges of empirical literature: wage dispersion is not fully explained by variables linked to standard human capital model like education and experience; residual or within-group wage inequality accounts for most of the growth in overall wage inequality.
The empirical analysis reveals that residual wage inequality among immigrants is higher than among natives. However those differences do not contribute to explain (much) increasing residual wage inequality observed in the two countries.

Keywords: wage inequality, immigration, composition effects, residual
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1.Introduction

Over the last few decades immigration has increased significantly in both the U.S. and the UK; both countries have also experienced notable increases in the degree of wage inequality.

According to the Outgoing Rotation Group- Current Population Survey and Labour Force Survey data respectively, in 2006 nearly 13 percent of U.S.'s and 12 percent of UK's labour force population[1] was born abroad. The same data set also document that from 1994 to 2006 wage inequality measured by the standard deviation of the natural logarithm of hourly wage for male workers, increased by 1,9 percent in the U.S. and by 0,7 percent in UK.

There is a huge empirical debate on the social and economic consequences of international migration, one of the core concerns relates to the impact of immigration on wages of native workers. Despite the common sense intuition behind the theoretical implications of the laws of the supply and demand, the international migration literature has found it difficult to document the impact of immigration on wages of workers in the receiving countries and evidence provided is sometimes mixed.

Abdurrahman and Borjas (2006) for example investigate the effect of the immigration-induced supply shifts on the cross-country evolution of relative wages experienced in Canada, Mexico and United States. They find that the impact of migration on the wage structure differs significantly across the three countries. Card (2006), Dustmann, Fabbri and Preston (2005) give evidence that the effect of immigration on U.S. and UK native's wages is almost negligible.

A consensus emerging from a recent stream of the empirical literature is that not only immigration has little impact on natives' wages but also that on average immigration exerts a positive effect rather than negative ones on natives' wage (Ottaviano and Peri 2006; Manacorda, Manning and Wadsworth 2006 (MMW hereafter); Dustmann, Frattini, Preston 2008 DFP hereafter). As proved by Ottaviano and Peri (2006) for the U.S. and by Manacorda et al.(2006) for the UK natives' wage loss from immigration is mitigated because of incomplete substitutability of immigrants and natives within age and education groups. As explained by Ottaviano and Peri (2006) imperfect substitutability may arise, among other aspects, from different abilities or unobserved characteristics of workers.

The existing literature investigating the effect of immigration on native-born wages has only addressed the role of observable characteristics (education and experience) of workers while less

[1] Sample includes full time workers, not self-employed, main job only, with positive potential work experience; whose hourly wage is less than 100pounds for the UK and 100 Dollars for the U.S.

attention has been devoted to their unobservable skills[2]. Lemieux (2006) shows that residual wage dispersion among workers with the same education and experience "…is generally believed to account for most of the growth in overall wage inequality".

Recently Card (2009) offers an overview of existing understanding on the relationship between immigration and inequality, focusing on evidence from cross-city comparison in the U.S. Based on the fact that within-group wage inequality has risen substantially he shows that across major cities the level of residual wage inequality is strongly correlated with immigrants' densities. In particular a 10 percentage point increase in the immigrant share is associated with a 0.025 point rise in the residual variance of high school equivalent men's wages and a 0.027 point rise in the residual variance of college equivalent men's wages. However the causal effects of immigration on within-group inequality are small: immigrants account only for a share of 5% of the increase in U.S. wage inequality between 1980 and 2000, albeit immigrants tend to have higher residual inequality than natives.

There are many reasons to believe that immigrants and natives with similar observable skills may report differences in wages because of differences in unobservable skills that are relevant in the labour market. Immigrants are a particular group of their original population with motivations and tastes that may locate them separately from natives. In manual and intellectual works they have cultural-specific skills as well as limits (language) that might translate into advantages or disadvantages; foreign-born workers have different abilities pertaining to language, quantitative skills, and relational skills for which they choose occupations that are different from natives, even in the same education and experience group.

Another key fact that contributed to feeding the debate of both wage inequality and immigration is the changes in characteristics of workers. Labour force has been growing older and more educated (Autor, Katz and Kearney,2005; Lemieux 2006); Lemieux (2006) argues that these secular changes in the education and age structure may increase mechanically residual wage inequality and shows that a large fraction of the 1973-2003 growth in the residual wage inequality in the U.S. is a "spurious" consequence of the composition effects.

However this influential contribution does not account for the fact that over the last decades not only the share of immigrants in the labour force has been increasing but also that changes in characteristics (education and experience) also affect immigrants. Extensive literature (Dustmann, Preston, Fabbri 2005**;** Wadsworth 2007; MMW 2006; Wadsworth and Schmitt 2006; DFP 2008)

[2] Gould and Moav (2008) for example empirically investigating how the emigration rate of Israeli workers in the U.S depends on their unobservable skills measured with residual wage from a standard Mincer equation.

shows that compared to people born in the UK, immigrants are on average better educated. Similarly for Canada Boudarbat and Lemieux (2008) show that looking at years of completed education, immigrants are more educated than the Canadian born and that the education gap is growing over time.

This paper aims to adapt in the immigration context one of the main challenges of the 1990s wage literature: wage dispersion is not fully explained by variables linked to standard human capital model like education and experience; residual or within-group wage inequality[3] –wage dispersion among workers with the same education and experience- accounts for most of the growth in overall wage inequality (Juhn, Murphy and Pierce 1993; Acemoglu 2002; Autor, Katz and Kearney 2005, 2007; Lemieux 2006).

Unlike previous studies this paper focuses on the effects of immigration on the residual wage inequality in the UK and US between 1994 and 2006; it seeks to assess whether and how much of immigration contributed, along with technology and traditional explanations, to widening inequality. In other words this paper aims to re-assess Lemieux's hypothesis (composition effects exert an upward mechanical force on the residual wage inequality) by adding to the original analysis the immigration dimension.

This can be done by performing a variance decomposition which allows analysing and comparing the role and trends of the dispersion in unobservable skills for both immigrants and natives.

The methodology used by Lemieux and that is implemented in this work, is based on a simple approach having the advantage to analyse changes in the distribution of wages that is economically interpretable using the standard tools of human capital theory. Unlike other methodologies (Juhn, Murphy and Pierce 1993; Autor, Katz and Kearney 2005- 2007; Melly 2005) the procedure allows to control for changes in distributions of observables, by holding skill distribution of the work force constant at a base year; this requires taking the actual residual variance of the log hourly wage OLS regressions and re-weighting it according to a weight that holds the characteristics of labour force constant at a base year. In addition to the original methodology this paper also controls for increasing supply of immigration by constructing another weight that holds fix the share of immigrants at a base year.

The paper also focuses on the trends and timing of residual wage inequality over comparable groups of education; illustrating the evolution of upper and lower tail distribution, when controlling for both composition effects and for the increasing supply of immigrants. To account

[3] Intuitively, years of schooling and experience, do not capture returns to other skills. By contrast regression-based residuals include unmeasured aspects of human capital such as school quality, ability, effort or innate skills.

for the fact that immigrants perform differently[4] according to the time they have already spent in the receiving country (Wadsworth and Schmitt, 2006; DFP 2008) the analysis is re-run separately for new and old immigrants, define respectively as those who spent 5 years or less in the country and those who have been in the U.S. or UK for more than 5 years[5].

The structure of this paper is as follows. Next section provides an explanation to why unobservable components might be crucial in analysing the impact of immigrants on natives' wage inequality and what is the plausible link between the increase in educational attainments of labour force and the increase of residual; part three presents the econometric methodology; part four describes the two datasets used in this paper, part five discusses the results, the final section concludes.

2. Immigrants and natives: Imperfect substitutability, unobserved skills and composition effect.

The lack of any negative effect of immigration on wages of native in the U.S. and the UK drawn by Ottaviano and Peri (2006) and MMW (2006) is built up on the evidence that immigrants do not fully compete and substitute with natives even within an education-experience group.

As highlighted by Ottaviano and Peri (2006), the imperfect substitution between immigrants and native may be due, among other aspects to differences in unobservable skills that are relevant in the labour market. Immigrants are a particular group of their original population with motivation and tastes that may locate them separately from natives. In manual and intellectual works they have cultural-specific skills as well as limits (language) that might translate into advantages or disadvantages; foreign-born workers have different abilities pertaining to language, quantitative skills, and relational skills for which they choose occupations that are different from natives, even in the same education and experience group.

Not dissimilar in the spirit of Ottaviano and Peri (2006), Gould and Moav[6] (2008) argue that unobservable skills are a mixture of "general" skill (like education) that can be easily transported to

[4] DFP (2008) demonstrate that immigrants downgrade considerably upon arrival within educational categories; in particular because of their lack in complementary skills-like language. Recent immigrants may not be able to make use of their educational background to its full potential.

[5] The existing literature defines recent and new immigrants in different ways; Dustmann, Frattini and Preston (2008) define earlier and recent immigrants in the UK respectively as those who have been in the UK two years or more and as those who arrived over the last two years. Chiquiar and Hanson (2002) define recent Mexican in the US as those who migrated in the last 10 years. Schmitt and Wadsworth (2006) consider recent immigrants as those who already spent from 0 to 5 years the U.S. or UK.

[6] They show that a higher ratio of individuals with a higher transferability rate of unobservable skills exists in the middle of the distribution of the total unobservable skills. They argue that those at the bottom of the unobservable skills distribution have little of both types of skills, while those at the top have high levels of both. Individuals are more likely

another country and other skills "country-specific" that cannot be easily transported to another country; "country-specific" skills include personal connection, local knowledge of the labour market, language-specific communication skills, luck in the labour market. A significant proportion of an individual's total human capital is likely to be country specific for several reasons; language and cultural barriers may prevent an individual from transferring their skills to a country where they lack a commanding knowledge of the local languages, consumer tastes and so on.

The idea that there might be crucial unobservable skills component in the immigration process is consistent with a recent consensus of the wage inequality literature: unobservable skills, measured by the residual of a Mincer equation, explain most of the variation in the observed increasing wage inequality (Acemoglu 2002, Juhn, Murphy, Pierce, 1993; Autor &Katz 1999; Autor, Katz and Kearney, 2005, 2007, Lemieux 2006).

Evidence from the U.S. (Autor and Katz 1999) shows that residual wage inequality started increasing in the 1970s, continued rising considerably in the 1980s and then at a slower pace in the 1990s; the residual log weekly wage inequality for full-time, full year workers increased by 27 log points for men and 25 log points for women from 1963 to 1995. Juhn, Murphy and Pierce (1993) for the U.S. show that unobserved components affect with different magnitude the wages of workers at the top and at the bottom of the distribution. Over the period 1964-1988 changes in unobservable quantities account for 65 percent of the increase in inequality for workers below the median but less than half of the increase in inequality for those above the median.

More recently Lemieux (2006) outlines the main patterns observed in the United States using Current Population Survey (CPS) data: the residual variance for full time, full year men workers from 1973 to 2003 grows by about 0.04 log points; most of that growth is concentrated in the 1980s, remains essentially unchanged during the 1990s but grows again between 1999 and 2003.

Leading existing explanations on wage inequality such as declining unionization, the falling real minimum wage and the SBTC[7] do not then seem to help explain the main recent trends in wage inequality, since they find it harder to predict increasing upper-tail inequality and compressing lower

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to have high levels of unobservable general skills versus country specific skills if they are in the middle of the distribution rather then the tails.

[7] Similarly Lemieux (2007) discusses why the SBTC explanation presents several limitations; one reason is that it could not help to explain some diverging pattern of inequality across advanced countries; SBTC was depended on the weak fact that the residual inequality was increasing since the 1970s. The failure of the SBTC for develop countries can be explained by the fact that because those countries are subject to the same technological change, they did not experience an increase in inequality, as we should instead expect. They did not vary in a similar way over time.

tail inequality (Autor, Katz and Kearney 2005). As documented by Lemieux, there are two main different reasons affecting the increase in residual wage inequality over the last decades:

i) The "price" or return to unobserved skills may be increasing over time because of the increase in the demand for skills;

ii) Dispersion could be increasing because of composition effects.

Changes in characteristics[8] affect both the demand and supply of observed and unobserved skills and can alter wage and employment outcomes (Autor and Katz, 1999). Movements in within-group inequality may reflect market forces changing the returns to (unmeasured) skills. Therefore the rise in within group inequality can be interpreted as reflecting a rise in the returns to unobserved skills. Holding market prices constant, changes in labour force composition can mechanically raise or lower overall earnings dispersion by increasing or reducing heterogeneity in observed skills (education and experience).

The link between composition effects and the residual can be explained by the fact that when the level of education of the labour force increases, there are more and more "marginal" workers added to the high-education workers group, creating more unobserved heterogeneity in that group and increasing within-group inequality. Therefore an increase in the supply of more educated workers will immediately benefit workers with more unobserved skills, will also depress returns to schooling while raising within-group inequality. More skilled workers within each education group also benefit from skill-biased technical progress, technical change spurred by the increase in the supply of educated workers will immediately benefit workers with more unobserved skills, raising within-group inequality. Therefore, an increase in the supply of educated workers will depress the returns to schooling, while increasing within-group inequality[9].

An increase in the proportion of the workers with more education and experience can mechanically raise residual wage inequality also because earnings variation is higher for those with college education relative to high school education (Machin, Van Reenen 2007). If immigrants and natives are imperfect substitute within education and experience group, and for the reasons stated above we should expect immigrants to be more heterogeneous than natives within the same group, it may be

[8] Acemoglu (2001) explains that composition effects cannot by themselves explain the recent changes in wage dispersion; but it suggests that inequality among more educated and less educated workers should move in opposite directions.

[9] Mincer (1996) applies a human capital analysis to intra-group wage inequality, measured by variances in log-wages, and their changes over time reveal to the U.S. wage structure changes from 1970-1990. In similar vein to Acemoglu, he provides evidence that within-group inequality is not directly or closely related to between group variances, therefore we can expect difference in movements in the two components of inequality.

tented to think that the increase of immigrants over time might be somewhat connected to the increase in residual wage inequality in the receiving countries.

A number of influential studies (Juhn, Murphy and Pierce (1993) Autor, Katz and Kearney (2005)) focus on this interplay between changes in educational and experience characteristics of the labour force and the evolution of the residual to evaluate how much of the overall increase in wage inequality can be attributed to wage dispersion among workers with the same education and experience; and how much of the increase in residual wage inequality is due to changes in the composition of the work force. The evidence provided is sometimes different, due presumably to different methodologies applied.

Lemieux (2006) concludes that a large fraction of the 1973-2003 growth in residual wage inequality in the United States is due to composition effects, affecting both upper and lower tails of the distribution. In particular he demonstrates that the increase in within wage inequality appears to be a spurious consequence of the fact that work forces became older and more educated over time; in other words the increases in educational level and experience act as a mechanical force on the residual such that the increase in the variance of the residual follows the same sign of the change in composition of work force. This means that changes in education and experience characteristics of the work force determine more variation in wage due to unmeasured aspects of human capital.

There is little existing research on the overall impact of immigration on natives within-group inequality. As far as I am aware the only contribution has been recently provided by Card (2009) who shows that the relative level of residual wage inequality for natives in different skill groups is uncorrelated with the relative fraction of immigrants, however suggesting that immigration has a relatively small causal effect.

4. Econometric Methodology and reweighted approach à la Lemieux.

Since this work mainly seeks to test Lemieux's findings in the immigration context, the methodology and the identification strategy, largely adhere to his original work, although some modifications and adjustments of data sets have been necessary. To assess the contribution of observable and unobservable components of wage dispersion to changes in overall wage inequality, I follow part of the existing literature (Juhn, Murphy and Pierce 1993, Autor and Katz, 1999 Lemieux 2006) which applies the variance decomposition. In addition I treat immigrants and natives as two separated groups.

The econometric methodology of this work is based on two simple steps: the analysis of inequality in the residuals and a reweighting approach to control for composition effects and for increasing supply of immigration in both US and UK.

The residuals are obtained from a standard OLS regression, having the following specification:

(3) $$y_{it} = X_{it}B_t + \varepsilon_{it}$$

Where y_{it} is the log hourly wage of individual I in year t, X_{it} is a vector of observed individual characteristics (education, age and a set of interaction terms between education and age), B_t is a vector of estimated returns to observable characteristics in t, and ε_{it} is the log wage residual depending on unmeasurable skills.

Given the orthogonality of the predicted values and the residuals in an OLS regression, the variance of y_{it} can be written as:

(4) $$Var(y_{it}) = Var(X_{it}B_t) + Var(\varepsilon_{it}).$$

In other words the change in the variance of log wages can be decomposed into the change in the variance in the predicted values (between group inequality) reflecting the contribution of observable prices and quantities; and the change in the residual variance (within-group inequality) measuring the role of unobserved skills.

Changes in the residual variance can be attributed to changes in prices for unobserved skills (p_t^2) and changes in unobservable skills (var e_{it}) if $\varepsilon_{it} = p_t e_{it}$ then

(5) $$var(\varepsilon_{it}) = p_t^2 \, var(e_{it}) .$$

This dispersion can be disaggregated across time and across education and experience groups. Because the information and structure of the data sets used in this work (ORG/CPS, LFS) are somewhat comparable, it is possible to divide workers into 12 education and experience cells based on a group of 3 (similar) education categories (lower, intermediate and high) and 4 potential experience categories 1-10, 11-20, 21-30 and 31+ years.

To control for composition effects, i.e. to assess if and how much changes in the educational level and experience of labour force account for the increase of wage inequality for the whole labour force, as well as for natives and immigrants separately, the variance of the residual is recomputed assigning workers observed at the actual year the same characteristics of workers observed at a given base year; in other words the technique holds the skill composition of the work force (θ_{jt}) constant over time in order to reflect the distribution of characteristics of labour force at a given year.

Assuming[10] that observed skills, x_{jt}, can be divided into a finite number of education-experience groups j; then the (unconditional) variance of the residual $Var(e_{it})$ is directly affected by changes in θ_{jt} (share of workers in experience-education group j at time t) and is linked to the conditional variance σ^2_{jt} by the following:

(6) $$var(e_{it}) = \Sigma\, \theta_{jt}\, \sigma^2_{jt}$$

where σ^2_{jt} represents the conditional variance $(Var(e_{it})|x_{it})$ so changes in the education-experience cell shares will correspond to changes in the residual variance. Since the conditional variance in wages V_{it} is linked to the conditional variance of unobserved skills by the following:

(7) $$V_{it} = p_t^2\, \sigma^2_{jt}$$

Where p_t captures the returns to unobserved skills (e_{it}) it follows that σ^2_{jt} also increases as a function of experience and education. Only when the variance of unobserved skills remains constant over time, can changes in residual variance be interpreted as evidence of changing skill prices p_t.

