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HAL Id: hal-02334085
https://hal.science/hal-02334085

Preprint submitted on 25 Oct 2019

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The interaction between labour force participation of older men and their wife: lessons from France

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This draft: July 2019

Abstract

Since the mid-1990s, the labor force participation of older men and women increased substantially in France. In this paper, we investigate the causal impact of having a participating wife on the labor market behavior of the elderly husband. Working with data from the French Labour Force Survey and using the cohort-specific participation rate of women at age 40 as an instrument for their current participation, we find that the magnitude of the causal relationship is strong. The likelihood of husbands' participation increases of about 28 points when their wives are currently active on the labor market. Such findings support the view that some complementarities in leisure exist so that French married men attribute a higher value to leisure when it is shared with their wife. It also suggests that policy makers should take into account both direct and indirect effects when they implement a change in the economic environment of elderly.

Keywords: Labor force participation, elderly, cohort effects, France
JEL classifications: J14, J21, F42
Word count: 8939

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1 Introduction

In many OECD countries, we observe that the labor market attachment, measured by the participation rate or the employment rate, of men aged 50-64 substantially increased since at least the mid-1990s. However, such an increase in labor market attachment was preceded by an important downward trend throughout the post WWII. In the meantime, the labor supply of women of the same age group followed a clear upward trend and increased sharply. The latter increase is one of the reflections of important structural changes that occurred during this period: access to the birth control pill (Bailey, 2006), a general increase of wives' bargaining power within the household, and so on. Figure 1 illustrates this evolution for the French economy, the country under scrutiny in this paper. In France, the labor force participation rate (LFPR, thereafter) of older men fell from 68% to less than 60% over the 1983-1995 periods while the one for older women increased of about 6 point over the same period. After the mid-1990s, the LFPR of French older men (re-)increased to reach 67% in 2016.[1] At the end of the sample period studied here, the gap between LFPR of French older men and women was approximately equal to 5 points, whereas it was of about 25 points in 1983[2]. Overall, from these figures it seems that there is a positive association between the participation of women and men, and it is reasonable to imagine that this link is stronger within couples. The main objective of the present paper is to estimate to what extent the labor supply of wives causally impacts the labor supply of their husbands in France.

The causes and consequences of these shifts in labor market attachment of elderly have attracted the attention of policy makers and researchers alike, particularly in light of recent reforms that affect pension schemes or the minimum age at retirement. It is crucial to understand the reason explaining labor supply decisions of older individuals. For instance, if the recent increase in older men's activity is not related to the labor supply of their wives, but rather a consequence of other factors, such as educational attainment, then policies aiming at changing the path of labor market activity at the end of the active life have any externalities on the partner. By contrast, if husband's participation is, at least in part, causally driven by his wife own participation, then policy makers should design their toolkit on the modeling of the joint labor market participation decision within couples. In such a context, the decision to work or not is interdependent and any reforms changing the economic environment at the end of the active life could potentially affect both partners.

The current economic literature presents some piece of evidence indicating that married

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[1]Strictly speaking, the LFPR of older men falls between 2002 and 2007 before increasing again. The sensitivity analysis conducted in this paper indicates that such a break is not a matter of concern for the question under investigation in this paper.

[2]The same pattern could be observed for the employment rate. In 1983, the gender gap was approximately equal to 28 points. It fell to 5 points in 2016.

couples are likely to coordinate their retirements (Hurd (1990), Gustman and Steinmeier (2000)). More specifically, in the US context it is shown that a husband responds more to the retirement of his wife than she does. In this paper, we do not focus on retirement *per se* but rather on the joint labor supply decisions that occurs just before the end of the active life. In this respect, Schirle (2008) shows that having an active wife increases significantly the likelihood of participation of her older husband, in the US, Canada and the UK. Focusing on younger people, Hamermesh (2000) show that couples change their working day schedule in order to enjoy leisure together. Overall, two economic interpretations are invoked to explain how wives' participation influences husband labor market attachment. The first channel is an income effect implying that, all else being equal, having a participating wife increases non-labor income of her husband. This extra-revenue is able to act as a preference shifter, decreasing the marginal utility of consumption leading ultimately to an increase in leisure and so non-participation. The second channel is a shared leisure effect operating if they are some complementarities so that couple members have a preference to spend their leisure time together. In this context, a husband does not evaluate as much its leisure time if it is spent alone. Therefore, having a participating spouse decreases the marginal utility of leisure (and so non-participation) leading ultimately to an increase in older men labor supply. The empirical model developed in this paper will allow us to conclude about which of the two effects prevails over the other one.

The concrete measure of the relationship between spouses' labor supply is however not straightforward. Although *prima facie* a positive correlation between husbands and wives participation is observed (e.g. figure 1), it remains quite hard to disentangle a causal relationship for at least two reasons. First, the two decisions are influenced by common factors so that it is necessary to control for observable characteristics in the empirical model. Second and perhaps most importantly, the labor market behaviors of husbands and wives are likely to be simultaneous. As a consequence of these shortcomings, standard models as Ordinary Least Square (OLS, thereafter) or Probit are biased when the wife's labor market status appears as an explanatory variable in husband's equation. In order to identify a causal effect, an exogenous source of variation of wives' participation is needed. In this respect, we follow Schirle (2008) by using a measure of cohort-specific participation rate of women at age 40 as instrument, a cohort being defined as women's year of birth. This instrument should capture the general increase in female participation implying that women belonging to recent cohort are much more likely to participate than those belonging to older cohort. Thus, we expect that the cohort LFPR of women at age 40 to be strongly related to wives' current labor

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market status.[3] Given the choice of the instrument, different econometric models could be used to estimate the marginal effect of interest. Here, we employ a Two-Stage Least Squares strategy but also a Bivariate Probit model. In doing so, we test for the robustness of the empirical finding.

