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IZA DP No. 15300

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ABSTRACT

Real Estate Agent Earnings and Local Housing Prices

Real estate agents typically receive commissions based on a fixed percentage of home price purchases. Because housing prices vary across markets, one might expect that realtors have higher earnings in high-priced markets. Prior work by Hsieh and Moretti (2003) suggests that entry among realtors leads to roughly equivalent earnings across markets. We examine evidence from U.S. metro areas during 1996-2021 using Zillow housing price indices, coupled with realtor microdata (the CPS and ACS) including realtors' location, earnings, and work hours. Realtors' earnings elasticity with respect to local home prices is roughly 0.30, so that 10 percent higher home prices lead to 3 percent higher earnings. The positive wage-price relationship is not unique to realtors. The overall workforce has wage-price elasticities (conditioned on covariates) of about 0.20, two-thirds the size of realtors' elasticity. Realtors receive slightly higher earnings in higher-priced cities, about 1 percent for each 10 percent difference in housing prices. Weekly work hours across markets vary little with respect to metro housing prices, both for realtors and non-realtors. Evidence supports Hsieh and Moretti's conclusion that "over-entry" in high-priced markets is due to the inefficiency of fixed percentage commissions. Realtors have higher hourly earnings (and variance) than do "similar" non-realtor workers within the same labor markets, on the order of 10 percent. Evidence supports the view that real estate agents (on average) realize wage premiums. We suspect that higher earnings reflects both unmeasured personal attributes and compensating differentials for risk (e.g., variable earnings).

JEL Classification: J31, J44, R3

Keywords: wages, housing prices, real estate agents, wage differentials

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1. Introduction

A widely known paper by Hsieh and Moretti (2003) focused on there being "over entry" among real estate agents in high-priced housing markets, due in part to inefficiencies associated with fixed percentage commissions. Generous commissions likely lead to the entry of real estate agents, which in turn leads to fewer sales for individual agents in high-priced housing markets. "Over-entry" of realtors is likely to attenuate a share of the rents associated with relatively fixed percentage commissions. Our principal focus is not the inefficiencies related to fixed percentage commissions per se. Instead, we focus on how realtor earnings and hours worked vary across markets with substantial differences in housing prices. Based on the evidence, we draw inferences regarding the existence and magnitude of realtor wage "premiums" emanating from partially fixed commission rates. We examine earnings differentials among real estate agents and other "similar" nonagent workers within U.S. labor markets (i.e., metropolitan areas).

To do so, we combine 26-plus years of household data (1996-2021) on individual realtors and other workers, using the Current Population Surveys (CPS) and, for more limited years, the American Community Surveys (ACS). These surveys of individual realtors (and other workers) are matched to detailed metro area-level measures of housing prices provided by Zillow. We find that both real estate agents and nonagents receive higher earnings in those metropolitan areas with higher housing price levels. Work hours for both groups are largely invariant to such prices. We find that real estate agents realize an earnings advantage compared to "similar" nonagent workers, particularly in labor markets with high housing price levels. That said, this advantage for realtors in high-priced markets is modest. In short, we find evidence showing largely similar earnings differentials across labor markets for both real estate agents and nonagents, consistent with standard theory (Roback 1982) but not so similar as to eliminate earning premiums for real estate agents in high-priced markets.

2. Background and research approach

Theory posits that there is mobility among households/workers and firms. Mobility among households and workers produces movement toward equilibria in which wage and price differences across markets reflect varying worker skills, preferences, local amenities, and productivity (e.g., Roback 1982, Winters 2009, Albouy 2016). "Price" differences exist across labor, housing, and product markets. Price differences across markets (cities) are driven primarily by land and housing costs, which are affected by area amenities reflected in demand and the supply elasticities of land and housing. Differences in housing prices generate differences in payments to realtors, particularly so if commissions are determined by fixed percentage of selling prices.

We expect potential home buyers to vary in preferences, household wealth, and expected future incomes. Willingness to pay is conditioned not only by expected income but also by local amenities (or disamenities) and prices. We expect real estate agents to command a similar pattern of wage compensation across labor markets. Realtors' real earnings are influenced by their income, housing and overall local prices, and preferences on local amenities and disamenities. In what follows, we compare how wages and hours worked among realtors, and the overall workforce vary with respect to local housing prices (and, by extension, with respect to overall local prices).

3. Measurement of earnings, hours worked, worker attributes, and housing prices

Our initial analysis relies primarily on the use of the 1996-2021 U.S. Current Population Survey monthly outgoing rotation group files (CPS-MORG). The outgoing rotation group files are the CPS quarter samples (i.e., those in the 4th and 8th rotation group months-in-sample) that are administered questions on usual weekly earnings (including tips, commissions, and overtime) on their primary job. The CPS surveys also provide usual weekly hours of work (with an option of reporting variable hours) and the hours worked in the previous week. Hence, one can measure each worker's hourly "wage" on their primary job based on usual weekly earnings divided by usual hours worked per week.