Holding the characteristics of the labour force constant at a base year, can be done by constructing a counterfactual weight, expressed as $(1-\omega_i)/\ \omega_i$, where ω_i is the predicted probability for each worker observed at time *t* to be in the base year *s*. This probability is obtained by applying a logit model conditioning on the characteristics (education and age) of the workers. The magnitude of the weight depends therefore on the characteristics of workers observed at the year *t* compared to the characteristics of workers observed at a given base year *s*. For example the predicted probability of lower educated workers observed in a year characterized by a higher level of education of workforce, will be small therefore the counterfactual weight $(1-\omega_i)/\ \omega_i$ will give more to lower educated workers in the later years. Similarly the weight would give less weight to observations of higher educated individuals in the later sample years.

In this way, by holding the distribution of skills constant over time, it is possible to compute a counterfactual variance i.e. the variance of the residual that would prevail if the distribution of skills of workers remained constant at their base year value. The difference between the counterfactual variance and the actual variance shows how much the composition of the labour force accounts for the evolution of the observed residual. By applying this methodology to natives only, the counterfactual variance will take into account not only changes in characteristics of the labour force but it will also consider what would have happened did immigration not occur.

Formally the residual variance needs to be written as a function of the variance of wages, V_{jt} within each skill group j:

[10] This part follows Lemieux (2006).

(8) $$Var(\varepsilon_{it}) = \Sigma\theta_{jt} V_{jt}$$

holding constant the skill distribution of workers (θ^{*}_{jt}), the counterfactual residual variance can be written as:

(9) $$V_t^{*} = \Sigma\theta^{*}_{j} V_{jt}$$

Working in this way will help understand whether the composition effect is driving changes in the residual variance; in particular when the composition of the work force is held constant, any increase in the residual variance can be interpreted as an increase in skill prices p_t.

If one assumes that the causal effect of higher immigration depends on the fraction of immigrants in the labour market, controlling for the increasing supply of this share should help to disentangle the effect of immigrants on the residual wage inequality.

Controlling for increasing supply of immigration can be done by following the same methodology, constructing a weight and in the spirit of DiNardo, Fortin and Lemieux (1996) adding a dummy variables for the state of immigrant as well as interactions terms. This would allow constructing another counterfactual: "what would have happened to the residual wage inequality of the labour force had the share of immigrants remained constant at a base year".

4. Data

The analysis is based on two pooled time series, cross-sectional micro data sets: Outgoing Rotation Group (ORG CPS) for the U.S. and the Labour Force Survey (LFS) for the UK. Both data sets cover the same period (1994 to 2006) contain same information of interest on wage and immigration, and are sufficiently large to analyse minority population.

Current Population Survey is a monthly household survey conducted by the Bureau of Labor Statistics to measure the labour force participation and employment. The survey provides individual data for about 30,000 individuals each month. Every household that enters the CPS is interviewed each month for 4 months, then ignored for 8 months, then interviewed again for 4 more months. Usual weekly hours/earning questions are asked only at households in their 4^{th} and 8^{th} interview. These outgoing interviews are the only ones included in the extracts. New households enter each month, so one fourth of the households are in an outgoing rotation each month.

One of the main advantages of the ORG CPS is that it provides point-in-time measures of usual hourly wage for 60 per cent of the sample; the remaining non-hourly wage can be easily calculated as the ratio of earnings to hours. I kept real hourly wage between $1 and $100. One of the main issues addressed when working with ORG CPS dataset, relates to the top coded earnings. In the release of data available to public, the Census Bureau restricts the top of the earnings distribution at $99.999 a year. This means that all earnings above that level appear in the CPS public use as $99.999, whatever their actual earnings are. This top coding can lead to bias in the measurement of trends in earnings inequality if the proportion of earning so affected changes over time, in particular will lower the mean and the variance of the wage data relative to the true mean and variance. I adjust for the top coding issue by using the log-normal approach recommended by Schmitt (2003). Contrary[11] to the existing procedure usually applied, the log-normal procedure models the entire distribution, not just the "top" portion of interest, under the assumption that the entire distribution of earnings is log-normally distributed. The properties of the log-normal allow for the straightforward estimation of the mean and variance of the "true" distribution, even though the estimates of the mean above the top-code that are consistently below those generated by these versions of the pareto approach.[12]

The LFS is very similar to the U.S. Current Population Survey in terms of its purpose- measuring labour market activity and unemployment on a timely fashion-; sample size and because, similarly to CPS, LFS provides point-in-time hourly wage for the great part of the sample.

The Labour Force Survey (LFS) is the largest survey of household living at private addresses and in NHS accommodation in the UK, conducted by the Office for National Statistics (ONS).

Information is recorded in four quarters; each quarter's LFS sample of 53,000 UK households is made of five "wave" each of approximately 11,000 private households. Each wave is interviewed in five successive quarters, earnings information are only recorded in wave 1 and 5. A single stage sample of addresses with a random start and constant interval is drawn from the Postcode Address File (PAF) sorted by postcode. To limit the effect of outliers, following the existing literature in the UK (Manacorda, Manning, Wadsworth 2006), I only keep observations with an hourly wage between one and hundred pounds in 1994 pounds. In the same manner as for the CPS for individual whose wage is only recorded weekly, I derive an hourly wage by dividing weekly wage by the usual amount of hours worked per week.

[11] Great part of existing literature on wage inequality (Lemieux 2006, Katz and Autor 1999, Autor, Katz and Kearney 2005,2007) address the top coding issue adjusting it by multiplying top coded wages by a factor of 1.3 or 1.4 which is believed to provide estimates of the mean and the variance that are closer to their true values.

[12] For details see John Schmitt (2003): "*Creating a consistent hourly wage series from the Current Population Survey's Outgoing Rotation Group, 1979-2002*"

Real wages for the UK are obtained by deflating nominal wages with Retail Price Index. For the sake of comparability with the United Kingdom, wages measures for the United States are deflected using Consumer Price Index.

The samples used for estimations are men and female, separately in the labour force, meaning men and women aged 16-64 for the U.S. and aged 16-60 and 16-64 respectively for English women and men. I limit the analysis to workers, who are employees, full time[13] considering only their main job. I define as an immigrant someone who was born outside the United States and United Kingdom, irrespective of the time of age on arrival.

All results derive from separate regression for men and women, respectively all workers, natives, immigrants, by using the log hourly wage on a set of dummies for age, education and interactions between education and a quadratic in age.

One of the main issues arising when aggregating immigrants and natives using same level of education is that, due to the heterogeneity educational systems there is not a one-to-one correspondence in years of schooling. In order to keep the analysis as consistent as possible, the classification criterion I apply is the highest educational qualification which is common to the two countries and whose information is available in all datasets.

One problem arising for LFS is that foreign educational qualifications are classified in the "other" category. As explained by MMW (2006), there is a good reason to believe that many of immigrants in the "other" category actually have quite high levels of educations. The LFS has another alternative definition of educational level: age at which individuals left full time education; to create comparable educational categories for the UK data I combine both information on "age left school" and "other".

The similarity between U.S. and UK schooling system allows creating 3 educational categories which are pretty similar:

The lower education group includes workers who have completed compulsory qualification i.e. less than a lower secondary education; for both the U.S. and the UK this group corresponds to 0 to 11 years of schooling. Intermediate category gathers workers with qualifications that are in between the high school dropout and the degree (both excluded). In both countries analysed this corresponds to any qualification with years of schooling equal or greater than 12 and less or equal to 15 years of schooling. The educational group "high" in all cases refers either to graduate or postgraduate earned qualification and correspond to 16 or more years of schooling.

[13] The use of full time workers only is meant to eliminate variation associated with hours per week or weeks per year (Katz and Murphy, 1992; Lemieux and Card, 2001).

The variable years of potential labour market experience is conventionally derived as Age – Years of completed Education- the age at which children start school. Workers are aggregated into four-year experience intervals (0 –10; 11-20; 21-30, 31+). Based on the three education categories (lower, intermediate and high) and the four experience categories, workers can be classified into one 12 skill groups[14].

5. Results

5.1 Characteristics of immigrants and natives.

Figure 1 to 4 outline the composition of the workforce and its changing over time in the UK and U.S; as shown in the first column of table 1 in both countries the number of immigrants increased, especially in the UK where the share of immigrants in the labour force increased from 0.05 in 1994 to 0.13 in 2006; similarly in the US the corresponding increase ranges from 0.09 in 1994 to 0.14 during the last year of the sample. The area of origins of immigrants is displayed in table 2; rising immigration is also associated with a change in the origin mix; in the U.S. the trend is for more immigrants from the Americas at the expense of Europe; for the UK the reverse is true with almost half of immigrants coming from Europe while the share of Americans decreased over the sample period. The increase in 2006 of Europeans in the UK probably reflects the arrival of polish after the 2004.

Table 3 reports the educational characteristics of the labour force; a couple of facts immediately emerge from the table; compared to the UK the U.S. labour force is on average characterized by the lowest share of low educated workers (around 0.08 and 0.09); it also appear to be more educated then the UK at the beginning of the sample year. About one third of the UK labour force is low educated, while although characterized by a lower proportion of high educated workers in 1994, it raises from 19 percent of the labour force in 1994 to 30 percent in 2006. In addition most immigrants to the U.S. are relatively less educated, 31 percent of male immigrants in the whole sample compared to 0.07 percent of male natives; in contrast the mix of immigrants to the UK has become much more educated over time; in 2006 almost half of the immigrants to the UK have a high level of education compared to 24 and 30 percent respectively for male and female natives.

[14] In the original data Lemieux defines 20 education and experience group based on 5 education groups and 4 experience groups. The education groups are high school dropouts; college; some college; post graduate and high school college. These 5 groups have been clustered into 3 to generate 3 educational groups consistent through the three countries.

5.2 Wage dispersion for immigrants and natives

The pattern and the evolution of wage dispersion in the two countries are shown from Figure 1 to 4 together with table 4; the results are displayed for all workers as well as immigrants and natives separately. Figure 1 and 2 use as measure of dispersion of wage inequality the standard deviation of the log hourly wage of workers. The first remarkable fact is that for all workers, represented by the plain line in the graphs, the level of wage inequality in the U.S. is higher than that in the UK and this appear to be true both for men and women; in 1994 the standard deviation of log hourly wage for men in the U.S. was 0.549 compared to 0.530 for those in the UK, for women the level is lower but still wage dispersion in the U.S. (0.511) overcomes that in the UK (0.493).Similarly both countries experienced an increase during the period analysed although the increase is higher in the U.S. (+ 0.017 for men and + 0.012 for women) than the UK (+0.007) where women present a slight decrease (-0.003). When separating immigrants and natives some differences arise: in all cases the level of wage dispersion compared to overall labour force decreases but the trends do not change that much, in particular figure 1 and 2 also depict the counterfactual wage dispersion for the overall labour force in the absence of immigration; had immigration not occurred wage inequality of natives in both countries would have increased anyway, albeit at a lower level. This description confirms existing results i.e. the presence of immigrants cannot be considered partially responsible for the increasing level of wage inequality in both U.S. and UK.

Another message deriving comparing immigrants and natives working in the same labour force, relates to the remarkable differences arise in wage inequality. The dashed line in figure 3 and 4 representing immigrants, shows that in all cases foreign-born workers suffer for more wage dispersion than natives; immigrants in the UK experienced the highest variation in wage during the sample year especially in 1998; while more variation occurs between male immigrants and natives in the UK, in the same country less variation characterises the trends of female immigrants and natives. Considering the 90-50 wage gap and 50-10 wage gap as displayed in Table 4, for male workers in the U.S. 90-50 log hourly wage gap increases over the sample period for all workers, immigrants and natives both for men and women; similarly for workers located in the lower path of the wage distribution, wage dispersion decreases from 1994 to 2006 but immigrants experience the highest decrease. Female workers located in the lower path of the wage distribution do not display any decrease in wage dispersion, in fact there is a slight increase, and it's higher for female immigrants. For the UK 90-50 log hourly wage gap, follows a different direction for men and women; the former experience an increase in wage dispersion which is higher for immigrants; the latter are instead affected by an overall decrease in wage inequality. More similarities are displayed for workers

located in the lower path of the wage distribution: in all cases wage dispersion decreases, the highest decrease is displayed for male immigrants.

Figure 3a and 4a plot the residual variance of log wage for all workers (male and women separately) and the share of immigrants. Figure 3a compares the trends for male workers in the US and UK; while the level of residual wage inequality has been (relatively) increasing during the year sample, both for the US and UK the share of immigrants has been constantly increasing, at a higher pace for the UK although the presence of immigrants in the country is higher in the US. The results are qualitatively similar for women, except that women immigrants in the UK are more numerous than male. The correlation between residual variance of all male workers and the share of male immigrants is 0.467 for the U.S. and 0.304 in the UK; while the correlation between residual wage variance for all women and share of immigrants is 0.564 in the UK and 0.313 for the US.

5.3 Residual inequality, composition effect and the increase in immigration.

This section presents the main results for residual hourly wage inequality for U.S. and UK; table 5a presents the decomposition of total wage variation into different components (between and within-variance) analysing all workers, natives and immigrants separately.

In addition to changes in residual variance table 5b displays the related effect of changing characteristics of the labour force and increasing share of immigrants comparing results for the whole labour force (immigrants and natives together) and for natives only. Between 1994 and 2006 change in total wage variance in the U.S. is more than double than it is in the UK, and this is valid for both men and women. In all cases over the period analysed the residual component accounts for most of the variation observed in the total wage variance. When considering natives only the overall variation in wages decreases a bit (by 0.003 log points for male workers in the U.S. and 0.004 log points for male in the UK; 0.004 log points and 0.003 for female workers respectively in the US and the UK). Despite this decrease in the total wage variation when immigrants are not counted in the labour force, residual not only still accounts for most of the deviation but the contribution of the residual increases; for example for the U.S. residual variance of natives only accounts for roughly 68% of the change for men and 63% for women (versus respectively 42 and 53 for all workers). However when the distribution of skills characteristics of the labour force is held fix at its 1994 level, the remaining growth of the residual variance accounts for a small share. The results hold both for men and women, for natives and all workers in both the US and the UK. For example when controlling for the distribution of skills for the U.S. the residual component accounts only for 17% and 31% for male workers respectively for natives in the U.S. The role of this component drops further once share of immigrants is also held fix at 1994. In general once both distribution of skills

and the share of immigrants are held fix at 1994, the role of the residual components ranges from 0.05 to 0.10 for natives and up to 19% for all workers. This evidence confirms the findings of Lemieux (2006) when analysing separately natives and all labour force. Although the composition effects still explains most of the growth in the residual for natives and all labour force, the results also suggest that the presence of immigrants also plays a role in explaining the growth in the residual variance observed, albeit for a small share. On average the effect of immigration on residual variance ranges between 5% and 15%. Consistent with Card(2009) the effect is small but not causal.

Figure 3 and 4 plots the trends and levels of the residual wage inequality[15]; the residual variance has been calculated separately from three different regressions respectively for the whole labour force, natives and immigrants. Although the level of the residual variance is higher in the U.S. than in the UK both for men and women, the change for the overall labour force between 1994 and 2006 is positive in both countries for men and women in the U.S: (0.008 and 0.008 respectively) in addition to the positive increase UK experienced a higher increase during the overall sample (0.013 and 0.014). Again wage dispersion of immigrants is higher than natives, especially for the UK, with the bulk of the increase for foreign-born immigrants working in the UK occurring between the end of 1990s and the beginning of the 2000s; the difference in the residual wage dispersion between natives and immigrants may reflect the findings of Ottaviano and Peri (2006) and MMW (2006) proving the imperfect substitution, due presumably to difference in unobservable skills. As explained in part 2 immigrants may differ from natives because of their difference in unobservable skills.

Two main features characterise the residual wage inequality: since 2002 residual wage inequality for male immigrant workers in the U.S. converges to that of natives and therefore to the general trend of the labour force suggesting an assimilation and integration process in the U.S. not occurring in the UK. When performing the analysis for natives only, wage inequality is lower than it would be when accounting for immigrants although the trend remains almost unchanged. In similar vein to the recent interpretation of Card (2009) this suggests that immigration can be said to have contributed to the rise of inequality in the workforce albeit for a small share and even if it has no effect on the inequality of native wages.

Figures 5 to 10 present the results of the counterfactual reweighting approach proposed by Lemieux that helps to account for the role of composition effects and the share of immigrants on changes in residual wage inequality. The figures compare for each country, separately for men and women, and for natives and immigrants, the actual residual variance from 1994 to 2006 to the counterfactual

[15]Wage residuals are obtained from a series of regression model fit separately by gender, immigrant status and year. The models include controls for education, experience, and interaction terms. When including control for countries of origin, the main results do not change too much. On average the residual obtained when adding the control for area of origin is 0.002 lower than the one obtained when controlling for human capital variables only.

variance that would have existed if the distribution of skills had remained at the same level of the initial (1994) or the final (2006) year. The composition effect is represented in the figures by the distance between the actual variance and the counterfactual variance (residual holding skills at 1994 or 2006).

When the distribution of skills is held at its 1994 level, the composition effect appears to play a central role for both the U.S. and the UK for which the great part of the growth in residual can be explained by the changes in education and experience composition.

The results are consistent with Lemieux (2006) confirming that the fact the labour force has been increasing more educated and older, also increases the role of unobservable skills of workers. If workforce had 1994 characteristics, the level of the residual would have been lower, suggesting that composition effects exerted an upward force on residual inequality.

Figure 7 and 8 show the results when the reweighted approach is performed by removing immigrants from the labour force; this should give the counterfactual variance of natives if immigration would not occurred and the level of education of the natives only would be remained constant at the base year; the figures prove that the patter in residual wage inequality observed for native in both U.S. and UK is mainly due to changing characteristics of natives, while the increased supply of immigrants does not account too much. When running the analysis on immigrants treated as a separated group, figures 9 and 10 shows that the effect of composition is less evident for male immigrants particularly for those in the U.S., while the performance of female immigrants is qualitatively more similar to natives, since changes in characteristics in education and experience account for the increase in residual wage inequality observed.

