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Women's employment and the decline of home cooking: Evidence from France, 1985–2010

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Abstract

We here investigate the extent to which labour-market changes explain the decline in the time spent home cooking by married women in France between 1985 and 2010. Using time use data and Oaxaca-Blinder decompositions, we find that rising women's employment and *observed* wages together account for about 60% of the fall in the time married women spent cooking. We then use a semi-parametric matching technique to construct an implicit wage rate, which better reflects the change in labour-market incentives that individuals face. The rise in women's implicit wages explains no more than 20% of the decline in their cooking time, while the wage of their partner has no effect. Changing labour-market incentives are thus far from being the main driver of the decline in home-cooking. We also find evidence that home cooking continues to be structured by the gendered social norm of the "proper family meal".

JEL Codes D13 · I18 · J22

Keywords Cooking · Household production · Labour supply · Wages · Gender

1 Introduction

In most human societies, home cooking was and still is traditionally carried out by women. The rise in women's labour-force participation is thus likely to have had an impact on food preparation at home. Aggregate data does indeed reveal a negative correlation between trends in women's labour supply and non-market work such as

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home-cooking. For instance, American women spent 3.8 h more per week at work in 2003 than in 1965, but 10.3 h less in non-market work (Aguiar and Hurst 2007). Similarly, the rise in French urban women's labour-force participation between 1974 and 2010 is associated with a four-hour fall in their supply of non-market work (Brousse 2015). The leading economic explanation of this negative correlation is price substitution. As women obtain more opportunities to participate in the job market and to earn decent wages, the opportunity cost of time spent in household production rises, as does the relative full price of cooking from raw ingredients at home. This rise in the relative price of home cooking, combined with time-saving innovations in food processing, may thus explain why the purchase of processed or semi-prepared food and the consumption of food away has progressively become more attractive than "cooking from scratch".

We here use French time-use data collected in 1985–1986 (INSEE 1986) and 2009–2010 (INSEE 2010) to investigate the extent to which labour-market changes explain the fall in home-cooking time in recent decades. France is of particular interest here for two reasons. First, similar negative trends in cooking time are observed for the US, France and the UK. However, French women still spend more time on cooking, despite the popular view of a loss of food culture and cooking skills (Warde et al. 2007).[1] Second, the labour-force participation of French women rose continuously over the period. According to official statistics, this reached 65.8% in 2010 for women aged between 15 and 64, as against 56.7% in 1985.[2]

We focus specifically on partnered women under the legal retirement age for four reasons. First, our data show comparatively little change in home-cooking time for single women (with or without children) or for men. Second, the rise in women's labour-force participation came almost exclusively from partnered women. Third, labour-market incentives disappear after retirement.[3] Last, we want to examine the question of gender balance in home cooking.

We use Oaxaca-Blinder decomposition techniques to identify the contribution of labour-market changes to the change in home-cooking time. We first find that rising women's employment and *observed* wages together account for about 64% of the decline in married women's cooking time (57% when we also control for the increase in education levels and ownership in kitchen equipments). However, observed labour-force statuses and wages are the outcomes of individual choices. They thus mix individual selection on preferences and on labour-market incentives, as well as

[1] In an interview with The Independent (23/01/2010), the famous French chef Alain Ducasse attributed the decline in home cooking to "the rising number of working women: 'Unfortunately in France the women don't really have time to cook, and we are going toward this trend of less and less home-cooking (…) it's globalisation, it's not good news. The Italians have kept this tradition—la *mamma* cooks for the family home".

[2] INSEE statistics from "Enquêtes Emploi" (labour force surveys): http://www.insee.fr/fr/themes/series-longues.asp?indicateur=taux-activite-femmes [Accessed: 18/07/2016].

