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Migration and redistributive spending: evidence from local authorities in England

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European University Institute

Robert Schuman Centre for Advanced Studies

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Abstract

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Keywords

Migration and redistributive spending: evidence from local authorities in England[*]

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November 10, 2021

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Keywords: Migration; Migration policy; Public spending; Redistribution

1   Introduction

Concerns about redistributing income to what are considered outsiders has featured as a salient issue in the run up to the 2016 Brexit referendum that ultimately saw the UK leaving the European Union (EU) by popular vote. Both UK transfers to the EU and the pressure EU immigrants allegedly put on public service provision in the UK were platforms the "Vote Leave" campaign heavily relied on to mobilise its supporters [Gherghina and O'Malley, 2019, Goodwin and Milazzo, 2017, Becker et al., 2017].

In this paper, we investigate if the link between the inflow of EU "outsiders" and a local loss of appetite for redistributing income was visible in the UK before the Brexit referendum took place. Specifically, we focus on the time period after the 2004 and 2007 EU enlargement when the historically anchored EU scepticism in the UK took a turn against migration following the granting of free movement rights to citizens from Central and Eastern European countries and the large inflow that followed into UK territory [Gherghina and O'Malley, 2019]. We analyse the effect of the unexpected and spatially heterogeneous migration wave from the 12 post-2004 Accession Countries (AC-12) on English local authority level public spending and revenue to answer the question if the local presence of migrants is indeed associated with less redistributive spending patterns. We combine detailed local authority revenue and expenditure data from the Chartered Institute of Public Finance and Accountancy (CIPFA) with annual data on local authority level migrant stocks calculated from the UK Labour Force Survey/Annual Population Survey (LFS/APS) obtained under a special licence agreement over the 2000 to 2015 observation period. Due to the very low number of AC-12 migrants present in England in the pre-enlargement period, the estimated coefficients we obtain from our two-way fixed effects panel regressions correspond to a difference-in-differences research design, allowing us to recover treatment-on-the-treated effects of AC-12 migration on local authority revenue and spending.

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Taken at face value, we find ambiguous results with regards to the hypothesis of a closed in-group that cuts down on redistributing income when faced with outsiders. On the one hand, AC-12 migration did not affect local authorities' per capita spending. However, once we zoom in on local revenue and spending patterns, we find that the presence of AC-12 migration is associated with a decrease in locally generated revenue and the unchanged per capita spending was heavily supported by an increase in funding local authorities received from the central government. AC-12 migration is further associated with both a decrease in means-tested social care spending per capita and an increase in education expenditure per capita, an expenditure item where inter-group transfers are likely to be relatively more salient compared to other non-means-tested services [Tabellini, 2020a, Speciale, 2012].

To further explain these results, we then disentangle local preferences for less redistribution from mechanical changes in demand for local services brought about by the distinct characteristics of AC-12 migrants. Our results show that the strong association of AC-12 migration with a decline in social care and a rise in education expenditure per capita is driven by changes this migrant group caused to local demographics. In fact, social care expenditure per population aged 65 and above, the main recipient population of social care services, increased strongly in response to AC-12 inflows. Similarly, when normalising education expenditure per the rising local number of pupils in areas more strongly affected by AC-12 migration, expenditure remained vastly unaffected. Thus, the effects AC-12 migrants had on local authority expenditure patterns were in large parts due to the shifts to local demographics these migrants caused and the corresponding institutional responses that were triggered by the resulting changes in local service demand. The relative shifts from social care towards education expenditure further explain the observed dynamics on the revenue side: In England, local authority education expenditure is almost entirely funded through central government grants, while a larger share of social care spending comes from locally generated revenue [Phillips, 2018]. It thus appears that migration decreased the pressure

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local authorities faced on social care spending over our observation period, allowing local authorities to take better care of their vulnerable older population while decreasing the need for raising revenue locally. On the other hand, we do not find evidence that would support the hypothesis of a shift in local preferences towards less redistribution in response to migration inflows, which we test by analysing local voting patterns and native out-migration ("voting with their feet") following the 2004 EU enlargement and the subsequent wave of AC-12 migration. Our results show that a larger presence of AC-12 migrants is associated with a rise in local Council seats held by the more redistributive Labour party (rather than the Conservatives) and a decline in net-migration outflows. We note that the latter result, coined "fiscal externality" by Tabellini [2020b], may also provide a partial explanation for the changes in local demographics associated with AC-12 migration.

England is a suitable test bed for the local level link between migration and public spending for a number of reasons. First, the country experienced large waves of migration in recent decades, including the both unprecedented and unexpected wave of AC-12 migrants following the 2004 enlargement of the European Union [Becker et al., 2016]. These successive waves have led scholars to test the impact of the intensity of migration flows to the UK on numerous outcomes including crime rates [Bell et al., 2013, Jaitman and Machin, 2013], house prices [Sá, 2015], hospital waiting times [Giuntella et al., 2018], public budgets and the wages and employment of natives [Card et al., 2012, Manacorda et al., 2012, Dustmann et al., 2013, Becker et al., 2018]. In this study, we exploit the large and spatially heterogeneous shock to local migration stocks that stemmed from EU enlargement in 2004 and led to more than one million people migrating from Central and Eastern Europe to the UK. The fact this stemmed from the granting of free movement rights to new EU citizens explains the size and suddenness of the migration wave and distinguishes it from other migration waves because of the rights framework that enabled movement from the AC-12 to England post-2004. Second, the discretion in raising revenue and spending decisions at the hands of local

authorities in the UK makes it an appropriate case study. Funded through a mix of central government grants and locally raised revenue, England, and the UK more generally, is one of the European countries where local governments have discretion over spending decisions that encompass several public expenditure items. UK local authorities are responsible for policies concerning education, social care services, highways, roads and transport, housing, cultural services, environmental services, planning and development and protective services [Gavazza et al., 2019, Sandford, 2018, Phillips, 2018]. Local authorities are required to balance their budget but can increase or decrease their total spending through steering the local council tax, a property tax. They can further shift their spending between more or less redistributive spending items, with spending on means-tested social care services in particular reflecting the redistribution of income towards the relatively less wealthy. Third, due to the limited scope the UK central government had under EU law to target EU migrants directly over our 2000 to 2015 observation period, the central government could not use restrictive migration policies in the years prior to the Brexit referendum, such that cutting public spending was the only possible response to a decrease in appetite for redistributing resources. Finally, the wealth of information available allows to disentangle local preferences and fiscal externalities from a more mechanical migrant demand channel, a mechanism frequently neglected in the literature when studying the effect of migration on preferences for redistribution.

1.1 Contribution to the Literature

Our results contribute to the literature on the impact of migration on redistribution in destination areas. Pioneered by Freeman [1986], Alesina et al. [2001], Alesina et al. [2004] and Easterly and Levine [1997], an important stream of literature argues that redistributive policies are supported more strongly by homogeneous groups. These findings are driven by in-group biases which translate into greater immigrant diversity lowering preferences for redistribution. Following this work, several scholars have analysed the relationship between

immigration and preferences for redistribution in the context of migration to the US and European countries with results pointing towards a negative association of the two [Senik et al., 2009, Hopkins, 2010, Speciale, 2012, Halla et al., 2017, Dinas et al., 2019, Steinmayr, 2020]. For example, Senik et al. [2009] finds some evidence of a negative association studying Europe as whole. Speciale [2012] leverages the variation in inflows of migrants to EU-15 countries stemming from the 1990s Balkan wars to study the impact of migration on education expenditure and finds a small and negative association between perceived migration and support for the welfare state. Both authors document considerable heterogeneity across countries and stress the importance of sub-national studies to understand the mechanisms at play and allow for a causal investigation.

Dahlberg et al. [2012] exploit a refugee dispersal mechanism in Sweden and find a significant negative effect of immigration on the local support for redistribution. In Denmark, Harmon [2018] uses an instrumental variable strategy based on historical housing stock data and finds that greater migration inflows leading to increases in local ethnic diversity shift election outcomes from traditional "big government" left-wing parties towards anti-immigrant nationalist parties. Both studies suggest immigration may lower the level of redistribution or public spending but identify further examination of the effect of immigration and ethnic diversity on more direct measures of redistributive spending as an important topic for future work. Similarly, in more recent work studying the effect of extending the voting franchise to non-natives, Ferwerda [2021] stresses that while evidence points towards European citizens preferring less redistribution with greater migration, the evidence that this leads to a reduction on public good provision is less well understood. Our work contributes directly to filling this gap by measuring the impact of a large migration shock to England on local level redistribution.

Closest to this present work are studies by Tabellini [2020b], Tabellini [2020a], Gerdes

Electronic copy available at: https://ssrn.com/abstract=3972303

[2011] and Jofre-Monseny et al. [2016]. Tabellini [2020b] studies the first "Great Migration" when 6 million black Americans migrated from the South to the North of the US. The author specifically focuses on its impact on local public finances due to changes in racial heterogeneity in Northern US cities between 1915 and 1930. After collecting data on local finances for the years 1910, 1919, and 1930 and deploying a version of a shift-share instrument based on historical settlements similar to Card [2001] and Boustan [2010] to predict black migration, the author finds that larger inflows had negative impacts on both public spending and tax revenues. The author then investigates whether this result is driven by a change in local preferences or by second-order effects black migrants had on out-migration of white Americans. While Tabellini [2020b] acknowledges that these mechanisms are not necessarily mutually exclusive, the author argues that the study's results are rather driven by a negative fiscal externality due to white flight, corroborated by the fact that cities did not change their allocation of spending. In a second related study, Tabellini [2020a] jointly investigates the political and economic impact of European immigration to the US between 1910 and 1930, using a similar shift-share instrumental variable strategy. The author finds that reductions in redistribution stemming from greater migration inflows were more likely driven by natives' preferences and cultural distance. Our study distinguishes itself from these contributions by investigating the role of migration at a time where levels of discretion of municipal councils in Europe differ from the early 20th century US. In addition to the mechanism linking migration to local expenditure and revenue offered by Tabellini [2020a] and Tabellini [2020b], we are able to study a third potential mechanism, namely the change stemming from mechanical demand for local services induced by distinct demographic characteristics of migrants.

Exploiting a refugee placement policy in Denmark, Gerdes [2011] examines the effect of immigration on municipal redistributive spending and does not find any evidence of a change in public sector spending. However, as highlighted in Harmon [2018], the author's empirical strategy might suffer from the endogenous relocation choices of immigrants not covered by

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the policy as well as the political discretion in assigning migrants to different municipalities. We tackle the empirical issue of endogenous location choices of AC-12 migrants in England by presenting parallel trends comparing heavily and less heavily affected local authority areas in our main outcomes. We further show that all our results are robust to (i) matching local authorities on a wide range of 2001 Census characteristics and (ii) deploying a shift-share instrumental variable strategy based on historical settlement of AC-12 migrants in the tradition of Card [2001].

Jofre-Monseny et al. [2016] focus on the link between municipality-level variation in extra-EU immigrant density and local social spending in Spain. Instrumenting migration flows between 1998 and 2006 using the distribution of rental housing in 1991, the authors find that per capita social spending increases less in municipalities that experience the largest increases in immigrant density. While the authors report strong first-stage results in their instrumental variable regressions, one main concern with this particular identification strategy relates to the exclusion restriction. Municipalities with a relatively large supply of rental housing six years before the migration inflows are likely to also be poorer and larger than other cities and therefore may lie on differential trends that the authors do not account for. Municipalities' public finances might be affected in a way that social services spending may slow down six years later for reasons other than migration. A second concern relates to the authors' interpretation of their results. While Jofre-Monseny et al. [2016] do not study the impact of elections on native outflows and electoral outcomes, they interpret their findings as evidence for a materialisation of a shift in preferences for redistribution among the native population. We argue that this interpretation, although in line with predictions of in-group-out-group theories, is only one possibility. A decrease in redistributive public spending could also reflect a mechanical relationship introduced by migrants' socio-economic characteristics and/or their differing propensity to take up social services if inflows are sufficiently large and migrant characteristics are distinctly different from the local population.

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The remainder of this paper is structured as follows. In the following section 2, we introduce the institutional setting of local authority spending and describe the nature of AC-12 migration flows. Section 3 discusses our data sources. Section 4 lays out our main identification strategy. Section 5 presents and discusses our results. Section 6 discusses alternative identification strategies and robustness. Section 7 discusses the main mechanisms of our results and section 8 concludes.

2 Institutional setting

In this section, we first provide an overview of the level of discretion local authorities hold over spending and revenue in subsection 2.1. We then describe the nature of AC-12 migration to England in more detail in subsection 2.2.

2.1 Local authorities in England

In total, there are 353 local authorities in England. England's local government structure is not homogeneous across the country. Local governments either function under a two-tier or a single-tier regime. The two-tier local authorities consist of an upper-tier, the county councils, and a lower-tier, the district councils. Single-tier authorities encompass 55 unitary authority councils, 36 metropolitan boroughs, 32 London boroughs, the Common Council of the City of London and the Council of the Isles of Scilly for a total of 125. Of these, we exclude nine new unitary authorities from our analyses that were only formed out of tow-tier authorities between 2007 and 2009. Two-tier authorities consist of 27 county councils which in turn are divided into 201 district councils.

