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# Is the future of work childless? Self-employment and fertility<sup>1</sup>

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## Abstract

The growth of self-employment and in particular gig work may explain part of the declining fertility rates observed in many countries. This study examines this question drawing on longitudinal data to compare women's fertility, proxied by maternity leave uptake, when self-employed or wage workers. It considers the case of Portugal, which allows to focus on structural aspects of work types, as fertility-related social protection there does not discriminate between self-employment and wage work. Results indicate that there are no statistically significant differences in fertility between employees and self-employed women. These findings highlight the importance of social protection for the self-employed, at least as far as their fertility is concerned.

Keywords: fertility; instrumental variables; maternity leave; self-employment

JEL Codes: C26, J13, J24.

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## **Introduction**

Self-employment currently attracts considerable attention in policy debates, given the emergence of the ‘gig’ economy. On the one hand, apps and online platforms may greatly facilitate the conversion of leisure into labour income, creating opportunities for work not subject to employment laws, namely when these may happen to be restrictive. These platforms may thus promote the growth of flexible work, complementing more traditional self-employment formats. On the other hand, self-employment may have negative impacts across various domains, such as health or fertility.

Fertility is a particularly important dimension, with many countries facing low fertility rates, significant population aging, and even population decline. Indeed, self-employment may be related to the decision to have children through the ability to balance work and family life (e.g. Shreffler et al., 2010). Research on work-family conflict has identified several characteristics that make certain jobs more compatible with family life than others (for a review of this literature, see Begall and Mills, 2011). In short, most studies find that control over work, including flexible working times and arrangements, higher autonomy and independence, and variety (i.e. jobs varying in content, location, or routine), seem to reduce conflict between work and family life.

On the contrary, job demands, such as higher responsibility or too much work, which may end up in individuals bringing work home more often or spending more time away from home, are harmful to the balance between work and family life. The literature suggests that self-employment is associated with both higher job control and higher job demands than wage work (e.g. Parasuraman and Simmers, 2001; Prottas and Thompson, 2006; Stephan and Roesler, 2010). Therefore, compared to wage work, self-employment may enhance or hamper work-family balance. In fact, the evidence on self-employment and work-family conflict is in-

conclusive (e.g. Annink et al., 2016; Craig et al., 2012; König and Cesinger, 2015; Nordenmark et al., 2012; Parasuraman and Simmers, 2001; Prottas and Thompson, 2006).

Self-employment and wage work also differ in at least three other relevant aspects. First, self-employment may be more volatile, i.e. more subject to demand shocks, and income when self-employed directly depends on ability to and availability of work and work effort. The uncertainty arising from this volatility may deter some individuals from having (more) children (e.g. Tölke and Diewald, 2003). Second, the cost of having children, including childcare costs, opportunity costs such as forgone income and depreciation of professional skills, and the risk of losing one's employer or clients, may be different for self-employed individuals and wage workers (e.g. Balbo et al., 2013). Third, some self-employed individuals, namely entrepreneurs, may have a preference for having (more) children in order to increase the likelihood that the business will remain in the family (e.g. Broussard et al., 2015).

The relationship between self-employment and fertility is also affected by different policy dimensions, such as the generosity of parental leave benefits or subsidized childcare. For example, in some countries there are no parental leave benefits for the self-employed or, if they exist, they are less generous, which may lead to lower fertility among that group of workers (Annink et al., 2015).

In sum, from a theoretical perspective, self-employment has an ambiguous effect on fertility; the relationship has to be determined empirically. Identifying the causal effect of self-employment on fertility is challenging due to the endogeneity of the decision to become self-employed. For example, individuals may decide to become self-employed because they intend to have a child and believe that if they are self-employed they can have a better work-family balance (e.g. Sullivan and Meek, 2012). Conversely, individuals may opt for dependent work when they intend to have a child if they believe that they can have more stability as wage workers. That is, there is reverse causality from fertility decisions to type of work (e.g. Joona,

2017; Noseleit, 2014; Patrick et al., 2016). It is also possible, for instance, that individuals who have a desire to be more independent and have more control over their lives (in both their professional and personal dimensions) choose both to be self-employed and have no or fewer children (e.g. Avison and Furnham, 2015; Cassar, 2007). Such individual traits are unmeasured in most datasets and can be regarded as individual unobserved heterogeneity. If ignored in empirical work, reverse causality and individual unobserved heterogeneity will confound the estimation of the true causal impact of self-employment on fertility.