[3] Retirement has therefore been found to have a large and significant positive impact on food production at home and a negative effect on purchases of prepared food, especially for women (Aguiar and Hurst 2005; Stancanelli and Soest 2012).

other environmental factors (from child-care subsidies to the institutional determinants of spouses' bargaining power). We then use semi-parametric matching techniques to construct implicit wage rates, *i.e.* the expected wage rates of individuals were they to work full time. This implicit wage represents the labour-market incentives faced by individuals at the moment of deciding their labour supply, and directly determines the opportunity cost of time spent in household production (Becker 1965). We find that 28% of the decline in married women's cooking time comes from higher implicit wages, and only 18% when we also control for the confounding effects of education and kitchen equipments. This is much lower than the above figure of 64%. The difference (46 percentage points) is explained by changes in preferences, technologies and environmental factors that are positively correlated with labour-market incentives and negatively correlated with cooking. By way of comparison, educational expansion, *i.e*. the increase in the schooling level of both men and women, sharply reduced home cooking, and represents about half of the observed fall in time spent in cooking.

These results confirm that labour-market changes have a significant impact on women's home cooking, even in a country like France, where home cooking is a strong cultural value. This is in line with empirical results from different countries and cultures, such as the US and Japan (Davis 2014; Davis and You 2010; Hamermesh 2007; Kohara and Kamiya 2016). Beyond cooking, our semi-parametric matching treatment of the endogeneity of observed wages and the measurement of time costs is also a methodological contribution to the large literature on the effect of partners' wages on non-market work (see Bloemen and Stancanelli 2014, for a recent study).

We also find that changing labour-market incentives are far from being the main driver of the decline in home cooking. Our regression results reveal the time-saving role of technological innovations in home cooking (kitchen appliances). Male wages have little effect on the distribution of cooking tasks and home cooking remains strongly gendered, even among the more educated. These results confirm previous evidence that men and women are not substitutes for most household chores (Bertrand et al. 2015; Sullivan 2011; Sofer and Thibout 2015; Bloemen and Stancanelli 2014).

Our results have direct consequences for food and nutritional policies. The decline in women's home cooking has been related to the rise in obesity and diabetes (Anderson et al. 2003; Cawley and Liu 2012; Fertig et al. 2009; Hamermesh 2010; Liu et al. 2009; von Hinke Kessler Scholder 2008).[4] A popular view among nutritionists and health-policy makers is that public-health programs should promote home cooking (Smith et al. 2013). Our results suggest that such programs may fail, because of the trade-offs faced by women between paid work and home cooking,

[4] These underline five mechanisms linking women's employment, food preparation and obesity: (1) the price substitution effect from rising opportunity costs of time (increasing wage rates), which implies a greater reliance on ready-to-eat processed food that is of poor nutritional quality; (2) an income effect, as food-away (especially restaurant eating) is a normal good; (3) a "behavioural" effect of the greater availability of ready-to-eat food on impulsive consumers; (4) less parental supervision of children's diet; and (5) fathers not offsetting the fall in mothers' time inputs.

women's preferences over these choices, and the lack of substituability between men and women in meal preparation. Given the impact of technologies on cooking trends, encouraging innovations designed to ease the preparation of healthy meals might be a better way of ensuring the healthiness of food-at-home whatever the time inputs that women can and *want to* devote to home cooking. This point is not specific to France, as Davis and You (2011) reached a similar conclusion after an empirical analysis of the consistency of household decisions of food production and food assistance programs in the U.S.

The remainder of this paper is organized as follows. Section 2 uses insights from the economics of household production and the sociology of food to discuss the effect of labour-market incentives, technology and social norms on home cooking. We derive three testable empirical hypotheses. Section 3 describes the French Time Use Surveys used to test these hypotheses, and outlines the major changes in cooking time, labour-market participation and socio-demographic variables between 1985–1986 and 2009–2010. Section 4 presents the statistical models. The main results are presented in Section 5, and further discussed in Section 6. Last, Section 7 concludes.

2 The economics of home cooking

This section presents the main economic and sociological mechanisms that may lie behind the trends in home cooking. We highlight the key role of changing labour-market incentives and technological progress. We also emphasise the interactions between economic forces and social norms regarding the gender division of household production and what is considered to be a proper meal. We derive three hypotheses that will be tested in the empirical work.

