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Importing Inequality: Immigration and the Top 1 Percent

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Importing Inequality: Immigration and the Top 1 Percent

Abstract

In this paper we study the contribution of migrants to the rise in UK top incomes. Using administrative data on the universe of UK taxpayers we show migrants are over-represented at the top of the income distribution, with migrants twice as prevalent in the top 0.1% as anywhere in the bottom 97%. These high incomes are predominantly from labour, rather than capital, and migrants are concentrated in only a handful of industries, predominantly finance. Almost all (85%) of the growth in the UK top 1% income share over the past 20 years can be attributed to migration.

JEL-Codes: H200, J300, J600.

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The dynamics of top incomes are important for our understanding of entrepreneurship and innovation, growth, aggregate demand and savings, and the effects of taxation.¹ Identifying the sources of growth in top incomes is necessary to interpret the underlying mechanisms, and determine what policy responses are appropriate, if any. Recent work has studied the source of these incomes and the characteristics of those who receive them (Bell and Van Reenen, 2014; Piketty, Saez and Zucman, 2018; Smith et al., 2019; Advani and Summers, 2020). However, prior work was unable to distinguish between natives and migrants—a distinction we will show is essential for understanding changes in the top 1% income share in the UK. In particular, we find that migration accounts for the vast majority of the growth in UK top 1% income share in the past 20 years.

¹See for example Gabaix et al. (2016); Jones and Kim (2018); Aghion et al. (2019); Bell et al. (2019); Lansing and Markiewicz (2018); Jones (2019); Auclert and Rognlie (2017, 2018); Straub (2019); Roine, Vlachos and Waldenström (2009); Aoki and Nirei (2017); Rubolino and Waldenström (2020).

We make use of confidential, anonymised data on the universe of taxpayers in the UK, from 1997 to 2018, to study the role that immigration plays at the top of the income distribution. We exploit the process by which National Insurance Numbers (NINOs) – the UK’s Social Security Numbers – are assigned to identify migrants arriving since the Second World War, and in more recent years cross-check this with administrative microdata on migrant workers. We use this to examine the rise in top income migrants, their sources of income and their contribution to measured growth in the top income share.

In surveying the literature on the importance of high-skilled migration for innovation, entrepreneurship and growth, [Kerr et al. \(2017\)](#) highlight that ‘a key objective that research should address over the next decade [is] to trace out how high-skilled migration impacts inequality within and across countries.’ [Saez and Veall \(2005\)](#) suggest that rising top incomes in Canada are driven by changes in US top taxes and a consequent threat of emigration from Canada to the US; [Atkinson and Leigh \(2008\)](#) show a similar effect in New Zealand. These studies point to a potential impact of migration on inequality in the origin country. But little is known about how high-skilled migration affects inequality in the receiving country. Our work provides the first exploration of this relationship. We present three main results.

First, migrants are very prevalent at the top of the UK income distribution. Although much of the political and public discussion around migration focuses on low-skilled migrants, we show the share of migrants in the top 1% (0.01%) is $1.4\times$ ($2.2\times$) the share in the bottom 10%. This share has grown rapidly over the past two decades, rising by 50% for the share of migrants in the top 1%, and more than doubling for those in the top 0.01%.

The economic literature has advanced numerous explanations for rising top income shares, including tax policy ([Roine, Vlachos and Waldenström, 2009](#); [Alvaredo et al., 2013](#); [Piketty and Saez, 2013](#)), the degree of labour and product market regulation ([Piketty and Saez, 2006](#); [Bivens and Mishel, 2013](#); [Saez, 2019](#)), technological change ([Autor, Katz and Kearney, 2006, 2008](#); [Koenig, 2019](#)), and performance pay for CEOs ([Gabaix and Landier, 2008](#); [Lemieux, MacLeod and Parent, 2009](#)). These explanations share a common feature: they explore the effects of a changing economy on a *fixed* population. Thus far they omit the striking global growth of high-skilled migration, which ‘rose by nearly 130% from 1990 to 2010’ ([Kerr et al., 2016](#)). Migration and migration policy are therefore likely to be a crucial part of understanding changes to top income shares, not only in the UK but globally.

Second, we show that – as in the US ([Smith et al., 2019](#)) – growth in UK top incomes has been driven by rising income from human capital. The UK has been the destination of choice for many high profile migrants, including high wealth individuals such as Lakshmi Mittal and Roman Abramovich. It is natural to wonder whether the incomes of top migrants are driven by

investment rather than labour income. We find the share of earned income going to top migrants has doubled over the past twenty years, while there has been no change in the share of investment income they receive.

The rise of the financial sector in the UK has been a key contributor to the increase in the share of top incomes coming from labour (Bell and Van Reenen, 2014), and this is true for migrants as well: 47% of top income to migrants comes from finance. Similar to ‘tech’ in the US – which also has a large migrant share – these jobs are concentrated in particular locations, suggesting agglomeration externalities (Devereux, Griffith and Simpson, 2007; Brühlhart, Jametti and Schmidheiny, 2012; Kerr et al., 2017). These location-specific productivity effects potentially serve not only as a magnet to top earning immigrants but may also dampen the returns to tax-induced emigration (Kleven et al., 2019).

In contrast to the US (Kerr et al., 2017), most migrants to the UK do not arrive as students or even immediately after university. Rather they are predominantly middle-aged individuals who migrate straight into a high-paying job, echoing findings by Azoulay et al. (2020) on the (middle) age of entrepreneurs. Despite this, they are significantly younger than top income natives: the median migrant joining the top 1% is 42 years old, compared with 47 for the median native. They are also highly paid relative to natives in the same industry. This suggests migrants are positively selected on earnings ability. Once in the top 1%, they are also no less likely to stay there than natives, up to two decades later.

Finally, we show that 85% of the rise in the top 1% share over the past two decades is contributed by migrants: the UK appears to be *importing inequality*. This comes from an accounting decomposition, in the manner of growth accounting; it is not intended to quantify a causal estimate of the impact of migrants. Nevertheless it is an important stylised fact that quantitative models of top income shares, described earlier, need to account for: much of the growth in income concentration comes not from a reallocation of resources within a fixed population, but from a change in the underlying population.

This result also provides a new lens on the debate concerning international comparisons of top share inequality. Top income shares have risen substantially in English-speaking countries (US, UK, Australia, Canada) over the past decades, while the rise has been more modest in continental Europe and in Japan (Atkinson, Piketty and Saez, 2011). Over the same period, English-speaking countries have attracted a large influx of high-skilled migrants. Kerr et al. (2016) report that the US, UK, Australia, and Canada alone received nearly 70% of high-skilled foreigners who migrated to OECD countries in 2010. Migration is therefore an important channel in explaining cross-country differences. Where tax and regulatory policy drive differences in top shares, this is not only because of changes *within* individual economies. Instead these differences also lead to a

reallocation of human capital across countries, moving high earners and hence affecting national measures of top share inequality in both sending and receiving countries.

The remainder of the paper is organised as follows. Section I describes our data sources, including our novel approach to identifying migrants in the administrative data. Section II examines the prevalence and rise of top income migrants in the UK. Section III documents migrants’ sources of incomes, and their characteristics. Section IV decomposes top share growth in the UK over the past two decades, to quantify the proportion attributable to migrants. Section V concludes.

I. Data and Measurement

We use administrative tax data from the UK tax authority (HMRC) to measure top incomes and identify migrants and natives resident in the UK. We observe the universe of personal tax returns filed for tax years 1997 to 2018.² The tax unit is an individual.

Around one third of all UK taxpayers are required to file a tax return; this includes anyone with taxable income that has not already been subject to withholding tax, plus all individuals with total income above a nominal filing threshold, regardless of their income source.³ We supplement our tax return data using data from HMRC’s ‘Pay-As-You-Earn’ (PAYE) system. This system covers all income tax payers who did not file a tax return (as well as many who did file a return).⁴ By combining the data from tax returns and PAYE records, we obtain full coverage of the universe of UK taxpayers.

To calculate top income shares based on the total adult population (given that not all adults are taxpayers), we apply external control totals for population and income. We use the same data sources and approach outlined in [Alvaredo \(2017\)](#), as currently used for the UK fiscal income series of the World Inequality Database (WID). We depart slightly from the current WID UK methodology in that we define ‘adult’ as an individual aged 18+ (instead of 15+ as used in WID). This is for consistency with our definition of a migrant, as we describe in Section I.B.

A. Measuring Incomes

We measure pre-tax *fiscal* income, meaning all income that is assessable for income tax, prior to the deduction of income tax and National Insurance Contributions (NICs) levied at the personal level. We classify income into two main categories. ‘Earned income’ includes income from employment, self-employment and partnership activities, as well as pension income in retirement.

²The UK tax year runs from April to April. In line with HMRC practice, we cite the latter year, so the tax year 2017-18 is given as 2018.

³Since 2005, the filing threshold has been fixed at £100,000; for the earlier period 1997-2004, the filing threshold tracked the top income tax threshold (between £29,265 to £35,115).

⁴For years 2015-2018 we use the universe of PAYE tax records; for 2000-2014 we use a 10 per cent random sample and apply weights to estimate the full PAYE population. For 1997-1999 PAYE data is unavailable; however in these years the threshold for filing a tax return was much lower than the top 1 per cent threshold and our results using tax return data alone closely match HMRC estimates for the entire taxpayer population within this income range.

