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Medium-Run Impacts of Immigration on the Housing Market: Evidence from a Quasi-Experimental Shift-Share Instrument[*]

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Abstract

To estimate the *causal* effect of immigration flows on housing market variables in the medium-run, we address the key problem of immigrant sorting by exploiting exogenous variation from push-factor migration and a unique institutional setting that allocates refugee immigrants to municipalities on a quasi-random basis. Economic theory predicts that immigrant influx will increase demand for residential space, increasing house rents and prices as well as residential construction at the aggregate level, but will have ambiguous effects at the neighborhood level in case of native flight. We find a large positive impact on house rents and prices and little evidence of native flight at the municipal level. At the neighborhood level, we also find a positive impact on house rents and prices, albeit more modest, as well as evidence of native flight. We further provide evidence of inelastic supply. Our findings support economic policies that increase housing supply elasticities and re-distribute part of the gains from immigration to groups that bear the burden from immigration and thereby decrease political opposition to immigration.

Keywords: Immigration, Residential real estate, Re-distribution, Inequality, Quasi-random allocation of refugee immigrants, Shift-share instruments.

JEL codes: J61, R31, H71, I38

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I. Introduction

In recent decades, high-income countries have experienced high rates of immigrant influx. In 2024 the flow of permanent-type migrants to OECD countries amounted to 6.5 million people, a 28 percent increase relative to the flow observed in 2019 (OECD, 2024). This trend has led economists to study how immigration affects destination countries. Most studies have investigated the effects on local labor markets, where the empirical evidence generally suggests that immigration only has small effects on employment and wages (e.g. Altonji and Card, 1991; Jaeger, 1996; Card, 2001; Friedberg, 2001; Glitz, 2012; Ottaviano and Peri, 2012; Manacorda, Manning, and Wadsworth, 2012; Peri, Shih and Sparber, 2016; Foged and Peri, 2016). However, immigration affects natives differently across the distribution of native wages, because along the skill distribution some may lose and some gain depending on the elasticities of substitution between immigrants and natives (e.g. Borjas, 2003; Dustmann, Frattini and Preston, 2013). Native attitudes toward immigrants may also depend on other factors, such as their impact on welfare benefits (Dahlberg, Edmark, and Lundqvist, 2012), housing costs and preferences for ethnic identity (Sá, 2015; Moraga, Ferrer-i-Carbonell, and Saiz, 2019). Recently, Dustmann, Vasiljeva and Damm (2019) have shown that high rates of refugee influx increase the political support for populistic right-wing parties outside the larger cities and reduce the political support for re-distributive policies.

Against this backdrop, this paper uses high-quality administrative microdata covering the entire Danish population to examine medium-run impacts of increased immigration influx on the Danish housing market over a long period between 1999 and 2016, exploiting exogenous variation in immigrant influx from push-factor migration (refugee influx) and a unique institutional setting that allocates refugee immigrants to municipalities on a quasi-random basis. Since 1999, the population share of immigrants in Denmark has more than doubled from 5.4 percent to 12.6 percent in early 2025. Over the same period, the influx of immigrants and descendants account for 90 percent of the Danish population growth (from 5.3 million to approximately 6.0 million).

The purpose of the paper is to study how immigration affects house rents and house prices in the medium run to shed light on the extent to which current owners of residential property benefit from immigration, using Denmark as a case study. To understand the impacts on house rents and house prices, our study also examines the medium-run effects of immigration on the local housing stock, distinguishing between public and private supply. According to standard economic theory

on real estate markets, population growth due to immigration will increase demand for housing space, increasing house rents and prices, and thus stimulating housing supply. The long-run effects will depend upon the local housing supply elasticity. The increased demand for housing space leads to a higher income for landlords and, if unexpected, a positive wealth effect on current residential property owners. Although these predictions are generally well-regarded, there are scenarios in which immigration does not affect house rents and prices over the long run such as native flight and local ethnic group-specific amenities. To elucidate the mechanisms through which immigration affects house rents and prices, we further examine native flight. Evidence indicates that immigrants tend to settle in larger cities, thus affecting urban and rural populations differently, and, within the larger cities, influencing property owners and renters differently. Therefore, our analysis allows for heterogeneous effects across local labor markets depending on their population size. Our results aim to help policy makers in the design of economic policies that re-distribute part of the gains from immigration to groups that bear the burden of immigration and thereby decrease political opposition to immigration.

An empirical approach to study the impacts of immigration on housing market outcomes could involve relating changes in residential property rents, prices, and housing stock to changes in immigrant settlement. However, such a strategy faces endogeneity concerns, as immigrants tend to sort into areas where they want to live and work – decisions that may be influenced by, or correlated with, local housing market conditions. A standard solution to circumvent these concerns is to use an instrument for the local immigration rate that is plausibly exogenous – uncorrelated with unobserved characteristics – yet still strongly correlated with the immigrant flows. Following the seminal contribution of Card (2001), the shift-share instrument has become the predominant identification strategy in the literature on immigration, exploiting variation in the immigration "shift" from national changes in immigration flows and variation in the local exposure "share" to the national "shift" arising from historical settlement patterns of immigrant groups, for example, in ethnic enclaves (Bartel, 1989). This strategy has been widely adopted to study the impacts of immigration on housing markets. Saiz (2007) finds that a one-percent immigration inflow raises U.S. city rents and prices by roughly one percent, while Saiz and Wachter (2011) show that, within cities, immigrant inflows depress housing appreciation in immigrant-dense neighborhoods because of native flight. Accetturo, Manaresi, Mocetti and Olivieri (2014) document similar spatially heterogeneous effects in Italian cities, with rising city-level prices but declining relative prices in

immigrant-receiving districts. Sanchis-Guarner (2023), using Spanish data, estimates that a one percentage point increase in immigration raises house prices by 3.3 percent, decomposing this into a direct immigrant demand effect (2.5 percent) and an induced native relocation effect. In contrast, Sá (2015) finds that immigration to the UK reduces local house prices by 1.7 percent for every percentage point increase in immigrant share, driven by native displacement and lower income growth. Sharpe (2019) re-evaluates the U.S. evidence and shows that controlling for initial city characteristics—such as rent levels and housing supply elasticity—attenuates the estimated effect of immigration on rents by roughly 75 percent, with preferred estimates suggesting that a one percent immigration inflow leads to only a 0.3–0.4 percent increase in rents. He further demonstrates that immigration has a stronger rental impact than native inflows, particularly in cities with inelastic housing supply.

Despite its popularity, the shift-share instrument performs poorly in our sample period, failing standard balancing and exogeneity tests, raising concerns about its suitability for causal inference in our context. To sidestep this obstacle, we build upon the contribution of Card (2001) and propose a novel shift-share instrument, the *refugee forecast shift-share instrument*, to estimate the medium-term impacts of local immigration influx on housing rents, house prices and the housing stock at the municipal level over the period from 1999 to 2016. Our quasi-experimental shift-share instrument has two key innovations. It exploits two types of arguably exogenous variation: exogenous variation in the "shift" from push-factor refugee migration (Hatton, 2016) and exogenous variation in the "share" from a unique institutional setting that allocated refugee immigrants to municipalities in Denmark on a quasi-random basis, the first Danish Spatial Dispersal Policy on Refugees, in place between 1986 and 1998.[1] The "shift" is the Danish Immigration Service's initial annual forecast on the refugee influx to Denmark, referred to as the refugee forecast for the country ("Landstallet"), accumulated over a five-year period. We fix the exposure share of a given municipality to its share of refugees by the end of 1995. Hence, our instrument allocates the predicted refugee influx to Denmark across municipalities according to the municipality's share when the first Danish Spatial Dispersal Policy on Refugees has been in place for a decade.

[1] Our study covers years before the influx of refugees from Ukraine since 2022 because unlike earlier cohorts of refugees, Ukrainian refugees were not subject to spatial dispersal across Danish municipalities upon asylum.

To our knowledge, our study is the first to leverage exogenous variation for the estimation of impacts of immigration from this unique institutional setting. Our study therefore also contributes to the emerging literature on quasi-experimental shift-share instruments, see Goldsmith-Pinkham, Sorkin, and Swift (2020), Sequeira, Nunn, and Quian (2020), Borusyak, Hull, and Jaravel (2022), and Burchardi, Chaney, Hassan, Tarquinio, and Terry (2020, 2024).

Moreover, we use the refugee forecast shift-share instrument to predict the allocation of immigrants at a more granular geographical level using the novel population-wide data set on neighborhood of residence by Damm, Hassani, and Schultz-Nielsen (2021), available for the period 1986–2016. We thus estimate impacts of immigration on house rents, house prices, and housing stock using the refugee forecast shift-share instrument, not only at the municipal level, but also at the neighborhood level. While economic theory suggests that additional demand for housing space generated by immigrants will drive up house rents and prices, at both municipal and neighborhood levels, the ultimate effect depends on the response of natives to the influx of immigrants. In addition, since native people tend to live in more spacious houses relative to immigrants from low-income countries (see Moraga et al., 2019), it is not clear in which direction immigrant influx affects the housing stock at the neighborhood level. To answer this important question, we extend our analysis to study the response of natives to immigration at the neighborhood level. Overall, our quasi-experimental data allow us to investigate and identify the medium-run effects of local immigration influx on the overall real estate system (space market, asset market, and housing supply) at different geographical levels.

Our results suggest large and positive impacts of immigration on private rental prices and house prices at the municipal level. More specifically, we find that a one percentage point increase in the local immigration influx over a five-year horizon relative to the local population in the base year 1995 leads to an average increase of approximately 6 percent and 11 percent in private rental prices and house prices at the municipal level, respectively, during the same period. These effects are accompanied by an inelastic housing supply and no displacement of natives. At the neighborhood level, we also find positive and significant effects, albeit more modest, with private rents and house prices increasing around 1–2 percent on average. Contrary to the municipal-level evidence, the slower growth in rents and prices is associated with the expanded supply of public housing and native out-migration. The empirical results are robust across different specifications and, to some

extent, qualitatively similar to the instrumental variable estimates obtained leveraging the less-than-perfect standard shift-share instrument.

The structure of our paper is as follows. Section II describes the institutional background. In Section III we briefly present the relevant theory and the hypotheses to be tested. Then follows a description of our data in Section IV. Section V presents our methodological considerations and our empirical models, followed by our baseline results and robustness checks in Section VI. In Section VII, we discuss our findings and provide our concluding remarks.

II. Institutional Background

In 1956, following its 1952 ratification of the 1951 United Nations Convention on the Status of Refugees, Denmark established the Danish Refugee Council (DRC) to support asylum seekers in their application for refugee status and residence permits. In response to a large inflow of refugees in the early 1980s, the Danish government implemented a policy in 1986 through the DRC, whose guiding principle was the equal distribution of individuals who received asylum (i.e., obtained "refugee status" and became "refugees") across counties and municipalities according to pre-existing populations.

Spatial dispersal was implemented as a two-stage process (Damm, 2005). In the first stage, refugees were allocated to one of the fifteen counties of Denmark proportional to the counties' populations.[2] In the second stage, refugees were allocated to municipalities within counties, again relative to the population size in these municipalities. The equal allocation across municipalities within a county was aimed to be achieved over a 3–5 years period, by regularly moving integration offices from some municipalities to others within the county (Ministry of the Interior, 1993, p. 44).[3] Importantly, municipalities had no influence on the allocation process. Two years after the introduction of this allocation policy, refugees had been assigned to 243 out of 275 Danish municipalities (Danish Refugee Council, 1987, pp. 30–31), and their geographical distribution closely resembled that of the overall population. Previous analyses reveal that by the end of 1998,

[2] "Since 1985 the Danish Refugee Council's geographical distribution of refugees has aimed at distributing refugees relatively equally relative to the population in each county […]". (Danish Refugee Council, 1988, p. 8).

[3] Letter from the Minister of Social Affairs to municipalities and counties (copies to the DRC received on the 26 March 1987): "If the integration policy shall succeed, it is essential that all municipalities participate in the task. […] A completely equal distribution each month or year would not be appropriate to practice. […] Over a longer period, the possibility for a more equal distribution will be greater. […] The distribution will aim at municipalities receiving an equal number of refugees relative to the population size. […]"

refugees who had received asylum between 1986 and 1998 had been allocated evenly across counties in proportion to each county's population in 1986, as well as fairly even across municipalities in proportion to the municipality's population in 1986 (Damm, 2009a; Dustmann, Vasiljeva and Damm, 2019). The variation in the refugee share across even-sized municipalities is due to the limited period of this dispersal policy and the regional office rotation scheme in conjunction with a large variation in yearly inflows (Dustmann, Vasiljeva and Damm, 2019). The "share" variable in our quasi-experimental shift-share instrument uses this variation across municipalities, i.e. variation from the first Danish Spatial Dispersal Policy on Refugees.