2.1 The economics of home-cooking

The economic approach to cooking revolves around individuals substituting cooking time for food preparation partly or entirely done in restaurants and factories, depending on consumer preferences and on the money and time costs of home cooking relative to the market price of food preparation away. These relative prices depend on food processing technologies and time-saving kitchen appliances (e.g. the invention of deep freezing combined with microwaves) and on the characteristics of non-food markets, especially labour markets.

Consumer responses to changing market prices, time costs and technologies can be formalized in a simple static model that stems directly from household-production theory (Becker 1965; Pollak and Wachter 1975). We consider a simple utility structure that corresponds to a consumer or a unitary household allocating time and money resources between the home production of meals and purchase of food-away for one-period. Utility is defined as:

$$U(q_a, F_h(T_h, q_h; z_1), L, c; z_2) \tag{1}$$

where q_a is food entirely prepared away from home, F_h is food prepared at home using time T_h and food products q_h, L is leisure commodity, c is the numeraire good,

z_1 is cooking technology and z_2 is a vector of preference variables.[5] We let N be the time spent working, w the hourly wage rate and ν non-labour income. The prices of food-away and food products for cooking are denoted respectively as p_a and p_h.

Cooking, as well as paid work, may produce utility in their own right. Following Kooreman and Kapteyn (1987), this "joint production" can be formalized as $L = l + g_T(T_h) + g_N(N)$, with l being available leisure time. Assuming that $g_T(T_h) = (1 - k_T)T_h$ and $g_N(N) = (1 - k_N)N$ with k_T, $k_N < 1$, one hour spent cooking (working) costs the individual only a fraction k_T (k_N) of 1 h of leisure. The household optimization program is then:

$$\begin{gathered} Max_{q_a,T_h,q_h,l,c,N}\, U(q_a, F_h(T_h, q_h; z_1), L, c; z_2) \\ p_a q_a + p_h q_h + c = wN + v \\ T_h + l + N = T \\ L = l + g_T(T_h) + g_N(N) \end{gathered} \tag{2}$$

Assuming away corner solutions, the first-order conditions yield:

$$\partial F_h / \partial T_h = \eta \frac{k_T}{k_N} \frac{w}{p_a} \tag{3}$$

where $\eta = (\partial U/\partial x_a)$ / $(\partial U/\partial F_h)$ is the marginal rate of substitution (MRS) between food consumed away and meals prepared at home.[6] Then, at a very general level, optimal cooking time is given by the following equation:

$$T_h = f(w, p_h, p_a, \nu; z) \tag{4}$$

where $z = (z_1, z_2)$ is a vector of factors related to preferences and technologies, including k_T and k_N.

When the returns in household production are decreasing, F_h is increasing and concave in its arguments. Eq. (3) then tells us that cooking will decline with a fall in the price p_a of food-away and an increase in the wage rate w. Note also that non-labour income has a pure income effect through the consumer's full budget constraint; this income effect is likely positive. The opportunity cost of time spent cooking is a fraction $\eta\ k_T/k_N$ of wages. As labour-market opportunities for women have changed, wages have risen and so has the opportunity cost of time. All else equal, it became more advantageous to work more and purchase meals prepared away rather than buying food and spending time preparing it. This prediction has been confirmed by a number of empirical contributions: see, for instance, the review of US research in Davis (2014). The impact of increasing wage rates is all the more important that the direct utility of paid work is high (*i.e.* when k_N decreases), which is

[5] Davis (2014) discusses the most general formulation that makes the distinction between food products and food commodity (meals), where meals consumed away requires time to be produced. For simplicity here, we assume that purchasing food-away entails no time costs, or time costs that are negligible as compared to cooking times. Plessz and Gojard (2015) find no significant correlation between the time spent shopping and the consumption of fresh vegetables.

