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Housing Costs and Family Formation: Empirical Evidence

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Abstract

What institutional configurations influence fertility patterns across countries? While analyses of work-family policy dominate the literature, this article highlights the importance of housing costs and housing policy in shaping family formation decisions. Housing costs, determined by state and market factors, directly compete with spending on children, prompting tradeoffs between the two. Housing further influences fertility by shaping transition decisions into parenthood, which in turn alter fertility behavior. This article provides the logic and empirical evidence linking housing to fertility both directly and indirectly. Direct links are examined through a Poisson regression model. Indirect links are tested through sets of bivariate statistics. Austria, Germany, France, and Italy serve as the primary test cases, with reference to other rich OECD countries. The findings suggest that the literature suffers from omitted variable bias: to understand fertility patterns we must broaden our coverage of institutional variables to include housing.

Keywords: housing costs; housing policy; fertility rate; family formation; OECD

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Introduction

The global housing crisis has received sustained attention in both the popular and scholarly communities over the last several years, and for good reason. Lending practices prompted many people to buy, and to buy too much. Huge portions of personal equity were devoured by the housing crisis, triggering a broader financial collapse. But a more subtle crisis, highlighted by the bursting of the housing bubble, is brewing. The spheres of modern society: state, family, and market are now so deeply connected that problems in one sphere reverberate across the others. Social scientists have spent a good deal of time and energy identifying links between the spheres, and today we know much about the relationship between the state, the family, and the market through a number of rich literatures (e.g. welfare state regimes à la Esping-Andersen (1990), or the Varieties of Capitalism literature via Hall and Soskice (2001)). This paper contributes to the literature by exploring a relationship linking all three spheres: the way in which housing influences fertility. We know little about the paths which connect housing configurations, determined partly by the market and partly by the state, to household behavior.

Family size is important to both families and governments. In that vein, there can be two types of "ideal" fertility – the fertility rate that is ideal for governments hoping to balance governmental budget sheets while trying to meet the basic needs and desires of the citizenry, and the number of children that is ideal for families looking to balance personal budget sheets while trying to achieve their desired family size. Today, there is a mismatch between actual and ideal fertility at both levels.[1] The former is a policy concern, and both are a concern of democratic obligations and social equality.

When fertility rates are sub-replacement – below a rate of 2.1 – future generations are smaller than current generations. This scenario prompts a number of sustainability concerns for governments with mature welfare states. Under a pay-as-you go pension system, current and future workers will be faced with heavier burdens to fund pension obligations. In the short term, this can be offset with increases in the retirement age, cuts to pension benefits, or an inflow of young immigrant workers (Blake and Mayhew 2006). Rarely, however, are these options politically popular or viable. From a longer

perspective, sub-replacement fertility is even more concerning, especially "lowest-low" fertility, where the fertility rate is at or below 1.3 (Kohler et al. 2002). Peter McDonald has recently calculated that in 100 years, the population of Italy will be just 14% of what it was in 1995 if fertility levels remain constant. Other countries are not much better. Spain will be at 15% of its 1995 population, Germany 17%, and Greece 26%. Even the population of France, which has higher fertility rates than most European countries, will be reduced by half (McDonald 2006). Maintaining above-replacement fertility is a long-term strategy to the sustainability of the welfare state, but also to economies and societies more generally.

Sub-replacement fertility also prompts the question of whether governments are meeting the needs and desires of their citizens when it comes to parenthood. Citizens living in countries with a preference for larger families have higher fertility rates. But, families do not reach desired fertility in any country, with actual fertility rates an average of 36% below desired fertility.[2] This gap between desired and observed fertility has widened over the last two decades (d'Addio and d'Ercole 2005).

Low fertility does not merely occur because families want fewer children. Across the board, in countries with higher fertility, families are *closer* to achieving their ideal fertility and in countries with low fertility, families are *further* from ideal levels. Take Italy and the United States. In 2000, the fertility rate in Italy was 1.2, but families on average preferred a fertility of 2.3. Italians barely made it half way to their fertility goals. In the United States, the fertility rate was 2.1, but families preferred a fertility rate of 2.7. Americans made it three quarters of the way to their fertility goals, but still fell short. Fertility preferences and outcomes are out of sync. Citizens are unable to achieve one of the most fundamental pleasures of adulthood – raising a family of the desired size. Democratic governments have a responsibility to meet citizens' needs; sub-ideal fertility is more than just a concern about welfare state sustainability, it is a concern about democratic obligations. Moreover, if the rate at which families achieve their fertility preferences varies by social or economic characteristics, there are broader concerns of equality of citizenship (Marshall 1950).

This paper examines whether housing configurations contribute to fertility levels in advanced industrialized democracies. In the first section of this paper, I offer a theoretical framework to understand the link between housing and fertility, and review the literature from which I draw this framework. The second and third sections outline the data and methods used to assess this framework, and provide empirical support for the relationship. The final section reaffirms the necessity to study the link between housing and fertility.