Until now, the literature has focused on the effect of fertility on self-employment. Studies tend to find that having children pushes women into self-employment (e.g. Joona, 2017; Noseleit, 2014; Patrick et al., 2016; Semykina, 2018). On the contrary, a recent study finds that having children decreases the likelihood of being self-employed, especially among men (Caballero, 2017). Older studies tend to report positive correlations between self-employment and fertility, without exploring the direction of the link between the two (for a review, see Noseleit, 2014).

To the authors' best knowledge, only three studies have tried to identify a causal effect of self-employment on fertility, and they found mixed results. All rely on cross-sectional data and apply an instrumental variable strategy to deal with endogeneity. The instruments employed are the amount of assets that would be protected if an individual considering self-employment filed for bankruptcy, the regional share of employment in small businesses, and the individual's father's self-employment status. Using data from the 1990 US Census, Broussard et al. (2015) find that married men have more children if they are self-employed than if they are wage workers. Noseleit (2014) uses data from the European Social Survey for the period 2002-2010 and finds that self-employment does not result in higher fertility overall. The sample used in this study considers only women with at least two children and excludes self-employed women working in family businesses and those pursuing self-employment as freelance/liberal professionals (e.g. medical doctors or lawyers). The results therefore concern specifically the

impact of self-employment on moving from a second to a third child, and only for a reduced subset of self-employment occupations. Lastly, Billari et al. (2017), using data from Italy for the period 1995-2014, find that compared to wage workers, self-employed men and women have more children.

On a different perspective, Anxo and Ericson (2015) consider instead the relationship between self-employment and parental leave uptake in Sweden. They find that self-employed women and men take on average fewer parental leave days than wage workers (taking into account both the extensive and intensive margins, i.e. parental leave uptake and parental leave duration conditional on uptake, respectively). For women, the authors believe that the difference is in part explained by the fact that, in Sweden, women who have stronger commitments to paid work may be more prone to choose self-employment over wage work, even when planning for family and children. That is, Swedish women may worry less about work-family balance than women in other countries, because the parental leave system is so generous that work-family balance is a non-issue equally for self-employed and wage workers. For men, the authors explain their findings by the relatively higher costs of absence (e.g. risk of losing business) and a parental leave participation effect, whereby many self-employed men do not take parental leave at all. For women, this latter factor bears no significance because maternity leave is a natural consequence of childbirth. This means that for women, parental leave uptake is a good proxy of fertility.

The present study contributes to this very small literature on the causal impact of self-employment on fertility in several ways. Like Anxo and Ericson (2015), it relies on a large administrative longitudinal dataset, in this case covering the period between 2005 and 2011 and representative of the Portuguese population. In Portugal, there are no differences in the degree of social protection between employees and the self-employed, in what regards maternity/paternity. This allows to focus exclusively on the structural effects of self-

employment on fertility, while holding constant the institutional factors related to the generosity of paid parental leave that may affect previous studies.

Moreover, knowing individuals' employment (wage work or self-employment) and parental leave status in each month, this study relates parental leave episodes to the individual's employment status nine months before, i.e. around the time of conception. The focus of the article is leave uptake by women, because as stated previously maternity leave is a good proxy of fertility. The rich data at hand allow controlling for time-invariant individual (unobserved) heterogeneity. Exogenous variations in self-employment status, driven by changes in the market structure of the individual's residential area, are also explored, to further eliminate any endogeneity concerns.

Women's fertility, as measured by their uptake of maternity leave, is found to be similar when self-employed or a wage worker. Therefore, results suggest that self-employment does not have a significant impact on fertility, at least in a context where the degree of social protection offered does not discriminate against the self-employment.

## **Institutional background**

Portugal introduced its first maternity leave policies in 1976, establishing a 90-day paid leave. Only in 1999 were men given the right to take five days of paid paternity leave during the child's first month (consecutive or not), as well as an optional 15-day paid leave (consecutive). The five-day leave was made mandatory in 2004. In 2003, the length of fully paid maternity leave increased from the original 90 days to 120 days. In 2009, maternity and paternity leaves were combined into the parental leave, a leave period of up to 150 days (fully paid) that can be shared between mother and father. Self-employed workers are entitled to the same parental benefits as wage workers since 1988 (women) and 2009 (men).