The Spatial Dispersal Policy on Refugees implemented in 1986 was active until the Danish Parliament's enactment of the 'Integration Act' from the 1st of January 1999, which included a major reform of the policy and was in place until mid-2016. Henceforth, we will refer to the reform as the second Danish Spatial Dispersal Policy on Refugees. The aim of the reform was to obtain an even more equal distribution of refugees relative to the local population size across municipalities and to decrease subsequent migration out of the assigned municipality of residence. The former goal was obtained by allocating the annual influx of refugees across municipalities according to a quota system that settled refugees in municipalities with a positive quota; municipalities with a lower immigrant concentration received higher quotas.[4]

Our refugee forecast shift-share instrument does not use municipal refugee quotas. Rather, to exploit exogenous variation in push factor migration to Denmark (Hatton, 2016), the "shift" variable is the Danish Immigration Service's initial forecast on the annual refugee influx to Denmark, calculated at least one year ahead, referred to as the refugee forecast for the country ("Landstallet"), accumulated over a five-year period.[5] Our instrument allocates the forecast, i.e., the predicted refugee influx to Denmark, across municipalities according to the municipality's share of refugees at the end of 1995. We thus exploit within-municipality variation in the predicted refugee influx between 1999 and 2016 over rolling five-year periods that stem from push factors.

[4] The formula for calculating annual municipal quotas from the Danish Immigration Service's (DIS) forecast on the annual refugee influx to Denmark is given in the third chapter of the Integration Act. The method for calculating quotas did not change during 1999–2016.[4] Using the formula to predict the annual municipal quota of refugees, Azlor, Damm, and Schultz-Nielsen (2020) find that a correlation between the predicted and actual refugee quota across municipalities is as high as 0.96. Importantly, the socioeconomic characteristics of the municipality (e.g., job and rental housing vacancies) do not enter the formula for calculating the municipal quota.

[5] For some years, DIS has published a revised forecast of the annual refugee influx to Denmark, in some cases for the current year, but our "shift" variable uses the first published forecast for a given year to ensure that it is predetermined in all years in our observation period.

Since 1999, the population share of immigrants in Denmark has doubled from 5.4 percent to 12.6 percent in early 2025, while the share of descendants has increased from 1.4 percent to 3.7 percent (www.statistikbanken.dk/FOLK2).[6] For the same period, the influx of immigrants and descendants account for 90 percent of the increase in the Danish population from 5.3 million to almost 6 million. Over our observation period from 1999 to 2016, the composition of immigrants changed remarkably. At the beginning of the period family-reunified immigrants constituted the largest share of around one third. Due to strict immigration laws introduced in 2001, this share declined substantially, making students the largest category until the EU-enlargement in 2004 that allowed workers from the newly welcomed EU-countries from Eastern-Europe to work in Denmark starting in 2007. Between 2008 and 2015, the annual influx of immigrants has increased by around 233 percent (from around 21,000 to around 70,000), primarily because of the large increase in immigrant workers from EU/EEA countries; this category of immigrants constitutes the largest share of the annual immigrant influx since 2007 (Schultz-Nielsen 2018). With regards to refugees, their annual influx varied over our observation period: it peaked in 2001 when it reached a share of 19.3 percent of the annual immigrant influx and later declined fast to around 5 percent due to more strict requirements to qualify for recognition as refugee introduced in 2002. Nonetheless, the share of refugees has primarily followed international patterns (Hatton, 2009) with a particular increase between 2013 and 2015 (reaching a share of 14.9 percent) due to the civil wars in Syria and Afghanistan (www.statistikbanken.dk/VAN8A).[7]

While the majority of native Danes live in owner-occupied housing (62 percent in 2016), recently arrived immigrants tend to live in private rental housing, followed by public housing; in 2016, 47 percent of immigrants who arrived to Denmark between 2011 and 2015 lived in private rentals, compared to 28 percent in public housing and 17 percent in owner-occupied housing.[8]

[6] We follow Statistics Denmark's classification of natives, immigrants, and descendants. According to Statistics Denmark's definition: (i) a native, or person of Danish origin, is someone who, regardless of place of birth, has at least one parent who is both a Danish citizen and born in Denmark; (ii) an immigrant is someone born abroad whose parents are not both Danish citizens and born in Denmark; and (iii) a descendant is someone born in Denmark whose parents are either immigrants or descendants and hold foreign citizenship (www.dst.dk/Statistik/dokumentation/Times/forebyggelsesregistret/ietype, accessed on Aug. 11 2025).

[7] People that apply for asylum in Denmark after travelling independently are regarded as spontaneous asylum seekers; a fraction of them have their applications approved and are granted asylum. Between 1989 and 2016, the UNHCR resettled close to 500 refugees annually in Denmark. We refer to any recognised refugees, whether spontaneous or quota, as "refugees".

[8] Authors' own calculations using administrative registers from Statistics Denmark (Population register, Housing register and Permit of residence register).

This shows that the public housing sector has not met the increased demand for housing space due to immigrant influx over this period. In fact, construction of public housing has decreased since its peak at the beginning of the 1970s (Hassani, 2019; Scanlon and Vestergaard, 2007; Vestergaard and Scanlon, 2014). Immigrant influx has therefore affected demand for housing space in the private sector, which will increase private housing rents and house prices according to the standard economic theory. The positive correlation between immigration to Denmark and house prices is evident in Figure 1, which plots the annual stock of immigrants, and the house rent and price indices, adjusted for inflation in consumer prices, from 1992 to 2016.

[Insert Figure 1 around here]

Due to its many islands, Denmark has many commuting areas. Residential properties within a commuting area are competitive with each other. Mobile households quickly generate higher prices for more desirable sites, e.g., closer to the concentration of jobs in the center of the commuting area, as predicted by the Alonso-Muth-Mills model. Therefore, one may regard each commuting area defined by Statistics Denmark as a local housing market, in which case Denmark has 29 local housing markets (Statistics Denmark 2016), of which the Copenhagen commuting area is the largest and Ærø is the smallest. The Spatial Dispersal Policy on Refugees in place between 1986 and 1998, however, generated exogenous variation in refugee influx at the municipal level. To exploit this variation to identify the effects of immigrant influx on the Danish housing markets, we treat each of the 98 municipalities as a local housing market.[9]

III. THEORY

The analysis of housing markets has been at the center of economic research for decades. Housing resembles many of the characteristics exhibited by many other commodities, and hence it responds to market forces that affect demand and supply. A cornerstone for the study of housing markets is the Four-Quadrant Model (4Q) introduced by DiPasquale and Wheaton (1992) in which the housing market is split into two interconnected markets: (i) the property market for use of space,

[9] We will use the administrative structure of Denmark in place since 2007 (98 municipalities) throughout our analysis. The Structural Reform of 2007 ("Strukturreformen") reduced the number of municipalities from 271 to 98. The largest municipalities remained unchanged. Smaller municipalities that were merged into one will be treated as one (post-reform) municipality. The 13 municipalities that were split will be assigned to the post-reform municipality to which the majority of the pre-reform population belong post-reform. Any municipal-level data for the period 1992-2006 is consolidated into the current 98.

that determines the stock of housing and the rental price; and (ii) the asset market, or market for real estate assets, that determines the property selling price and the construction activity. Both markets are affected by changing economic and financial conditions, and hence the model provides a simple framework to study their medium- to long-run effects on the housing market as a whole.

Within the 4Q model, a sudden increase in immigration into a particular local housing market (e.g., region, municipality, city, neighborhood) acts like a property demand shock that leads to rising housing rents and prices in both the short and long run, thereby stimulating housing supply. The rent and price growth in the long run will depend upon the local housing supply elasticity. In particular, a population shock, like the one induced by an immigrant influx, increases, *ceteris paribus,* the demand for housing units, which together with a fixed housing supply, translates into higher rents in the short run. For a given market capitalization rate, investors will demand higher prices for their properties in the asset markets, thereby incentivizing construction activity. As time passes, the increased housing development will enlarge the stock of housing. A higher supply of housing units will therefore dampen the initial rent spike. In the long run, the higher population will result in a new long-run equilibrium in the housing market characterized by higher rents, higher prices, higher construction rates and a higher stock of housing.[10, 11]

Although the predictions of the 4Q model are generally well regarded when applied across different local housing markets, there are instances in which they may not hold quantitatively. In fact, empirical evidence suggests that there are circumstances in which immigration does not affect house prices or rents over the long run. Two theoretical extensions to the 4Q model have been proposed to understand this outcome: (i) native out-migration from the urban area, and (ii) local immigrant-specific amenities that affect the degree of competition in the local housing market. In particular, Saiz (2007) introduces a model of the housing market at the municipal (metropolitan) level in which the effect of immigration influx on house rents and prices is determined, together with the basic mechanism introduced above, by the out-migration response of natives. The latter affects the housing market through two potential channels. The first suggests that the influx of

[10] For a detailed discussion about the effect of demand growth in space market, see the Four-Quadrant Model by DiPasquale and Wheaton (1992, 1996).

[11] Sinai and Souleles (2005) show that an increase in the value of the real estate assets offsets the increases in the cost of real estate services because the positive "endowment" effect that arises from the increase in the value of current real estate assets washes out (in aggregate) the negative "income" effect that emerges from the increase in the implicit rents in the future (see also Buiter, 2010). However, current residential property owners would benefit from the positive "collateral" effect which is driven by an increase in real estate prices that relax the owners' borrowing constraints.

immigrants with a particular set of skills can put downward pressure on wages in competitive labor markets leading to a flight of natives. If the displacement of natives occurs one-one, the model suggests that, in the absence of income effects, immigration does not have any effect on house prices. The second channel is based on the fact that immigrants tend to concentrate in particular housing and labor markets due to local immigrant-specific amenities such as ethnic enclaves (Bartel, 1989; Borjas, 1998). This implies that immigrant property demand is less rent elastic than that of natives. Therefore, increased housing costs, as a response to the initial demand shock, could generate significant out-migration of natives. Empirical evidence for the U.S. suggests that, at the metropolitan level, native out-migration is less than proportional to immigrant shocks, and therefore house prices have responded positively to population increases driven by immigrant influxes.

However, the previous result has been challenged lately based on the acknowledgment that the ultimate effect of migration on house prices will depend on the level of geographical disaggregation used in the analysis. Saiz and Wachter (2011) and Sá (2015) suggest that while immigration is associated with higher house prices at the metropolitan level, the effect is ambiguous, although more likely negative, if analyzed at the neighborhood level. In particular, natives' out-migration combined with sorting and socioeconomic segregation can in principle deteriorate the value of properties. Andersson, Berg, and Dahlberg (2021) provide evidence of native flight at the neighborhood level in Sweden in response to refugee immigration, but only among those with high mobility—primarily homeowners. This flight is predominantly within municipalities, suggesting short distance moves rather than long-distance relocations. In contrast, no such effect is found among renters, likely due to constraints in Sweden's regulated rental market. No evidence of native out-migration is found when looking at the overall level of immigration. While Dustmann, Vasiljeva and Damm (2019) find no evidence of native out-migration in response to quasi-random refugee influx at the municipality level in Denmark, Boje-Kovacs et al. (2024) offer evidence of native flight at the neighborhood and building level in Denmark, leveraging the quasi-random nature of refugee influx and simulated exogenous Markov-chain predictions. Evidence for the U.S. shows that within metropolitan areas increased immigration is associated with a lower house price appreciation, a result that Saiz and Wachter (2011) find consistent with the idea that natives are willing to pay a premium on the house price

to be able to live in predominantly native areas. Similar results are found in the United Kingdom (see Sá, 2015).

The unique institutional setting in Denmark allows us to employ an experimental setup that exploits the quasi-random variation in refugee allocation to different municipalities and neighborhoods over a long period. In particular, we can test the following predictions:

H1: Following the influx of immigrants, the house rents in the municipalities have increased (this occurs because the demand for housing has increased).

H2: Following the influx of immigrants, the house prices in the municipalities have increased (this occurs because the increased rent would allow property owners to adjust their house prices to a higher level).

H3: Following the influx of immigrants, the housing stock in the municipalities has increased (this occurs because the increase in house prices triggers more construction).

H4: Following the influx of immigrants, the house rents in the neighborhoods have decreased because the natives may have preference for living with individuals of the same ethnic groups and of higher socioeconomic status, inducing native flight.

H5: Following the influx of immigrants, the house prices in the neighborhoods have decreased because of native flight.

H6: Following the influx of immigrants, the housing stock in the neighborhoods is not significantly affected (this occurs because immigrants tend to live in more dense space as compared to natives, therefore the immigration-driven increase in housing demand offsets the effect of native flight on housing stock).

We will now turn to the data used to test these hypotheses.

IV. DATA

IV.A. Data sources and variables

The data used in this study come from high-quality micro-level administrative registers from Statistics Denmark for the period 1992-2016, which are then aggregated on a yearly basis into two different geographical units. First, we construct municipal-level variables using the 98 administrative municipalities established by the municipality reform of 2007. Second, we compute neighborhood-level variables using the 1,961 residential neighborhoods constructed by Damm et

al. (2021) using Danish geo-referenced housing units (residential neighborhoods with a median of 1,173 housing units and standard deviation of 394).