In addition to the CPS-MORG files, we have provided parallel sets of estimates using individual worker data from the American Community Surveys (the ACS). As discussed subsequently, the ACS earnings and work hours data are not as precise as in the CPS-MORG. That said, the ACS has the advantage of larger sample sizes of realtors and lower rates of earnings nonresponse (we exclude imputed earners, as discussed subsequently). As it turns out, evidence from the CPS and ACS are highly similar.

We use the Zillow Home Value Index (ZHVI) to measure metropolitan area housing prices, which provides MSA level measures of middle-tier (35th to 65th percentile) house values with price indices for lower-tier and top-tier housing. Across all markets, the weighted simple correlations between the middle-tier (that we use) and other indices are 0.98 and above. The Zillow MSA "price" indices (for most MSAs) were available from January 1996 to the present. Thus, our CPS-Zillow dataset begins in January 1996 and extends through December 2021, when this dataset was created in early 2022.[1]

We match metro areas in Zillow to the identical (or mostly similar) MSAs identified in the CPS. The CPS does not identify all MSAs, omitting small MSAs (very roughly, those with populations below about 100,000). Moreover, the CPS adopts revised MSA definitions approximately every ten years and drops small

[1] Zillow home values are estimates ("Zestimates") based on information of recorded selling prices for similar homes and locations. Methodology used by Zillow is described at http://www.zillow.com/research/zhvi-methodology-6032/.

MSAs with declining populations while adding small MSAs with increasing populations. Thus, some smaller MSAs are included in some years but not in others, whereas larger metro areas are typically in our dataset for all years.

Our overall sample size is roughly 3 million, including those with imputed earners, whereas our sample excluding imputed earnings includes is approximately 2 million (i.e., roughly a third of wage and salary workers refuse to report earnings in the CPS earnings surveys (for details, see Hirsch and Schumacher 2004; Bollinger and Hirsch 2006; and Bollinger et al. 2019).

Our initial 1996-2021 CPS/Zillow estimation sample includes all metropolitan area wage and salary workers with an hourly wage of $1 to $200 in 2021 dollars, ages 18 and over who are matched to metro areas included in the Zillow database. Our MSA matching program requires refinements that increase the matched sample size by a modest amount, particularly among New England MSAs. The sample included in this initial draft includes 3,061,669 worker observations in metro areas, 13,448 of whom are real estate agents and 3,048,221 of whom are in occupations other than real estate agents.

We use this CPS "full sample" for our analysis of hours worked. For our wage analysis, however, we omit earnings nonrespondents. CPS nonrespondents have their earnings imputed by the Census Bureau, being assigned the earnings of CPS respondents who have similar characteristics. The CPS imputed earners are not matched to donor earnings based on either metropolitan area or narrow occupation (e.g., real estate agent). The overall nonresponse (imputation) rate for weekly earnings is nearly 35%, whereas the nonresponse rate for real estate agents is roughly 50%. Thus, our estimation sample for earnings includes 6,695 realtors and 2,030,557 nonagents. As expected, the inclusion of earnings imputations severely attenuates estimated wage gaps between realtors and non-realtors and the estimated elasticities of wages with respect to housing prices (for details, see Hirsch and Schumacher 2004; Bollinger and Hirsch 2006). The inclusion of imputes does not correct for nonignorable response bias since we do not observe the earnings of nonrespondents. Response bias is unlikely to affect results substantively. The exclusion of imputed earners does not meaningfully affect regression (mean) coefficient estimates compared to selection-adjusted estimates (Bollinger et al. 2019). We use the entire sample for our work hour analyses; these results minimally change if we exclude those with imputed earnings.

4. Descriptive evidence on realtor employment and wages by year and by market price tier

Table 1 and Figure 1 show real estate agent employment for April 1996 through early 2022 based on tabulations from the CPS-MORG files, as reported at Unionstats.com by Hirsch and Macpherson (2003, with annual updates) in the occupation data section. Readily evident is the considerable volatility in the size of the realtor workforce. There are substantial increases of realtors during 1983-1987, followed by slow

decline through 1996. Realtor employment increased from about 400 thousand in the mid-1990s to a peak of over 600 thousand in 2005-2007. Employment fell sharply following the 2009-2010 Great Recession real estate bust to a low of about 421 thousand in 2012. Since 2012 there has been a strong recovery, with realtor employment peaking at 686 thousand in 2019, close to its previous peak. It should be noted that the employment figures from the CPS, for the most part, identify realtors as wage and salary workers, even though a substantial share of these are classified as self-employed workers for administrative tax purposes. Using the 2005-2020 ACS, which has annual sample sizes of realtors roughly eight times those in the CPS, we see highly similar employment estimates, albeit with less sample variation from year to year. In 2015, for example, the CPS realtor estimate of employment is 577 thousand, as compared to an ACS estimate of 583 thousand.