Nationally, during the period covered here, the uptake of parental leave increased substantially. In 2005, the number of women who collected maternity leave benefits represented 70% of the number of children born. The number of men who took mandatory paternity leave represented only 39% of the number of children born. By 2011, those numbers had increased to 90% for women and 64% for men.<sup>1</sup> In these figures, only benefits paid to workers under the social security regime are considered. This excludes public servants, the military, and banking sector workers, who have separate social insurance systems. Other factors that may explain the difference between the number of children born and the number of leaves include twin pregnancies, pregnancies to inactive individuals, and cases where the parent was not working for long enough to be eligible for the benefit. Note that the unemployed are also entitled to parental leave benefits (the unemployment subsidy is suspended during the parental leave period). Some individuals, especially self-employed men, may prefer not to take leave. For women, in general, maternity leave is a natural consequence of childbirth.

In this study, the Portuguese Social Security definition of self-employment (*Trabalhadores independentes*) is adopted; it does not include own-account workers with employees. Family and informal workers also do not appear in the data, as they do not pay social security contributions. This explains the smaller proportion of self-employment in the data at hand, shown in Table 1, compared to the Labour Force Survey. For more details about self-employment in Portugal, see e.g. [Blinded for review].

## **Data and methods**

### *Social security data*

The dataset is a one-percent random sample of all individuals with some type of social security record over the period 2005-2011 in Portugal. Once individuals are selected for the sample, all



of their monthly records are registered, over the entire period. Social security records include contributions that are tied to income from wages or self-employment, as well as unemployment, sickness, parental, and other benefits. Individuals are observed on a monthly basis, from January 2005 to December 2011. Use information includes whether they are wage workers or self-employed, and whether they receive parental benefits in a specific month. The dataset also includes information on the individuals' gender, age, and nationality, but not their occupation or their industry.

For this study, only women between 18 and 45 years old are considered, as maternity leave episodes outside this age range are very rare. After deleting observations with missing information on the key variables, there are almost 53,000 individuals in the resulting dataset. Of those, more than 3,000 are self-employed at some point over the period 2005-2011. In addition, almost 3,000 women switch at least once between self-employment and wage work over that period (the 'switchers'). In total, there are more than 2 million individual-month observations, and almost 100,000 when considering only switchers (Table 1).

### *Identification and empirical strategy*

This study estimates several specifications of a linear probability model:<sup>ii</sup>

$$Leave_{i,t} = \beta_0 + \beta_1 Self - Employed_{i,t-9} + \gamma X_{i,t} + \tau_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

The binary dependent variable,  $Leave_{i,t}$ , indicates whether individual  $i$  takes maternity leave in month  $t$  or not. Model 1 regresses  $Leave_{i,t}$  on a constant and the nine-month lag of the self-employment indicator,  $Self - Employed_{i,t-9}$ , with  $\beta_1$  giving the impact on the likelihood of entering maternity leave of being self-employed, as opposed to being a wage worker, around the time of conception.<sup>iii</sup> Model 1 controls for the individual's age group (18- 25, 26-35, or 36-45), nationality (Portuguese or foreign), and place of residence (one of 308 municipalities),

included in  $X_{i,t}$ , as well as time (i.e. month) fixed effects, denoted by  $\tau_t$ . To be clear, Model 1 treats the data as a pooled cross-section, with the standard errors adjusted for the correlation between multiple observations of the same individual.

Model 2 is exactly as specified in Equation 1, i.e. similar to Model 1 but adjusting for the longitudinal nature of the data by including individual fixed effects, denoted by  $\mu_i$ , to control for time-invariant individual unobserved heterogeneity.

As endogeneity due to unobserved individual characteristics that vary over time may remain, an instrumental variable is applied, so that only exogenous variations in self-employment status, driven by changes in the market structure of the individual's residential area, are captured. The instrumental variable strategy is applied to both the pooled cross-sectional and panel data models (Model 3: instrumental variable model without individual fixed effects, and Model 4, controlling for individual fixed effects).

More precisely, the instrument is the proportion of self-employed workers in the individual's district, excluding the individual's own municipality of residence, in the same month. A district includes almost 20 neighbouring municipalities on average; there are 18 districts in continental Portugal (see Figure A1 in the Appendix for the division of the Portuguese territory into districts and municipalities). This approach to devise instrumental variables has been employed e.g. in Autor et al. (2013) and Nevo (2001), and the goal of excluding the individual's own municipality is to reduce any concerns regarding the exogeneity of the instrument itself. In this way, the individual's own employment status (the potentially endogenous variable) does not influence the instrument.