[6] When food-away and meals prepared at home are perfect substitutes, and there is no joint production, $\eta = k_T = k_N = 1$, and the standard result that optimal time inputs depend only on wages, prices and the household-production technology holds.

the case if, for instance, paid work yields non-monetary benefits (social status, feeling of social inclusion, etc.).

Changes in technology and women's labour-market participation are related. Technological innovations have increased the productive efficiency of time spent home cooking.[7] A number of innovations in food processing, preservation and preparation have occurred since the 1960s. Frozen ready-meals require only a few minutes of preparation. Frozen ingredients avoid spending time chopping, dredging and sautéing. Most home-cooked meal include ultra-processed food that is ready-to-eat (e.g. yogurts). Sauces or cakes are easier to prepare thanks to prepared mixes. Washed and sliced fresh vegetables have now become available in all French supermarkets. For the household meal planner, outsourcing cooking operations is a way to save time while benefitting from considerable economies of scale, with lower fixed and variable costs per meal. The mass processing and preparation of food away from home is more capital-intensive, with larger and more efficient equipment and devices. It exploits the division of labour and the specialization of food professionals along the production chain. Technological advances in the food sector (and more generally in the household sector) have contributed to render labour-market participation more attractive for women, the rise in which has stimulated in turn the demand for innovations.[8]

Standard household-production theory then yields two empirical hypotheses that we will test:

Hypothesis 1—Labour-market incentives. Rising wages for women on the labour market have had a negative impact on cooking time.

Hypothesis 2—Household technology. The diffusion of kitchen appliances has had a negative impact on cooking time.

We now consider how within-household social interactions can add to these predictions.

2.2 Social norms and spousal interactions

As noted above, the impact of changing wages will be affected by contemporaneous variations in the marginal rate of substitution between home cooking and food away, and in the enjoyment from cooking. These factors depend notably on social norms and interactions between household members.

Sociologists have examined trends in eating patterns in relation to the possible decline of the "proper family meal" (Charles and Kerr 1988; Murcott 1982). The latter refers to a social norm regarding the time pattern of meals, their structure (food and dishes), the labour input in terms of cooking or table dressing, the ways of cooking, and the participants. Its precise definition and normative strength varies

[7] Most technological innovations in household meal production actually originate from innovations in the food-away sector. See Cutler et al. (2003) for an extensive description of these technological advances.

[8] The long-term macroeconomic impact of technological progress in the household sector on the rise in married female labour-force participation is analyzed in Greenwood et al. (2005). They estimate that technological progress in the household sector accounts for over 50% of the rise in female labour-force participation in the US over the last century. de V. Cavalcanti and Tavares (2008) estimate an elasticity of female labour-force participation to the price of home appliances in the range of (−0.73; −0.46) in the US over the 1977–1999 period.

across western cultures. For instance, regularity in time patterns and eating commensality are more important for the French than for Anglo-Americans. In France, the family meal retains both strong normative and descriptive content for everyday living (McIntosh et al. 2009; Grignon and Grignon 2009; Fjellström 2009).[9] Eating home-cooked food is a key element of the "proper family meal", with a crucial gender connotation. Family members, including mothers, tend to see cooking for the family as an "act of love" (Moisio et al. 2004). French mothers tend further to endorse a "caring ideology", whereby concerns over their children's and partner's health play a significant role in meal composition (Le Bigot Macaux 2001). Cooking remains a strong moral imperative *for women*. The impact of a weakening of this norm can be formalized in Section 2.1's model as either a shock to the joint production function $g_T(T_h)$ leading to a fall in the marginal enjoyment from home-cooking (a rise in k_T), or alternatively by a rise in the MRS η, which may tend towards one (perfect substitution).

