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Fostering Household Formation: Evidence from a Spanish Rental Subsidy*

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Abstract

In Southern Europe youngsters leave their parental home significantly later than in Northern Europe and the United States. In this paper, we study the effect of a monthly cash subsidy on the probability that young adults live apart from parents and childbearing. The subsidy, introduced in Spain in 2008, is conditional on young adults renting accommodation, and it amounts to almost 20 percent of the average youngsters' wage. Our identification strategy exploits the subsidy eligibility age threshold to assess the causal impact of the cash transfer. Difference-in-Differences estimates show positive effects of the policy on the probability of living apart from parents, living with a romantic partner, and chidbearing for 22 year-olds compared to 21 year-olds. Results persist when the sample is expanded to include wider age ranges. The effect is larger among young adults earning lower incomes and living in high rental price areas. This is consistent with the hypothesis that youngsters delay household formation because the cost is too high relative to their income.

JEL Codes: J1, H2, I3

Keywords: Household formation, Fertility, Rental subsidy, Conditional cash transfer.

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1 Introduction

Over the past three decades Southern European countries have witnessed a sharp increase in the fraction of young people living with their parents. In 2010, almost 60 percent of young people in the 18-34 age bracket still lived in their parental homes in Italy, Spain, Portugal, and Greece, whilst that statistic is below 40 percent in France, the UK, and the Netherlands, and as low as 20 percent in Norway, Sweden, and Finland.[1] Late household formation is of primary concern for policy, because it may critically affect fertility rates, youth labour supply, and the sustainability of pay-as-you-go pension systems.

Economic literature finds that perceived youngsters' job insecurity (Becker et al., 2010), limited access to credit markets (Martins and Villanueva, 2006), high housing prices, low lifetime earnings (Giannelli and Monfardini, 2003) and economic recessions (Lee and Painter, 2013) play an important role in delaying youngsters' adult life. According to the 2007 Eurobarometer survey, lack of financial resources is the main reason for staying in their parental home. When asked the reason that young adults remain in their parental home longer than they used to, 44 percent of young Europeans reply they cannot afford to move out, and 28 percent think that there is not enough affordable housing available. In contrast, 16 percent believe that staying with their parents allows them to live more comfortably and with less responsibilities.

In this paper, we investigate the hypothesis that youngsters delay household formation because they cannot afford it. We study the impact of a conditional cash transfer contingent on young adults' renting accommodation. Economic theory suggests that, if young adults have positive tastes for independence, the combination of income and price effects of the policy would increase the proportion of young individuals living apart from parents, especially for youngsters at the lower tail of the income distribution and those who live in high rental price areas. On the contrary, if young individuals who are observed living with their parents actually prefer living with their parents, the conditional cash transfer would be a prize for those who prefer living outside the nest. The income effect of the policy may also encourage young people who live apart from their parents to engage in complementary activities, such as childbearing.

The policy under analysis has been implemented in Spain beginning in January 2008, in order to promote youngsters living apart from parents. The analysis of the Spanish policy is an interesting case because Spain shares similar living arrangements, housing market, and institutional traits with other Southern European countries. The policy, called Minimum Income for Household Formation ("Renta basica de emancipacion"), offers to young people in the age bracket 22-29 a monthly monetary subsidy of € 210 for a maximum period of four years, conditional on renting accommodation. The policy applies only after the individual turns 22 years old. Given that individuals cannot manipulate their age, the subsidy is "as if" randomly assigned to individuals around the age cutoff. Outcomes are estimated with a Difference-in-Differences (D-i-D) strategy, com-

[1] Source: Eurostat, EU-SILC.

paring outcomes for individuals younger and older than 22 years of age before and after the policy implementation. Our baseline specification focuses on 21-22 year-olds because the identifying assumption is more likely to hold for that group, i.e., 21 and 22 year-olds would have experienced similar evolution of their living arrangements in the absence of the policy. We also estimate the effect of the policy on samples including wider age ranges and results are arguably invariant.

Using data from the Spanish Labour Force survey and the Household Budget Survey, we find that the subsidy increases the probability of living apart from parents between 0.002-0.037 percentage points (95% confidence interval) for 22 years-old youngsters with respect to 21 ones in 2008. The subsidy has a stronger effect for young adults at the lower tail of the income distribution, and for those living in high rental price areas. This is consistent with the hypothesis that young adults with a positive taste for independence would form a household if they earned higher incomes or if they faced lower rental prices. While we cannot detect any significant effect of the policy on the marriage rate, it increases the probability of living with a romantic partner by 0.008-0.041 percentage points. The subsidy has a stronger effect for couples living in high rental price areas. Individuals already living apart from parents, who mostly benefit from the income effect of the policy, increase the probability of childbearing by 0.017-0.131 percentage points for 22 year-olds.

This paper makes a contribution to the burgeoning literature on heterogeneity in living arrangements in developed countries. A branch of this literature highlights the role of culture in shaping living arrangements. Giuliano (2007) argues that the liberal attitudes brought by the sexual revolution allowed young people in Southern European countries to obtain their sexual independence at home while still enjoying the benefits of living with their parents. Manacorda and Moretti (2006) focus on parental preferences for having children living at home, showing that if children have a preference for living on their own, some parents are willing to trade off their own consumption to bribe their children into staying at home. While recognizing the importance of preferences in shaping living arrangements, our paper abstracts from this source of heterogeneity, and focuses on changes in the budget constraint as a result of the policy.

Another branch of the literature focused on the importance of economic conditions, exploring the effects of youngsters' job insecurity, access to credit, housing prices, and economic recessions. Evidence on the role of job insecurity is mixed. Becker et al. (2010) analyze the relationship between household formation and job insecurity on a sample of European and Italian data, and find that coresident rates are positively related with youngsters' job insecurity and parental job security. Garcia-Ferreira and Villanueva (2007), using a legally-induced sharp increase in firing costs as an identification strategy, find that there is no causal relationship between youngsters' employment risk and living arrangements. With regard to housing costs, Martins and Villanueva (2009) document the negative causal relationship between the cost of credit and household formation. Martínez-Granado and Ruiz-Castillo (2002), using data on Spanish youth, find that the rental-equivalent values of housing services and housing prices are negatively correlated with the probability of living independently. Ermish (1999) adds to the analysis the option of returning to parental home, finding that tighter housing markets significantly retard leaving home and encourage returns to the parental home. Lee and Painter (2013) show that during recessions household formation falls by 1-9 percent. Our results confirm the importance of economic conditions by showing that a reduction in rental costs fosters the probability of living apart from parents.

The paper is organized as follows. Section 2 describes the institutional settings of the policy under analysis and its impact on young adults' living arrangements; Section 3 details the identification strategy, Section 4 outlines the results, Section 5 analyses the robustness of the results, and Section 6 concludes.

2 The Spanish rental subsidy

2.1 Institutional background

Announced in September 2007 and enacted since January 2008, the Minimum Income for Household Formation is a monetary subsidy introduced by the Spanish Ministry of Housing with the aim of fostering youngsters' household formation. The government expected to achieve this goal by helping young individuals to cope with rental expenses. The policy also aimed at promoting youngsters' economic independence and geographical mobility.

The subsidy pays € 210 monthly for a maximum period of four years. Eligibles may also benefit from an additional € 120 to pay the bank guarantee associated with the rental contract, and a one-time € 600 loan to pay the rent deposit in case they sign a new rental contract. To appreciate the magnitude of the subsidy, it can be useful to compare it with the average Spanish youngsters' monthly earnings. Average gross monthly earnings of young people in the 20-24 age brackets amount to € 1,100 in 2008.[2] The subsidy is therefore equivalent to almost 20 percent of the average gross salary of a young person. Moreover, young people who receive the subsidy devote on average 25 percent of their income to pay the rent, while they would devote 42 percent to pay the same amount in the absence of the subsidy. Finally, the subsidy is likely to make household formation affordable for many youngsters, as the maximum affordable rent for the average young household is € 560, while the average rent € 626. By July 2011, the subsidy was given to 35 percent of households headed by an individual between 22 and 29 years old.[3] The total cost of the program from January 2008 to December 2011 has been € 400 million (approximately, $ 523 million).