Our primary outcome of interest is the five-year growth in real house prices. We use the property transactions and housing registers linked by the unique property identifier to construct real house price indices over time and across locations. The property transaction register includes information such as the unique housing address, transaction price, date of transaction, and type of sale since 1992. The housing registers contain characteristics of the housing units sold, like size, construction year, number of rooms, etc. for the annual stock of residential properties in Denmark, since 1980. Using the population of one-family houses sold in regular sales between 1992 and 2016, we estimate a standard hedonic model[12] of the form:

$$\ln(p_{nit}) = \alpha + \beta_{it}(\delta_{nt} \times \gamma_{ni}) + \mathbf{Controls}_{nit} + \varepsilon_{nit}, \quad (1)$$

for $n = 1, \dots, N$, $i = 1, \dots, I$, and $t = 1, \dots, T$, where p_{nit} denotes the transaction price of an individual property n, in municipality/neighborhood i (depending upon the specification of the local housing market) at time t deflated by the annual consumer price index published by Statistics Denmark[13], and ln $(\cdot)$ is the natural logarithm. The variables δ_{nt} and γ_{ni} correspond to property-year and property-location dummy variables, respectively. $\mathbf{Controls}_{nit}$ is a vector that contains all other variables of interest that we control for, such as, size of the house (i.e., structure), total area sold, number of rooms, age of the house in the year of transaction, age square (to control for the non-linear effect of the age), area of the basement, drainage conditions, installation conditions, roofing material, water supply, and exterior wall material. The ordinary least squares (OLS) estimate of $\hat{\beta}_{it}$ provides us with a yearly index of the (log) real house price in each municipality/neighborhood.

Our second outcome of interest is the five-year growth rate in real house rents. We begin by constructing a nominal rent index using data from the housing rent allowance registers[14] and the public housing rent register, both provided by the National Building Fund (Landsbyggefonden).

[12] The hedonic price model has been widely used to create price indexes for residential housing (see, e.g., Francke and De Vos, 2000; Sirmans, MacDonald, Macpherson, and Zietz, 2006; Hill, 2012), and commercial real estate (see, e.g., Bokhari and Geltner, 2011).

[13] Available at www.statistikbanken.dk/PRIS113. The annual consumer price index (CPI) is computed as the average monthly CPI over a given year.

[14] The amount of housing allowance depends on various factors, including the rent stated in the lease contract, household size, and other criteria. The housing allowance registers contain the rent figures used to calculate the allowance, which we use to identify annual rent levels for all-year residential rental units.

We retain the most recent lease contracts and stated rents for each year, covering all-year residential rental units dating back to 1990, and deflate them by the annual consumer price index to obtain a measure of real rents. These are then linked to the housing register to identify property characteristics similar to those used to estimate the house price index. Using this information, we estimate hedonic models analogous to Equation (1) to derive annual indices of (log) real house rents at the municipality or neighborhood level, both for the overall rental stock and separately for the public and non-public (i.e., private) stock.

To identify the immigration status of individuals in the population, we use the Danish population register and classify each individual as native, immigrant, or descendant according to Statistics Denmark's definitions (see footnote 7). Since the population register provides information about country of origin, type of citizenship, and housing address of each inhabitant of Denmark, we can identify the municipality and neighborhood of residence of each person in each year and over time and measure the stock of immigrants at a given location and a given year. We then compute the five-year flow of immigrants and calculate yearly immigration rates at municipal or neighborhood level as the ratio between the five-year flow of immigrants and the total municipal/neighborhood population in 1995, our base year. We will explain our choice of base year in Section V. Similar shares are constructed by immigrant's country of origin to help us construct a standard shift-share instrument for robustness checks.

We also use the housing register to construct variables related to the housing supply. The housing register includes the unique address of each residential property at the municipal level, as well as several structural characteristics and ownership types of housing units over time. The housing stock, our third outcome of interest, is constructed as the number of all-year dwellings (farmhouses, detached houses, semi-detached houses, and multi-dwelling houses) at a given location and a given year. In addition to the total housing stock, we compute separate measures for public and private housing stocks.

Our last outcome of interest is the five-year change of the native rate in a given location. The native rate is defined as the ratio of the native population in a given local housing market to the total local population in the base year. Using the population register, we define a native, i.e., a person of Danish origin, as an individual who is neither registered as an immigrant nor a first-generation descendant of an immigrant. This ends the description of our dependent variables (house rent, price, stock, and native rate) measured as five-year changes in the empirical analysis.

In robustness checks, we will use an augmented control set that includes the five-year change in (i) the overall housing vacancy rate, (ii) the public housing vacancy rate, and (iii) the yearly real income in the local housing market. The (public) housing vacancy rate is constructed as the share of vacant dwellings to the total number of (public housing) dwellings in a given location and in a given year. Vacant units are defined as dwellings without people registered at the address, which is also identifiable from the housing register. We construct our measure of annual real income at the municipality/neighborhood level from the Danish income register. We compute the (log) mean family-adjusted disposable income at each location and deflate it by the annual consumer price index from Statistics Denmark (cf. footnote 15). We use family-adjusted or equivalized disposable income as this measure ensures comparability of income levels of families of different sizes under the assumption that income is distributed perfectly across family members.

IV.B. Summary statistics

In our empirical analysis, we restrict the sample period to (ultimo) 1999-2016 consistent with the duration of the second Danish Dispersal Policy on Refugees and the availability of neighborhoods of residence. In the cross-section, our sample includes all 98 municipalities and 1,686 (of 1,961) neighborhoods. The lower number of neighborhoods is the result of considering only geographical units with at least five house price transactions in each of the years considered.

Table 1 contains descriptive statistics for the main variables used in the empirical analysis at the municipal level. It reports the mean, standard deviation, 25^{th} and 75^{th} percentiles, and number of observations. In Panel A, we report level statistics for the period (ultimo) 1999-2016, while in Panel B we report similar statistics for the five-year differences over the period (ultimo) 2004-2016, consistent with the sample used in the econometric specifications discussed in the next sections.

In terms of demographics, Danish municipalities had an average population size of around 56 thousand inhabitants during our observation period, of which 90 percent correspond to natives and the remaining 10 percent to immigrants and descendants. During the same period, the average municipal immigration rate measured relative to the population in the base year (1995) was 6.4 percent while the average municipal native rate relative to the base year population was 95 percent. The average five-year change in the immigrant stock across municipalities was 1.2 percent of each

municipality's 1995-population size. By contrast, the native population declined slightly on average over each five-year period. The average five-year change in the native population was -0.3 percent of the municipal population in 1995, with substantial variation across municipalities and periods.

The average five-year growth rates in real house rents and prices across municipalities and years were 6.9 percent and 6.5 percent, respectively. There is considerable variation across municipalities and time behind this average, with some areas showing house price increases exceeding 30 percent, while in others house prices fell by more than 17 percent. We also find that the housing stock increased by around 900 units, on average, across Danish municipalities and five-year periods, with about 30 percent of the additions correspond to public housing. Municipal real disposable income on average grew at a rate of 6.7 percent during each five-year period.

[Insert Tables 1 and 2 around here]

Table 2 reports similar statistics for neighborhood-level variables. The average neighborhood had a population size of 2,944 inhabitants, 92 percent of whom were natives and 6 percent immigrants. Similar to the municipal level, the immigration rate across neighborhoods was 6.6 percent on average, when measured relative to the 1995-population. The corresponding native rate was 96 percent. The average five-year change in the immigrant stock across neighborhoods was 1.4 percent of each municipality's 1995-population size. On average the five-year change in the native population across neighborhoods was 0.3 percent of the municipal population in 1995. Real house rents and prices recorded average five-year growth rates of 8.2 percent and 7.2 percent, respectively. The average five-year increase in the neighborhood housing stock was approximately 55 units.

Appendix Table A1 reports mean log house prices across double-sorted deciles of five-year changes in native Danes and immigrants, providing a descriptive overview of how native and immigrant populations correlate with house prices at the municipal level (Panel A) and neighborhood level (Panel B). Table A1 shows that house prices increase both when the number of native Danes increases (vertically, from decile 1 to 10) and when the number of immigrants increases (horizontally, from decile 1 to 10). Interestingly, the relative increase in house prices is larger when the number of Danes increases (moving from decile 1 to 10) in municipalities (or neighborhoods) with very few immigrants (decile 1), compared to those municipalities (or neighborhoods) with many immigrants (decile 10). These patterns highlight an interaction between

the share of immigrants and native population: house prices rise in response to increases in both, but the price response to increases in natives is strongest where immigrant inflows are low. This univariate analysis motivates our subsequent multivariate analysis, where we formally examine the causal effect of immigration flows on housing market outcomes, as well as potential evidence of native flight.

V. Methodological considerations and empirical model

In this paper, we aim to estimate the causal effects of immigration flows on house prices, house rents, housing stock, and native out-migration. Our empirical strategy adapts the first-difference approach of Dustmann et al. (2019) to identify the effects of local immigration on local housing markets. Specifically, we estimate the following baseline linear specification:

$$\Delta^5 y_{it} = \beta_1 \Delta^5 \mathrm{IMS}_{it} + \Delta^5 \tau_t + \Delta^5 \varepsilon_{it}, \quad (2)$$

where $\Delta^5 y_{it} = y_{it} - y_{it-5}$ denotes the five-year change in each outcome of interest in location i, $\Delta^5 \mathrm{IMS}_{it} = \frac{\mathrm{Immigrants}_{it} - \mathrm{Immigrants}_{it-5}}{L_{i1995}}$ denotes the five-year change in the immigration rate defined as the immigrant population relative to the population in our base year 1995, L_{i1995}, over the same period and location, and $\Delta^5 \varepsilon_{it}$ is the error term that captures all unobserved determinants of house price changes. We consider eight different outcomes: the (log) real house prices, $y_{it} = \ln(p_{it})$, the (log) real rental prices (total and by owner: private versus public), $y_{it} = \ln(r_{it})$, the housing stock scaled by the local population size in the base year (total and by owner: private versus public), $y_{it} = \frac{h_{it}}{L_{i1995}}$, and the native population also scaled by the local population size in the base year, $y_{it} = \frac{d_{it}}{L_{i1995}}$. Our baseline specification (specification 1) also includes time fixed effects, $\Delta^5 \tau_t$, to capture common shocks or time-specific characteristics that affect all locations in the same way at a given point in time, such as changes in the overall business cycle. The advantage of the first-difference specification in Equation (2) is that it eliminates any time-invariant, location-specific characteristics that may affect both the outcome variable and immigration.[15] Our parameter of interest, β_1, thus measures the effect of medium-term population growth due to immigration on

[15] The underlying level equation is $\ln(p_{it}) = \beta_0 + \beta_1 \frac{\mathrm{Immigrants}_{it}}{L_{i1995}} + \varphi_i + \tau_t + \varepsilon_{it}$, where the φ_i denote local area fixed effects.

the medium-term growth rate of the outcome of interest. In municipal level regressions, we further account for common shocks by clustering standard errors at the municipal level. Our neighborhood level regressions instead cluster standard errors at the neighborhood level, thereby accounting for common shocks at the neighborhood level.

Importantly, we also consider an alternative specification that modifies the conditioning information set of the baseline linear specification in Equation (3). In specification 2, we substitute the time fixed effects by a time-by-municipality size fixed effect

$$\Delta^5 y_{it} = \beta_1 \Delta^5 \mathrm{IMS}_{it} + \Delta^5 \tau_t \times \mathrm{Large}_i + \Delta^5 \varepsilon_{it}, \quad (3)$$

where Large_i is a dummy variable that takes the value 1 if the population of municipality to which unit i belongs exceeded 80,000 inhabitants in 1995 (and zero otherwise), a threshold consistent with that used in Dustmann et al. (2019). The time-by-municipality size fixed effects allow correlated effects like changes in the interest rate to affect the dependent variable differently in small and large municipalities. We expect, for instance, larger impacts of a change in the interest rate on house prices in large municipalities where average house prices are higher due to higher location rent.

The main challenge for identification is that the influx of immigrants may be endogenous in Equations (2) and (3). This may occur, for example, if house prices affect immigrants' settlement patterns, a phenomenon consistent with the quasi-experimental evidence of location sorting of immigrants reported in Edin, Fredriksson and Åslund (2003) and Damm (2009a). In that case, the OLS estimate $\widehat{\beta_1}$ will suffer from endogeneity bias. To address this issue, we construct an instrumental variable $\widetilde{\Delta^5 \mathrm{IMS}_{it}}$ that is correlated with $\Delta^5 \mathrm{IMS}_{it}$, but uncorrelated with the model's error term $\Delta^5 \varepsilon_{it}$.