5.4 Residual wage inequality: upper and lower wage gap.

This section looks at alternative measures of wage inequality, specifically the 90-50 and 50-10 residual gap, comparing the actual residual and the residual computed holding distribution of skills at their 1994 characteristics, to understand how much change in residual as well as composition affect all workers, native and immigrants separately at different tails of the distribution.

Looking at the evolution for the 90-50 gap of male workers, figure 11a and 11b show that residual wage dispersion for workers located at the upper path of the tail distribution has been increasing for the workforce in both countries; in both cases the evolution of the upper tail residual wage inequality

for immigrants differ from natives; by contrast to natives, wages dispersion for immigrants in the UK gaining more decrease over time; for those in the U.S. even though some decrease occurs during the 2000s, the level of 90-50 residual gap is roughly the same as in the initial year.

Considering the overall female labour force, results are qualitatively similar to men but differences arise for female immigrants in both countries: unlike male immigrants, female immigrants in the UK experience over time an overall increase in the 90-50 residual gap and even bigger that natives; similarly in the U.S. female immigrants experience an increase in the 90-50 residual gap which overcomes that of male in the same group. Considering the lower paid workers, the evolution of the residual variance presents more similarities across groups (all workers, natives and immigrants) and between the two countries; in fact the 50-10 residual gap is characterised by a general decrease over time which appears to be more striking for immigrants and a similar slight increase during the last years.

Consistent with the results of the previous section, the effects of composition appear to be more important for natives than for immigrants and accounting more for female immigrants in the U.S.; changes in composition characteristics of immigrant in the UK exert almost no effect on better workers, while it shows a more important effect on female immigrants in the UK on both upper and lower tails of the wage distribution, suggesting that composition effect plays a more important role for female immigrants in both countries, while male immigrants are less affected by those changes.

5.5 Residual wage inequality by group of education

This section presents the evolution of the residual wage inequality for all workers, natives and immigrants by looking at educational level; as discussed in the descriptive session of the data I define three groups of education: lower, intermediary and high.

There are several features worth noting when analysing all male workers; the level of the residual by group of education is higher in the U.S. than in the UK for both the high educational and intermediate group while lower educated workers experienced more inequality in the UK than in the U.S.; compared to the other groups in the UK lower educated workers also suffer from higher inequality. The situation reverses in the U.S. where the degree of inequality decreases with the level of education, in other words the more educated the workers are the higher is the residual wage dispersion while the less educated experience lower level of residual wage dispersion.

Comparing natives and immigrants in the same educational group, confirms the main message of the previous results: removing immigrants from the labour force does not change the leading trend observed for all workers, the only slightly difference appear in the level.

Remarkable differences arise between immigrants and natives; the former encounter a higher inequality as well as more variation than the latter in the same educational group, the only exception is for the group of lower educated immigrants in the U.S.; in this case the trend and level of residual wage inequality converges to that of natives; on the other hand their level of wage dispersion is slightly lower than natives. This convergence may suggest that lower educated immigrants and natives in the U.S. are more complement not only in the observable as it has been shown by recent literature (Ottaviano and Peri 2006) but they also appear to be substitutable in the unobservable, meaning that these workers compete for similar jobs more than others. This result may also depend on the composition of the immigrants since this group is less heterogeneous than the others in fact the lower educated group of immigrants is mainly composed by Mexican.

By contrast to the US the higher variation in wage affects low educated immigrants working in the UK while on average better educated workers experience less variation, albeit still characterised by a different trend. Considering the overall changes overtime, in the UK both high and intermediate educated immigrants experience an overall decrease in the residual wage inequality, while it increases for lower educated during the last years of the samples.

Results for female workers follow qualitatively those of male except that the level is lower in both the U.S. and the UK.

5.6 New and old immigrants.

This section presents the results by separating immigrants in two groups: old and new immigrants. I define new immigrants as those who arrived in the receiving countries at the year of the interview in the last five years, and old immigrants as those who are in the receiving country since 6 years or more.

Figure 16, 17 and 18 present respectively the standard deviation, the 90-50 and 50-10 log hourly wage gap for old and new immigrants in the U.S. and UK for men and women. The first aspect worth noting is that according to the time spent in the receiving country they experience differences in wage inequality; after they spent some years in the receiving country they assimilate to immigrants who were already there but not to natives. By looking at the standard deviation of male and female in the two countries analysed, new immigrants suffer for more variation both than old immigrants and natives; one exception is for male immigrants in the U.S. whose wage dispersion is not so different from the old immigrants; and new female immigrants in the U.S. experience less dispersion than old immigrants. For immigrants in the UK both for men and women wage dispersion of new immigrants

is higher than old immigrants. The results are consistent with a recent evidence from DFP (2008) who show that recent immigrants downgrade upon their arrival in the receiving country, or new immigrants presumably do not allocated themselves in the occupation according to their educational level, given essentially to lack of knowledge of the labour market, weak knowledge of the language.
Different patterns are shown when considering old and new immigrants in the upper and lower path of the wage distribution.
As shown by figures 17a and 17b, immigrants who gain more face a worse situation upon their arrival since experiencing a higher wage variation than existing similar immigrants. And this appears to be true for men and female in both countries. When looking at immigrants located at the lower path of the wage distribution, main differences arise between U.S. and UK: in the U.S. immigrants generally earnings less face a better situation since they arrive, and after spending some years in the hosting country wage dispersion increases but stays sometimes lower than natives. Lower paid immigrants in the UK follows similar path than better paid ones.
Results for the actual residual (Figure 19a and 19b) are pretty similar to the patterns and trends of the standard deviation presented earlier: more similarity appears between old and new male immigrants in the U.S.; higher dispersion at the beginning of the period spent in the country. Similar results are confirmed by looking at the upper and lower residual variance: again new lower paid immigrants in the U.S. get better than old and natives in terms of wage inequality.

6. Conclusion

In this paper addressed empirically the question of whether immigrants in the U.S. and the UK could have affected residual wage inequality between 1994 and 2006. As far as I am aware, except a recent study of Card (2009), almost no attention has been devoted to the role of unobservable skills of immigrants related to wage inequality. By applying Lemieux's methodology (2006) this paper controls for changing characteristics of both natives and immigrants. In line with Card's findings, results show that the presence of immigrants does not have a causal relation with the increase of residual inequality. Even when treating natives and immigrants as two separated groups, the trend of residual variance inequality for natives does not change that much, suggesting that inequality for natives is not due to the unobservable skills of immigrants acting in the same labour market.
However when the share of immigrants in the labour force is held fix at the base year, the role of the residual components ranges from 0.05 to 0.10 for natives and up to 19% for all workers. Although the composition effects still explains most of the growth in the residual for natives and the whole

labour force, the results also suggest that the presence of immigrants plays a role in explaining the growth in the residual variance observed, albeit for a small share. On average the non-causal effect of immigration on residual variance ranges between 5% and 15% of the observed change between 1994 and 2006.

Remarkable differences are displayed when considering immigrants and natives separately, especially by comparing them in similar education groups. More generally immigrants suffers from more wage dispersion than natives in both UK and U.S.; even though wage inequality in the U.S. is higher than in the UK, the reverse occurs for immigrants that seems to get worse in the European country. Lower educated immigrants in the U.S. appear to be more similar in terms of wage dispersion than the peer group in the UK, suggesting that they are more substitutable in terms of unobservable skills. Finally differences arise between new immigrants, especially when better educated, and those who spent already some years in the receiving country; the former suffer from more wage dispersion than old immigrants but as time goes they assimilate to those who were already there but never to natives.

APPENDIX

One of the aims of this paper is to account for the unmeasured aspects of human capital; due to the difficulties in investigating this by following the limited literature (Lemieux 2006, Moav and Gould 2008) this paper uses as a proxy for unobservable skills the residual of a standard Mincer equation; in other words to interpret the residual as the unmeasured aspect of human capital I model the specification only on age, educational level (years of schooling) and experience.

As a sensitivity check of my results, I recomputed the results for all workers, natives and immigrants by adding other controls. As it should be expected the level of the results slightly decreases, nevertheless the trends do not change in any case and even more importantly the distance in wage inequality due to residuals between natives and immigrants remains unchanged.

Some results[16] for male and female residual variance for the U.S. are given in the appendix. The line indicated as “Residual 1” refers to the original specification; the others two “Residual “ and “residual 3” add respectively other control such as country of origin, immigration/natives status when considering all workers, union and years spent in the U.S. for immigrants.

[16] Other results for the sensitivity check may be available on request from the author.

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Table1. Proportion of immigrants in the labour market (full time, employed, main job)

	All	Men	Women
U.S.			
1994	0,09	0,10	0.08
2006	0,14	0,15	0,12
UK			
1994	0,05	0,06	0,07
2006	0,13	0,14	0,15

Notes: Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year , employed and main job only.

Table 2. Area of Origin of immigrants to United States and Great Britain, 1994-2006

U.S.	1994	2006
Europe	0.13	0.11
Asia	0.25	0.25
Africa	0.14	0.031
Americas	0.46	0.58
Oceania	0.003	0.005
Other	0.014	0.028
UK		
Europe	0.39	0.52
Asia	0.26	0.203
Africa	0.16	0.17
Americas	0.13	0.07
Oceania	0.05	0.036
Other	0.02	0.006

Table 3. Educational Attainment of Natives and Immigrants

	Natives		Immigrants	
	Men	Women	Men	Women
A.**US**				
Lower Ed				
1994	0,08	0,05	0,29	0,22
2006	0,06	0,04	0,31	0,21
Intermediate				
1994	0,64	0,67	0,43	0,51
2006	0,63	0,63	0,43	0,47
Higher				
1994	0,28	0,27	0,27	0,27
2006	0,31	0,28	0,27	0,33
B. **UK**				
Lower Ed.				
1994	0,28	0,43	0,21	0,25
2006	0,27	0,40	0,21	0,20
Intermediate				
1994	0,55	0,39	0,37	0,34
2006	0,49	0,37	0,29	0,27
Higher				
1994	0,18	0,17	0,42	0,41
2006	0,24	0,30	0,50	0,54

Notes: Based on ORG/CPS and LFS. Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year and main job only.

Table 4a. Wage dispersion in the U.S. and UK

	U.S.			UK		
	Standard deviation	90-50	50-10	Standard deviation	90-50	50-10
		Males				
A. All workers						
1994	0.549	0.686	0.721	0.530	0.705	0.630
1998	0.542	0.694	0.700	0.538	0.729	0.611
2006	0.566	0.743	0.697	0.537	0.738	0.602
B.Natives						
1994	.0538	0.673	0.698	0.526	0.703	0.621
1998	0.530	0.653	0.693	0.532	0.723	0.603
2006	0.553	0.704	0.658	0.529	0.727	0.597
C. immigrants						
1994	0.600	0.876	0.693	0.584	0.760	0.776
1998	0.588	0.901	0.584	0.616	0.833	0.722
2006	0.596	0.959	0.559	0.588	0.868	0.623
		Females				
A. All workers						
1994	0.511	0.692	0.598	0.493	0.686	0.580
1998	0.497	0.674	0.611	0.483	0.667	0.561
2006	0.523	0.729	0.597	0.490	0.673	0.543
B.Natives						
1994	0.503	0.682	0.591	0.491	0.678	0.577
1998	0.491	0.671	0.573	0.482	0.667	0.558
2006	0.515	0.705	0.593	0.485	0.669	0.534
C.Immigrants						
1994	0.552	0.786	0.579	0.510	0.701	0.633
1998	0.538	0.814	0.546	0.495	0.633	0.600
2006	0.571	0.890	0.590	0.522	0.683	0.613

Notes: Based on ORG/CPS and LFS. Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year and main job only. Hourly wages are reported in 2006 dollars and pounds.

Table 4b. Change in Wage inequality for US and UK, male 1994-2006

	U.S.			UK		
	Standard deviation	90-50	50-10	Standard deviation	90-50	50-10
Males						
A. All workers						
1994-2006	0.017	0.057	-0.024	0.007	0.033	-0.028
B. Natives						
1994-2006	0.015	0.031	-0.04	0.003	0.024	-0.024
C. Immigrants						
1994-2006	-0.004	0.083	-0.134	0.004	0.108	-0.153
Females						
A. All workers						
1994-2006	0.012	0.037	-0.001	-0.003	-0.013	-0.037
B. Natives						
1994-2006	0.012	0.023	0.002	-0.006	-0.009	0.043
C. Immigrants						
1994-2006	0.019	0.104	0.011	0.012	-0.018	-0.02

Notes: Based on ORG/CPS and LFS. Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year and main job only. Hourly wages are reported in 2006 dollars and pounds.

Table 5a. Wage decomposition

	1994-2006 *UK*			1994-2006 **U.S.**		
	Natives	Immigrants	All workers	Natives	Immigrants	All workers
A. Men						
Actual Residual	0,006	0,001	0,013	0,011	-0,012	0,008
Predicted Value	-0,004	0,004	-0,005	0,005	0.007	0,011
Total wage variance	0,003	0,005	0,007	0,016	-0,005	0,019
B. Women						
Actual Residual	0,010	0,016	0,014	0,007	0,001	0,008
Predicted value	-0,015	-0,003	-0,016	0,004	0,021	0,007
Total wage variance	-0,005	0,013	-0,002	-0,247	0,022	0,015

Notes: Based on ORG/CPS and LFS. Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year and main job only. Hourly wages are reported in 2006 dollars and pounds. Residual wage variance is based on standard Mincer wage equation, fit separately by year, gender, immigration status.

Table 5b. Changes in Residual Variance and Composition Effects of log hourly wages

	U.S.		UK	
	Natives	All Workers	Natives	All Workers
A. Men				
Actual Residual	0.011	0.008	0.006	0.013
Skills at 1994	0.005	0.00	-0.005	-0.001
Skills and Share of Immigrants at 1994	0.003	0.001	-0.005	-0.005
Total Wage Variance	0.016	0.019	0.003	0.007
B. Women				
Actual Residual	0.007	0.008	0.010	0.014
Skills at 1994	-0.0003	-0.0002	0.001	0.002
Skills and Share of Immigrants at 1994	-0.001	-0.001	-0.001	0.0004
Total Wage Variance	0.011	0.015	-0.005	-0.002

Notes: Based on ORG/CPS and LFS. Samples include people aged 16 or older with positive potential experience; working full time, full year and main job only. Hourly wages are reported in 2006 dollars and pounds