To be eligible for the subsidy, youngsters need to be in the 22 to 29 age bracket and have a rental contract. This includes individuals who had a rental contract before becoming eligible. Those who do not have a rental contract may request the subsidy conditional on providing the contract signed in three months

[2] Source: Spanish Wage Structure Survey, 2008.
[3] Source: Spanish Ministry of Housing.

time. Eligibles need to certify that they are employed, autonomous workers, grant holders, or receivers of a periodic social benefit (including unemployment benefit). The latter are also required to have worked for at least six months or provide evidence that the social benefit will last for at least six months. For all the eligibles, the gross source of yearly income must not exceed € 22,000, which approximately corresponds to a monthly net income of € 1,500. EU citizens and non-EU citizens with a permanent resident permit are eligible. If several individuals are sharing accommodation, each young adult entitled to the subsidy receives a share of the subsidy proportional to the number of people who sign the rental contract. Individuals who rent out from close family members are not eligible.

2.2 Theoretical framework

The rental subsidy is a conditional cash transfer contingent on renting accommodation. In the standard utility maximization problem, the consumer chooses the quantity of housing and other goods to consume subject to her budget constraint. The cash transfer implies a parallel shift upward of the budget constraint proportional to the amount of the cash transfer. For eligible individuals who live with their parents, the subsidy has both income and price effects that increase the likelihood of living apart from parents. For given preferences and income, the effect of the policy should be stronger in high rental price areas; while for given preferences and rental prices, the effect of the policy should be stronger for low income earners. For eligible individuals who would rent accommodation even in the absence of the policy, conditionality is not binding, and the policy is likely to have only a pure income effect, increasing activities complementary to living apart from parents.

We test the following hypotheses. First, we examine whether the policy increases the probability of living apart from parents among eligible individuals, relative to ineligible. The policy can foster living apart from parents along two dimensions, that we analyze as two separate outcomes. One occurs when young adults move away from parents, and the other when a romantic couple decides to cohabit.[4] Second, we examine whether the probability of living apart from parents increases more among eligible youngsters resident in high rental price areas than for those living in low price areas. Similarly, we test whether this probability increases more for young adults earning low income. Third, for the sample of individuals who live apart from parents, we analyze the income effect of the policy on the probability of childbearing, an activity that is complementary to living apart from parents. Finally, we estimate the effect of the policy on labour supply and geographical mobility, other two dimensions that the policy aimed at affecting.

[4] New households can be formed also when couples separate, or when unrelated individuals that previously shared a residence choose to live singly. While with the available data we cannot identify couple separation, we explore how the policy affects the probability of living singly in the empirical section.

Three remarks are in order. First, for simplicity, we assume the decision process is static. However, in an intertemporal dynamic setting, 21 year-olds may have an incentive to postpone household formation to the time they turn 22 and become eligible for the subsidy. Postponing would allow 21 year-olds to save money and afford to pay for a more expensive accommodation or to rent it without sharing with roommates once she becomes eligible. The policy design could provide an incentive to wait because eligible youngsters can benefit from € 120 to pay the bank guarantee associated with the rental contract, and a one-time € 600 loan to pay the rent deposit in case they sign a new rental contract. In Section 4 we investigate the extent to which 21 year-olds postpone their household formation decision. Second, our theoretical analysis describes a partial equilibrium. Nevertheless, the policy may induce an increase in rental prices (Susin 2002). In Section 5, we analyze the extent to which the policy affected rental prices. Finally, previous studies documented the role of preferences in shaping living arrangements (Giuliano 2007 and Manacorda and Moretti 2006). Our analysis of the differences in the effect of the policy by rental prices and income abstracts from differences across individuals' preferences, assuming that preferences and rental prices (income) are not systematically correlated.

3 Empirical strategy

3.1 Data

Our main dataset consists of the 2006-2009 waves of the Spanish Labour Force Survey (LFS), which surveys 65,000 households every quarter (approximately 180,000 people). The LFS sample is drawn in two stages. In the first stage, census areas are randomly selected and in the second stage inhabited family dwellings within the selected census areas are selected to be part of the LFS sample. Census areas stay in the sample until all potentially surveyed households are interviewed whilst inhabited family dwellings participate in the survey for six consecutive quarters. We use all quarters of the 2006-2009 samples and select four age ranges: 21-22, 20-23, 18-26 and 18-33 years old individuals. The 21-22 and 20-23 age ranges are closest to the age cutoff, the 18-26 is the widest age range for which all treated individuals are entitled to the subsidy for 4 years, while the 18-33 includes the whole 22-29 treated age range, and another eight age groups as control. The estimation sample varies from 28,185 to 413,703 individuals according to the chosen specification. The data contain detailed information on age, gender, country of origin, employment status, and household composition. We exploit the cross sectional version of the data because the panel version does not allow us to identify households, and therefore individuals living apart from parents, and the individual's age, which is grouped in intervals of five years. To partially account for the autocorrelated over time unobservable component we cluster residuals at regional level.

Living apart from parents is measured by a dummy equal to one if the individual lives out of her parental home and zero otherwise. Living with a romantic partner is defined with a dummy equal to one if the individual lives with her partner, and zero otherwise. Childbearing is defined only for individuals living apart from parents because those are the only ones who experience the income effect of the policy. It is a dummy equal to one if the individual has one or more children, and zero otherwise. For the controls, the classification of education in the LFS includes many educational levels, without clear ranking among them. For simplicity, we define three levels of education: the reference category includes all individuals with at most primary education, secondary education includes all individuals who studied any form of secondary education, and tertiary education includes individuals with any university degree.

We also use the Household Budget Survey (HBS), a yearly survey of about 24,000 households (60,000 individuals) run since 2006 with the main purpose of registering detailed information on individuals' expenditures. Again, we select four age ranges: 21-22, 20-23, 18-26 and 18-33 years old individuals. Due to the lower number of individuals in the HBS, we select all the 2006-2009 time periods in the estimations. The estimation sample varies from 1,728 to 18,077 individuals according to the chosen specification.

Beside expenditures, HBS also collects data on individuals' income. Some individuals report the exact amount of net monthly income, whilst others report an interval. The two variables are equally distributed. We combine them using information on interval when the exact amount is not available.[5] We exploit the information on individuals' income to assess the heterogeneous reaction to the policy of individuals with low and high income levels. In particular, we define as low income individuals those with income lower than the median. Given that non-employed individuals typically have no income, in this part of the analysis we select only employed individuals. From those, we exclude the few individuals earning more than € 1,500 (as they were ineligible for the rental subsidy) and those whose income is missing (approximately 20 percent of the sample of employed individuals).[6] The classification of education used in the HBS differs from that in the LFS. We define four educational levels: no primary education, completed primary education, any secondary education (including lower vocational education) and tertiary education (university and upper vocational education).

A potential threat to our strategy may arise because the sampling occurs at the household level in both LFS and HBS. Aparicio and Oppedisano (2014)

[5] To individuals who report only the interval, we assign the average income of those that report the exact amount within that interval.

[6] When comparing the distribution of the observed characteristics between the samples of individuals who declare their income and those who do not, we find that individuals who do not declare their income are on average more educated (26% of them have a university degree versus 15% of income-declaring individuals). **Moreover, their predicted wages from a standard Mincer equation including all covariates are also higher on average (843 versus 835 euros per month).** We also test the effect of the policy on the probability of living apart from parents on this subsample of individuals, finding a negative and imprecisely estimated effect. Hence, the inclusion of individuals with high income and low effect of the policy in the estimation sample would reinforce our hypothesis that the impact of the policy is higher for low income individuals.

show that siblings' decisions to leave parental home are negatively related. In the presence of siblings interactions, the subsidy may indirectly affect non-eligible individuals who have eligible siblings. In order to estimate the effect of the policy net of peer effects, we randomly select one individual in each household with two or more siblings in the relevant age groups. Moreover, as individuals living with parents are overrepresented among the youngest age groups, the strategy of selecting one individual per household makes age groups more comparable. The results remain highly invariant with respect to those including all individuals.[7]

Finally, we use the 2006-2009 waves of the Fotocasa survey, which collects information on yearly rental prices per square meter, by region. The computation of rental prices is based on more than 1,000,000 houses. Rental prices are computed using the methodology designed by IESE Business School. This methodology guarantees that the computation of average prices is done using a homogenous sample of dwellings.[8] We use the information on rental prices to analyze the heterogenous reaction to the policy of individuals living in high versus low rental price areas and to estimate possible general equilibrium effects of the policy on rental prices. We compute the country average rental price across the 17 Spanish regions before the policy implementation and define high rental price regions as those where rental prices are above the country average.