The employment levels indicated in the CPS and ACS are substantially lower than the number of persons with active real estate licenses while higher than BLS reports based on measurement of establishment-level employees in the Occupational Employment Statistics (OES) program (191 thousand in May 2015). The number of persons with active real estate licenses overstates the number of individuals currently working as a realtor in their primary job. The OES total provides an employment estimate that reflects the number of realtors receiving wage and salary earnings (i.e., 1040 reports) from their employer but misses a substantial share of real estate agents recorded as wage and salary workers in the CPS but recorded as self-employed by the Internal Revenue Service (IRS). Similar issues exist for occupations such as lawyers, physicians, and clergy, who typically have earnings reported as wage and salary in the CPS but as self-employment earnings by IRS.[2]

Table 2 provides weighted means for key variables for real estate agents and nonagents. We show the means for the samples with and without imputed earners. Our earnings analysis examines only those who report earnings (we exclude imputes), whereas the analysis of employment and other non-earnings measures uses the full sample. As readily evident in Table 2, the inclusion of imputations substantially understates the earnings of real estate agents, the sample of respondent agents reporting average weekly (hourly) earnings of $1,600 ($39.17) in midyear 2021 dollars, as compared to an average $1,145 ($35.71) in the full sample that includes imputations. The weekly and hourly log earnings difference between agents and nonagents is 0.277 and 0.239, respectively. The somewhat larger realtor/nonrealtor ratios for weekly earnings than hourly earnings reflect that real estate agents tend to work 1.2 more hours weekly than do

[2] For related work, see Abraham et al. (2013).

nonagents, 39.9 versus 38.7 for usual hours worked per 38.0 versus 36.8 hours worked in the previous week. ACS results on work hours provide a similar pattern.

Consistent with the higher mean usual weekly hours worked among real estate, the proportion of part-time realtors is about 0.7 percentage points lower for real estate agents than nonagents. Reported hours worked in the previous week have means slightly lower (by about two hours) than usual hours worked. Realtors are more likely than nonagents to report variable weekly work hours.

Real estate agents are disproportionately female (59 percent), 4-5 years older than wage and salary workers other than real estate agents, and more likely to be currently or previously married. Average schooling is slightly higher for agents than nonagents. As compared to the overall workforce, relatively few real estate agents are dropouts or have at most a high school degree. Realtors are far more likely than nonagents to have a BA/BS as their highest degree. Relatively few realtors have graduate and advanced professional degrees. Realtors are more likely to be white than are nonagents and less likely to be Hispanic black, or Asian and other. Foreign-born naturalized noncitizens are underrepresented as real estate agents. As compared to the overall (nonagent) labor force, realtors are more likely to live in metro areas with higher-priced homes (roughly 6 percent higher average prices). There is little difference between realtors and other workers in their distribution across metropolitan area population size groups. That said, realtors are slightly more likely to reside in larger metro areas than nonagents. As shown in Table 2, 29.8 percent of realtors reside in metropolitan areas with five million plus, compared to 27.9 percent among nonagent wage and salary workers.

In Table 3a and 3b we provide detailed means for realtors and nonagents, respectively, separating each of the two groups into six groups of metropolitan areas ordered from low-to-high price tiers. The six price tiers are determined based on the distribution of MSA-level median prices over the entire 1996-2021 sample period, with all housing prices in 2021 dollars. The six price tiers represent price percentiles 1-10, 10-25, 25-50, 50-75, 75-90, and 90-100. The far-right columns in the tables show differences in means between the highest and lowest housing price groups (i.e., the top-10 versus bottom-10 MSA price-year percentiles). As expected, weekly and hourly earnings among realtors rise substantially with respect to MSA housing prices. However, the same is true for nonagents, but to a somewhat lesser degree. The top-to-bottom tier difference in log hourly earnings for real estate agents is 0.363 log points, slightly lower than the 0.389 log point differential for nonagents.

As seen in Table 3a, hours worked by realtors residing in locations with high housing prices tend to average more highly hours worked weekly. In short, real estate agents earn substantially more in markets with high housing prices. The same pattern is seen for the overall workforce, but the pattern is not as strong.

5. Regression analysis of realtor wage-price and hours-price elasticities

Table 4 provides regression estimates of the responsiveness of both wages and hours worked with respect to differences in market-level housing prices. These estimates of wage-price and work-hours price elasticities are provided both for real estate agents and the much larger population of nonagents. These estimates allow us to assess the extent to which realtors receive pay premiums in markets with high housing prices.