Figure 1 Standard Deviation for Men, US and UK. 1994-2006

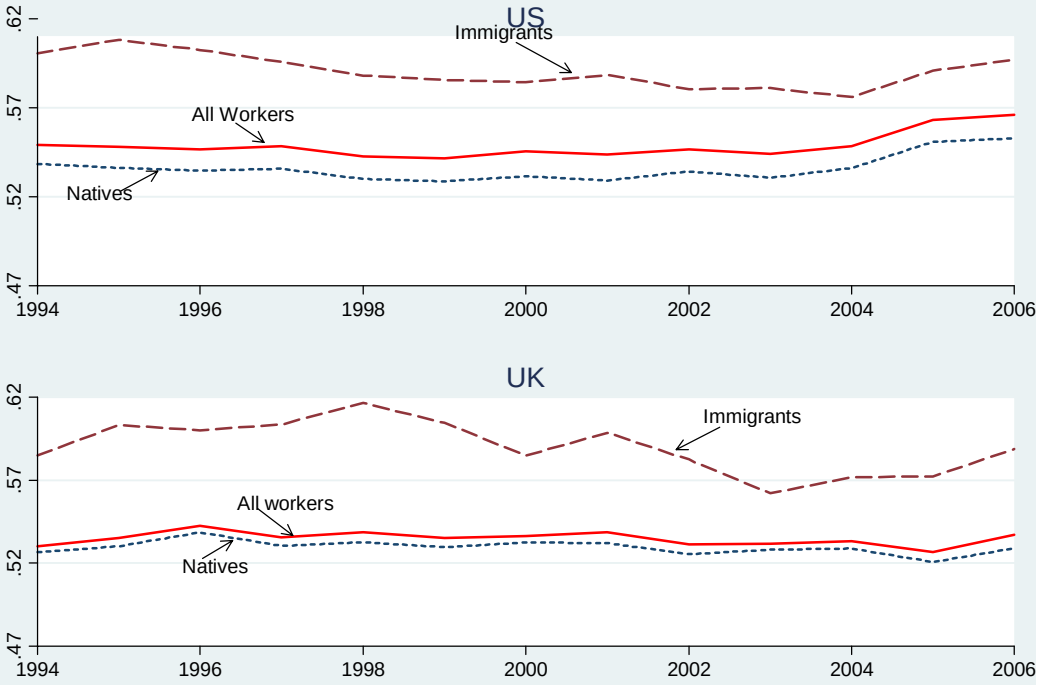


Figure 2.Standard Deviation for Women US and UK, 1994-2006

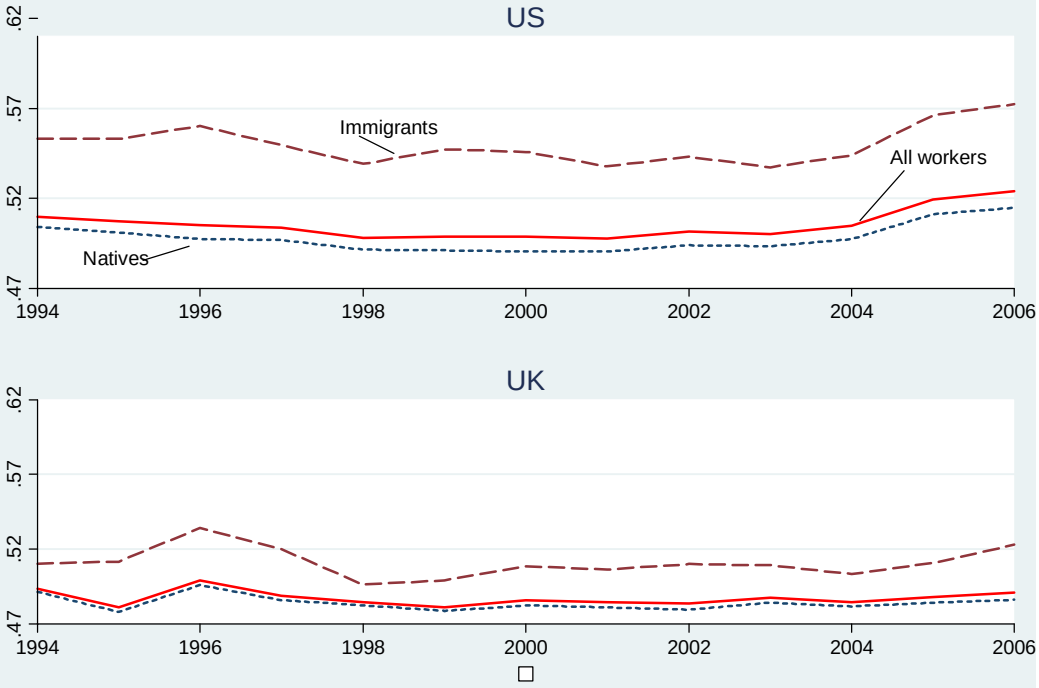


Figure 3a. Residual variance and Share Of Immigrants

Male workers,

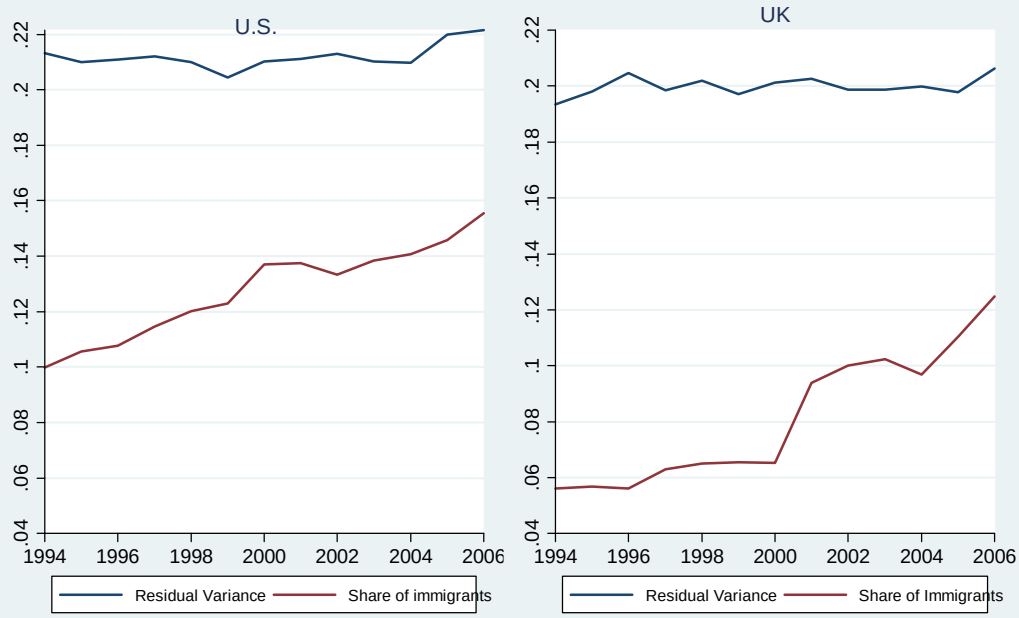
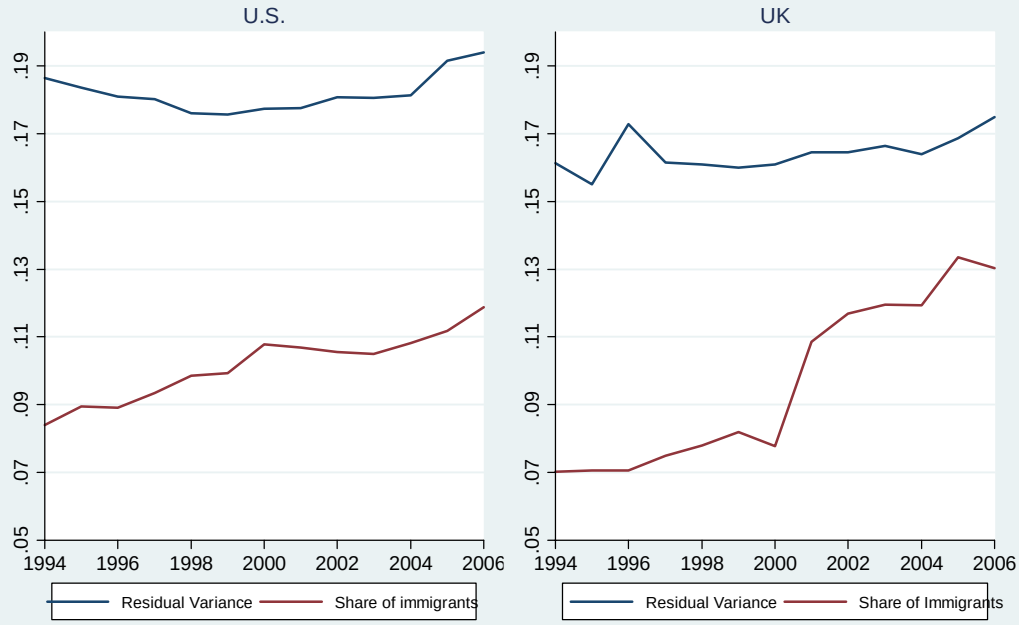


Figure 4a. Residual Variance and Share of Immigrants

Female Workers



Notes: Based on ORG/CPS and LFS. Samples include people aged 16 to 60 for men and 16 to 65 for women with positive potential experience; working full time, full year and main job only. Hourly wages are reported in 2006 dollars and pounds. Residual wage variance is based on standard Mincer wage equation, fit separately by year, gender, immigration status

Figure 3.Residual Variance for All workers, Natives and Immigrants. Men 1994-2006

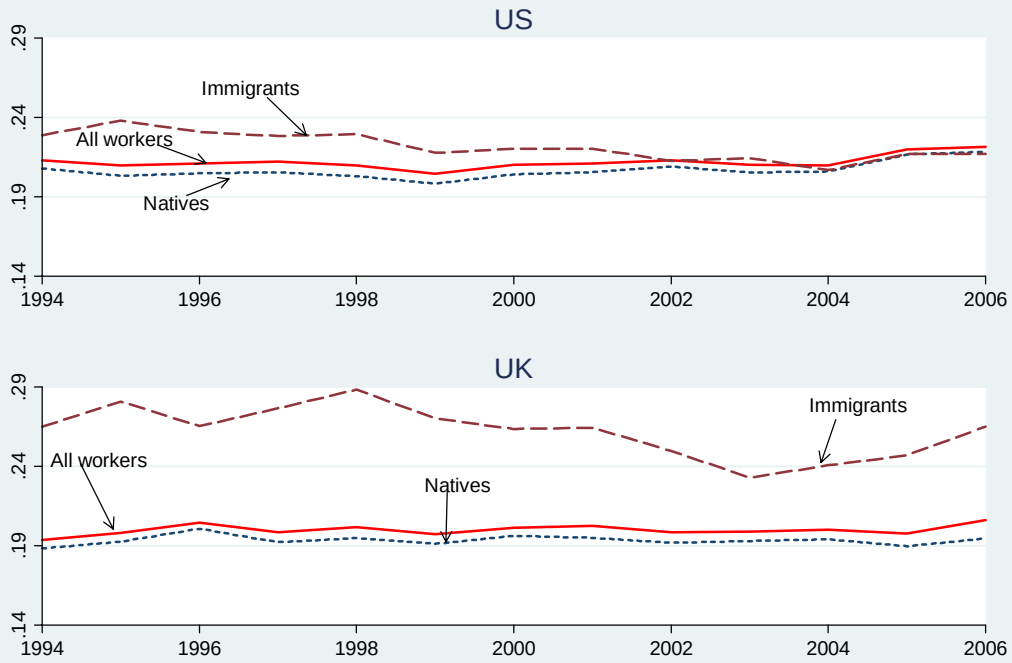


Figure 4.Residual Variance for All workers, Natives and Immigrants women, 1994-2006

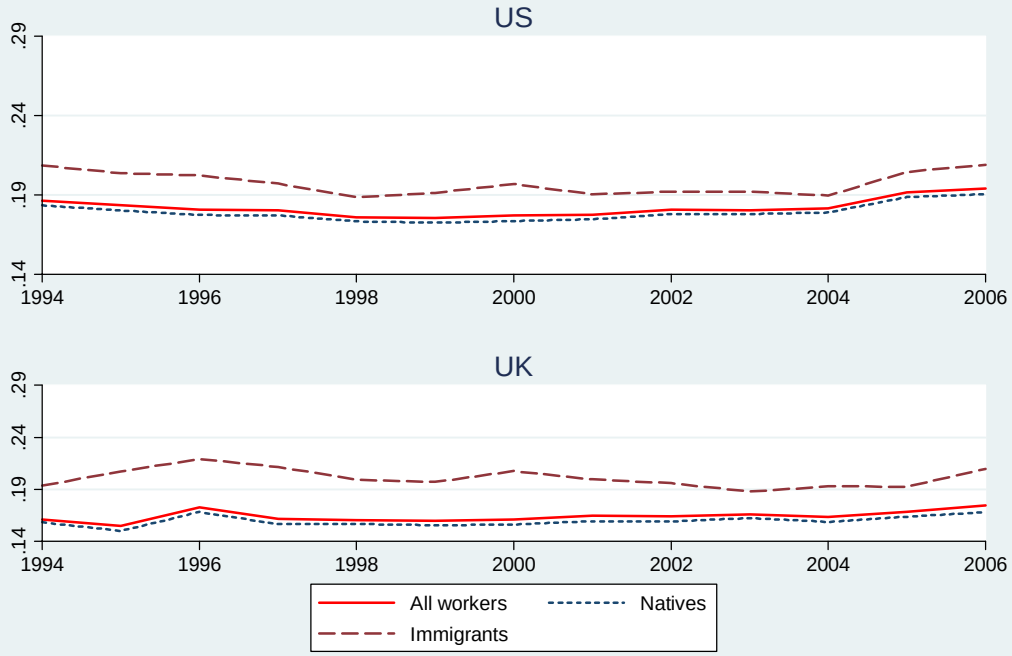


Figure 5a. Residual Variance, Composition Effects and Share of Immigrants at 1994

All Workers, Male

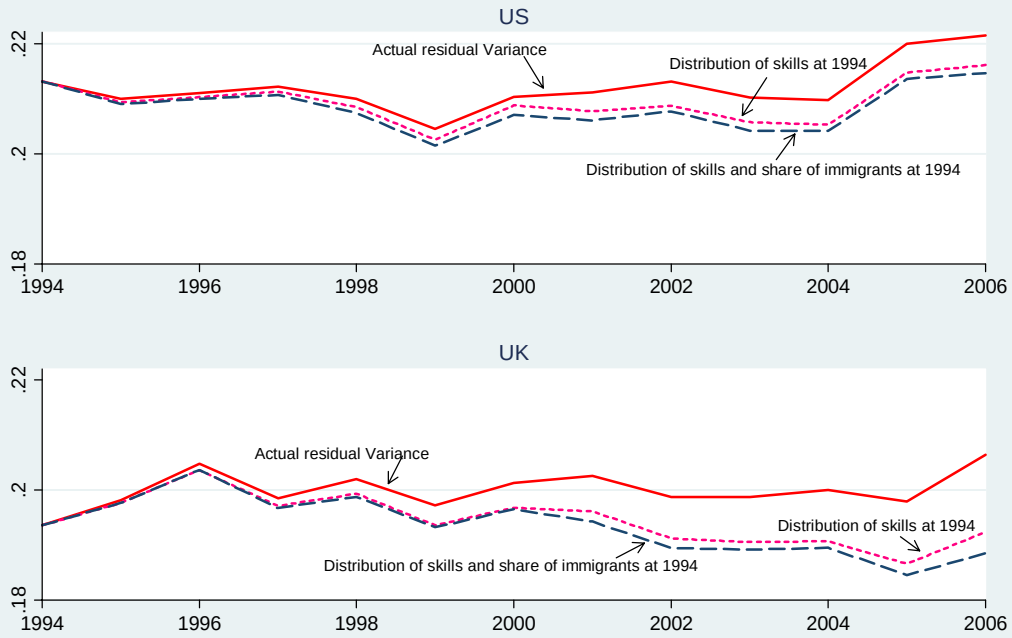
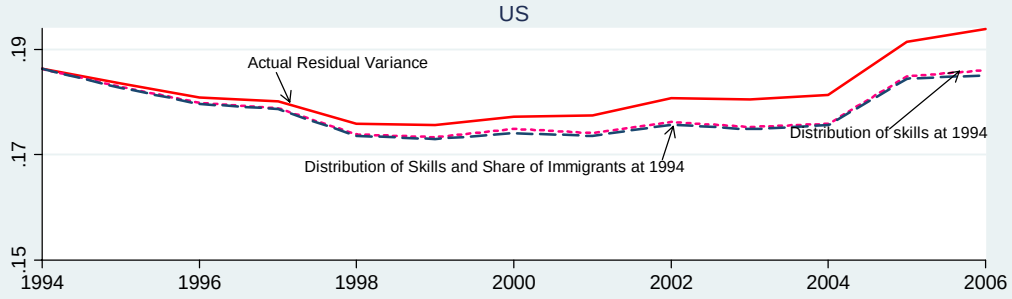


Figure 5b. Actual Residual Variance, Composition effects and Share of Immigrants at 1994

All Workers, Female



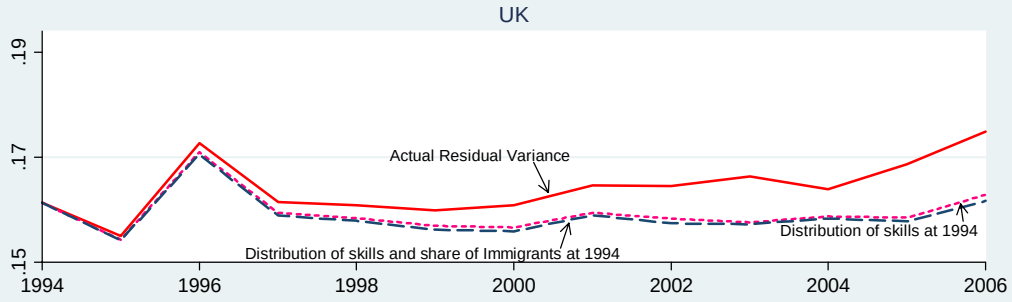


Figure 6a. Actual Residual Variance, Composition Effects and Shrare of Immigrants at 2006
All Workers, Male

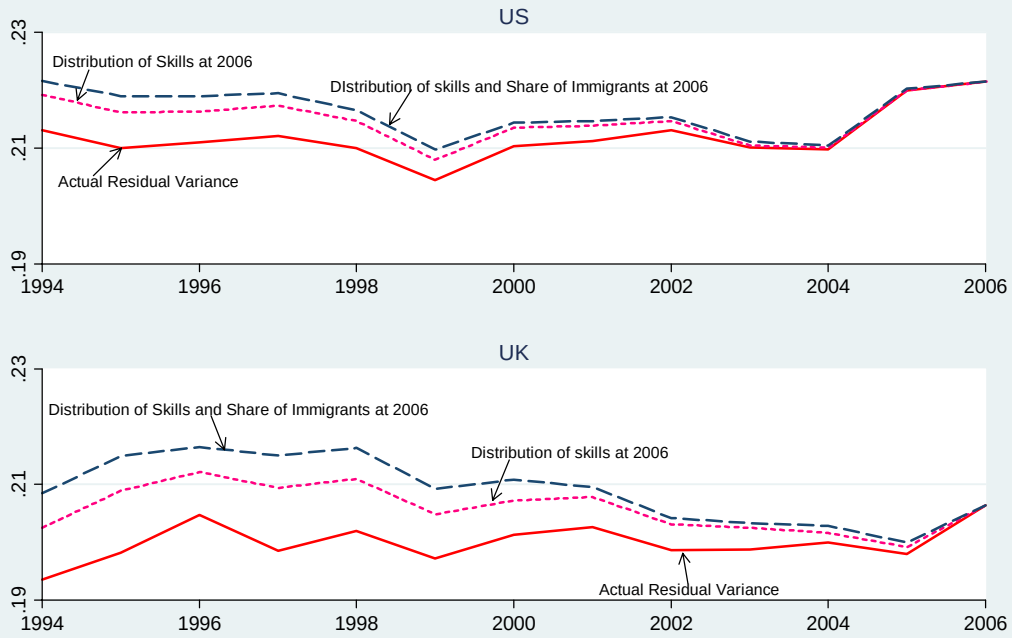
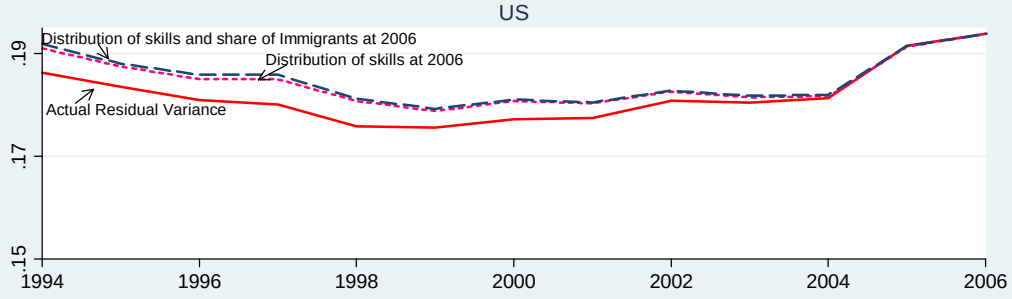


Figure 6b. Actual Residual Variance, Composition effects and Share of Immigrants at 2006
All Workers, Female