Table 1 shows summary statistics for each of the four age groups used in the estimation. The first panel of the table shows summary statistics of the Labour Force Survey; panel B those of the Household Budget Survey; and panel C Fotocasa statistics on rental prices. Differences in demographic and economic characteristics across the four samples are led by differences in the average age, which is 21.5, 21.5, 22.4 and 26.8 years old in the 21-22, 20-22, 18-26 and 18-33 year-olds sample respectively. The mean values of the outcomes increase with age. In LFS data, when passing from the 21-22 sample to the 18-33 sample, the proportion of individuals living apart from parents increases from 10 percent to 43 percent, the proportion of individuals living with a romantic partner increases from 6 percent to 34 percent and the proportion of individuals who live apart from parents and have children goes from 27 percent to 48 percent. The proportions of immigrants, high educated and employed individuals vary with the age of the sample as well. All these variables present similar values in the samples drawn from the HBS data. In line with the statistics for the employment rate, monthly net income also rises with average age, passing from € 835 to € 942. According to panel C, the average rental price per square meter is € 8.37. High rental price regions host between 27 and 30 percent of the sample, depending on the age range considered. Finally, the proportion of youngsters living in high versus low rental price areas stays stable across samples.

Table 2 shows summary statistics for the baseline estimation sample, including youngsters with 21 and 22 years old in 2007 and 2008. The summary statistics are shown separately for each of the four groups defined by the combination

[7] Results are available from the authors upon request.

[8] A description of the methodology can be found at http://www.fotocasa.es/Portals/49/Static/Tendencies/Metodologia.pdf.

of timing of the policy and age eligibility. The first column shows descriptive statistics for all observations, while the other columns refer to 21 year-olds in 2007, 22 year-olds in 2007, 21 year-olds in 2008 and 22 year-olds in 2008, respectively. Demographic and economic characteristics are relatively similar for 21 and 22 year-olds.[9] In LFS, 11 percent of individuals in the baseline specification live apart from parents, and 6 percent live with a romantic partner. Among individuals living apart from parents, 26 percent have at least a child. As expected, these figures are higher for 22 year-olds than for 21 year-olds in both years. In line with the results of the paper, these differences increase from 2007 to 2008. For controls, half of respondents are male. Roughly 6 percent are immigrants. 80 percent of the sample has secondary education and 12 percent have tertiary education. Almost half of the sample is employed. The education and employment status of 22 year-olds do not change significantly from 2007 and 2008, suggesting that our results are unlikely to be driven by the economic cycle. Descriptive statistics in panel B are similar to those in panel A. The average net monthly income amounts to € 835, and 72 percent of the sample earns less than the median income, which amounts to € 814. Not surprisingly, 22 year-olds earn slightly more than 21 year-olds in both years but differences are not statistically significant. Also changes in income from 2007 to 2008 are insignificant.

3.2 Identification strategy

To estimate the effect of the rental subsidy on the probability of living apart from parents we apply a D-i-D estimation strategy, exploiting the fact that individuals are entitled to the subsidy only after they turn 22 years old. The D-i-D strategy consists in comparing the change in outcomes after the introduction of the subsidy for eligible 22 years old individuals (the treatment group) and 21 years old non-eligible individuals (the comparison group). We extend the estimation of the D-i-D model to the 20-23, 18-26 and 18-33 age ranges as well. This estimation strategy accounts for time trends and age fixed effects in the probability of living apart from parents.

We exploit two sources of variation. One source of variation is determined by the year the youngster is interviewed. The young people interviewed in 2006 and 2007 did not benefit from the program, since the rental subsidy only came into force in January 2008. Only 22-29 years old individuals interviewed in 2008 and 2009 could be eligible. The other source of variation arises from age. Due to the eligibility criteria established by the law, individuals younger than 22 and older or equal to 30 were not entitled to the subsidy. Youngsters can receive the monthly subsidy for a maximum of four years, implying that 22-26 year-olds are exposed to the program for four years while individuals with ages between 27 and 29 enjoy the subsidy for a shorter period of time, i.e., the number of

[9] According to the Spanish Population Register, the size of the 21 year-olds and 22 year-olds groups stayed stable between 2007-2008. This constitutes additional evidence that composition effects are not affecting our estimates.

months until they turn 30. For this reason, our baseline specification compares 21 and 22 year-olds rather than 29 and 30 year-olds.

Our estimates provide a lower bound of the true effect of the policy. In fact, 22 year-olds are less likely to fulfill the requirements to be entitled to the subsidy than 30 year-olds. Moreover, non-eligibles 21 years-old youngsters, who are not financially constrained, may leave their parental home before becoming eligible anticipating that the following year they will be entitled to the subsidy.

Throughout the paper, we estimate intention to treat effects due to: (i) lack of information on whether each individual actually receives the subsidy and (ii) the potential endogeneity of actual treatment if there were unobserved differences between individuals receiving the subsidy and eligibles who do not receive the subsidy. However, in our estimation we use only one dimension of eligibility (namely, age) but there are others (employment status and income). In order to get a better approximation of the impact of the policy on eligible individuals we scale the estimated parameters in the spirit of Baker et al. (2010). In particular, we divide the estimated parameters by the probability of being eligible conditional on being 22 years of age. In the Appendix we derive this probability, which amounts to 0.571.

We define eligibility on the basis of the age threshold induced by the policy, without accounting for both the income threshold and the job history criteria. The income eligibility criterion requires individuals to earn a regular net monthly income lower than € 1,500. Our baseline strategy relies on the fact that age is not manipulable. Still, we need to rule out that individuals manipulate their income for the analysis of the impact of the policy by income level. The Spanish Labour Force Survey data do not provide information on individuals' income. We thereby use data from the Spanish HBS to rule out manipulation at the € 1,500 threshold. Figure 1 shows the histograms of the net monthly income of 22 year-olds in 2007 and 2008. The first observation is that the two distributions are very similar, and the 2008 distribution does not feature any jump on the left of the threshold as one would expect if manipulation had occurred. The second observation concerns the distribution itself: in 2008, less than 5 percent of the sample of 22 year-olds earned more than € 1,500 a month. In an unreported figure, we replicate the same exercise for the subsample of individuals who declare a precise income level. Also in this case, the 2008 distribution does not present any jump at the € 1,500 cutoff and features a very low number of individuals at the right of the cutoff. Consistently, the Kolmogorov-Smirnov test does not reject the hypothesis of equality of income distributions before and after the policy.

As regards job history, the law assesses that individuals who were employed for at least six months or who have just signed a working contract, whose length is at least six months, are eligible for the benefit. Omitting the employment status when defining eligibility does not constitute a threat to our identification strategy. First, because employment is not a necessary condition for receiving the subsidy: eligibles include grants holders and social benefits recipients. Second, because the requirement holds only when the individual applies for the subsidy. After that, lack of employment does not imply the benefit's withdrawal.

The main assumption behind the D-i-D strategy is that the trends of the average outcome of interest for treatment and control groups would have been parallel in the absence of the policy. In order to support this assumption, we show evidence that the trends were parallel before the policy was implemented. Figure 2 shows the trends of the average yearly proportion of individuals living apart from parents for treatment and control groups in the four age ranges (21-22, 20-23, 18-26 and 18-33), using the 2000-09 LFS data. The graph clearly illustrates parallel trends in living apart from parents between 21 and 22 year-olds before 2008, with the former featuring a lower probability of living apart from parents than 22 year-olds. In 2008, when the policy was introduced, the two lines diverge, consistently with the results of the paper. Trends appear parallel for the other samples as well, except for the 18-26 age group, for which they start diverging before the policy implementation. After 2008, trends seem to diverge for all groups, with the exception of the 18-33 year-olds sample.

There are two possible explanations for the declining trend in the probability of leaving parental home for 21 year-olds after 2008 (upper left panel of Figure 2). First, the economic recession, which hit the country in 2008, may have preempted non-eligible individuals from leaving their parental home. While in 2009 the likelihood of living apart from parents declined to the 2006 values for the control group, it continued to increase for the treatment group. Lee and Painter (2013), using US data, show that the probability of leaving home and becoming a renter is reduced by 3–9 percent during a recession and falls by 1-2 percent following an increase in the unemployment rate by 1 percent. In both cases, the impact is largest for individuals in the 21-24 age range. The observed pattern would also be consistent with the hypothesis that youngsters who have left their parental homes go back to their parental homes during recessions, as suggested by Ermisch (1999). A second potential explanation for the declining trend in the probability of leaving home for 21 year-olds in the post policy period is that they may postpone the decision to leave parental home until they become eligible and we discuss this possibility in Section 4.1.