The instrument captures the structure of the labour market in the individuals' residential area, e.g. to what extent the predominant industries rely on wage work versus self-employment. It is

expected that the larger the proportion of self-employed workers in a given district, the higher the likelihood that any individual residing there is self-employed.

There is no reason for the proportion of self-employed workers in the individual's district to have a direct effect on the individual's fertility. It also should not indirectly impact fertility through other variables (except of course through the individual's self-employment status), unless they are adequately taken into account. Since the regression specifications control for time, municipality, and individual fixed effects, there should be no reason for concern. For instance, if the structure of the labour market in a given area were correlated with other local factors that might influence fertility, e.g. abundance or quality of childcare and schools, that would be accounted for by the municipality fixed effects (as long as such local characteristics are relatively constant over the period of analysis).

In sum, the proportion of self-employed workers in the individual's district, excluding the individual's own municipality of residence, verifies in principle the two conditions for a good instrumental variable: explain variations in the individual likelihood of self-employment, and be validly excluded from the main equation (i.e. impact maternity leave solely through its impact on the individual likelihood of self-employment).

As an alternative instrument and similarly to Noseleit (2014), the proportion of self-employed workers in the individual's municipality in the same year was also considered. Results are similar when using one instrument or the other (see the Appendix). The results presented use the proportion of self-employed workers in the individual's district, excluding the individual's own municipality, for two reasons. First, municipalities are not very large, so many individuals work in neighbouring municipalities. Focusing on the labour market within the municipality seems limiting of the actual work opportunities available to each individual. Second, by excluding the individual's municipality of residence, the individual is excluded from the numerator/denominator of the instrument, limiting concerns that the instrument would be

predictive of individuals' self-employment status only by construction. Given that the endogenous variable,  $Self - Employed_{i,t-9}$ , is lagged, the instrument is also lagged nine months.

All model specifications are estimated on the full sample and on the subsample that includes only women who switch between wage work and self-employment at least once over the sample period. Individuals who switch between types of employment are the ones used for identification in the models with individual fixed effects, after all. Moreover, the fixed effects instrumental variable model provides the local average treatment effect, i.e. the average effect for compliers—those who switch between types of employment in response to changes in the local predominance of independent work. In other words, non-switchers are by definition non-compliers.

Over the sample period, very few individuals have more than one maternity leave episode. Therefore, unfortunately it was not possible to investigate the likelihood of having a second episode, or the count of maternity leave episodes.

## **Results**

### *Descriptive statistics*

Considering the full sample, the average rate of maternity leave uptake is 0.78% among self-employed women, compared to 0.80% among female wage workers; in the sample of switchers, the respective numbers are 0.83% and 0.85% (Table 1; see also Figures 1-2). Note that these at first apparently small values correspond to monthly rates. The percentage of self-employed workers in the district—the instrument—is 4.34% (4.62% in the sample of switchers), with significant variation between 0% and 17.54%. Descriptive statistics for the remaining variables are also available in Table 1.

[Table 1 and Figures 1-2 here.]

### *Effects on parental leave*

Table 2 shows the results of Models 1-4, considering all individuals (Panel A) or the subsample of switchers (Panel B). Starting with the first stage results, when the proportion of self-employment in the district increases, the individual likelihood of self-employment also increases, as expected. Specifically, considering the instrumental variable model with individual fixed effects (Model 4), when the proportion of self-employed workers in the district is one percentage point higher, the likelihood that an individual becomes self-employed is about 0.2 percentage points higher, on average, when considering the whole sample (Panel A). Naturally, the effect is larger when restricting the sample to individuals that switch between forms of employment at some point: the individual likelihood of switching to self-employment is increased by about 5.6 percentage points, on average (Panel B).

[Table 2 here.]

Judging from the large F- and t-statistics, the instrument appears strong.<sup>iv</sup> However, looking at the second stage, the standard errors of the coefficient on the self-employment indicator are huge, meaning it is very imprecisely estimated. When the instrument is at a higher level of aggregation than the instrumented variable, it may actually not be strong enough even though its F- and t-statistics are above the conventional thresholds. Therefore, caution interpreting the results from the instrumental variable models is advised, and this section focuses instead on the results from Model 2, which also addresses endogeneity by controlling for individual fixed effects.