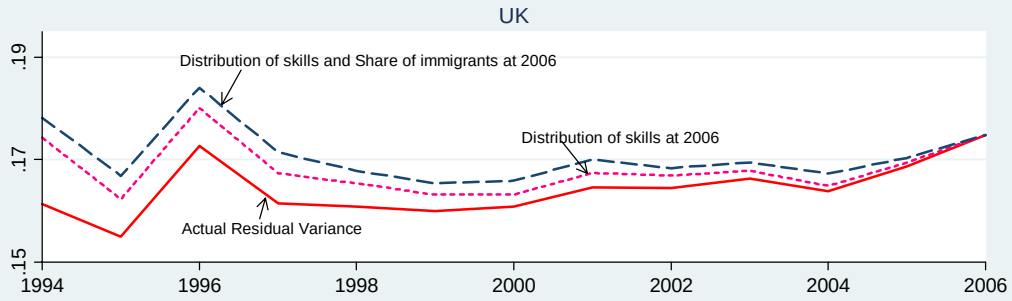


Figure 7.Residual and counterfactual for male Natives, 1994-2006

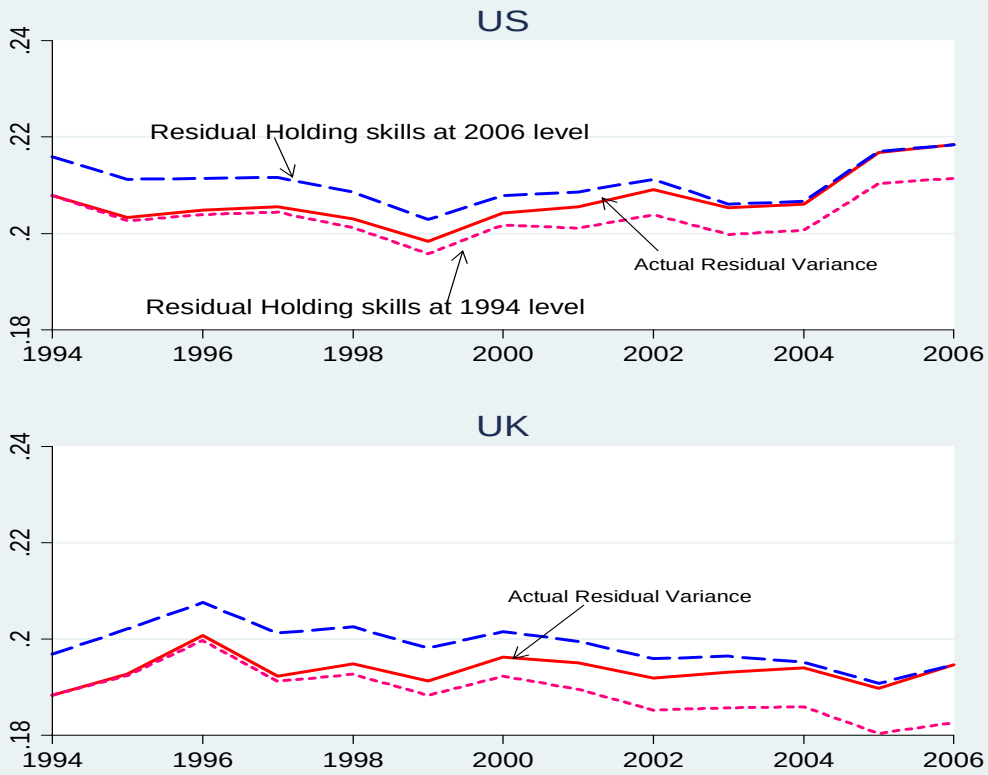


Figure 8.Residual and Composition effect for Immigrants Male, 1994-2006

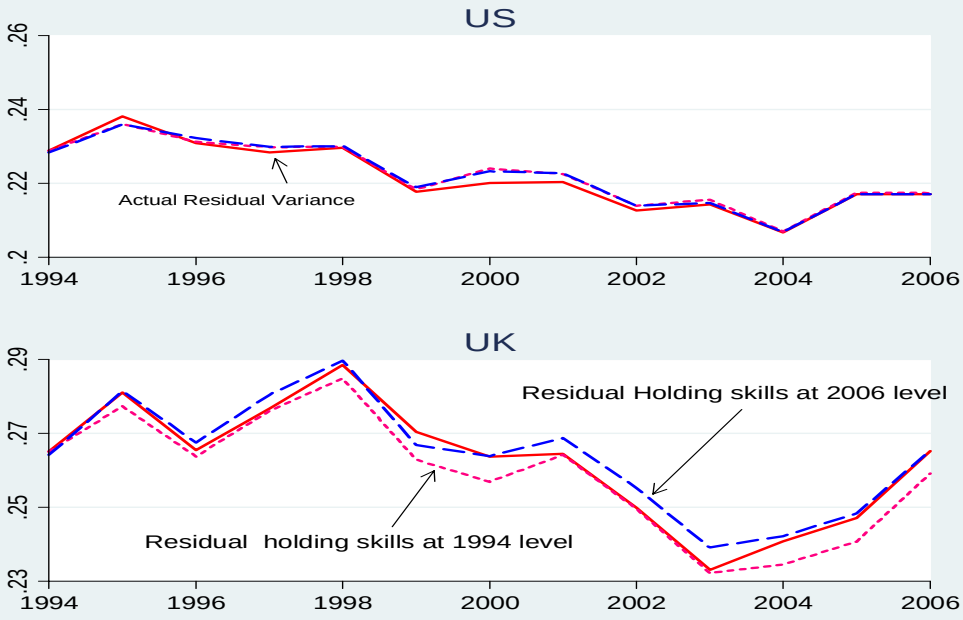


Figure 9.Residual and composition for female natives, 1994-2006

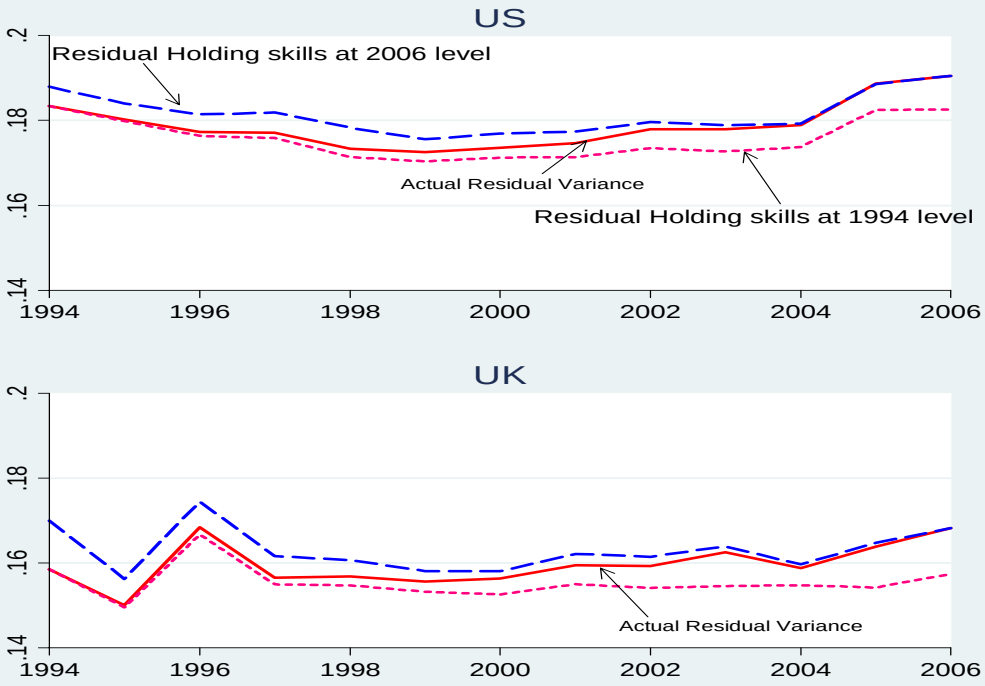


Figure 10.Residual and Composition effects for Female Immigrants, 1994-2006

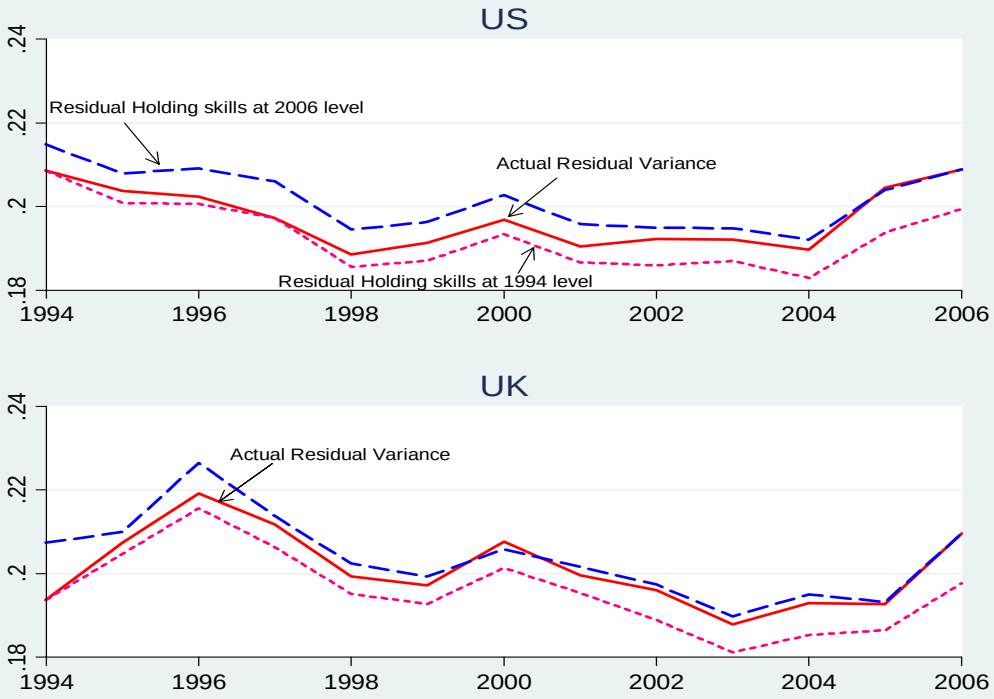


Figure 11a. 90-50 Residual Gap, Male U.S.

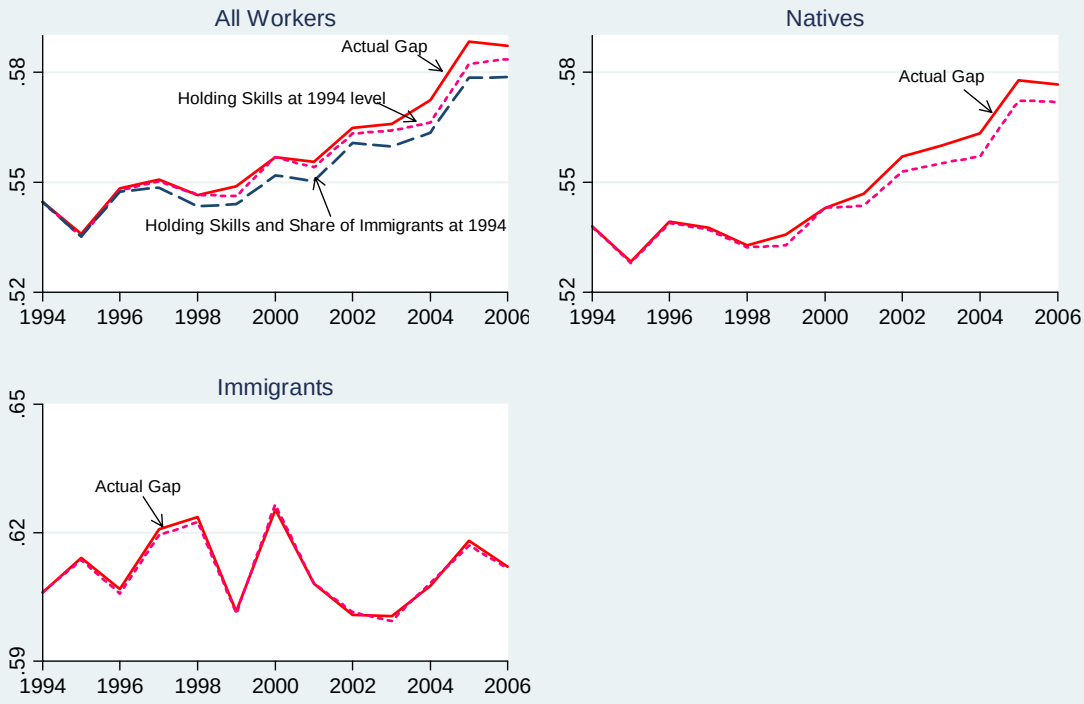


Figure 11b. 90-50 Residual Gap, male UK

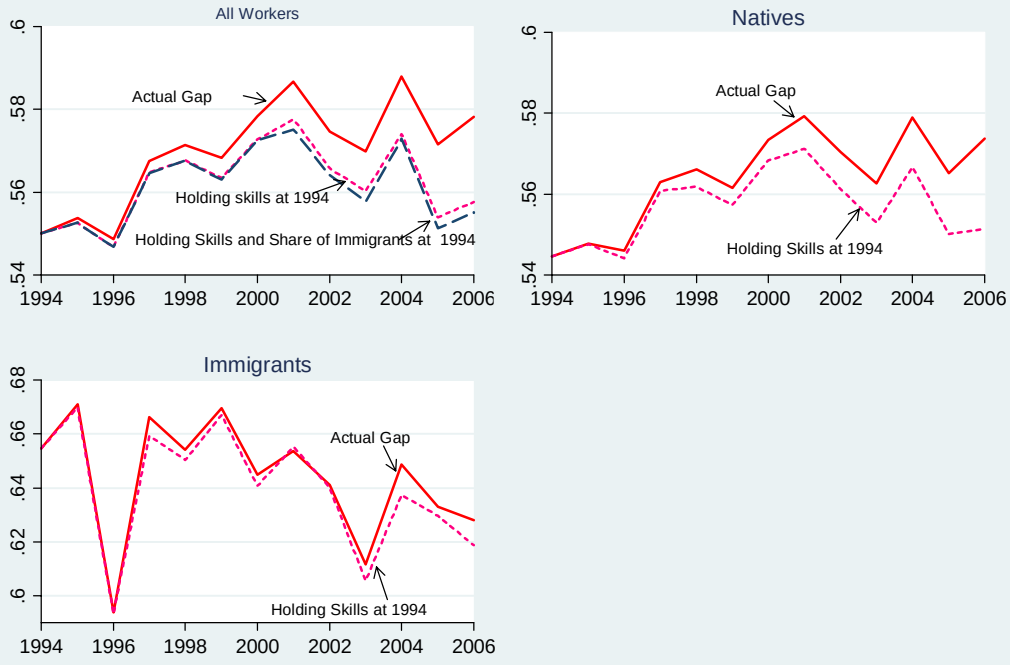


Figure 11c. 90-50 Residual Gap, Women U.S.

Holding Skills and Share of Immigrants at 1994 level

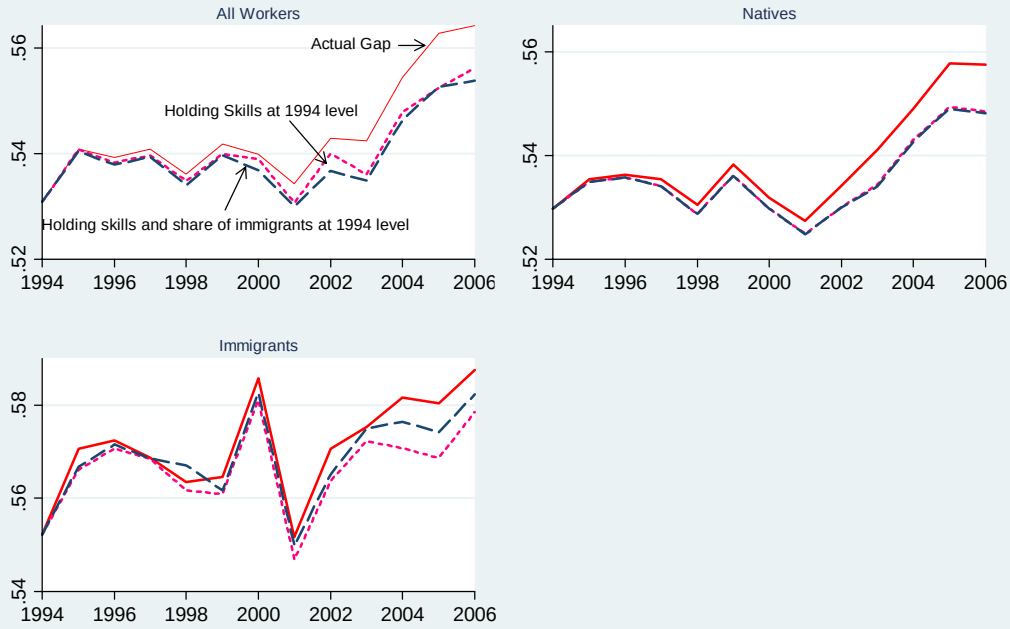


Figure 11d. 90-50 Residual Gap, Women UK

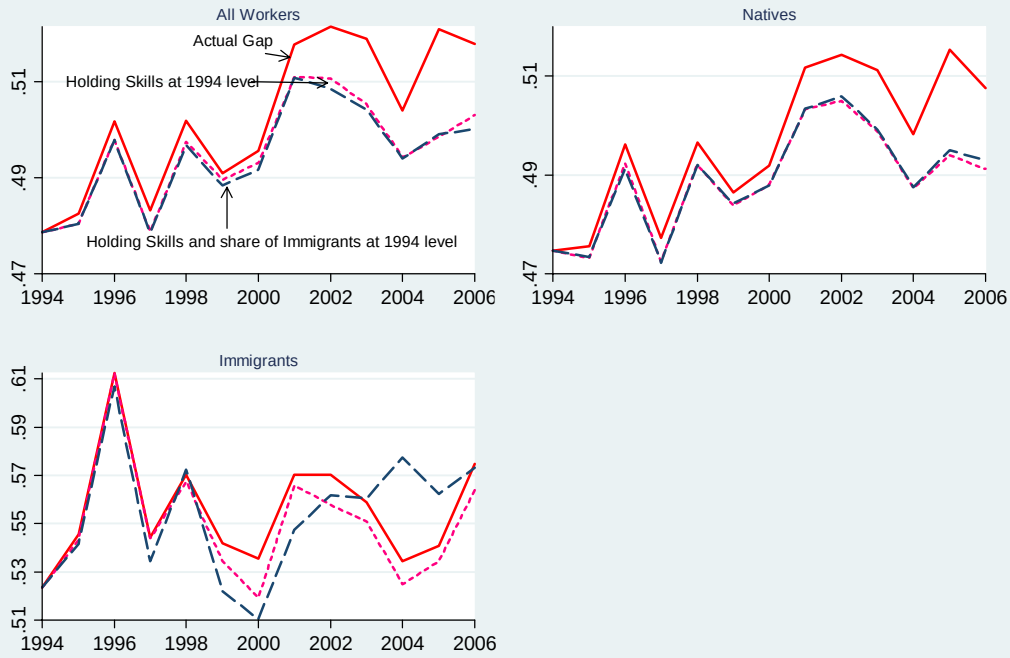


Figure 12c. 50-10 Residual Gap, Women U.S.