We make use of the two available versions of the French Labour Force Survey (FLFS, thereafter) in our investigation. The first is the quarterly version of the FLFS that exists since 2003. This database has several practical advantages for the problem in hand: it is representative of the French population, it contains a large number of observations allowing us to be immune from sampling errors when focusing on elderly and it provides information about individuals' characteristics but also about members within the same household. The quarterly FLFS covers the 2003-2016 period and is used to construct the sample on which the econometric model will be estimated. The second database employed is the previous annual version of the FLFS that exists since 1983. This source is particularly suitable for the construction of the cohort-specific participation rate of women at age 40.[4] Finally, the availability of the data implies that the sample of interest contains married men aged between 50-64 years old with a wife born between 1943 (the first cohort available from the 1983 version of the FLFS) and 1976 (the last cohort available from the 2016 version of the FLFS).

Our key findings can be summarized as follows. The first stage estimation confirms that our instrument has a significant impact on wives' current participation. Specifically, a 1 point increase in the cohort-specific participation rate at 40 induces an increase in women likelihood of participation of about 2.5 points. Moreover, some clues suggest the appropriateness of the instrumentation strategy leading us to be confident about the interpretation of the second stage equation. OLS regressions of the husbands' equation confirm a positive correlation between wives' labor market status and husbands' participation. However, the size of the impact changes when the former is instrumented. In particular, it is shown that OLS (or Probit) estimated coefficients are biased downward. Overall, our favorite specification indicates that having a participating wife leads to an increase in husband's participation of 28 points when Two-Stage Least Squares are used. These findings confirm that the shared leisure effect is stronger than any income effects suggesting that French older married men are quite sensitive to the current labor market behavior of their wives. Our conclusions constitute another piece of evidence for policy makers indicating that any modifications of the economic environment of elderly could have important effects not only on the single individ-

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[3]It should be observed that we focus on the effect of wives' participation on the labor market behaviors of their husbands. Given that we do not have any instruments affecting exogenously male labor market status, the reversed effect, namely the causal effect of husbands' activity on their wives behaviors, can not be investigated.

[4]Strictly speaking, the quarterly FLFS is also employed to construct measure of cohort participation between 2003 and 2016.
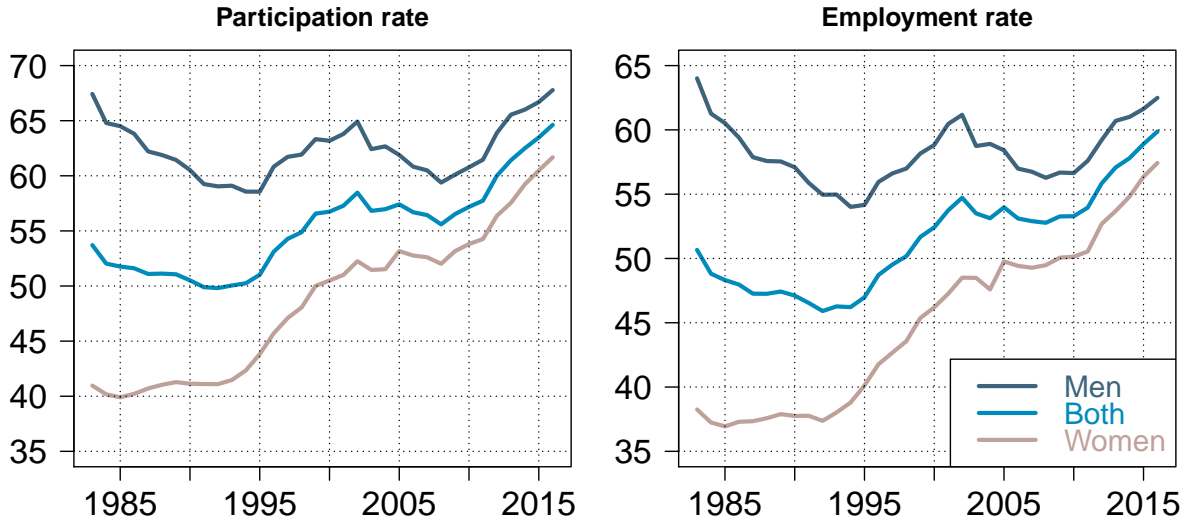
Figure 1: Labor force participation and employment rate of men and women aged 50-64 y.o. - France.
Sources: French Labour Force Survey (1983-2016), author's own calculations.

ual but also on the joint participation decision within households.

The paper proceeds in 6 sections including the introduction. In section 2, we provide a brief overview of the literature and we present in more depth the data. Section 3 presents both the theoretical and the empirical framework. The 4th section presents the main result of the paper. In section 5, an array of robustness check is conducted. Section 6 concludes.

2   Preliminaries

2.1   Literature background

An important US literature suggests that couple members coordinate their retirement decisions so that both the husband and its wife retire close in time, often during the same year (Hurd, 1990). Some evidence of joint retirement has been put in evidence by Blau (1998). Using the Retirement History Survey, he finds strong associations between the participation probabilities of one spouse and the labor force status of the other spouse. In particular, living with a non-participant partner increases the likelihood of retirement of the other couple member. From a different data source, the Health and Retirement Study, Gustman and Steinmeier (2000) find that the retirement probability of husbands is substantially affected by the retirement status of their wives. However, they find no significant effect in the opposite direction suggesting that wives do not confer the same value to the retirement status of their partners than husbands do. In order to explain why couple members adjust their

retirement strategies, the shared leisure effect is often put in evidence. In this respect, Blau (1998) affirms that to understand the incidence of joint retirements, it is necessary to go beyond the analysis of financial incentives. The existing literature provides strong evidence suggesting that the root of the shared leisure hypothesis is the notion of complementarity between wives and husbands leisure time. In this respect, Maestas (2001) reports that 62% of older men look forward to retiring only if their wives are able to retire as well. Studying the labor market behavior of older men, Schirle (2008) indicates that having a participating wife pushes the likelihood of older husband's participation up of about 20 points. An interesting point about her results is that the magnitude of the effect is very similar for countries such as the US, the UK and Canada.