While single-tier authorities bear the responsibility for all service spending decisions, county councils and district councils divide responsibilities between themselves in two-tier

authorities [Sandford, 2018]. To make local authorities comparable across England, we aggregate all lower-tier authority spending up into the upper tiers. This is unproblematic for two reasons. First, the areas where spending decisions are not clearly distinguishable only concern spending on cultural goods such as museums, transport planning, economic development and tourism. Second, spending decisions on the largest expenditure items such as education and social care - the focus of our study - are made on the upper-tier county council level. We provide more information on how areas of responsibility are divided between the two tiers in B of the appendix.

On the revenue side, UK local authorities obtain their funding via a mix of specific, ring-fenced grant funding, general grant funding, the collection of business rate revenue and income from a local council tax. While there is currently a trend towards more devolution in revenue, particularly regarding the retention of local business rates, the discretion of local authorities was limited to steering the local council tax rate over our main observation period from 2000 to 2015 [Phillips, 2018]. The council tax is a property tax collected by local authorities and its amount is based on the value of property. Each property is categorised into one of eight bands (A to H) and the tax is then due annually as a fixed fraction of local authority defined baseline tax band D. In 2001, the average band D council tax rate stood at GBP 898, rising to GBP 1,459 in 2015. Total tax income collected by local authorities is then simply the multiple of the band D tax rate and the tax base, i.e. the number of band D equivalent dwellings. Over our observation period, council tax income covers about 25% of annual total service expenditure. We summarise the other main sources of income from central government grant and centrally redistributed business rates in a 'central government transfers' measure.

The discretion of the elected Councillors over local authorities' spending is not limited to revenue collected from council tax, as only a small share of funding from central government

grants is explicitly ring-fenced [Phillips, 2018]. England, and the UK more generally, is one of the European countries where local governments have discretion over spending decisions that encompass several public expenditure items. UK local authorities are responsible for policies concerning education, social care services, highways, roads and transport, housing, cultural services, environmental services, planning and development and protective services such as fire and rescue [Sandford, 2018]. In this context, it is important to note that, unless local authorities can temporarily draw on previously accumulated reserves, they are required to balance their budgets and are unable to borrow on financial markets.

In 2000, British local public spending represented GBP 113 million, a value that increased to GBP 198 million in 2015 in current prices and represents approximately 25% of total government spending.[1] English local authorities spend by far the largest share of their total service expenditure on education. In 2001, education made for 53% of all service expenditure, a value that has decreased slightly over time. The second largest share of total expenditure is spent on social care services (23.5% in 2001) which has increased over time. All other expenditure items combined make for less than one fourth of total service expenditure throughout our observation period.

In our analysis, we are particularly interested in means-tested services for which local authorities have discretion during our sample period. Social care services in particular fulfil these criteria while education partially fulfils them.

Social care services in the UK consist of adult social care and child social care. Adult social care entails a range of support services available to the physically or mentally impaired as well as other items where the level of uptake is most highly correlated with advanced age. It also assists disadvantaged groups such as asylum seekers or substance abusers. Adult social care accounts for the bulk of social care service expenditure in England over our main observation period (approximately 70% on average). Social care service minimum eligibility

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[1]OECD (2018a), 'Consolidated government expenditure as a percentage of total general government expenditure (consolidated), http://www.oecd.org/ctp/federalism/table5_gov_exp-tot_gov_exp.xls (accessed 14/05/2021).

criteria are set by the central government but the amount spent on social care is at local authorities' discretion [Simpson, 2017]. Phillips [2018] notes that Councils' discretion extended to determining what kind of services were offered, needs' assessments and eligibility criteria over the 2000 to 2015 observation period. The latter included different thresholds for what Councils considered the risk for an individual in absence of treatment. A detailed overview of local authority social care services and its means-testing criteria is provided in Table 16 of appendix B.

While there has been a trend towards centralisation, the sample period we study still left room for local authority discretion when it comes to education expenditure. Education expenditure in the U.K. has traditionally been locally-managed although school funding was ring-fenced as of 2006 via the Dedicated Schools Grant (DSG), which de facto represents a minimum threshold below which school spending cannot fall for most of the sample period we study. However, local authorities could still exert upward discretion and use their own revenues to additionally fund education. Recent moves by the Conservative government to remove local governments from the education expenditure formula and only have a national funding formula, whereby schools with similar characteristics receive equal funding, are yet to come into place. As highlighted by Phillips [2018], education expenditures was still partially locally managed in our sample period.

In summary, for the purposes of this paper, two observations are therefore important: First, local authorities do have a significant amount of discretion over both the revenue they collect and the allocation of their funds across different spending areas but need to balance their budgets. Second, 1100 statutory spending requirements limit local authorities in their spending decisions to some extent and do not always allow for a clear distinction between mandatory and discretionary spending [Gray and Barford, 2018]. This means that the larger the level of disaggregation of spending items, the more detailed knowledge of statutory spend-

ing requirements is necessary. We conduct our analysis on expenditure items aggregated at a relatively high level within the different spending areas to minimize this risk.

A local fiscal response to migration in England that reflects a change in redistribution could thus become visible through two main channels. First, migration could affect total spending per capita and revenue. Second, less redistribution could also become visible through a shift between expenditure items more strongly associated with redistribution and those less associated with redistribution. In the analysis below, we focus on social care spending per capita as the main redistributive item due to its free availability only to low-income individuals. It is less clear to which extent education spending falls under redistribution. Some authors have argued that inter-group transfers are more salient in education expenditure than in other non-means-tested services [Tabellini, 2020a, Speciale, 2012]. In our analyses, we therefore leave education as a separate expenditure item. We then aggregate all expenditure that falls outside of social care and education into a third category.

2.2   The AC-12 migration shock

Following the EU accession of the so-called A-8 countries consisting of the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia, Poland and Slovenia, as well as Cyprus and Malta in 2004 and Bulgaria and Romania in 2007, the UK experienced a large labour migration inflow of a migrant group commonly referred to as AC-12. Due to the fear of mass migration from the, on average, less wealthy accession countries, EU Member States were given the option to temporarily restrict the fundamental freedom of movement of people originating from the 2004 Central and Eastern European joiners. This was possible "under provisions in the Accession Treaty allowing the existing Member States to apply national measures regulating access to their labour markets for nationals of A-8 countries for up to seven years" [Kennedy, 2011, p.5].

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All EU Member States but Sweden, Ireland and the UK applied these regulations on A-8 migrants [Anderson et al., 2006]. Becker et al. [2016, p.11] explain that the decision by Tony Blair's Labour government not to limit labour market access to A-8 migrants was driven by "a thriving economy and a misunderstanding of the consequences of decisions by other big EU countries to keep their borders closed to Eastern European workers for a transition period".[2]. As highlighted by the authors, a UK Home Office commissioned study conducted in 2003 by Dustmann et al. [2003] computed their migration projections under the false assumption that other countries such as Germany would also open their borders in 2004. The government then failed to adjust their initial projections when other EU Member States did not open their border immediately and estimated that "only around 5,000-13,000 Eastern Europeans would arrive to the UK per year" [Dustmann et al., 2003] (as cited in Becker et al. 2016, p.11). However, between 2004 and 2007, more than 500,000 migrants arrived to the UK from Central- and Eastern Europe, vastly exceeding the initial projections [D'Auria et al., 2008].[3]

Thus, overnight on 1 May 2004, workers from the A-8 accession countries, Malta and Cyprus obtained full rights to live and work in the UK, including the right to stay permanently and the right to be joined by dependants [Anderson et al., 2006]. Workers from A-8 countries (but not Malta and Cyprus) were obliged to register on the so-called Workers Registration Scheme (WRT). Registration on the WRT gave A-8 workers access to in-work benefits but they only had access to out-of-work benefits after they had been in registered employment for 12 months [Kennedy, 2011]. For the purposes of this study, it is important to note that local authority services, including social care and education, were accessible to AC-12 workers as soon as they were registered on the WRT.

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[2]One of the other motives cited for the Blair government agreeing to immediate free movement rights for A-8 citizens was that the UK saw a wider Europe as a way to provide the UK with new allies within the EU against the traditionally more pro-integration "old-Europe" States (see e.g. Bulmer [2008])

[3]It has been argued that the post-Brexit registration scheme figures suggest that the number of Central/East European migrants might have been under-estimated (see e.g. migrationobservatory.ox.ac.uk)

2.2.1 Characteristics of the AC-12 migrants

Table 1 summarises the AC-12 migrants' socio-economic characteristics relative to British natives, EU-15 migrants and the rest of the world based on the 2011 UK Population Census. The table shows age and employment characteristics that could potentially have had an impact on the local population's attitude towards AC-12 migrants. Both employment and young age may thereby reflect a lower likelihood of welfare dependency [Gherghina and O'Malley, 2019, Goodwin and Milazzo, 2017, Becker et al., 2017]. As noted above, these characteristics may also reflect the group's need for local authority services. The migration inflow to the UK stemming from the EU enlargement was indeed both sizeable and characterised by the distinctive features of AC-12 migrants in terms of age, education and employment.

Most of the AC-12 migrants living in the UK in 2011 were in the 25 to 39 years' old categories. This contrasts sharply with the age structure of AC-12 migrants we observe in the 2001 UK Population Census where the distribution was much flatter. Other migrants from EU-15 countries and the rest of the world are also younger than the UK born on average but their age-distribution is less skewed to the left than that of AC-12. Cross-checking these numbers with those from the 2001 Census shows little to no movement. Taken together, this suggests that the inflow of migrants from AC-12 countries was distinctively younger than AC-12 migrants living in the UK pre-enlargement and that this change in the pattern of their age-structure was distinct to this group of migrants.

In terms of qualifications, the bulk of AC-12 migrants living in England in 2011 were categorised in the "apprenticeships and other" qualifications section that does not directly translate into the UK system of qualifications but is indicative of relatively low and medium skills. It is further worth noting that the 24% share in the highest skill category did not translate into a similar share of employment in high-skill professions [Drinkwater et al., 2009]. Most of the residents born in AC-12 countries as per the 2011 census were working

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in routine or semi-routine occupations, again contrasting with the 2001 situation for AC-12 migrants residing in England in 2001 and other groups in both 2001 and 2011. Thus, at least over the years following the 2004 accession, the AC-12 migration flow was in its majority a labour migration flow into low and medium skills' professions. 80% of AC-12 migrants were economically active in 2011, a share significantly above that of UK born and other migrant groups.

Age Structure	UK	EU-15	AC-12	ROW	Family Structure	UK	EU-15	AC-12	ROW
Age 0 to 15	21%	12%	10%	7%	No children	29%	34%	35%	24%
Age 16 to 24	12%	13%	15%	12%	One dependent child	20%	20%	29%	22%
Age 35 to 49	12%	23%	41%	23%	Tow or more dependent children	35%	34%	27%	38%
Age 50 to 64	20%	26%	20%	29%	All children non-dependent	16%	12%	9%	16%
Age 50 to 64	18%	13%	9%	18%	**Economic activity**				
Age 65 and over	17%	13%	5%	10%	Economically active: total	63%	69%	80%	63%
Gender					In employment	59%	64%	76%	57%
Males	49%	46%	48%	49%	Full-time	43%	50%	61%	42%
Females	51%	54%	52%	51%	Part-time	15%	14%	15%	15%
Highest level of qualification					Unemployed	5%	5%	4%	7%
No qualifications	23%	13%	16%	19%	Economically inactive: Total	37%	31%	20%	37%
Level 1 qualifications	14%	7%	7%	9%	Retired	23%	15%	6%	11%
Level 2 qualifications	16%	9%	8%	9%	Students	5%	9%	5%	9%
Level 3 qualifications	13%	10%	7%	9%	Looking after home or family	3%	4%	4%	8%
Level 4 and above	26%	40%	24%	37%	Long-term sick or disabled	4%	2%	1%	3%
Apprenticeships and other	7%	21%	37%	18%	Other	2%	2%	3%	5%

Notes: Own table based on data from the 2011 UK Census. ROW refers to rest of the world.

Table 1: Socio-economic characteristics of immigrants vis-à-vis UK citizens and other

Finally, it should be noted that AC-12 migration inflows into the UK were also geographically and compositionally different from migrants of AC-12 countries that had settled in the UK prior to the 2004 enlargement shock [Becker et al., 2018]. Before the AC-12 countries joined the EU, the stock of individuals who were born in any of the ten Central- and Eastern

European accession countries was around 193,180. Unlike AC-12 migrants arriving in the UK after 2004, these migrants were mostly concentrated in the London area [Becker et al., 2016]. Approximately 30% of this group had arrived before 1981 and consisted mostly of people born in Poland, who made up 42% of the stock of Eastern Europeans having arrived prior to 2004 [Becker et al., 2016]. The number of these Polish-born migrants increased by a factor of seven, and the number of Eastern Europeans in the UK by a factor of five, such that the number of AC-12 migrants living in England represented approximately 2% of the English population in 2011, reaching 1,085,351 inhabitants.

3 Sampling frame and data sources

In this section, we first describe both the data on local authority expenditure and revenue and the migration data we use for our subsequent analyses, in subsections 3.1 and 3.2 respectively. We then describe additional data sources we draw on to obtain control variables and for the analyses of mechanisms that may explain the obtained results in section 3.3.

3.1 Local authority expenditure and revenue

Detailed panel data on local authority public finances is available from the Chartered Institute of Public Finance and Accountancy (CIPFA) website which gathers local authority budgeted expenditure and revenue data. We use this data set to identify exactly how the 116 single-tier authorities and 27 authorities operating under a two-tier regime allocated their funds between all different spending areas annually. We obtain these data for the period from 2000 to 2015 such that our sample consists of a total of 143 local authorities observed over a 16-year period. Table 2 summarises our main expenditure related dependent variables and also expresses these as expenditure shares for comparability.