Following David Card's seminal contribution on the immigration's impact on local labor markets (Card, 2001), the shift-share instrument has become the predominant tool in the economic literature on impacts of immigration. This standard shift-share instrument is similar to the Bartik instrument used in the labor and trade literature (Bartik, 1991). We construct the standard shift-share instrument by combining national inflows of immigrants with the locational patterns of immigrants in a previous period, say in the previous decade. More specifically, as the weighted average of the national inflow rates from each origin group (the "shift") with weights that depend on the distribution of earlier immigrants (the "shares"), i.e.,

$$\widetilde{\Delta^5 \mathrm{IMS}_{it}} = \sum_{k=1}^{K} \underbrace{\frac{\mathrm{Immigrants}_{i,1995}^{k}}{\mathrm{Immigrants}_{\mathrm{DK},1995}}}_{\text{Share}} \times \underbrace{\frac{\Delta^5 \mathrm{Immigrants}_{\mathrm{DK},t}^{k}}{L_{i,1995}}}_{\text{Shift}}. \quad (4)$$

In Equation (4), the shares are defined by the fraction of immigrants from origin group k residing in location i ultimo 1995 relative to the total number of immigrants to Denmark in the same year. The shift component corresponds to the five-year flow of immigrants from origin group k to Denmark, $\Delta^5 \mathrm{Immigrants}_{\mathrm{DK},t}^{k}$, relative to the local population in the base year 1995.

Unlike most existing applications of the standard shift-share design in migration studies, which define origin groups at the level of individual countries, we aggregate countries into 16 broader world regions that serve as our sending units. This departure from the standard approach is motivated by the Danish context. Being a small country, Denmark receives relatively few migrants from many individual countries, rendering country-level shares sparse and potentially unreliable. Aggregating at the regional level enhances the relevance and stability of the instrument while preserving meaningful variation for identification. The full classification of countries into regions is provided in Table A2 in the Appendix.

The validity of the shift-share instrument has been discussed by David Card himself (Card, 2001) and in a number of recent studies (Jaeger, Ruist and Stuhler, 2018; Sharpe, 2019; Goldsmith-Pinkham, Sorkin and Swift, 2020; Borusyak, Hull, and Jaravel, 2022, 2025). The claim for instrument validity in shift-share instrumental variable regressions must rely on some assumptions about the shift (shocks), exposure shares, or both. Card (2001, p. 43) notes that past immigration shares may be endogenous () and proposes overcoming this problem by finding instruments that explain the location choices of past immigrants from different source countries, an approach followed by, for example, Burchardi et al. (2019) and Sequeira, Nunn and Quian (2020). Goldsmith-Pinkham et al. (2020) formalize an approach based on the exogeneity of exposure shares, imposing no explicit assumption of shock exogeneity. Under their approach, exposure exogeneity is a sufficient condition for identification in shift-share instrumental variable regressions, i.e., for the shocks to be uncorrelated with the relevant unobservable in expectation. In related work, Borusyak et al. (2022) develop a framework to understand that it is a sufficient condition for validity of the shift-share instrument if we allow the variation in exposure shares to be endogenous but assume that shocks are as-good-as-randomly assigned, as if arising from a natural experiment. In principle, shares and shifts may simultaneously provide valid identifying

variation, but in practice it is unlikely that both sources of variation are priori plausible in the same setting (Borusyak et al., 2022).

[Insert Table 3 around here]

The validity of the standard shift-share instrument in our context is likely to depend on the share of the immigrant influx which is due to push factors rather than local pull factors and the year of measurement of the exposure shares. The larger the share of immigrant influx which is due to push factors or forced migration, the more likely the standard shift-share instrument is to be valid. Since 1986 forced (i.e. refugee) migrant arrivals have constituted a considerable share of the annual immigrant influx to Denmark and been subject to spatial dispersal across all municipalities upon receipt of asylum. Fixing the exposure shares to ultimo 1995 is attractive, because the policy of spatial dispersal of refugees has been in place for a decade and refugee influx to Denmark peaked in that year; 26 percent of the around 78,500 refugees that received asylum in Denmark between 1986 and 1997 received asylum in 1995 (Damm, 2009b), and the exposure shares are fixed *at least* five years prior to a given five-year shock: the first five-year period that we use in our regressions is ultimo 1999 – ultimo 2004 and the last five-year period is ultimo 2011 – ultimo 2016, by which time the local conditions for immigrants may have changed considerably. To assess the validity of the standard shift-share instrument we regress the instrument on the lagged five-year change in house prices to test if the past changes in house prices in a given location affect current changes in the share of immigrants in that location as predicted by the instrument. The results are reported in Table 3 (columns 1–2). At both the municipal and neighborhood levels, we find that an increase in past house prices is associated with a higher predicted share of immigrants in that area, suggesting that the standard shift-share instrument is not balanced. Moreover, our test of strict exogeneity of the standard shift-share instrument, reported in Table 4 (columns 1–2), suggest that a demand shock to the local area (municipality or neighborhood) leads to some spurious correlation between predicted shares of immigrants and changes in house prices.

[Insert Table 4 around here]

In light of these results, we propose a quasi-experimental shift-share instrument, the "*refugee forecast shift-share instrument*" for analyses both at the municipality and neighborhood levels. Our novel instrument uses information on the number of immigrants from refugee-sending countries exclusively. In particular, we define:

$$\widetilde{\Delta^5 \mathrm{RM}_{it}} = \underbrace{\frac{\text{Refugees}_{i,1995}}{\text{Refugees}_{DK,1995}}}_{\text{Share}} \times \underbrace{\frac{\Delta^5 \text{Forecast of refugees}_t}{L_{i,1995}}}_{\text{Shift}}, \tag{5}$$

where the "shift" is defined as the five-year change in the accumulated refugee forecast computed by the Danish Immigration Service (DIS) under the terms of the second Danish Dispersal Policy, denoted $\Delta^5 \text{Forecast of refugees}_t$. $\text{Forecast of refugees}_t$ is a stock variable defined as the cumulated annual forecast of refugee influx to Denmark since 1999 until year t, calculated based on the initial annual forecasts of refugee influx to Denmark by DIS. In any given year during our observation period from 1999 to 2016 this stock variable reflects the stock of allocated refugees to locations in Denmark since 1999. $\Delta^5 \text{Forecast of refugees}_t$ measures the migration shock during a given five-year period in our observation period as the predicted refugee influx to the country during year t-5 and t. We argue that these migration shocks are as-good-as-random because they predict the level of forced migration to Denmark in a given period. As for the "share" variable, it is the past number of immigrants from refugee-sending countries in a given municipality relative to the total number of immigrants from refugee-sending countries to Denmark in the same year, using ultimo 1995 as base year. The instrument allocates the predicted refugee influx to the country during year t-5 and t across municipalities i (the "shift") according to the "share" variable to obtain the predicted refugee influx to municipality i during year t-5 and t. The predicted number is divided by the municipal population in our base year 1995 to obtain a predicted refugee influx share relative to the historic municipal population, which we denote as $\widetilde{\Delta^5 \mathrm{RM}_{it}}$. Under the unique institutional setting in Denmark since 1986 the refugee forecast shift-share instrument allows us to separately identify the effect of immigration on house prices and estimate β_1 in Equations (2) – (3) by two-stage least squares (2SLS).[16] While the "shift" leverages only time series variation, the "share" uses only cross-sectional variation.

Fixing the exposure shares in a particular year (in our case 1995) has the advantage of isolating cleaner time-varying shock variation. However, it may have an efficiency cost to lag the shares by

[16] In a recent study of native flight in response to refugee influx, Andersson, Berg, and Dahlberg (2021) use a shift-share instrument for local refugee influx by focusing on immigrants from refugee-sending countries in the construction of the shift variable and using 1990-1993 as base years for the share variable to exploit a refugee placement policy that was in effect in Sweden from 1985 to mid-1994 to address potential endogeneity concerns regarding the past settlement patterns of immigrants. Instead of the realized influx from refugee-sending countries, our "shift" variable uses the forecast for refugee influx published in the previous year or earlier to predict annual refugee influx. Instead of country-specific past exposure shares as in the standard shift-share instrument by Card (2001), our "share" variable is not country-specific because it leverages plausibly exogenous variation in the distribution of refugees from spatial dispersal of refugees instead of self-selection of immigrants into ethnic enclaves.

so many periods as it is likely to reduce the predictive power of the instrument. The first stage regression of the 2SLS examines whether this is a concern. We estimate the Equation (6) to study the relevance of our modified shift-share instrument, $\widetilde{\Delta^5 \mathrm{RM}_{it}}$, i.e., its ability to predict the five-year *change* in the number of immigrants across geographical locations relative to the local population in our base year 1995 between year t and $t-5$, $\Delta^5 \mathrm{IMS}_{it}$,

$$\Delta^5 \mathrm{IMS}_{it} = \theta \widetilde{\Delta^5 \mathrm{RM}_{it}} + \Delta^5 \tau_t + \Delta^5 u_{it}, \quad (6)$$

where $\Delta^5 u_{it}$ denotes the error term. The results at the municipal and neighborhood levels are reported in Panels C of Table 5 and Table 8, respectively. In addition to reporting results from estimation of Equation (6) we also report results from estimation of a second specification which has time-by-municipality size fixed effects instead of time fixed effects. We find that our refugee forecast shift-share instrument is relevant, at both levels of aggregation. It is a strong predictor of the five-year change in the immigrant rate and has a positive sign as expected. At the municipal level, a one percentage point increase in the instrument increases the immigrant stock scaled by the 1995-population by 1.2–1.4 percentage points depending on the control set: time fixed effects or time-by-municipality size fixed effects. At the neighborhood level, a one percentage point increase in the instrument increases the immigrant stock scaled by the 1995-population by 0.6 across both specifications. To gauge the strength of the instrument, we employ the standard "rule of thumb" according to which the set of instrumental variables is strong, if the F-statistic for joint statistical insignificance of the exclusion restriction is at least 10. In our case with just one excluded variable in the first-stage regression, we calculate the F-statistic as the squared value of the t-statistic for statistical insignificance of the excluded variable in the first-stage regression. We find that the F-statistic is around 10 at both the municipal and neighborhood levels, which indicates that our instrument is indeed relevant.

To test the validity of our refugee forecast shift-share instrument we regress the instrument on the lagged five-year change in house prices to test if the past changes in house prices in a municipality (neighborhood) affect current changes in the predicted share of refugees allocated to that municipality. Controlling for time-by-municipality size fixed effects, we do not find any systematic impact of changes in past house prices in an area on the predicted share of refugees allocated to that area, irrespective of whether we conduct the test at the municipal or neighborhood level (see Table 3, columns 3–4). We also perform a strict exogeneity test to further ensure the

validity of our specification. We find that a demand shock to the local area (municipality or neighborhood) does not lead to spurious correlation between predicted allocation shares of refugees and changes in house prices (see Table 4, columns 3–4). Therefore, we leverage our refugee forecast shift-share instrument for baseline analysis.

VI. Results

In this section, we present and interpret our estimates of the effects of immigration on local housing markets using 2SLS with the refugee forecast shift-share instrument for the period 2004-2016 and compare our results to those obtained by OLS. We further compare our results to those obtained by 2SLS using the standard shift-share instrument.

VI.A. Medium-run impacts of immigrant influx on municipal housing markets

Table 5, Panel A, summarizes the OLS estimates at the municipal level for the model in Equation (2), separately listing estimates for each of the outcome variables. The estimates provide evidence that the immigrant influx is positively associated with house prices, housing rents, the private housing stock as well as the native share, but statistically uncorrelated with the overall housing stock and the public housing stock. The results are robust to conditioning on time-by-municipality size fixed effects (specification 3) instead of time fixed effects. However, as noted previously, these estimates will be biased to the extent that immigrants sort into specific locations.

We then proceed to estimate the model by 2SLS instrumenting the immigrant influx with the refugee forecast shift-share instrument in Equation (5). Table 5, Panel B, summarizes the results. For both specifications, we find that immigrant influx has large, positive and statistically significant medium-term effects on house prices (columns 1–2) and private housing rents (columns 5–6). These responses are accompanied by an inelastic housing supply (columns 9–14) and no native outmigration (columns 15–16). According to specification 2, our preferred specification, a one percentage point increase in the five-year immigrant influx, relative to the local population in 1995, causes, on average, an increase in private housing rents and house prices of around 6 percent and 11 percent, respectively, over a five-year period (semi-elasticity) at the municipal level. The effect on overall housing rents is more modest, while the overall effect on private and public housing stocks is insignificant. Our results suggest that the OLS estimates of the medium-term

impacts of immigration on house prices and housing rents are downward biased, presumably because immigrants tend to settle in areas with affordable housing.

[Insert Table 5 around here]

Next, we compare the 2SLS estimates obtained from the refugee forecast shift-share instrument to the 2SLS estimates from the standard shift-share instrument for all immigrants. We report the results in Table 6. For readability, Panels A and B reproduce, the OLS estimates and the first- and second-stage estimates of our preferred instrument from Table 5, respectively. Panel C reports the first- and second-stage estimates obtained using the standard shift-share instrument in Equation (4). We find that the standard shift-share instrument is relevant; a one percentage point increase in the predicted immigrant influx increases the immigration rate by between 0.24 and 0.25 percentage points, depending on the specification. According to our preferred specification, specification 2, use of the standard shift-share instrument yields larger point estimates for the effects of immigrant influx relative to the population in 1995 on private housing rents, and smaller estimates on house prices, compared to the refugee forecast shift-share instrument. More specifically, using the standard shift-share instrument we find that a one percentage point increase in the five-year immigrant influx, relative to the local population in 1995, causes on average an increase in private housing rents and house prices of around 8 percent over a five-year horizon. At the same time, the standard instrument implies a negative effect on the (private) housing stock relative to the population in 1995 and a positive effect on the number of natives relative to the population in 1995, results that lack theoretical support.