By contrast to the US, the French case is relatively less documented. To the best of our knowledge, the first study working with French data is the one of Sédillot and Walraet (2002). They show that French couples are also likely to take joint retirement decisions. However, and by contrast to the US case, they find that French women's retirement behaviors are more affected by the labor market status of their husbands. In a recent contribution, Stancanelli (2017) estimates the direct and indirect effects of a reform of the French pension on the retirement probability of both spouses.[5] From a regression discontinuity design, she finds that the husband's probability falls of about 1 point if his wife is affected by the reform, while she does not respond if her husband is affected, at least in the short run. In France, the implementation of the survey "Retirement motivation" in 2008 allows us to have further clues about the strength of the interactions between the retirement behaviors within couples. More specifically, 18% of retired elderly interviewed claim that having a retired partner was important for their own retirement decision. As for the US, the shared leisure hypothesis is viewed as a potential determinant of the willingness to retire together. Stancanelli and Van Soest (2016) exploit diary data to investigate to what extent partners spend more leisure time together upon retirement. They find that wife's retirement increases significantly couple's joint leisure time. Their findings reinforce the idea that leisure complementarities are significant, at least in France. Our study complements the existing French evidence by examining to what extent the labor supply of wives significantly affects the labor supply of their husband, just before the effective age of retirement.

2.2   Data

We exploit the two available versions of the French Labour Force Survey (FLFS): the quarterly version over the 2003-2016 period and the annual version over the 1983-2002 period.

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[5]Depending on the year of birth, the reforms requires that people need to work more months to retire with maximum pension benefit.

The quarterly FLFS Since 2003, the FLFS is a quarterly survey of about 100 000 observations, which is conducted by the French National Institute of Statistics and Economic Studies. Before 2003, the survey was annual. The survey's sample is a rotating panel divided into 6 subgroups (or wave). Each quarter, 1/6 of a sample is renewed: a new wave enters while the oldest wave leaves the sample. In this research, we only work with the entering wave of each quarterly sample. This choice can be justified by the fact that considering each quarterly sample entirely could induce repeated observations of the same individuals. The FLFS has several advantages compared to others databases. The first advantage relies on its representativeness of the French population and the very large number of individuals in the sample. This means that the FLFS is particularly suitable to eliminate most of sampling errors when one computes statistics on a particular subgroup, as it is done here with older married men. The second advantage is the wealth of information about people's demographics, labor market state or education. In particular, as the sample unit is the household, we are able to recover information about the household head (generally the man or the husband) but also all other members of the household (his wife, his children and so on). Thus, for each man living with a partner (or loosely speaking the husband),we know if his partner (or loosely speaking his wife) is in or out of the labor force. Another potential advantage of the FLFS is that it addresses some issues related to the measurement of the labor market states. Indeed, as definitions of the International Labour Office (ILO) are used, individuals participating to the labor market are those employed or unemployed, namely those that are actively searching for a job and available to take a job in a short delay (2 weeks). This distinction between unemployed and inactive people is not trivial since other databases, e.g. the French Census, use declarative measures that are more likely to be concerned by mismeasurement issues.

The annual FLFS As the instrumental variable used in the empirical application is a cohort measure of female's LFPR at age 40, in addition to the quarterly FLFS, we make use of the annual version of the FLFS available for the 1983-2002 period. We define a cohort in a restrictive way: a woman's cohort is defined according to her exact year of birth. In a robustness check, we will test the sensitivity of our results to a broader definition of cohorts. Given the availability of the data, we drop observations for which the computation of cohort-specific participation rate at 40 is not possible. Indeed, the first available cohort-specific LFPR is from the 1983 version of the annual FLFS and corresponds to women born in 1943. The last cohorts is from the 2016 version of the FLFS and corresponds to women born in 1976. Finally, our main sample of interest contains married men aged 50-64 years old, over the 2003-2016 period, with a partner born between 1943 and 1976.

2.3   Some stylized facts

Figure 1 shows that two distinct periods are observable over the post-2000s, especially for older men participation rate. In the first part of this subsample, until 2007, the LFPR of older men decreased of about 5 points. Then, a trend break is perceptible in 2008 and the LFPR (re-)increased to reach 67% in 2016. By contrast, for older women the trend is upward but accelerated from 2008. One could argue that such movements in older men participation rate could be a concern for our econometric models because they may reflect some cyclical feature of the French economy. To address this issue, we add annual fixed effects as control variables to capture some cyclical features of the data. Moreover, in a step of robustness the model is estimated by considering only the post-2008 period.

Table 1 reports a set of summary statistics about married older men of our sample. We could observe that the participation rate of French married men increases slightly between 2003 and 2016. However, this general picture hides some heterogeneity. Indeed, during this period, we witness an increase of about 3 percentage points in the LFPR of married men with a participating wife. By contrast, the LFPR of married men with a wife out of the labor force fall of about 4 points. Overall, in 2016 there is a difference in participation of about 30 points between older men with an active wife and older men with an inactive wife. This suggests that participation behaviors of husbands and wives are positively correlated. Focusing now only on the husband's wives, it is shown that their participation rate increase of 3 points between 2003 and 2016.

Table 1 also describes married men according to some demographics that enters as control variables in our empirical model. It is of interest to observe that the average age of married men belonging to our sample increases of 1.5 years old between 2003 and 2016. The age variable appears as an important control because we could expect that it plays an important role in participation/retirement behaviors. An increase in age could shift individuals' preference for leisure by, for example, decreasing the marginal utility of consumption and increasing the marginal utility of leisure. Furthermore, Hairault, Langot, and Sopraseuth (2010) show that the likelihood of participation is significantly affected by the distance to retirement. Specifically, on a frictional labor market, the returns to job of older workers depends on its expected duration. The shorter the time to retirement is, the lower the probability of getting a new job when unemployed is. In this application, we consider the age variable as a "catchall" of this effect. The average age of women also increases. However, the speed of the rise is higher for wives than what it is for their husband. This suggests that the average age gap within couple decreases markedly during the sample period. In the context of this paper, it should be observed that the age gap within couples could capture some income effects due to the fact that, all else being equal, a younger wife is more likely to participate but also more