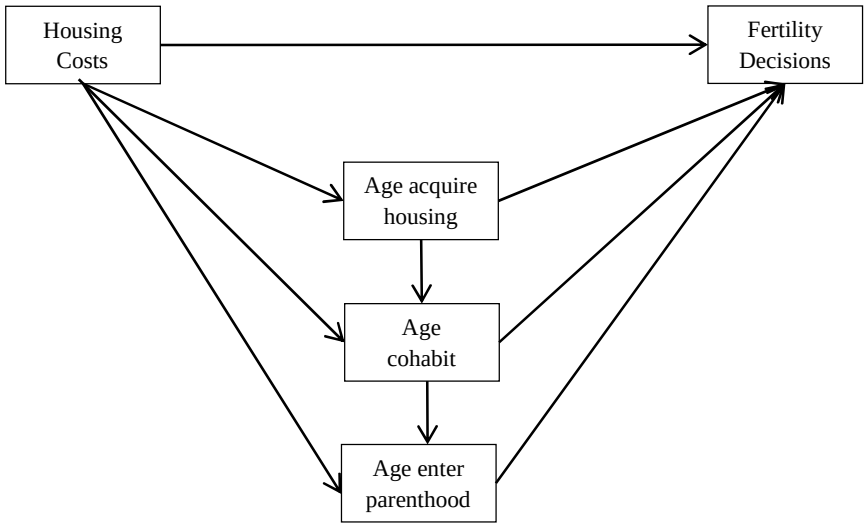
Literature Review

Research on fertility is often viewed through the lens of work-family balance. This may take the form of feminist theory, where women are on "birthstrike" because there is a mismatch between motherhood and employment, or a more purely institutional form, where the role of work-family reconciliation policy is assumed to be the most important policy determinant of family size (Adema and Whiteford 2007; Del Boca 2002; Gornick and Meyers 2003; Morgan and Zippel 2003; Hobson and Oláh 2006; Sleebos 2003). If the focus shifts to demographics, factors like education, employment, marriage, contraceptive use, and family size preferences are highlighted (Courgeau 2000; Kiernan 2002; Liefbroer 2009; Pinnelli et al. 2002; Rutstein 1998; Toulemon et al. 2008).

Scholars are right to consider the role of individual, policy, and institutional configurations, but the coverage must be broadened. To date, few have considered the role of housing in decisions regarding family size. Work-family scholars have shown us that the government is already in the business of influencing fertility, intentionally or not. Housing, as a key consideration to young adults making family formation decisions, is surely part of this story. Previous studies have argued that housing is more deeply connected to the welfare state and political behavior than the discipline has realized (Castles 1998; Kemeny 2001; Kemeny 2005; Schwartz and Seabrooke 2008; Schwartz 2012). Housing and children are arguably two of the most important – and expensive – components of adult life.

There are two sets of paths between housing costs and fertility outcomes: direct and indirect. Directly, housing and children serve as competing goods. Monetary considerations, which include housing costs in both the absolute terms (can families afford to have a child after acquiring housing) and marginal terms (can families afford the space required for an additional child), factor into fertility outcomes. Indirectly, housing costs influence the transition decisions of young adults, which in turn influence fertility. At any point during family formation and its continuation through the life course, there are a number of decision points. When, at a decision point, a family makes a tradeoff – postpones fertility to purchase a house or chooses not to have an additional child because they cannot afford an additional bedroom – aggregate fertility rates drop.[3] Figure 1 illustrates the two paths.

Figure 1. Housing Costs and Family Formation



Path 1: A Direct Tradeoff between Housing and Fertility

At least since the writings of Keynes, scholars have debated theories of consumption. All agree that income is an important factor in consumption decisions (Ando and Modigliani 1963; Friedman 1957; Keynes 1973). Consumption goods typically serve as competing goods – individuals only have a certain amount of resources (in this case money) to spend on consumption, and must choosing between various goods. It is common to consider both housing and children as forms of consumption (Becker 1965; Piazzesi et al. 2007).

As one of the biggest items on a family's budget sheet, housing costs directly affect how much disposable income individuals have for other consumption purposes. Children, like housing, are expensive—increasingly so over the last several decades. Additionally, children increase the amount of housing that individuals purchase (Simon and Tamura 2009). It is estimated that in the United States, housing accounts for the largest share of child-rearing expenses, hovering around 30% (Lino 2012). Expensive housing not only means a greater share of income will be spent on shelter, but also that a greater share of income will be spent on children. Housing prices can also affect fertility timing, and availability of living space can depress fertility (Curry and Scriven 1978; Dettling and Kearney 2011; Felson and Solaun 1975; Kulu et al. 2007). Housing and children should not only be considered competing consumption goods, but competing goods that are costly, heightening tradeoffs between the two.

Path 2: An Indirect Tradeoff between Housing and Fertility

Housing may be linked to fertility through an intermediate stage, where housing costs influence the transition decisions of young adults, which in turn affect fertility decisions. There are three types of decisions, where young adults must decide whether, when, and how often to engage in key decisions. Participation decisions include whether to find housing independent from parents, whether to cohabit/marry, and whether to have children. Timing decisions include when to leave the parental nest, when to cohabit/marry, and when to have children. Intensity decisions include how much housing to purchase and how many children to have. Housing costs may have a direct or indirect influence on each transition decision. Similarly, some transition decisions may directly influence fertility or influence decisions which in turn influence fertility. These possibilities are represented by the bottom set of arrows in Figure 1.

In 2001, when young Europeans (ages 15-24) responded to a Eurobarometer question on reasons why young people today tend to live longer in their parent's home, 67% responded that it is because they can't afford to move out, and 25% responded that there was not enough suitable housing, indicating that

housing costs and availability are important to young adults when making transition decisions. Across respondents in fourteen countries, the most cited were:

- Young people can't afford to move out (most cited first reason)
- There's not enough suitable housing available for young people (most cited second reason)
- They want all the home comforts without all the responsibilities (most cited third reason)
- Young people want to save up so they can make a good start later
- Young people get married or move in with their partner later than they used to

Individuals often delay marriage until they have moved from the parents' house, and having one's own home is key in for the transition into parenthood (Hobcraft and Kiernan 1995). Hobcraft (2002) emphasizes the importance of the structure of housing markets and the ease with which individuals have access to housing in explaining fertility patterns across countries. Dalla Zuanna (2001) finds that living with parents or extended family discourages both union formation and fertility.