A more formal treatment of the concept of the "family meal" in a choice model would consider collective household decisions over cooking and eating. The main difficulty in going down this path is that households produce both family and individual meals. Family meals should be treated as public commodities, whereas individual meals are private commodities. Cooking a family meal is likely to produce more enjoyment than cooking just for oneself. Although we do not formally write down the complex model that follows from these observations, it is worth considering the theoretical results from the economic literature on household production in non-unitary models. This literature analyses the allocation of goods and time between household members, either by assuming that each household member produces, supplies and demands commodities on intrahousehold shadow markets (Grossbard-Shechtman 1984), or under the assumption that intrahousehold decisions are Pareto-efficient (Apps and Rees 1997; Browning et al. 2014; Chiappori and Lewbel 2015; Pollak 2005; Rapoport et al. 2011).[10] Whatever the approach, the main prediction is that each spouse's time spent in cooking will depend on the wage rates of spouses and the market price of food away, but also on preferences and on factors affecting spouses' relative bargaining power.

Using the framework proposed by Grossbard-Shechtman (1984), cooking can be seen as a form of Work-in-Household (WIH) that is essentially supplied by women, as they have historically been in charge of food preparation and spouses' cooking times are technical substitutes in meal production. The shadow cost of women's cooking, and thus its supply price, will depend positively on their own labour market

[9] Commensality refers to eating with other individuals, i.e. with colleagues at the workplace, other students at school, or with family members at home. Comparing family meal practices in France and England, Pettinger et al. (2006) find that French household members eat together more often, cook raw ingredients more often, and are more likely to follow a regular meal pattern. Unsurprisingly then, grazing and the disappearance of the family meal is a real and well-documented source of concern in the UK and the US, while it is much less of a problem in France and continental Europe (Fjellström 2009).

[10] Writing a household maximisation program is easy but not very helpful, as it yields intractable results. The literature usually focuses on more restrictive models (goods are either public or private; there is no joint production etc.) when the objective is to recover deep structural parameters. This is not the case in this paper. In addition, it would be difficult to bring such a model to the data. We are able to observe meal commensality, but we do not know whether people eat something that has been cooked just before the meal, or some days in advance.

wages and the marginal utility of labour, and negatively on the marginal utility of cooking. Higher shadow costs of production result in a lower men's equilibrium demand for women's cooking. Men's willingness to pay for women's cooking increases with men's wage rates, due to an income effect and a substitution effect in home production.[11] The equilibrium cooking time of women will eventually depend negatively on their own wage and positively on their partner's wage. Higher wages for women should also result in a higher consumption of food away from home,[12] and in higher cooking times by men, but only for male partners who do have cooking skills. Absent these skills *and* the willingness to acquire them, there is no substitutability in household production, so that wives' wages should not affect husbands' cooking.

In addition, the "proper family meal" is a not-perfectly marketable good. It has one specific characteristic—being home-cooked—that food prepared away does not have. Hence, the wage effects will be smaller if the "proper family meal" norm is strong and gendered, in the sense that partners prefer not substituting women's cooking for food-away or for men's cooking.

Following these insights, we have one more testable empirical hypothesis:

Hypothesis 3—Household bargaining process. For couples, an increase in the husband's wage has a positive impact on the wife's cooking time.

Failure to validate Hypothesis 3 would suggest that the impact of changing economic incentives is largely attenuated by social norms regarding gender roles and family meals. We now present the data that will be used to test Hypotheses 1–3.

3 Data

We exploit the 1985–1986 and 2009–2010 French Time Use Surveys (FTUS—Enquêtes Emploi du Temps), which are conducted about every ten years by the French National Statistics Office (INSEE), and are included in the Multinational Time Use Study dataset.[13] Time-use surveys (TUS) have two key advantages. They provide more accurate accounts of the time devoted to domestic chores than traditional questionnaires; refusal to complete the survey generates very little bias in the estimated durations. Additionally, because TUS collect information on every activity, they avoid the selection or declaration bias that a survey focusing on food or eating

[11] See Grossbard-Shechtman (2003). In collective decision models *à la* Chiappori, the price effect of the wage rates is further divided into a pure price substitution effect and an extra price effect that comes from the change in the relative bargaining power of spouses, i.e. in the relative welfare weights of each spouse in the household collective welfare function (Vermeulen 2002).