Turning to Table 4, we first examine the wage-price elasticities based on regressing log wages on the log of MSA housing prices, separately for real estate agents and nonagents, with varying levels of controls. We initially include no controls, then add year and month dummies, and then add a rich set of demographic variables, including education dummies (dropouts, high school, some college, associate degree, BA/BS, postgraduate and professional degrees), potential experience and its square, cubic, and quartic, gender, race/ethnicity (i.e., non-Hispanic white, Hispanic, black, Asian and other), and foreign-born (classified as citizens and non-citizens). We then add geographic regions and metro size dummies. Given a relatively strong correlation of city size with wages and housing prices, it is not clear *a priori* whether one should include size dummies. That said, our conclusions are relatively insensitive to that choice.

As seen in the top panel of Table 4, estimates of the real estate agent wage-price elasticity are in the narrow range from 0.24 to 0.28, the lower elasticity estimate being from the specification including region and city size. The estimates are largely invariant with respect to other controls. This result implies that realtor earnings rise by roughly 2.5 percent for each 10 percent increase in housing price levels. Our results imply that real estate agents in higher-priced markets realize substantial earnings premiums due to the fixed commission-based system. Estimating the wage-price relationship for nonagents reveals a relationship similar to that of agents, with wage-price elasticities of 0.19 to 0.23. The difference between the agent and nonagent elasticities is about 0.05 (differing slightly across specifications). These results imply that much of the higher realtor wages in high-priced markets simply reflect area-specific differences in market wages. However, one cannot rule out a premium, given that real estate agent earnings rise with respect to housing prices, more so for agents than for nonagents. That 0.05 difference implies a small wage premium-price gradient across markets, with each 10 percent difference in home prices increasing realtor wages about 1

percent more than for nonagents. We cannot rule out that such a modest gradient might reflect unmeasured differences in skills or effort (holding work hours constant) between realtors in high- and low-price markets (i.e., skill and effort differences larger than in the nonagent workforce). Our results using the American Community Survey (ACS), as shown in Table 5, are highly similar to our estimates seen in the CPS.

It is also important to examine how work hours vary with housing prices. Given fixed percentage commissions, one might expect more effort (hours worked) where housing prices are higher, although income and substitution effects work in opposite directions. In the middle two sections of Table 4, we estimate hours worked-price elasticities using both usual hours worked per week and hours worked the previous week (the week before the CPS survey). Here we find elasticities that are very small and economically insignificant. The largest estimates are about -0.03, which implies that each 10 percent higher housing price level decreases work hours by 0.3 percent, about 7.2 minutes per week on a 40-hour base (.003 x 40 = .04 hours or 7.2 minutes). In short, hours worked do not systematically vary with respect to housing price levels, consistent with economy-wide evidence of near-zero labor supply elasticities among workers in the labor force. Income effects are linear with respect to hours worked, so zero labor supply elasticities occur only on the internal margin and not on the participation margin). Using the ACS, one can estimate elasticities of annual hours worked with respect to housing prices. These estimates are close to zero, as seen above using the CPS.

Our final analysis, shown in the bottom section of Table 4, provides standard economy-wide wage premium estimates comparing wages for real estate agents to those of a broad but similar (i.e., covariate-adjusted) group of nonagents. We estimate a pooled wage equation in which realtors are a trivial share of the total sample size. The nonagent pool of workers drives parameter estimates. Hence, the coefficient on the real estate agent dummy variable effectively measures the agent-nonagent log wage differential based on nonagent coefficients (rewards to schooling, experience, etc.). The raw wage gap between realtors and nonagents shows a substantial 0.24 log point wage advantage for real estate agents. Including Zillow housing prices does not substantively change the realtor-nonagent wage differential, from 0.24 to 0.22. Once one controls for demographics (e.g., schooling, potential experience, demographics, region, and city size), the wage gap is cut somewhat more than half, from 0.24 to 0.10. Inclusion of MSA fixed effects, which controls for time-invariant differences in wages across labor markets, has minimal. In short, our preferred estimate is that realtors, on average, earn about 10 percent more than nonrealtors, conditional on detailed individual and location controls. We cannot rule out whether an unknown portion of this wage gap reflects non-competitive rents due to fixed commissions or other non-competitive processes. It is easy to imagine

that a substantive portion of this 10 percent differential reflects a risk premium given the relatively high variability in earnings across realtors and time (both seasonal and cyclical). Nor can we rule out an unmeasured skill or favorable personality attributes among real estate agents (relative to nonagents) that would lead them to higher earnings. We cannot rule out the existence of rents accruing to realtors due to the fixed commission system. If rents do exist, however, they are relatively modest.