Scholars have found that it is specifically the price of housing that is influential in leaving the parental nest. Simon and Tamura (2009) show that the price of living space in the United States, as measured by rent per room, is negatively related to both the time of marriage and the age at first birth. They also show that high rent prices directly affect fertility. Specifically, their model estimates a .16 reduction in fertility for every one percent increase in rent. Ermisch (1999) finds that higher house prices reduce the rate of departure from the parents' home, as well as increase the rate of return from individuals who previously left home. He also finds that higher incomes increase the departure rate from the parents' home, indicating that house-leaving decisions have a strong monetary component.

Even before costs are considered, housing stock must be available for young adults to either buy or rent. If housing stock levels are low, the age at which young adults leave the parental nest increases (Iacovou 2002). Moreover, available housing stock must meet certain space and location criteria. There are some housing configurations that are simply more conducive to raising a family. Single-family homes, for instance, afford families more space to grow and more privacy than do multi-unit apartments. The location of available housing is also important – young couples need their housing to be close to available jobs and easily accessible to childcare arrangements and educational services. In other words, at least two

legs of the childcare-job-home triangle need to be close to each other (Hayden 2002). Since women now comprise a sizeable portion of the workforce, the location of affordable housing is more important than ever.

A number of scholars have found a negative association between the age at first birth and completed fertility (Kohler et al. 2002; Morgan and Rindfuss 1999; Pinnelli et al. 2002).[4] For instance, it is estimated that up to 40% of the fertility decrease in Spain is explained by the increased age at which women are having their first child (Allen et al. 2004). Kohler et al. find that each year a woman delays the onset of motherhood will reduce her completed fertility between 2.9 and 5.1 percent. In most countries, there is a strong correlation between marriage and children (Iacovou 2002).[5] By delaying emancipation from the parents' home, individuals may be subsequently delaying marriage and childbirth.

There are a number of reasons to expect an interaction between housing costs and fertility. Scholars have begun to examine this link, however most analysis is limited to a small number of countries, often only encompassing one region of a country. Housing costs vary substantially across regions and across countries. This is in large part due to specific policy configurations. This variation in policy is reviewed before turning to an empirical analysis of housing and fertility.

Country-specific Housing Configurations

There are two broad categories of factors that affect the price of housing for families – supply side factors (interest rates, zoning/land use regulations, supply of housing stock, generosity of tax deductions, and sellers' incentives) and demand side factors (mortgage finance regulations, transaction costs, tax deductions, and rent controls). It is difficult to separate out state, market, and idiosyncratic effects, but governments have roles as regulators, insurers, and guarantors in the housing market, which in turn affect housing costs in both the mortgage and rental markets.

The configurations of the housing market can induce those looking for a home to either buy or rent. The structure of the mortgage finance market is an important factor in families' behaviors, and is a product of a number of governmental and market actions. Governments can provide a number of avenues

that lead to more enticing mortgages in the market sector. For instance, the Netherlands, the United Kingdom, and the United States provide flexible and interest only mortgage repayment structures, while these options are limited or unavailable in Italy, Portugal, and Spain (OECD 2004). Some countries provide greater assistance to first-time home buyers, including lower down payment requirements, and have longer mortgage terms, effectively lowering families' monthly payments. And some countries allow for the withdrawal of home equity, which can increase a household's financial resources at key times.

Muellbauer and Murphy (2008) show how house prices are driven by several fundamental variables, many of which depend on government policy, such as mortgage rates and taxes on buying a home, and taxes on developers. For instance, take the case of two countries, both with similarly high house prices, but one with a liberal credit market and one with an illiberal credit market. High house prices in an illiberal credit market will lead to a reduction in consumer spending (and thus potentially a reduction in the share of spending for children), as compared to similar house prices in a liberal credit market. This is because in an illiberal credit market, those purchasing a home will have to save more for a down payment; those purchasing a home in a country with a liberal credit market do not.

Transaction costs also affect the total cost of acquiring a home. VAT, stamp duties, registration taxes, and other taxes such as inheritance taxes vary widely by country, and can range anywhere from two percent of the total cost of a house to almost twenty (Muellbauer and Murphy 2008). Not only can this lower the amount of housing that families can afford to purchase, but it can lower housing mobility and lower housing supply, as potential sellers remain in their current home. On the other end of the spectrum, tax deductions on mortgage interest can lower total housing costs, encourage housing purchases, and increase housing consumption. Mortgage terms, transaction costs, and tax deductions affect the cost of housing. These factors can help put home ownership within reach of young families, or price it out of their reach (Chiuri and Jappelli 2003).

The rental market in a country is also important in the overall costs of housing, especially in countries where home ownership is not a realistic option for young families. The rental market, in its

private, social, and co-operative forms varies substantially across countries and across time. Costs in the private rental market are partly determined by supply and demand, but the private rental sector is also regulated by the government. Rent increases are often regulated, even if the liberalization of the rental market has led to the dismantling of many rent control regulations (e.g. the Netherlands). Theoretically, rent controls are meant to benefit tenants. Common forms of rent controls limit the amount that landlords can increase rents and make evictions difficult (tenancy rent controls); other forms actually determine a maximum rental amount that landlords can exact from their tenants (maximum rent systems). While rent controls may lower the cost of housing in theory, they may actually raise rents in practice, or lower the supply of the rental units, as fewer landlords enter the rental market (Basu and Emerson 2000). The private rental sector can also be tied to the social rental sector, as in Sweden, where bargaining between tenants and landlords in the social sector influences private rents. Governments have roles in rent setting, rent adjustment, and rent protection within the private market (Van Der Heijden and Boelhouwer 1996). All of these institutional factors influence cost.