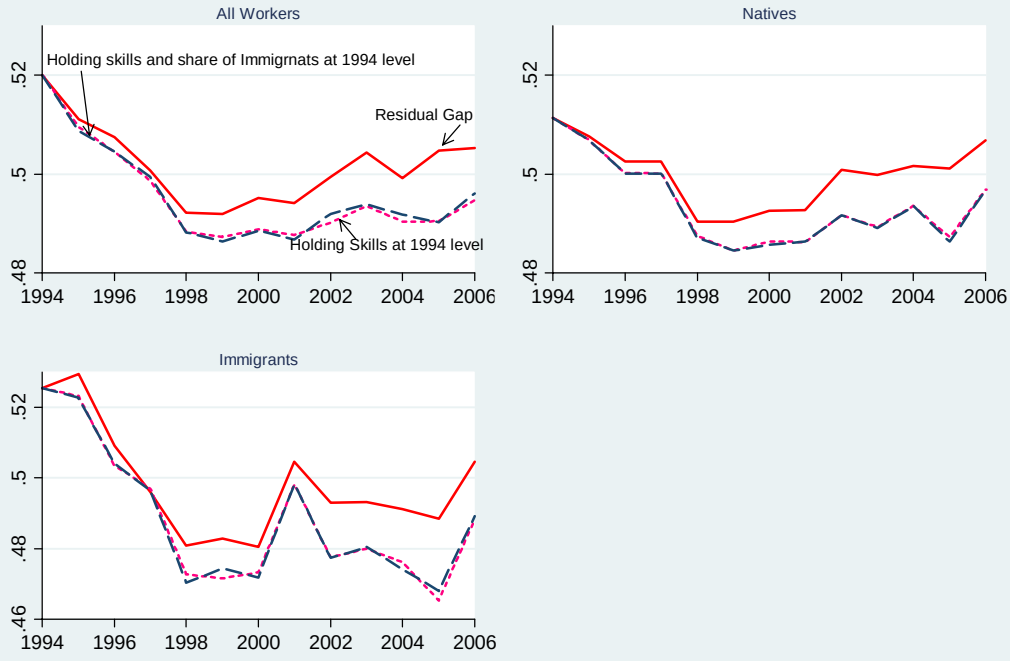
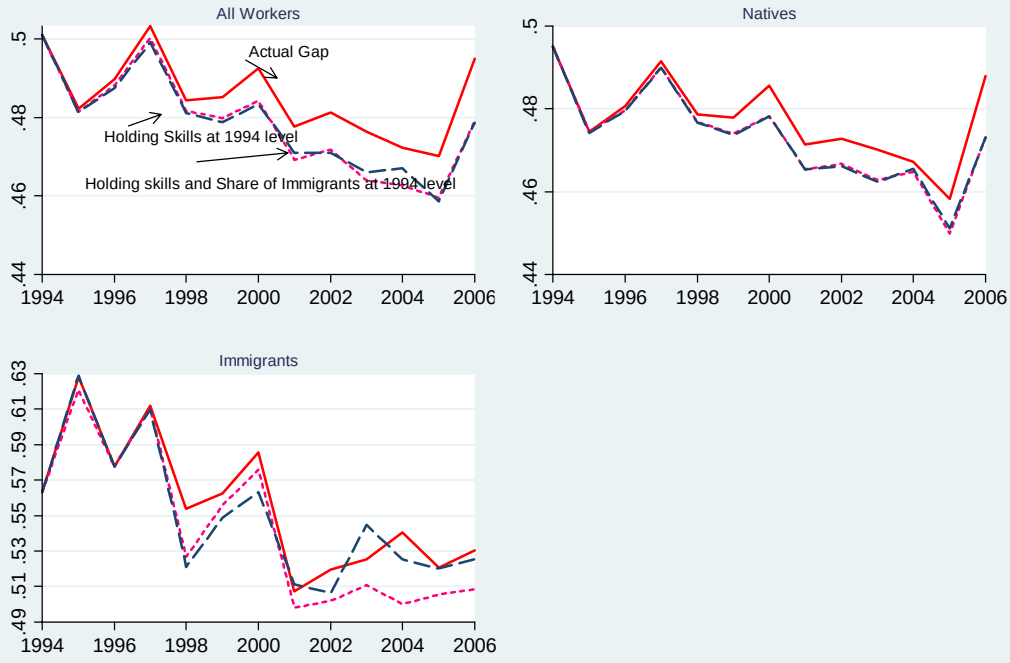


Figure 12d. 50-10 residual Gap, women UK



12a. 50-10 Residual Gap, Men U.S.

Holding skills and share of Immigrnats at 1994 Level

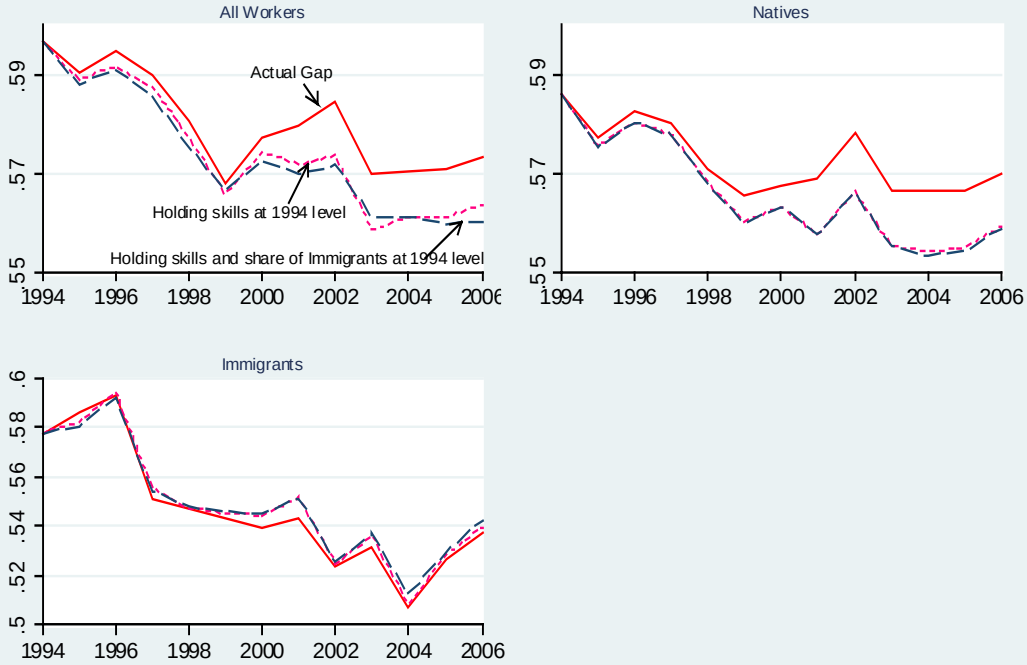


Figure 12b. 50-10 Residual Gap, Men UK

Holding Skills ann Share of Immigrants at 1994 Level

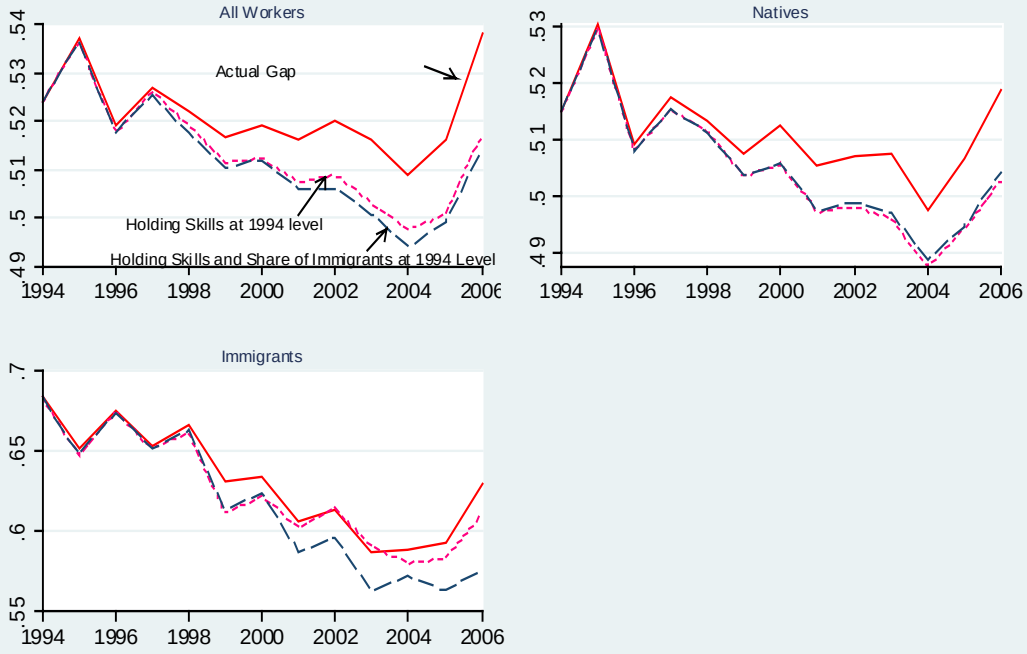


Figure 13.Within group variance by High education group for men, 1994-2006

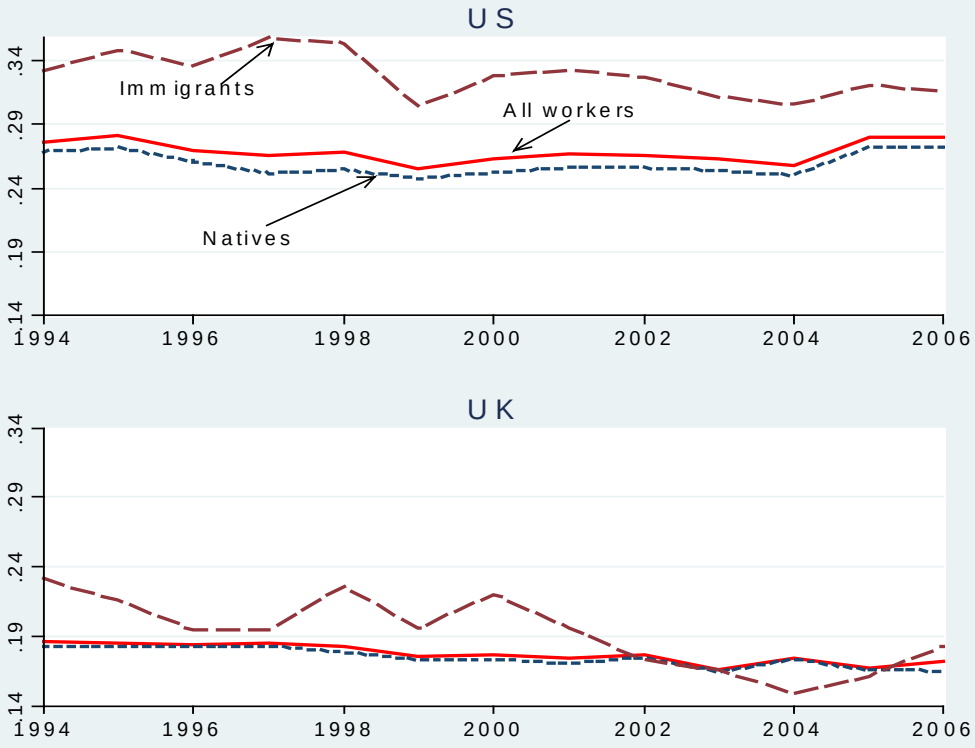


Figure 14.Within group variance by High level of education for women, 1994-2006

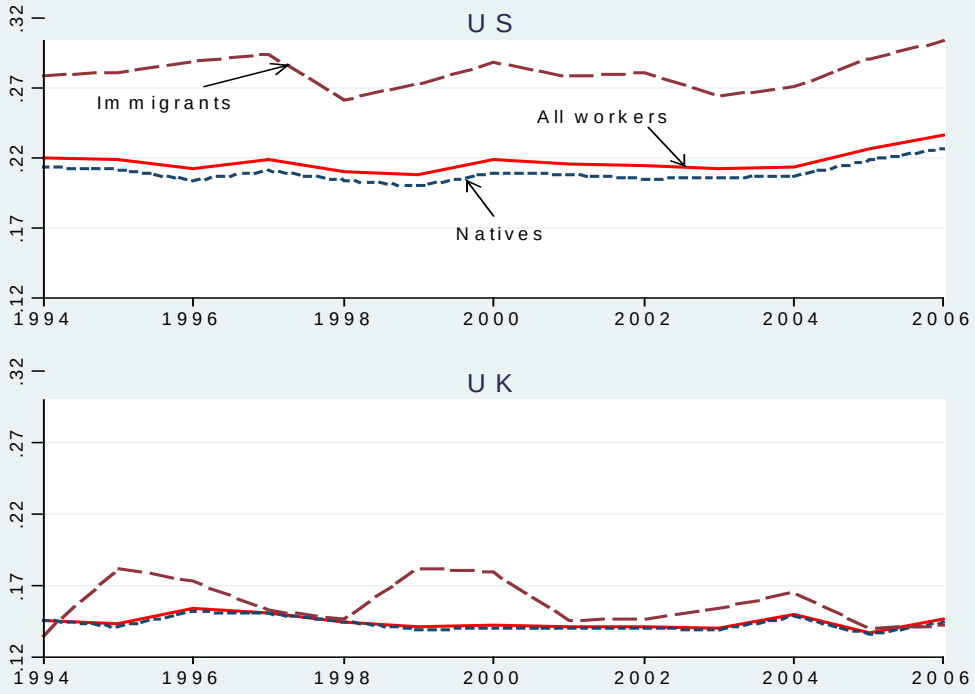


Figure 14a. Within group by Intermediate Level of education for men, 1994-2006

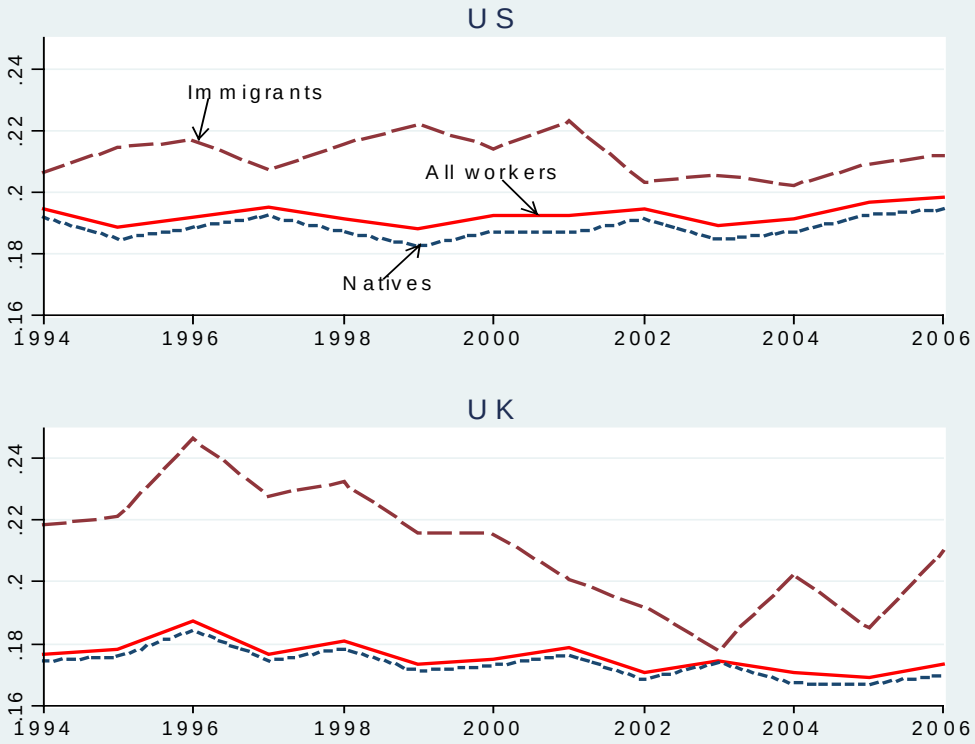


Figure 14b. Within group variance by Intermediate Level of education for women, 1994-2006