‘Investment income’ includes interest from savings, dividends, rents from property and all other taxable income from investments.⁵ Our definition of income, and sub-division into earned and investment income, exactly replicates the definitions used in HMRC’s Survey of Personal Incomes (SPI), which is the standard data source for top income statistics in the UK (Atkinson, 2007, 2014; Alvaredo, 2017).

Our definition of fiscal income excludes realised capital gains because these are not assessable for income tax. This is standard in the current UK inequality literature (Atkinson, 2007, 2014; Alvaredo et al., 2018; Burkhauser et al., 2018), and Piketty and Saez (2003) in the US. Recent work investigates the impact of capital gains on UK top shares and documents that some gains reflect repackaged income (Advani and Summers, 2020). However, here we follow the established approach to UK income measurement in order to focus our analysis on the role of migration, rather than making simultaneous innovations to the income definition.

In line with the literature, our income measure focuses on taxable income, so misses tax avoidance and evasion. One particular feature of the UK tax code effectively exempts foreign investment incomes from taxes if the taxpayer has a foreign ‘domicile’ i.e. the taxpayer declares their permanent home is abroad. ‘Non-dom’ status and offshore tax optimisation are both likely to be more common among internationally-mobile individuals. Our income measure thus is a conservative estimate of the true position of migrants at the top of the income distribution. However, our income definition is the standard one used for top income statistics and thus allows us to accurately quantify the contribution of migrants to these headline figures.

B. Measuring Migrants

We define a ‘migrant’ as an individual who migrated to the UK after the age of 18. Identifying the migrant status of top earners is challenging in most countries because although administrative tax data provide excellent coverage of top incomes, they contain limited demographic information about taxpayers because these characteristics are typically not relevant for tax purposes. For example, the standard form used to file annual personal income tax in the US (IRS form 1040) is used by American citizens and foreigners (‘resident aliens’) alike and does not require disclosure of citizenship or migration status.

To build our migrant indicator, we exploit the structure of National Insurance Numbers (NINOs), which are issued to UK residents for social security purposes and are also used by HMRC

⁵Although the categories of earned and investment income broadly map the economic distinction between labour and capital income, this distinction is blurred for some individuals. In the UK, like the US, there is a significant tax incentive for active owner-managers to repackage their labour income in form of dividends (Miller, Pope and Smith, 2019; Smith et al., 2019). In this respect, our measure of earned income is likely to underestimate the labour share of total income in economic terms.

as the primary unique taxpayer identifier. NINOs all have the following structure:

$$\underbrace{AB}_{\text{sequential prefix}} - 123456 - C$$

The two-letter ‘NINO prefix’ corresponds with a date range when the NINO was originally assigned. Once a NINO has been assigned to an individual, it is never reused. We use archival records to build a novel crosswalk from NINO prefixes to assignment dates covering the entire history of the National Insurance system since NINOs were introduced in 1947.⁶ This allows us to identify, for anyone born after 1930 (age 67 in the first year of our sample), the year when their NINO was assigned.⁷

Children who live in the UK are automatically assigned a NINO at age 16. The exact process of assignment has changed over time but has always been at this age.⁸ A migrant who arrives in the UK after age 16 is required to apply for a NINO through the adult registration process. A NINO is required by law for any individual liable to pay National Insurance Contributions, which includes anyone working in the UK with earned income from any source; it is also required to claim benefits. A NINO is also required to file a tax return, other than in exceptional circumstances.

We determine an individual’s migrant status by comparing the year when their NINO was assigned with their year of birth. We define a migrant as someone who was assigned their NINO after the age of 18. Since this leaves a clear gap between our age threshold and the age at which automatic assignment to natives occurs (age 16), it also guards against the risk of false positives for migrant status. It also means we can identify all adult migrants to the UK, without any bias from later naturalisation.

We cross-check our results on the number of migrants in several different ways. First, for individuals who arrived to the UK after 2001, we compare our results with data collected at the time of application for a NINO, available internally within HMRC. All adult registrants for a NINO must attend an in-person interview with a government employee and provide personal details. If the applicant does not have British nationality at the time of registration, this is recorded. This data source closely matches our results and gives us confidence that we are correctly identifying migrants.

Second, the share of foreigners among all individuals in our dataset is close to the population-wide estimates produced by the UK Office of National Statistics (ONS). In 2017, we find that

⁶Bernstein et al. (2018) use a similar approach in the US to link patent records to migrants identified by Social Security Numbers.

⁷For individuals born before 1931 whose NINO was assigned in 1947 when the National Insurance system was introduced, we are unable to determine migrant status based on the NINO prefix, so these individuals are excluded from our analysis.

⁸From 1947 to 1975, it was compulsory for all UK residents to apply for a NINO by age 16 regardless of intention to work; archival records show that this requirement was strictly enforced. Since 1975, NINOs have been assigned automatically to children at age 16, based either on school registers or entitlement to (universal) child benefits.

around 15.2% of all taxpayers are migrants. The ONS calculates that around 14.4% of individuals living in the UK are foreign-born, or 18.6% if considering only individuals aged 16-64 ([Office of National Statistics, 2019](#)).

Third, comparing the share of migrants across the income distribution in our data to those available in the Quarterly Labour Force Survey (QLFS) – a representative sample of the UK population from the ONS – we closely match the trends seen there (Figure A1). Using our data we can explore further the top of the distribution, since the QLFS is censored around the 97th percentile; study the longitudinal dimension of individual’s incomes; and observe the relationship between income and time since arrival in the UK.

C. Measuring Industry

To analyse the sectors in which top earning migrants work, we assign individuals to an industry based on the Standard Industrial Classification (SIC) 2007 version. For employees, PAYE (payroll) data provides the employer’s SIC code. Individuals with self-employment or partnership income report their business description on the tax return, and HMRC convert these descriptions to a SIC code.

For individuals with only one source of earned income, we assign the industry associated with that source. For individuals with multiple different sources (or multiple employers), we take the SIC code associated with the single largest earned income source. We do not assign any industry to individuals with investment or pension income as their single largest source, except in the case of owner-managers of closely-held companies. We classify an individual as an owner-manager where they received dividends as their single largest income source and reported being a director of a closely-held company, which is defined in UK tax law as a firm with five or fewer directors and/or shareholders. In this case we assign the industry of their firm.

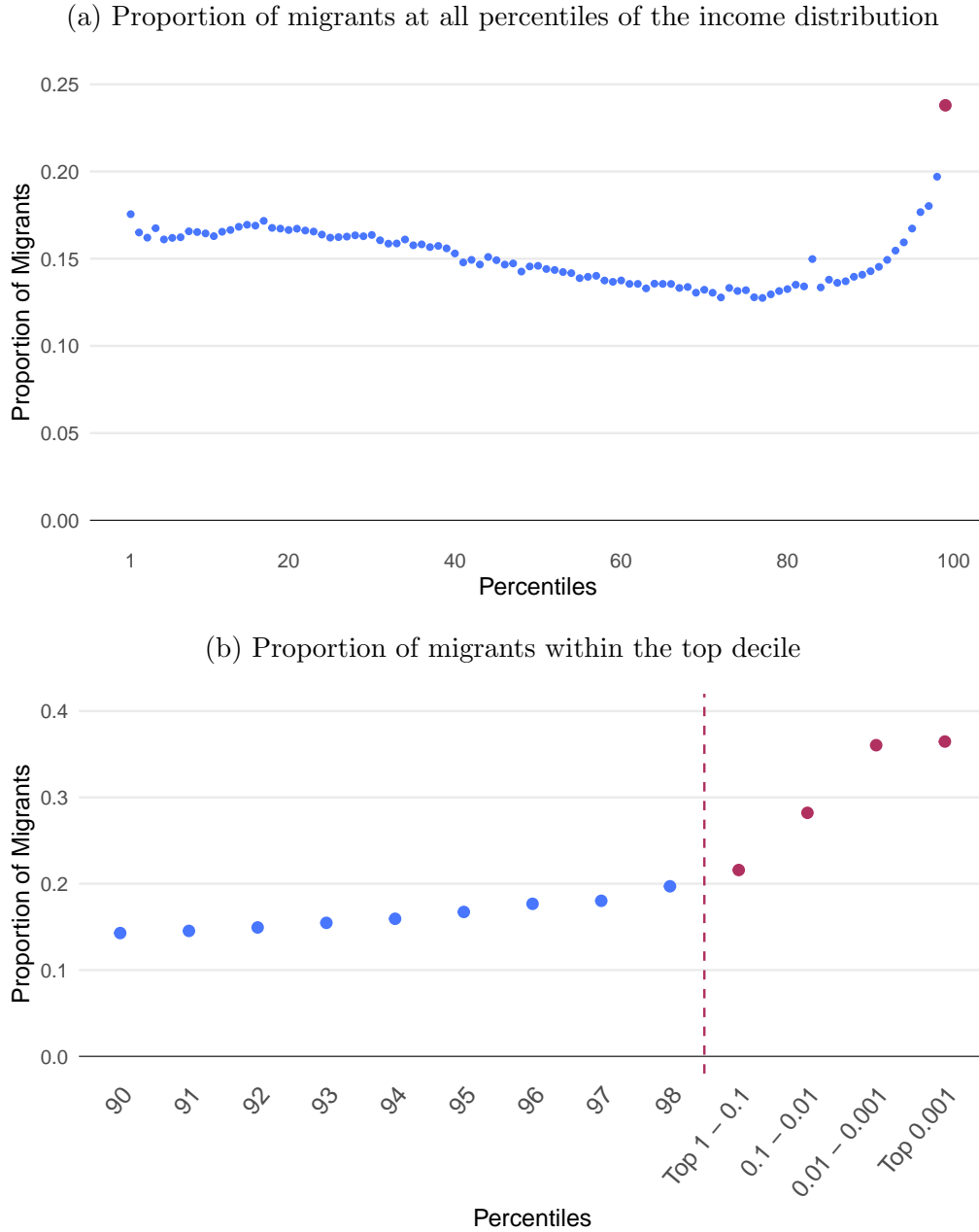
II. Prevalance and rise of top migrants

A. Prevalance of migrants across the income distribution

Migrants make up 24% of individuals in the top 1% of the income distribution in 2017 (Figure 1a). This compares to just 15% across the UK population as a whole. As we show below, this pattern of concentration at the very top is observed across all years of the data.