[Insert Tables 6 and 7 around here]

We further test whether the baseline 2SLS results reported in Table 5, specification 2, are robust to inclusion of additional control variables, the five-year difference in the tenure-type specific housing vacancy rates and the five-year difference in the mean household income, all measured at the municipality level. The results are reported under specification 3 in Table A3 in the Appendix. To facilitate comparison, the baseline 2SLS estimates using specifications 1 and 2 are repeated in the table. Our baseline results are indeed robust to the inclusion of these additional control variables.

As previously mentioned, Dustmann, Vasiljeva and Damm (2019) finds that local immigrant influx generates political opposition against immigration outside the larger cities in Denmark in

contrast to the pattern observed within the larger cities. A possible explanation could be that immigrant influx affects local labor and housing markets differently in large versus non-large cities. We test this mechanism by estimating reduced form regressions using the refugee forecast shift-share instrument. In practice, we estimate the following reduced form model to allow for different responses on the outcome variables to the immigration influx depending on the size of the municipality:

$$\Delta^5 y_{it} = \beta_1\left(\widetilde{\Delta^5 \mathrm{RM}}_{it} \times \mathrm{Large}_i\right) + \beta_2\left(\widetilde{\Delta^5 \mathrm{RM}}_{it} \times (1\text{-}\mathrm{Large}_i)\right) + \Delta^5\tau_t + \Delta^5\varepsilon_{it}, \quad (7)$$

where Large_i is the dummy variable introduced in Equation (3). The results are reported in Table 7.[17] We find that across municipality sizes, local immigrant influx increases private housing rents and house prices. The point estimates are twice as large for large municipalities, albeit not statistically different as suggested by the *F*-test of equal coefficient estimates. Across municipality sizes, our estimates suggest that the housing supply is inelastic and that natives are not displaced.

Summing up, using the refugee forecast shift-share instrument, our preferred instrument, the municipal level results provide quasi-experimental evidence of the following. Consistent with hypothesis H1 and H2, local immigrant influx has large and positive impacts on private rents and house prices over the medium run. In addition, we document an inelastic housing supply, contrary to hypothesis H3, and no displacement of natives. These results hold for both larger and smaller municipalities. Hence, evidence points at a (medium-run) demand-driven mechanism.

VI.B. Medium-run impacts of immigrant influx on neighborhood housing markets

Table 8 summarizes our results at the neighborhood level. Panel A reports the OLS estimates. We find a positive statistical association between immigrant influx and all outcomes. The 2SLS estimates obtained using our refugee forecast shift-share instrument are reported in Panel B. We find that local immigrant influx to residential neighborhoods increases, on average, house prices in the neighborhood in the medium run. A one percentage point increase in the five-year immigrant influx relative to the population in the base year increases, on average, private housing rents and house price by 1.4 percent and 2.2 percent (semi-elasticity), respectively, over the medium run. In

[17] The reduced form estimates are similar to the 2SLS estimates since the effect of the instrument on the endogenous explanatory variable of interest is close to 1. In Table 7, we report estimates using both time fixed effects $\Delta^5\tau_t$ (specification 1) and time by municipality size fixed effects $\Delta^5\tau_t \times \mathrm{Large}_i$ (specification 2), where Large_i is a dummy variable which takes the value one if the neighborhood is located in a large municipality as defined as a municipality in which the population size exceeded 80,000 inhabitants in 1995, and zero otherwise.

line with the results at the municipal level, the OLS estimates of the medium-term impacts on house prices and private housing rents are downward biased, presumably because immigrants tend to settle in areas with affordable housing. With regards to the response of housing supply, using our preferred 2SLS specification we find that while the stock of private housing is inelastic, the public housing stock reacts positively and in a significant way to immigrations flows. A one percentage point increase in the five-year immigrant influx relative to the base-year population on average increases the stock of public housing relative to the base-year population by 0.43 percent over a five-year horizon. By contrast, the native rate reacts negatively to the five-year immigrant influx. A one percentage point increase in the five-year immigrant influx relative to the base-year population on average decreases the number of natives relative to the base-year population by 1.7 percent.

[Insert Table 8 around here]

We have further estimated the impacts of immigration using the standard shift-share instrument and reported the results in Table A4, Panel B, in the Appendix. To facilitate comparison, Panel A repeats the baseline 2SLS results from Table 8. Use of the standard shift-share instrument leads to larger estimated impacts of immigrant influx on the house price and housing rents and no significant impacts on the public housing stock and native rate.

Similar to the municipal-level analysis, we have tested whether the baseline 2SLS results reported in Table 8, specification 2, are robust to inclusion of additional control variables, the five-year difference in the tenure-type specific housing vacancy rates and the five-year difference in the mean household income, all measured at the neighborhood level. The results are reported in Table A5 in the Appendix as specification 3. To facilitate comparison, the baseline 2SLS estimates using specifications 1 and 2 are repeated in the table. Our baseline results are robust to the inclusion of these additional control variables.

Viewed together, our findings provide quasi-experimental evidence to reject hypotheses H4, H5, and H6. However, the results indicate that the growth of private house rents and house prices is lower at the neighborhood level than at the municipal level. The reduced pace of rent and price change can be related to two mechanisms. First, as already mentioned, local immigrant influx increases supply of public housing contrary to the evidence documented at the municipal level. Second, we also find evidence that increased immigration influx leads to native outmigration. The average reduction in the native rate caused by increased immigrant influx (Table 8, column 16)

contrasts with the evidence found in Sanchis-Guarnier (2023) for Spain at a provincial level. However, our finding aligns with the results documented in Andersson et al. (2021) for the case of Sweden whereby refugee immigration is associated with native flight at the neighborhood level for the case of homeowners. Nonetheless, their evidence suggests that this flight occurs within the same municipality, consistent with our municipality results. Taken together, these two positive supply-side effects attenuate – but do not reverse – the positive response of house rents and house prices to the demand shock induced by increased local migration.

Allowing for heterogenous effects of immigrant influx to the neighborhood and controlling for year-by-municipality size fixed effects, we find similar impacts of immigration in the large municipalities (or cities) as outside the large municipalities. The results are summarized in Table 9. Across municipality size, we find a positive effect of immigration on house prices at the neighborhood level, despite our corollary finding that immigrant influx into the neighborhood leads to native flight (dis-amenity effect, see Sá 2014), which can be explained by our finding of no effect of immigrant influx on the overall housing stock.

[Insert Table 9 around here]

VII. DISCUSSION AND CONCLUSIONS

To identify the effect of immigration on house rents, house prices and the housing stock in Denmark over the medium term, we introduce a novel instrument that exploits within-municipal variation. We account for immigrant location by using a shift-share instrument where the "shift" uses exogenous variation from the Government's forecast of annual immigrant influx due to push factors (i.e., refugee influx). Our instrument allocates this exogenous influx across locations according to the past settlement pattern of refugees, which is quasi-random due to the first Danish Spatial Dispersal Policy on Refugees (1986-1998). To our knowledge, this is the first time that this unique institutional setting is used to identify economic impacts of immigration such as impacts on housing markets, whereby our study contributes to the emerging literature on quasi-experimental shift-share instruments.

We find that the medium-term effect of immigrant influx on the growth of private house rents and house prices is large and significant at the municipal level, with no effects on housing supply and the location patterns of native population. We also find a positive effect at the neighborhood

level, albeit reduced, possibly due to the positive response of public housing construction and native out-migration that dampens the positive price response to migration-induced demand shocks. The results remain robust when using different sets of control variables and, to some extent, when applying the less-than-perfect standard shift-share instrument. Therefore, in Denmark and contrary to the evidence for the US, the UK, and Spain, the effects of immigration on the housing market are similar across different levels of geographical aggregation (municipal vs. neighborhood level). The contrasting findings could be due to institutional differences across the countries studied. Leveraging our refugee forecast shift-share instrument, an immigration inflow equal to one percent of a municipality's 1995-population over a five-year period raises private housing rents and house prices by around 6 percent and 11 percent, respectively. Similar to our study, Bian, Coulson, and Sun (2025) have estimated the impact of immigration on local house prices over a five-year period and leveraging a newly developed instrument for US county-level non-European immigration by Bourchardi et al. (2024). According to their IV-estimate, an immigration inflow equal to one percent of a county's initial population over a five-year period raises housing price appreciation by approximately 6.8 percent over the same five-year period. During our observation period from 1999-2016, each five-year period the immigrant population grew, on average, by 1.2 percent of the population in our base year 1995, which according to our estimates increased house prices by 32 percent (calculated as 1.2 times 11 percent times 2.4 five-year periods). Over the same period, house prices in Denmark grew by 51 percent (as shown in Fig. 1, the HPI increased from 1.49 to 2.25). Immigration to Denmark can thus account for about 62 percent of municipal-level housing price appreciation in our sample period.

An alternative channel through which immigration may affect house rents and prices is through potential deterioration of the quality of local public goods (e.g., schools). Our study is conducted in the context of the Nordic Welfare State which is characterized by redistribution of resources to level the playing field across different socioeconomic groups. At the national level, Denmark operates a complex municipal equalization system for local public spending, which is based on each municipality's relative expenditure needs and tax base per inhabitant (Ministry of Interior and Health, 2024). At the municipal level, it is common to use progressive (compensatory) distribution of economic resources between local districts such as schools and early childhood education centers (Bæk and Kjærgaard, 2017), often based on the characteristics of the students via 'weighted student funding' (Ladd and Fiske, 2011). The extent of this resource redistribution

is considerable (Damm, Mattana, Nielsen, and Rouland, 2021; Heeager and Holm, 2019). Such progressive redistribution of resources mitigates potential negative effects of immigration on the quality of local public services. Consistent with this view, a recent Danish study finds null effects of school allocation of refugee children on academic achievement of native pupils (Hassan, Hvidtfeldt, Andersen, and Udsen, 2023).

Our findings lend support to economic policies aimed at increasing local housing supply elasticities to better accommodate new immigrants. They also advocate the policies that redistribute part of the gains from immigration to the groups that bear the burden from immigration, thereby reducing political opposition against immigration—for example tax system neutrality with respect to tenure-choice decision across income groups and land taxation.

Our novel shift-share instrument may not only be relevant for assessing impacts of immigration on other outcomes in the Danish context, but it may also be relevant for estimation of impacts of (refugee) immigration in other countries that have had periods of spatial dispersal of refugees. Several north-European countries have implemented spatial dispersal policies for refugees and asylum seekers, for example: Sweden, from 1985 to 1994 (Åslund and Rooth, 2007); and currently Denmark, since 1986 (Azlor, Damm, & Schultz-Nielsen, 2020); the Netherlands, since 1987 (Selm, 2000); Finland, since 1988 (Andersson et al., 2010); Switzerland, since 1988 (Couttenier, Petrencu, Rohner, & Thoenig, 2019); Germany, since 1991 (Bahar, Hauptmann, Özgüzel, & Rapoport, 2024), Norway, since 1994 (Bratsberg, Ferwerda, Finseraas, & Kotsadam, 2021); Ireland, since 2000 (Proietti & Veneri, 2021); and the UK, since 2000 (Bell, Fasani, & Machin, 2013).