Variable	Mean	Std. Dev.	N
Total expenditure per capita (pc)	1450.07	330.32	2028
Central government transfer (pc)	1086.04	335.83	2028
Council tax required (pc)	364.03	80.90	2028
Social care expenditure (pc)	375.15	102.68	2028
Education expenditure (pc)	734.42	189.07	2028
Other expenditure (pc)	340.66	94.51	2028
Share spent on social care	0.258	0.039	2028
Share spent on education	0.506	0.057	2028
Share spent on other items	0.236	0.037	2028

Notes: The acronym "pc" stands for per capita. Data aggregated and averaged over the 2000 to 2015 observation period for 143 local authorities when data is not missing in either the measures presented here or in the variables of interest in our regression analyses.

Table 2: Summary statistics outcomes

The main variables we construct from this data set are our measures of expenditure and revenue per capita: total service expenditure, central government transfers and the required locally generated revenue to balance the budget. We also use this data set to construct our set of expenditure measures on education, social care and aggregate measures of spending on other items.

3.2 Migration data

We draw our yearly data on population for each local authority from a special license of the UK Annual Population Survey (APS) between 2000 and 2015. This sample is obtained by aggregating waves of the Labour Force Survey (LFS) and the Labour Force Survey Boosts for England.[4] We refer to this data set as LFS/APS. We are then able to compute immigration figures of AC-12 migrants as well as natives, EU-15 and the rest of the world based on their country of birth. There are approximately 350,000 individuals per wave, making the LFS/APS the largest annual household survey in the U.K.. Although the LFS/APS is more robust than estimates based on one single LFS wave, concerns regarding the accuracy with which this survey precisely measures the shares of immigrant population at the local

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[4]See Cangiano [2010] for more details on the APS.

authority level remain, especially in years preceding the 2004 shock when the AC-12 stock in England was relatively small. In our empirical strategy, we explain that the way we construct our main variable of interest does not require us to make use of the AC-12 migrant population pre-2004 in our regression analyses.

We further verify the robustness of our results by exploiting 2001 and 2011 British Censuses, which capture information for the entire British population by country of birth by local authority at these two points in time. Despite the 2011 Census' advantage of reporting data on the self-reported year of arrival of different migrant groups for the years 2009, 2006, 2003, 2000 and 1990, concerns when using this data set remain. Differential rates of out-migration across local authorities by AC-12 migrants by year of arrival could mean that an imputed measure of migration stocks would have a poor relationship with the actual stock for years further in the past. We find a local authority level correlation between the number of foreigners from AC-12 migrants having arrived before 2000 as per the 2011 Census and the number of AC-12 migrants as reported by the 2001 Census of 0.77. Overall, this suggests the LFS/APS is the preferable data set. We nevertheless use the 2001 and 2011 Censuses to check our results for robustness.

In sum, given several missing values in CIPFA and LFS/APS data, our total sample consists of 2,028 observations spanning from 2000 to 2015 for 143 English local authorities.

3.3   Additional data sources

Our main specification measuring the effect of AC-12 migration controls for a number of local authority level time varying characteristics. First, we control for local area population obtained from CIPFA to account for potential scale effects in service delivery, especially regarding education. Since the effect of AC-12 on local redistribution may also be conditional of the existing composition and heterogeneity of the population, we further control for the

share of EU-15 and non-EU migrants obtained from the LFS/APS [Alesina et al., 2019, Tabellini, 2020b]. Finally, we also control for local unemployment rates to account for the fact that local economic conditions are an important pull factor for labour migrants such as those originating from AC-12 countries.

We then construct additional dependent variables to understand the mechanisms driving our main results. These variables include information on the number of pupils per local authority, and the age structure of the population (both obtained from CIPFA). To test for a change in political preferences, we use yearly data on the political composition of local Councils compiled by "The Elections Centre" at Nuffield college, Oxford.[5] In England, local Councillors are elected in a staggered way for 4-year terms by the local population, with some Councils electing all of their Councillors at the same time and other Councils electing half or a third of their Councillors at each election.[6] In our analyses, we are particularly interested in the shares held by the Conservative and Labour party, England's two main parties of government. The Conservative party is traditionally regarded as representing less redistributive "small government" platforms during our period of study as highlighted by Fetzer [2019] who studies the impact of austerity measures conducted by the Conservative government in the 2010s on Eurosceptic attitudes and Taylor-Gooby [2013] who shows that an "analysis of manifestos for the two main UK parties from 1987 to 2012" shows two patterns: First, Labour manifestos score higher than Conservative manifestos on references to social justice and pro-welfare content. Second, Conservative interest in social justice as equality or redistribution is limited, and is "virtually non-existent for the 1987, 2001 and 2005 elections" (p.36).

We further substantiate the strong differences between the Conservative and Labour party on redistribution in Figure 1.

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[5]The data can be accessed on http://www.electionscentre.co.uk.
[6]See https://www.gov.uk/understand-how-your-council-works/local-councillors-and-elections for details.
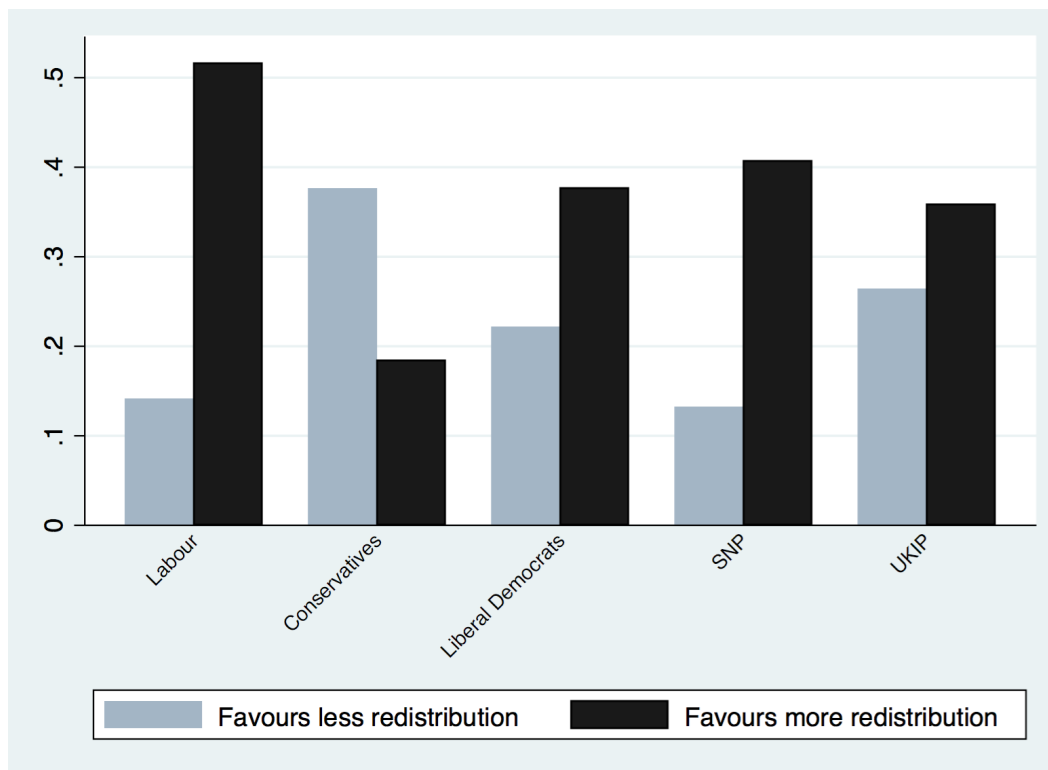
Figure 1: Redistribution preferences among voters of major British parties

Note: Figure based on data from the British Election Study (Wave 4, March 2015). The redistribution preference are calculated from the question "Should the government redistribute income?" to which respondents could respond on a scale from 0 ("make much greater effort") to 10 ("be much less concerned"). Respondents answering 0,1,2 or 3 are categorised as "favours more redistribution". Respondents answering 7,8,9 or 10 are categorised as "favours less redistribution". N=2840.

The figure based on data from the March wave of the British Election Study 2015 shows that more than 50% of Labour voters favour more redistribution of income, whereas that share stood at less than 20% among Conservative voters, who tend to favour less redistribution. Voters of Liberal Democrats, SNP and UKIP fall in between.

Unfortunately, the Council composition dataset aggregates information on the Council seat share of the UK Independence Party (UKIP) into an "other" category. Founded in 1991 and until the 2016 Brexit referendum, UKIP was essentially a single-issue party campaigning for an exit from the EU and made strong gains in European elections at the expense of the Conservative Party over our sample period [Ziebarth, 2020, Becker et al., 2016, Fetzer, 2019]. However, it is is not clear that more votes for UKIP are a signal of preferences towards less redistribution, as highlighted by Figure 1 . Nevertheless, greater vote shares for UKIP in the face of AC-12 migration still suggest greater distaste for migration, which could potentially result in changes in local Councillors' spending decisions. Therefore, we additionally match our database with information on all local election results from Fetzer [2019], which contains election results of almost all parties including UKIP. Finally, we also use information from the second quarter of each LFS wave as well as NHS data to build local authority level measures of internal inflows and outflows.

We note that not all data we use for our analyses of mechanisms is available for the entire 2000 to 2015 observation period. We summarise data availability, sources and the measures we construct in Table 11.

4   Empirical strategy

In this section, we first lay out our main empirical strategy in subsection 4.1. We then turn to the main empirical issue in our setting at hand, the potentially endogenous location choice of migrants within England in subsection 4.2.

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4.1 Main specification

The AC-12 migration wave to England, and the U.K. more generally, was a grand-scale natural experiment due to its large and unexpected nature. To capture its magnitude by local authority, we closely follow Becker et al. [2018] and build the following shock measure:[7]

$$Shock_{c,t} = \frac{AC12migrants_{c,t}}{LApop_{c,t}} - \frac{AC12migrants_{c,2001}}{LApop_{c,2001}} \tag{1}$$

where $AC12migrants_{c,t}$ represents the number of AC-12 migrants in local authority c in year t and $LApop_{c,t}$ local authority c's population in year t as per the APS while $AC12migrants_{c,2001}$ and $LApop_{c,2001}$ represent the AC-12 stock and total population in 2001 as per the 2001 Census. The shock measure thus represents the change in percentage points of the share of AC-12 migrants living in a given local authority relative to the share of AC-12 migrants in 2001. As argued earlier, the APS might not capture the share of AC-12 migrants by local authority pre-2004 well because of their low numbers. We therefore use the more precise 2001 census as our benchmark share of AC-12 migrants. Furthermore, we never use APS information regarding the AC-12 population pre-2004 as highlighted in our main empirical specification:

$$Y_{c,t} = \alpha_c + \beta_t + \gamma Post_{2004} * Shock_{c,t} + \delta X_{c,t} + \epsilon_{c,t} \tag{2}$$

In equation 2, $Post_{2004}$ is a dummy equal to 1 after 2004 such that its interaction with $Shock_{c,t}$ identifies a treatment on the treated effect of AC-12 migration on the outcome measures. $X_{c,t}$ represents our vector of controls which includes the local share of EU-15 migrants, the share of non-EU migrants, the local authority population and the local unemployment rate. We further include year fixed effects β_t and local authority dummies α_c to account for unobservable year-specific variation common to all local authorities and time-constant local

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[7]The main contrast in the construction of our shock measure is that we use the LFS/APS instead of only using the 2001 and 2011 Censuses to measure changes in migrant shares.

authority level variation respectively. Due to the spatial nature of our data, we cluster the error term $\epsilon_{c,t}$ at the local authority district level in all analyses to correct standard errors for within local authority correlations [Bertrand et al., 2004]. Our estimation is therefore akin to employing a two-way fixed effects panel model that combines features of a continuous Difference-in-Differences and event study as we set the pre-accession AC-12 stocks to zero. We do this due to the to the strong differences between AC-12 pre- and post-2004 and expect a gradual divergence of treated and untreated local authorities in the post treatment period, as not all migrants moved to the UK at the start of our treatment period.

Table 3 describes our main variable of interest - AC-12 migration shock - and controls' summary statistics.

Variable	Mean	Std. Dev.	N
AC-12 migration shock	0.011	0.015	2028
Share EU-15 migrants	0.027	0.023	2028
Share non-EU migrants	0.101	0.097	2028
Unemployment	0.068	0.026	2028
Population	358010	270538	2028

Table 3: Summary statistics AC-12 shock and controls

Local authorities' average population stands approximately at 358,000 inhabitants with the average increase in the share of AC-12 migrants representing a 1.1 percentage point increase in the share of a local authority's population compared to the 2001 baseline.

4.2   Endogenous location choices

The main concern for causal interpretation of γ is the endogenous location choices of AC-12 migrants. Despite the exogenous nature of the shock at hand, immigrants were not randomly allocated across local authorities and sorting into local authorities might be endogenous to migrants' underlying preferences for redistribution or other unobserved characteristics that determine both migration and trends in local authority spending. We first address this concern by presenting evidence in favour of the common trends assumption by showing that all

measures of interest did not move systematically differently between affected and unaffected local authorities prior to 2004 in 5 and 6.