There are a number of supply side variables that influence the demand and supply of affordable housing as well. Interest rates do not merely alter the cost of mortgages, they also alter costs for housing developers, and thus individuals in the rental and mortgage markets. Similarly, tax deductions can encourage buyers by lowering the cost of housing, and landlords by increasing earning potential on rental investments. All of the factors that encourage buyers should be expected to increase supply, as housing turnover will be greater if sellers are willing to sell (and hence become buyers again).

Zoning and land use regulations can shape the supply of to-buy and to-let housing in a number of ways. Land use planning can help create the optimal housing density in and around cities, contributing to optimal labor market dynamics. Yet strict regulations can increase construction costs, increasing the price of housing, or lowering the supply of housing if the regulations are prohibitively expensive. Housing regulations can also affect the quality of housing, contributing to whether housing is suitable for family formation. For instance, in some countries such as Italy, where little to no building regulation existed for

much of the country's recent history, older housing stock is of a lower quality, and often undesirable to families (Allen et al. 2004).

Research in spatial economics has shown that the size and location of cities impacts employment and wages (Leunig and Overman 2008). If housing is in the wrong place, or a suboptimal density, employment and wages suffer. The location and density of housing, while determined by a number of things, largely hinges on a government's land-use planning system. In Southern European countries, with the exception of Spain, there is very little land-use planning or zoning regulations, and today there is a mismatch between the location of available housing and job availability (Allen et al. 2004). This too contributes to fertility, as it influences the spending power of families.

Data and Methods

There is a growing body literature indicating a link between housing to fertility. To explore whether a direct link exists between housing costs and fertility, Poisson regressions are calculated using data from four countries: Austria, France, Germany, and Italy. The models suggest that housing is important in each country. In France, Italy, and Austria, housing costs are important. In Germany and Austria, housing tenure (owning versus renting) is important. Indirect links are explored through a set of bivariate relationships. Data is provided for 18 OECD countries often used in welfare state research: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, and the United States. The indirect relationship is verified, though more strongly in some countries than others.

Data in the regression models come from four different survey instruments, and have been harmonized into the Luxembourg Income Study Database maintained by the LIS Cross-National Data Center. The European Union Statistics on Income and Living Conditions (EU-SILC) instrument is used for Austria, the German Socio-Economic Panel for Germany, the Household Budget Survey for France, and the Survey of Household Income and Wealth for Italy. The reference period for each survey is the

2004 calendar year, except for France where the reference period is at time of interview, which spans from March 2005 to February 2006. Austria, France, Germany, and Italy were chosen for data quality reasons. In each country, housing cost data are relatively complete, providing information on both the owner and rental markets. The data is largely comparable across the four countries. While these countries do not represent the spectrum of welfare state regimes, there is still variation across key variables. Data from before the housing crisis was chosen to avoid adding confounding factors into the analysis.

For the quantitative models, the dependent variable is the number of children living in the household.[6] Included in the sample are women aged 19-45 who live in noncomplex households – households with one or two adults (head and possibly spouse) but not more. This helps to ensure that any children in the household belong to the parent(s).[7] Data on the primary variable of interest, housing costs, are available for both owners and renters, and are measured as the percent of household income spent on housing. In the chosen countries, the data include actual rent paid for tenants and imputed rent for owners. Imputed rent may have been collected directly from the respondent or imputed by the data provider.[8] Spending on utilities is included for each country but Italy. Primary residencies are always included in the calculation; however in France second residences are included as well. Other household level-variables include a dichotomous variable for housing tenure type, total household income net taxes and transfers, and an interaction between income and housing costs. Income is bottom coded at zero (to avoid negative incomes) and top coded at ten times the median of household income (to account for families with exceptionally large incomes). Individual-level variables include employment status, education, marital status (which includes both legal and consensual unions), age, and age squared. Table 1 lists descriptive statistics for each country.

Table 1. Variable Averages

	Austria	France	Germany	Italy
Number of Children	1.46	1.45	1.24	1.40
Housing costs (Percent of income spent on housing)	29.60	30.74	22.6	27.25
Household income (net taxes and transfers, in ten thousands)	3.69	3.39	3.68	2.73
Ownership status (owned=1)	.57	.54	.42	.67
Employment Status (employed=1)	.68	.74	.69	.61
Marital status (married=1)	.72	.57	.61	.85
Education (low=1/ medium=2/high=3)	2.01	2.20	2.14	1.68
Age	35.5	34.33	35.5	37.5

Source: Luxembourg Income Study (LIS) Database

When available, data from additional countries are used to consider the indirect relationship between housing costs and transition decisions, between transition decisions themselves, and between transition decisions and fertility. To capture individual housing costs, the absolute amount of income spent on housing at the household level is used. To capture the affordability of the housing market generally, average spending on housing is calculated at the regional level.

