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House prices and female labor force participation

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ABSTRACT

Is there a causal connection between house prices and labor force participation of married women? The simple correlation between house prices and married women's labor force participation across U.S. metro areas is positive. Plausible, informal arguments have been advanced to support causation in either direction: prices raising participation (negative income effects of higher house prices lead more married women to work) or participation raising prices (richer two-earner households bid up the price of scarce housing). I construct an equilibrium model of location, labor supply and real estate (land) prices within a metro area which predicts that (1) metro areas with exogenously less buildable land will have higher house prices and more labor force participation of married women, while (2) metro areas with married women exogenously more prone to work will have higher house prices. Using geographic instruments for housing supply, I find little evidence of a positive effect of house prices on married women's labor force participation, but a somewhat greater possibility that house prices raise their earnings. Likewise, an instrument for married women's labor supply reveals no consistent significant causal effect of two earner households on housing prices, although the possibility of a positive effect cannot be ruled out.

1. Introduction

Two salient changes over the past four decades have been the rising labor force participation of married women (LFPMW) and an increase in the real price of housing. This paper examines the possible links between the two phenomena. A plausible argument can be made for causation in either direction. Warren and Tyagi (2003) have argued that the higher relative cost of housing induces households to supply more labor to the market by sending two earners into the labor market. But an equally plausible case could be made for the causation running in the opposite direction. In Frank and Cook (1995), the rise of two-earner families bids up the price of land thereby raising the relative price of housing. This direction of causation is consistent with the findings of Gyourko et al. (2010, 2013) who identify increasing national income inequality as a force creating "superstar cities" with markedly higher relative housing costs as the housing demands of an expanding number of high-income households collide with housing supply constraints in certain cities. Although Gyourko, Mayer and Sinai do not explicitly mention the rise of two-income households as a cause of increasing income inequality, other studies have found that assortative mating and a greater tendency for well-educated wives to pursue careers exacerbates income inequality across households. Moretti (2013) shows that high wage, college educated workers are increasingly drawn to cities with high housing costs because they can earn more there but he does not argue that the high housing prices are caused by this sorting.

This paper tries to untangle the direction of causation between house prices and LFPMW using data on a cross-section of US metropolitan areas. The simple cross-section relation between real house prices and LFPMW is positive – high-priced housing markets are associated with greater LFPMW. This could arise because (1) high house prices induce women to work; (2) more working women bid up housing prices; or (3) a third variable is correlated with both house prices and LFPMW. My empirical results suggest that higher house prices do not raise LFPMW but there is some likelihood that LFPMW increases house prices.

A simple model of labor supply and residential location within a metropolitan area motivates both directions of causation. Assuming a monocentric city in which all employment occurs at the center, households with two earners will have a greater incentive to save on commuting costs by locating close to the city center, bidding up the price of close-in land and raising the overall cost of housing. Consequently, other things equal, cities with more two-earner households will have higher land prices. Labor supply choices are made in the standard way, balancing the value of non-market time against the purchased goods foregone by not

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working, but the household also takes into account the cost of housing and commuting. With reasonable assumptions about preferences and positive assortative mating, the model shows that high wage households will choose to send two earners into the labor market and will reside in high priced housing close to the city center. Lower wage households will have only one earner and will live on the periphery in lower priced housing.[1]

The model can generate differences in labor supply and house prices across metropolitan areas. Cities may differ geographically in the capacity to build housing close to the city center; the model captures that with a parameter which represents the fraction of land that is buildable. These geographic factors will affect the price of land across metropolitan areas and, indirectly, labor supply since the decision to work depends on housing costs and commuting times.[2]

Metro areas might also differ in exogenous factors that affect women's labor force participation. If preferences for purchased goods relative to non-market time differ across cities, that would be reflected both in labor supply behavior and, in equilibrium, in land prices. To instrument for female labor force participation, I use a measure of the fraction of the city's males who served in the military during World War II, a variable which has been found to be causally related to female labor force behavior by Acemoglu et al. (2004).

The model generates some empirical implications that are confirmed by the data. House prices are higher and commuting times are longer in metropolitan areas with less close-in buildable land. Married women are less likely to work in cities with longer commuting times.

The hypothesis that house prices cause LFPMW can be probed by instrumenting for endogenous house prices to estimate the extent to which exogenous variations in house prices across metropolitan areas affect LFPMW. The instruments are measures of the topographic characteristics of metropolitan housing markets which may affect both the supply of close-in land, the cost of building on that land, and the desirability of the location. The results show no significant positive effect of house prices on labor supply, though possibly an effect on women's earnings. The reverse direction of causation is examined by instrumenting for LFPMW in an equation explaining house price variation across metro areas using the fraction of the city's males who served in the military during World War II as an instrument. While I cannot reject the null hypothesis of no effect of LFPMW on house prices, a substantial positive effect also cannot be ruled out.