In the popular imagination it is low-income migration that looms largest, and Figure 1a shows the migrant shares are declining gently across most of the income distribution. They reach a low between the 75th and 80th percentiles, then rise slowly up to the 90th percentile and more rapidly thereafter. The top three percentiles by share of migration are the 99th, 98th and 97th; but even among these the 99th stands out sharply at 4pp above the 98th.

Figure 1. : Migrants are over-represented at the top of the income distribution



Notes: The charts show the proportion of migrants among individuals located in each fractile of the (fiscal) income distribution in 2017. Panel (a) plots the proportion for each percentile of the income distribution. Panel (b) shows the proportion for percentiles from 90th-98th, for the top 1% of individuals excluding the top 0.1%, for the top 0.1% excluding the top 0.01%, for the top 0.01% excluding the top 0.001%, and for the top 0.001%. The unit of analysis is an individual taxpayer. Percentiles of the fiscal income distribution are defined according to publicly available data from HMRC Survey of Personal Income. Income is defined as the sum of “total earned income” (TEI) and “total investment income” (TII). TEI comprises income from employment, trading income from self-employment activities, partnership income, and pensions. TII comprises income from savings and investments including interest, dividend payments, rent from properties.

This rise was previously not observable in UK data. The Quarterly Labour Force Survey data, shown in Figure A1 and used by [Dustmann, Frattini and Preston \(2013\)](#) and [Dustmann, Schönberg and Stuhler \(2016\)](#), are censored from around the 97th percentile. This is too low to pick out the extreme rise at the top.

Within the top percentile, migrants predominantly locate at the very top, making up 29% of the top 0.1%, and 36% of the top 0.01% (Figure 1b). This makes them twice as prevalent in the top 0.01% as anywhere in the bottom 97%. These results are a lower bound since, as described in Section I, we do not observe foreign investment incomes for individuals with ‘non-dom’ status—almost all of whom will be migrants.⁹

It is already known that the UK is an important destination for high-skilled migration ([Kerr et al., 2016](#)). What is striking is that these flows are so quantitatively large, and the migrants so positively selected, that migrants make up a quarter of the top 1%, and a third of the top 0.01%. In one sense it should perhaps not be surprising: 37% of FTSE 100 chief executives, and 57% of the Sunday Times Rich List (top 1000 defined on wealth not income) are foreign-born. The highest echelons of income and wealth are therefore clearly very international. Our results show that international mobility and global talent flows run far deeper, beyond the top hundreds of people down to the top hundreds of thousands of people.

B. Rise in migrants at the top

Over the past twenty years, migrants have become increasingly prevalent at the top of the income distribution in the UK. Figure 2a shows the rise in the proportion of migrants among individuals in various top shares. There are 52% more migrants in the top 1% in 2018 than in 1997, and more than twice as many in the top 0.01%. While this period encompasses economic expansions and recessions, it exhibits a steady increase in migrants at the top of the income distribution in the UK.

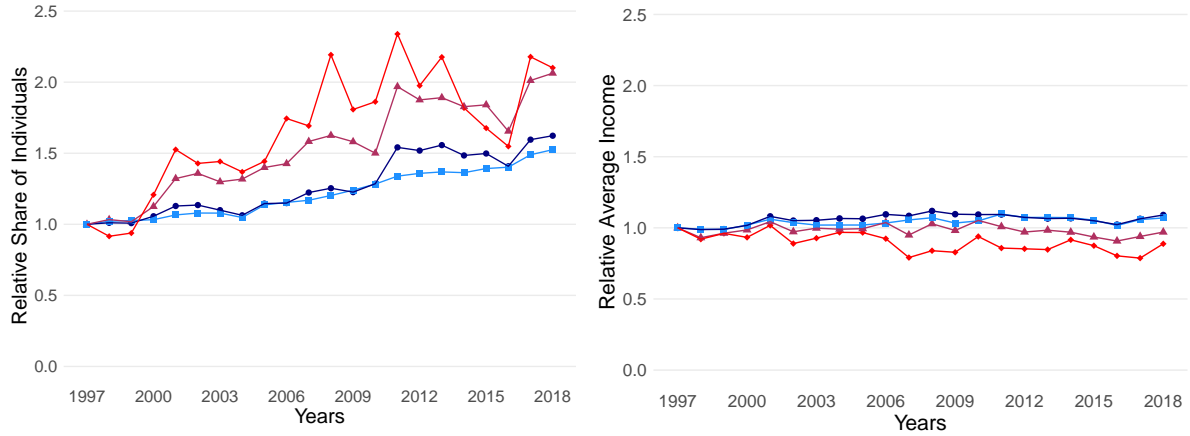
At the same time the ratio of average incomes between natives and migrants has remained roughly constant (Figure 2b), rising by 7% for the top 1%, and falling slightly – by 3% – for the top 0.01%. This suggests that the relative distribution of skills between natives and migrants who have come to the UK over this period has remained constant. The constant relative income of migrants during a period of sharply increasing labour supply also points towards increased demand for global talent in the UK economy. As we will show below this trend is closely linked to the continued growth of the City of London as a global financial centre.

Figure 2c shows the combined effect of these two trends on the share of all income at the top that goes to migrants. Driven largely by the rise in the number of top migrants, the share of top

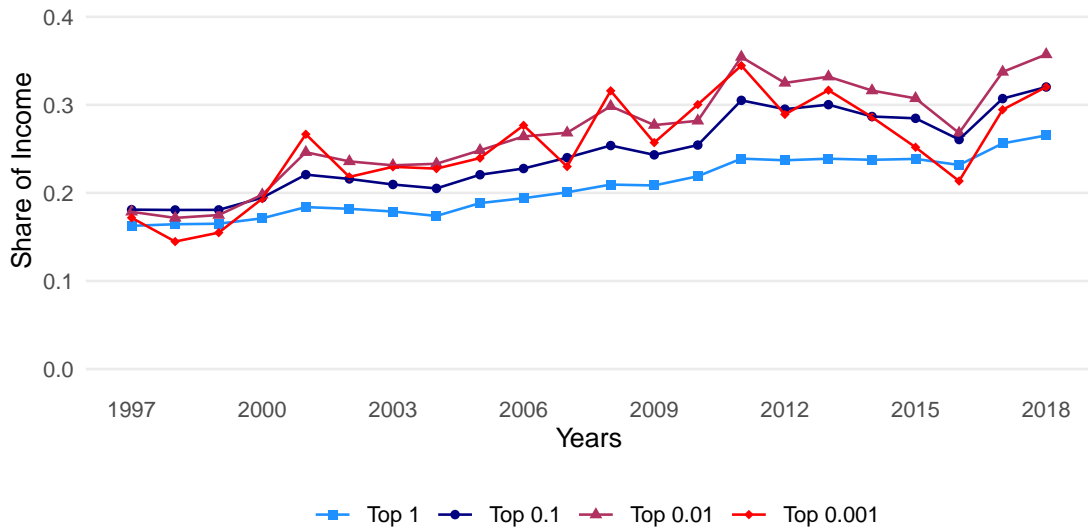
⁹This untaxed foreign investment income is also missing from the fiscal income definitions typically used when measuring income top shares ([Atkinson, 2002, 2007](#)).

Figure 2. : Migrants have become more prevalent at the top since 1997

(a) Share of top individuals who are migrants (1997=1) (b) Average migrant income relative to average native income (1997 = 1)



(c) Share of income in top fractiles that goes to migrants



Notes: These graphs display cumulative growth rates for the following time series: Panel (a) shows the cumulative growth in the ratio of the number of migrants and the total number of individuals in each fractile, normalized to 1 in 1997; Panel (b) shows the cumulative growth in the ratio of average income for migrants and natives in each fractile, normalized to 1 in 1997; Panel (c) shows in levels the share of top income going to migrants in each fractile. The unit of analysis is an individual. Income is defined as the sum of earned income and investment income. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

1% (0.01%) income going to migrants rose from 16% (18%) in 1997 to 27% (36%) in 2018.

Many explanations for the dynamics of top shares implicitly assume the individuals that make up that top share are fixed (Gabaix and Landier, 2008; Autor, Katz and Kearney, 2008; Lemieux, MacLeod and Parent, 2009). We see that in fact this is not the case: the rising migrant share comes not from rising relative incomes but from a rising number of migrants joining the top.

III. What are migrants doing?

A. The importance of earnings

Migrants make up an increasing share of top *earnings*, but their share of investment income is unchanged. Figure 3a shows, separately for earnings and investment income, the cumulative growth in the share of this income going to migrants. Migrants' share of all top 1% earnings has roughly doubled since 1997. In contrast there has been no change in the share of overall investment income: interest, dividends, and rents from properties.¹⁰

This pattern also holds, but is more extreme further up the income distribution. The share of earnings going to migrants in the top 0.1% (0.01%) has nearly tripled (quadrupled) since 1997 (Figure A2). Hence even at the very top, migrants are active participants in the labour force, highlighting the increasing importance of labour income at the top. In both cases investment income shares for migrants have remained flat.

