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Stranded!
How Rising Inequality Suppressed US
Migration and Hurt Those "Left Behind"

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How Rising Inequality Suppressed US Migration and Hurt Those Left Behind

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Abstract

Using bilateral data on migration across US metro areas, we find strong evidence that increasing house price and income inequality has reduced long distance migration, the type most linked to jobs. For those migrating uphill, from a less to a more prosperous location, lower mobility is driven by increasing house price inequlity, as the disincentives from higher house prices dominate the incentives from higher earnings. By contrast, increasing income inequality drives the fall in downhill migration as the disincentives from lower earnings dominate the incentives from lower house prices. The model underlines the plight of those trapped in decaying metro areas—those "left behind".

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I. INTRODUCTION

1.   **US history is characterized by episodes of mass movement of Americans in search of a better life.** Examples include the Oregon Trail, the California Gold Rush, the northward migration of African Americans post-World War II, and, more recently, the tech boom influx that turned San Francisco and Seattle from port towns into IT hubs. However, the United States' status as the global poster child of dynamic labor mobility is waning. The Current Population Survey reports that interstate migration of America's working population halved between 1980 and 2016. This decline in migration reduces labor market churning, rendering downturns longer and recoveries slower. But it also has a structural element. The fall in migration has been most marked out of poorer areas, exacerbating the problem of those trapped in decaying metro areas and the accompanying economic and social anger around growing geographic inequality.

2.   **This paper links this fall in migration to rising income and house price inequality.** We find that much of the fall in migration from less to more prosperous metro areas can be traced to increasing differences in house prices, discouraging worker migration out of economically depressed, low house price metro areas to more productive ones with brighter prospects—the kind of mobility that best supports economic opportunity and vibrancy. On the other side, rising income inequality has lessened incentives for individuals to move in the other direction.[1]

3.   **The key insight is a marked asymmetry in the behavior of people moving from poorer to richer metro areas compared to those moving in the reverse direction.** The discouragement to moving from a poor to a rich metro area coming from wider divergences in house prices has outpaced the positive impacts to migration from greater differences in incomes—the centrifugal effects of rising wealth inequality dominate the centripetal effects of more income inequality, providing a direct link between rising inequality and the problems of those "left behind". By contrast, in the obverse case of people moving out of prosperous areas, the centrifugal forces from moving to a place with lower incomes dominates the centripetal effect of lower house prices. Increasing divergences in returns to land (house prices) is discouraging migration to prosperous areas even as widening divergences in returns to labor (earnings) is reducing migration in the opposite direction. Prices are moving, not people.[2]

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[1] The fall in migration and the rise in geographic inequality in the 1980s marks an end to over a century of income convergence across U.S. regions (Nunn, Parsons, and Shambaugh, 2018). Similar patterns of higher regional inequality and lower (net) migration appear to also be happening within other advanced economies (Gbohoui, Lam, and Lledo, 2019).

[2] More generally, Decker et al. (2014), analyzing measures such as the pace of job reallocation, the dispersion of growth rates across businesses, and within-business volatility, find falling economic dynamism in the United States since the mid-1980s. Our finding that lower long-distance migration is connected with increasing housing and income inequality links rising inequality to this wider trend toward less economic flexibility.

4. **This dynamic of rising housing and income inequality and lower migration has continued since the 1980s because it is self-reinforcing.** Metro areas with high house price due to limited space attract skilled workers at the expense of the unskilled. This gentrification accumulates over time as the ratio of skilled workers in the overall work force rises, further raising wage and home price inequality (as modeled in Gyorko and others, 2013, who observe that rapid increases in house prices are consistent with asset market equilibrium as they compensate home owners for the elevated level of house prices compared to rents). This dynamic is amplified as technology and other factors such as agglomeration effects increase the wage premium for the skilled despite the larger supply. As well-paid workers cluster in high productivity metro areas, lower earnings and less attractive amenities elsewhere reduce migration to poorer areas. The net result is to discourage labor market churning, including by the able and energetic located in poorer areas who could take advantage of moving to high productivity ones. This has macroeconomic consequences. Since lower labor market churning leads to a less efficient allocation of labor, it also reduces productivity and output.[3]

II. LITERATURE REVIEW

5. **Until recently the literature on the fall in migration focused on explanations other than rising inequality.** These include the rise in homeownership and shifting demographics. From the 1980s through 2010, the fraction of (less-mobile) middle-aged people (ages 40 to 59) in the working-age population increased from around 45 percent to nearly 60 percent, however more recent analysis has questioned the economic importance of this trend.[4] Another oft-cited culprit for the decline in migration is the rise in homeownership since it increases the cost of moving. However, as migration has fallen for both homeowners and renters, rising homeowner rates cannot account for the full story. Others suggested that the collapse of the housing boom and subsequent recession help explain the recent fall in labor mobility.[5] While the housing crisis could have contributed to dwindling migration, the downward trend originated in the 1980s, well before the crisis, and migration has not rebounded as the housing market has recovered.

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[3] Using a model in which high productivity cities limit local employment opportunities using land restrictions, Hsieh and Moretti (2017) suggest that the resulting misallocation of labor could have halved US growth between 1964 and 2009. While this size of the effect may be implausible, the basic logic that growing divergences in house prices can support growing income inequality, labor misallocation, and reduced aggregate output, is intuitive.

[4] Molloy, Smith, and Wozniak (2013) find that demographic shifts reduce within-state migration but has no statistical effect on interstate mobility (which is more likely to be linked to jobs), while Kaplan and Schulhofer-Wohl (2015) observe that migration rates have fallen across all age groups, suggesting a limited role for demographic factors.

[5] Frey (2009) highlights the difficulty for households to obtain credit and the reduction in home values directly after the financial crisis as important factors in the most recent fall in mobility. Similarly, Donovan and Schnure (2011) describe the lock-in effect for households have negative housing equity ("underwater" mortgages) on their homes.

6.   **Some have argued that increasing economic homogeneity across states has reduced the need for internal migration (Kaplan and Schulhofer-Wohl, 2015).** However, the opposite trend of increasing geographic *inequality* is consistently found using more granular data on individual metro areas.[6] Indeed, there is a growing literature highlighting the problems of those "left behind" in decaying metro areas, focusing on saving the heartland through regional policies (Austin, Glaeser, and Summers, 2018), the lower mobility of the poor and disadvantaged (Bound and Holzer, 2000), rising deaths of despair (Case and Deaton, 2015), the persistent impact of the 2008 financial crisis on employment (Yagan, 2016), and job losses in manufacturing after China's accession to the WTO in 2001 (Autor, Dorn, and Hansen, 2013). Indeed, the burgeoning literature on the "China shock" documents numerous social ills associated with persistently worse labor market outcomes, such as increased deaths from overdoses (Pierce and Schott, 2018) and higher idleness and lower marriage and fertility rates (Autor, Dorn, and Hansen, 2019). More generally, Case and Deaton (2017) link deaths of despair to persistent economic and social disadvantage. This evidence stands in sharp contrast to earlier work that had suggested that labor mobility tended to rapidly erase regional differences in labor markets (Blanchard and Katz, 1992).