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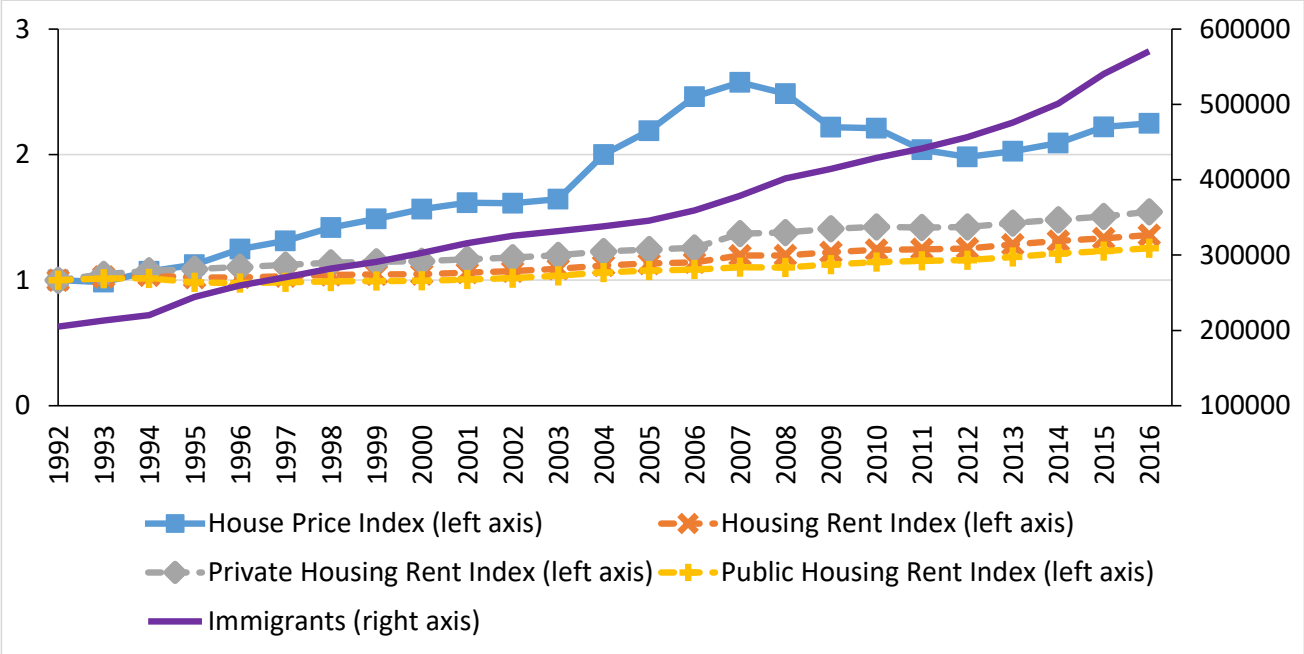
Figure 1 National real housing rent index (1992=100), real house price index (1992=100), and immigrant population, Denmark, 1992-2016



Source: Danish administrative registers on housing rents, transaction prices, and population, 1992-2016.

Notes: Indices for housing rents and house prices are measured on the left axis. Immigrant population is measured on the right axis. Housing rents and house prices are deflated using the consumer price index with base year 1992.

Table 1 Summary Statistics at the muncipality level. House price sample.

Variable	Mean	Std. Dev.	25th Percentile	75th Percentile	Obs.	No. of Muncipalities
Panel A: Levels						
Total population	56171.17	62865.61	29452	59980	1764	98
Number of Danes	50823.47	51862.2	27645	54796	1764	98
Number of immigrants	4116.353	8993.395	1336	4087	1764	98
Number of immigrants/population	0.061	0.033	0.038	0.076	1764	98
Population ultimo 1995	53520.18	57166.17	28477	57675	98	98
Number of immigrants/1995-population	0.064	0.035	0.039	0.079	1764	98
Number of Danes/1995-population	0.9519	0.0734	0.9180	0.9989	1,764	98
Accumulated standard shift-share instrument for immigrant population	2556.774	7557.538	393.810	2358.294	1764	98
Refugee forecast shift-share instrument for immigrant influx (flow)	35.513	103.512	6.190	29.8155	1764	98
Refugee forecast shift-share instrument for immigrant population (accumulated)	259.101	633.873	48.600	244.9642	1764	98
Log house price index	0.434	0.480	0.0547	0.780	1764	98
Log rent index (using public & private rentals)	0.219	0.120	0.129	0.291	1764	98
Log rent index (using public rentals)	-0.005	0.125	-0.100	0.076	1762	98
Log rent index (using private rentals)	0.414	0.134	0.3120	0.497	1764	98
Housing stock	27041.48	33597.81	13110.5	28726.5	1764	98
Public housing stock	5388.434	7793.94	1648	6610	1764	98
Non-public housing stock	21653.04	26395.74	10167	22964	1764	98
Housing vacancy rate	0.060	0.045	0.036	0.069	1764	98
Public housing vacancy rate	0.036	0.027	0.018	0.048	1764	98
Log average income	12.355	0.143	12.261	12.413	1764	98
Panel B: Five-year differences						
Δ Immigrants/1995-population	0.012	0.009	0.006	0.015	1274	98
Δ Danes/1995-population	-0.003	0.028	-0.020	0.015	1274	98
Δ Accumulated standard shift share instrument for immigrant population/1995-population	0.025	0.018	0.013	0.030	1274	98
Δ Accumulated refugee forecast shift-share instrument for immigrant population/1995-population	0.002	0.002	0.001	0.002	1274	98
Δ Log House price index	0.065	0.312	-0.172	0.328	1274	98
Δ Log rent index (using public & private rentals)	0.069	0.041	0.042	0.09	1274	98
Δ Log rent index (using public rentals)	0.066	0.041	0.041	0.0907	1271	98
Δ Log rent index (using private rentals)	0.076	0.069	0.028	0.108	1274	98
Δ Housing stock/1995-population	0.016	0.011	0.009	0.021	1274	98
Δ Public housing stock/1995-population	0.005	0.008	0.002	0.007	1274	98
Δ Non-public housing stock/1995-population	0.011	0.012	0.005	0.017	1274	98
Δ Share of vacant housing	0.009	0.015	-0.002	0.017	1274	98
Δ Share of public vacant housing	0.011	0.024	-0.001	0.022	1274	98
Δ Log average income	0.067	0.040	0.039	0.095	1274	98

Source : Danish administrative registers, 1995-2016.

Notes : In panel A, the observation period is (ultimo) 1999-2016, restricting the sample to observations with non-missing house price index. In panel B, the observation period is (ultimo) 2004-2016, restricted to the 2SLS house price regressions. Log values of a given variable refer to the natural logarithmic values of the variable.

Table 2 Summary statistics at the neighborhood level

Variable	Mean	Std. Dev.	25th Percentile	75th Percentile	Obs.	No. of Neighborhoods
Panel A: Levels						
Total population	2944.196	1062.849	2160	3547	29,721	1728
Number of Danes	2715.813	1001.3	1969	3296	29,721	1728
Number of immigrants	178.407	170.286	88	212	29,721	1728
Number of immigrants/population	0.062	0.047	0.032	0.077	29,721	1728
Population ultimo 1995	2802.927	913.201	2125	3362	1653	1653
Number of immigrants/1995-population	0.066	0.054	0.033	0.080	29,721	1728
Number of Danes/1995-population	0.9622504	0.1248765	0.9038	1.0106	29,721	1,728
Accumulated standard shift share instrument for immigrant population	107.464	151.707	26.556	135.233	29,721	1728
Refugee forecast shift-share instrument for immigrant influx (flow)	1.503	4.004	0.228	1.426	29,721	1728
Refugee forecast shift-share instrument for immigrant population (accumulated)	10.924	24.345	1.772	11.553	29,721	1728
Log house price index	0.811	0.4901	0.476	1.126	29,721	1728
Log rent index (using public & private rentals)	0.217	0.221	0.060	0.38	35,217	1960
Log rent index (using public rentals)	0.100	0.217	-0.037	0.258	32,252	1828
Log rent index (using private rentals)	0.334	0.283	0.121	0.529	34,026	1928
Housing stock	1371.937	449.155	1037	1643	29,721	1728
Public housing stock	231.838	268.031	50	323	29,721	1728
Non-public housing stock	1140.1	427.350	841	1409	29,721	1728
Husing vacancy rate	0.047	0.034	0.024	0.061	29,721	1728
Public housing vacancy rate	0.033	0.055	0.003	0.04	29,721	1728
Log average income	12.344	0.187	12.224	12.4328	29,721	1728
Panel B: Five-year differences						
Δ Immigrants/1995-population	0.014	0.020	0.004	0.019	21,137	1686
Δ Danes/1995-population	0.003	0.061	-0.031	0.022	21,137	1686
Δ Accumulated standard shift-share instrument for immigrant population/1995-population	0.025	0.022	0.011	0.032	21,137	1686
Δ Accumulated refugee forecast shift-share instrument for immigrant population/1995-population	0.002	0.004	0.0004	0.002	21,137	1686
Δ Log house price index	0.072	0.338	-0.180	0.33	21,137	1686
Δ Log rent index (using public & private rentals)	0.082	0.087	0.031	0.12	25,408	1960
Δ Log rent index (using public rentals)	0.071	0.080	0.0266	0.109	23,102	1812
Δ Log rent index (using private rentals)	0.095	0.135	0.016	0.148	24,344	1918
Δ Housing stock/1995-population	0.020	0.0370	0.002	0.026	21,137	1686
Δ Public housing stock/1995-population	0.004	0.019	-0.001	0.005	21,137	1686
Δ Non-public housing stock/1995-population	0.015	0.036	0.001	0.023	21,137	1686
Δ Share of vacant housing	0.009	0.023	-0.003	0.020	21,137	1686
Δ Share of public vacant housing	0.013	0.064	-0.003	0.025	21,137	1686
Δ Log average income	0.067	0.062	0.033	0.097	21,137	1686

Source: Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes: In panel A, the observation period is (ultimo) 1999-2016, in case of non-missing house price index. In panel B, the observation period is (ultimo) 2004-2016, restricted to the 2SLS house price regressions. Log values of a given variable refer to the natural logarithmic values of the variable.

Table 3 Balancing tests for house prices

	Dependent variable:			
	Standard shift-share instrument for immigration/1995-population		Refugee forecast shift-share instrument for immigration/1995-population	
	(1)	(2)	(3)	(4)
Panel A: Municipal level				
Five-year difference in log(house price index) lagged by five years	0.0317***	0.0292***	0.0007**	0.0002
	(0.00700)	(0.0053)	(0.0003)	(0.0002)
R^2	0.223	0.249	0.403	0.497
N	1274	1274	1274	1274
Panel B: Neighborhood level				
Five-year difference in log(house price index) lagged by five years	0.0208***	0.0178***	0.0004**	-4.10e-05
	(0.0014)	(0.0013)	(0.0002)	(0.000147)
R^2	0.139	0.162	0.099	0.120
N	20,974	20,974	20,974	20,974
Controls:				
Time FE	Yes	No	Yes	No
Time fixed effects interacted by municipality size	No	Yes	No	Yes

Source : Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes : *** p<0.01, ** p<0.05, * p<0.1. In Panel A, standard errors clustered at the level of municipality are reported in parentheses. In Panel B, standard errors clustered at the level of neighborhood are reported in

Table 4 Strict exogeneity tests for house prices

	Dependent variable:			
	Five-year difference in log(house price index)			
	(1)	(2)	(3)	(4)
Panel A: Municipal level				
Accumulated standard shift-share	-1.085	-1.327*		
instrument for immigration/1995-	(0.793)	(0.727)		
Accumulated refugee forecast shift-share			-1.163	-11.46
instrument for immigration/1995-			(7.599)	(7.081)
N	1274	1274	1274	1274
Panel B: Neighborhood level				
Accumulated standard shift-share	-0.435**	-0.421**		
instrument for immigration/1995-	(0.213)	(0.193)		
Accumulated refugee forecast shift-share			1.266*	-0.151
instrument for immigration/1995-			(0.755)	(0.741)
N	21,137	21,137	21,137	21,137
Controls:				
Time FE	Yes	No	Yes	No
Time fixed effects interacted by municipality size	No	Yes	No	Yes

Source : Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes : *** p<0.01, ** p<0.05, * p<0.1. In Panel A, standard errors clustered at the level of municipality are reported in parentheses. In Panel B, standard errors clustered at the level of neighborhood are reported in parentheses.

Table 5 Effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Municipal level. Refugee quota shift-share instrument. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: OLS estimates																
Immigrants/1995-population	4.479***	3.921***	1.622***	1.615***	2.603***	2.638***	1.182***	1.273***	0.247*	0.228	0.286**	0.283**	-0.0386	-0.0551	1.157***	1.023***
	(0.962)	(0.873)	(0.369)	(0.362)	(0.505)	(0.511)	(0.342)	(0.353)	(0.143)	(0.157)	(0.134)	(0.142)	(0.0445)	(0.0442)	(0.315)	(0.326)
R^2	0.849	0.853	0.174	0.178	0.352	0.354	0.126	0.134	0.203	0.220	0.125	0.140	0.042	0.052	0.141	0.184
Panel B: 2SLS estimates of effects																
Immigrants/1995-population	11.83***	10.73***	2.012*	2.174*	5.188***	5.606***	0.846	1.207	0.0853	-0.373	-0.0402	-0.455	0.125	0.0814	1.078	-0.361
	(2.967)	(3.696)	(1.057)	(1.289)	(1.461)	(2.032)	(1.095)	(1.368)	(0.379)	(0.381)	(0.331)	(0.382)	(0.160)	(0.197)	(1.243)	(1.288)
Panel C: First stage of 2SLS																
Effects of five year change in accumulated refugee forecast shift-share instrument on five-year change in immigrants/1995-population:																
Accumulated refugee forecast shift-share instrument for immigration/1995-	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***
	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.355)	(0.359)	(0.355)	(0.359)	(0.355)	(0.359)	(0.355)	(0.359)
t-statistic	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes
# municipalities	98		98		98		98		98		98		98		98	
N	1274		1274		1274		1274		1274		1274		1274		1274	

Source : Danish administrative registers 1995-2016.