6. Concluding Remarks

Real estate agents typically receive commissions based on a percentage of home selling prices. Because housing prices vary substantially across markets, one expects that realtors receiving such commissions would realize higher earnings in higher-priced markets. As suggested in prior literature, relatively easy entry among realtors should lead to roughly equivalent earnings across markets. We examine the evidence for U.S. metro areas during 1996-2021 using Zillow housing price indices and CPS earnings files for realtors and other workers. Agents do earn more in higher-priced markets, with an earnings elasticity with respect to local home prices of roughly 0.30 (i.e., a 10 percent higher home prices leading to 3 percent higher earnings). But this positive wage-price relationship is not unique to agents. The overall workforce has wage-price elasticities, conditioned on covariates, of about 0.20. The evidence implies that realtors realize slightly higher earnings (relative to market-level wages) in cities with higher prices, each 10 percent difference in housing prices leading to a 1 percent difference in realtor earnings relative to non-realtors in the same market. Weekly work hours across markets do not vary with housing prices for real estate agents or nonagent workers. Apart from the wage-price gradient, nationwide real estate agents have hourly earnings about 10 percent higher than "similar" nonagent workers within the same labor markets. Earnings variance among agents and across time are higher among real estate agents than for the larger non-realtor workforce no doubt accounts for some portion of the difference. Unobserved skills and personality may also be at work. Hsieh and Moretti (2003) emphasize that "over-entry" in high-priced markets due to the inefficiency of fixed percentage commissions largely exhausts rents. Our evidence is broadly supportive of their analysis to the extent that earnings differentials with respect to housing prices across labor markets increase for non-realtors nearly as much (by two-thirds) as they do for real estate agents. That said, the modestly higher wage-price gradient seen for agents as compared to nonagents suggests that agent entry may not fully eliminate earnings premiums for agents in high-priced markets.

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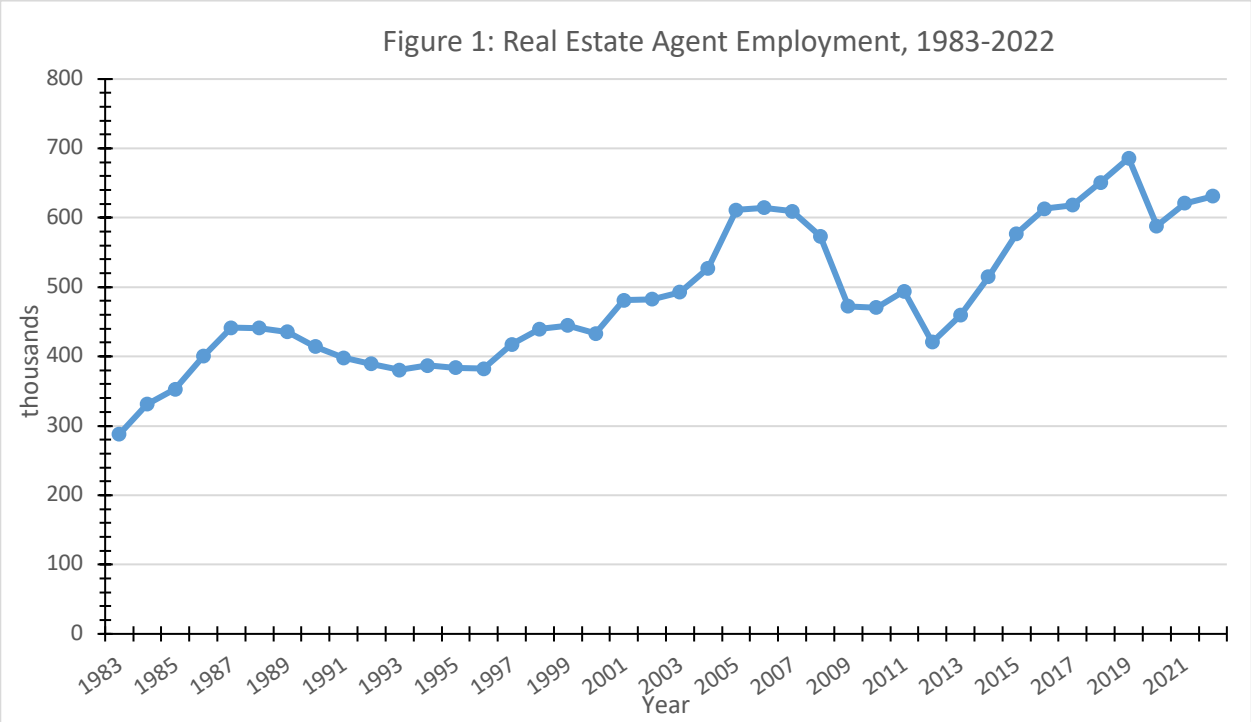