7.   **Rising inequality for the 99 percent has been driven by the increasing wage premium on education**.[7] The pay gap between those with more and less education has risen steadily, especially in the 1980s and 1990s (Autor, 2014). The main explanations for the loss of middle-income jobs (possibly feeding on each other) are technological change (Autor and Dorn, 2013), trade openness (Autor, Dorn, and Hansen, 2013), and declining unionization (Hirsch, 2008). Other reasons include a falling minimum wage, lower tax rates for high earners, and a limited supply of skilled workers (Gordon and Dew-Becker, 2008).

8.   **Recent analysis of US labor market dynamics has highlighted a geographic aspect of the rise in the skill premium**. Autor (2019) finds that, particularly since 2000, the wage premium for skilled workers has risen sharply in urban areas but much less in more rural areas.[8] There is considerable evidence that the widening skill premium in urban areas has discouraging in-migration by the unskilled.[9] On the other side of the coin, there is also

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[6] Partridge and Tsvetkova (2017), who compare trends in incomes across states and counties, conclude that analysis at the state-wide level masks rising within-state inequality, and that there has been a steady increase in income inequality over time.

[7] Incomes of the very rich are discussed in Piketty and Saez (2003).

[8] See Moretti (2016) and Diamond (2017) on the rising concentration of skilled jobs in some metro areas, Autor (2014) and Gordon and Dew-Becker (2008) on the widening wage gap, and Alabdulkareem and others (2018) on differences in skills demanded and average wages across metro areas.

[9] Ganong and Shoag (2015) document that rapidly rising housing prices in productive metro areas has deterred unskilled workers from moving there, while Feenstra, Ma, and Xu (2018) find that differences in house prices exacerbated employment losses in metro areas affected by the China shock. Bhutta, Laufer, and Ringo (2017) find that low-income families in high house price counties are being priced out of homeownership. More

evidence that higher urban wage premiums may have reduced incentives for the skilled to leave metro areas.[10] Our analysis examines migration and inequality holistically, looking simultaneously at in- and out-migration as well as incomes and house price differences across a swathe of metro areas. In addition, time series analysis allows us to examine in more detail the links between housing and income inequality and falling migration, and to compare their relative impacts. It turns out both are important, with rising housing inequality discouraging migration into more prosperous metro areas and higher income inequality lowering migration out of them.

III. STYLIZED FACTS

Stylized Fact I: *Long-Distance Migration, which is Primarily Driven by Jobs, Has Experienced a Large Structural Decline Between 1980 and 2015*

9.   **There has been a large fall in long-distance migration within the United States.** The longest-running migration database available, the Current Population Survey (CPS) Annual Geographical Mobility Rates, reports a halving in inter-state migration rates from 3.0 percent in 1981 to 1.5 percent in 2016 that goes beyond demographic shifts, with virtually no change in the composition of migration flows between 1996 (the start of such data) and 2016, whether considering age, race, or gender.[11] By contrast, intra-state migration has only fallen by about a quarter. The fall in inter-state migration is also seen in a shorter IRS dataset, which computes migration by tracking changes in the mail addresses of tax filers, where it falls from 2.9 percent in 1990 to 2.4 percent in 2015.

10.   **Long distance migration is important for economic churning as it is more related to job opportunities than local moves.** The CPS survey has incorporated questions regarding motivations to move since 1998, but the results are only distinguished between intra- and intercounty migration. Job-related motives explain 34.3 percent of moves across counties in 2015 while jobs were linked with only 20.2 percent of moves in a county.[12]

11.   **Long-distance migration is also closely linked to educational attainment, which links it to the wage premium of skilled workers.** In 2016, those with an education beyond high school were almost twice as likely to move to another state than those with only high

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generally, Partridge and Tsvetkova (2017) find that income growth is higher and poverty levels are lower in counties with more favorable industrial structures.

[10] In the typical lifecycle migration pattern, workers move to large metro areas to benefit from relatively fast wage growth, only to relocate to less-populated areas later in life. Wang (2013) argues that the increase in wage growth premiums in large metro areas has prompted workers to delay their relocation, dampening out migration. Similarly, Gyorko and others (2013) find that high house prices in superstar cities have resulted in relatively more high-income families and fewer middle-low income families across metro areas.

[11] Current Population Survey Annual Social and Economic Supplement, 1997-2016

[12] U.S. Census Bureau, Current Population Survey, March 1999; U.S. Census Bureau, Current Population Survey, November 2016

school education (in contrast, there is almost no difference in the likelihood of the two groups moving within a county).[13]

Stylized Fact II: *House Prices and Incomes Across Metro Areas Have Widened over Time*

12.   **We use a largely unutilized source of house price data to examine the link between house prices, incomes, and migration.** The Zillow Home Value Database provides median nominal estimated house prices for 571 census-based statistic areas (CBSAs) across the United States from 1996 and 2016.[14] CBSAs are a geographic area defined by the Office of Management and Budget which consist of one or more counties centered around an urban area. They are more relevant to our analysis than county-level movements since CBSAs typically capture entire labor markets.[15] As can be seen in Figure 1, the standard deviation between the logarithm of median home values widens by nearly 50 percent between 1996 and 2016, with its peak in 2006 simultaneous with the zenith of the housing bubble. After a low in 2012, the diversion picks up and approaches pre-crisis levels near the end of our sample period. Figure 2A shows the cross-section of these deviations from the median for 1996 and for 2015. While deviations from the median have increased throughout the distribution, there has been a particularly striking increase in the right-hand tail of superstar cities with extremely high house prices.[16]

13.   **Zillow also provides median nominal incomes by CBSA from 1996 to 2016 using data from the US Census Bureau and Bureau of Labor.** Income inequality has also risen steadily—the standard deviation of median incomes in logs of 381 CBSAs grew by 20 percent, and there was a similar thickening in the right-hand tail (Figures 1 and 2B). The thicker right-hand tail is consistent with the widening skill premium and increasing numbers of skilled jobs in successful urban areas.

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[13] Current Population Survey Migration/Geographic Mobility Tables, 1991-2016

[14] Zillow created its Home Value Index by estimating prices of both houses that were sold and ones that did not sell on a monthly basis, covering over 100 million homes nationwide. Zillow constructs its estimates based on an array of "automated valuation models", which are retrained three times a week based on a latest data. The estimates are subject to minimal systematic error, meaning that estimation errors are as likely to overprice as underprice the value of a particular home. The Zillow series are highly correlated with other series that measure house prices at the city level, such as the Case-Shiller index (which covers only twenty CBSAs) and the FHFA series (which use a much more limited and less representative sample).

[15] For example, the CBSA for Washington DC covers about 5,600 square miles (equivalent to a circle with an 80-mile diameter) that stretches from the Shenandoah Valley in the west to the Chesapeake Bay in the east, and from Frederick in the north to Fredericksburg in the south. We aggregated any data that was exclusively available on a county-basis to CBSAs using the Zillow Crosswalk Tool, following Howard (2016).