	Married men		Wife in LFP		Wife not in LFP	
	2003	2016	2003	2016	2003	2016
Activity	0.68	0.69	0.76	0.79	0.53	0.49
Wife's activity	0.64	0.67	1.00	1.00	0.00	0.00
Age	55.4	56.9	54.7	56.0	56.6	58.8
Wife's age	51.6	54.3	50.8	52.7	53.1	57.7
Children in household	0.46	0.44	0.49	0.49	0.42	0.32
Nb. children	0.81	0.74	0.80	0.82	0.81	0.57
No degree	0.36	0.23	0.34	0.20	0.39	0.30
< High school	0.37	0.43	0.39	0.44	0.35	0.40
High school	0.10	0.12	0.11	0.13	0.09	0.11
High school +2	0.05	0.08	0.06	0.09	0.04	0.07
> High school +2	0.11	0.13	0.10	0.14	0.12	0.12

Table 1: Summary statistics of older married men (50-64 y.o.)
Sources : French Labour Force Survey (2003-2016), author's own calculations.

able to support the retirement decision of her husband. Finally, whatever the participation of the wife, we observe a substantial increase in educational attainment of older married men. For example, the share of men without any degree falls of 13 points while the share of those having a high school degree increases of 2 points between 2003 and 2016. As a result, controlling for such structural trends is of particular importance because the likelihood of participation increases with the education level.

3   The framework

3.1   Theoretical elements

The empirical model of this paper can find its rational with a simple static framework in which both the husband and his wife maximize their own utility independently and consider some proportion of the partner's income as non-labor income. It should be observed that some more sophisticated framework could be employed. However, relying on such a simple model allows us to link its theoretical prescription with its data-driven reduced-form counterpart. Let husband's labor supply behavior be driven by the following latent variable Y^{H*}, where

$$Y_{it}^{H*} = U^H(C_{it}, Y_{it}^H, X_{it}^H, Y_{it}^W | Y_{it}^H = 1) - U^H(C_{it}, Y_{it}^H, X_{it}^H, Y_{it}^W | Y_{it}^H = 0) \qquad (1)$$

The first term of the right hand side of this equation is the utility obtained when the individual participates to the labor market ($Y_{it}^H = 1$) whereas the second term represents the utility obtained when the individual does not supply his labor ($Y_{it}^H = 0$). These two utility gains depend on individual's consumption of goods C_{it}, individual's participation Y_{it}^H, his own characteristics X_{it}^H such as demographics or educational attainment, and the labor supply of his partner Y_{it}^W. In this context, a husband will supply his labor when the utility obtained when participating on the labor market is higher than the utility obtained when being outside of the labor market. In other words, an husband participates when $Y_{it}^{H*} > 0$. From this simple decision rule, wife's participation could change husband's own participation by two main channels. First, there is an income effect suggesting that a husband is less likely to participate if his wife supplies her labor. Indeed, as wife's participation acts as a preference shifters and increases to some extent the household's income available for consumption, all else being equal, the husband will be likely to enjoy more leisure. The income effect is always negative. Second, there is a substitution effect that requires two conditions for being effective. On the one hand, couples should make interdependent leisure decisions. On the other hand, it should exist some complementarity in leisure time. Put differently, this condition states that both the husband and the wife should prefer spending part of their leisure time together. As demonstrated by Stancanelli and Van Soest (2016), this statement is empirically supported, at least on French data. More specifically, they show that wife's retirement, a close cousin of the notion of non-participation used in this paper, significantly increases couple's joint leisure time. Under these two conditions, the substitution effect implies that wife's participation pushes the marginal utility of husband's leisure time down leading ultimately to an increase in his labor supply. In contrast to the income effect, the substitution effect is expected to be positive.

3.2 Empirical model

Moving now to the data, the empirical model to be estimated can be written in linear terms as:

$$Y_{it}^H = \gamma^H Y_{it}^W + X_{it}\beta^H + \varepsilon_{it}^H \tag{2}$$

$$Y_{it}^W = X_{it}\beta^W + \delta^W Z_{it}^W + \varepsilon_{it}^W \tag{3}$$

with, X_{it} a vector of covariates such as husband's age, the age gap between the husband and his wife, dummies for husband's education level,[6] the number of children at home, annual fixed effects and dummies indicating the region of residence. β is a vector of coefficients associated to covariates while ε_{it} are standard error terms. The coefficient of main interest

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[6]In a more complete model, dummies for wife's education level will be added.

is the one associated to wife's participation γ^H. It is a reflection of which of the two effects mentioned previously, namely the substitution effect and the income effect, prevails over the other one. If the sum of these two effects is negative ($\gamma^H < 0$), then the income effect is stronger than the substitution effect and wife's activity decreases husband's participation. By contrast, if the sum of these two effects is positive ($\gamma^H > 0$), then the substitution effect prevails over the income effect, and wife's activity is likely to increase husband own activity.

The estimated coefficient associated to wife's participation in equation (2) (γ^H) is probably endogenous because labor supply decisions within the couple is likely to be simultaneous. As a result, we estimate this system of two equations by the Instrumental Variable (IV) method and Bivariate Probit, the used instrument being Z_{it}^W. In order to be transparent, we use both strategies to estimate the marginal effect of interest. However, our favorite specification is the IV method. The IV estimator, which uses a Two-Stage Least Squares strategy, has several practical advantages for the problem in hand. In contrast to maximum likelihood models, it does not specify the distribution of error terms. It is relatively simple to implement and, as argued by Angrist and Pischke (2009), when it comes to approximate marginal effects it works well. Then, this model does not specify any types of distribution for the endogenous variables. They may be censored, discrete or continuous (Lewbel, Dong, and Thomas, 2012).

In the context of the IV model, two general assumptions are required for having valid instrument. First, it should have a significant predictive power on the endogenous variable. This assumption implies that the correlation between Z_{it} and wife's participation should be different from 0 so that a difference in labor supply likelihood can be measured. Estimates of the first stage provide information about the validity of this assumption. The second assumption states that Z_{it} should not be correlated with the error terms of equation (2) (exclusion restriction). Put differently, Z_{it} must be itself exogenous and its effect on husband's labor supply acts only indirectly through its (direct) effect on wife's participation.