To obtain an estimate of the change in household formation rates attributable to the subsidy from a D-i-D strategy, we implement a regression analysis of the following form:

$$Y_{ijt} = \alpha_j + \eta_t + \beta\alpha_j\eta_t + \delta X_i + \varepsilon_{itj} \tag{1}$$

where Y_{ijt} is the outcome of interest for individual i of age j, interviewed at time t, α_j is a dummy variable for age higher or equal to 22 and lower than 30, η_t is a dummy equal to one for individuals interviewed in 2008 and after, and zero otherwise. The coefficient β measures the intention to treat effect, i.e. the average effect of the subsidy for the population of eligibles. X_i controls for individuals' observable characteristics: age and year fixed effects, region of residence dummies, month and year of birth binary variables, a male dummy, an indicator for immigration status, and educational level dummies.[10] In addi-

[10] There is no perfect collinearity between year of birth and age because individuals are interviewed at any quarter, before or after their birthday.

tion, the regression includes quarter of interview dummies, which capture the "seasonality effect", i.e., any systematic differences in household formation rates implied by the calendar period of the year. According to the theoretical analysis in Section 2.2, the coefficient β must be positive if the subsidy induces eligible individuals to leave parental home.

We also assess whether the policy was more effective for youngsters at the lower tail of the income distribution. The following equation is estimated using data from the HBS, which provides information on individuals' monthly income:

$$Y_{ijtz} = \alpha_j + \eta_t + \beta\alpha_j\eta_t + \gamma WL + \theta\alpha_j\eta_t WL + \eta_t WL + \alpha_j WL + \delta X_i + \varepsilon_{itj} \quad (2)$$

where WL is a dummy equal to one if monthly income is less or equal to median income (€ 814 for the 21-22 year-olds sample), and zero otherwise. The parameter of interest is θ, which captures the effect of the interaction between the age dummy, the post-policy dummy and the dummy of lower than median income. The coefficient θ measures the different propensity to live apart from parents between eligibles earning less than the median income and eligibles earning more than the median income after the policy implementation. The theoretical analysis in Section 2.2 predicts that the coefficient corresponding to the lower level of income is positive.

To assess the differential impact of the policy according to rental price, we estimate the following equation:

$$Y_{ijtz} = \alpha_j + \eta_t + \beta\alpha_j\eta_t + \gamma H_z + \theta\alpha_j\eta_t H_z + \alpha_j H_z + \eta_t H_z + \delta X_i + \varepsilon_{itj} \quad (3)$$

where the subscript z indicates the region where the young adult lives. The dummy H_z is equal to one if the average price of a square meter of rental housing in the region of residence in 2007 is higher than the mean Spanish value. The parameter of interest is θ, which captures the effect of the interaction between the age dummy, the post-policy dummy and the dummy of high rental price in the region of residence. The coefficient θ measures the different propensity to live apart from parents between eligibles living in a high rental price area and eligibles living in a low rental price area after the policy implementation. According to the theoretical analysis, the policy is more effective for young adults living in high rental prices areas, and thus θ will be positive.

This strategy relies on the fact that the subsidy amounts to € 210, regardless the area of residence, which allows us to attribute the heterogeneous impact of the subsidy between high and low price areas to differences in housing affordability. The reliability of this strategy would be threatened if some eligible youngsters migrated to areas with lower rental price in order to benefit most from the subsidy. If migration towards lower rental price area drives up the rental price, the definition of high/low rental price area would be endogenously affected. To rule out this concern, we define high and low rental price areas on the basis of the region rental price in 2007, before the policy was implemented.

The basic idea behind the D-i-D identification strategy can be illustrated using a simple two-by-two table. Table 3 presents the change in the probabilities of living apart from parents, living with a romantic partner, and childbearing (conditional on living apart from parents) between 2007 and 2008 for 21 and 22 year-olds. The first column presents differences between 21 and 22 year-olds in 2007, the second column displays differences between 21 and 22 year-olds in 2008 and the third column shows the difference between the previous ones. Average outcomes dropped from 2007 to 2008 for 21 year-olds, whilst they increased for 22 year-olds. The simple unconditional differences indicate that subsidy eligibility increases the probability of living apart from parents by 1 percentage points, living with a romantic partner by 1.3 percentage points, and childbearing by 6 percentage points. These estimates are significant at the 15, 5 and 10 percent respectively.

4 Results

4.1 Probability of living apart from parents

Table 4 presents estimates of the coefficient associated with subsidy eligibility in Equation 1. The dependent variable is a dummy equal to one if the individual is living apart from parents, and zero otherwise. Panel A presents estimates for the 2007-2008 period and Panel B for the 2006-2009 period. In the first column we make use of the 21 and 22 age groups, in the second of the 20-23, in the third of the 18-26, and in the fourth of the 18-33. In what follows, we focus on the coefficients from our favourite specification (21-22 year-olds in 2007-2008) and compare them across different age ranges and time periods. Estimates from the D-i-D strategy show that the probability of living apart from parents increased significantly by 1.9 percentage points for 22 year-olds with respect to ineligible 21 year-old youngsters. Coefficients are fairly similar for all the other age ranges and for the 2006-2009 time periods. However, two of the coefficients in panel B, which include the 2006 and 2009 year samples, are not significant. A possible explanation relies on the economic downturn, which worsened in 2009, reducing further labour market opportunities for young adults. The coefficients for the 2007-08 sample are consistent with preliminary evidence of the unconditional means presented in Table 3, where the effect of the policy (one percentage point) was underestimated.

We analyze to which extent our baseline results are driven by 21 year-olds delaying the decision to leave parental home. We add a control variable equal to the number of months before turning 22 for young adults in their 21 years-old, and equal to zero for youngsters older than 22, and the interaction between this variable and the variable that identifies ineligibles in the post treatment period. If ineligible youngsters close to the 22 years old cut-off delayed the decision to leave parental home, then the coefficient of the interaction between the post-policy ineligible dummy and the number of months missing before turning 22 would be positive and significant. Estimates indicate that the coefficient of the interaction between the post-policy dummy and the number of months missing before turning 22 is negative, very close to zero and not significant, suggesting limited postponement.[11]

Figure 3 shows the estimated propensity to leave home for different age groups (20, 21 and 22 year-olds) with lines fitted separately for months before and after January 2008. Given that the cost of postponing is higher for 20 year-olds than for 21 year-olds, the comparison between 20 and 21 year-olds is useful to rule out postponement effects. Visually, it appears that 21 year-olds reduced their propensity to live apart from parents more than 20 year-olds, but they also increased it more sharply before 2008. It appears that the post-policy decline in the probability of living apart from parents offsets the pre-policy increase for 21 years-old as much as for 20, suggesting that the economic downturn may be the common shock to these trends. This interpretation would also be consistent with the fact that the effect of the policy is not significant in 2009, when the recession worsened.

If young adults postponed the decision to leave parental home to the time they turn eligible, they would save money to afford a more expensive accommodation or to live alone without sharing it with roommates. As an additional check on the postponement option, we check whether rental expenditures increase and whether young adults are more likely to live singly. We do not find any evidence that this is the case. In fact, as we discuss in the next section, there is some evidence for higher incentives to share accommodation.

Scaling the coefficients of the baseline specification by the probability of being eligible conditional on being 22 years of age, the D-i-D effect of the policy on the probability of living apart from parents is 3.3 percentage points. Relative to the baseline rate of youngsters living on their own (14.9 percent), this implies that the policy increases the probability of living apart from parents for entitled 22 year-olds by 22.1 percent in 2008. Positive and significant effects are also found with the other age groups. The coefficient for the 18-26 year-olds sample is the largest, probably because of the pre-existing trend. The reduction in the estimated coefficient for the 18-33 year-olds sample may respond to 27-29 being less intensively affected by the policy.

Overall, the estimated effects of economic conditions on living arrangements differ across studies. Garcia-Ferreira and Villanueva (2007) find inconclusive evidence on the link between job insecurity and the probability of leaving parental home. Switching from a fixed-term to a permanent job contract seems to have a positive effect on the probability of leaving parental home for 20-25 years old. The magnitude of the estimated effect is very similar to ours but their coefficient is non-significant. Martins and Villanueva (2009) find that a one percent decrease in the cost of a mortgage increases the probability of leaving the nest by 0.8-3.3 percent on a sample of 18-37 years old Portuguese. In our most comparable specification, we find that the rental subsidy increases the probability of living apart from parents by 0.7 percent in the 18-33 year-olds sample. When comparing the two effects, one should take into account that renters are

[11] Results are not reported but are available from the authors upon request.