The cross-sectional nature of the data makes it difficult to measure the age at which transition decisions are made. To proxy these measures, the probability of various transition scenarios are examined. For instance, the probability an adult child (over 18) is living with their parents is used to proxy when young adults acquire housing. Partnership status is used rather than marital status because it has a broader definition, including those who live together without being joined in a legal or consensual union. Fertility outcomes are measured as the average number of children women have by age.

Results

This section empirically examines the direct and indirect links between housing and fertility. As two of the most expensive forms of consumption, housing and children should serve as competing goods. Housing may also indirectly influence fertility through transition decisions. Evidence is provided to support the existence of both sets of links.

Table 2 provides the results of country-level Poisson regressions. The dependent variable, fertility, is measured as the number of children living in a household. Both individual and family-level determinants are included in the model.

Table 2. Determinants of Fertility

	France	Italy	Austria	Germany
Intercept	-6.473***	-3.818***	-5.781***	-7.601***
	(.488)	(.845)	(.754)	(.580)
Housing costs	-0.010***	-0.004***	-0.004*	0.002
	(.002)	(.002)	(.002)	(.002)
Household income	-0.002	0.003	0.004	0.019**
	(.011)	(.014)	(.014)	(.008)
Housing costs*income	0.004***	0.000	0.002***	0.000
	(.001)	(.001)	(.001)	(.000)
Ownership status	0.053	0.057	0.170***	0.171***
	(.033)	(.047)	(.052)	(.034)
Employment Status	-0.311***	-0.312***	-0.364***	-0.410***
	(.032)	(.046)	(.044)	(.031)
Marital status	0.458***	0.753***	0.469***	0.531***
	(.036)	(.087)	(.061)	(.042)
Education	-0.239***	-0.153***	-0.097***	-0.163***
	(.021)	(.034)	(.035)	(.024)
Age	0.393***	0.184***	0.328***	0.399***
	(.028)	(.047)	(.043)	(.032)
Age^2	-0.005***	-0.002***	-0.004***	-0.005***
	(.000)	(.001)	(.001)	(.000)
N	3560	1767	1654	3724

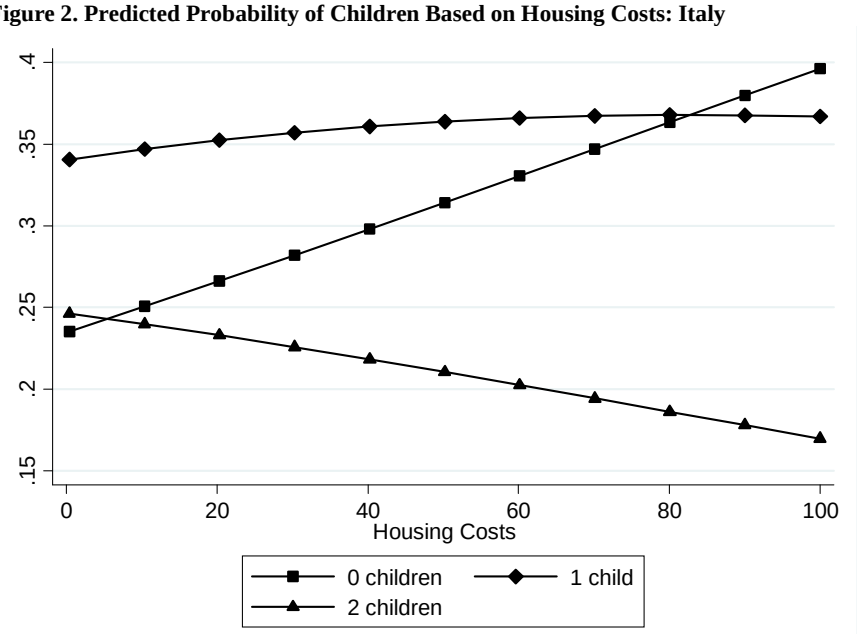
*p<.1; ** p<.05; *** p<.01; Standard errors in parentheses.
Source: LIS Database

The model verifies what has been found in the work-family literature. In all four countries, working women have fewer children. Holding all other variables at their mean values, employment is predicted to increase the probability of being childless by 10-14 percentage points, depending on the country. For instance, employed women in Germany have a 40% probability of being childless, where those not employed have a 26% probability. The model also verifies the findings of many sociologists – marriage is associated with more children, and increased education with fewer. As expected, fertility increases with age to a point, and then begins to decline. The decline is an artifact of how fertility is measured in the LIS database.[9] Demographers have found mixed evidence on whether income increases or decreases fertility. In the models, income is related to fertility in Germany only.

While employment and socio-economic variables are common in models of work-family balance and fertility, housing variables are almost always neglected. The models here indicate that previous research suffers from omitted variable bias. Two aspects of housing configurations are depicted in the model. Each is significant for a different set of countries. Housing costs are important in France, Italy, and Austria. Housing tenure is important in Austria and Germany.

In France, Italy, and Austria, those families who spend higher portions of their income on housing have fewer children, holding all other variables constant.[10] In the case of France, the expected number of children decreases by one percent for every additional percent of income spent on housing. In Austria and Italy, an additional percent of income spent on housing decreases the expected number of children by approximately one-half of a percent. In Italy, the effect of housing costs on fertility is constant across income levels. In France and Austria, the interaction between housing costs and income is significant. Housing costs have less of an effect on fertility in households with higher incomes. This could be because the absolute amount of income available to raise children is higher, and thus the share of income spent on housing matters less. To better interpret the effects of housing on fertility, predicted probabilities can be calculated. Figure 2 shows how the probability of having children varies in Italy as spending on housing changes.