Along the lines of Schirle (2008), Z_{it} corresponds to a measure of cohort-specific participation rates of the wife at age 40, a cohort being defined by the wife's year of birth. Given the general increase in female's participation over the second half of the XXth century, it is expected that women belonging to cohort with high level of participation at age 40 are more likely to be "currently" active. In regards to our sample of married women, we could observe that those belonging to the very first cohorts did not have a full control of their motherhood. Until 1967 the access to the birth pill control were not free and abortion has been legalized (only) in 1975 with the "Veil law". By contrast, women of younger cohorts had free access to the "pill" and abortion so that they were more able to control when and how much children they want. Such changes across cohorts are probably useful for predicting
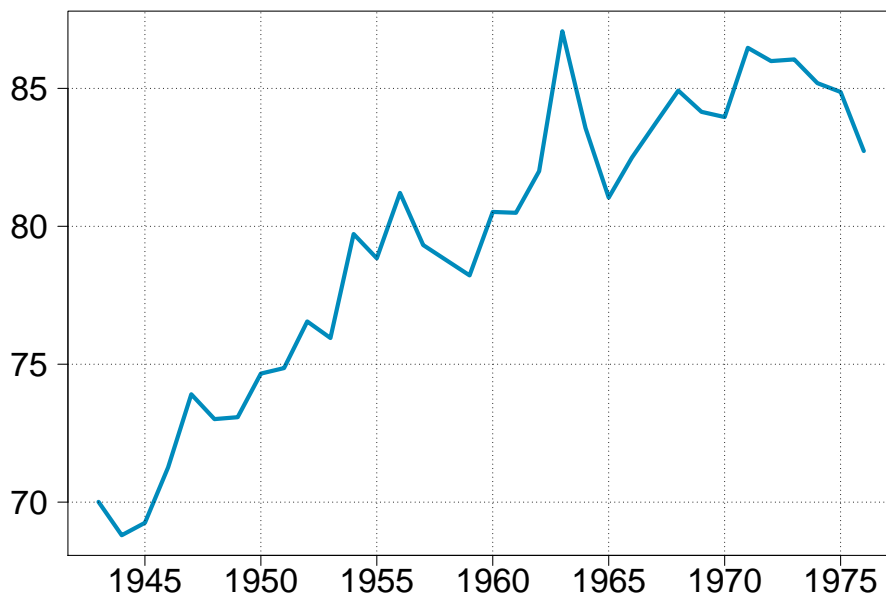
Figure 2: Labor force participation rate at 40 of women born between 1943 and 1976. - France.
Sources: French Labour Force Survey (1983-2016), author's own calculations.

the likelihood of current participation. In a seminal contribution Bailey (2006) finds that the liberalization of contraceptive has a causal impact on female's labor market outcomes and especially their participation rate. Figure 2 shows the evolution of participation rates at 40 for women born between 1943 and 1976. Clearly, the likelihood of participating follows an upward trend suggesting that women born in the latter cohorts were more often active in the labor market at 40 than those born in the first cohorts. However, around the clear upward trend, we observe some "noisy" movements that could be a consequence of sample fluctuations. In section 5, we construct another measure of cohort-specific LFPR and we test the robustness of our results to this new instrument. Unfortunately, we do not have in hand any valid instruments to study the reversed effect, namely how husband's participation impacts wife's participation. Indeed, the same measure of cohort-specific participation rate for men does not display any trend and do not have any impact on his current likelihood of participating.

4 Results

When presenting the results, we follow the traditional approach which consists first in a description of the first stage equation, namely the wife's equation, and then we show results relative to the estimated equation of main interest.

4.1 The wife's equation

Results of the estimated equation linking wife's labor supply to covariates and the instrument Z_{it} are reported in table 2. Several features of this table merits attention. It is shown that the cohort-specific participation rate induces a significant increase in female's current participation. On average, a 1 point increase in the cohort participation rate at age 40 pushes women likelihood of participation up of about 2.6 points. The estimated marginal effect is precise, significant and of the same order in both specifications. Moreover, including female's education level in the vector of control variables does not change the magnitude of the estimated effect. Even if there are no direct test for the validity of the instrumentation strategy, some clues suggest its appropriateness. First, F-statistics of first stage equations are largely above the threshold of 10 suggested by Stock and Yogo (2005).[7] This indicates that the instrument is non-weak. Second, as a further check for the validity of the exclusion restriction, we adopt a similar strategy than Fernández, Fogli, and Olivetti (2004). More specifically, to test whether the wife's cohort participation rate at age 40 has an impact on current husband's labor supply, we estimate both a Probit model and an OLS model of equation (2) but we add Z_{it} as an additional covariate. A violation of the exclusion restriction will be suspicious in the event that, even after controlling for our set of covariates, Z_{it} has a significant impact on older participation. In this case, a significant relationship reveals a direct channel which is beyond the impact of the instrument on wife's activity. Estimation results unveil that the estimated coefficient associated to the cohort-specific participation rate is 0.[8]

As regard to covariates, our estimates indicate that all of them have the expected sign. On average, the husband's age decreases wife's likelihood of participating. Combined with the fact that the estimated coefficient associated to the age differential within couples is significantly positive, this could be a piece of evidence in favor of a shared leisure effect. Living in an area other than Paris and having children at home decrease female's participation. Finally, it should be observed that the effect of husband's education level is significant only for the dummy indicating that he has no degree. As expected, wife's educational attainment is an important determinant of her participation to the labor force.

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[7]In particular, they are equal to 763 and 696 in each IV specification.

[8]Detailed results are available upon request.