Unfortunately, the fact the treatment increases in all groups means we cannot use the alternative estimation procedures developed by De Chaisemartin and d'Haultfoeuille [2018] and De Chaisemartin and d'Haultfoeuille [2020] to account for possibly many negative weights in the weighted sums of the average treatment effects (ATE) in two-way fixed effects with heterogeneous treatment effects estimations.[8] We however verify the robustness of our results to alternative estimation procedures.

We show that our results are practically unchanged when matching local authorities affected by AC-12 migration inflows to unaffected local authorities using propensity score matching. To do so, we follow an approach similar to Becker et al. [2018] and first apply a corrected Akaike Information Criterion (AICc) algorithm to a large set of local authority characteristics we gather from the 2001 Census to find the best predictors for AC-12 migration inflows and then match our sample based on these variables (with replacement). While this approach reduces our sample size, it mitigates remaining concerns that destination choices were not picked at random and should be treated as complementary to our main difference-in-differences results.

Finally, we proceed to showing the results when using a shift-share "Bartik" instrumental variable approach based on historical settlement [Bartik, 1991]. The problem of endogenous sorting of migrants has indeed often been tackled by using such an approach pioneered by Card [2001]. It is based on the premise that immigrant networks are an important determinant of locational choices and allows to identify local average treatment effects of current migration inflows induced by these historical settlement patterns. In the context of the UK,

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[8]See also Borusyak and Jaravel [2017] , de Chaisemartin et al. [2019] and Callaway et al. [2021] for other examples of the recent literature focusing on the issues associated with this topic.

this instrument has been used by Bell et al. [2013], Sá [2015] and Giuntella et al. [2018] in their studies on the impact of migration to the UK and its effect on crime, house prices and hospital waiting times respectively. The validity of such an instrument relies on the assumption that the past settlement of immigrants is uncorrelated with changes in economic outcomes between local authorities prior to 2003. Thus, it assumes that immigrant settlement patterns years before 2004 are only correlated with measures of local authority spending patterns though their effect on post-2004 inflows.

While we show that our results are stable when using such an approach based on 1991 settlements of AC-12 migrants, several problems have been identified in shift-share instrumental variables. Jaeger et al. [2018] first show that such instruments run the risk of conflating the short- and long-run responses to immigration shocks if the spatial distribution of immigrant inflows is stable over time. Second, Lee et al. [2020] find that current practice using instrumental variables typically relies on the first-stage F-statistic exceeding a threshold of 10 as a criterion for showing instrument relevance and trusting t-ratio inference yield an anti-conservative test. In addition to these concerns, we believe this approach is potentially less relevant when applied to AC-12 migrants. Becker et al. [2018] point out that the historical distribution of Central and Eastern European may not capture subsequent AC-12 migration inflows well because of the stark differences between the two waves. The authors argue that migrants from Poland – the country where the largest share of AC-12 migrants originate from - who resided in the UK in 2001 mainly consisted of people of pension age, having lived in the UK since the second world war as remnants of the Polish Free Army, or of migrants who had entered before 1991 for graduate studies under high-skill visas. Thus, the baseline distribution of Central and Eastern European migration into the UK in 2001 would act as a weak proxy for subsequent migration flows or could pick up very specific parts of these migration flows. This is confirmed when conducting standard first-stage relevance tests but also by comparing the distribution of AC-12 migrants in 1991 and in 2015 as highlighted in Figure 2. The figure shows that recent AC-12 migration was more heterogeneously dis-

tributed across England than in 1991, when a concentration in London and its surroundings was more clearly visible.

AC-12 as share of population
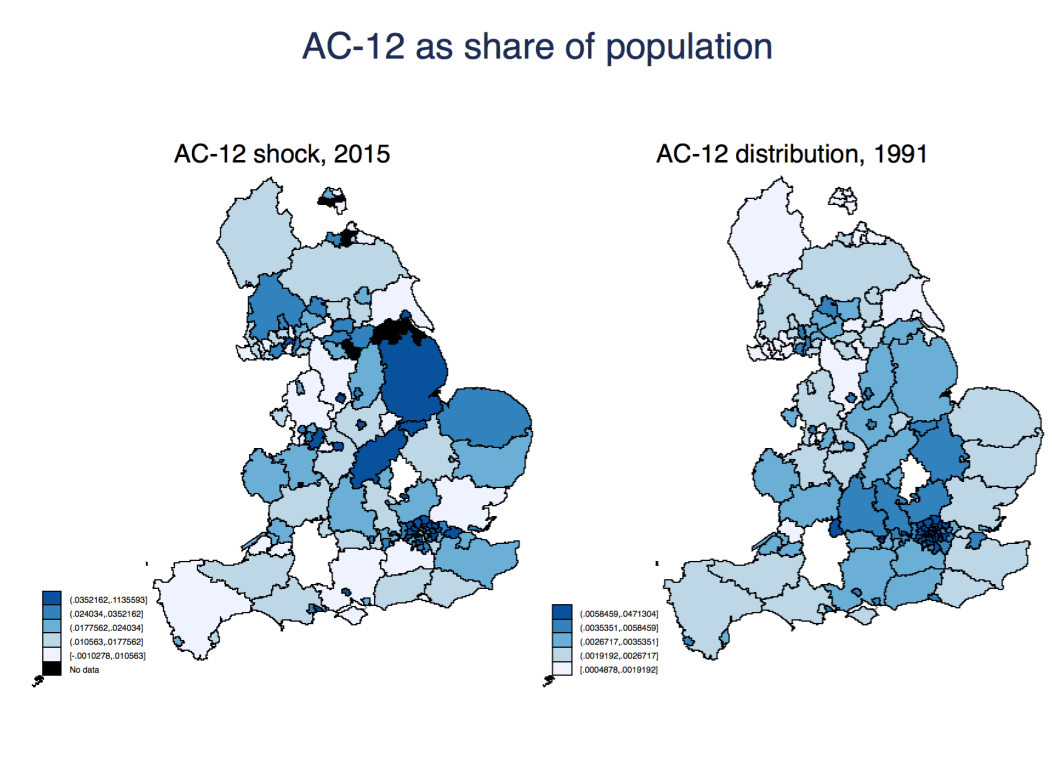
Figure 2: Contemporaneous AC-12 shock and historical distribution

5 Results

In this section, we turn to the results and split our analyses into two parts. Subsection 5.1 provides evidence in support of the identifying common trend assumption. Subsection 5.2 then shows the main results.

5.1 Pre- and post trends

In this subsection, we analyse the main outcomes of interest before and after the opening of UK borders to AC-12 migrants in 2004. Figure 3 shows that the share of AC-12 migrants

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indeed gradually picked up after 2004, starting from a level close to zero before the accession of the AC-12 countries.
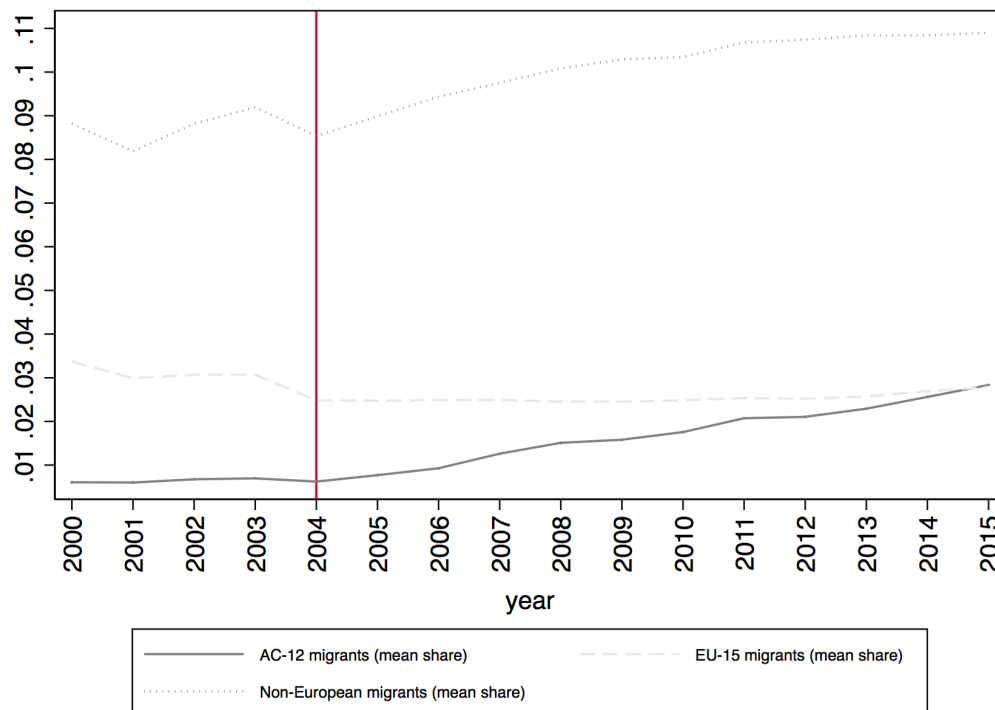
Figure 3: Migration to the UK by region of origin

The mean annual local population share of AC-12 born migrants in English local authorities fluctuated between 0.6% and 0.7% in the pre-accession years and then gradually increased to 2.8% in 2015. In relative terms, the average English local authority saw their AC-12 migrant population rising by more than 400% over an 11 year period.

Figure 3 further shows an increase in the local authority mean population share of non-EU migrants between 2004 and 2015 while the EU-15 population share remained stable on average. One of the concerns in our empirical analysis when focussing on one migrant group specifically is that location choices of AC-12 migrants may coincide with inflows of other migrant groups. In appendix C we show that the spatial distribution of non-EU and EU-15 migrant inflows does not correlate visibly with the AC-12 shock visualised in Figure 2. We

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nevertheless control for these migrant shares in our preferred specification to adequately capture the diversity of the local area population as discussed in section 4.1.

To test for pre- and post-trends in our main outcome variables of interest, we define local authority districts that were in the top 25% (Q4) of the 2015 migration shock distribution as treated ("affected") . We further define all local authority districts that are within the bottom 25% (Q1) of the 2015 migration shock distribution as untreated ("unaffected"). Formally, we define

$$
\tau_c = \begin{cases} 1, if & AC12Shock_{2015,c} > Q3(AC12Shock_{2015}) \\ 0, if & AC12Shock_{2015,c} < Q1(AC12Shock_{2015}) \end{cases} \tag{3}
$$

The categorisation is motivated by the distribution of the AC-12 shock measure in our final observation year in 2015 shown in Figure 4.
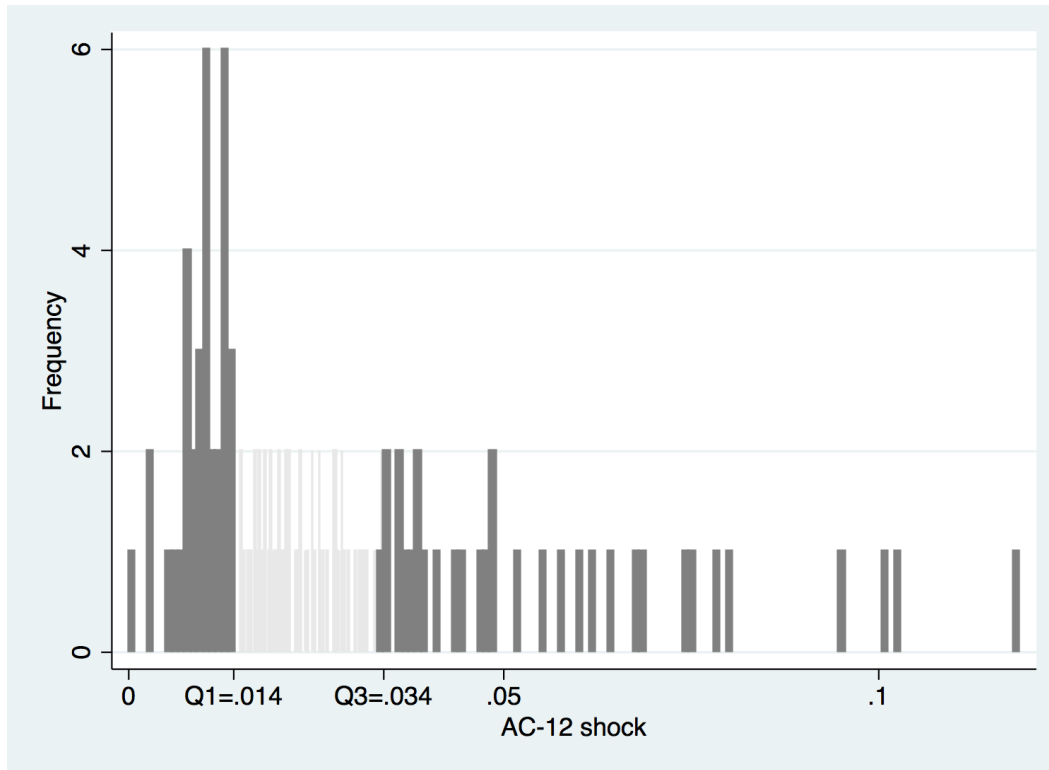
Figure 4: Distribution of AC-12 shock in 2015

Local authorities in the bottom quartile of the AC-12 shock distribution only saw their population share of AC-12 migrants rising by between 0.1% and 1.4%. The frequency distribution then has a long right tail with AC-12 migrant shares rising to between 3.4% and 11.9% in local authorities in the top quartile.