[16] The geographical distribution that underlies the Zillow house price data looks as one would expect. Analyzing the ten metropolitan areas with fastest growing house prices, eight of them are in California, plus one in Florida (Key West) and one in Massachusetts (Vineyard Haven). Large metro areas like New York, Washington, DC, Boston, Denver, and Seattle are ranked in the top 50. Meanwhile, the ten metropolitan areas with the lowest house price growth are all in Indiana, Ohio, and Georgia.

14.   **As land in desirable locations such as superstar cities has become scarce, house prices have risen compared to incomes**. Indeed, the ratio of the logarithm of median house prices to median incomes has increased by 39 percent as those with high future earnings potential have crowded into successful metro areas and gentrified them. As predicted by models of superstar cities, the increase in house price and income inequality are closely linked. Within our bilateral dataset, 80 percent of observations represent movements upward or downward movements in both house prices and income, and the limited number of observations with opposite movements are concentrated in cases with relatively small divergences in these variables.[17]

15.   **The divergence in house prices and incomes since 1996 reflect long-run trends that correspond to the fall in labor mobility (Figure 3).** We extended our house price and income data back to 1981, the start of the CPS data on mobility, using the Federal Housing Finance Agency's (FHFA) House Price Index and the data on incomes by county. The standard deviation of the log of house prices and incomes show clear upward trends since 1981 which is largely contemporaneous with the decline in long-distance mobility.

IV.   REGRESSION RESULTS

16.   **We use the Internal Revenue Service's Statistics on migration for our empirical analysis, since it allows us to track bilateral migration flows between metro areas.**[18] This provides a more granular view than can be found in the CPS survey data that looks only at overall in- and out-migration.

17.   **To focus on job-related migration, we examine migration between CBSAs of over 200 miles.**[19] Such migration dropped from an average of 1.25 percent in 1996-8 to 1 percent in 2014-16.[20] Consistent with reduced migration of the poor and unskilled, the decline is larger for metro areas with lower median incomes. While migration out of metro areas in the lowest quartile of median income fell by 25 percent, the reductions get progressively smaller as median income rises, culminating in a fall of only 10 percent for

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[17] Fischer, Johnson, Sneeding, and Thompson (2017) find that income, consumption, and wealth inequality have become more linked across individuals since 1989. Our results confirm the result in Diamond (2015) that this this is also happening across US metro areas.

[18] The IRS Migration data covers county-to-county migration across the United States from 1990-2015 by tallying the number of tax returns and exemptions, proxies for households and individuals respectively, that have filed taxes for a given year from a different mailing address than the previous year, an indication the household in question has moved. Since the IRS database only covers households whose level of income requires them to file taxes it excludes some low-income families. However, this may be less of an issue given our focus on migration related to jobs, since most of the employed file taxes, especially as the earned income tax credit (a form of negative income tax) brings many of the working poor into the tax net.

[19] In their "Reasons for Moving" issue, the Census reports that 31 percent of moves of up to 200 miles are motivated by job-related reasons, compared to 48 percent for migration of 200-499 miles; separate analysis finds that 47.5 percent of moves of over 500 miles are related to following or attempting to find a job (Ihrke, 2014).

[20] We used three-year averages to reduce noise in the data. In 2013, the cut-off for the number of moves below which data was not reported was raised from 10 to 20. We adjusted the data for this change in methodology.

metro areas in the top quartile. Indeed, migration from metro areas within the highest income quartile other areas in the top quintile marginally increased while migration from such areas to those in the lowest quartile has fallen by over a quarter. Reflecting these trends, the "smile" that characterized labor mobility in the 1990s, with high migration out of metro areas in the highest and lowest quartiles of median incomes, has turned into a lopsided smirk, in which migration is elevated only for areas in the highest quartile (Figure 4).[21]

18.   **Our data on migration flows between 323 CBSAs whose centers are at least 200 miles from each other amounts to roughly 200,000 observations over 20 years.** [22] To make the migration flows comparable across metro areas with different numbers of people, we take a "gravity" approach and divide bilateral migration by the square root of the product of their respective populations (the regression results accept the implied coefficient restrictions on the logarithm of population).[23] The most important other variables relate to relative house prices and incomes. The house prices variable, *HP*, is the log median house prices in the destination CBSA minus the log median house price in the source CBSA. Similarly, the income variable, *I*, is the difference between log median income in the destination and source CBSA. In addition, since migration is also heavily influenced by distance, we included the log of the distance between the centers of the two CBSAs. Basic statistics on these and other control variables are shown in Table 1.

A. Bartik Shocks

19.   **Before directly examining the relationship between migration and house price and income differences, it is worth examining the impact of unfavorable labor market shocks on each of these variables in turn.** We did this by calculating cumulative labor market shocks using the approach first proposed by Bartik (1991) and used by many subsequent papers. Labor market shocks are calculated by taking changes in national employment by sector each year and weighting these changes by the differing initial employment structure in each CBSA. These Bartik shocks thus trace potential employment shocks across metro areas assuming no change in employment structure and that national trends correspond to local developments. Because of a major change in the definition of industrial composition, we construct Bartik shocks using 1998 industry compositions, and regress them on migration, house price, and income divergence from 1998:

$$\text{1) } M_{ij,t} = \propto \; + \beta_1 B_{ij,t} + \beta_2 D_{ij} + \beta_3 \delta_i + \beta_4 \theta_j + \beta_5 \tau_t + \; u_{ij,t}$$

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[21] See also Nunn, Parsons, and Shambaugh (2018).

[22] The Zillow house price database has data for 571 CBSAs, while the income database provides data for 381 CBSAs. The overlap comprises 323 CBSAs (35 percent of total number of CBSAs in the United States, but 82 percent by population). Finally, we calculated our bilateral distance variable using a trigonometric equation using county-level longitude and latitude coordinates taken from the US Census.

[23] The gravity model is a flexible specification for examining geographic relationships which, in the context of trade, is compatible with a wide range of theoretical models (Costinot and Rodriguez-Clare, 2014).

2) $HP_{ij,t} = \propto \ + \beta_1 B_{ij,t} \ + \beta_2 \delta_i + \ \beta_3 \theta_j + \ \beta_4 \tau_t + \ u_{ij,t}$

3) $I_{ij,t} = \propto \ + \beta_1 B_{ij,t} \ + \beta_2 \delta_i + \ \beta_3 \theta_j + \ \beta_4 \tau_t + \ u_{ij,t}$

where *M* is migration between the source CBSA i and the destination CBSA j adjusted by population at time t; *B* is difference between Bartik shocks in i and j; *HP* represents the difference in the logarithm of median house prices between i and j; *I* is their difference in the logarithm of median incomes between i and j; *D* is a distance variable, and δ, θ, and τ comprise CBSA i, CBSA j, and time fixed effects.