	OLS	Probit		OLS	Probit	
		Coef.	Marg. eff.		Coef.	Marg. eff.
Cohort activity at 40	0.026 ***	0.074 ***	0.023 ***	0.026 ***	0.075 ***	0.023 ***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.001)
Husband's age	-0.030 ***	-0.092 ***	-0.029 ***	-0.029 ***	-0.090 ***	-0.028 ***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Age gap	0.014 ***	0.046 ***	0.014 ***	0.013 ***	0.045 ***	0.014 ***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Nb. of children	-0.048 ***	-0.154 ***	-0.049 ***	-0.048 ***	-0.155 ***	-0.048 ***
	(0.002)	(0.006)	(0.002)	(0.002)	(0.006)	(0.002)
Urban	-0.058 ***	-0.185 ***	-0.058 ***	-0.056 ***	-0.177 ***	-0.055 ***
	(0.005)	(0.017)	(0.005)	(0.005)	(0.017)	(0.005)
Paris (ref.)	–	–	–	–	–	–
Rural	-0.029 ***	-0.089 ***	-0.028 ***	-0.027 ***	-0.080 ***	-0.025 ***
	(0.006)	(0.019)	(0.006)	(0.006)	(0.019)	(0.006)
Husbdand's education level						
No degree	-0.077 ***	-0.245 ***	-0.077 ***	-0.042 ***	-0.131 ***	-0.041 ***
	(0.005)	(0.018)	(0.005)	(0.005)	(0.018)	(0.006)
< High school	-0.006	-0.021	-0.006	-0.007	-0.027	-0.009
	(0.005)	(0.017)	(0.005)	(0.005)	(0.017)	(0.005)
High school (ref.)	–	–	–	–	–	–
High school +2 years	0.014 ***	0.045 ***	0.014 ***	-0.005	-0.019	-0.006
	(0.007)	(0.024)	(0.008)	(0.007)	(0.025)	(0.007)
> High school +2 years	0.002	0.002	0.001	-0.049 ***	-0.178	-0.056
	(0.006)	(0.021)	(0.001)	(0.006)	(0.022)	(0.007)
Wife's education level						
No degree	–	–	–	-0.035 ***	-0.108 ***	-0.034 ***
				(0.004)	(0.011)	(0.004)
< High school	–	–	–	0.066 ***	0.201 ***	0.063 ***
				(0.004)	(0.011)	(0.004)
High school (ref.)	–	–	–	–	–	–
High school +2 years	–	–	–	0.093 ***	-0.318 ***	0.099 ***
				(0.006)	(0.019)	(0.004)
> High school +2 years	–	–	–	0.156 ***	0.548 ***	0.171 ***
				(0.007)	(0.022)	(0.007)

Table 2: Wife's equation - "first stage" estimation.
Sources: French Labour Force Survey (2003-2016), author's own calculations
Notes: Standard errors are reported in parenthesis. Significant levels: * 10%; ** 5%; *** 1%. Samples contain wifes of married men aged between 50 and 64 years old. Marginal effects are mean marginal effects. Annual fixed effects are integrated in each regressions but they are not reported in the table.

4.2 The husband's equation

The second stage estimation results linking participation of older married men with wives' participation and control variables are displayed in table 3. Due to space limitations, we do not report results using the Probit specification.[9] The two OLS columns of the table consistently show a positive association between wife and husband own participation. In the other column, we use Z_{it} as an instrument for female's participation. Such a strategy leads to a larger effect suggesting that OLS models are biased downward. This finding is quite surprising. Indeed, because of the assortative matching in the marriage market hypothesis, one could argue that individuals with similar preferences are more likely to match, leading ultimately to an upward bias in OLS estimates. To note, Schirle (2008) finds that estimation results obtained without using the instrument are biased upward in the UK while any significant differences between specifications are observed in Canada and the US. Overall, in France, the estimated marginal effect of having a participating wife on husband's participation ranges between 22 and 28 points depending on the specification used. Again, the estimated effect is precise, significant and adding wife's education level as covariates does not change the magnitude of the marginal effect. Unambiguously, our estimates suggest that the shared leisure effect dominates over any income effects. This finding is in line with Stancanelli and Van Soest (2016) who finds, using French data, that spouses coordinate their retirement. Our findings could be seen as a refinement of their conclusion. Indeed, we show that interactions exist not only at the retirement stage but also at the end of the active life, just before the retirement.

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[9]However, they remain available upon request.

	OLS	IV	Biprobit		OLS	IV	Biprobit	
			Coef.	Marg. eff.			Coef.	Marg. eff.
Wife's activity	0.115 ***	0.280 ***	0.968 ***	0.223 ***	0.114 ***	0.282 ***	0.960 ***	0.221 ***
	(0.003)	(0.032)	(0.012)	(0.003)	(0.003)	(0.032)	(0.069)	(0.019)
Husband's age	-0.062 ***	-0.054 ***	-0.190 ***	-0.044 ***	-0.062 ***	-0.054 ***	-0.191 ***	-0.044 ***
	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.005)	(0.001)	
Age gap	0.000 ***	-0.004 ***	-0.017 ***	-0.004 ***	0.000 ***	-0.005 ***	0.018 ***	-0.004 ***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)
Nb. of children	0.010 ***	0.018 ***	0.102 ***	0.023 ***	0.010 ***	0.018 ***	0.100 ***	0.023 ***
	(0.001)	(0.002)	(0.007)	(0.002)	(0.001)	(0.002)	(0.007)	(0.001)
Urban	-0.046 ***	-0.037 ***	-0.155 ***	-0.036 ***	-0.045 ***	-0.036 ***	-0.151 ***	-0.035 ***
	(0.004)	(0.005)	(0.020)	(0.004)	(0.004)	(0.005)	(0.020)	(0.004)
Paris (ref.)	–	–	–	–	–	–		
Rural	-0.039 ***	-0.035 ***	-0.159 ***	-0.031 ***	-0.038 ***	-0.033 ***	0130 ***	0.030 ***
	(0.005)	(0.005)	(0.022)	(0.005)	(0.005)	(0.005)	(0.022)	(0.005)
Husbdand's education level								
No degree	-0.104 ***	-0.092 ***	-0.367 ***	-0.084 ***	-0.099 ***	-0.092 ***	-0.365 ***	-0.084 ***
	(0.005)	(0.005)	(0.022)	(0.005)	(0.005)	(0.005)	(0.021)	(0.005)
< HS	-0.061 ***	-0.060 ***	-0.244 ***	-0.050 ***	-0.057 ***	-0.059 ***	-0.235 ***	-0.054 ***
	(0.005)	(0.005)	(0.019)	(0.004)	(0.005)	(0.005)	(0.019)	(0.004)
HS (ref.)	–	–	–	–	–	–	–	–
HS +2 years	0.022 ***	0.019 ***	0.108 ***	0.025	0.018	0.019	0.101 ***	0.023 ***
	(0.006)	(0.006)	(0.028)	(0.006)	(0.006)	(0.006)	(0.028)	(0.006)
> HS +2 years	0.124 ***	0.124 ***	0.581 ***	0.134 ***	0.114 ***	0.122 ***	0.555 ***	0.128 ***
	(0.006)	(0.006)	(0.026)	(0.006)	(0.006)	(0.006)	(0.026)	(0.006)
Wife's education level								
No degree	–	–	–	–	-0.008 **	-0.002	-0.006 ***	-0.001 ***
					(0.003)	(0.003)	(0.013)	(0.003)
< HS (ref.)	–	–	–	–	-0.004	-0.016 ***	-0.056 ***	-0.013 ***
					(0.003)	(0.004)	(0.014)	(0.001)
HS	–	–	–	–	–	–	–	–
HS +2 years	–	–	–	–	0.010 **	-0.005	0.000	0.000
					(0.005)	(0.006)	(0.023)	(0.005)
> HS +2 years	–	–	–	–	0.022 ***	-0.004	0.055 *	0.013 *
					(0.006)	(0.007)	(0.028)	(0.007)