Figures 5 and 6 show the trends in the main outcome variables of interest, with the solid lines corresponding to regions most heavily affected by AC-12 migrant inflows and dashed lines indicating the least affected regions.

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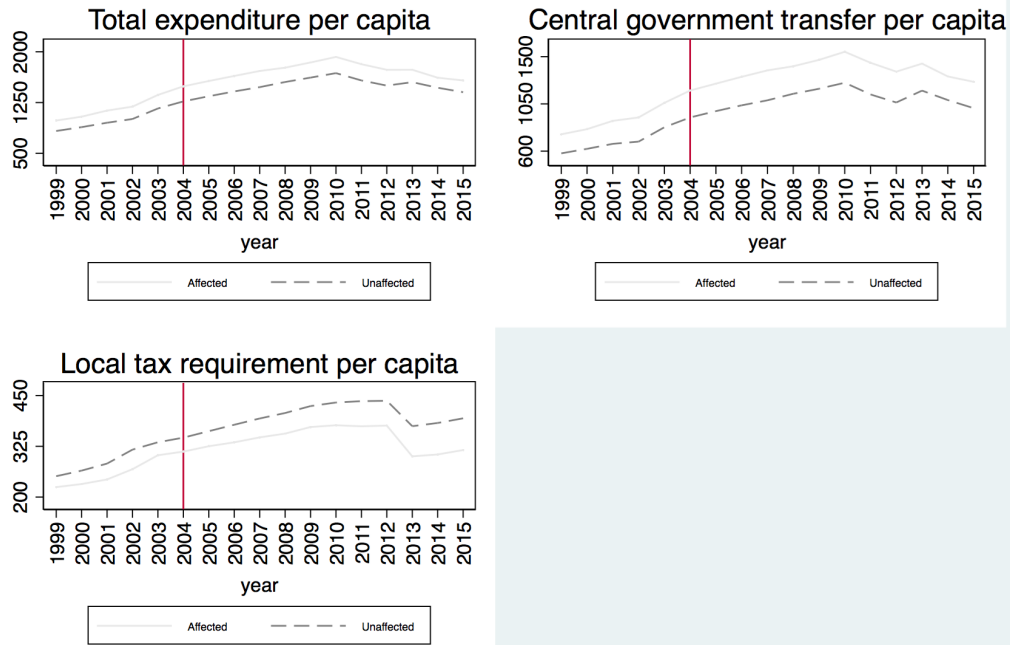
Figure 5: Pre- and post trend I
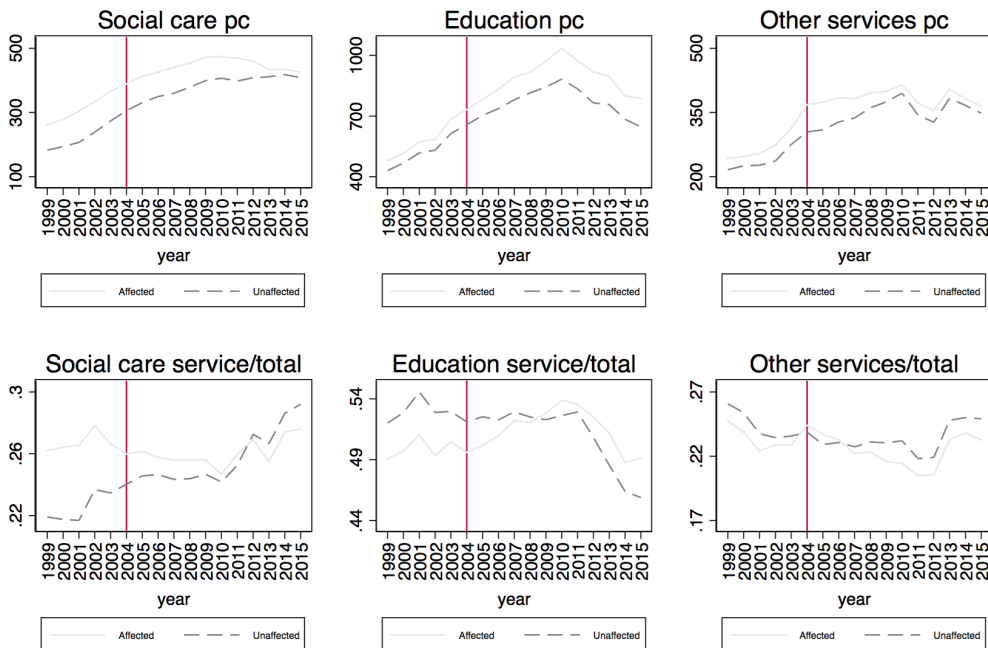
Figure 6: Pre- and post trend II

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We first note that pre-trends from 1999 to 2003 are parallel in all outcomes, validating the difference-in-differences research design. We detect no visual changes in the total expenditure per capita gap post accession (Figure 5, upper left panel). Affected and unaffected local authorities continue to move in parallel after the onset of treatment. The parallel trend continues beyond 2010, when strict austerity measures were imposed on local authorities, a topic we turn to in greater detail in section 6.1. The lower left and upper right panel of Figure 5 suggest a marginal effect of AC-12 migrant inflows on the funding sources of local authorities. Taken together, the figures suggest that in affected areas, less funding was raised locally and slightly more funding came from central government sources following the inflow of AC-12 migrants, leading to the observed unchanged total per capita spending in an institutional setting where local authorities have to balance their annual budgets.

Figure 6 then turns to the spending mix. Social care expenditure per capita starts to rise significantly less in affected local authority areas when AC-12 migrants start to immigrate in 2004. The gap most visibly declines in the years from 2010 onwards (top right panel). The change in trends becomes even more visible when graphing social care as a share of overall local authority spending, where the social care expenditure share in unaffected local authorities passes the share spent in affected local authorities in 2012 (bottom right panel). Similarly, trends in education expenditure per capita start to diverge after 2004, with local authorities most heavily affected by AC-12 migrant inflows spending relatively more on education in per capita terms (top centre panel). The share spent on education in total spending surpasses that of unaffected areas in 2009 and the gap continues to widen up to the final year of the observation period (bottom centre panel). Other expenditure items expressed in per capita terms show slightly more noise but tend to converge after 2004, with affected areas experiencing a small relative decrease (Figure 6, upper left and bottom left panel).

In sum, three main findings emerge from this first descriptive analysis. First, total expen-

diture per capita remained unchanged following AC-12 migrant inflows. Second, the funding mix slightly shifted away from locally raised budget towards central government transfers. And third, AC-12 migrants shifted the expenditure mix away from social care expenditure towards education expenditure.

5.2 Main results

In this subsection, we turn to the regression results based on the empirical specification introduced in section 4. Table 4 shows the results of the effect of AC-12 migration on local spending and revenue sources. For the sake of clarity, we only show the coefficient of interest in the following tables. A regression table also showing the coefficients estimated on our main control variables is shown in Table 14 of appendix A. We will refer to the specification with all controls as our preferred specification.

	Total expenditure pc		Central government transfer pc		Locally raised budget pc	
	(1)	(2)	(3)	(4)	(5)	(6)
AC-12 shock	460.44	525.65	1014.67**	976.97**	-554.22***	-451.33***
	(459.70)	(457.89)	(483.08)	(472.25)	(96.65)	(87.04)
N	2028	2028	2028	2028	2028	2028
R^2	0.879	0.890	0.821	0.834	0.819	0.826
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD
Full set of controls	No	Yes	No	Yes	No	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors clustered at the local authority level in parentheses.
* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

Table 4: Effect of AC-12 migration on local spending and revenue

Column (1) and (2) show that the association between the AC-12 shock measure and total service expenditure per capita is positive, albeit not significant at any conventional level. Similar to the descriptive analysis in subsection 5.1, local authority revenue sources were indeed impacted by AC-12 migration: Column (3) indicates that a 1 percentage point increase in the AC-12 shock over the 2001 baseline shares is associated with an annual

increase of approximately GBP 10 in central government transfers per capita to affected local authorities (p<0.05). The result is remarkably stable to the inclusion of controls for local labour market conditions, population and other migrant groups (column 4). The results of column 5 and 6 show that a percentage point increase in the AC-12 migrant population share over the 2001 baseline is associated with a GBP 5 decline in the locally raised budget per capita (p<0.01). The coefficients are again stable when adding controls variables. It is worth noting that the coefficients estimated on EU-15 and non-EU migrant shares point into the same direction. These coefficients shown in columns (1), (2) and (3) of Table 14, appendix A, indicate that AC-12 migration affected central government transfers in a similar manner compared to migrants from other regions.

Table 5 then turns to the results of the effect of AC-12 migration on local expenditure by area of spending.

	Social care expenditure pc		Education expenditure pc		Other expenditure pc	
	(1)	(2)	(3)	(4)	(5)	(6)
AC-12 shock	-477.89**	-414.47**	1214.59**	1179.50**	-279.10	-238.21
	(219.71)	(204.35)	(574.23)	(564.80)	(178.60)	(152.78)
N	2028	2028	2028	2028	2028	2028
R^2	0.771	0.790	0.750	0.757	0.641	0.654
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD
Full set of controls	No	Yes	No	Yes	No	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors clustered at the local authority level in parentheses.
* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

Table 5: Local authority spending by area

The results indicate that the AC-12 migrant shock indeed changed the local authority spending mix. The results of our preferred specification of column (2) show that a 1 percentage point increase in the shock measure is associated with an approximate GBP 4 decrease in annual per capita spending on social care (p<0.05). Column (4) shows that education spending per capita increased by approximately double that magnitude (p<0.01). The increase in

AC-12 migrant shares further had a small negative effect on other expenditure items, albeit estimated effects are not significantly different from zero at any conventional statistical level. In comparison, changes in migrant shares from other regions of origin had less impact on the expenditure mix. Column (4) of Table 14, appendix A, suggests that the positive association of EU-15 migrant shares and total expenditure per capita (column 1, 14) is the result of an increase in additional spending on education associated with this particular migrant group. Neither EU-15 migrants nor non-EU migrants appear to be associated with changes in social care expenditure (column 4, Table 14).

In sum, three main results emerge. First, the inflow of AC-12 migration does not show a statistically significant association with total service expenditure per capita. Second, AC-12 migration did impact on local authority revenue sources: They are associated with an increase in funding received from the central government but decreased locally generated income. Finally, AC-12 migration decreased social care spending per capita and increased education expenditure per capita, while other expenditure items remained largely unchanged. We note that these findings do not allow for making definite statements about the mechanisms at hand: A reduction in the mostly discretionary means-tested social care services and the relative reduction of locally generated revenue in response to AC-12 inflows could indicate both a shift in local preferences towards less redistribution but could also capture changes in local service demand brought about by distinct socio-economic characteristics of new-arrivals, with repercussions for necessary funding. We analyse these mechanisms in more detail in section 7, after testing the robustness of our results in section 6.

6   Robustness tests

In this section, we test the robustness of our main results along a range of dimensions. Sub-section 6.1 excludes all years post 2010 to account for the potentially endogenously austerity

measures imposed on local authorities in 2010 as well as the expiration of the UK's Worker Registration Scheme (WRS) in 2011. If, for example, austerity measures were imposed on the central government level such that more diverse areas were more heavily affected, these would not necessarily reflect a local change in preferences for redistribution. In subsection 6.2 and 6.3 we further address potential endogenous sorting of AC-12 migrants by showing the results of a matching and an instrumental variable approach. These robustness tests thus account for the risk that AC-12 migrants potentially chose their destinations within England based on observed or unobserved local authority characteristics that could be correlated with our outcome measures. Finally, in subsection 6.4 we use UK Census data instead of the more volatile Annual Population Survey data as a more accurate but static measure of AC-12 migration.

6.1   Excluding austerity year and the end of WRS

Austerity measures imposed on local authorities by the central government dramatically reduced transfers to local authorities from 2010 onwards, putting pressure on local authorities to raise budget locally. These measures have been shown to have uneven effects on local authorities across England, mostly affecting urban areas, the north of England, parts of the East and Cornwall [Gray and Barford, 2018]. If these geographically heterogeneous budget cuts imposed by the central government correlate with the different intensity of AC-12 migration inflows for either political or institutional reasons unrelated to *local* preferences for redistribution, they could potentially taint the estimated effects.

A further important institutional change coinciding with the introduction of austerity measures is the expiration of the UK's Worker Registration Scheme (WRS) in 2011. The WRS stipulated that AC-8 migrants - that is, migrants who originate from the 2004 Central and Eastern European EU joiners - could claim out-of-work benefits and tax credits on the same grounds as other EEA nationals only after being registered to the WRS and in contin-

uous employment for 12 months. Giua [2020] shows that the expiration of the WRS had a positive impact on the probability of claiming out-of-work benefits by these migrants. Access to some of the local authority services such as social care services only required registering on the scheme, mitigating the concern of a pick-up in demand after the expiration of WRS [Kofman et al., 2009]. However, the pick-up in claims of out-of-work benefits by AC-8 migrants post 2011 may have had a second-order effect on demand for means-tested local authority services due to its direct effect on income. A general link between local unemployment rates and demand for means-tested social care services is indeed visible in our regressions (column 4, Table 14, appendix A). To account for these two important regime changes, we therefore test our results for robustness when excluding post-2010 years.

Table 6 shows the results estimated in our preferred specification when excluding all years post 2010.