The rising importance of labour income is true for natives as well. In 1997 migrants in the top 1% received 84% of their income from earnings, compared with 80% for natives. By 2017 it was 92% to 87%. In the top 0.01%, migrants (natives) have moved from 68% (54%) of income from earnings to 90% (83%). These results are notwithstanding the repackaging of some labour income into investment income (Smith et al., 2019; Miller, Pope and Smith, 2019).

The picture for migrants contrasts sharply with the common image of top migrants as high wealth individuals living off the returns to wealth. While such cases clearly exist, quantitatively earnings are more important, and increasingly so at the very top.

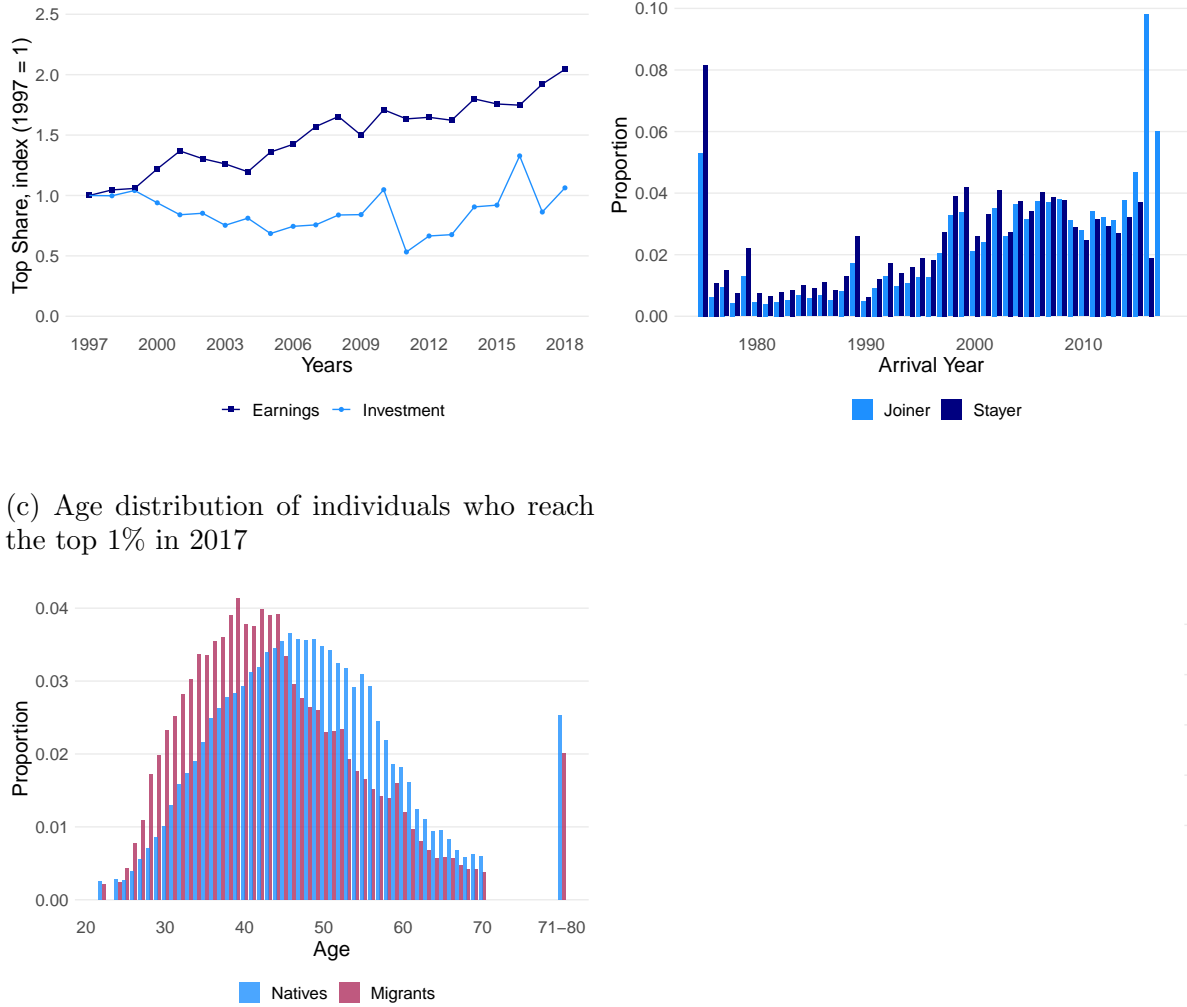
B. The importance of finance

Having seen that top migrants rely on earnings, it is natural to ask where these come from. Table 1a shows – among migrants who report some income from employment, self-employment

¹⁰Note, as discussed in Section I.B, that we find a lower bound on the investment income of migrants. Some migrants will have 'non-dom' status, so will not be taxed on, or have to report, their foreign investment income. This foreign investment income is not observable nor is it included in standard fiscal income measures, so we are consistent with previous work, but it potentially undercounts additional investment income migrants may have. The number of non-doms has risen by only around 10% over the past decade (Table A1), so income levels per non-dom migrant would have to have grown extremely rapidly to overturn the relative pattern between earnings and investment income.

Figure 3. : Characteristics of migrants at the top

- (a) Fraction of earnings and investment income in top 1% going to migrants (1997 = 1)
 (b) Distribution of year of arrival for migrants who reach the top 1% in 2017



Notes: Panel (a) shows the cumulative growth rate from 1997 to 2018 of the following time series: the series labeled “earnings” represents the cumulative increase in migrants’ earnings share of top 1% income, the series labeled “investment” represents the cumulative increase in migrants’ investment income share of top 1% income. Each time series is normalized to 1 in 1997. Panel (b) shows the distribution of year of arrival for migrants in the top 1% in 2017. The series labeled “Joiner” represents the distribution of individuals who reached the top 1% in 2017 but were not in the top 1% in 2016, while the series labeled “Stayer” represents the distribution of individuals who were in the top 1% in both 2016 and in 2017. Individuals arriving before 1975 are pooled into the left-most bars. Panel (c) shows the age distribution for individuals that reached the top 1% in 2017 but were not in the top 1% in 2016, showing the distribution for migrants and natives separately. Each bar represents one year of age, except for years of age between 20-24 that are grouped into two-year bins and for ages between 71-80 that are grouped into a single bin labeled “71 – 80” in the figure, for reasons of disclosure. The unit of analysis is an individual. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

or partnerships, or who are owner-managers – the ten industries which engage the largest share of migrants who are in the top 1%.

The importance of finance is immediately clear. More than one in six top migrants work for a bank. Taking into account support to financial services, fund managers, and other smaller areas of financial activity, finance employs more than a quarter of all migrants in the top 1%. Healthcare is the second most important area: one in ten top migrants is employed in a hospital, medical practice or some other human health activity.

The concentration in finance is disproportionate. Finance is clearly an important industry in the UK, and many people working in finance have high incomes (Bell and Van Reenen, 2014). But finance is highly dependent on migrants: they make up 40% of top individuals who are employed in banks, and between 35% and 45% of top individuals in credit bureaus, securities dealing, financial management, fund management and support to financial services (Table 1b).

The concentration of finance in the UK, specifically London, is crucial for understanding how responsive migrants might be to economic policy. While they have no choice but to respond to migration policies such as visa restrictions – which would clearly have implications for the financial sector – their response to taxes will depend on their outside options. Given the large agglomeration externalities present in finance, it is likely that many migrants to the UK will be less responsive to top taxes than migrants seen in other contexts (Kleven et al., 2019).

C. Local training or international poaching?

Many migrants receive incomes that put them in the top 1% immediately on arrival to the UK. One in six migrants who join the top 1% in 2017 arrived in the UK in either 2016 or 2017 (Figure 3b).¹¹ A third arrived in the past five years.

Many top migrants are thus ‘born’ at the top, not made in the UK, similar in spirit to Blum et al. (forthcoming) in the context of top exporters. This contrasts with the US, where the more important route to the top for migrants is via local training at a US university and then working their way up (Kerr et al., 2017). This may partly be explained by the US’ historically more restrictive visa system, which made universities an important route to allow migrants into the US.

This again highlights the importance of going beyond national borders in thinking about the dynamics of top incomes, to account for international poaching of top earners. Not only is there substantial entry to the top, so that the top 1% are not a fixed group, but a large portion of that entry is from individuals who were not previously *anywhere* in the UK income distribution.

¹¹We do not know when in the tax year a migrant arrives. We therefore combine the last two arrival years, since some migrants may immediately have an annualised income that puts them in the top 1%, but we only observe part of it in the year they arrive.

Table 1—: Industries with highest proportions and concentrations of migrants

(a) What industries do top 1% migrants work in?

Industry (SIC)		Share of Top 1% Migrants	Average Income (£)	Industry Dependency Ratio	
				Share	Rank
1	Banks (64191)	17.0	383,301	39.7	5
2	Hospitals (86101)	6.4	160,412	37.1	8
3	Management consulting (70229)	4.2	326,813	27.4	31
4	Support to financial services (66190)	4.1	515,550	34.7	10
5	Fund managers (66300)	3.6	431,620	36.1	9
6	Information technology (62020)	2.4	207,960	21.1	59
7	Head offices (70100)	2.2	422,862	27.1	32
8	Medical practice (86210)	2.1	194,188	29.2	27
9	Business administration (82990)	1.9	314,761	25.8	34
10	Software development (62012)	1.3	208,332	20.9	64

(b) How reliant are specific industries on migrants among top 1% workers?