Figure 2. Predicted Probability of Children Based on Housing Costs: Italy



Source: LIS Database

The x-axis indicates the percent of income spent on housing, the y-axis the predicted probability that a woman has zero, one, or two children. The graph indicates that housing costs and number children co-vary. High housing costs increase the probability that a household will be childless. Housing costs do

not seem to influence households with one child. However higher housing costs correspond to a lower probability of having two children. The predicted probabilities are similar for Austria and France, but not Germany (where the relationship is the opposite).

In Austria and Germany, housing tenure is an important variable; owners have more children than renters. Table 3 lists the predicted probabilities of each scenario by number of children. The probabilities are based on an employed, married woman with a medium education level. All continuous level variables are held at their mean.

Table 3. Predicted Probability of Children Based on Ownership Status

		0	**1**	**2**	**3**
Austria	Rent	.30	.36	.22	.09
	Own	.24	.34	.25	.12
Germany	Rent	.35	.37	.19	.07
	Own	.28	.36	.23	.09

Source: LIS Database

Owners are less likely to be childless or have a single child, and more likely to have two or three children. This trend exists for comparisons of owners to renters for larger family sizes as well. At any particular family size, the difference between owners and renters may seem small, but as a whole, the effect is large. Holding all other variables constant, owning a home increases the expected number of children by nearly 20% (18.5% in Austria and 18.7% in Germany).

In three of four countries, the empirical model points to the existence of a direct link between housing costs and fertility decisions. The explanation is logical – housing costs and children serve as competing goods. When housing is expensive, families may postpone children (potentially leading to fewer births) or purposely have fewer children. In two of four countries, owning a home is associated with larger families. Owning may coincide with increased space, more stable living arrangements, and other factors conducive to larger families.

Do housing costs also influence fertility indirectly? I find support for the claim that there is an order through which young adults transition from the original nuclear family to one of their own: cohabitation typically occurs before children, and exit from the parental home before cohabitation.

Delays in these transitions lower completed fertility. Housing costs influence timing decisions, and thus fertility. Several measures, identified in Table 4, are used to show that leaving the parental home, partnership, and parenthood often happen in a particular order.

Table 4. Leaving Home, Partnership, and Parenthood

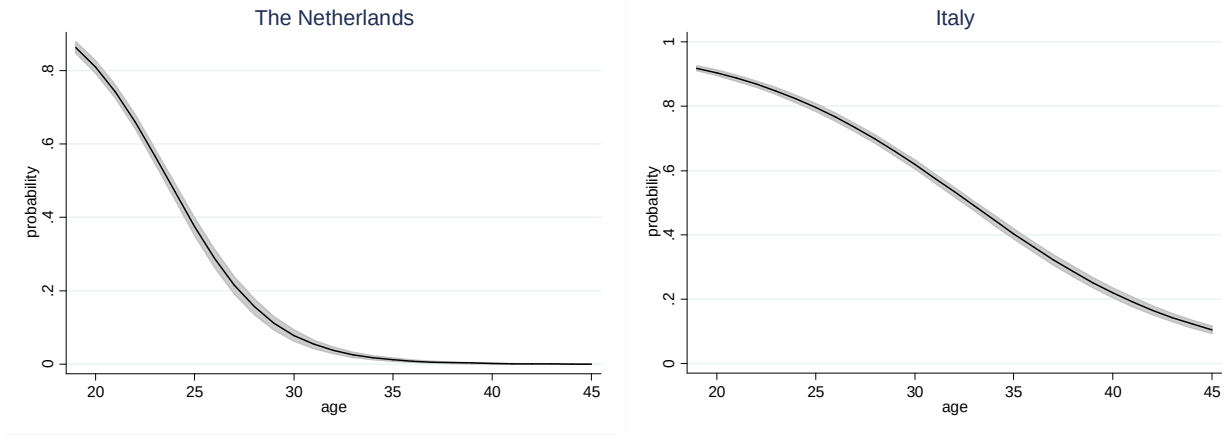
	Average age acquire housing	Average age partnered	Correlation: Housing and partnership	Correlation: Age parent and fertility	Probability a parent: In parental nest	Probability a parent: Not in parental nest
Austria	23.2	26.2	0.39	-0.26	no relationship	
Belgium	24.8	24.0	0.61	-0.18	--	--
Canada	22.2	24.9	0.43	-0.24	--	--
Denmark	20.8	25.9	0.28	-0.24	--	--
Finland	20.8	23.8	0.38	-0.28	8.3%	56.4%
France	23.8	24.3	0.56	-0.29	40.6%	62.7%
Germany	22.2	26.5	0.43	-0.18	--	--
Greece	28.8	30.1	0.76	-0.21	32.4%	64.6%
Ireland	25.7	30.4	0.65	-0.35	21.7%	63.3%
Italy	30.8	32.3	0.74	-0.35	13.0%	55.1%
Luxembourg	25.4	25.2	0.63	-0.25	87.1%	59.0%
Netherlands	22.8	24.6	0.43	-0.23	--	--
Norway	19.1	--	--	-0.26	--	--
Spain	28.8	29.2	0.82	-0.29	no relationship	
Sweden	20.8	25.2	0.29	-0.30	--	--
Switzerland	23.7	25.3	0.50	-0.24	--	--
UK	22.6	25.3	0.48	-0.23	no relationship	
US	21.6	25.2	0.40	-0.26	35.9%	69.8%

Notes: All correlations and probabilities are significant at $p<.01$, with the exceptions of France, Ireland, and Luxembourg, where $p<.05$ for columns 5-6. Probabilities are calculated from logistic regressions, with those aged 25 to 30 included in the sample. Parenthood status is the dependent variable, and living arrangements the independent variable.
Source: LIS Database