[12] See Grossbard-Shechtman (2003) and Bloemen and Stancanelli (2014) for more formal discussions of these predictions. Time-use research in sociology also recognizes that cooking is "unpaid labour" and is therefore doomed to decline as long as people find alternative ways to provide meals and more rewarding ways of spending their time (Gershuny 2000; Ricroch 2011).

[13] See https://www.timeuse.org/mtus/surveys. For simplicity, we refer to 1985 and 2010 as the survey years in the rest of this paper. The data were collected between September 1985 and September 1986 for the 1985–1986 FTUS, and between September 2009 and September 2010 for the 2009–2010 FTUS. These FTUS are part of the Multinational Time-Use Database maintained by the Centre for Time Use Research of the University of Oxford.

might generate. Their main limitation is that there is no information on the foods consumed and their prices; there is, however, information on earned and unearned incomes (Gershuny 2003).

The survey samples are nationally representative of households and individuals not living in institutions, with calibration by labour-force status, age by gender, education, household structure, place of residence, days of week, months and school holidays. Various types of household- and individual-level data are collected. We will in particular use information on the kitchen equipment in the household, *i.e.* freezer and microwave, labour-market outcomes (labour-force status, earned income, and usual working hours), education and non-labour income. When individuals are in a couple, their partner is also interviewed and also provides time-use data for the same day. The latter consist of self-completed 24-hour paper diaries. The 1985 FTUS data include (i) a base of 10,373 households with complete household-level data and at least one time diary for a randomly drawn household member (the main respondent);[14] (ii) information on 29,723 household members, of which 77.6% are aged over 15. For the 1985 survey, one day was randomly drawn for the main respondent, and the activities were coded into slots of 5 minutes (min) each. When the main respondent had a partner (6582 households), the latter was invited to complete a time diary. The refusal rate was 13.8% only. We have 16,047 completed time diaries, among which 11,348 are same-day diaries completed by 5674 couples. The 2010 data includes: (i) a base of 12,069 households, with missing time diaries for 1394 households; (ii) a base of 18,521 individuals, of which 2279 have missing time diaries and 98.8% are aged over 15. One week day and one week-end day were randomly drawn for one randomly drawn household member individual, with activities being coded into 10-min slots.[15] When this respondent had a partner, the latter was asked to provide time diaries on the same days. The refusal rate was 5.24%. We have 27,903 completed time diaries for 16,242 individuals, with 8966 pairs of same-day diaries from married couples.

3.1 Construction of the estimation sample and definition of the main variables

The empirical analysis focuses on households that fully completed the time diaries, where all adults are aged between 18 and 64, at least one adult is active on the labour market and without self-employed. We keep households with at least one adult woman, and without other cohabiting adults (grand-parents, brothers, sisters etc.). We drop households with more than two adults, as well as same-sex couples, as social norms and decision processes may be structurally different for these. We drop diaries completed on a sickness day. Starting with a dataset of 20,994 households observed either in 1985 or in 2010, this leaves us with an initial sample of 5579 households and 9227 individual-days observed in 1985, and 5345 households and 13,658 individual-days in 2010.

[14] The data for the 998 households with incomplete data are not provided by INSEE. For more information on the completeness of the data, see the documentation of the survey, volumes 4 and 5.

[15] About 40% of individuals completed only one day of diary. For these individuals, the distribution of days do not show any systematic bias in favour of a particular day. There are only 78 couples where one partner completed one day and the other two days.

We use a strict definition of time spent cooking, which does not include meal-related chores such as setting and clearing the table, washing dishes, grocery shopping, etc.[16] In some analyses, we will use household cooking time, which is defined as the sum of partners' cooking times. We ignore time overlaps, because there is little spousal synchronization in cooking: around 2 min in 1985 and 4 min in 2010. The direct substitute for home cooking, food away, will be captured by the frequency of restaurant eating, which includes meals at worksite restaurants and commercial restaurants. We do not distinguish between meals at non-company restaurants with work colleagues and meals with family or friends. To test the robustness of our results, we have also looked more broadly at the frequency of eating away from home, which encompasses all eating-away occasions (e.g. eating at friends).