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of municipality are reported in parentheses. In the population register, individuals who are neither registered as an immigrant nor a first-generation descendant of an immigrant are considered native, i.e. of Danish origin. The refugee forecast shift-share instrument is constructed as follows. First, we count all immigrants (ie_type=2 in the population register) from refugee-sending countries in 1995 in each municipality and calculate the municipal share of the national refugee population in 1995. Then, we allocate the initial national forecast of refugee influx to municipalities over each five-year period according to the calculated municipal share of the national refugee population in 1995. Mean five-year change in the immigration rate is 0.012, i.e. 1.2%.

Table 6 Effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Municipal level. Robustness checks using the standard shift-share instrument. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: OLS estimates																
Immigrants/1995-population	4.479***	3.921***	1.622***	1.615***	2.603***	2.638***	1.182***	1.273***	0.247*	0.228	0.286**	0.283**	-0.0386	-0.0551	1.157***	1.023***
	(0.962)	(0.873)	(0.369)	(0.362)	(0.505)	(0.511)	(0.342)	(0.353)	(0.143)	(0.157)	(0.134)	(0.142)	(0.0445)	(0.0442)	(0.315)	(0.326)
Panel B: 2SLS estimates using the refugee forecast shift-share instrument for immigrants																
Immigrants/1995-population	11.83***	10.73***	2.012*	2.174*	5.188***	5.606***	0.846	1.207	0.0853	-0.373	-0.0402	-0.455	0.125	0.0814	1.078	-0.361
	(2.967)	(3.696)	(1.057)	(1.289)	(1.461)	(2.032)	(1.095)	(1.368)	(0.379)	(0.381)	(0.331)	(0.382)	(0.160)	(0.197)	(1.243)	(1.288)
First stage of 2SLS: Effects of five year difference in accumulated refugee forecast shift-share instrument on five-year change in immigrants/1995-population:																
Accumulated refugee forecast shift-share instrument for immigration/1995-	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***	1.384***	1.203***
	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)	(0.385)	(0.424)
t -statistic	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8	3.6	2.8
Panel C: 2SLS estimates using the standard shift-share instrument for immigrants																
Immigrants/1995 population	9.010***	8.480***	4.819***	5.101***	7.704***	8.081***	3.193***	3.500***	-0.290*	-0.397***	-0.295*	-0.381**	0.00539	-0.0151	1.319**	1.042*
	(1.646)	(1.703)	(0.812)	(0.957)	(1.370)	(1.535)	-0.674	-0.755	(0.163)	(0.153)	(0.170)	(0.172)	(0.0787)	(0.0841)	(0.577)	(0.532)
First stage of 2SLS: Effects of five-year change in the accumulated standard shift-share instrument on five-year change in immigrants/1995-population:																
Accumulated standard shift-share for immigration/1995-population	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***	0.251***	0.242***
	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)	(0.0398)	(0.0415)
t -statistic	6.3	5.8	6.3	5.8	6.3	5.8	6.3	5.8	6.3	5.8	6.3	5.8	6.3	5.8	6.3	5.8
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
# municipalities	98		98		98		98		98		98		98		98	
N	1274		1274		1274		1274		1274		1274		1274		1274	

Source : Danish administrative registers 1995-2016.

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of municipality are reported in parentheses. Mean five-year change in the immigration rate is 0.012, i.e. 1.2%.

Table 7 Heterogeneous effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Municipal level. Refugee forecast shift-share instrument. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Accumulated refugee forecast shift-share instrument*Large	21.26***	19.77*	3.190	4.712	8.125***	11.07**	0.896	2.144	0.923*	0.757	0.663	0.728	0.259	0.0291	4.156***	2.909
	(5.256)	(10.54)	(2.273)	(4.746)	(2.599)	(5.254)	(1.839)	(3.435)	(0.488)	(1.124)	(0.423)	(0.945)	(0.198)	(0.308)	(1.282)	(1.891)
Accumulated refugee forecast shift-share instrument*Non-large municipality	11.38**	11.54**	2.369	2.199	6.214**	5.885**	1.419	1.275	-0.707*	-0.689	-0.793*	-0.800*	0.0859	0.112	-1.237	-1.098
	(4.565)	(4.674)	(1.624)	(1.680)	(2.446)	(2.530)	(1.666)	(1.759)	(0.420)	(0.434)	(0.418)	(0.435)	(0.256)	(0.273)	(1.595)	(1.708)
F-test of equal coefficient estimates:																
F(1,97)=		0.51		0.25		0.79		0.05		1.44		2.16		0.04		2.47
Prob > F =		0.4768		0.6188		0.3757		0.8223		0.2332		0.1452		0.8416		0.1191
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
# municipalities	98		98		98		98		98		98		98		98	
N	1274		1274		1274		1274		1274		1274		1274		1274	

Source : Danish administrative registers 1995-2016.

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of municipality are reported in parentheses. The refugee forecast shift-share instrument is constructed as follows. Mean five-year change in the accumulated refugee forecast shift-share intrument is 0.002, i.e. 0.2%.

Table 8 Effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Neighborhood level. Refugee forecast shift-share instrument. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: OLS estimates																
Immigrants/1995-population	1.089***	0.784***	0.528***	0.519***	0.845***	0.810***	0.170***	0.189***	0.651***	0.651***	0.433***	0.432***	0.218***	0.219***	0.941***	0.894***
	(0.192)	(0.167)	(0.115)	(0.115)	(0.0885)	(0.0888)	(0.0628)	(0.0642)	(0.160)	(0.161)	(0.0974)	(0.0976)	(0.0758)	(0.0765)	(0.273)	(0.276)
R^2	0.729	0.744	0.060	0.060	0.126	0.128	0.039	0.041	0.151	0.155	0.069	0.094	0.054	0.057	0.094	0.116
Panel B: 2SLS estimates																
Immigrants/1995-population	4.516***	2.226**	0.0511	-0.140	1.657**	1.369**	-0.265	-0.191	0.289	0.125	-0.111	-0.302	0.400**	0.428**	-0.792	-1.689**
	(1.459)	(1.124)	(0.397)	(0.462)	(0.646)	(0.693)	(0.391)	(0.458)	(0.238)	(0.268)	(0.217)	(0.274)	(0.158)	(0.189)	(0.497)	(0.713)
Panel C: First stage of 2SLS																
Effects of five-year change in accumulated refugee forecast shift-share instrument on five-year change in immigrants/1995-population:																
Accumulated refugee forecast shift-share instrument for immigration/1995-	0.640***	0.554**	0.633***	0.549**	0.695***	0.610***	0.630***	0.545**	0.640***	0.554**	0.640***	0.554**	0.640***	0.554**	0.640***	0.554**
	(0.226)	(0.219)	(0.225)	(0.218)	(0.231)	(0.224)	(0.227)	(0.220)	(0.226)	(0.219)	(0.226)	(0.219)	(0.226)	(0.219)	(0.226)	(0.219)
t -statistic	2.8	2.5	2.8	2.5	3.0	2.7	2.8	2.5	2.8	2.5	2.8	2.5	2.8	2.5	2.8	2.5
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
# neighborhoods	1686		1686		1681		1576		1686		1686		1686		1686	
N	21,137		21,076		20,784		19,397		21,137		21,137		21,137		21,137	

Source : Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of neighborhood are reported in parentheses. The OLS sample is restricted to be identical to the 2SLS sample. The refugee forecast shift-share instrument is constructed as follows. First, we count all immigrants (ie_type=2 in the population register) from refugee-sending countries in 1995 in each municipality and neighbourhood and calculate the neighborhood share of the national refugee population in 1995. Then, we allocate the initial national forecast of refugee influx over each five-year period to neighborhoods according to the calculated neighborhood share of the national refugee population in 1995. Mean five-year change in the immigration rate is 0.014, i.e. 1.4%.

Table 9 Heterogeneous effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Neighborhood level. Refugee forecast shift-share instrument. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Accumulated refugee forecast shift-share instrument*Large municipality	7.365***	0.700	0.293	-0.170	2.187***	1.007	-0.481	-0.320	0.679**	0.335	0.304	-0.00889	0.375***	0.344***	0.886**	-0.690
	(1.520)	(0.716)	(0.278)	(0.335)	(0.687)	(0.668)	(0.335)	(0.373)	(0.272)	(0.252)	(0.185)	(0.172)	(0.124)	(0.127)	(0.442)	(0.468)
Accumulated refugee forecast shift-share instrument*Non-large municipality	-2.038**	1.703**	-0.254	0.00494	0.0534	0.689	0.181	0.0869	-0.360**	-0.165	-0.484***	-0.307*	0.124	0.142	-2.041***	-1.152***
	(0.798)	(0.730)	(0.372)	(0.387)	(0.444)	(0.467)	(0.353)	(0.379)	(0.174)	(0.182)	(0.176)	(0.182)	(0.118)	(0.124)	(0.311)	(0.274)
F-test of equal coefficient estimates:																
F(1,# neighborhoods-1)		0.96		0.14		0.16		0.58		2.59		1.42		1.3		0.73
Prob > F =		0.3271		0.7133		0.6894		0.4472		0.1074		0.2331		0.2546		0.3943
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
# neighborhoods	1686		1686		1681		1576		1686		1686		1686		1686	
N	21,137		21,076		20,784		19,397		21,137		21,137		21,137		21,137	

Source : Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of municipality are reported in parentheses.The refugee forecast shift-share instrument is constructed as follows. Mean five-year change in the accumulated refugee forecast shift-share intrument is 0.002, i.e. 0.2%.

Table A1 Univariate test: The mean log of house price index categorized based on deciles of five-year differences in natives and deciles of five-year differences in number of immigrants across locations

		Deciles of five-year differences in number of immigrants									
		1	2	3	4	5	6	7	8	9	10
Panel A: Municipal level											
Deciles of five-year differences in number of natives	1	-0.242	-0.066	-0.066	-0.024	-0.016	-0.047	0.024	0.149	0.163	0.576
	2	0.089	0.109	-0.101	0.027	0.224	0.210	0.458	0.383	0.554	0.873
	3	-0.089	-0.029	0.267	0.102	0.302	0.428	0.301	0.279	0.671	0.843
	4	-0.020	0.307	0.223	0.400	0.325	0.310	0.325	0.524	0.940	0.192
	5	0.123	0.450	0.346	0.289	0.521	0.525	0.248	0.708	0.753	1.052
	6	0.554	0.408	0.457	0.483	0.506	0.679	0.566	0.449	0.599	1.018
	7	0.392	0.548	0.556	0.521	0.604	0.538	0.389	0.514	0.276	0.781
	8	0.728	0.701	0.757	0.553	0.490	0.630	0.562	0.702	0.484	0.939
	9	0.711	0.652	0.625	0.625	0.740	0.743	0.708	0.824	0.535	0.581
	10	0.453	0.464	0.390	0.389	0.574	0.656	0.519	0.655	0.664	0.847
Panel B: Neighborhood level											
Deciles of five-year differences in number of natives	1	0.438	0.378	0.415	0.410	0.436	0.451	0.517	0.542	0.628	0.770
	2	0.544	0.502	0.551	0.566	0.562	0.561	0.690	0.690	0.795	0.844
	3	0.658	0.628	0.643	0.715	0.709	0.703	0.730	0.813	0.898	0.828
	4	0.737	0.704	0.715	0.750	0.775	0.848	0.793	0.824	0.875	0.959
	5	0.777	0.826	0.797	0.794	0.850	0.829	0.864	0.905	0.877	0.939
	6	0.829	0.856	0.864	0.835	0.836	0.8460	0.824	0.960	0.905	0.973
	7	0.898	0.912	0.872	0.895	0.913	0.900	0.883	0.956	0.979	1.031
	8	0.904	0.872	0.882	0.879	0.870	0.931	0.902	0.887	0.981	0.984
	9	0.892	0.902	0.930	0.926	0.937	0.928	0.947	0.905	0.940	1.071
	10	0.961	0.918	0.943	0.910	0.951	0.957	0.909	0.958	1.076	1.164

Source : Danish administrative registers, 1999-2016.

natives (i.e., Danish origin) and deciles computed based on 5-year change in number of Immigrants. Panel A: N = 1274. Panel B: N = 21,137.

Table A.2 List of countries and aggregation into origin groups (world regions), first part.