Results indicate that self-employed women are about 0.08 percentage points less likely than female wage workers to take maternity leave in any given month, on average (0.06 percentage

points if focusing on switchers). However, this difference is statistically not different from zero and relatively small: compared to the average monthly rate of maternity leave uptake of 0.80% (0.85%) among wage workers, this means that women are 10% (7%) less likely to take maternity leave when self-employed. Looking separately at women up to 30 or above 30 years old also does not produce any statistically significant results. There are also no differences when focusing on transitions from self-employment to wage work or vice-versa.

## **Discussion and conclusion**

The results of no effect of self-employment on maternity leave contrast with those of the only previous study the authors know of that looks at the impact of self-employment on parental leave. Anxo and Ericson (2015) consider the case of Sweden and find that, on average, self-employed women take 15% fewer days of maternity leave than female wage workers. As all mothers in Sweden take maternity leave independently of employment status, the authors argue that the difference is explained by what they call an employment selection effect, whereby women who are very committed to work or with high performance-related income opt for self-employment. This selection effect is ruled out in this study as it compares the same individuals over time, under self-employment and under wage work (i.e. fixed effects models).

While one can always discuss the quality of the instrument used, the individual fixed effects should eliminate most endogeneity concerns. Moreover, this study finds no evidence of a significant association between self-employment and fertility among younger versus older women, or women who transition to or from self-employment, which confers robustness to the non-significant effect found.

One important aspect that deserves to be explored in the future is whether the impact of own self-employment status on fertility depends on the partner's self-employment status. For

example, if the partner has stable income from wage work, the uncertainty associated with self-employment may lose relevance, while the flexibility aspect, that facilitates balance between work and family life, may gain relevance. Income level may also play a role. However, both partner's self-employment status and income are themselves endogenous variables, so studying these questions remains difficult.

In conclusion, the findings in this study suggest that, as far as the emergence of the gig economy is concerned, one may not be worried that the future of work is childless. While self-employment involves a number of risks that may affect one's fertility decisions, it also offers considerable opportunities, namely greater say in one's balance between family and work.

One important consideration may be the extent of social protection available to the two types of work. In this study, this is equal between employees and the self-employed, which allows to focus on what the authors termed the structural differences between the two forms of work, as they are unaffected by institutional aspects or public policy. Institutional settings where the self-employed do not have access to the same degree of fertility-related social protection may lead to different outcomes.

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<sup>i</sup> Source: [http://cite.gov.pt/pt/destaques/complementosDestqs2/evol parent 2005 2016.pdf](http://cite.gov.pt/pt/destaques/complementosDestqs2/evol%20parent%202005%202016.pdf)

<sup>ii</sup> The linear probability model was chosen given the computational difficulties associated with applying instrumental variables methods to nonlinear panel data models, especially when various large vectors of fixed effects are included. To investigate if the chosen functional form is appropriate, the logit/panel logit versions of Model 1/Model 2 were estimated (i.e., with or without individual fixed effects), and provided marginal effects similar to the ones obtained with the linear versions.

<sup>iii</sup> Instead of the nine-month lag of the self-employment indicator, using the one-month lag, the eight-month lag, or all lags up to the ninth, twelfth, or twenty-fourth, for example, gives estimated total effects of self-employment that slightly differ in magnitude, but have the same sign and statistical significance.

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The self-employment indicator is very stable, with individuals rarely changing type of work more than once over the seven-year period considered. This study is interested in the overall effect of self-employment, not in the time dynamics. That overall effect can be captured by (any) single lag, given the high correlation between adjacent lags.

<sup>iv</sup> Clustering standard errors at the district level does not cause the F- and t-statistics to significantly decrease.