Industry (SIC)		Industry Dependency Ratio	Average Income (£)	Share of Top 1% Migrants	
				Share	Rank
1	Web portals (63120)	51.0	259,669	1.0	18
2	Credit bureaus (82912)	47.4	321,500	0.1	84
3	Securities dealers (64991)	44.9	498,245	1.1	16
4	Financial management (70221)	43.9	373,728	1.1	14
5	Banks (64191)	39.7	383,301	17.0	1
6	News agencies (63910)	39.0	217,338	0.4	35
7	Human Resource management (78300)	38.7	273,508	0.2	68
8	Hospitals (86101)	37.1	160,412	6.4	2
9	Fund managers (66300)	36.1	431,620	3.6	5
10	Support to financial services (66190)	34.7	515,550	4.1	4

Notes: This table presents statistics on migrants within 5-digit industries. “Share of top 1% migrants” is the fraction of all migrants in the top 1% who are in this industry. “Average Income” is the mean total income of top 1% migrants employed in this industry. “Industry Dependency Ratio: share” is the fraction of all top 1% workers in this industry who are migrants. “Industry Dependency Ratio: rank” is the ranking of the industry from highest to lowest fraction of all top 1% workers who are migrants. In Panel (a) the rows are sorted by the “share of top 1% migrants”. In Panel (b) the rows are sorted by the “industry dependency ratio”.

D. Migrants are positively selected

Migrants reach the top at younger ages than natives, but still in middle age. The median age for a native who newly joined the 1% in 2017 was 47, and the distribution is roughly symmetric around that (Figure 3c). For a migrant joining the 1% the median was 42, with the distribution skewed to the right. The same distinctive pattern is visible among individuals who were in the top 1% in 2016 and in 2017 (Figure A4a) and in the pooled distribution (Figure A4b).

We have already seen that migrants are increasingly represented at higher income shares, so that a migrant in the 1% on average has an 8% higher income than a native in the top 1%. Looking at age provides another way to see that migrants are positively selected. Not only are they disproportionately represented at the top of the income distribution but relative to natives at the top they are much younger.

Using a [DiNardo, Fortin and Lemieux \(1996\)](#) decomposition, we see that migrants earn more not because they work in high paying industries, but because they are positively selected within the industry. Migrants are only slightly more likely to work in extremely high paying industries, so that industry differences explain roughly 20% of the immigrant-native wage differences at the top. The majority of income differences are driven by top income migrants earning much more than comparable natives, again highlighting that they are positively selected.

Existing studies looking at the selection of immigrants use educational qualifications to determine skills ([Grogger and Hanson, 2011](#); [Peri, 2016](#)). However, depending where these qualifications were earned, it is not always straightforward to compare these qualifications with those of natives. Moreover, educational qualifications at the top of the income distribution are often the same and reveal little about selection. We see that on direct economic measures – income, and age given income – top migrants do better than natives.

These results also highlight that a typical top migrant is not someone leaving university in the UK and immediately getting a high-paying job in a bank. Rather they are predominantly early middle-aged individuals who migrate straight into a high-paying job, echoing findings by [Azoulay et al. \(2020\)](#) on the (middle) age of entrepreneurs.

IV. Contribution of migrants to the growth in top shares

A. Constructing contribution to top

To understand the contribution of migrants to inequality, we decompose the rise in the top 1% share into the contributions of migrants and natives. This is not a causal analysis of the ‘impact’ of migrants, but a decomposition in the vein of growth accounting ([Solow, 1957](#); [Barro, 1999](#)).

We calculate the contribution of migrants and natives to the growth rate in the top share from

year t to year $t + N$ as:

$$\frac{S_{t+N} - S_t}{S_t} = \frac{S_{t+N}^m - S_t^m}{S_t} - \frac{S_{t+N}^n - S_t^n}{S_t}$$

where S_t is share of fiscal income going to individuals in the top percentile in year t , while S_t^m and S_t^n are the shares going to migrants and natives, respectively, in the same percentile.

B. Migrants contribute almost all of the growth in the 1%

Migrants account for a substantial fraction of the increase in top income shares in the UK. Between 1997 and 2018 incomes at the top of the distribution grew substantially faster than average incomes: the top 1% share rose 15% from 12.4% to 14.3%. The top 0.1% (0.01%) share rose faster, growing 35% (49%) over the period.

Using the above growth accounting framework, we find that migrants account for 85% of the growth in top 1% share from 1997 to 2018 (Figure 4a). Out of the 15% increase in the top 1% share, migrants accounted for 14pp (around 85%), while natives contributed 1pp. Further up the distribution, migrants accounted for around two thirds of the increase in the top 0.1% and 0.01% shares. In this sense it appears that the UK is *importing inequality*.

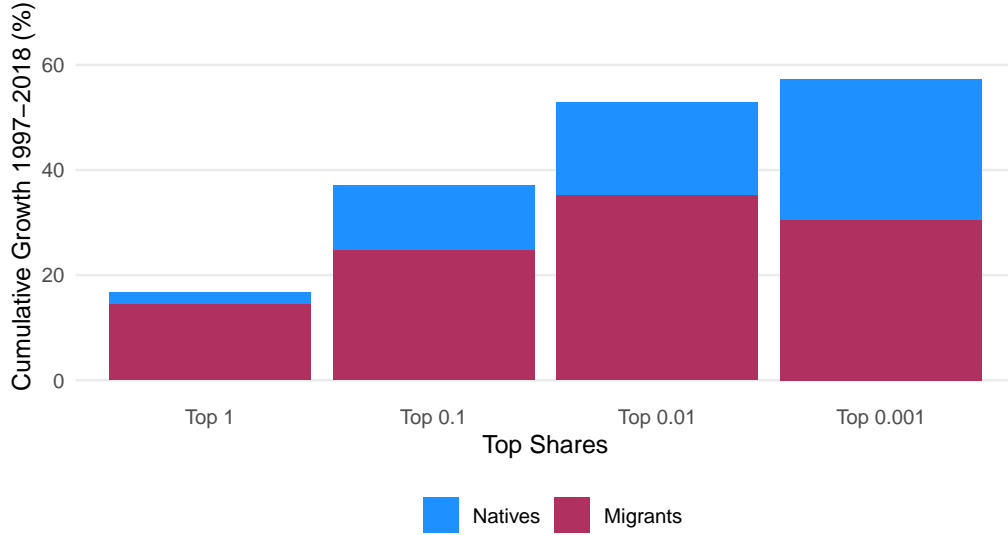
Most of this growth comes from migrants being positively selected. Using a decomposition in the manner of [DiNardo, Fortin and Lemieux \(1996\)](#) and [Firpo, Fortin and Lemieux \(2011\)](#), we examine the effect of retaining migrants, but imposing that they come from the same distribution as natives. We find that when migrants are not positively selected relative to the UK distribution, the top 1% share falls to 11.2 in 1997 and 11.9 in 2018, and growth in this share falls from 1.9pp to 0.6pp. The *positive selection* of top income migration therefore contributes two thirds of the rise in UK top 1% share over this period.

Even without reallocating these migrants into their home country income distributions, removing them from the UK reduces the top share to a level much closer to other European countries: top 1% shares for France, Italy, and Sweden hover between 8-10%. [Alvaredo et al. \(2013\)](#) note the different paths of top income inequality taken by English-speaking countries and other European countries. They suggest tax and labour market developments are key explanatory factors, focusing on the impact on the existing population. We highlight that international sorting is an important channel by which these factors operate ([Dustmann and Preston, 2019](#)), driving some of the international difference in top shares. The English-speaking countries [Alvaredo et al. \(2013\)](#) report as seeing the largest rises in inequality are the same ones [Kerr et al. \(2016\)](#) single out as top destinations for high-skilled migrants.

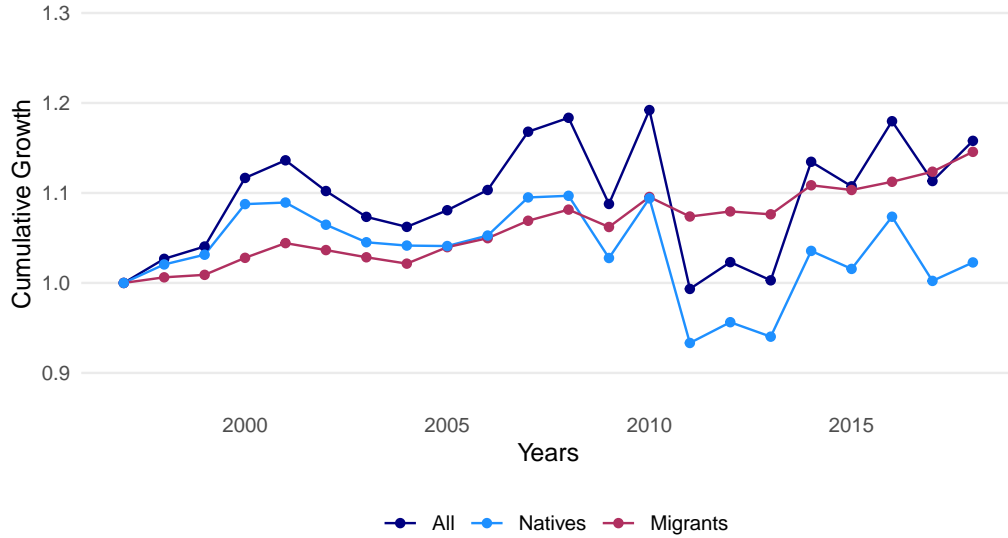
UK top share inequality over the past two decades can be divided into two distinct periods (Figure 4b). All the increase in top income concentration took place over the first decade, up to a peak in 2007. Top shares have remained broadly flat around 14% since then, although with

Figure 4. : Migrants account for a large fraction of growth in top shares

(a) Decompositon of total growth in top income shares from 1997 to 2018



(b) Decomposition of cumulative total growth of top 1% share over time



Notes: The figures show the cumulative growth in top shares from 1997 to 2018. Panel (a) shows the decomposition of the total cumulative growth rate between migrants and natives, as described in Section IV.A. Panel (b) shows the decomposition of the cumulative growth rate in the top 1% share from 1997 up to each subsequent year. The unit of analysis is an individual. Income is defined as the sum of earnings and investment income. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

significant volatility. This volatility was driven by policy: a pre-announced rise in the top rate of income tax led to ‘dividend forestalling’, where top income individuals who were owner-managers of companies brought forward dividend payments before the tax rate increase, and later delayed dividends ahead of a pre-announced rate cut (Miller, Pope and Smith, 2019).