The labour-market outcomes of interest are labour-force status and wages. We code the former into four categories: inactive or unemployed (including a few students), part-time workers, full-time workers with missing wage information, and full-time workers with observed wages. The latter are calculated as total self-reported annual earned income from all activities divided by self-reported usual weekly working hours. They are adjusted for annual changes in the Consumer Price Index, so that all monetary variables are expressed in 2010 Euros.

A key variable in any economic analysis of time-use decisions is the opportunity cost of time. As outlined in Section 2.1, this is a function of the wage that the individual earns or may expect to earn on the labour market. This wage is not observed for those who do not work, and imperfectly measured for those who work part-time. Section 4 proposes a semi-parametric matching method to construct *implicit* wages for these individuals. This method further reduces the sample size, as we drop individuals for whom the matching is unreliable.[17] Considering only the female partner, the full estimation sample finally includes 3949 households from the 1985 FTUS (3949 days), and 3566 households from the 2010 FTUS (5727 days, as 2 days are available for about half of the sample).

Importantly, we control for changes in non-labour income, which is an important determinant of choices over work, leisure and household production. The FTUS allow us to measure this.[18] In both years, information is missing for about 15% of the sample. Instead of dropping these observations, and given the likely lack of accuracy of our measure, we construct a categorical variable for non-labour income, with five interval categories ([0,50], [50, 250], [250,500], [500, 1000], over 1000 Euros/month), and a sixth category for missing values.

[16] Our restricted definition of cooking time follows Bittmann (2015). We chose it because the time spent "washing kitchen utensils" is not a precise category in the FTUS, and our conceptual framework specifically includes the direct utility from cooking. Adding the time spent on meal chores does not fundamentally alter our results.

[17] Table S2 in the Supplementary Appendix shows that dropping these individuals has little effect on the average characteristics of the sample.

[18] In the 1985–1986 FTUS, total household income is self-reported as an interval variable in 12 categories. We assume a log-normal distribution to extrapolate a continuous measure of total household monthly income (in 2010 Euros). We subtract total self-reported labour earnings from the latter to obtain a measure of unearned household income in Euros per month. The data from the 2009–2010 FTUS come with a continuous household income measure constructed by INSEE.

Table 1 Trends in household cooking times

	Population share		Unconditional mean (min/day)		Proportion of zeros (%)		Conditional mean (min/day)	
	1985	2010	1985	2010	1985	2010	1985	2010
Household cooking time								
Sample size	3949	5727						
All households	100%	100%	71.75	61.01	4.06	16.67	74.79	73.21
Couples	75.11%	65.47%	82.60	72.82	0.82	9.93	83.29	80.86
Single women	19.23%	22.07%	35.76	33.72	16.6	33.20	42.90	50.48
Single mothers	5.66%	12.46%	50.04	47.25	4.31	22.77	52.30	61.18
Individual cooking time—Women								
Sample size	3949	5727						
All women	100%	100%	61.28	49.64	6.18	22.14	65.31	63.76
Women in couple	75.11%	65.47%	68.66	55.47	3.64	18.29	71.25	67.88
Women in couple, day off in week-end	18.46%	13.85%	77.99	67.36	3.98	18.02	81.23	82.17
Women in couple, working or week day	56.65%	51.62%	65.61	52.27	3.53	18.37	68.01	64.03
Individual cooking time—Men								
Sample size	3751	5300						
All men	100%	100%	14.87	18.71	45.92	58.02	27.49	44.57
Men in couple	74.43%	67.28%	13.97	17.98	46.81	59.46	26.26	44.36
Men in couple, day off in week-end	17.07%	14.77%	17.15	22.63	48.52	54.60	34.47	49.84
Men in couple, working or week day	57.36%	54.83%	12.84	16.73	46.31	60.77	23.92	42.65