Table 3: Husband's equation - "second stage" estimation.

Sources: French Labour Force Survey (2003-2016), author's own calculations.

Notes: Standard errors are reported in parenthesis. Significant levels: * 10%; ** 5%; *** 1%. Samples contain married men aged between 50 and 64 years old. Marginal effects are mean marginal effects. Annual fixed effects are integrated in each regressions but they are not reported in the table.

Results of table 3 also show that control variables also have a significant impact on the labor supply decisions of older married men. In particular, increasing the age of 1-year leads to a fall in man's activity of about 3 percentage points. This finding confirms that the age shifts individuals' preference in favor of leisure leading ultimately to an increase in the retirement probability. In contrast to their wife, the age gap between spouses has any incidence on husband's participation since the estimated coefficients are 0 in nearly all specifications. If the number of children at home decreases wife's participation, the opposite is observed for the husband. Educational attainment is another important factor in understanding participation behavior. In particular, older men with the highest education level, probably those with the highest opportunity cost of staying at home, are more likely to supply their labor. Finally, our model estimates suggest that wife's education level does not have strong effects on husband's participation decision. Indeed, estimated coefficients associated to dummies for wife's education are in general non-significant and when they are significant, the marginal effect is estimated to be low (see the last 3 columns of table 3).

5   Sensitivity analysis

Overall, estimates reported in table 3 indicate that the shared leisure effect dominate so that when his wife participate to the labor marker the husband is also more likely to participate. However, these findings could be sensitive to different modeling choices. In this subsection, we apply a battery of robustness checks to confirm the phenomena unveiled previously. Table 4 reports the results of our alternative estimations. It should be observed that to save some space, we report only the estimated coefficients associated to wife's participation.[10]

Employment as dependent variable   In our baseline specification, the variable of main interest is the labor supply of the husband and the latter is explained, among others, by his wife's activity instrumented by her cohort LFPR at age 40. Although, this choice appears to be quite natural, it could be interesting to focus on another indicator of labor market attachment: the employment status. Indeed, as only a fraction of the participating wives are employed, we could imagine that for their husbands the shared leisure effect, the dominant effect in the baseline model, has more chances to be effective. In the current exercise, we replace labor market participation by employment. Corresponding estimates for the second stage are reported in row 2 of table 4.

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[10]Complete tables are available upon request.

Shared leisure and husband's age   Another important robustness check is to establish if the results are of the same order with different age groups. In particular, as our baseline model suggests that the shared leisure effect is strong for married men aged between 50-64 years old, we could expect that the latter changes for younger men. For instance, we could imagine that preferences evolve with the age so that younger married men confer relatively less importance to the shared leisure value. Moreover, the income effect due to wife's participation could be more important for younger married men because on average their wives have more chances to be active. To address this potential issue, we run regressions by considering married men aged between 25-49 years old. Results from these new estimations are reported in row 2 of table 4.

Changing the cohort-specific LFPR   In the baseline specification, we use as instrument the cohort participation rate at 40, a cohort being "strictly" defined by the exact women year of birth. As shown in figure 2, such a measure is a bit "noisy" and we are able to observe some weird variations around the clear upward trend. A potential explanation for such movements could be the relatively small number of observations belonging to each cohort. On average, there are 1045 available observations to compute the LFPR at 40. In order to ensure that the results are insensitive to such a noise, we compute a second measure of LFPR by changing the cohort definition. Specifically, a cohort is now defined as women year of birth $\pm$ 2 years. Doing so allows us to substantially increase the cohort size since the average cohort now contains 5200 observations. Figure 3 displays the alternative measure of cohort LFPR. As the first instrument, the second one displays a strong upward trend. However and as expected, the latter is smoother than the former. Row 4 of table 4 reports estimation results with this "extended" measure of cohort LFPR at 40 as instrument for wife's activity.

Sub-periods analysis   Results of the causal effect presented in table 3 could be seen as an average over the 2003-2016 period. Implicitly, the model of equations (2) and (3) assumes that the impact of wife's labor supply on her husband's participation does not evolve over time. To investigate if the magnitude of this causal effect is the same or not throughout the sample period, we re-estimate two models by considering two sub-periods: i) the 2003-2006 period and ii) the 2013-2016 period. In the event that there are some changes in the influence of spousal participation on the participation of their husband, we are likely to observe a significant difference between the two γ^H estimated. Results are displayed in rows 5 and 6 of table 4.

	OLS	IV	Biprobit	
			Coef.	Marg. eff.
Baseline	0.115 ***	0.280 ***	0.968 ***	0.223 ***
	(0.003)	(0.032)	(0.012)	(0.003)
Employment	0.128***	0.527 ***	1.168 ***	0.293 ***
	(0.003)	(0.117)	(0.060)	(0.013)
Prime-age men	0.039 ***	0.036 ***	0.371 ***	0.029 ***
	(0.002)	(0.043)	(0.021)	(0.002)
Extended cohort	0.115 ***	0.273 ***	0.806 ***	0.187 ***
	(0.003)	(0.022)	(0.077)	(0.017)
2003-2006 period	0.109 ***	0.284 ***	1.305 ***	0.299 ***
	(0.007)	(0.079)	(0.093)	(0.020)
2013-2016 period	0.121 ***	0.101 **	0.426	0.102
	(0.005)	(0.060)	(0.281)	(0.066)
Post-2008 period	0.116 ***	0.243 **	0.794	0.183
	(0.004)	(0.033)	(0.102)	(0.023)

Table 4: Robustness estimation - "second stage" estimation.
Sources: French Labour Force Survey (2003-2016), author's own calculations.
Notes: Only parameters associated to wife's participation are reported. Standard errors are reported in parenthesis. Significant levels: * 10%; ** 5%; *** 1%. Except in row 3 and 4, samples contain married men aged between 50 and 64 years old. Marginal effects are mean marginal effects. Annual fixed effects are integrated in each regressions but they are not reported in the table.