The first set of columns in the table compare acquiring independent housing to rates of partnership. Across countries, there is a correlation between the age at which 50% of an age group acquires independent housing and the age at which 50% of that age group is partnered (columns one and two – the correlation is .80, and significant at $p< .01$).[11] Within countries (column three), there is a positive correlation between whether one has acquired independent housing and whether one is partnered. Individuals who have left the parental nest are more likely to be partnered in every country examined. Very few adult children who live with their parents are partnered. Southern European countries have the

strongest relationship between partnership and leaving the parental home. Since there is evidence at both the micro and macro levels that acquiring housing independent from parents predates partnership, the rates at which young adults leave home is important. Figure 3 contrasts two types of home-leaving patterns.

Figure 3. Probability of Adult Children Living with Parents, aged 19-45



Notes: Probabilities calculated from a logistic regression model. Shaded area represents 95% confidence interval.
Source: LIS Database

In the Netherlands, the likelihood that an adult child is living with their parents decreases substantially as soon as children reach adulthood. In Italy, at any given age, the probability is higher that adult children will live with their parents. Home-leaving patterns like that of the Netherlands are more likely to lead to earlier partnering. Importantly (and verifying previous research), parenthood is typically contingent on partnership. There is nearly a 50 percentage point difference between the probabilities of being a parent if partnered versus if not partnered. And, across all countries, the younger an individual is when they become a parent, the more likely they are to have larger family sizes, as noted in the fourth column of Table 4.

Acquiring independent housing is also associated with parenthood. Columns five and six in Table 4 list the probability that an adult aged 30 is a parent, based on whether they live with their own parents. For six of the ten countries where data is available, those who have acquired independent

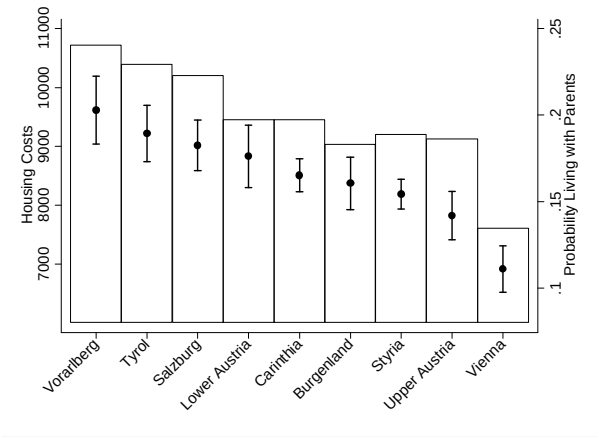
housing are more likely to be a parent than those who have not left the parental home (Finland, France, Greece, Ireland, Italy, and the United States). On average, there is nearly a forty point difference between parenthood status of those still in the parental home versus those who have acquired independent housing. However, there is substantial variation across countries. For instance, there is no relationship between leaving home and partnership in Austria, Spain, and the United Kingdom. In Luxembourg, the relationship is the opposite – those living with their parents are more likely to be parents themselves.

While there is variation across countries, there is evidence that acquiring housing is key to partnership and parenthood. Are housing costs prompting these transition decisions? Those countries used in the previous Poisson model are used in this analysis. In Austria, France, Germany, and Italy, when the housing costs of a household are low, adult children are less likely to live at home. As household housing costs rise, adult children are more likely to live at home. The clearest case is Austria. The probability an adult child lives at home ranges from 11% for households spending little on housing, to 19% for households spending large amounts. Perhaps young adults see their parents spending large amounts on housing and decide to avoid the costs of acquiring their own home. Or perhaps adult children make a decision to spread out the costs of housing by remaining in the parental home. Maybe those with expensive housing have more space so it is easier for adult children to live in the home. Regardless of the reason, transitions from the parental home are linked to household-level housing costs.

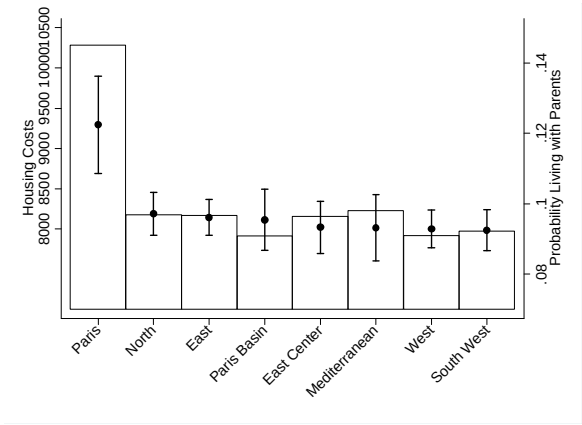
Regional housing costs reflect the market an individual will face if they decide to acquire housing independently from their parents. In two countries, Austria and France, leaving the parental home varies with regional housing costs, as demonstrated in Figure 4.

Figure 4. Regional Housing Costs and Leaving the Parental Home

Austria



France



Source: LIS Database

The first y-axis (on the left, associated with the bars) indicates average housing costs by region. The second y-axis (on the right) indicates the predicted probability (accompanied by its 95% confidence interval) that an adult in each region will live with their parents given average housing costs of that region. Some confidence intervals overlap, meaning that the difference in point estimates is not statistically meaningful. The trend, however, is clear. In Austria, regions with higher housing costs have more adult children in the parental home. Regions in the west are associated with higher housing costs. In France, Paris drives the relationship. Housing costs are much higher there, as is the percentage of adults living with their parents. Outside of Paris, housing costs and living arrangements are roughly even across regions. This provides support for the relationship between housing costs and living with parents at a broad level (Paris vs. the rest of the country), but not across other regional classifications.