Over the same period, top migrant incomes have grown steadily, while top native incomes have

been much more volatile. The lack of volatility partly reflects the importance of labour income for migrants: this means they did not have the opportunity to engage in the forestalling behaviour undertaken by (some) natives.

The overall top income series has broadly taken its trend from migrant incomes, and its volatility from natives. Right before the financial crisis, migrants accounted for less than half of the increase in the top 1 share from 1997. In the ten years since 2007, the contribution of migrants continued to increase and doubled to 85%. A similar pattern is observed further up the income distribution (see Figure A3). The rise in migrants has thus continued even while income concentration remained roughly constant.

V. Discussion

The evolution of top income shares are of interest to researchers, policymakers and the public at large. Most explanations for changes to these top incomes implicitly assume a fixed population whose incomes are rising, and the public discussion is conducted in the same way. In contrast, we show that the share of migrants at the top of the income distribution is large and rising. Almost all of the rise in the top 1% share over the past two decades can be attributed to migrants. Their incomes are largely from employment, focused in the finance industry.

These trends in migration highlight the importance of the international allocation of talent. Particular industries, including finance and technology, are known to have strong agglomeration externalities. It is perhaps no surprise that migrants should sort internationally to where they can receive the highest returns. These migrants are also positively selected: they are younger than natives with the same incomes, and are increasingly concentrated at higher fractiles of income. Understanding what these migrants are doing, and what their alternatives are, is key to understanding how responsive they are likely to be to policy, including top tax rates.

Some industries have an extremely high concentration of migrants: they make up more than half of top earners in some parts of finance. Recent nativist policies in the US and UK, which heavily restrict visa availability, are largely premised on the idea that natives can and will fill those jobs. But the high concentrations by industry mean that, even if this were ultimately possible, transition costs from removing existing migrants are extremely high. Political decisions about the future of the UK visa system are therefore critical in determining what happens to top incomes, and to the industries which rely on top migrants.

REFERENCES

- Advani, Arun, and Andy Summers.** 2020. “Capital gains and UK inequality.” Competitive Advantage in the Global Economy (CAGE) Working Paper Series 465.
- Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell, and David Hémous.** 2019. “Innovation and top income inequality.” *Review of Economic Studies*, 86(1): 1–45.
- Alvaredo, Facundo.** 2017. “UK estimates of top income shares 2013-2014 and 2014-2015: Note on methods.” WID.world Technical Note 2017/02.
- Alvaredo, Facundo, Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez.** 2013. “The top 1 percent in international and historical perspective.” *Journal of Economic Perspectives*, 27(3): 3–20.
- Alvaredo, Facundo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman.** 2018. “World Inequality Database.” <http://WID.world>.
- Aoki, Shuhei, and Makoto Nirei.** 2017. “Zipf’s Law, Pareto’s Law, and the evolution of top incomes in the United States.” *American Economic Journal: Macroeconomics*, 9(3): 36–71.
- Atkinson, Anthony B.** 2002. *Top incomes in the United Kingdom over the twentieth century*. Vol. 43, University of Oxford: Oxford.
- Atkinson, Anthony B.** 2007. “Top Incomes over the Twentieth Century: A Contrast between Continental European and English-Speaking Countries.” Chapter 4: ‘The distribution of top incomes in the United Kingdom 1908–2000’, 82–140.
- Atkinson, Anthony B.** 2014. “UK estimates of top income shares 2011-2012: Note on methods.” WID.world Technical Note 2014/01.
- Atkinson, Anthony B., and Andrew Leigh.** 2008. “Top incomes in New Zealand 1921–2005: Understanding the effects of marginal tax rates, migration threat, and the macroeconomy.” *Review of Income and Wealth*, 54(2): 149–165.
- Atkinson, Anthony B., Thomas Piketty, and Emmanuel Saez.** 2011. “Top incomes in the long run of history.” *Journal of Economic Literature*, 49(1): 3–71.
- Auclert, Adrien, and Matthew Rognlie.** 2017. “Aggregate demand and the top 1 percent.” *American Economic Review*, 107(5): 588–92.

- Auclert, Adrien, and Matthew Rognlie.** 2018. “Inequality and aggregate demand.” *NBER Working Paper 24280*.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney.** 2006. “The polarization of the US labor market.” *American Economic Review*, 96(2): 189–194.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney.** 2008. “Trends in US wage inequality: Revising the revisionists.” *Review of Economics and Statistics*, 90(2): 300–323.
- Azoulay, Pierre, Benjamin F. Jones, J. Daniel Kim, and Javier Miranda.** 2020. “Age and high-growth entrepreneurship.” *American Economic Review: Insights*, 2(1): 65–82.
- Barro, Robert J.** 1999. “Notes on growth accounting.” *Journal of Economic Growth*, 4(2): 119–137.
- Bell, Alex, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen.** 2019. “Do tax cuts produce more Einsteins? The impacts of financial incentives versus exposure to innovation on the supply of inventors.” *Journal of the European Economic Association*, 17(3): 651–677.
- Bell, Brian, and John Van Reenen.** 2014. “Bankers and their bonuses.” *Economic Journal*, 124(574): F1–F21.
- Bernstein, Shai, Rebecca Diamond, Timothy McQuade, and Beatriz Pousada.** 2018. “The contribution of high-skilled immigrants to innovation in the United States.” Stanford University Graduate School of Business Research Papers 3748.
- Bivens, Josh, and Lawrence Mishel.** 2013. “The pay of corporate executives and financial professionals as evidence of rents in top 1 percent incomes.” *Journal of Economic Perspectives*, 27(3): 57–78.
- Blum, Bernardo S., Sebastian Claro, Ignatius Horstmann, and Trevor Tombe.** forthcoming. “The DNA of new exporters: Spin-offs and FDI at the extensive margin of trade.” *American Economic Review: Insights*.
- Brühlhart, Marius, Mario Jametti, and Kurt Schmidheiny.** 2012. “Do agglomeration economies reduce the sensitivity of firm location to tax differentials?” *Economic Journal*, 122(563): 1069–1093.
- Burkhauser, Richard V., Nicolas Hérault, Stephen P. Jenkins, and Roger Wilkins.** 2018. “Survey under-coverage of top incomes and estimation of inequality: What is the role of the UK’s SPI adjustment?” *Fiscal Studies*, 39(2): 213–240.

- Devereux, Michael P., Rachel Griffith, and Helen Simpson.** 2007. “Firm location decisions, regional grants and agglomeration externalities.” *Journal of Public Economics*, 91(3-4): 413–435.
- DiNardo, John, Nicole M. Fortin, and Thomas Lemieux.** 1996. “Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach.” *Econometrica*, 64(5): 1001–1044.
- Dustmann, Christian, and Ian P Preston.** 2019. “Free Movement, Open Borders, and the Global Gains from Labor Mobility.” *Annual Review of Economics*, 11: 783–808.
- Dustmann, Christian, Tommaso Frattini, and Ian P Preston.** 2013. “The effect of immigration along the distribution of wages.” *Review of Economic Studies*, 80(1): 145–173.
- Dustmann, Christian, Uta Schönberg, and Jan Stuhler.** 2016. “The impact of immigration: Why do studies reach such different results?” *Journal of Economic Perspectives*, 30(4): 31–56.
- Firpo, Sergio, Nicole Fortin, and Thomas Lemieux.** 2011. “Decomposition Methods in Economics.” *Handbook of Labor Economics*, 4(PART A): 1–102.
- Gabaix, Xavier, and Augustin Landier.** 2008. “Why has CEO pay increased so much?” *Quarterly Journal of Economics*, 123(1): 49–100.
- Gabaix, Xavier, Benjamin Moll, Jean-Michel Lasry, and Pierre-Louis Lions.** 2016. “The dynamics of inequality.” *Econometrica*, 84(6): 1–45.
- Grogger, Jeffrey, and Gordon H. Hanson.** 2011. “Income maximization and the selection and sorting of international migrants.” *Journal of Development Economics*, 95(1): 42–57.
- Jones, Charles I.** 2019. “Taxing top incomes in a world of ideas.” National Bureau of Economic Research Working Paper 25725.
- Jones, Charles I., and Jihee Kim.** 2018. “A Schumpeterian model of top income inequality.” *Journal of Political Economy*, 126(5): 1785–1826.
- Kerr, Sari P., William Kerr, Çağlar Özden, and Christopher Parsons.** 2016. “Global talent flows.” *Journal of Economic Perspectives*, 30(4): 83–106.
- Kerr, Sari P., William Kerr, Çağlar Özden, and Christopher Parsons.** 2017. “High-skilled migration and agglomeration.” *Annual Review of Economics*, 9: 201–234.
- Kleven, Henrik J., Camille Landais, Mathilde Muñoz, and Stefanie Stantcheva.** 2019. “Taxation and migration: Evidence and policy implications.” National Bureau of Economic Research Working Paper 25740.