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## Tables

Table 1: Descriptive statistics by type of employment in t-9

	Self-employed (t-9)	Wage workers (t-9)	Total
<b>Panel A: Full sample</b>			
Maternity leave in month t	0.78%	0.80%	0.80%
Age	34.66 (5.98) [19;45]	33.06 (6.43) [18; 45]	33.10 (6.42) [18; 45]
Foreign	13.29%	11.94%	11.98%
Prop. of self-employed in the district (Main instrument)	5.03% (2.06) [0; 17.54]	4.32% (2.21) [0; 17.54]	4.34% (2.21) [0; 17.54]
Prop. of self-employed in the municipality (Alternative instrument)	5.61% (4.15) [0.10; 47.56]	4.15% (2.77) [0; 47.56]	4.19% (2.83) [0; 47.56]
Individuals (n)	3,173	51,711	52,800
Observations (N)	63,212 2.86%	2,146,475 97.14%	2,209,687 100.00%
<b>Panel B: Sample of switchers</b>			
Maternity leave in month t	0.83%	0.85%	0.84%
Age	32.91 (5.22) [19; 45]	32.72 (5.59) [18; 45]	32.79 (5.56) [18; 45]
Foreign	13.10%	15.61%	14.04%
Prop. of self-employed in the municipality (Main instrument)	4.74% (2.06) [0; 17.54]	4.55% (2.28) [0; 17.54]	4.62% (2.20) [0; 17.54]
Prop. of self-employed in the municipality (Alternative instrument)	5.04% (3.17) [0.10; 47.56]	4.42% (2.84) [0; 42.52]	4.65% (2.98) [0; 47.56]
Individuals (n)	2,336	2,519	2,786
Observations (N)	37,204 37.46%	62,123 62.54%	99,327 100.00%

Continuous variables: standard deviations in parentheses and minimum and maximum values in brackets.

Table 2: Effect of self-employment on the likelihood of maternity leave

	Model 1	Model 2	Model 3		Model 4	
			1 <sup>st</sup> stage	2 <sup>nd</sup> stage	1 <sup>st</sup> stage	2 <sup>nd</sup> stage
<b>Panel A: Full sample (n=52,800; N=2,209,687)</b>						
Self-employed (t-9)	0.03567 (0.03282)	-0.07748 (0.08668)		0.09763 (1.51689)		-4.43951 (4.09340)
Prop. of self-employed in the district			0.00552*** (0.00049)		0.00246*** (0.00038)	
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	-	Yes	-	-	Yes	Yes
Instrument strength	-	-	F=125.74***		F=42.36***	
Endogeneity	-	-	$\chi^2=0.002$		$\chi^2=1.160$	
<b>Panel B: Sample of switchers (n=2,786; N=99,327)</b>						
Self-employed (t-9)	-0.02238 (0.05860)	-0.06033 (0.08860)		-0.02780 (0.75479)		-0.40740 (1.13415)
Prop. of self-employed in the district			0.06664*** (0.00818)		0.05630*** (0.00933)	
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	-	Yes	-	-	Yes	Yes
Instrument strength	-	-	F=66.31***		F=36.41***	
Endogeneity	-	-	$\chi^2=0.000$		$\chi^2=0.094$	

Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

The coefficient of the self-employment indicator was multiplied by 100 to facilitate reading.

## Figures

Figure 1: Probability of entering maternity leave by type of employment in month t-9, Oct 2005-Dec 2011 (full sample)