Table 6: Effect of AC-12 migration on local spending and revenue - pre-austerity

	(1)	(2)	(3)	(4)	(5)	(6)
	Total expenditure pc	Central government transfers pc	Locally raised budget pc	Social care pc	Education pc	Other pc
AC-12 shock	787.90*	1027.55**	-239.65**	-184.75	1309.79***	-336.15
	(463.06)	(471.63)	(104.79)	(179.80)	(435.48)	(206.63)
N	1343	1343	1343	1343	1343	1343
R^2	0.953	0.925	0.872	0.874	0.933	0.734
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2010.

The results broadly confirm those of the longer panel shown in Tables 4 and 5. All coefficients are of the same sign in the early years of AC-12 inflows, suggesting that neither the expiration of the WRS nor the centrally imposed austerity measures fundamentally changed the effect AC-12 migrants had on local authority spending and revenue. Two observations are nevertheless noteworthy. First, all results are slightly less precisely estimated, likely a consequence of the significantly smaller sample size. Second, the coefficient estimated on social care spending per capita is smaller than in the full sample (column 4). One possible reasons for the amplification of observed changes in social care spending during the austerity years is a progressive adaptation by local authorities to changing demographics. A second possible explanation is a delay in the change in local preferences for redistributive polices. On the other hand, the more gradual increase in the demand for education services in local authorities more heavily affected by the migration shock is in line with the observation that many AC-12 migrants were of child-bearing age when they arrived to the UK, or required additional spending due on language schooling. We analyse these hypotheses in more detail in section 7.

6.2   Matching

The pre-trends we present in Figures 5 and 6 show that AC-12 migrants did not systematically sort into local authorities based on trends in local spending or revenue regimes. However, a concern remains that destination choices were not picked at random: If AC-12 migrants moved into local authorities of specific underlying unobserved characteristics, these characteristics could have medium- to long-term consequences for local spending and revenue patterns that are then picked up by our estimates. For example, since AC-12 migrants were primarily labour migrants of a distinct skill profile, their destination choices were likely based on labour demand from specific industries; if the presence of these industries was linked to future local economic development in local authority areas, the association of AC-12 migrant shares and local area spending may be spurious.

In this subsection, we address this concern by matching affected and unaffected local authorities based on a wide range of local authority characteristics we draw from the 2001 UK Census. The local area characteristics we use for the matching procedure range from local authority expenditure and revenue measures to local household wealth indicators, local industry composition and demographics. A full list of variables is provided in appendix D. The simple matching-with-replacement estimation proceeds in three steps. Similar to our pre and post-trend analysis, we first divide local authorities into affected (=treated) and unaffected (=untreated) based on the increase in AC-12 migrants they experienced between 2004 and 2015. To increase the pool of potential matches, we define the top 50% receiving areas as affected and the bottom 50% of receiving areas as unaffected for the sake of the matching exercise. In a second step, we then use a simple stepwise Akaike's corrected information criterion (aicc) to select variables that best predict whether or not a local authority was treated, balancing an increase in the goodness-of-fit against the additional information required to achieve it [Cavanaugh and Neath, 2019]. The variables selected by the algorithm are highlighted in the full list shown in appendix D. In summary, AC-12 migrants were most likely to migrate into local authority areas with relatively larger manufacturing, hotel, health, fishing, financial and domestic work industry shares. Further variables that predict AC-12's propensity to migrate into specific areas include household shares deprived in one dimension and the share of social housing provided by the local Council. In the final step, we then use propensity score matching to match treated and untreated local authorities based on the selected variables.

Table 7 shows the results of the matching regressions.

Table 7: Effect of AC-12 migration on local spending and revenue - matching

	(1) Total expenditure pc	(2) Central government transfers pc	(3) Locally raised budget pc	(4) Social care pc	(5) Education pc	(6) Other pc
AC-12 shock	664.77	1187.73**	-522.96***	-402.99*	1475.97**	-404.50**
	(520.56)	(539.25)	(115.50)	(233.09)	(616.92)	(174.83)
N	1295	1295	1295	1295	1295	1295
R^2	0.883	0.826	0.808	0.771	0.752	0.651
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD (matched)	DiD (matched)	DiD (matched)	DiD (matched)	DiD (matched)	DiD (matched)
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. Local authorities in the top 50% of AC-12 migrant receiving areas in 2015, measured by the AC-12 shock, are defined as affected and matched with the bottom 50% of AC-12 migrant receiving areas based on 2001 UK Census characteristics described in appendix D. Matching conducted with replacement.LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

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Matching local authorities based on their 2001 characteristics does not alter the main results. All estimated coefficients are of similar magnitude compared to the results based on the unmatched sample in Tables 4 and 5. The results continue to indicate a shift in revenue sources away from locally raised budget towards central government transfers (columns 2 and 3) and a shift in expenditure from social care towards education (columns 4 and 5). The drop in local service expenditure outside education and social care in response is more precisely estimated in the matched sample (p<0.05). Overall, the results suggest that spatial sorting among AC-12 migrants based on observable local authority characteristics is not a large concern in the post-accession English setting. To further robustify this finding, we next turn to an an instrumental variable approach in subsection 6.3.

6.3 Instrumental variable approach

As discussed in subsection 4.2, a common way of dealing with endogenous destination choices is to instrument contemporaneous migration inflows by historical settlement patterns. This instrumental variable was pioneered by Card [2001] and is based on the premise that immigrant networks are an important determinant of locational choices [Altonji and Card, 2018]. In the context of the UK, such a "shift-share" instrument has been used by Bell et al. [2013], Sá [2015] and Giuntella et al. [2018] in their studies on the impact of migration to the UK and its effect on crime, house prices and NHS waiting times respectively. In our setting, the identifying assumption of such an instrument is that the historical settlement of AC-12 immigrants is correlated with post-2004 changes in local authority spending and revenue only through their effect on post-2004 inflows of AC-12 migrants. In this subsection, we use 1991 UK Census data to construct the instrument similar to Giuntella et al. [2018]. Specifically, we define $\lambda_{c,1991}$ as the share of AC-12-borns living in local authority c in 1991 and calculate:

$$\frac{\lambda_{c,1991} \sum AC12_t}{Pop_{c,t}}. \tag{4}$$

Thus, for each local authority c and year t, we multiply the 1991 share of AC-12 migrants residing in that local authority by the aggregate national level stock of AC-12 migrants in year t to project the new stock of AC-12 migrants. We then divide this number by the local area population $Pop_{c,t}$ to derive the projected shares.

We do not use the IV approach as our preferred specification for a number of reasons. First, in the context of AC-12 migration, Becker et al. [2016] point out that it is unclear whether such a shift-share instrument captures the skill-composition of AC-12 migrants well. The authors argue that migrants from Poland – the country where the largest share of AC-12 migrants originate from - who resided in the UK in 1991 mainly consisted of people of pension age, having lived in the UK since the second world war as remnants of the Polish Free Army, or of migrants who had entered before 1991 for graduate studies under high-skill visas. This would mean that the baseline distribution of Eastern European migration into the UK in 1991 would act as a weak proxy for subsequent migration flows, a point confirmed by the relatively weak first-stage F-test of 5.93 shown in Table 8. In the context of our research question, the distinct nature of historical inflows from AC-12 settlement in the UK raises an equally important question pertaining to the specifics of the local average treatment effects (LATE) such an instrumental variable identifies. The subset of contemporaneous AC-12 migrants pulled in by historical settlers from AC-12 countries is likely to be different from those AC-12 migrants who came to England for work. Thus, any LATE identified is potentially very different from the average treatment effect of AC-12 migrants on local authority spending researchers and policymakers are ultimately interested in.

With these caveats in mind, Table 8 displays the results of the IV-regressions.

Table 8: Effect of AC-12 migration on local spending and revenue - IV approach

	(1) Total expenditure pc	(2) Central government transfers pc	(3) Locally raised budget pc	(4) Social care pc	(5) Education pc	(6) Other pc
AC-12 shock	3092.22	5002.80**	-1910.58**	-3293.37***	5853.21***	551.08
	(2052.34)	(2471.26)	(855.56)	(1215.52)	(2055.41)	(826.78)
N	2028	2028	2028	2028	2028	2028
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD - IV	DiD - IV	DiD - IV	DiD - IV	DiD - IV	DiD - IV
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS
First-stage F-test	5.93	5.93	5.93	5.93	5.93	5.93

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. DiD - IV refers to a difference-in-differences approach where the AC-12 shock variable is instrumented by the historical distribution of AC-12 migrants across England as defined in 4. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population.LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015. The F-test of the first-stage regression is the Kleibergen-Paap rk Wald F statistic. It is reported only for the post-shock period.

The LATE estimates obtained from the instrumental variable regressions confirm the main results. When interpreted causally, the results show that the subset of AC-12 migrants pulled in by historical networks had sizeable effects on both local authority revenue sources and the spending mix. All estimated coefficients are between five and eight times larger than those obtained in our preferred specifications of Tables 4 and 5. We note that the difference in the magnitude of the obtained coefficients allows for two possible interpretations: First, the treatment-on-the-treated effects obtained from the difference-in-differences specification underestimate the effects AC-12 migration had on local authority budgets and service provision. A second interpretation is that the estimated LATE is identified based on a subset of migrants that differs significantly from the average group characteristics of AC-12. For the reasons outlined above, we believe that the second is more likely to hold true. We conclude that the estimates obtained in Tables 4 and 5 are likely to be closer to the true effect AC-12 had on local authority service provision.[9]

6.4 Census data

Despite being relied on heavily in the UK-migration literature as a source of tracking local authority level migration stocks over time in the UK [Bell et al., 2013, Sá, 2015, Giuntella et al., 2018], the LFS/APS data we use as our primary data source has some disadvantages regarding its ability to accurately capture migrants of specific countries of origin on a granular geographical level [Cangiano, 2010]. The absolute number of AC-12 migrants or other migrant groups sampled in each local authority-year is sometimes too low to rely on in our empirical analyses, leading us to discard observation points when these counts fall below 10. In this section, we therefore confirm the main results using 2001 and 2011 Census data instead of the more volatile LFS/APS. Both censuses provide data at the local authority level of residents by country or region of birth while the 2011 Census provides information on the time of arrival

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[9]In theory, the relatively weak first stage F-test (F=5.93) may both lead to a bias of the estimated coefficient towards OLS -in which case the true coefficients would be even larger than those obtained - and an underestimation of the size of the standard errors around these point estimates [Murray, 2006].

of 2011 residents in two- or three-year brackets. As we do not have information within these year brackets, we calculate the stock of migrants as the last year of each bracket: For example, a migrant reporting to have entered a local authority district five to seven years ago in 2011 enters our stock calculation for the year 2006. This way, we obtain stock data for AC-12 migrants in every local authority district for the years 2000, 2003, 2006, 2009 and 2011. A disadvantage compared to our main AC-12 shock measure is that all results are estimated exploiting year-on-year variation within local authorities only when stock data is available. The way the stock of residents is reported in the Censuses further means that it does not count migrants who arrived in England before 2011 and then left England before 2011 or who died before 2011. The stock of migrants reported for every year is therefore a lower bound estimate of the true migration inflow. The alternative shock measure is summarised in Table 9.

Variable	Mean	Std. Dev.
AC-12 migration shock (alternative)	0.013	0.017
N		2028

Table 9: Summary statistics

Table 10 then turns to the results using the alternative AC-12 migration shock measure based on Census data.

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Table 10: Effect of AC-12 migration on local spending and revenue - Census data

	(1) Total expenditure pc	(2) Central government transfers pc	(3) Locally raised budget pc	(4) Social care pc	(5) Education pc	(6) Other pc
AC-12 shock (alternative)	1322.18***	1779.49***	-457.31***	-622.42***	2153.44***	-208.84
	(330.69)	(344.50)	(94.18)	(195.69)	(438.68)	(160.81)
N	2028	2028	2028	2028	2028	2028
R^2	0.891	0.837	0.825	0.793	0.767	0.654
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Census	Census	Census	Census	Census	Census

Standard errors clustered at the local authority level in parentheses.

* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. Census refers to the 2001 and 2011 UK Census. The observation period is 2000 to 2015.

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The results confirm the main results shown in Tables 4 and 5. The estimated coefficients on total service expenditure per capita (column 1), central government transfers per capita (2), social care spending per capita (4) and education per capita (5) are by a magnitude of 1.5 to three times larger than those estimated in the baseline specification. All coefficients are slightly more precisely estimated. Due to the shortcomings of the Census data discussed above, we do not overinterpret these differences in effect size; however, the results show that imprecisely measured AC-12 migration stocks are unlikely to be the drivers of the association between AC-12 migration and local authority spending and revenue patterns.

7 Mechanisms

The results found in this paper document how a large migration shock translates into the provision of different public goods. In aggregate terms, our results suggest that the AC-12 migration shock only marginally affected the overall supply of public services in both pre and post-austerity years. On the revenue side, our results show a relative increase in central government transfers and a relative decline in locally generated revenue in local authorities affected by AC-12 migration inflows. We also observe important shifts in the types of public goods local authorities provide following the migration shock brought about by AC-12 migrants. Local authorities affected relatively more by migration inflows spent relatively less on means-tested social care services and significantly more on education services.