Table 1. U.S. Real Estate Agent Annual Employment, 1983-2022

Year	Obs	Employment	Year	Obs	Employment
1983	574	287,595	2003	704	492,653
1984	625	331,095	2004	718	527,450
1985	641	352,806	2005	817	611,303
1986	723	400,250	2006	809	614,403
1987	784	441,361	2007	817	609,361
1988	754	441,031	2008	728	573,247
1989	739	435,250	2009	632	472,170
1990	729	414,179	2010	621	470,344
1991	682	397,948	2011	607	493,874
1992	635	389,402	2012	538	420,843
1993	614	380,360	2013	587	459,423
1994	599	386,781	2014	627	514,944
1995	587	383,827	2015	692	577,182
1996	521	382,489	2016	707	612,860
1997	562	417,226	2017	716	617,747
1998	586	439,789	2018	693	650,913
1999	582	444,852	2019	717	685,651
2000	572	432,981	2020	567	587,727
2001	648	481,091	2021	609	620,977
2002	696	482,452	2022*	141	630,927

Source: Current Population Survey (CPS) Outgoing Rotation Group files, 1983-2022, compiled by Barry Hirsch and David Macpherson, posted annually in occupation tables (section VI on the left-side index) at Unionstats.com.
*Employment for 2022 is based on the January-March surveys. All other years are based on January-December.

Table 2: Weighted Means for Real Estate Agents and Nonagents

	Estimation sample, no imputes			Sample with imputed earners		
Variable	Agents	Nonagents	Difference	Agents	Nonagents	Difference
Weekly earnings (2021$)	$1,600	$1,167	$433	$1,451	$1,145	$306
Hourly wage (2021$)	$39.17	$28.74	$10.43	$35.71	$28.22	$7.49
Log weekly earnings (2021$)	6.998	6.721	0.277	6.893	6.711	0.182
Log hourly wage (2021$)	3.359	3.120	0.239	3.265	3.104	0.160
Usual hours worked per week	39.9	38.7	1.2	39.6	38.7	0.9
Hours worked last week	38.0	36.8	1.2	37.7	36.9	0.7
Variable hours worked per week	11.1%	4.5%	6.5%	15.1%	5.7%	9.4%
Part-time (<35 hours)	15.8%	16.6%	-0.7%	16.2%	15.7%	0.4%
Age	44.6	40.1	4.5	46.0	40.5	5.5
Female	59.2%	48.2%	11.0%	58.9%	47.9%	11.0%
Years schooling completed	14.6	13.9	0.7	14.6	13.9	0.7
<High school	1.3%	8.9%	-7.7%	1.4%	8.9%	-7.5%
High school	16.8%	25.8%	-9.0%	17.5%	27.0%	-9.5%
Some college, no degree	24.8%	19.6%	5.1%	23.4%	19.4%	4.0%
Associate degree	9.5%	9.7%	-0.2%	9.6%	9.5%	0.1%
College grad (BA/BS)	38.4%	23.3%	15.1%	38.4%	23.0%	15.4%
Graduate/professional degree	9.4%	12.7%	-3.3%	9.7%	12.2%	-2.5%
Hispanic	11.3%	16.6%	-5.3%	10.5%	16.4%	-5.8%
Non-Hispanic white	77.6%	65.2%	12.4%	76.9%	63.7%	13.2%
Non-Hispanic black	5.9%	10.9%	-5.0%	6.7%	12.5%	-5.7%
Asian and other	5.1%	7.2%	-2.1%	5.9%	7.5%	-1.6%
Native	87.9%	82.6%	5.3%	87.0%	82.3%	4.7%
Foreign-born citizen	7.5%	7.3%	0.2%	8.4%	7.8%	0.7%
Foreign-born noncitizen	4.5%	10.1%	-5.5%	4.6%	10.0%	-5.4%
Married, spouse present	59.5%	54.4%	5.1%	59.8%	53.2%	6.6%
Married, sep., div., widow	19.6%	15.7%	3.9%	19.9%	15.8%	4.1%
Mid-tier house price, (2021$)	$261,032	$245,454	$15,578	$270,492	$250,643	$19,850
Log mid-tier house price	12.325	12.259	.066	12.360	12.280	.080
Bottom-tier house price, (2021$)	$182,189	$171,198	$10,991	$186,604	$173,090	$13,514
Top-tier house price, (2021$)	$468,779	$441,491	$27,289	$483,618	$448,011	$35,607
Metro 100-250 thousand	5.5%	7.2%	-1.8%	5.3%	6.9%	-1.6%
Metro 250-500 thousand	8.4%	10.7%	-2.3%	8.6%	10.5%	-1.9%
Metro 500 thousand to 1 million	13.0%	13.5%	-0.5%	12.2%	13.2%	-0.9%
Metro 1 to 2.5 million	23.4%	22.6%	0.8%	22.1%	22.0%	0.1%
Metro 2.5 to 5 million	20.0%	18.1%	1.8%	19.3%	18.1%	1.3%
Metro 5 million plus	29.8%	27.9%	1.9%	32.5%	29.4%	3.1%
Sample size	6,695	2,030,557		13,448	3,048,221	