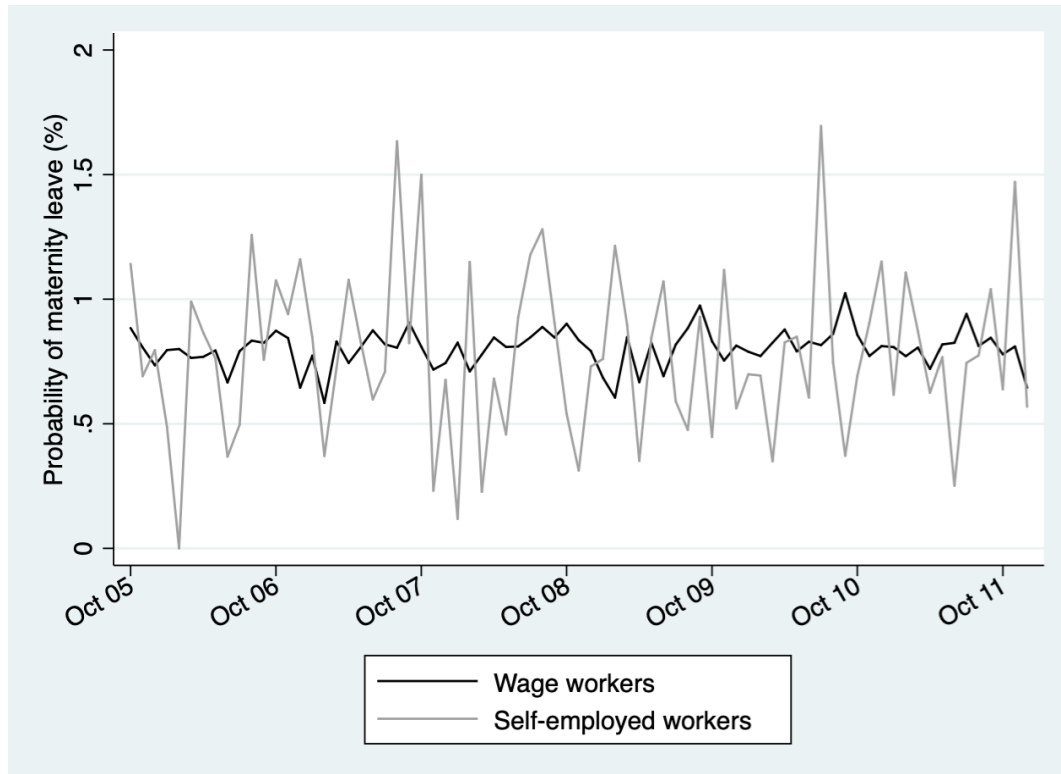
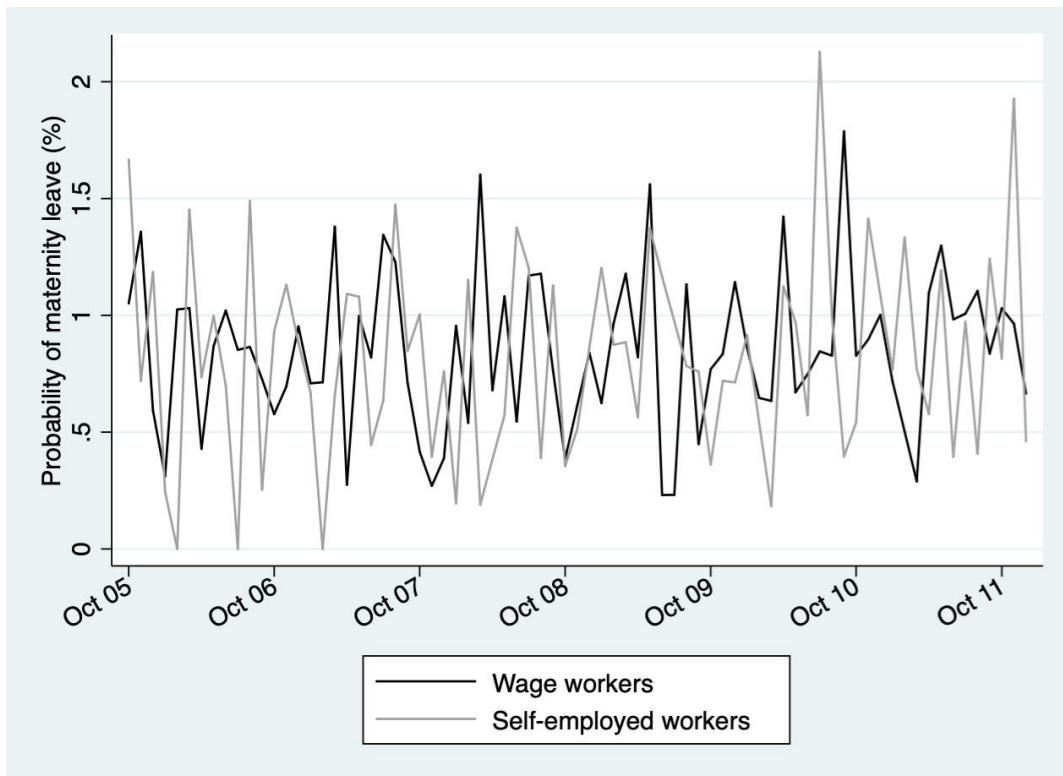
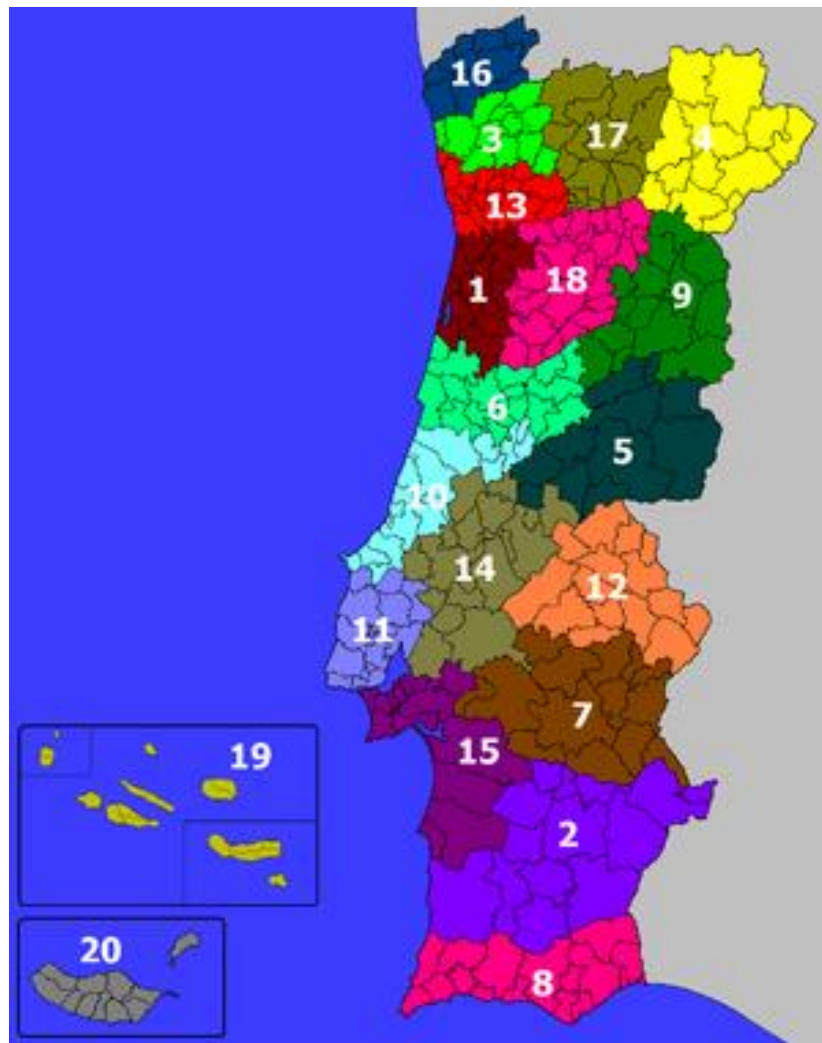