20.   **The results suggest that labor market shocks show up in relative house prices and earning rather than migration (Table 1).** A Bartik shock of 1 percent of employment in one metro area compared to another one leads to an immediate and highly statistically significant increase in relative house prices of over 2 percent and of relative income of ¾ percent. In both cases, this represents around 5 percent of the typical gap across metro areas. While the impact fades over time, between half and two-thirds is still present after 4 years. By contrast, a relative Bartik shock of 1 percent has no significant contemporaneous impact on migration. Indeed, the sign is negative, implying that, if anything, bilateral migration dwindles in response to favorable relative employment shocks, the opposite of what might be expected. This result persists and becomes significant with 4-year lags. Employment shocks seem to move prices, rather than people.

B. Migration Results

21.   **To confirm that higher (lower) relative house prices and lower (higher) relative incomes do indeed deter (encourage) migration, we ran the following regression**:

4) $M_{ij,t} = \propto \ + \beta_1 HP_{ij,t} + \beta_2 I_{ij,t} + \ \beta_3 X_{ij,t} + \ \beta_4 \delta_i + \ \beta_5 \theta_j + \ \beta_6 \tau_t + \ u_{ij,t}$

where *X* are control variables. These are: the proportion of the population over 60 in the source and in the destination CBSA to account for lower mobility of retirees; the average household annual gross income (AGI) of migrants to account for their economic status; relative regional unemployment to account for the business cycle; relative population growth to account for economic vitality; and the distance between the two CBSAs. We also include time dummies and fixed effects by CBSA and impose cluster-robust standard errors where the cluster comprise CBSA-pairs. The sample is 1996-2015.

22.   **Since migration may affect relative incomes and house prices as well as respond to them, we use instrumental variables.** For example, higher migration will increase house price differentials by bidding up house prices in the destination region and lowering them in the source and reduce income differentials by increasing labor supply in the destination while lowering it in the source. We instrument incomes and house prices with the averages of incomes and house prices of other CBSAs within a 200-mile radius of the CBSA in question, since our migration data exclude trips within 200 miles. While these instruments are a good

proxy for house prices, they work less well for median incomes. Hence, we also use house price and income differentials from 15 years earlier—which extends our instruments back to the start of the widening of income and house price inequality. While income and house prices shocks can last for some time, it seems highly unlikely that current migration is significantly affected by conditions a decade-and-a-half earlier.[24]

23.   **The results confirm the role of house prices and incomes in driving migration (Table 3).** The coefficient on *HP* is negative and on *I* is positive, and both are highly economically and statistically significant—a 1 percent increase in house prices (incomes) lowers (raises) the proportion of the population migrating by 0.0041 (0.0111) percentage point.[25] In addition, the coefficients on the controls are intuitive and significant.[26] This specification, however, cannot identify an impact from increasing dispersion of house prices or income on overall migration. This is because any change in migration from metro area A to B is offset by the opposite effects on migration from B to A.

24.   **To identify potential asymmetric effects on migration from house prices and incomes, we extend the model by differentiating between *uphill* and *downhill* migration.** More precisely, we calculate a dummy D_{UH} for observations where the house price in the destination CBSA is higher than the house price for the source CBSA (*HP* is positive, and the migration is uphill) and use $(1-D_{UH})$ to identify downhill migration.[27] We then multiply the house price dummies with the house price and income variables. The extended model is:

$$5)\quad M_{ij,t} = \propto\; + \beta_1 D_{UH} +\; \beta_2\big(D_{UH}\cdot HP_{ij,t}\big) + \beta_3\big((1-D_{UH})\cdot HP_{ij,t}\big) + \beta_4\big(D_{UH}\cdot I_{ij,t}\big)\; +$$
$$\beta_5\big((1-D_{UH})\cdot I_{ij,t}\big)\; +\; \beta_6 X_{ij,t} +\; \beta_7\delta_i +\; \beta_8\theta_j +\; \beta_9\tau_t +\; u_{ij,t}$$

25.   **The results, reported in Table 4, find major asymmetries in the impact of relative house prices and incomes for those moving uphill and those moving downhill.** The coefficient on *HP* for those moving uphill (to a more expensive housing market) is negative, highly significant, and at -0.0064 is much higher than estimate in the basic

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[24] The first stage regressions are well specified. The F-statistic for all first-stage regressions is well over the cut-off of 30. In addition, the Kleibergen-Paap rk LM and Wald F-statistics, which can be seen as generalizations of the Anderson LM and Cragg-Donald Wald statistics respectively to the case of non-i.i.d. errors, firmly reject the null hypotheses of under and weak identification.

[25] This is economically significant; given that the median bilateral migration coefficient for a sample is .01206, the regression estimates suggest that a 1 percent increase in house price (income) dispersion leads to 0.33 percent decrease (0.92 percent increase) in bilateral migration.

[26] A larger old-age population discourages mobility, particularly in the source CBSA since it is the young who tend to migrate; higher AGIs result in higher migration since it is less of a financial burden for the more prosperous to move; higher relative unemployment discourages mobility by lowering job opportunities; a larger divergence in population growth increases migration, as migrants are attracted to booming metro areas; and longer distances discourage mobility.

[27] Results using income to calculate the uphill and downhill dummies are reported as a robustness check. That model finds similar results, but fits less well, suggesting that house prices are a more fundamental driver of our findings.

regression. By contrast, at -0.0013, the coefficient on house prices associated with downhill migration is less than a third of the basic regression and is only significant at the 10 percent level, implying that lower house prices elsewhere provide little incentive to move. The opposite asymmetry is seen in incomes, with an uphill coefficient (0.0063) that is well under a half of the downhill one (0.0151). In both cases, the differences between the uphill and downhill coefficients are economically large and highly statistically significant.

26.   **Why might there be such a marked asymmetry in response to house price and income differentials?** On house prices, the existing empirical literature suggests two reasons. First, because wider house price differences have been accompanied by falling housing affordability, rising income inequality, and increased concentration of skilled and unskilled workers across metro areas, it has become ever more difficult for people in low-house-price areas to be able to afford to move to successful ones—financial constraints on moving have become more binding (Ganong and Shoag, 2015). On the other side of the coin, since the divergence in house prices is linked to rising concentrations of skilled workers, current home owners in high house price areas are reluctant to relocate to places with lower prices but also lower prospect for future house appreciation (Gyorko and others, 2013). Indeed, anecdotal stories abound of individuals asked by their employers to move out of (say) Silicon Valley and then being later unable to afford their old houses when asked to return. Turning to incomes, the incentives for low income workers to leave rich metro areas have risen due to the widening wage gap (Autor, 2019), exacerbated by associated changes in life-cycle migration patterns (Wang, 2013) and the increasing prevalence of superior goods in the form of amenities that high income households appear to value more highly (Diamond, 2016).