Table 3a: Real Estate Agent Means, by MSA Housing Price Tiers, 1996-2021

	MSA Housing Price Tiers, from Low to High Price Percentiles						
Variables	1-10	10-25	25-50	50-75	75-90	90-100	high-low
Real Estate Agents:							
Weekly earnings (2021$)	$1,290	$1,302	$1,359	$1,465	$1,747	$1,895	$605
Hourly wage (2021$)	$31.29	$31.36	$33.26	$35.94	$42.62	$46.63	$15.33
Log weekly earnings	6.801	6.828	6.861	6.933	7.067	7.171	0.370
Log hourly wage	3.166	3.170	3.227	3.296	3.428	3.529	0.363
Usual hours worked per week	40.2	40.2	39.9	39.8	39.9	40.2	0.0
Hours worked last week	37.0	38.3	38.5	38.2	37.4	38.1	1.0
Variable hours worked per week	9.6%	12.4%	10.8%	11.6%	9.5%	11.9%	2.3%
Part-time (<35 hours)	17.9%	17.0%	14.8%	16.7%	16.6%	14.4%	-3.5%
Age	43.7	44.2	43.6	43.9	45.1	45.8	2.2
Female	62.3%	61.3%	61.9%	59.5%	58.6%	56.7%	-5.7%
Years schooling completed	14.2	14.1	14.4	14.5	14.7	14.9	0.8
< High school	0.4%	1.2%	1.3%	1.8%	0.9%	1.2%	0.8%
High school	28.7%	21.3%	18.9%	16.7%	15.2%	14.3%	-14.4%
Some college, no degree	25.2%	33.7%	28.9%	26.2%	24.0%	18.4%	-6.9%
Associate degree	8.4%	9.8%	8.8%	10.4%	9.2%	9.4%	0.9%
College grad (BA/BS)	28.9%	28.2%	33.8%	36.1%	40.5%	45.9%	17.0%
Graduate/professional degree	8.5%	5.9%	8.3%	8.8%	10.2%	10.9%	2.5%
Hispanic	2.9%	6.1%	7.7%	11.2%	13.7%	14.3%	11.4%
Non-Hispanic white	94.8%	87.8%	83.8%	78.7%	78.4%	66.7%	-28.1%
Non-Hispanic black	1.4%	4.8%	5.9%	6.7%	4.4%	7.3%	5.9%
Asian and other	1.0%	1.3%	2.6%	3.4%	3.5%	11.7%	10.7%
Native	99.3%	93.2%	93.4%	90.4%	86.2%	80.4%	-18.9%
Foreign-born citizen	0.7%	2.8%	3.3%	6.1%	8.3%	13.3%	12.6%
Foreign-born noncitizen	0.0%	4.0%	3.3%	3.5%	5.4%	6.2%	6.2%
Married, spouse present	65.6%	67.1%	60.7%	59.9%	58.2%	56.7%	-8.9%
Married, sep., div., widow	17.4%	17.6%	20.1%	19.7%	20.0%	19.6%	2.2%
Sample size	170	471	1,211	1,699	1,533	1,611	

Wage regression estimation sample, earnings imputes excluded.

Table 3b: Nonagent Means, by MSA Housing Price Tiers, 1996-2021

	MSA Housing Price Tiers, from Low to High Price Percentiles						
Variables	1-10	10-25	25-50	50-75	75-90	90+	high-low
Nonagents:							
Weekly earnings (2021$)	$866	$940	$1,029	$1,112	$1,222	$1,453	$587
Hourly wage (2021$)	$21.68	$23.27	$25.34	$27.37	$30.11	$35.63	$13.95
Log weekly earnings	6.485	6.569	6.636	6.694	6.771	6.890	0.405
Log hourly wage	2.902	2.968	3.032	3.091	3.170	3.291	0.389
Usual hours worked per week	38.2	38.8	38.8	38.8	38.7	38.6	0.4
Hours worked last week	36.3	36.8	36.9	36.8	36.7	36.6	0.3
Variable hours worked per week	6.2%	5.1%	5.0%	4.5%	4.2%	4.0%	-2.2%
Part-time (<35 hours)	18.4%	16.7%	16.5%	16.5%	16.5%	16.4%	-1.9%
Age	39.2	39.2	39.7	39.9	40.5	40.9	1.6
Female	49.5%	49.0%	48.5%	48.2%	48.2%	47.6%	-1.9%
Years schooling completed	13.4	13.6	13.8	13.9	14.1	14.3	0.9
< High school	9.7%	9.3%	9.1%	8.8%	8.2%	9.3%	-0.4%
High school	35.0%	31.3%	28.2%	26.0%	24.0%	21.0%	-14.0%
Some college, no degree	21.4%	21.8%	21.0%	20.0%	19.0%	17.4%	-4.1%
Associate degree	9.7%	10.3%	10.1%	9.9%	10.0%	8.7%	-1.0%
College grad (BA/BS)	16.2%	18.5%	21.2%	23.3%	25.2%	26.7%	10.5%
Graduate/professional degree	8.1%	8.7%	10.4%	12.0%	13.7%	17.0%	8.9%
Hispanic	9.0%	9.2%	12.2%	16.0%	17.9%	24.6%	15.5%
Non-Hispanic white	78.7%	75.6%	71.2%	66.8%	64.1%	52.6%	-26.1%
Non-Hispanic black	10.0%	12.2%	12.5%	11.7%	10.4%	8.8%	-1.2%
Asian and other	2.3%	3.0%	4.1%	5.5%	7.6%	14.1%	11.8%
Native	94.3%	92.2%	89.2%	84.4%	81.0%	70.3%	-24.0%
Foreign-born citizen	2.0%	2.8%	3.8%	5.9%	8.1%	14.1%	12.1%
Foreign-born noncitizen	3.7%	5.1%	7.0%	9.7%	10.9%	15.6%	11.9%
Married, spouse present	57.1%	56.1%	55.3%	54.3%	53.8%	52.9%	-4.2%
Married, sep., div., widow	17.1%	17.0%	16.6%	15.9%	15.3%	14.2%	-2.8%
Sample size	87,533	178,117	392,120	531,971	406,632	434,184	