Figure 2: Probability of entering maternity leave by type of employment in month t-9, Oct 2005-Dec 2011 (sample of switchers)



## Appendix

Figure A1: Division of the Portuguese territory into districts and municipalities



There are 18 districts in Continental Portugal. Each island is considered as a separate district.  
Source: Wikipedia.



Table A1: Effect of self-employment on the likelihood of maternity leave (Alternative instrument)

	Model 1	Model 2	Model 3		Model 4	
			1 <sup>st</sup> stage	2 <sup>nd</sup> stage	1 <sup>st</sup> stage	2 <sup>nd</sup> stage
<b>Panel A: Full sample (n=52,800; N=2,209,687)</b>						
Self-employed (t-9)	0.03567 (0.03282)	-0.07748 (0.08668)		0.23100 (0.89514)		-1.11103 (2.29796)
Prop. of self-employed in the municipality			0.00701*** (0.00045)		0.00322*** (0.00031)	
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	–	Yes	–	–	Yes	Yes
Instrument strength	–	–	F=242.62***		F=107.02***	
Endogeneity	–	–	$\chi^2=0.048$		$\chi^2=0.203$	
<b>Panel B: Sample of switchers (n=2,786; N=99,327)</b>						
Self-employed (t-9)	-0.02238 (0.05860)	-0.06033 (0.08860)		-0.14286 (0.42868)		-0.40768 (0.57776)
Prop. of self-employed in the municipality			0.07238*** (0.00545)		0.06439*** (0.00595)	
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	–	Yes	–	–	Yes	Yes
Instrument strength	–	–	F=176.65***		F=117.23***	
Endogeneity	–	–	$\chi^2=0.082$		$\chi^2=0.376$	

Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

The coefficient of the self-employment indicator was multiplied by 100 to facilitate reading.