27.   **The model explains about one-third of the overall fall in migration from 1996-8 to 2014-16, but over half of the reduction from poor to rich metro areas** (Table 5). The high explanatory power for migration between poor areas (those with house prices below the median) and rich areas (above the median) is intuitive, as such moves have the largest differences in house prices and incomes. Importantly, such migration is also key for economic churning as it is movement to higher productivity areas that offers the best chance for talented workers to forge ahead with their own careers and (in particular) to improve life prospects for their offspring.[28] This has been stifled by rapid increases in house prices particularly in the richest metro areas. Indeed, the increasingly fat right-hand tail of "superstar cities" with burgeoning highly educated work forces is also why the model can explain a quarter of the fall in migration within rich metro areas. By contrast, the model

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[28] Greenwood (1975) and Glaeser and Mare (2001) discuss the benefits to migrants themselves. Chetty and Hendren (2017) discuss the advantages to children of migrants.

explains a negligible amount of the fall in migration across poor areas, suggesting that forces other than rising inequality have driven this trend.[29]

28.   **Greater inequality in house prices and incomes play important but different roles in the fall in migration.** Table 5 indicates that rising house prices are key to explaining the fall in uphill migration particularly from poor to rich metro areas. By contrast, the fall in downhill migration is driven by the rise in income inequality, again particularly between rich and poor metro areas. Both sides of inequality matter.

C. Robustness

29.   **Adding lags to the specification or proxies for inequality within CBSAs produces the same asymmetry (Table 6).** The first column, which adds first lags to the specification, suggests that the impact of disincentive to moving to a metro area with higher house prices is immediate, while the effect of relative incomes builds over time. The second column adds measures of inequality in CBSAs to the basic regression given that Autor (2019) suggests that the larger rise in skill differentials in urban areas compared to rural ones may have reduced the incentives for the poor to migrate.[30] The results find that higher population density in the source and (especially) destination increase migration, while greater house price and income inequality tends to discourage it. These additions, however, have no material effect on the asymmetry in coefficients on relative house prices and income—the increase in inequality within CBSAs does not seem to be a major driver in the fall in migration between them.

30.   **Another potential concern with the baseline specification is that it only measures migration between metro areas that are *relatively* poor or rich.** However, there may also be a role for *absolute* poverty. Migration from poor areas such as Dayton, Ohio to rich superstar metro areas such as San Francisco might respond differently to house price and income differences than flows within poor areas, such as from Dayton to Lafayette, or within rich ones, such as Washington, DC to San Francisco. To incorporate *absolute* measures of economic standing, we include dummies that differentiate poor CBSAs, with house prices below the median in that year, and rich CBSAs with above-median values. We thus identify the coefficients on house price and income differences across six possible 'economic directions' for migration: from poor CBSAs to rich ones, from rich to poor, from poor to less poor, from poor to poorer, from rich to less rich, and from rich to richer.

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[29] Possible reflecting the changing nature and location of low-skilled jobs or the greater importance of support from family and friends as the fraying of the social safety net has led to a transfer of economic risk from the government and firms to individuals (Hacker, 2012).

[30] For house price inequality we have data on the difference between the 84th and 16th percentile of house prices. For income, we have Gini coefficients by CBSA. Unfortunately, both measures are only available for a subset of CBSAs, and the Gini coefficient series only start in 2006. Since both measures are positively correlated with population density, which is available for all CBSAs, we include this variable in the regression.

31.   **Table 7 finds that the marked asymmetry in response to house prices and incomes between those moving between rich and poor metro areas continues to hold**. There are, however, more marked changes in behavior for migration within rich metro areas and within poor ones. In these cases, the impediment to uphill mobility from higher house prices is even larger, while lower house prices continue provide little or no incentive to move away from more prosperous areas. The asymmetry remains for the income results as well, although it is much smaller between rich metro areas. As shown in Table 5, the model now explains almost two-thirds of the fall in migration between rich and poor metro areas and one-third of the fall within rich areas. However, even the extended model fails to explain much of the fall in migration between poor areas.

32.   **Our finding of major asymmetries in responses to house price and income differences is also robust to a range of other specifications** (Table 8). This includes: switching to defining uphill and downhill migration using relative incomes rather than relative house prices; defining migration by households rather than individuals; weighting the regression by population to check the results are not dominated by smaller metro areas; excluding the twenty largest metropolitan areas to check the results are not dominated by behavior in large metro areas; and cutting off the sample before 2007 to ensure our results were not driven by the housing bust and its aftermath. We also ran the specification on migration of under 200 miles. Consistent with the evidence that jobs are less important for this migration, the coefficients on relative houses prices and incomes (as well as the AGI of migrants) is not significant.

V. CONCLUSIONS

33.   **This paper finds clear links between lower long-distance migration (that is most linked to job moves) and rising house price and income inequality.** House price inequality has its largest effect on migrants seeking to move to more prosperous metro areas that offer brighter perspectives, while having little to no role in prompting people to leave richer areas. Income divergences have the opposite effects, discouraging outflows from high-income metro areas while providing more limited incentives for inflows into such areas. Indeed, our model explains up to two-thirds of the fall in long-distance migration between poor metro areas and rich ones, exactly the type of mobility that has traditionally helped denizens of low-productivity locales to relocate and use their skills more efficiently. In short, our model helps explain how rising inequality has stifled labor market churning, thereby worsening inequality and economic sclerosis, both of which are important for the plight of those "left behind" in decaying areas with diminishing prospects.

34.   **Policymakers across levels of government should prioritize tackling the impediments to migration.** The literature on successful metro areas suggest that targeted support that allows firms to adapt and workers to gain new skills is more effective than more

general support.[31] Another policy, favored by the Obama administration, is to modernize land-use regulations, reduce bureaucratic delays, and lower economic and racial segregation (which would allow housing supply to respond to better demand) and improve transportation and public transit (which would widen the catchment areas for prosperous metro areas).[32] More fundamentally, unless policy action is taken, the gradual erosion in the flexibility, and hence the competitiveness and prosperity, of the United States economy will likely continue, with its attendant economic and social strains.

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[31] Bartik (2018), and Nunn, Parsons, and Shambaugh (2018).

[32] White House (2016). More specifically, the report recommends ten actions states and local jurisdictions can take to promote smoothly functioning housing markets and thus to reduce costs.

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**Figure 1. House Price and Income Divergence**