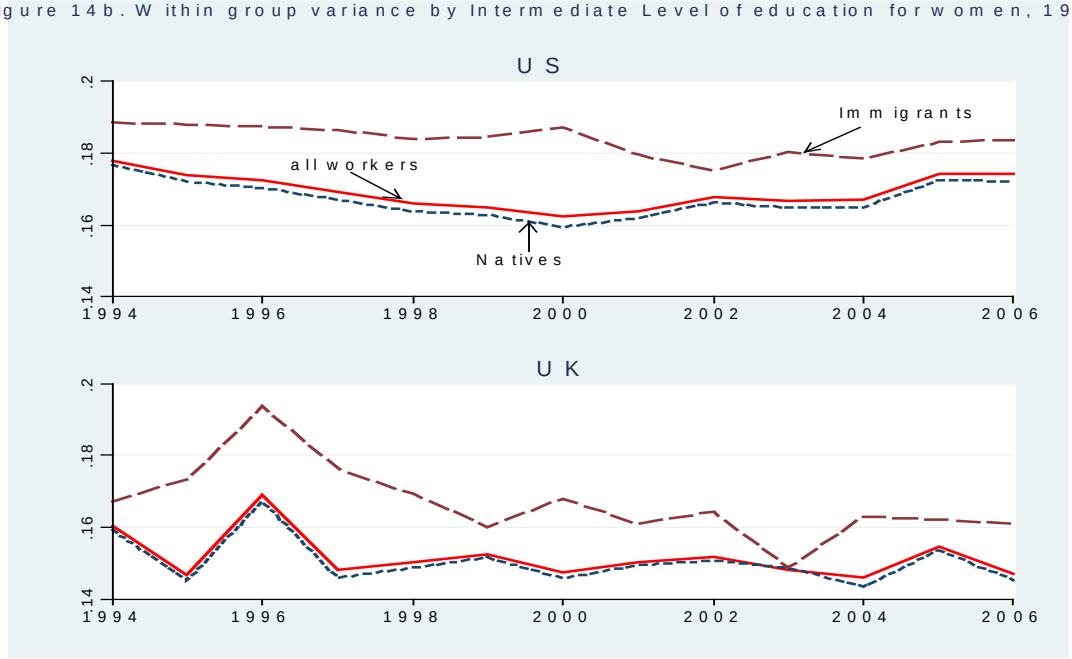


Figure 15a. Within group by lower level of edcuation for men, 1994-2006

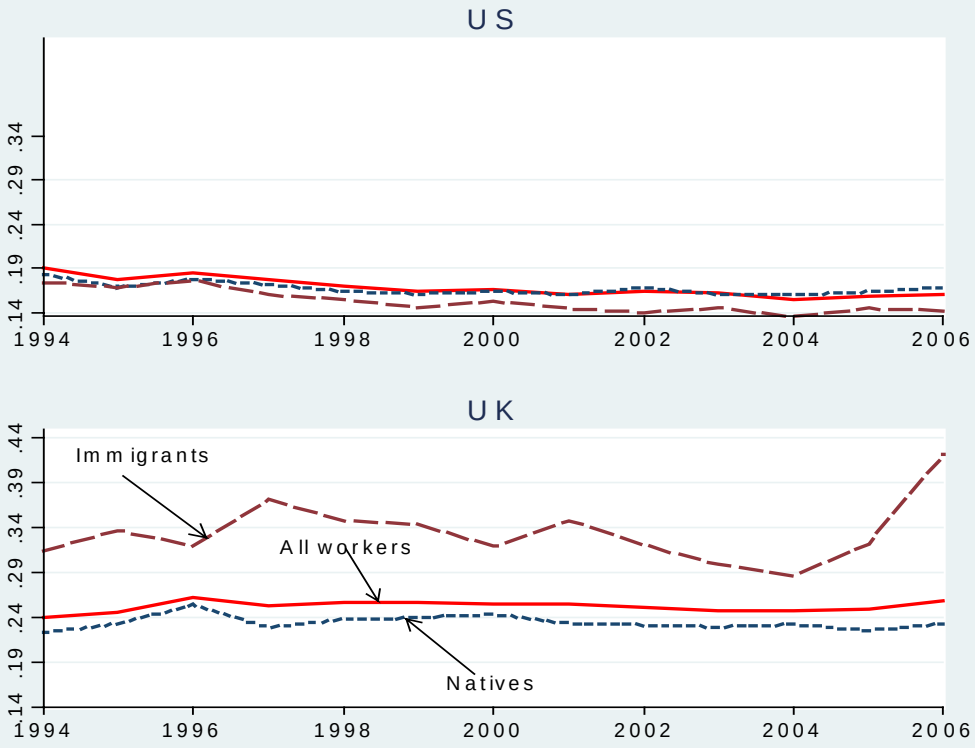
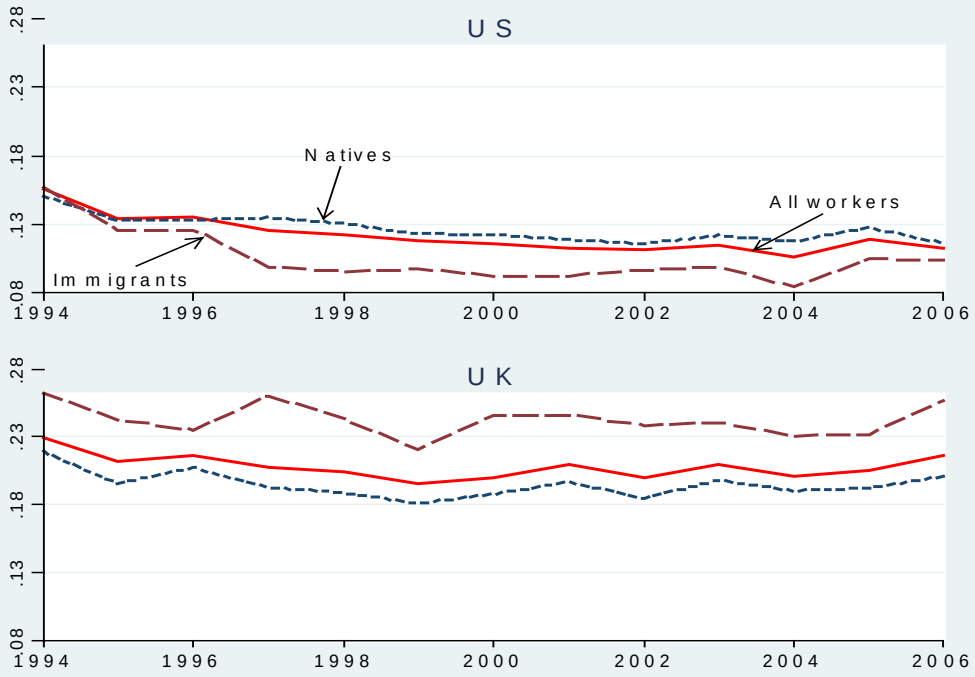