In this section, we investigate two important channels that might explain our observed results. On the one hand, the change in local authorities' populations stemming from AC-12 migration could lead to changes in redistribution via a change in preferences towards less redistribution or native flight lowering the tax base and local authority revenues. On the other hand, these changes could also reflect a more mechanical response. Migrants' have different socio-economic characteristics and different propensities to uptake services, which could lead

to changes in redistribution without reflecting any migration-specific altruistic component. In this case, changes in redistribution from the rich to the poor do not discriminate between native-born versus foreign-born poor and simply reflect changes in the socio-economics characteristics of the population. Conditional on an institutional response by local authority councils, changes in the allocation of spending would then follow a mechanical response. We discuss both these channels separately in the following subsections. While we acknowledge that both channels are non-exhaustive and could be at play simultaneously, we first discuss each of these channels and the hypotheses one can derive from them before arguing, through a number of tests, that the demographic channel better explains the observed changes in redistribution following AC-12 migration. For an overview of all variables we analyse as mechanisms and their source, data availability and construction, see Table 11 .

7.1 Migration and the altruism towards co-nationals: the preferences channel

The shift in expenditure from social care services towards education and the decline in the locally raised budget we identify could be interpreted as local authorities responding to a change in local preferences towards less redistribution following the migration shock. The link between migrant inflows and local preferences for redistribution could be a reflection of people from different groups disagreeing on the optimal amount and composition of local spending, or the dominant native group being less willing to redistribute towards non-co-nationals. While one has to be careful with using vote shares as an indication for an underlying preference for redistributing wealth or income in the population, we showed in Figure 1 that in England, it is clearly the Conservative party that has support from voters less in favour of redistribution. We can thus test whether such a "demand" for less redistribution effect could explain our results by measuring the impact of AC-12 migration on the composition of local Councils and test whether the Conservative less pro-redistributive platform increased its seat share following a stronger migration wave. In this context, it is also worth noting

that all EU (and Commonwealth) migrants to the UK have voting rights in local elections. Thus, an increase in the seats' share of Conservative Councillors, who represent the interest of voters with preferences for less redistribution, could also reflect a change in the aggregates populations' preferences if migrants exerted their voting rights.

A second more indirect mechanism through which distaste for outsiders could lead to less redistribution is a mechanism often referred to as "native flight" (see e.g. Cascio and Lewis [2012]) or "voting by feet". In addition to a direct reduction in demand for redistribution translating into changes in local spending, distaste for living near foreigners can also affect redistribution via natives moving into different local authorities. Such changes can indeed lead to a lowering of the tax base as the number of taxable properties decline, leading to a deterioration of local authorities' budgets and eventually a decline in local authority government spending. To analyse such second-order internal migration in response to international inflows of migrants, we therefore report the impact of AC-12 migration on the number of taxable dwellings per capita (the tax base) as well as on the Band-D council tax rate, a lump-sum tax due to be paid annually by the dwelling owner. On average, this Band-D council tax stood at GBP 1278 over our observation period. To test the native flight hypothesis, we create two measures of internal migration. First, we draw on National Health Service (NHS) registration data. Getting basic access to free public health care in the UK requires registration with a local general practitioner. If individuals change their residence within the UK, they are required to provide their new general practitioner with any previous registration. The data thus allows to calculate both registrations and de-registrations for any given local authority and year. We then subtract internal migration inflows from internal migration outflows to construct a measure of net outflows of internal migrants at the local authority year level. Since the measure does not allow us to distinguish internal migrants by country of birth, we construct a second similar measure for UK native borns only, following Giuntella et al. [2018]. Between 2000 and 2013, the second quarter survey of the UK-LFS

contained a variable that asked respondents for their local authority of residence in the year prior to the survey, as well as their current local authority of residence. We use this information and calculate a "net internal native out-migration" variable for UK born individuals for all local authority years. Unlike the measure based on administrative NHS registration data, which is comprehensive, we normalise the UK-LFS data by the total number of respondents in each local authority-year to account for fluctuations in the sample size of the survey over time.

Table 11: Summary statistics - mechanisms

Variable	Mean	Std. Dev.	N	Source	Years available	Unit
Share of pupils in population	0.159	0.02	1755	CIPFA	2000-2013	$\frac{Pupils_{c,t}}{Population_{c,t}}$
Education per pupil	4664.09	1033.50	1755	CIPFA	2000-2013	$\frac{Education_{c,t}}{Pupils_{c,t}}$
Population aged > 64	0.153	0.034	1881	CIPFA	2001-2014	$\frac{Population\,65+_{c,t}}{Population_{c,t}}$
Social care per population aged > 64	2659.26	1365.57	1881	CIPFA	2000-2013	$\frac{Social\,care_{c,t}}{Population\,65+_{c,t}}$
Vote share Labour party	0.398	0.267	2028	UK Elections Centre	2000-2015	$\frac{Council\,seats\,Labour_{c,t}}{Total\,seats_{c,t}}$
Vote share Conservative party	0.371	0.243	2028	UK Elections Centre	2000-2015	$\frac{Council\,seats\,Labour_{c,t}}{Total\,seats_{c,t}}$
Net internal out-migration	198.57	2452.55	1840	NHS registrations	2002-2015	$Net\,outflow\,internal\,migrants_{c,t}$
Net internal native out-migration	0.007	0.049	1756	LFS	2000-2013	$\frac{Net\,outflow\,UK\,natives_{c,t}}{Population_{c,t}}$
Band D equivalent council tax	1278.14	225.49	2028	CIPFA	2000-2015	$Council\,tax_{c,t}$
Dwellings: Tax base per capita	0.34	0.06	2028	CIPFA	2000-2015	$\frac{Band\,D\,dwellings_{c,t}}{Population_{c,t}}$

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7.2 Migration and changes to local authorities' socio-economic structure: the demographic channel

A second hypothesis that could explain the decline in local revenue and social care spending could simply be an institutional response to changes in impacted local authorities' underlying demographics. In our setting, local authority demographics are likely to have changed significantly in response to the distinct socio-economic characteristics of AC-12 migration inflows shown in Table 1. These could have important implications for social care expenditure, which is predominantly consumed by elderly segments of the population. In 2004, the year of EU enlargement, the share of social care consumed by locals aged 65 and above stood at 40.1%. The observed decline in spending on social care could therefore simply reflect the per capita decline in demand for these services. We further recall that English local authorities only have upward discretion over education spending such that its relative increase could directly be linked to the rise in central government transfers that are channeled through local authorities [Phillips, 2018]. To investigate this institutional response, we begin by analysing changes in local demographics associated with AC-12 inflows by constructing a measure for the population share of pupils and a measure for the share of the population aged 65 and above to proxy demand for education services and social care services brought about by demographics respectively. In a second step, we then normalise changes in spending by these largest relevant consumer groups for both total spending on education and social care instead of using the previous per capita measure to test whether the observed changes were mechanical.

A second potential explanation for the uncovered association between AC-12 migration inflows and changes in local authority spending and revenue is a second-order effects brought about by an internal migration response to the new-arrivals: If, for example, the availability of relatively cheap labour creates local economic opportunities, this could draw in additional migrants from within the country. This, in essence, is the opposite of the "native flight"

mechanism and can therefore be tested using the same internal migration measures as out-come variables as explained in subsection 7.3.[10]

7.3 The relative importance of the demographic channels: the easing off of pressure on social care stemming from AC-12 migration

Table 12 reports the results testing the hypotheses we have brought forward to discuss the relative relevance of the two main channels discussed above.

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[10]An additional mechanism we do not consider due to the lack of reliable data is migrants' propensity to demand local services, even once demographic differences are accounted for. For example, the "healthy migrant effect" could decrease the demand for social care services [Abraido-Lanza et al., 1999]. While data on social care referrals in England are available, these cannot systematically be divided into self-referrals and referrals by doctors. This is problematic since doctors are likely to refer their patients to social care services based on their understanding of availability of these services. A further issue with data on referrals is that they do not indicate the type (and thus, cost) of services requested.

Table 12: Mechanisms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Share pupils	Share 65+	Education/pupils	Social care/65+	Labour seats	Conservatives seats	Net int. outflows	Native outflows
AC-12 shock	0.15***	-0.26***	2947.91	5559.07***	0.65*	-0.54	-12811.18***	-0.31**
	(0.04)	(0.04)	(2684.36)	(1337.05)	(0.39)	(0.36)	(3968.12)	(0.13)
N	1755	1881	1755	1881	2028	2028	1840	1755
R^2	0.383	0.212	0.790	0.694	0.313	0.241	0.046	0.013
Time FE	Year	Year	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD	DiD	DiD
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Notes: The outcome variables are defined in Table 11. The number of observation varies due differences in data availability shown in detail in the same table. The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey.

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We first turn to columns (1) to (4) to analyse the local demographic channel. AC-12 migration is strongly associated with an increase in the local population share of pupils (p<0.01; column 1) and is similarly associated with a decline in the local population aged 65 and above (p<0.01; column 2). The estimated coefficients indicate that a one percentage point increase in the share of local AC-12 migrants relative to the 2001 AC-12 population share changes the share of pupils in the population and the share of individuals aged above 65 by 0.15 percentage points and -0.26 percentage points respectively. Columns (3) and (4) then show the spending on education and social care relative to their main consumption groups. The coefficient estimated on education expenditure by pupil (3) shows that the large increase in education expenditure per capita we documented in the previous analyses is likely due to the change in underlying demographics associated with AC-12 inflows. The estimated coefficient is still positive, but no longer differs from zero at any conventional statistical level. In column 4, we show that the decline in social care service spending per capita associated with AC-12 inflows disappears when spending is calculated as a share of the main recipient group. In fact, increases in the local AC-12 migration share are associated with a large *inrease* in social care spending by population aged 65 and above (p<0.01). The estimated coefficient shows that a one percentage point increase in the AC-12 migrant shock measure leads to a GBP 56 increase in social care spending by the population aged 65 and above.

We next turn to the local preferences for redistribution channel in column (5) and (6) of Table 12. The association of AC-12 migration inflows with the share of local council seats held by Conservatives is negative and not significantly different from zero (6). In fact, we find suggestive evidence that it is the share in Labour held seats that increased following AC-12 migration inflows (p<0.1; column 5). Our data does not allow us to disentangle whether the shift towards Labour votes were in parts caused by AC-12 migrant voters themselves or if their presence causally affected the voting behaviour of the local non-migrant population. However, our results allow us to conclude that, if there was indeed a shift of native pref-

erences towards the less-redistributive Conservative party, this shift was smaller than any excess Labour votes cast by migrants themselves, such that the aggregate local preferences showed no signs of a preference shift towards less redistribution as a response to more heterogeneity. In appendix E, Table 18, we find suggestive evidence that AC-12 did indeed increase UKIP votes by approximately the same magnitude as Conservative seats decreased, although these results are only stable when including controls.

Finally, columns (7) and (8) show the association of AC-12 migration with net total UK-internal migrant outflows and the net internal outflow of UK-borns respectively. Unlike previous research by Sá [2015] and Giuntella et al. [2018], who analyse migrants as a homogenous group, we find no evidence for a "native flight" following the inflow of AC-12 migrants into local authority areas. Instead, our estimates in fact suggest a decline in the net outflow of both total and UK native-born internal migrants in response to AC-12 migration.

Taken together, we interpret these results as strongly suggestive of a greater role played by the demographic channel. While the results on native flight and the increase in the more pro-redistributive platform go against the preferences channel, the fact AC-12 migrants were on average younger and more likely to be in employment suggests the demographic channel played a significant role in explaining the reduction in social care spending per capita. Furthermore, education spending per pupil remains stable and can explain the rise in central government transfers per capita for this partially ring-fenced expenditure item. While we cannot fully test this argument, it is also worth noting that this increase in pupils per capita should not be fully attributed to a rise in pupils from AC-12 countries only. As shown in Table 1, AC-12 migrants were not particularly more likely to have more children than other groups, such that the relative increase in pupils may also reflect the second order effect of a reduction in net outflows of potentially young natives with children.

Table 13 then turns to a more detailed analysis of the effect of AC-12 migration on local revenue sources by breaking up the local revenue measure into the council tax and the tax base.

	(1)	(2)
	Council tax (Band-D)	Taxable dwellings pc
AC-12 shock	-395.33*	-0.215***
	(235.61)	(0.050)
N	2028	2028
R^2	0.949	0.789
Time FE	Year	Year
Model	DiD	DiD
Full set of controls	Yes	Yes
Sample	LFS/APS	LFS/APS

Standard errors in parentheses
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Notes: The Council tax (Band-D) is the baseline annual lump-sum Council tax set by local authorities. Taxable dwellings is the number of Band-D equivalent dwellings that are subject to paying Council tax. "pc" refers to per capita. The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

Table 13: Effect of AC-12 migration on local revenue sources

The results shown in Table 13 suggest that, while it was indeed the case that the housing stock did not keep up with the increasing number of migrants (column 2), AC-12 migration was also associated with a relative decrease in the local council tax (column 1, $p<0.1$).

In light of the results on local voting patterns and internal migration responses to AC-12 inflows shown in columns (5) to (8) of Table 12, we do not interpret these effects as reflecting the importance of the preferences channel. The provision of local housing units naturally lags changes in the local population size, explaining the decline in the tax base per capita as affected local authorities' populations increased drastically. This decline in the number of taxable dwellings relative to the local population did likely not require a compensation by increasing the local council tax. This interpretation is corroborated by the fact that the reduction in social care spending per capita was not conducted at the expense, but rather at the benefit of the most vulnerable populations (column 4, Table 12). Indeed, the most

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plausible interpretation of our findings is that the inflow of a dynamic and young population eased pressure on local authorities who could now spend relatively more on the social care of those aged 65 and above.