27 percent of emancipated 18-33 year-olds. Hence, given that rentals are less frequent than acquisitions, we expect the average effect of the rental subsidy to be smaller than equivalent policies affecting acquisitions. Martinez-Granado and Ruiz-Castillo (2002) show that average housing prices and the proportion of renters significantly affect the probability that the young lives independently, with the associated coefficients being -0.4 and 2, respectively. This last figure indicates that, even if renting is not the prevalent option, it still plays an important role in the decision to leave parental home.

We now assess whether the policy was more effective for youngsters at the lower tail of the income distribution. We use data from the HBS survey, which provides information on individuals' monthly income. This strategy relies on the fact that the policy did not affect individuals' earnings. We test this assumption estimating the main equation with income as a dependent variable. The effect of the policy is not significantly different from zero in all specifications.

We define a dummy equal to one if the reported income is lower than the median value. We interact this dummy with the treatment variable. Table 5 presents the estimates of the treatment variable interacted with the lower than median income dummy using HBS data. The estimated interaction suggests that young adults earning lower incomes experience a marginally higher increase in the propensity to live apart from parents, consistently with the predictions derived in Section 2.2. The effect is significant in three specifications out of four, showing that the probability of living apart from parents increases by 8.4 percentage points for individuals who earn less than the median income in the baseline specification.[12]

In the third specification we test whether the effect of the policy is sharper for youngsters who live in high rental price regions than for those who live in low rental price ones. Table 6 shows the estimates of the treatment effect interacted with the dummy for living in a region with higher than the country average rental price. The interaction between the treatment dummy and the high rental price area is positive and statistically significant in seven out of eight specifications. The estimated effects indicate that eligibles 22 years-old experience a 2.3 percentage points higher probability of living apart from parents in high rental price regions compared to low rental price ones. This result is consistent with the theoretical predictions described in Section 2.2.[13]

Living arrangements across countries features a common pattern that consists in young women leaving parental home earlier than men. Policies that alleviate financial constraints may imply further bifurcation in the transition to adulthood if they affect women's living arrangements more than men's (Chiuri

[12] **Results are fairly consistent when we alternatively define the low income dummy using the 500 and 1000 euros per month rather than median income cutoffs.**

[13] If high rental price regions feature different employment dynamics than low rental price regions, the coefficient would capture different business cycles aside from differences in the impact of the policy. We test the hypothesis of differential trends in regional employment by estimating the same equation but substituting the dependent variable with a dummy equal to one if the individual is employed and equal to zero otherwise. The interaction of interest is not significantly different from zero in all specifications.

and Del Boca, 2010). We investigate whether this is the case in the policy under analysis by splitting the sample by gender. Women are 2-2.4 percentage points more likely than men to live apart from parents as a consequence of the subsidy, therefore confirming the intuition from Chiuri and Del Boca, 2010.

4.2 Living with a romantic partner, childbearing, and other outcomes

We study the impact of the policy on the probability of living with a romantic partner, and on the probability of childbearing of individuals already living apart from parents.[14]

Table 7 shows the estimates of the treatment effect on the probability of living with a romantic partner. Results in the first column indicate that the probability of living with a romantic partner increases by 2.4 percentage points.[15] Dividing the estimated coefficients by 0.571, we obtain the policy effect for eligible 22 years-old individuals. The impact of the policy on the probability of living with a romantic partner is 4.2 which translates into increases of 47.2 percent in the proportion of individuals who live with a romantic partner for entitled 22 year-olds when we scale the coefficient for the sample mean (8.9 percent). Differently from the probability of living apart from parents, the coefficients for this age group are statistically significant in the sample using individuals interviewed in 2006-2009. Given that sharing accommodation is cheaper than living singly, the economic crisis may have reduced the effect of the policy on the probability of living singly, while increasing its effect on the probability of sharing accommodation. Indeed, the probability of sharing accommodation increases in the 2006-09 sample with respect to the 2007-08, although the coefficient is not significant (t=1.43), providing additional evidence in favour of the hypothesis that the incentive to share house expenses increased when the recession hit deeper. The effect of the policy is positive and significant also for the other age groups (except 18-33 in the 2006-09 period), and consistently with baseline results, ranges between 1.1 and 2.4 percentage points.

We replicate the same exercise we did for the probability of living apart from parents, and estimate the effect of the policy for income levels below the median and higher than average rental prices. While in the first case there is no evidence that the effect of the policy is marginally higher for low income young adults, estimates in Table 8 show that the effect of the policy is stronger in high rental price areas and significant in seven out of eight specifications. The probability of living with a romantic partner increased by 2.9 percentage points with respect to low rental price areas in the baseline specification, consistently with the evidence presented in the previous Section.

[14] We do not find any effect of the policy on marriage rates.

[15] A possible explanation for the slightly higher impact of the policy on living with a romantic partner with respect to living apart from parents is the lower baseline level of the probability of living with a romantic partner. An alternative explanation is reshuffling: some individuals who were living apart from parents before the policy started living with a romantic partner after the policy.

As the theoretical analysis in Section 2.2 highlights, the policy is expected to have an income effect and hence, individuals living apart from parents are expected to engage more in costly activities on average. Given that childbearing is complementary to living apart from parents, we test the hypothesis that the policy has a positive impact on childbearing. As the income effect is only present for individuals living apart from parents, we restrict the analysis to the sample of individuals who have left their parental home. Table 9 shows the effect of the policy on the probability of having at least one child conditional on living apart from parents. The estimate in the first column and panel indicates that the policy significantly increases fertility by 7.4 percentage points for 22 years-old compared to 21 years-old. Again, scaling the coefficients to obtain an estimate of the policy effect, the policy impact is 13 percent. Relative to the sample mean (27.6 percent), this implies that the increase in fertility rates for eligible 22 years-old is 47 percent. This effect is corroborated by the positive and significant coefficients in the estimations with the 20-23 and 18-26 age ranges. The effect is not significant in the 18-33 year-olds sample. A possible explanation may rely on the fact that the effect of the policy on the probability of living with a romantic partner is the smallest for this age range.

The strong impact of the policy on childbearing may be the result of the combination of the rental subsidy with a universal child benefit, introduced in Spain in 2007. The child benefit is a one-time payment of € 2,500 to be paid to the mother immediately after birth. All mothers giving birth from July 1st, 2007 on were eligible to receive it. The effect of the rental subsidy, which made cohabitation with a romantic partner by renting accommodation cheaper, may have been strengthened by the child benefit, which reduced the cost of having a baby (Gonzalez, 2011). The concern that the effect we find is solely due to the child subsidy is limited by the eligibility rules: while all mothers, regardless their age, were eligible for the child benefit, only mothers older than 22 and younger than 30 could apply for the rental subsidy.

The policy may have additional consequences on labour supply and geographical mobility. However, we do not find any significant impact of the policy on employment, hours worked, or mobility. The lack of significant effects on employment and hours worked can be explained by a combination of the economic crisis and the rigidities of the Spanish labour market. While the economic downturn may have reduced opportunities to find a job (extensive margin), the rigidities of the Spanish labour market have limited the possibility to adjust number of hours worked (intensive margin). Our analysis does not detect any significant change in labour search intensity either, which could be a consequence of the economic recession if the number of discouraged workers increases. Similarly, we do not detect any significant effect of the policy on geographical mobility.

The policy may have ambiguous effects on rental expenditures. It may reduce rental expenditures, if it relaxes young households' budget constraint. Or, it could increase rental expenditures, if it subsidizes more expensive housing. We use the HBS data, which collect information on the real rental expenditures, net of public subsidies, to assess the effect of the policy on rental expenditures. In an unreported table, we find that rental expenditures declined by more than

€ 72, which is the size of the subsidy when shared between three people. The effect is significant only in the specification that includes 20-23 year-olds. The finding indicates that the policy was effective in reducing young households' burden of rental expenditures, at least for 20-23 year-olds.

The policy could also affect the choice of renting versus buying accommodation. The HBS collects information on tenure status, however the fraction of renters is too low and the sample size too small to detect significant effects on tenure.

5 Robustness checks

To increase the confidence in our results, we run a battery of robustness checks. The D-i-D estimation is reliable under the assumption of a common time trend between treatment and comparison groups in the absence of the reform. If this assumption fails, our positive estimates may reflect differential time trends in living arrangements between treatment and comparison groups, rather than a true policy impact. To provide further evidence supporting the existence of parallel trends before the policy change, we perform a placebo test and pretend that the policy was implemented in 2007 rather than 2008, using the 2006 sample as pre-policy period. Differential time trends in treatment and control groups should cause these effects to be significantly different from zero. Table 10 presents D-i-D estimates of the probability of living apart from parents, living with a romantic partner, and childbearing for those living apart from parents in the period from 2006 to 2007. The chosen specification includes the whole set of individual controls. The results show that none of the coefficients is significantly affected by the placebo policy. The only exception are the coefficients in the estimation of the probability of living with a romantic partner using the 18-26 and 18-33 year-olds samples. Hence, it is possible that there was a pre-treatment trend in the difference between the probabilities of living with a romantic partner between eligible and ineligible in the 18-26 and 18-33 year-olds samples. However, the magnitude of the estimates shows that this pre-treatment trend may only account for part of the estimated effect and thus, the net effect of the policy would still be positive. Overall, these results provide evidence for the robustness of the D-i-D identification strategy, limiting concerns relative to differential time trends.