In Germany and Italy, region is a better predictor of leaving the parent's nest than housing costs. In the east of Germany and the south of Italy, living arrangements are more likely to be with the original nuclear family (despite on-average lower housing prices) whereas in the west of Germany and the north of Italy, adult children are less likely to live with their parents. The housing costs of a region do not help explain the percentage of adult children living at home in Germany, and in Italy, housing costs have a *negative* association with parental living arrangements. In other words, where housing costs are higher,

fewer adult children live at home – opposite than expected.[12] The link between housing costs and leaving the parental home is partially verified. The mixed country findings call for the addition of other countries before more definitive conclusions can be made.

Discussion

The primary purpose of this paper has been to empirically examine the possible links between housing configurations and fertility outcomes. Support is found for each of two cases. First, housing costs are directly related to fertility. Children and housing are competing goods, and when one or both are expensive, there is a tradeoff between the two. Second, housing costs are indirectly related to fertility through transition decisions of young adults. If housing is expensive enough to delay key transition decisions, fertility is also delayed, and sometimes lowered. However, housing does not matter in the same way in all countries. In some cases, housing tenure is the important variable.

The relationship between housing and fertility is increasingly important, especially given the recent volatility of the housing market. Financialization of the housing market brings many individuals into capital markets with an asset that is directly linked to family formation decisions. A dialogue is needed on how changes in the housing market influence fertility, and whether these changes will be short term—prompting changes in behavior with a "catch-up" effect later, or permanent—prompting changes in behavior that cannot be altered.

Countries cannot sustain continued low fertility. In the short- and medium-term, welfare state programs like pensions will continue to meet funding challenges. In the long-term, population shrinkage will have more far-reaching consequences, not just on the welfare state, but the viability of economies and societies more generally. New generations do not just fund government programs. They start new companies, develop new technologies, and bring creativity and new ideas to current practices. The risks of smaller generations should not be taken lightly.

In all countries, especially those with lowest-low fertility, families are much smaller than desired. Housing seems to constrain the number of children that families can achieve and prevents aggregate fertility from reaching a sustainable level. The financial collapse has brought greater regulation to the housing market, but governments should consider how their influence has the potential to raise or lower fertility. Policy-makers and scholars need to move beyond the obvious strategies to reconcile work and family to consider whether non-traditional strategies, such as subsidizing housing for the young, are viable approaches to countering declining fertility.

Notes

[1] In this paper, ideal fertility and desired fertility are used interchangeably.
[2] Author's calculations using data from OECD Indicator SF 2.2 and d'Addio and d'Ercole (2005). Ideal fertility can be measured in a number of different ways. The surveys used here vary across country, with some surveys measuring personal preferences (e.g. "What would be the ideal number of children you would like to have or would have liked to have?", and others measuring general preferences (e.g. "Generally speaking what you think is the ideal number of children for a family?") The OECD concludes that ideal number of children is artificially higher in countries where a general perspective is measured rather than a personal perspective (e.g. the United States). Demographers typically use more advanced measures of fertility preferences: see Coombs (1974).
[3] Fertility can be defined in a number of ways. Here, aggregate fertility refers to the total fertility rate, which is the hypothetical number that women in a given group (country, region, ethnic group, etc.) will have given the current number of births for a set of age brackets. Completed fertility is another common measure, and refers to the number of children a woman has borne at the end of her reproductive years. Most policy analysts use total fertility in their research.
[4] Using data on the United States, Morgan and Rindfuss find that the relationship between age at first birth and completed fertility has weakened over time. Most likely, this has something to do with the fact that, even though women in the U.S. are postponing their first pregnancy, their completed fertility rates have not decreased as much as in many European countries. This is, to use Kohler's term, "pure" postponement of fertility, because women make up for their late entry into parenthood by having the same number of children at a later age as they would have at an earlier age.
[5] This relationship is strongest in non-Nordic countries. However, for evidence that the relationship between marriage and children is not very strong today, see Kohler et al. (2002).
[6] It is important to note that the average number of children living in the household is not the same as total fertility rate. Notably, the sample has a lower number of children in the household than the fertility rate in France would suggest, and a higher number than the fertility rate would suggest in Italy. Since the purpose of the quantitative model is to explore whether a relationship exists, not to explain cross-country variation in fertility rates, this is not seen as problematic from a methodological standpoint.
[7] Single mothers are included in this design, but not single fathers.
[8] For instance, the EU-SILC questionnaire asks: "If you were a tenant of this dwelling how much would you pay monthly as a rent (at market price)?" DIW Berlin – the institution responsible for the German Socio-Economic Panel, on the other hand, uses a comprehensive set of variables to impute rent for owner-occupied dwellings.
[9] As women age they will reach their completed fertility with all children likely still living in the household, but at a point children will begin to leave the parental nest, hence a positive age coefficient and a negative age squared coefficient.
[10] In Germany, if the interaction term is removed from the model (which improves the goodness of fit), housing costs have a *positive* effect on fertility (significant at $p<.01$).
[11] The 50% benchmark follows Allen et al. (2004).
[12] Significant only at the .1 level. This finding partially holds across tenure types. Region is a predictor of living at home for renters and owners, but rental cost and mortgage payments are not significant factors.

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