Standard deviation of logged HP and Incomes (normalized, 1996-2016)
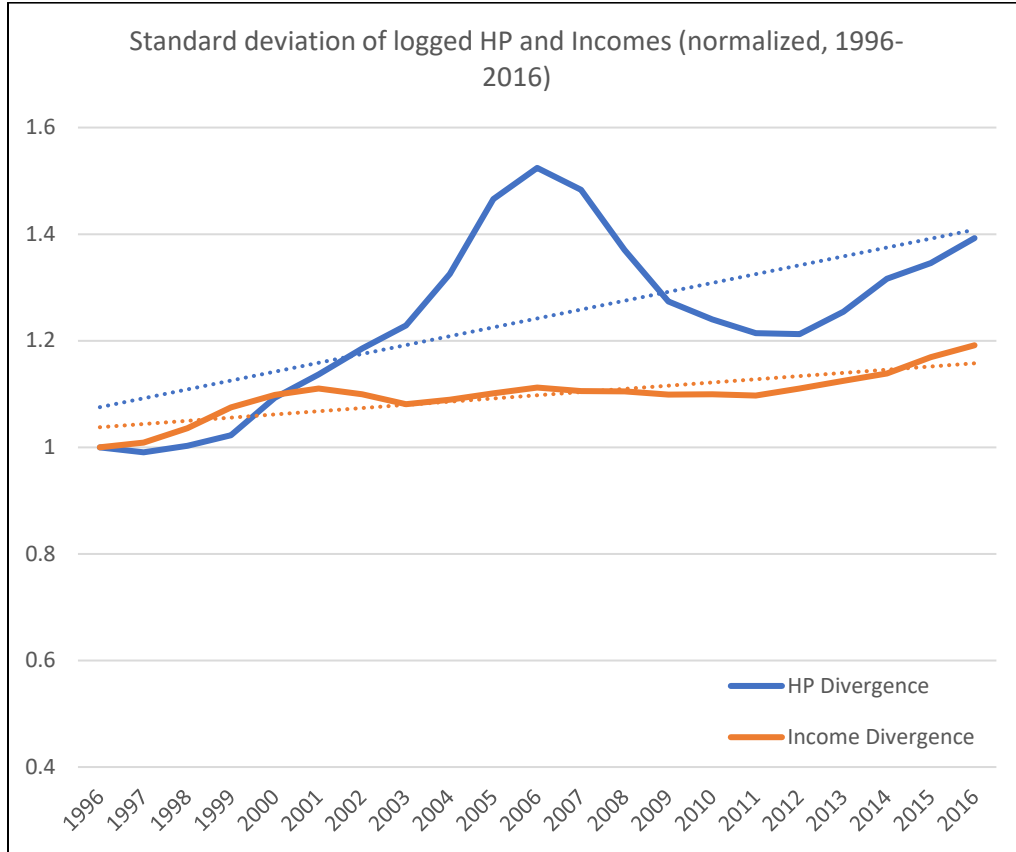
Figure 2A. HP Divergence Distribution Has Flattened over Time

Kernel Density Plot for HP deviation from median, 1996 vs. 2015
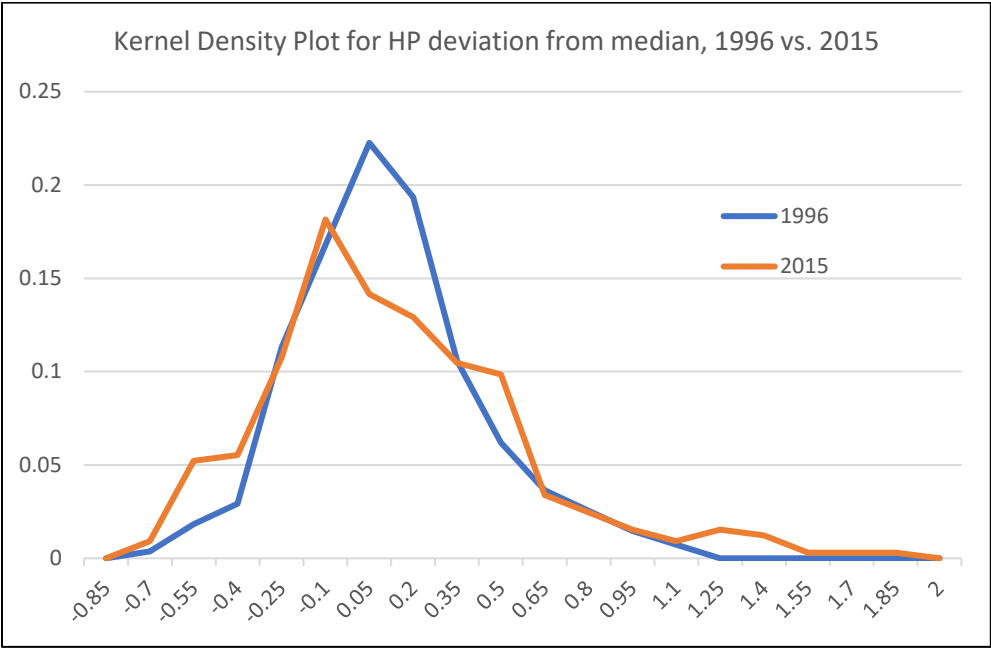
Figure 2B. Income Divergence Has Flattened Less

Kernel density plot for income deviation from median, 1996 vs. 2015
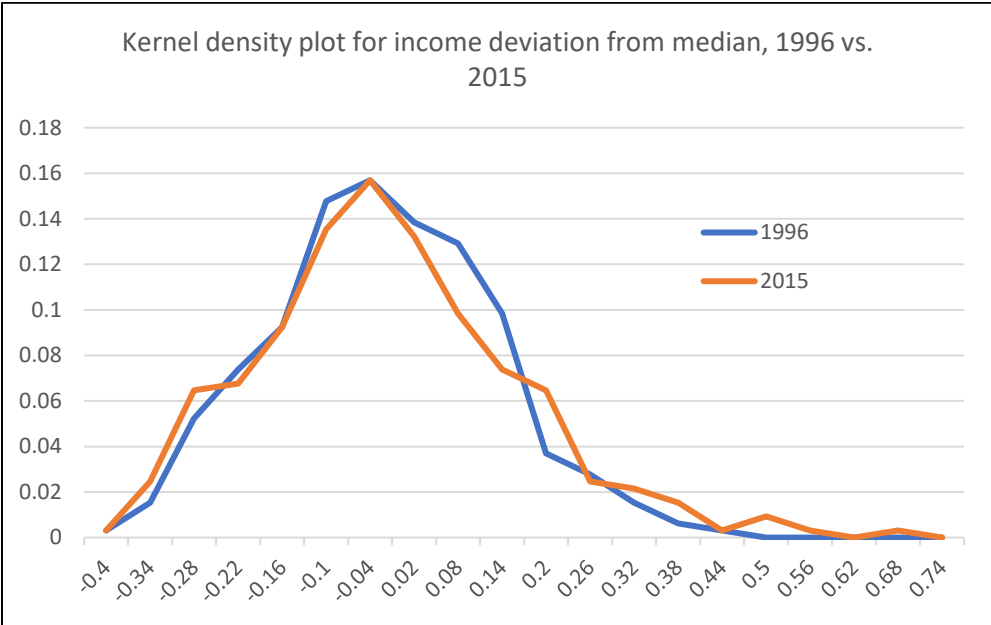
Figure 3. House Price and Income Divergence Has Increased As Migration Has Slowed

Standard deviation of logged HP and Incomes (normalized, 1981-2016); Migration Coefficient (1981-2015)