Figure 15b.Within group variance by Low level of education for women, 1994-2006



Part Two: analysis by New and Old Immigrants

Figure 16a. Standard Deviation of Log Hourly Wage, Men

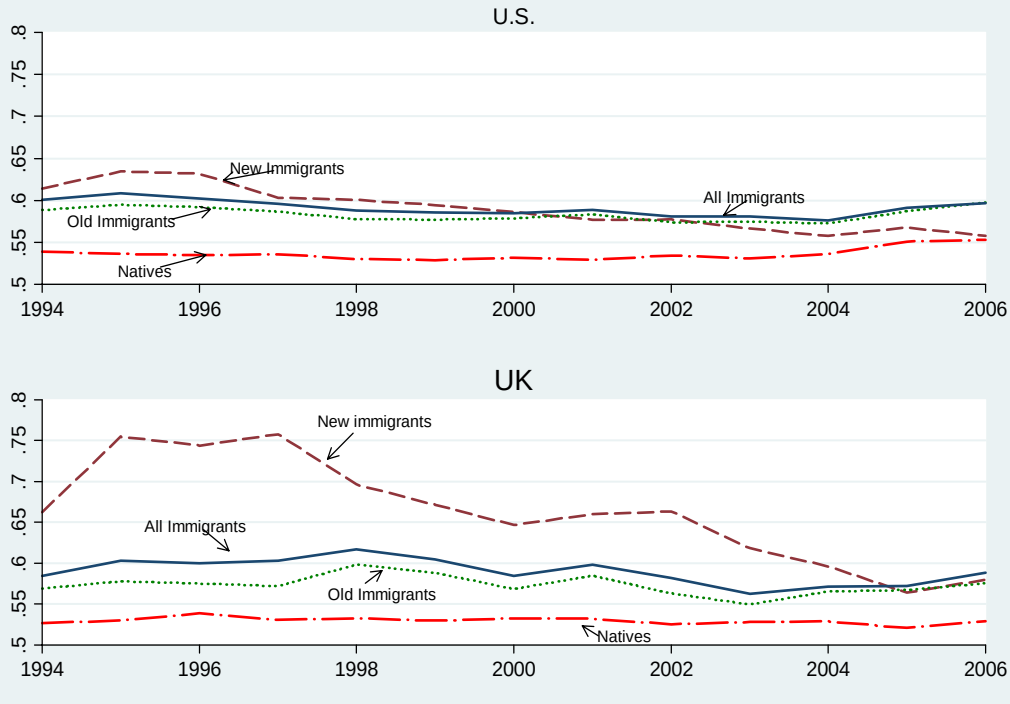


Figure 16b. Standard Deviation of Log Hourly Wage,Female

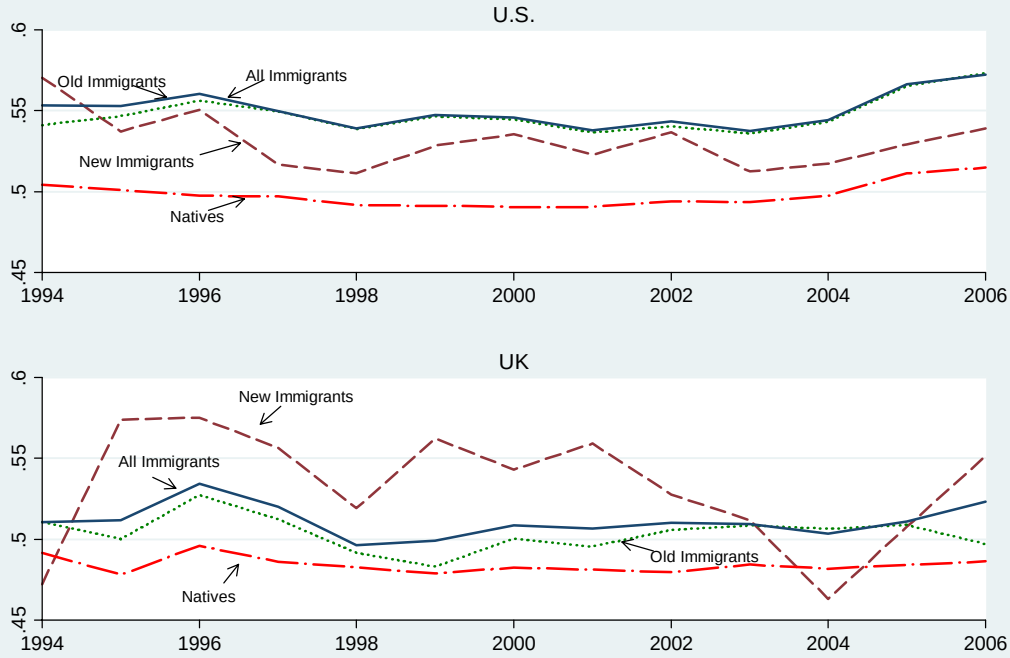


Figure 17a. 90-50 Log Hourly Wage gap, Men

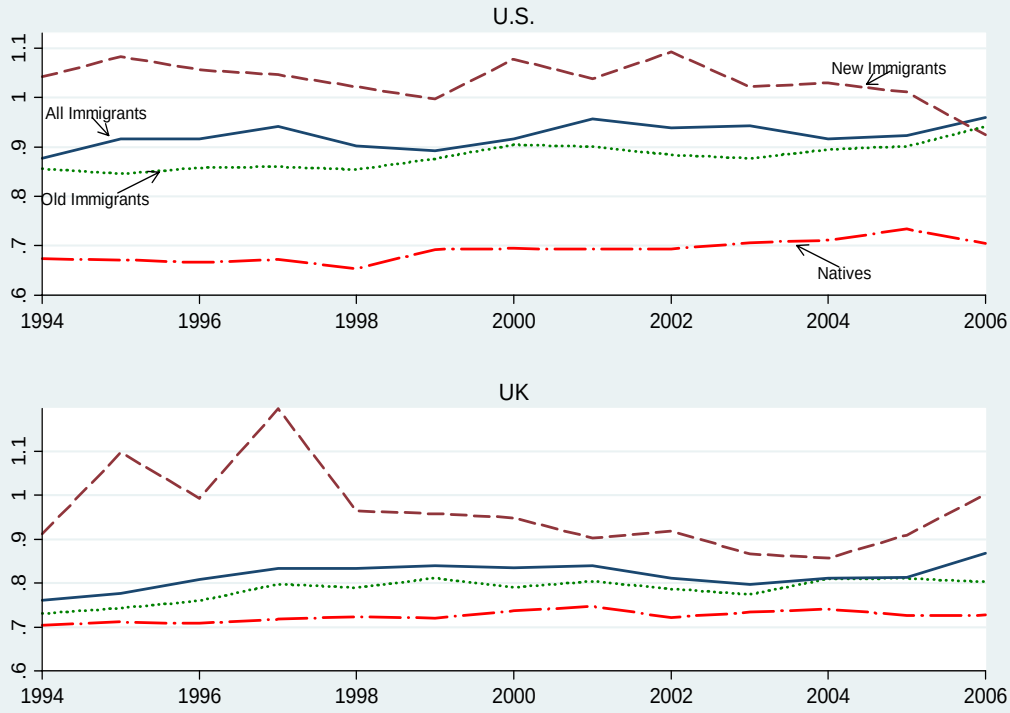


Figure 17b. 90-50 Log Hourly Wage Gap, Female

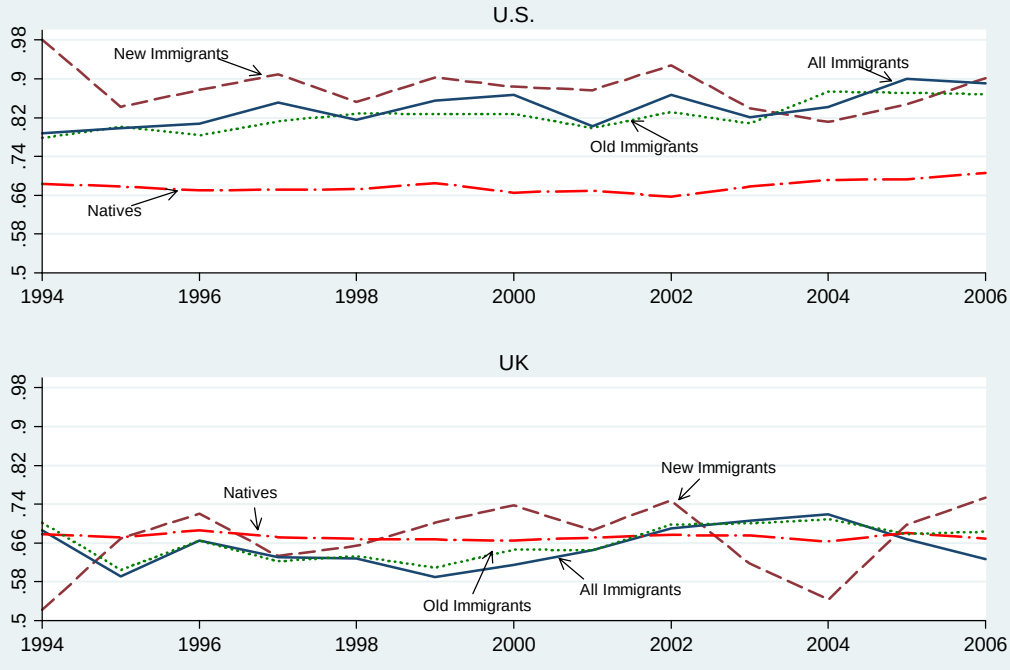


Figure 18a. 50-10 Log Wage Gap, Men

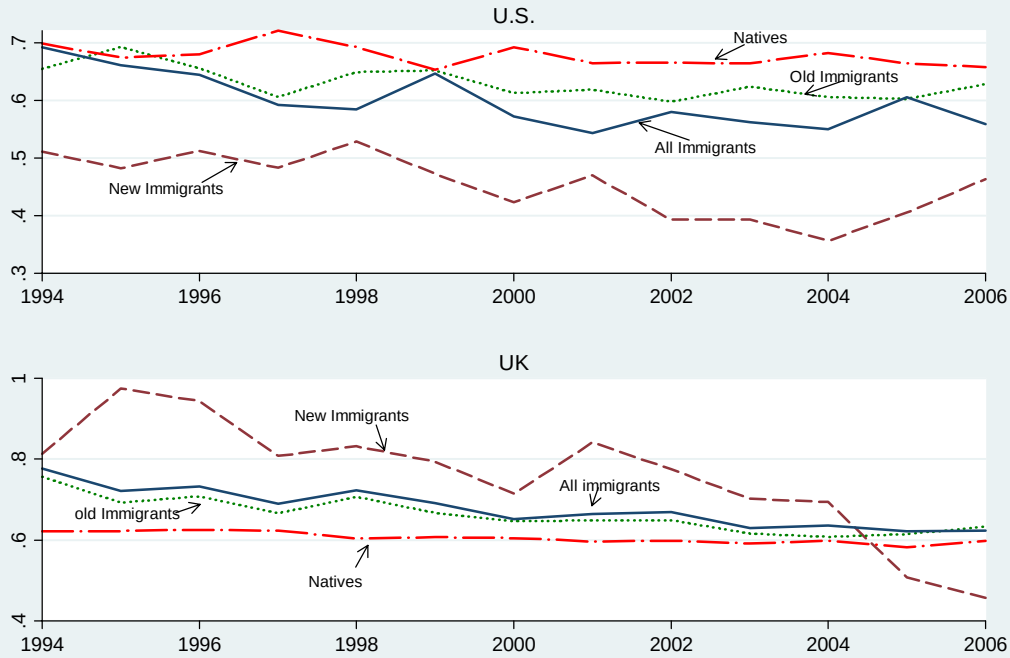


Figure 18b. 50-10 Log Hourly Wage gap, Female

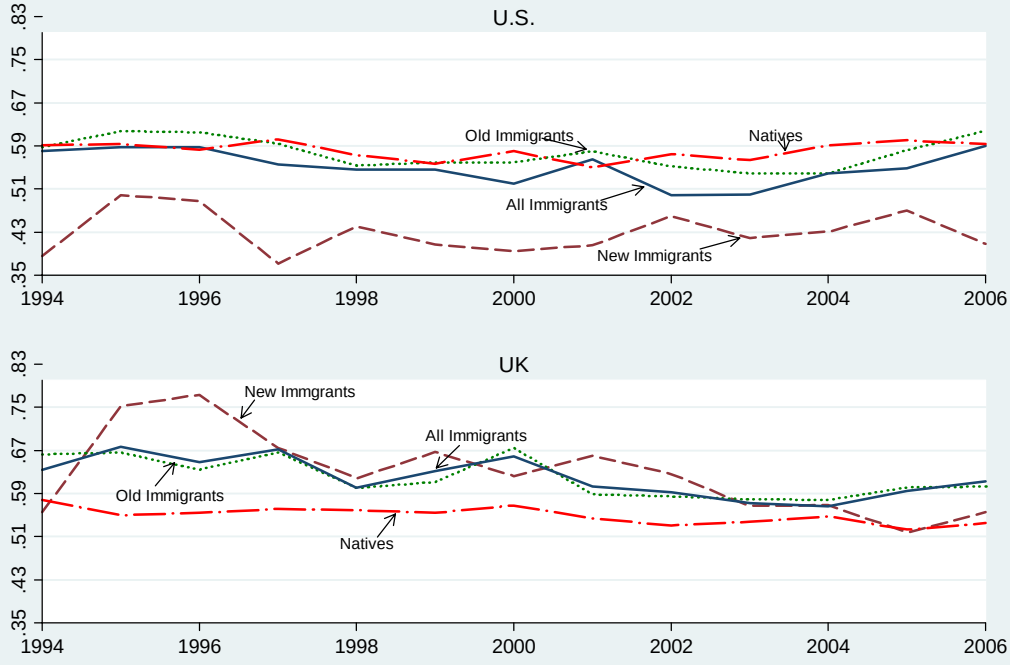


Figure 19a. Actual Residual Variance, Men

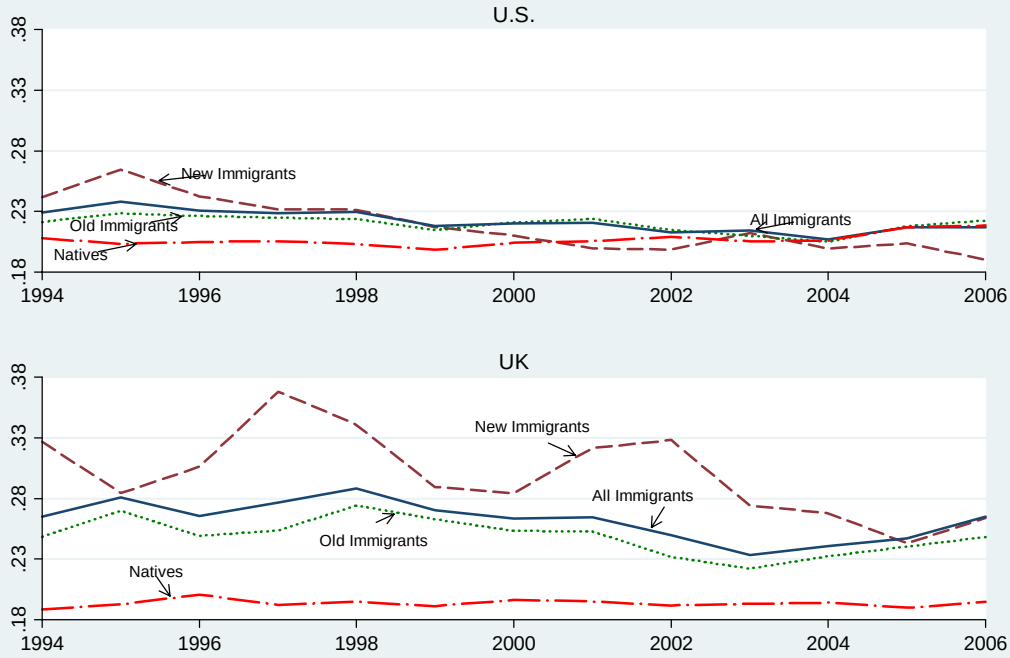


Figure 19b. Residual Variance,Female

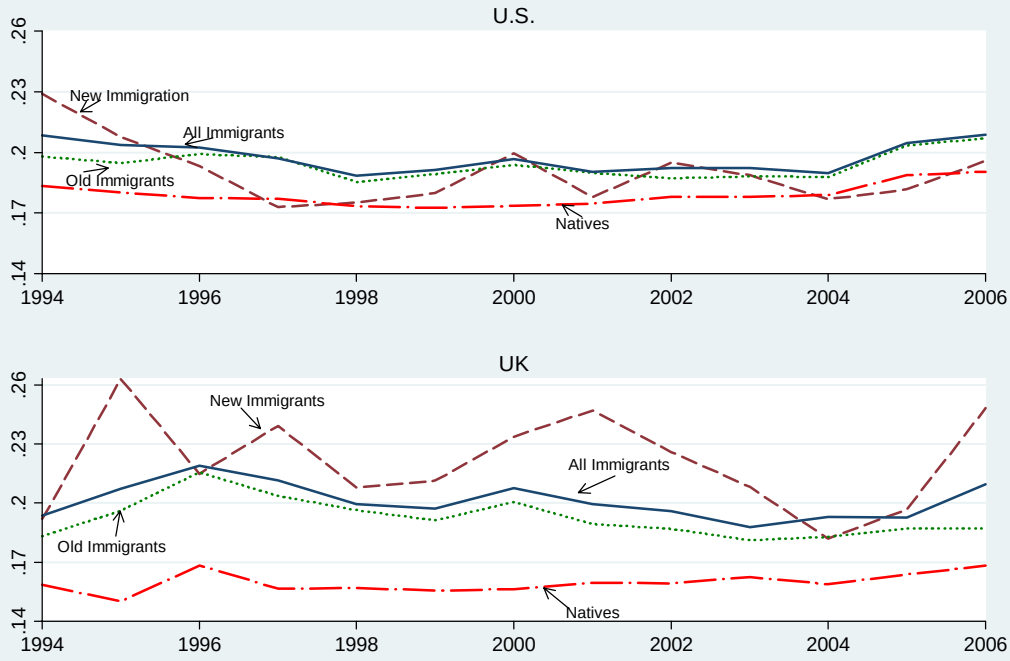


Figure 20a. 90-50 Residual Gap, Men

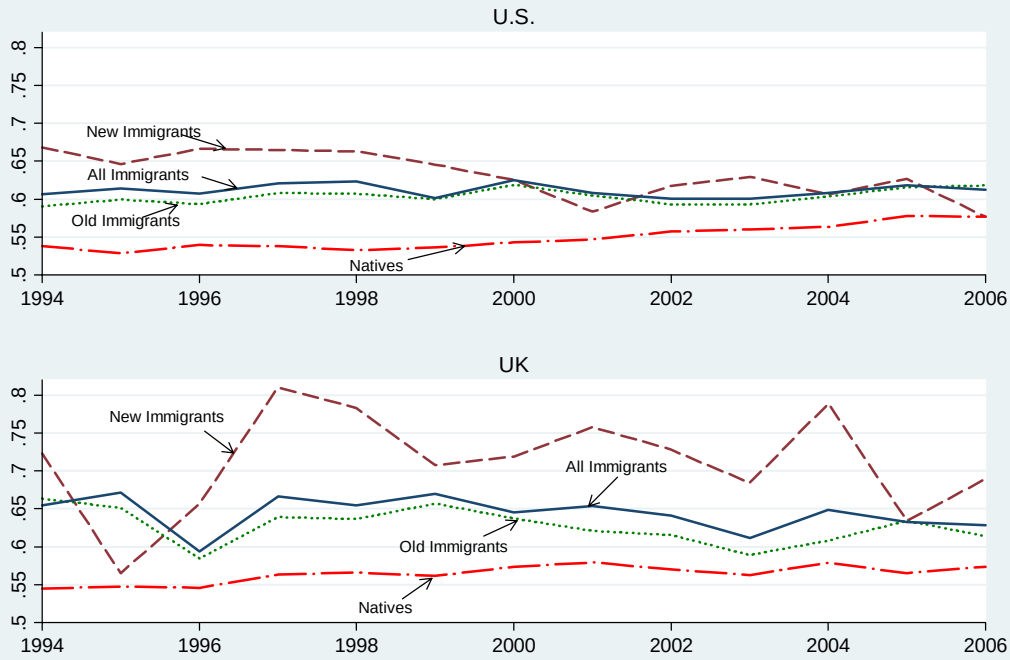


Figure 20b. 90-50 Gap Variance, Female

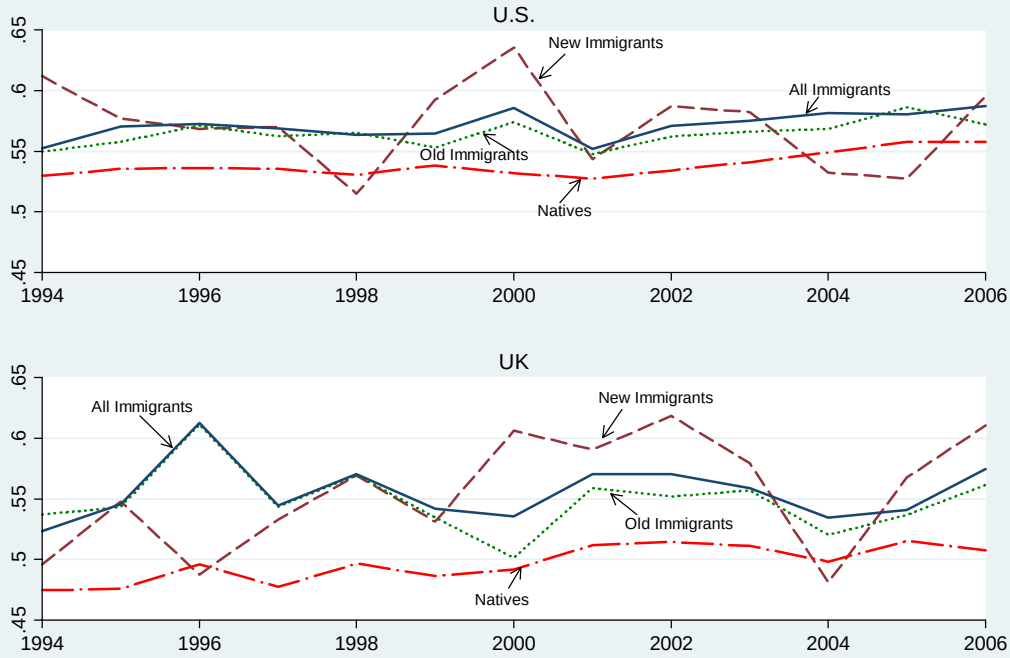


Figure 21a. 50-10 Residual, Men

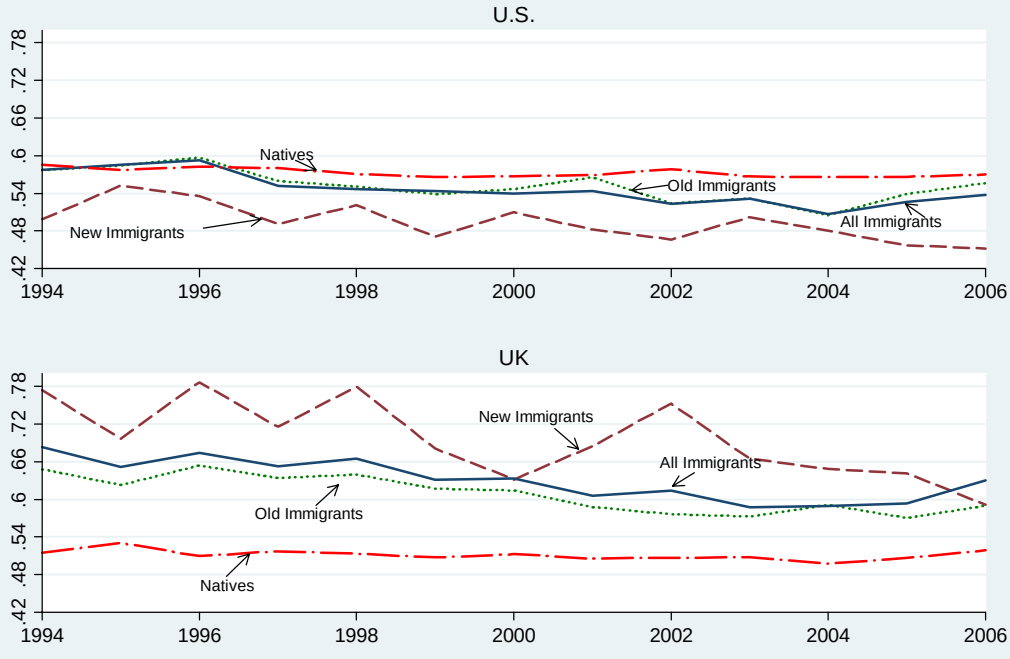
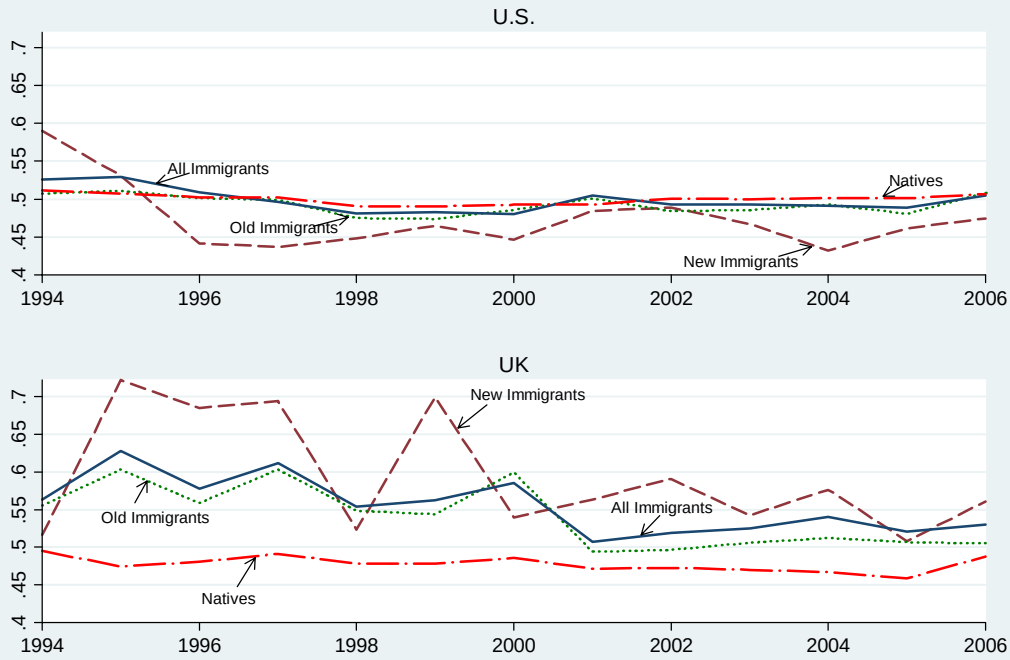
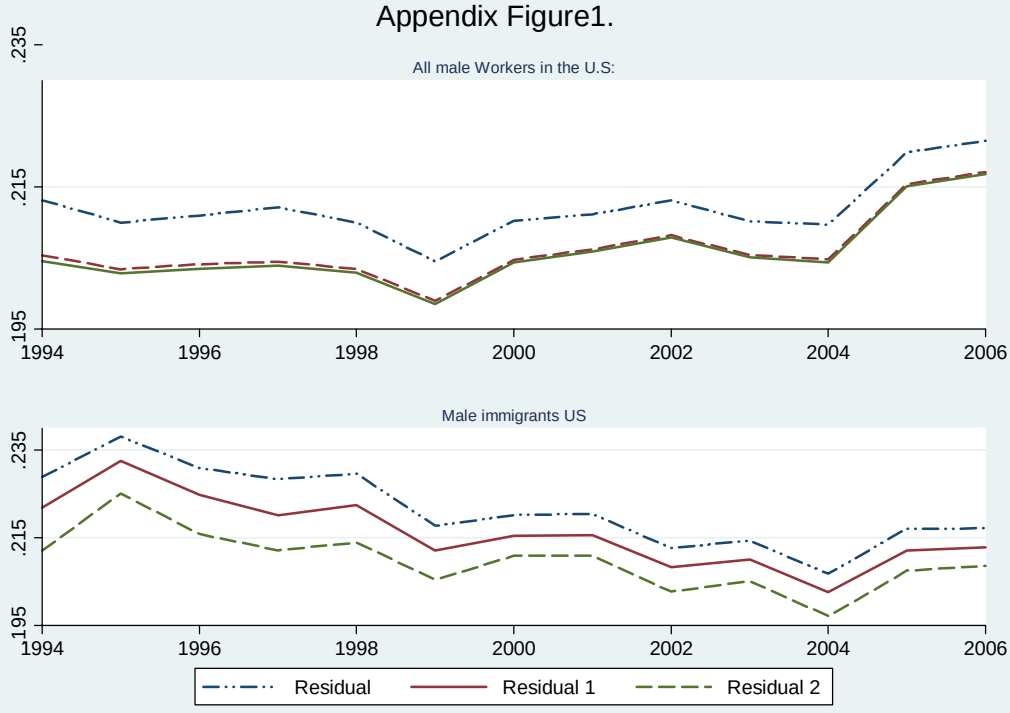


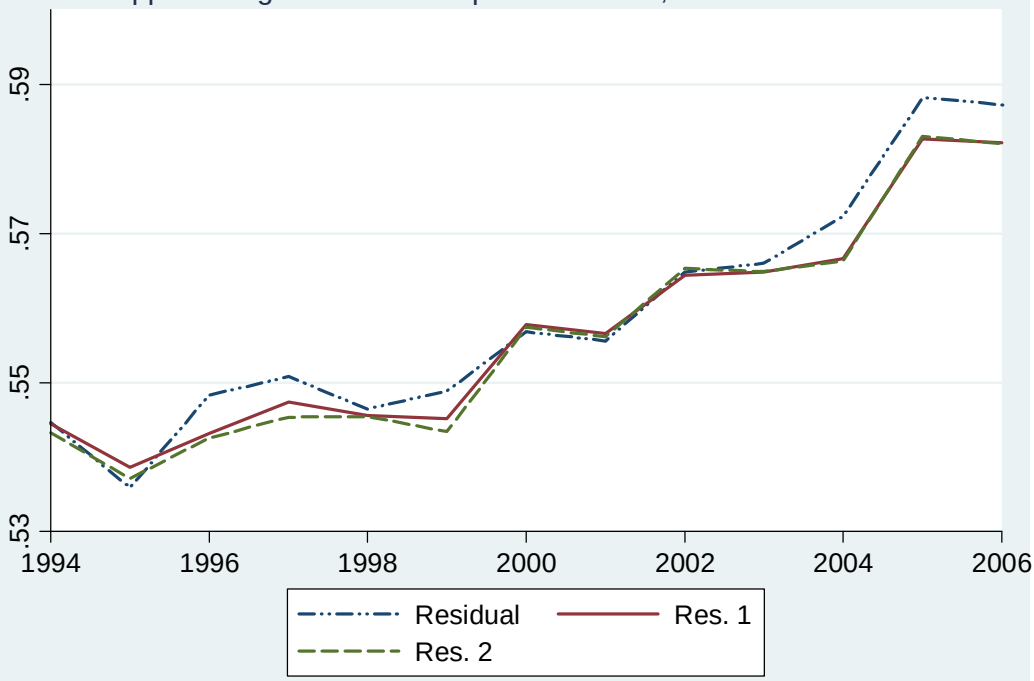
Figure 21b. 50-10 Residual, Female



Appendix Figure1.



Appendix figure2. 90-50 Gap with controls, All Male workers US



Appendix Figure 3. Residual variance with controls for female immigrants US