Although it is reassuring to find that the trends are not systematically deviating in the pre-policy period, we may worry about breaks in the underlying trends coinciding with the policy. This could be the case if there were other policies that simultaneously affected the treated age groups but not the control ones. If this were the case, estimates from the D-i-D strategy would not capture the true effect of the rental subsidy because they would reflect the benefits of both the rental subsidy and other policy effects. The reform of the higher educational system, aimed at adapting Spanish universities to the European Higher Education Area, slightly affected the length of university studies.[16] It was ap-

[16] The pre-reform model for university studies offered first cycle education (short cycle),

proved in 2007, and some universities enacted it in 2008, but the whole system was required to conform to the law by 2010. We believe this does not constitute a threat to our identification strategy: even if some universities began offering the new courses in the 2008/09 academic year, the first students affected by this reform will graduate in July 2012. Still, we perform another placebo test, replacing the household formation outcome with educational level. A significant effect of the reform on individuals' educational level would raise concerns that effects on the probability of living apart from parents reflect underlying changes in educational levels. However, we find no differential effects of the policy on educational levels for treatment and control groups. Moreover, we estimate the equation of interest excluding students as they may be enrolled in some of the new graduate courses offered after the educational reform. This does not affect our estimates.

A possible concern is related to individuals leaving parental home just after they graduated from university. If this is the general rule, and there are more graduates among 22 year-olds than 21 year-olds, our results could be driven by differences in graduation rates between treatment and control groups. As we show in Table 10, estimates of a placebo D-i-D performed in the pre-policy period indicate that this effect is not significant.

We analyze the extent to which the policy has general equilibrium effects on rental prices, following Martins and Villanueva (2009). If the policy also affects rental prices, regions with a higher fraction of eligibles should have experienced a sharper increase in rental prices after 2008. We test this hypothesis using Fotocasa data and assuming each region is a separate market. Panel estimates of regional yearly variation in rental prices do not show any significant effect of the interaction between the fraction of eligibles (measured with the yearly proportion of 22-29 year-olds in each region) and the post-policy dummy.

Finally, when we include employment status as a control our estimates do not change, showing that they are not driven by the differential impact of the economic recession on 21 and 22 year-olds. We also test the robustness of our results to an alternative functional form, a Probit model. Results are consistent in this alternative specification.

6 Conclusion

Our paper estimates the effects of a cash transfer contingent on young adults renting accommodation on the probability of living apart from parents, living with a romantic partner and childbearing. Our identification strategy exploits the subsidy eligibility age threshold to assess the causal impact of the cash transfer.

D-i-D estimates show positive effects of the policy on the probability of living apart from parents and living with a romantic partner for an eligible 22 year-old

first and second cycle (long cycle), second-cycle only, and third cycle. With the 2007 reform, education provision was structured into three cycles: bachelor, master and doctorate. This implies that for short (long) cycle the length of university studies increased (decreased).

compared to a non-eligible 21 year-old. The increase is sharper for youngsters at the lower tail of the income distribution and those living in high rental price areas, consistent with the hypothesis that young adults in Southern Europe delay household formation because the cost is too high relative to their income. Additional evidence indicates that the policy also affects childbearing decisions.

The stronger effect of the policy for individuals earning low incomes suggests that the program should be targeted to poorer individuals. Moreover, the higher impact of the policy for young adults living in high rental price regions indicates that the policy design should take into account not only individual's income but also housing prices. This would allow the policy to remove barriers to household formation for young adults who are too poor to afford renting accommodation, while limiting the cost of the program and its negative impact through potential general equilibrium effects.

To provide a cost benefit analysis of the policy, one needs to measure the causal effect of living apart from parents on living with a romantic partner, labour supply and geographical mobility. We leave those important directions for future research.

References

[1] Aparicio, A. and V. Oppedisano (2014). "Shall I Follow my Brother? Peer Effects in Living Arrangements", mimeo.

[2] Baker, M., Gruber, J., Milligan, K. (2008) "Universal Child Care, Maternal Labour Supply, and Family Well-Being", Journal of Political Economy, Vol. 116(4), pp. 709-745.

[3] Becker, S. O., Bentolila, S., Fernandes, A., Ichino, A. (2010) "Youth Emancipation and Perceived Job Insecurity of Parents and Children", Journal of Population Economics, Vol 23(3), pp. 1047-1071.

[4] Chiuri, M.C., Del Boca, D. (2010) "Home-Leaving Decisions of Daughters and Sons", Review of Economics of the Household, Vol 8(3), pp. 393-408.

[5] Ermish, J. (1999) "Prices, Parents, and Young People's Household Formation", Journal of Urban Economics 45, 47-71

[6] Garcia-Ferreira, M., Villanueva, E. (2007). "Employment Risk and Household Formation: Evidence from Differences in Firing Costs." Banco de España Working Paper No. 737.

[7] Giannelli, G. C., Monfardini, C. (2003) "Joint Decisions on Household Membership and Human Capital Accumulation of Youths. The Role of Expected Earnings and Local Markets", Journal of Population Economics, Vol 16(2), pp. 265-285.

[8] Giuliano, P. (2007) "Living Arrangements in Western Europe: Does Cultural Origin Matter?", Journal of the European Economic Association, Vol 5(5), pp. 927-952.

[9] Gonzalez, L. (2011) "The Effects of a Universal Child Benefit", American Economic Journal: Economic Policy, Vol5(3): pp. 160-188.

[10] Lee, K. O., Painter, G. (2013) "What happens to household formation in a recession?", Journal of Urban Economics, Vol 73, pp. 93-109.

[11] Manacorda, M., Moretti, E. "Why do Most Italian Youths Live with their Parents? Intergenerational Transfers and Household Structure", Journal of the European Economic Association, Vol 4(4), pp. 800-829.

[12] Martínez-Granado, M. and J. Ruiz-Castillo (2002) "The Decisions of Spanish Youth: a Cross-section Study," Journal of Population Economics, Springer, Vol. 15(2), pp 305-330.

[13] Martins, N., Villanueva, E. (2009) "Does High Cost of Mortgage Debt Explain Why Young Adults Live with Their Parents?", Journal of the European Economic Association, Vol 7(5), pp. 974-1010.

[14] Susin, S. (2002) "Rent Vouchers and the Price of Low-Income Housing", Journal of Public Economics, Vol. 83, pp. 109-152.