Wage regression estimation sample, earnings imputes excluded.

Table 4: CPS Regression Estimates of Agent and Nonagent Wage Gaps, Wage-Price Elasticities, and Hours-Price Elasticities, 1996-2021

Wage elasticity with respect to Zillow MSA housing prices:

Agents	Nonagents	
0.2645	0.2266	no controls
0.2840	0.2302	adds year/month dummies
0.2745	0.2179	adds demographics
0.2383	0.1903	adds region and city size dummies
n=6,695	n=2,030,557	note: earnings imputes excluded

Weekly hours worked elasticity with respect to Zillow MSA housing prices:

0.0013	-0.0010	no controls
0.0053	-0.0011	adds year/month dummies
0.0039	-0.0102	adds demographics
0.0054	0.0038	adds region and city size dummies
n=13,445	n=3,047,450	note: earnings imputes included

Hours worked last week elasticity with respect to Zillow MSA housing prices:

-0.0165	-0.0020	no controls
-0.0152	-0.0020	adds year/month dummies
-0.0178	-0.0120	adds demographics
-0.0287	0.0001	adds region and city size dummies
n=12,922	n=2,936,297	note: earnings imputes included

Log wage gaps between agents and nonagents:

0.2386	raw log wage gap
0.2235	regression with log Zillow price only
0.1013	plus demographics, year/month
0.1024	plus region and city size dummies
0.1029	plus MSA Fixed Effects and no region and city size
n=2,037,252	note: sum of agents and nonagents, earnings imputes excluded

Demographic variables included are education dummies (dropouts, high school, some college, associate degree, BA/BS, postgraduate and professional degrees), potential experience and its square, cubic, and its quartric, gender, race/ethnicity (Hispanic and non-Hispanic white, black, Asian and other), and foreign born (citizen, non-citizen). The hourly wage and agent differential models also include part-time status.

Table 5: ACS Regression Estimates of Agent and Nonagent Wage Gaps, Wage-Price Elasticities, and Hours-Price Elasticities, 2005-2020

Agents	Nonagents	
Wage elasticity with respect to Zillow MSA housing prices:		
0.2971	0.2238	no controls
0.2727	0.2201	adds year/month dummies
0.2650	0.2226	adds demographics
0.2754	0.2025	adds region and city size dummies
n=40,640	n=13,113,352	note: earnings imputes excluded
Weekly hours worked elasticity with respect to Zillow MSA housing prices:		
0.0037	-0.0010	no controls
0.0066	-0.0038	adds year/month dummies
0.0054	-0.0114	adds demographics
0.0135	0.0018	adds region and city size dummies
n=52,662	n=16,193,237	note: earnings imputes included
Annual earnings elasticity with respect to Zillow MSA housing prices:		
0.3009	0.2332	no controls
0.2866	0.2268	adds year/month dummies
0.2731	0.2181	adds demographics
0.2950	0.2003	adds region and city size dummies
n=40,640	n=13,113,522	note: earnings imputes included

Log wage gaps between agents and nonagents:	
0.2045	raw log wage gap
0.1850	regression with log Zillow price only
0.1030	plus demographics, year/month
0.1017	plus region and city size dummies
0.1035	plus MSA Fixed Effects and no region and city size
n=13,154,172	note: sum of agents and nonagents, earnings imputes excluded

Demographic variables included are education dummies (dropouts, high school, some college, associate degree, BA/BS, postgraduate and professional degrees), potential experience and its square, cubic, and its quartric, gender, race/ethnicity (Hispanic and non-Hispanic white, black, Asian and other), and foreign born (citizen, non-citizen). The hourly wage and agent differential models also include part-time status. The annual income models also include part-time status and weeks worked.