The post-2008 period As mentioned previously, older men participation rate followed a downward trend over the 2003-2007 periods before increasing again. Given that the increase in older men LFPR coincide with the beginning of the Great Recession in France, one could argue that such a pattern may disturb our general results. To address this issue, we run regressions by considering the post-2008 period. Results are displayed in the last row of table 4.

Comments As shown in table 4, the magnitude of the marginal effect of interest is quite insensitive to our set of robustness check. For each specification, the estimated marginal effect is highly significant. Overall, this complementary findings reinforce the idea that, on French data, the willingness to share leisure dominates over any income effects. However and in some case, the sensitivity analysis provides a refinement of the strength of the causal impact especially in regards to husband's age and sub-periods.

Changing the variable indicating labor market attachment confirms our initial intuition. Thus, the likelihood of being employed for married men increases of about 30 points when his wife is herself employed (Bivariate Probit estimates). Again, this finding clearly supports the shared leisure hypothesis. The definition of the cohort has no incidence on the marginal
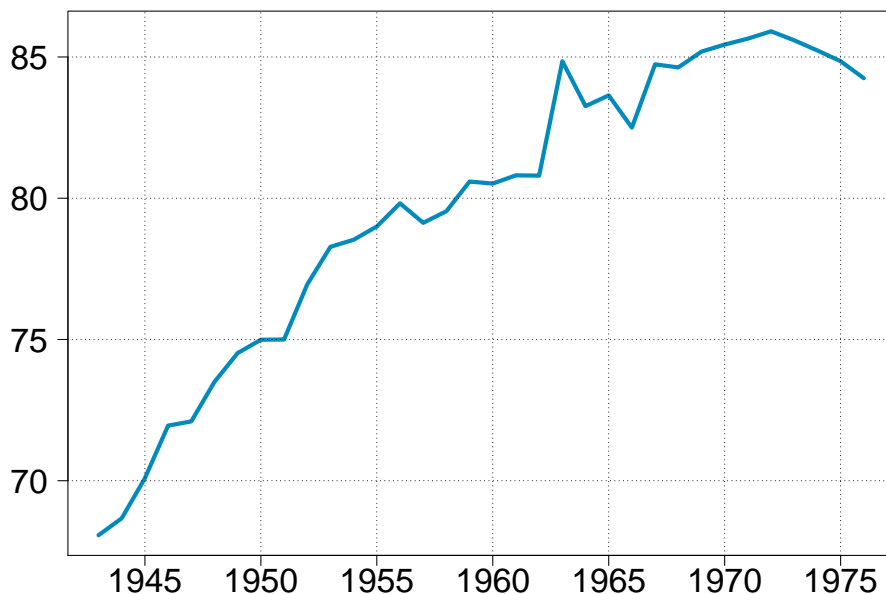
Figure 3: Labor force participation rate between 38-42 years old of women born between 1943 and 1976. - France.
Sources: French Labour Force Survey (1983-2016), author's own calculations.

effect of interest. Indeed, estimated coefficients between this model and the baseline one are not significantly different. This suggests that the "noise" observed in figure 2 is not a matter of concern for the problem in hand. Now let me focus on the strength of the effect with the age of the married men. The third row of table 4 suggests that having a participating wife increases labor force participation of younger married men of 3 points. Even if the estimated marginal effects are significant, they are sharply lower compared to what we see in the baseline case. Such a finding indicates that preferences of prime-age men are different from those of their older counterparts. Thus, it is possible to conjecture that either the shared leisure effect is weaker or the income effect is stronger (or a combination of the two effects). When estimating the model for two different sub-periods, it seems that the magnitude of the causal effect changes over time. However, the estimates do not provide sufficient statistical power to strongly affirm this statement. Finally, estimations of the model by considering only the post-2008 lead to nearly the same results.

6 Concluding remarks

Working with data from the quarterly and the annual French Labour Force Survey, we investigate the impact of having an active partner on older men labor market behaviors in France over the 2003-2016 period. To provide a causal interpretation between the two phenomena,

we estimate both Two-Stage Least Squares and Bivariate Probit using the cohort-specific participation rate of women at 40 as an exogenous variation in wives' labor supply. The construction of the instrument confirms the general increase in female's participation over the sample period. Estimates of the wife's equation indicate that a 1 point increase in cohort participation at 40 pushes current women likelihood of participation of about 2.5 points. Then, the marginal effect of interest, estimated with the second stage husband equation, is shown to be quite strong. More specifically, having an active wife induces an increase in male participation of 28 points (resp. 22) when Two-Stage Least Squares (resp. Bivariate Probit) are used. Then, we test for the sensitivity of the results by changing the dependent variable, the age group of interest and the measure of cohort-specific participation rate. Each time, our finding is confirmed and the causal effect of having a participating wife on her husband is estimated to be important.

All in all, this study should be seen as a further step in understanding the relationship between labor market decisions within couples. In particular, it suggests that, at least, husbands adjust their labor market behaviors to the decisions of their wife. In this respect, our finding is important from the policy maker viewpoint. Indeed, it suggest that, when implementing reforms changing the economic environment of elderly, policy designers should focus on the joint modeling of labor force participation decision in the household, especially because such modifications have both direct and indirect effects on the second partners.

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Mathieu Bunel, Emilia Ene Jones, Yannick L'Horty, Pascale Petit

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Jihan Ghrairi

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Frédéric Gavrel

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Joseph Lanfranchi, Mathieu Narcy

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