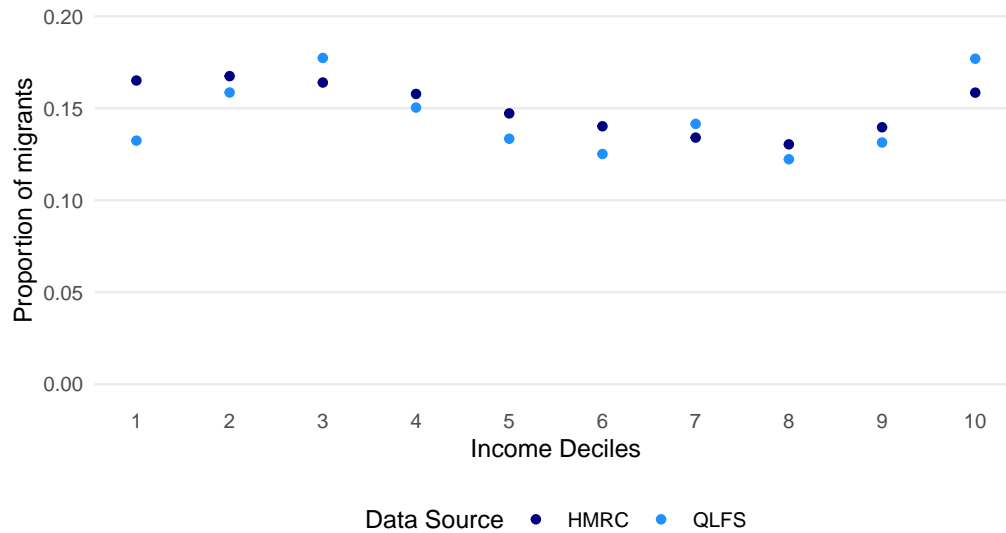
- Koenig, Felix.** 2019. “Superstar effects and market size: Evidence from the roll-out of TV.” CEP Discussion Paper 1663.
- Lansing, Kevin J., and Agnieszka Markiewicz.** 2018. “Top incomes, rising inequality and welfare.” *Economic Journal*, 128(608): 262–297.
- Lemieux, Thomas, Bentley MacLeod, and Daniel Parent.** 2009. “Performance pay and wage inequality.” *Quarterly Journal of Economics*, 124(1): 1–49.
- Miller, Helen, Tom Pope, and Kate Smith.** 2019. “Intertemporal income shifting and the taxation of owner-managed businesses.” *IFS Working Paper W19/25*.
- Office of National Statistics.** 2019. “Population of the UK by country of birth and nationality.”
- Peri, Giovanni.** 2016. “Immigrants, productivity, and labor markets.” *Journal of Economic Perspectives*, 30(4): 3–30.
- Piketty, Thomas, and Emmanuel Saez.** 2003. “Income inequality in the United States, 1913–1998.” *Quarterly Journal of Economics*, 118(1): 1–41.
- Piketty, Thomas, and Emmanuel Saez.** 2006. “The evolution of top incomes: A historical and international perspective.” *American economic review*, 96(2): 200–205.
- Piketty, Thomas, and Emmanuel Saez.** 2013. “Top incomes and the great recession: Recent evolutions and policy implications.” *IMF Economic Review*, 61(3): 456–478.
- Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman.** 2018. “Distributional national accounts: methods and estimates for the United States.” *Quarterly Journal of Economics*, 133(2): 553–609.
- Roine, Jesper, Jonas Vlachos, and Daniel Waldenström.** 2009. “The long-run determinants of inequality: What can we learn from top income data?” *Journal of Public Economics*, 93(7-8): 974–988.
- Rubolino, Enrico, and Daniel Waldenström.** 2020. “Tax progressivity and top incomes evidence from tax reforms.” *Journal of Economic Inequality*, 1–29.
- Saez, Emmanuel.** 2019. “Striking it Richer: The evolution of top incomes in the United States (updated with 2017 final estimates).” *University of California Berkeley*.
- Saez, Emmanuel, and Michael R. Veall.** 2005. “The evolution of high incomes in Northern America: lessons from Canadian evidence.” *American Economic Review*, 95(3): 831–849.

- Smith, Matthew, Danny Yagan, Owen M. Zidar, and Eric Zwick.** 2019. “Capitalists in the twenty-first century.” *Quarterly Journal of Economics*, 134(4): 1675–1745.
- Solow, Robert M.** 1957. “Technical change and the aggregate production function.” *Review of Economics and Statistics*, 312–320.
- Straub, Ludwig.** 2019. “Consumption, savings, and the distribution of permanent income.” *mimeo*.

Appendix A. Supplementary Online Appendix

Additional Figures

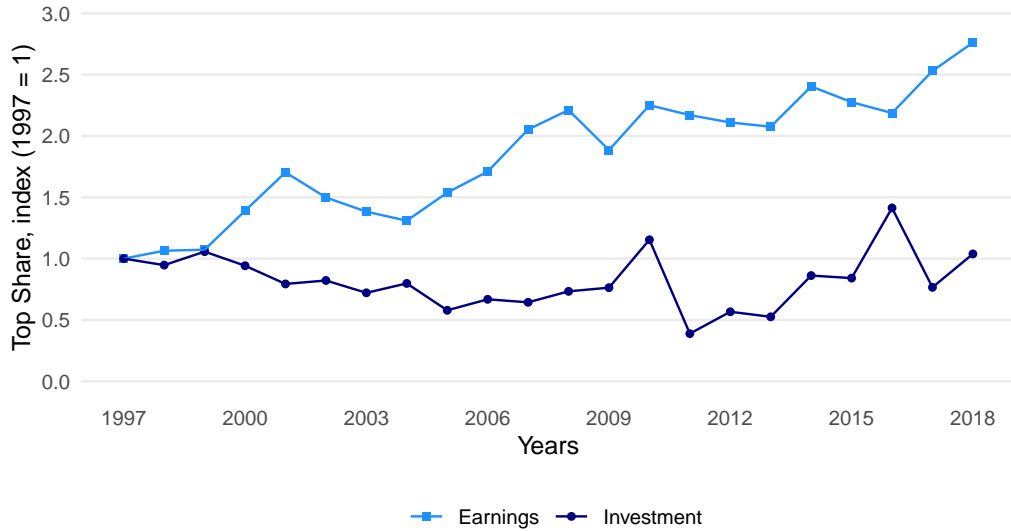
Figure A1. : Similar trend but lower level of migrants across income distribution, comparing survey data to administrative data



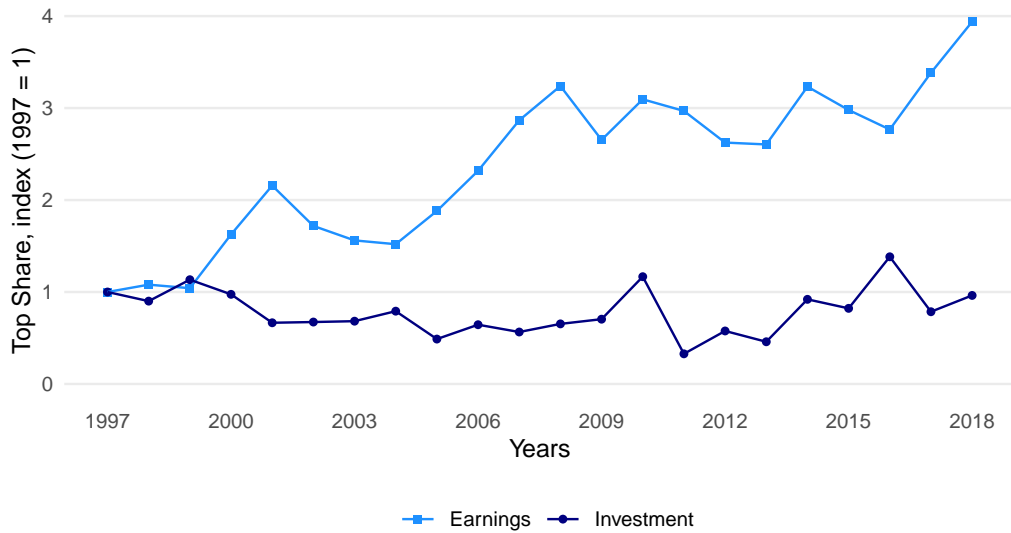
Notes: The figure shows the proportion of migrants at each decile of the income distribution. The series labelled “HMRC” is based on confidential tax micro-data on the population of income tax filers, for tax year 2016-17. The series labelled “QLFS” comes from the Quarterly Labour Force Survey – a representative sample of the UK population – using the four quarters from the 2016-17 tax year (2016 Q2, Q3, Q4, and 2017 Q1). Deciles boundaries are defined using the publicly available data from HMRC’s Survey of Personal Incomes.