— HP-Divergence   — Income-Divergence   — Migration Rate
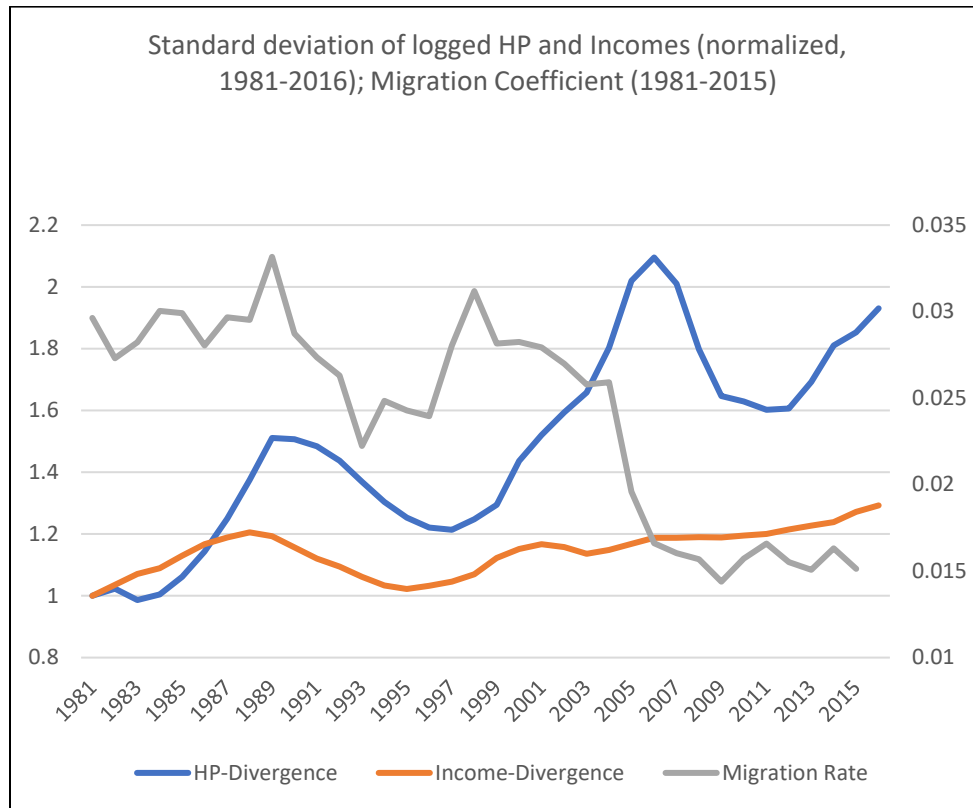
Figure 4. The Migration "Smile" Has Turned into a "Smirk"

Average Bilateral Migration Coefficient for 4 income quartiles (96-98 vs. 13-15)

— 1996-1998
— 2013-2015
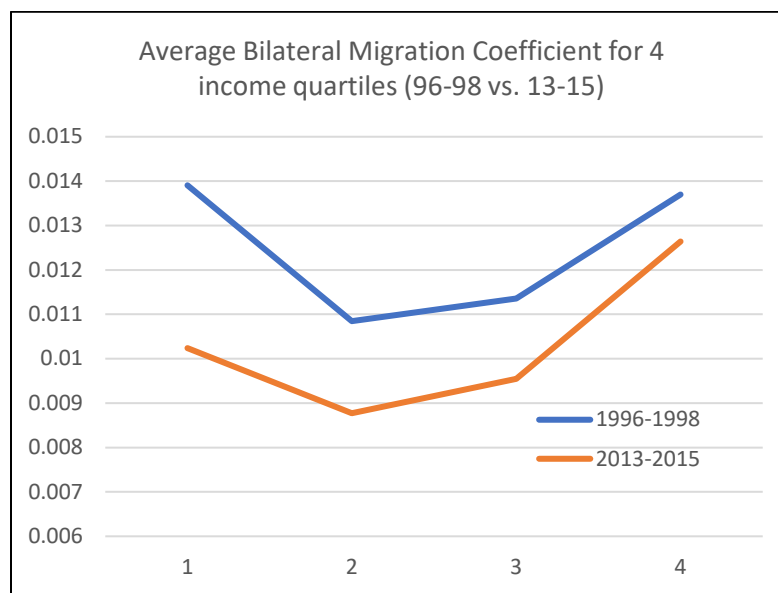
Table 1. Descriptive Statistics

Variable	Observations	Mean (absolute terms)	Standard Deviation	Calculation	Source
Bilateral Migration Coefficient	200190	.0119264	.0178535	The number of migrants between I and J, over the square root of the product of I and J	Internal Revenue Statistics US Population Migration Data
Bilateral House Price Difference	200190	.468212	.3810372	Log of house prices in J - log of house prices in I	Zillow Home Value Index
Bilateral Income Difference	200190	.1941114	.1491441	Log of incomes in J - log of incomes in I	Zillow, who receives it from Moody's Analytics
Population over 60	200190	.1722263	.0465034	The number of inhabitants over 60 in J over the population of J	United States Census
Avg AGI of Migrating Households (Logs)	200190	10.63752	.4696579	Log of total Annual Adjusted Income of the migration flow over the number of households moving	Internal Revenue Statistics US Population Migration Data
Relative Unemployment	200190	.0170239	.0197856	The average unemployment rate within 200 miles of J - the average unemployment rate within 200 miles of J	Bureau of Labor Statistics
Relative Population Growth	200190	.0120332	.0104687	Percentual growth of population in J - percentual growth of population in I	United States Census
Distance	200190	6.723665	.7402172	Distance in Logs between I and J	United States Census

Table 2. The Effect of Job Market Shocks to Migration, House Price and Income Divergence

Independent variables	Dept Var: Migration	Dept Var: House Price	Dept Var: Income
Bartik Shock	-0.00194	2.220***	0.756***
	(-1.58)	(61.94)	(66.18)
Distance	-0.0111***	-0.000779*	0.000188*
	(-22.58)	(-1.86)	(1.69)
Constant	0.0673***	0.0124**	-0.0000351
	(20.99)	(1.99)	(-0.02)
Observations	266161	236741	266161
R-squared	0.287	0.913	0.965
t statistics in parentheses			
="* p<0.1	** p<0.05		

Table 3. *Simple* Specification: Regressing Migration on House Price and Income Divergence

Dept Var: Bilateral Migration	Coefficient
	Beta
HP	-0.00412***
	(-12.99)
Income	0.0111***
	(6.44)
Population over 60 in Destination CBSA	-0.0219***
	(-4.19)
Population over 60 in Source CBSA	-0.0511***
	(-9.33)
Average Adjusted Income per Migrating Household	0.00384***
	(18.67)
Relative Unemployment	-0.0236***
	(-9.24)
Relative Population Growth	0.0526***
	(14.33)
Log of Distance between Source and Destination	-0.0110***
	(-28.83)
Observations	200190
R-squared	0.313
t statistics in parentheses	
* p<0.1 ** p<0.05 *** p<0.01	

Table 4. *Basic* Specification: Regressing Migration on House Price and Income Divergence, Accounting for Relative HP in Source CBSA

Dept Var: Bilateral Migration	Coefficient
	Beta
HP - Uphill	-0.00640***
	(-8.39)
HP - Downhill	-0.00125*
	(-1.67)
Income - Uphill	0.00631***
	(3.16)
Income - Downhill	0.0154***
	(8.04)
Population over 60 in Destination CBSA	-0.0195***
	(-3.77)
Population over 60 in Source CBSA	-0.0462***
	(-8.55)
Average Adjusted Income per Migrating Household	0.00361***
	(18.05)
Relative Unemployment	-0.0241***
	(-9.30)
Relative Population Growth	0.0545***
	(14.39)
Log of Distance between Source and Destination	-0.0108***
	(-28.47)
Observations	200190
R-squared	0.318
t statistics in parentheses	
* p<0.1 ** p<0.05 *** p<0.01	