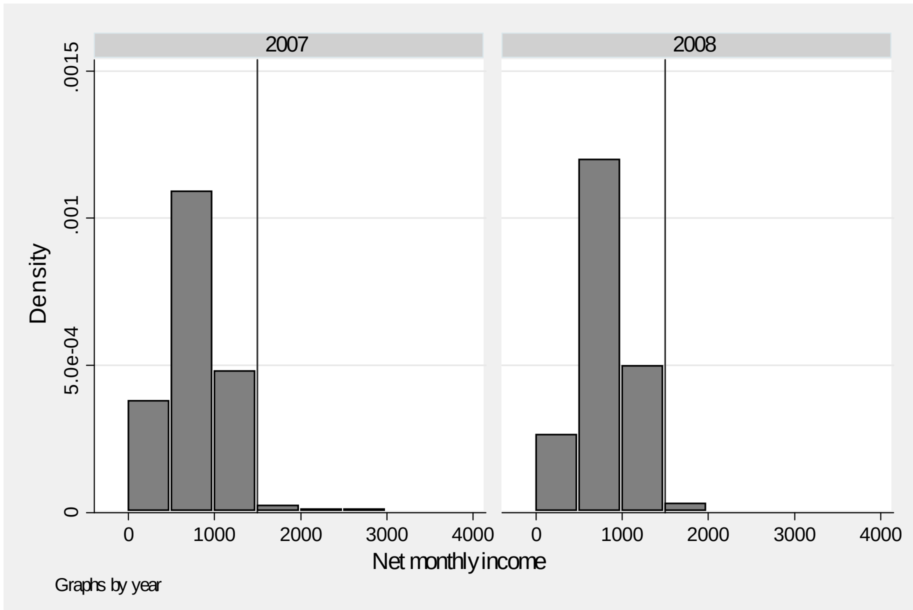

Figure 1: Histogram of net monthly income of 22 year-olds, HBS 2007 and 2008

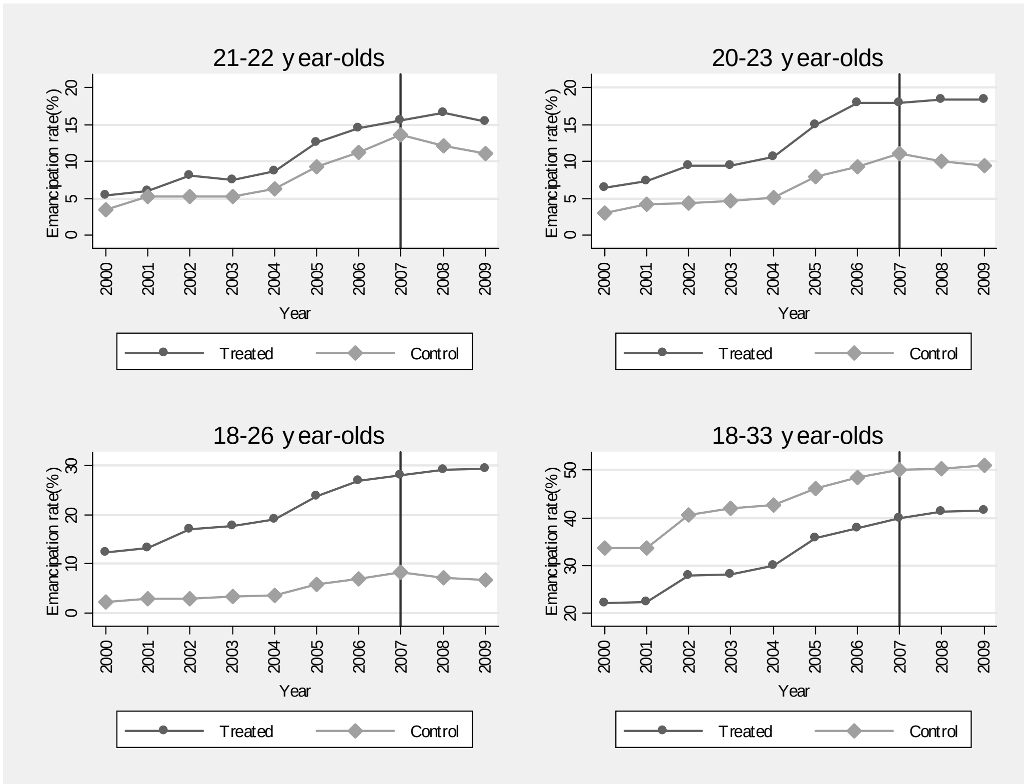

Figure 2: Trends in the probability of living apart from parents for treatment and control age groups using LFS data.

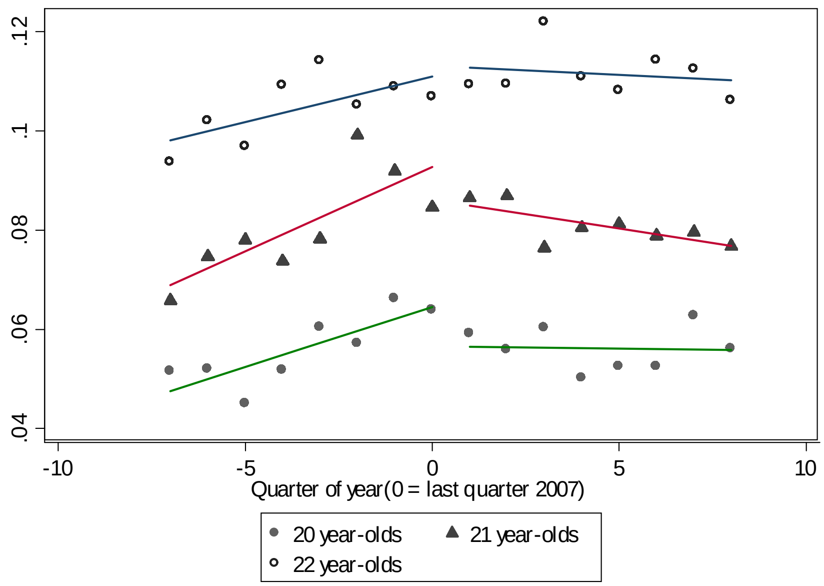

Figure 3: Probability of living apart from parents before and after the introduction of the Minimum Rent for Household Formation, by age group.

Years	2006-09			
Age group selected	21 - 22	20 - 23	18 - 26	18 - 33
Panel A - LFS				
Living apart from parents	0.149	0.154	0.245	0.536
LIving with a romantic partner	0.089	0.095	0.164	0.419
Childbearing if apart from parents	0.276	0.284	0.32	0.469
Post-treatment period	0.493	0.492	0.493	0.5
Age 22-29	0.506	0.515	0.616	0.484
Age	21.506	21.539	22.401	26.776
Male	0.506	0.507	0.505	0.503
Immigrant	0.132	0.133	0.16	0.193
Secondary education	0.807	0.808	0.774	0.707
Tertiary education	0.107	0.105	0.135	0.206
Employment	0.463	0.463	0.492	0.608
Number of observations	55,613	109,944	218,029	413,703
Panel B - HBS				
Living apart from parents	0.22	0.224	0.319	0.59
Living with a romantic partner	0.094	0.097	0.174	0.442
Childbearing if apart from parents	0.229	0.24	0.271	0.442
Post-treatment period	0.475	0.485	0.485	0.49
Age 22-29	0.56	0.601	0.74	0.513
Age	21.56	21.742	23.066	27.544
Male	0.572	0.571	0.544	0.516
Immigrant	0.14	0.138	0.15	0.158
Secondary education	0.321	0.301	0.287	0.264
Tertiary education	0.188	0.2	0.256	0.343
Monthly net income	835.2	834.9	862.9	942.1
Income less than median	0.718	0.701	0.654	0.522
Number of observations	1,728	3,407	7,173	18,077
Panel C - Fotocasa				
Average rental price, Euro/m2	8.372	8.372	8.372	8.372
Regions above average 2007 price	0.271	0.272	0.28	0.298

Only observations included in the baseline estimation.

Table 1: Descriptive Statistics for the four age groups.

Age	21-22	21	22	21	22
Year	2007-08	2007	2007	2008	2008
Panel A - LFS					
Living apart from parents	0.156	0.146	0.168	0.131	0.179
Living with a romantic partner	0.093	0.085	0.1	0.072	0.113
Chidbearing if apart from parents	0.271	0.26	0.284	0.215	0.308
Year 2008	0.497	0	0	1	1
Age 22	0.51	0	1	0	1
Age	21.51	21	22	21	22
Male	0.506	0.511	0.511	0.512	0.492
Immigrant	0.135	0.129	0.117	0.158	0.138
Secondary education	0.801	0.836	0.776	0.835	0.76
Tertiary education	0.108	0.078	0.14	0.066	0.146
Employment	0.484	0.473	0.513	0.434	0.513
Number of observations	28,185	7,064	7,102	6,772	7,175
Panel B - HBS					
Living apart from parents	0.220	0.175	0.232	0.221	0.244
Living with a romantic partner	0.094	0.068	0.108	0.083	0.109
Chidbearing if apart from parents	0.229	0.343	0.246	0.150	0.196
Year 2008	0.475	0	0	1	1
Age 22	0.560	0	1	0	1
Age	21.560	21	22	21	22
Male	0.572	0.584	0.561	0.561	0.584
Immigrant	0.140	0.125	0.148	0.152	0.135
Secondary education	0.321	0.436	0.341	0.282	0.309
Tertiary education	0.188	0.130	0.207	0.169	0.233
Monthly net income	835.2	801.1	818.8	850.2	871.36
Income less than median	0.718	0.805	0.740	0.669	0.658
Number of observations	1,728	399	508	362	459

Means weighted by sample weights.

Table 2: Descriptive Statistics for the baseline specification (21 and 22 years-old in 2007-08).

	Diff 21-22 2007	Diff 21-22 2008	Diff 21-22 2007-2008
Outcome			
Living apart from parents	0.022	0.032	**0.01**
	(0.005)	(0.005)	(0.007)
Living with a romantic partner	0.017	0.029	**0.013****
	(0.004)	(0.004)	(0.006)
Childbearing if apart from parents	0.037	0.099	**0.062***
	(0.022)	(0.023)	(0.032)

Note: LFS data. Means and standard errors in brackets; ** significant at 5 percent; * significant at 10 percent.