World region number	World region	Countries included in a given world region
1	EU15 North	Austria
		Belgium
		Faroe Islands
		Finland
		France
		Germany
		Greenland
		Iceland
		Liechtenstein
		Luxemburg
		Netherlands
		Norway
		Sweden
		Switezerland
		United Kingdom
2	EU15 South	Andorra
		Cyprus
		Greece
		Vatican City State
		Ireland
		Italy
		Portugal
		San Marino
		Spain
3	EU27 East Europe	Bulgaria
		Hungary
		Poland
		Romania
4	Rest of Europe	Czechia
		Estonia
		Latvia
		Lithuania
		Malta
		Monaco
		Slovakia
5	Balkans and Turkey	Albania
		Bosnia and Herzegovina
		Croatia
		Kosovo
		Macedonia
		Montenegro
		Serbia
		Slovenia
		Turkey
6	Oceania	Australia
		Cook Islands
		Fiji
		Kiribati
		Marshall Islands
		Nauru
		New Zealand
		Papua New Guinea
		Samoa
		Solomon Islands
		Tonga
		Tuvalu
		Vanuatu
		Pacific Islands
7	Indo Continent	Bangladesh
		Buthan
		India
		Nepal
		Pakistan
		Sri Lanka

Table A.2 List of countries and aggregation into origin groups (world regions), continued

World region number	World region	Countries included in a given world region
8	Middle East and Arab	Afghanistan
		Bahrain
		Iran
		Iraq
		Israel
		Jordan
		Kuwait
		Lebanon
		Oman
		Qatar
		Saudi Arabia
		Syria
		United Arab Emirates
		Yemen
9	North Africa	Algeria
		Egypt
		Lybia
		Morocco
		Sudan
		Tunisia
10	West Africa	Benin
		Burkina Faso
		Cape Verde
		Ivory Coast
		Equatorial Guinea
		Gabon
		Gambia
		Ghana
		Guinea
		Liberia
		Mali
		Mauritania
		Niger
		Nigeria
		Sao Tome and Principe
		Senegal
		Sierra Leone
		Togo
11	Rest of Africa	Angola
		Botswana
		Burndi
		Cameroon
		Central African Republic
		Chad
		Comoros
		Congo, Democratic Republic
		Congo, Republic
		Djibouti
		Eritrea
		Ethiopia
		Guinea Bissau
		Kenya
		Lesotho
		Madagascar
		Malawi
		Mauritius
		Mozambique
		Namibia
		Ruanda
		Seychelles
		Somalia
		South Africa
		South Sudan
		Swaziland
		Tanzania
		Uganda
		Zambia
		Zimbabwe

Table A.2 List of countries and aggregation into origin groups (world regions), last part

World region number	World region	Countries included in a given world region
12	Central America and Caribbean	Antigua and Barbuda
		Bahamas
		Barabados
		Belize
		Costa Rica
		Cuba
		Dominica
		Dominican Republic
		El Salvador
		Grenada
		Guatemala
		Haiti
		Honduras
		Jamaica
		Nicaragua
		Panama
		Saint Kitts and Nevis
		Saint Lucia
		Saint Vincent and the Grenadines
		Trinidad and Tobago
		West Indies
13	Latin America and Brazil	Argentina
		Bolivia
		Brazil
		Chile
		Colombia
		Ecuador
		Guyana
		Mexico
		Paraguay
		Peru
		Surinam
		Uruguay
		Venezuela
14	USA and Canada	Canada
		United States of America
15	China and Far Asia	Brunei
		Myanmar
		Cambodia
		China
		Indonesia
		Japan
		North Korea
		South Korea
		Laos
		Malaysia
		Maldives
		Mongolia
		Phillipines
		Singapore
		Taiwan
		Thailand
		East Timor
		Vietnam
16	Russia and Ex-Soviet Union	Armenia
		Azerbaijan
		Belarus
		Georgia
		Kazakhstan
		Kyrgyzstan
		Moldova
		Russia
		Tajikistan
		Turkmenistan
		Ukraine
		Uzbekistan

Notes: The world regions are based on the classification in Sanchis-Guarner (2017).

Table A3 Robustness checks of the effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Municipal level. Refugee forecast shift-share instrument. Five-year differences model.

	Dependent variable:																							
	Log(house price index)			Log(housing rent index)			Log(private housing rent index)			Log(public housing rent index)			Housing stock/1995-population			Private housing stock/1995-population			Public housing stock/1995-population			Natives/1995-population		
Specification:	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Panel A: OLS estimates																								
Immigrants/1995-population	4.479***	3.921***	4.041***	1.622***	1.615***	1.623***	2.603***	2.638***	2.518***	1.182***	1.273***	1.318***	0.247*	0.228	0.242	0.286**	0.283**	0.259*	-0.0386	-0.0551	-0.0170	1.157***	1.023***	1.006***
	(0.962)	(0.873)	(0.682)	(0.369)	(0.362)	(0.327)	(0.505)	(0.511)	(0.492)	(0.342)	(0.353)	(0.342)	(0.143)	(0.157)	(0.156)	(0.134)	(0.142)	(0.141)	(0.0445)	(0.0442)	(0.0391)	(0.315)	(0.326)	(0.347)
R^2	0.849	0.853	0.874	0.174	0.178	0.217	0.352	0.354	0.372	0.126	0.134	0.169	0.203	0.220	0.234	0.125	0.140	0.154	0.042	0.052	0.093	0.141	0.184	0.218
Panel B: 2SLS estimates of effects																								
Immigrants/1995-population	11.83***	10.73***	14.52***	2.012*	2.174*	2.799**	5.188***	5.606***	6.192***	0.846	1.207	1.755	0.0853	-0.373	-0.387	-0.0402	-0.455	-0.450	0.125	0.0814	0.0628	1.078	-0.361	-0.0483
	(2.967)	(3.696)	(4.304)	(1.057)	(1.289)	(1.257)	(1.461)	(2.032)	(2.082)	(1.095)	(1.368)	(1.352)	(0.379)	(0.381)	(0.413)	(0.331)	(0.382)	(0.402)	(0.160)	(0.197)	(0.192)	(1.243)	(1.288)	(1.217)
Panel C: First stage of 2SLS																								
Effects of five-year change in accumulated refugee forecast shift-share instrument on five-year change in immigrants/1995-population:																								
Accumulated refugee forecast shift-share instrument	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***	1.384***	1.203***	1.179***
	(0.385)	(0.424)	(0.417)	(0.385)	(0.424)	(0.417)	(0.385)	(0.424)	(0.417)	(0.385)	(0.424)	(0.417)	(0.355)	(0.359)	(0.399)	(0.355)	(0.359)	(0.399)	(0.355)	(0.359)	(0.399)	(0.355)	(0.359)	(0.399)
Controls:																								
Time FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Time by municipality size FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes	Yes
Tenure-type specific housing vacancy rates & income	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
# municipalities		98			98			98			98			98			98			98			98	
N		1274			1274			1274			1274			1274			1274			1274			1274	

Source : Danish administrative registers 1995-2016.

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of municipality are reported in parentheses.

Table A4 Effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Neighborhood level. Standard shift-share instrument as robustness check. Five-year differences model.

	Dependent variable:															
	Log(house price index)		Log(housing rent index)		Log(private housing rent index)		Log(public housing rent index)		Housing stock/1995-population		Private housing stock/1995-population		Public housing stock/1995-population		Natives/1995-population	
Specification:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: 2SLS estimates using the refugee forecast shift-share instrument																
Immigrants/1995-population	4.516***	2.226**	0.0511	-0.140	1.657**	1.369**	-0.265	-0.191	0.289	0.125	-0.0768	-0.198	0.400**	0.428**	-0.792	-1.689**
	(1.459)	(1.124)	(0.397)	(0.462)	(0.646)	(0.693)	(0.391)	(0.458)	(0.238)	(0.268)	(0.164)	(0.171)	(0.158)	(0.189)	(0.497)	(0.713)
Effects of five-year change in accumulated refugee forecast shift-share on five-year change in immigrants/1995-population:																
Accumulated refugee forecast shift-share instrument for immigration/1995-population	0.640***	0.554**	0.633***	0.549**	0.695***	0.610***	0.630***	0.545**	0.640***	0.554**	0.640***	0.554**	0.640***	0.554**	0.640***	0.554**
	(0.226)	(0.219)	(0.225)	(0.218)	(0.231)	(0.224)	(0.227)	(0.220)	(0.226)	(0.219)	(0.226)	(0.219)	(0.226)	(0.219)	(0.226)	(0.219)
t-statistic	2.8	2.5	2.8	2.5	3.0	2.7	2.8	2.5	2.8	2.5	2.8	2.5	2.8	2.5	2.8	2.5
Panel B: 2SLS estimates using the standard shift-share instrument																
Immigrants/1995-population	7.112***	6.136***	3.580***	3.871***	4.568***	4.761***	1.779***	2.088***	-0.0768	-0.198	-0.162	-0.263*	0.0850	0.0656	0.599**	0.222
	(0.984)	(0.900)	(0.518)	(0.579)	(0.592)	(0.645)	(0.343)	(0.401)	(0.164)	(0.171)	(0.135)	(0.144)	(0.0664)	(0.0699)	(0.278)	(0.286)
First stage of 2SLS: Effects of five-year change in standard accumulated shift-share instrument on five-year change in immigrants/1995-population:																
Accumulated standard shift-share instrument for immigration/1995-population	0.226***	0.210***	0.222***	0.206***	0.232***	0.216***	0.224***	0.207***	0.226***	0.210***	0.226***	0.210***	0.226***	0.210***	0.226***	0.210***
	(0.0371)	(0.0359)	(0.0369)	(0.0357)	(0.0363)	(0.0350)	(0.0408)	(0.0394)	(0.0371)	(0.0359)	(0.0371)	(0.0359)	(0.0371)	(0.0359)	(0.0371)	(0.0359)
t-statistic	6.1	5.8	6.0	5.8	6.4	6.2	5.5	5.3	6.1	5.8	6.1	5.8	6.1	5.8	6.1	5.8
Controls:																
Time FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Time by municipality size FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
# neighborhoods	1686		1686		1681		1576		1686		1686		1686		1686	
N	21,137		21,076		20,784		19,397		21,137		21,137		21,137		21,137	

Source: Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of neighborhood are reported in parentheses.

Table A5 Robustness checks of the effects of immigration on house prices, housing rents, housing stock relative to population in 1995, and native population relative to population in 1995. Neighborhood level. Refugee forecast shift-share instrument. Five-year differences model.

	Dependent variable:																							
	Log(house price index)			Log(housing rent index)			Log(private housing rent index)			Log(public housing rent index)			Housing stock/1995-population			Private housing stock/1995-population			Public housing stock/1995-population			Natives/1995 population		
Specification:	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Panel A: OLS estimates																								
Immigrants/1995 population	1.089***	0.784***	0.935***	0.528***	0.519***	0.553***	0.845***	0.810***	0.852***	0.170***	0.189***	0.225***	0.651***	0.651***	0.667***	0.433***	0.432***	0.452***	0.218***	0.219***	0.215***	0.941***	0.894***	0.924***
	(0.192)	(0.167)	(0.209)	(0.115)	(0.115)	(0.126)	(0.0885)	(0.0888)	(0.0855)	(0.0628)	(0.0642)	(0.0728)	(0.160)	(0.161)	(0.163)	(0.0974)	(0.0976)	(0.0972)	(0.0758)	(0.0765)	(0.0794)	(0.273)	(0.276)	(0.276)
R^2	0.729	0.744	0.751	0.060	0.060	0.064	0.126	0.128	0.130	0.039	0.041	0.045	0.151	0.155	0.158	0.069	0.094	0.072	0.054	0.057	0.067	0.094	0.116	0.139
Panel B: 2SLS estimates using the refugee forecast shift-share instrument																								
Immigrants/1995 population	4.516***	2.226**	4.149**	0.0511	-0.140	0.0867	1.657**	1.369**	1.880**	-0.265	-0.191	0.0755	0.289	0.125	0.160	-0.111	-0.302	-0.291	0.400**	0.428**	0.452**	-0.792	-1.689**	-1.777*
	(1.459)	(1.124)	(1.769)	(0.397)	(0.462)	(0.542)	(0.646)	(0.693)	(0.882)	(0.391)	(0.458)	(0.558)	(0.238)	(0.268)	(0.325)	(0.217)	(0.274)	(0.331)	(0.158)	(0.189)	(0.228)	(0.497)	(0.713)	(0.926)
Panel C: First stage of 2SLS																								
Effects of five-year change in accumulated refugee forecast shift-share on five-year change in immigrants/1995-population:																								
Accumulated refugee forecast shift-share instrument for immigration/1995-population	0.640***	0.554**	0.470**	0.633***	0.549**	0.469**	0.695***	0.610***	0.526**	0.630***	0.545**	0.459**	0.640***	0.554**	0.470**	0.640***	0.554**	0.470**	0.640***	0.554**	0.470**	0.640***	0.554**	0.470**
	(0.226)	(0.219)	(0.214)	(0.225)	(0.218)	(0.214)	(0.231)	(0.224)	(0.220)	(0.227)	(0.220)	(0.215)	(0.226)	(0.219)	(0.214)	(0.226)	(0.219)	(0.214)	(0.226)	(0.219)	(0.214)	(0.226)	(0.219)	(0.214)
Controls:																								
Time FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Time by municipality size FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Tenure-type specific housing vacancy rates & income	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
# neighborhoods		1686			1686			1681			1576			1686			1686			1686			1686	
N		21,137			21,076			20,784			19,397			21,137			21,137			21,137			21,137	

Source : Danish administrative registers 1995-2016 linked with the dataset on Danish residential neighborhoods constructed by Damm, Hassani and Schultz-Nielsen (2021).

Notes : *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the level of neighborhood are reported in parentheses. The OLS sample is restricted to be identical to the 2SLS sample.