Figure A2. : Migrants' earnings share increased more further up the income distribution

(a) Cumulative increase in share of earnings and investment of migrants in top 0.1%



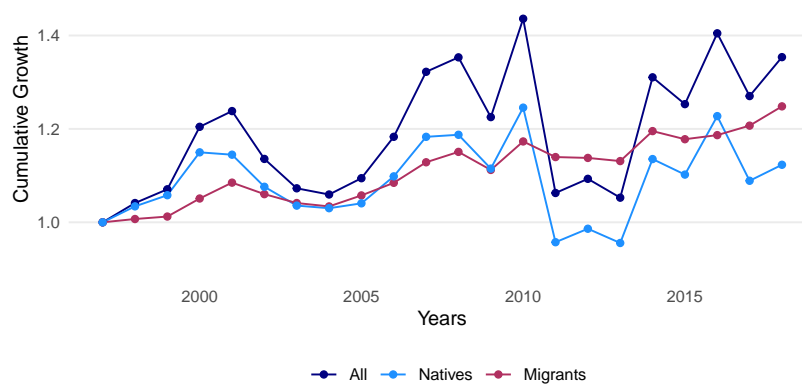
(b) Cumulative increase in share of earnings and investment of migrants in top 0.01%



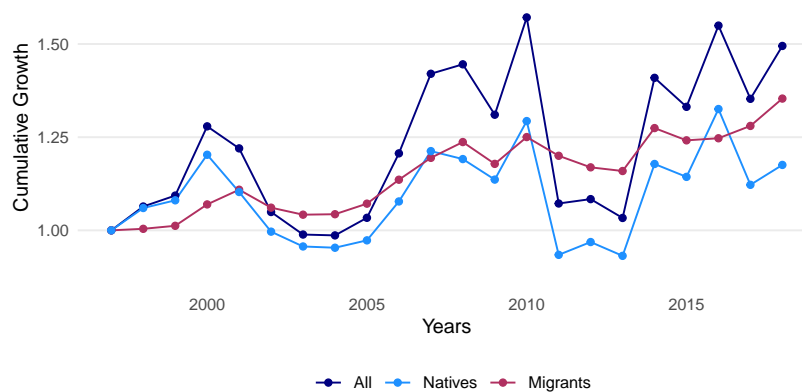
Notes: The figure shows the cumulative growth rate from 1997 to 2018 for two time series described below for migrants in the top 0.1% (Panel a) and in the top 0.01% (Panel b). The series labeled “earnings” represents the cumulative increase in migrants’ earning share of top share income, and the series labeled “investment” represents the cumulative increase in migrants’ investment income share of top share income. Each time series is normalized to 1 in 1997. The unit of analysis is an individual. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

Figure A3. : Migrants account for a large fraction of growth in top shares

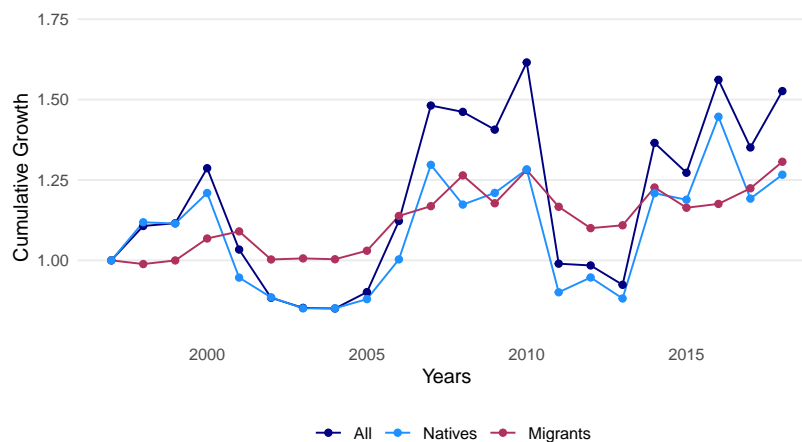
(a) Decomposition of total growth of top 0.1% share



(b) Decomposition of total growth of top 0.01% share

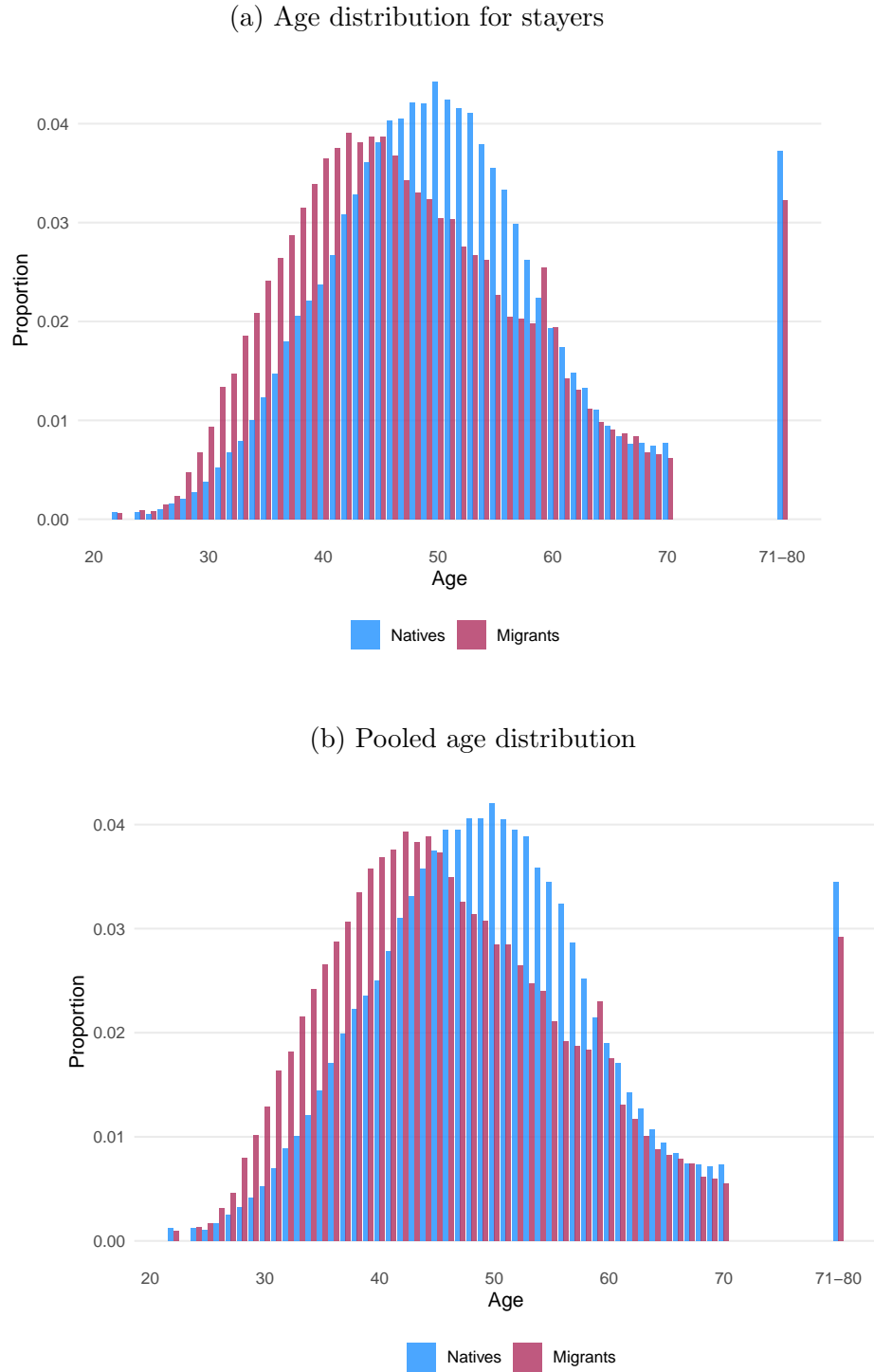


(c) Decomposition of total growth of top 0.001 share



Notes: The figure shows the decomposition of the cumulative growth rate in the top 0.1% share (Panel a) and in the top 0.01% share (Panel b) from 1997 up to each subsequent year. The decomposition is described in section IV.A. The unit of analysis is an individual. Income is defined as the sum of earnings and investment income. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

Figure A4. : Migrants are younger than natives at the top



Notes: The figure shows the age distribution of individuals in the top 1% of the income distribution in 2017, aged 20-80. Each figure shows the distribution for migrants and natives separately. Panel (a) shows the age distribution for 'stayers': individuals that were in the top 1% in 2016 and remained in the top 1% in 2017. Panel (b) shows the age distribution of all individuals in the top 1% in 2017 wherever they were in 2016. Each bar represents one year of age, except for years of age between 20-24 that are grouped into two-year bins and for ages between 70-80 that are grouped into a single bin labeled "71-80" in the figure, to avoid disclosure. The unit of analysis is an individual. A migrant is identified as a taxpayer who received their National Insurance Number (NINO) at the age of 18 or older. All top shares are defined relative to the total number of individuals aged 18 or older in the population living in the UK.

Additional Tables

Table A1—: Number of non-domiciled individuals claiming the remittance basis

Year	Count of non-doms
2009	48,500
2010	45,600
2011	49,200
2012	48,900
2013	48,000
2014	53,000
2015	55,100
2016	55,100
2017	53,700
2018	45,700

Notes: This table shows the number of non-domiciled individuals claiming the remittance basis. The remittance basis allows eligible individuals to avoid reporting, or being taxed on, investment income arising outside the UK. The source of this table is “Statistics on Non-Domiciled Taxpayers in the UK 2007-08 to 2018-19” published by HMRC in July 2020.