Table 3: Average outcomes by year of interview and eligibility status - baseline specification.

Age groups selected	(1) 21-22	(2) 20-23	(3) 18-26	(4) 18-33
Panel A: 2007-08				
Age 22*Post 2008	0.019**	0.016***	0.028***	0.020***
	[0.008]	[0.006]	[0.005]	[0.004]
Observations	28,185	55,562	109,867	208,498
R-squared	0.176	0.178	0.244	0.384
Panel B: 2006-09				
Age 22*Post 2008	0.012	0.009	0.024**	0.016***
	[0.007]	[0.006]	[0.006]	[0.004]
Observations	55,613	109,944	218,029	413,703
R-squared	0.168	0.175	0.240	0.383

Note: LFS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, quarter of interview, month and year of birth dummies.

Table 4: Probability of living apart from parents

	(1)	(2)	(3)	(4)
Age groups selected	21-22	20-23	18-26	18-33
Age 22*Post 2008*Low income	0.084*	0.065*	0.068**	0.034
	[0.044]	[0.034]	[0.029]	[0.026]
Observations	1,728	3,407	7,173	18,077
R-squared	0.234	0.221	0.265	0.313

Note: HBS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, provincial capital, dummy, month of interview, month and year of birth dummies.

Table 5: Probability of living apart from parents: interaction with lower than median wage, 2006-09 years

	(1)	(2)	(3)	(4)
Age groups selected	21-22	20-23	18-26	18-33
Panel A: 2007-08				
Age 22*Post 2008*High	0.023*	0.019**	0.023***	0.017**
	[0.014]	[0.010]	[0.008]	[0.007]
Observations	27,915	55,025	108,898	206,801
R-squared	0.170	0.174	0.244	0.384
Panel B: 2006-09				
Age 22*Post 2008*High	0.013	0.012*	0.020***	0.014***
	[0.010]	[0.007]	[0.006]	[0.005]
Observations	55,094	108,937	216,128	410,358
R-squared	0.163	0.169	0.239	0.382

Note: LFS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, quarter of interview, month and year of birth dummies.

Table 6: Probability of living apart from parents: interaction with higher than average rental price

	(1)	(2)	(3)	(4)
Age groups selected	21-22	20-23	18-26	18-33
Panel A: 2007-08				
Age 22*Post 2008	0.024***	0.017***	0.024***	0.014**
	[0.008]	[0.006]	[0.004]	[0.006]
Observations	28,185	55,562	109,867	208,498
R-squared	0.122	0.133	0.187	0.314
Panel B: 2006-09				
Age 22*Post 2008	0.017***	0.011*	0.022***	0.007
	[0.006]	[0.006]	[0.004]	[0.004]
Observations	55,613	109,944	218,029	413,703
R-squared	0.121	0.131	0.186	0.315

Note: LFS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, quarter of interview, month and year of birth dummies.

Table 7: Probability of living with a romantic partner

	(1)	(2)	(3)	(4)
Age groups selected	21-22	20-23	18-26	18-33
Panel A: 2007-08				
Age 22*Post 2008*High	0.029***	0.022***	0.018***	0.014**
	[0.011]	[0.008]	[0.007]	[0.007]
Observations	27,915	55,052	108,898	206,801
R-squared	0.121	0.132	0.186	0.314
Panel B: 2006-09				
Age 22*Post 2008*High	0.014*	0.010*	0.011**	0.004
	[0.008]	[0.006]	[0.005]	[0.005]
Observations	55,094	108,937	216,128	410,358
R-squared	0.118	0.126	0.185	0.314

Note: LFS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, quarter of interview, month and year of birth dummies.

Table 8: Probability of living with a romantic partner, interaction with higher than average rental price

	(1)	(2)	(3)	(4)
Age groups selected	21-22	20-23	18-26	18-33
Panel A: 2007-08				
Age 22*Post 2008	0.074**	0.061**	0.034*	-0.008
	[0.027]	[0.022]	[0.016]	[0.009]
Observations	2,990	6,050	18,534	89,275
R-squared	0.176	0.151	0.138	0.154
Panel B: 2006-09				
Age 22*Post 2008	0.050**	0.049***	0.036**	-0.008
	[0.021]	[0.017]	[0.013]	[0.008]
Observations	5,668	11,677	36,398	176,839
R-squared	0.152	0.143	0.137	0.153

Note: LFS data. Standard errors clustered at regional level in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Controls include: age, year, and region fixed effects, gender, education dummies, immigrant status, quarter of interview, month and year of birth dummies.

Table 9: Probability of childbearing for those who live apart from parents

Years	2006-07	2006-07	2006-07	2006-07
Age groups	21-22	20-23	18-26	18-33
Living apart from parents				
Age 22*2007	-0.006	-0.005	0.01	0.01
	[0.008]	[0.006]	[0.006]	[0.006]
Observations	28,061	55,389	109,481	205,780
R-squared	0.175	0.183	0.241	0.381
Living with a romantic partner				
Age 22*2007	0.001	0.000	0.015***	0.011**
	[0.006]	[0.005]	[0.005]	[0.005]
Observations	28,061	55,389	109,481	205,780
R-squared	0.125	0.139	0.187	0.315
Childbearing				
Age 22*2007	-0.017	-0.029	-0.018	0.013
	[0.037]	[0.029]	[0.022]	[0.01]
Observations	2,814	5,837	18,131	86,970
R-squared	0.167	0.152	0.145	0.163

LFS data. Years 2006 and 2007. Note: Robust standard errors in brackets clustered at regional level. Controls included.

Table 10: Placebo estimates on pre-policy years 2006-07

Appendix

We devote this section to explain how we compute the probability of being eligible for the subsidy conditional on being 22 years of age. This probability is the ratio between the number of 22 year-olds eligible for the subsidy and the total number of 22 year-olds. The numerator is the sum of four components: (1) the number of 22 year-olds employed and earning less than 1,500 euro per month, (2) the number of 22 year-olds receiving unemployment benefit, (3) the number of 22 year-olds receiving other social benefits, and (4) the number of 22 year-old students with scholarship. All these data refer to 2008, the year after the implementation of the subsidy.

In order to compute the number of employed 22 years-old who earn less than € 1,500, we combine data from the Spanish Labour Force Survey and the Spanish Household Budget Survey. The Spanish Labour Force Survey contains very reliable data on employment. In fact, this data is used to compute the official statistics. Using sample weights, we obtain an estimation of the number of employed 22 year-olds, which is equal to 309,187. From the Spanish Household Budget Survey we compute the fraction of employed 22 year-olds earning less than € 1,500 per month, which is 81.7 percent. The product of these numbers gives us an estimation of the number of 22 year-olds employed earning less than € 1,500 per month, which amounts to 252,601.

The computation of the number of unemployment benefit recipients presents one challenge: data on the number of unemployment benefit recipients, which is provided by the Spanish Ministry of Labour and Social Affairs, are only released in age intervals. In particular, we have information regarding the number of unemployment benefit recipients among 20-24 year-olds, which is 122,400. We scale this number by the proportion of unemployed 22 year-olds with working experience among 20-24 years old (19.5 percent). The latter proportion is obtained from the Spanish Labour Force Survey. This gives an estimation of the number of unemployment benefit recipients among 22 year-olds equal to 23,809.

The available information about social benefits, provided by the Spanish Ministry of Labour and Social Affairs, refers to the number of social benefit recipients among 16-24 year-olds (124,200). We scale this number by the proportion of 22 year-olds over 16-24 year-olds in the population (12.2 percent). The latter data is obtained from the Spanish Labour Force Survey and coincides with the data calculated from the Spanish Town Hall Census. This results in 15,110 social benefit receivers who are 22 years old.

The available information to calculate the number of 22 year-olds getting a scholarship, provided by the Spanish Ministry of Education, is not disaggregated by age. Hence, the calculations are done in two steps. First, using data from the Spanish Labour Force Survey, we compute the proportion of 22 year-olds university students, which amounts to 6.7 percent. Second, we multiply the proportion of 22 years old university students by the total number of university students with scholarship, 407,189. This results in an estimation of the number of 22 years old university students with scholarship of 27,166.

By adding the four data points described above and dividing it by the total number of 22 year-olds (558,441), we conclude that the probability of being eligible for the rental subsidy conditional on being 22 years of age is 0.571.