2. The empirical puzzle

The rise in the labor market activity of women, especially married women with children, is well known and has been a central focus of research attention by labor economists. The fraction of married women in the labor market has essentially doubled in the past half century, rising from 31.9% in 1960 to 61.0% in 2010. Economic explanations for this increase have centered on the rising relative wages of women, the availability of effective contraception, and the changing structure of labor demand. Non-economic explanations have relied on what economists term changes in tastes or what sociologists call "norms".

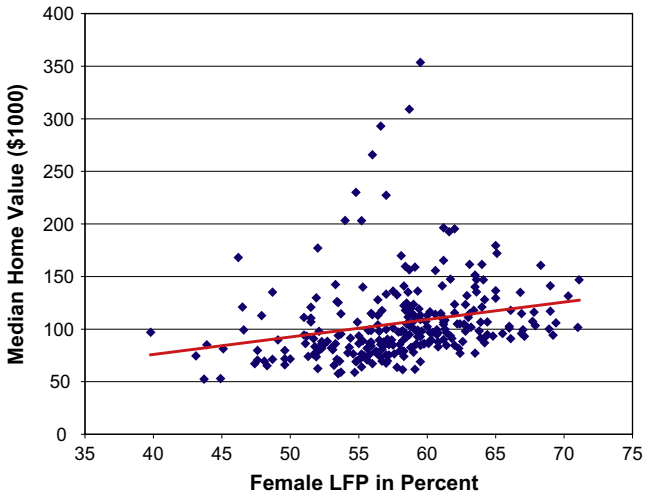

Fig. 1. Median home value and married women's labor force participation across us metro areas: 2000 Census.

The second time-series observation is the rising relative price of housing in the United States. Although the housing market is cyclic and localized, quality-adjusted house prices nationally have risen on average faster than overall inflation over the past 35 years despite the recent sharp decline in house prices. From 1975 to 2010, an index of house prices, based on repeat purchases of the same house, has risen 72.6% relative to the GDP deflator and 40% relative to the CPI.[3]

Cross-section evidence also points to a possible relation between house prices and women working. Housing markets and labor markets in the US are usually identified by metropolitan areas. House prices vary widely by metro area, with the highest prices in California, New York and New England. Less well known is the fact that LFPMW varies substantially across metro areas with the highest rates in the upper Midwest.[4] The cross metro area relationship between LFPMW and housing prices is significantly positive. In Fig. 1, each additional percentage point of LFPMW in 2000 Census data is associated with $2000 extra in median house prices across metropolitan areas. So, the crude cross-section data agree with the time-series evidence.[5]

Empirical associations between house prices and LFPMW would not be worth pursuing were there not a plausible theory linking the two. In this case, there are at least *two* theories. First, it is argued that higher housing prices are the *cause* of LFPMW. For example, a recent popular book entitled The Two Income Trap Elizabeth Warren and Amelia Tyagi argue that housing has become so expensive that married women must work (in the paid labor force) to maintain the standard of living that households achieved in the 1950s with only one earner. This is essentially an

[1] This paper focuses on two adult households with some attachment to the labor market. Married-couple family households are only 48% of all households and 35.9% of those have at least one person 60 years of age or above, so a majority of housing units in the US are not occupied by the type of household that is the focus of this paper.

[2] The role of commuting time in explaining cross metro area differences in women's labor force participation is highlighted in the work of Black et al. (2014).

[3] The time period is from the first quarter of 1975 to the first quarter of 2010. See US Housing Finance Agency, http://www.fhfa.gov/webfiles/15762/1q10hpi_reg.txt. Much of this increase occurred in the northeastern and western regions of the country.

[4] Black, Kolesnikova, and Taylor (2014) highlight the variation in married women's labor force participation across metro areas and conclude that commuting costs drive some of the variation. They find no correlation between LFPMW with housing cost differences but their analysis uses only 50 large MSAs. The analysis here uses over 200 MSAs. When I restrict my estimates to Black et al's smaller sample of metro areas, I, too, find no correlation between housing cost and LFPMW.

[5] Median house value conflates the price per unit of housing and the quantity of housing. The statistical analyses below use only pure housing price indices. The cross-metro correlation between LFPMW and each of two house price indices is positive. Simple regressions of price indices on LFPMW show significantly positive coefficients implying that an extra percentage point of LFPMW raises house prices by roughly .03 standard deviations.