Table 5. Explaining the Fall in Migration (Percent)

Direction	Basic Regression			Extended Regression		
	House Prices	Incomes	Total	House Prices	Incomes	Total
All	17%	16%	33%	23%	18%	41%
Poor to Rich	72%	-10%	62%	84%	-12%	72%
Rich to Poor	-24%	66%	42%	-32%	84%	52%
Poor to Poor - Uphill	7%	-2%	5%	13%	-2%	11%
Poor to Poor - Downhill	-1%	2%	1%	-2%	3%	1%
Rich to Rich - Uphill	42%	-12%	30%	68%	-19%	49%
Rich to Rich - Downhill	-8%	27%	20%	-2%	22%	20%

Table 6. *Basic* Regression with Lags and Local Inequality

Dept Var: Bilateral Migration Coefficient	Dynamic	Local Inequality
HP - Uphill	-0.00637***	-0.00660***
	(-7.04)	(-8.10)
Lagged HP - Uphill	-0.000227	
	(-0.25)	
HP - Downhill	0.00232**	-0.00215***
	(2.50)	(-2.64)
Lagged HP - Downhill	-0.00409***	
	(-4.20)	
Income - Uphill	0.00411	0.00705***
	(0.64)	(3.24)
Lagged Income - Uphill	0.00464	
	(0.89)	
Income - Downhill	0.00884	0.0139***
	(1.38)	(6.73)
Lagged Income - Downhill	0.00955*	
	(1.80)	
Population over 60 in Destination CBSA	-0.0173***	-0.0201***
	(-3.13)	(-3.09)
Population over 60 in Source CBSA	-0.0468***	-0.0416***
	(-8.18)	(-6.77)
Average Adjusted Income per Migrating Household	0.00360***	0.00346***
	(18.09)	(15.52)
Relative Unemployment	-0.0223***	-0.0268***
	(-5.87)	(-8.43)
Relative Population Growth	0.0489***	0.0503***
	(10.31)	(12.56)
Log of Distance between Source and Destination	-0.0108***	-0.0102***
	(-28.52)	(-28.20)

Table 6. *Basic* Regression with Lags and Local Inequality (cont.)

Population Density Source		0.00000367**
		(2.27)
Population Density Destination		0.00000718***
		(3.73)
Gini in Source		-0.00670**
		(-2.52)
Gini in Destination		0.00298
		(1.04)
HP Divergence within Source		-0.00122**
		(-2.55)
HP Divergence within Destination		-0.00156***
		(-2.97)
Observations	189537	165668
R-squared	0.319	0.310
t statistics in parentheses		
* p<0.1 ** p<0.05 *** p<0.01		

Table 7. *Extended* **Specification Accounting for Absolute Differences in Migration**

Dept Var: Bilateral Migration	Coefficient
HP - Poor to Rich	-0.00660***
	(-6.80)
HP - Rich to Poor	-0.000765
	(-0.80)
HP - Poor to Less Poor	-0.0109***
	(-4.04)
HP - Poor to Poorer	-0.00186
	(-0.62)
HP - Rich to Richer	-0.00980***
	(-6.25)
HP - Rich to Less Rich	0.000307
	(0.17)
Income - Poor to Rich	0.00623***
	(2.74)
Income - Rich to Poor	0.0184***
	(8.08)
Income - Poor to Less Poor	0.00701**
	(2.34)
Income - Poor to Poorer	0.0195***
	(6.54)
Income - Rich to Richer	0.00910***
	(3.43)
Income - Rich to Less Rich	0.0118***
	(4.69)
Population over 60 in Destination CBSA	-0.0173***
	(-3.24)
Population over 60 in Source CBSA	-0.0448***
	(-8.13)

Table 7. *Extended* Specification Accounting for Absolute Differences in Migration (cont.)

Average Adjusted Income per Migrating Household	0.00359***
	(18.22)
Relative Unemployment	-0.0228***
	(-8.98)
Relative Population Growth	0.0548***
	(14.00)
Log of Distance between Source and Destination	-0.0108***
	(-28.60)
Observations	200190
R-squared	0.318
t statistics in parentheses	
* p<0.1 ** p<0.05 *** p<0.01	

Table 8. Other Robustness Checks

	Income dummies	Households instead of Individuals	Weighted Regression	Excluding 20 Large Cities	Sample Before 2007	Under 200 instead of over 200
HP - Uphill	-0.00607***	-0.00640***	-0.00846***	-0.00393***	-0.00648***	-0.0163
	(-12.26)	(-8.39)	(-5.68)	(-4.18)	(-7.80)	(-0.70)
HP - Downhill	-0.00217***	-0.00125*	-0.00189	-0.00213**	-0.000945	-0.0279
	(-4.65)	(-1.67)	(-1.27)	(-2.31)	(-1.15)	(-1.23)
Income - Uphill	0.00769***	0.00631***	0.0105***	0.00633**	0.00346	-0.00731
	(3.15)	(3.16)	(3.26)	(2.00)	(1.14)	(-0.10)
Income - Downhill	0.0162***	0.0154***	0.0232***	0.0103***	0.0142***	0.0150
	(6.97)	(8.04)	(7.79)	(3.41)	(4.62)	(0.20)
Population over 60 in Destination CBSA	-0.0193***	-0.0195***	-0.0249***	-0.0144*	-0.0388***	-0.100
	(-3.70)	(-3.77)	(-3.38)	(-1.95)	(-4.44)	(-1.63)
Population over 60 in Source CBSA	-0.0473***	-0.0462***	-0.0718***	-0.0331***	-0.0491***	-0.343***
	(-8.68)	(-8.55)	(-7.17)	(-4.16)	(-4.90)	(-5.72)
Average Adjusted Income per Migrating Household	0.00363***	0.00361***	0.00271***	0.00362***	0.00318***	0.00112
	(18.16)	(18.05)	(7.09)	(14.71)	(15.75)	(0.41)
Relative Unemployment	-0.0235***	-0.0241***	-0.0313***	-0.0193***	-0.0266***	-0.118***
	(-9.21)	(-9.30)	(-8.70)	(-5.11)	(-7.03)	(-3.40)
Relative Population Growth	0.0532***	0.0545***	0.110***	0.0325***	0.0432***	0.430***
	(14.55)	(14.39)	(11.95)	(6.91)	(10.06)	(7.59)
Log of Distance between Source and Destination	-0.0109***	-0.0108***	-0.0152***	-0.00752***	-0.0114***	-0.197***
	(-28.56)	(-28.47)	(-20.07)	(-19.02)	(-28.43)	(-31.41)
Observations	200190	200190	200190	114579	115830	49278
R-squared	0.317	0.341	0.459	0.300	0.321	0.658

t statistics in parentheses * p<0.1 ** p<0.05 *** p<0.01