In summary, our analysis of mechanisms that explain the shifts in local authority expenditure and revenue associated with AC-12 migration inflows leads us to three main conclusions: First, the changes AC-12 migrants caused to local authority expenditure and revenue patterns were in large parts due to the shifts these migrants caused to local demographics and the corresponding institutional responses that were triggered by the resulting changes in local service demand. Second, AC-12 inflows were significantly associated with a relative increase in internal migration. The increasing share of pupils associated with AC-12 migration was likely linked to internal migrant inflows into the same local authorities leading to increased education spending per capita. Finally, the relative drop in demand for local social care services associated with AC-12 migrants did not just result in a large *inrease* in social care spending by the population aged 65 and above, but also allowed affected local authorities to keep their council tax rates relatively low. Overall, our results suggest that the demographic channel was most relevant to explain the impact of AC-12 migration. Thus, they further strengthen previous research findings of an overall net positive fiscal contribution migrants from 2004 EU accession countries made to the UK government budget [Dustmann and Frattini, 2014].

8 Conclusion

In this study, we investigated the effect of the large and unexpected wave of Central and Eastern European migrants starting in 2004 on local authority redistributive spending in England. Our results suggest that AC-12 migrants indeed impacted on local authority revenue sources and the local spending mix. We do not find evidence in favour of the hypothesis

that these large migration inflows impacted on local preferences for redistributing income. We neither observe voting patterns in local elections that would indicate such a shift in preferences, nor did local residents "vote with their feet" in response to migration inflows. While our results clearly favour shifts in demographics as an explanation for the observed changes in local authority revenue and spending, a limitation of our study is the lack of survey data that could capture preferences for redistribution more precisely.

We interpret our results as a word of caution when relating them to the existing literature. A decrease in public spending can mean a lack of demand from newcomers due to their distinct socio-economic characteristics, rather than the outcome of an increasing local insider-outsider dynamic. Thus, our findings rather lend further support to Dustmann and Frattini [2014] who show that AC-12 migrants were positive net contributors to the UK public purse.

It is worth reflecting on our results in light of the Brexit vote, where anti-immigrant sentiment has played an important role [Meleady et al., 2017, Dennison and Geddes, 2018]. A possible interpretation of our results is that the national-level distaste for immigrants expressed in the Brexit vote was not driven by local level exposure to foreigners. This explanation finds strong support in a recent study by Becker et al. [2017], who show that local education, income and unemployment levels are strongly correlated with the local Vote Leave share, whereas exposure to EU migrants has little explanatory power. Such an interpretation would further corroborate the necessity to conduct studies relating the presence of migrants to preferences for redistribution on the subnational rather than the national level if the aim is to study direct exposure: On the national level, changes in preferences for redistribution may capture an increased fear of foreigners in areas not necessarily exposed to migration.

Finally, the interpretation of our findings with regards to the sustainability of social

care services in England requires a careful reflection. On the one hand, we show that the distinct demographics of AC-12 migrants eased the pressure these means-tested services face in England in the short-term. On the other hand, those migrants who arrived as part of the post-accession waves are increasingly getting older and will likely demand social care services in larger numbers in the future. Using migration as a tool to permanently ease the pressure on local service provision would thus require a continuous inflow of migrants. However, migration inflows from EU countries to the UK have slowed down in response to the end of free movement for EU citizens and recent political developments in the UK, with net migration flows from the 2004 Central and Eastern European countries turning negative in 2018 for the first time [Sumption and Vargas-Silva, 2021]. These developments are likely to have repercussions for local authority revenue and spending in the near future and may call for new reforms to regulate the flow of migrants in the absence of free movement of EU citizens.

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Appendices

A   Main results with controls - full table

Table 14 shows the coefficients of the AC-12 shock as well as the coefficients of all our control variables on our main outcomes of interest.

Table 14: Main results: All controls

	(1) Total expenditure pc	(2) Central government transfers pc	(3) Locally raised budget pc	(4) Social care pc	(5) Education pc	(6) Other pc
AC-12 shock	526.82	978.15**	-451.32***	-414.47**	1179.50**	-238.21
	(457.81)	(472.17)	(87.03)	(204.35)	(564.80)	(152.78)
Share EU-15	1291.99**	1482.37***	-190.38	33.77	1062.35***	195.87
	(514.40)	(441.90)	(156.07)	(230.67)	(365.07)	(231.50)
Share non-EU	247.52	406.58	-159.06**	-62.79	265.37	44.94
	(251.84)	(277.55)	(67.62)	(109.33)	(242.30)	(98.83)
Unemployment rate	51.85	75.64	-23.78	649.06***	-423.88	-173.33
	(343.96)	(355.50)	(106.79)	(187.60)	(405.00)	(145.36)
Population	-0.0020***	-0.0018***	-0.0003**	-0.0006***	-0.0008***	-0.0006***
	(0.0003)	(0.0003)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
N	2028	2028	2028	2028	2028	2028
R^2	0.890	0.834	0.826	0.790	0.757	0.654
Time FE	Year	Year	Year	Year	Year	Year
Model	DiD	DiD	DiD	DiD	DiD	DiD
Sample	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS	LFS/APS

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Notes: Outcomes expressed in per capita terms (pc). The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

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B Local authority spending and funding

Table 15 is based on Sandford [2018, p.19] and provides a comprehensive overview of how the different functions within two-tier authorities are split between the upper tier (the County) and the lower tier (the District).

Function	Tier
Births, deaths and marriage registration	County
Children's services	County
Concessionary travel	County
Education	County
Emergency planning	County
Highways, street lightning and traffic managament	County
Libraries	County
Mineral and waste planning	County
Passenger transport (buses) and transport planning	County
Public health	County
Social care services	County
Trading standards	County
Waste disposal	County
Building regulations	District
Burials and cremations	District
Coastal protection	District
Community safety	District
Council tax and business rates	District
Elections and electoral registration	District
Environmental health	District
Housing	District
Licensing	District
Markets and fairs	District
Public conveniences	District
Sports centres, parks, playing fields	District
Arts and recreation	Country and District
Economic development	Country and District
Museums and galleries	Country and District
Parking and galleries	Country and District
Parking County	Country and District
Planning	Country and District
Tourism	Country and District

Table 15: Overview of local authority services in England by government tier

Table 16 provides an overview of social care services in English local authorities.[11]

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[11]Note that the thresholds for means testing changed over our observation period; however the general setting remains the same

Service	Expenditure items included	Means testing (as of 2018)
Adult social care	Physical support Sensory support Memory and cognition support Learning disability support Mental health support Social support (substance abusers and asylum seekers) Assistive equipment Social care activities Early interventions counselling	Needs test: Carried out by local council Asset test: Lower asset threshold GBP 14,250; Upper asset threshold GBP 23,250 Full coverage below lower threshold Shared at the discretion of local authorities in between. Income test: Entitled to GBP 24.90 per week of personal expense allowance fo care home residents; Minimum income guarantee of beween GBP 91.90 and GBP 144.30 per week for other settings
Child social care	Children centres Children looked after Family support services Other children and family support Youth justice Safeguarding children's safety Services for young people	Needs test: Carried out by local council wihtin 45 days after referral

Table 16: Overview of social care services in England

C   Spatial distribution of other migrant groups

Figure 7 shows the change in the shares within the population of non-EU migrants and EU-15 migrants between 2004, the year of enlargement, and 2015.
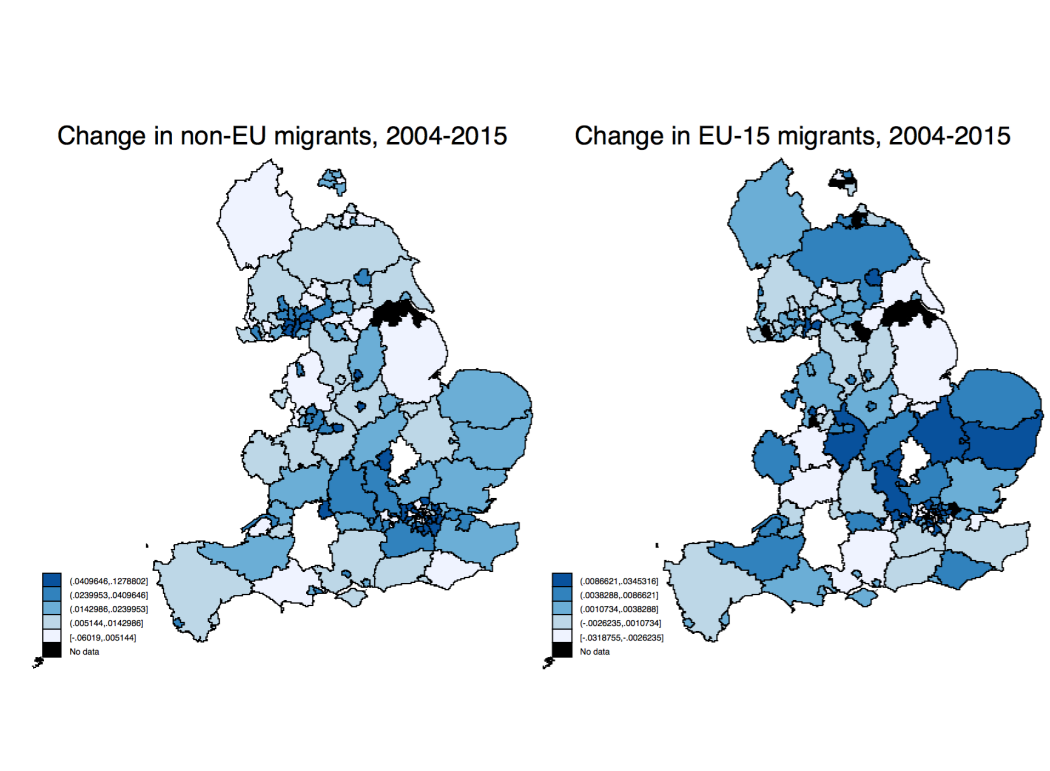

Figure 7: Changes in non-EU and EU-15 migrants by English local authority

D 2001 Census variables for matching

Table 17 shows the full list of 2001 local authority characteristics drawn from the 2001 UK Census. The variables highlighted in grey were selected as best predictors for AC-12 inflows between 2004 and 2015.

Variable	Mean	Std. Dev.	N
Tax base	110.802	94.351	143
Council tax per capita required	304.85	446.339	143
Central government transfer per capita	839.677	1221.178	143
Share spent on social care	0.235	0.048	143
Share spent on education	0.525	0.066	143
Share spent on other items	0.24	0.068	143
Unemployment	0.059	0.025	143
Population	327418.182	257845.906	143
Household share - not deprived	0.413	0.061	143
Household share - deprived in one dimension	0.329	0.019	143
Household share - deprived in two dimensions	0.196	0.036	143
Household share - deprived in three dimensions	0.056	0.019	143
Household share - deprived in all dimensions	0.006	0.003	143
Household share - owns house	0.686	0.123	143
Household share - socially rented	0.196	0.093	143
Household share - socially rented from Council	0.137	0.08	143
Household share - privately rented	0.101	0.053	143
Share houses unoccupied in local authority	0.039	0.025	143
Share houses unoccupied - secondary houses	0.007	0.023	143
Share houses unoccupied - vacant	0.032	0.012	143
Share population in rural area	17.644	24.566	142
Share EU-15 born	0.015	0.015	143
Share AC-12 born	0.006	0.008	143
Share non-EU born	0.079	0.083	143
Share industry: Agriculture	0.011	0.012	143
Share industry: Fishing	0.001	0.001	143
Share industry: Mining	0.002	0.002	143
Share industry: Manufacturing	0.144	0.055	143
Share industry: Electricity	0.007	0.004	143
Share industry: Construction	0.065	0.016	143
Share industry: Whole Sale	0.167	0.025	143
Share industry: Hotels	0.05	0.024	143
Share industry: Transport	0.073	0.019	143
Share industry: Financial	0.051	0.029	143
Share industry: Real Estate	0.137	0.056	143
Share industry: Public sector	0.055	0.016	143
Share industry: Education	0.076	0.012	143
Share industry: Health	0.107	0.018	143
Share industry: Domestic work	0.001	0.001	143
Share aged 64+	0.072	0.016	143

Table 17: Summary statistics matching variables

E UKIP results

Table 18 shows the impact of our AC-12 shock measure on the electoral results of UKIP in local elections that took place between 2000 and 2015.

	(1) Vote share UKIP	(2) Vote share UKIP
AC-12 shock	0.78	0.37*
	(0.23)	(0.22)
N	878	774
R^2	0.715	0.752
Time FE	Year	Year
Model	DiD	DiD
Full set of controls	No	Yes
Sample	LFS/APS	LFS/APS

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Notes: Notes: Outcomes expressed in percentage points. The AC-12 shock is defined as the difference in AC-12 population shares in a given local authority-year and its 2001 baseline share as defined in equation 1 of section 4.1. All regressions include local authority fixed effects. The full set of controls refers to the share of EU-15 migrants, the share of non-EU migrants, the local authority unemployment rate and the total local population. LFS/APS refers to the UK Labour Force Survey and its boost samples in the Annual Population Survey. The observation period is 2000 to 2015.

Table 18: Effect of AC-12 migration on UKIP vote shares

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