Notes: The statistics are adjusted for individual-day sampling weights. The sample (Estimation Sample) used to calculate total household cooking time includes all households with at least one adult woman (i.e. household head or spouse/partner of the household head) and non-missing information on both partners (for couples). Households with other cohabiting adults (such as grand-parents, aunts and uncles) are excluded. Total household cooking time is defined as the sum of the cooking times of the woman and her partner if she lives in a couple. The samples used to calculate individual cooking times exclude individuals in partnership with missing information on the partner's cooking time. The first column shows the subsample on which the statistics are calculated. The second and third columns indicate for each year the proportion of the estimation sample that is represented in the subsample. The unconditional mean columns show the estimated mean cooking times by year of survey for each subsample. The proportion of zeros is the estimated proportion of individuals who did not cook in the day. The conditional mean is the estimated mean cooking time in the subpopulation with strictly positive cooking times. The sum of the unconditional means of men and women in couples differ slightly from mean household cooking time due to the use of individual-day sampling weights

Last, technological innovations in home cooking will be captured by variables for whether the household has a freezer and/or a microwave, and can therefore prepare meals from food products that have been partly processed away from home (ready-meals and frozen products). In some regressions, we will also use a proxy measure of household time-saving kitchen technology by summing up ownership of freezer, microwave and dishwasher.

3.2 Changes in cooking times and labour-market choices between 1985 and 2010

Table 1 illustrates the decline in time spent cooking. All durations are in minutes per day. The upper panel shows the descriptive statistics for household cooking time for the whole sample, whether partnered or not, while the middle and lower panels

consider the trends for women and men respectively. The first line of Table 1 shows that households cooked about 10 min less in 2010 than in 1985 (61.0 vs. 71.7 min). A large part of this fall is due to a rise in the proportion of zeros, *i.e*. days where households do not cook at all, from 4.1 to 16.7%. The conditional mean cooking time is actually quite stable at around 74 min per day. These trends also apply for married couples, which represent 75.1% of household-day observations in 1985, as against 65.5% in 2010. This shift in sample composition reflects a rise in divorce and later union formation, with more single women and single mothers in 2010. Interestingly, there has been little change in unconditional mean cooking times for these last two categories. Although they have more "no-cooking" days in 2010 than in 1985 (33.2% for single women), they nevertheless spend more time cooking when they do so (50.5 min in 2010 vs. 42.9 min in 1985 for single women).

The trends in individual cooking time reveal the same pattern for married women (see the middle panel of Table 1), with more "no-cooking" days and little variation in conditional mean cooking times. Splitting the sample into working days and week days (Monday–Friday) and Saturdays or Sundays off reveals little effect from the potential constraint of work.[19] This can be interpreted as evidence that the time input into cooking is *on average* the outcome of long-term decisions, rather than short-term changes in constraints.

As shown in the lower panel of Table 1, partnered men cook only 4 min more per day in 2010 than they did in 1985, with an average cooking time of 18.0 min that remains far below that of their partners. The same trend as for women is observed at the extensive margin, with a 15% point rise in the proportion of "no-cooking" days (59.5%). However, when they do cook, they spend more time doing so (44.4 vs. 26.3 min). This is not just because cooking has become a fancy means of amazing friends at week-end dinners, as they also spend more time in cooking (when they do cook) during weekdays.

Table 2 compares these trends in cooking times with trends in meal times, meal chores and working time. A number of notable figures emerge. First, the French spent more time in 2010 than in 1985 eating. For women in couples, this figure rose from 94.6 min per day in 1985 to 136.5 min in 2010. Interestingly, this is not because having a meal is declared as a secondary activity, undertaken while watching TV for instance. Eating remains a primary activity, unlike in the US (Hamermesh 2010). The French take more time to eat at home (+18 min for women in couples) and away-from-home (+22 min). The time devoted to meal chores has fallen, thanks to the diffusion of dishwashers. Similar trends are observed for single women, single mothers and men in couples. The only difference between these categories regards paid work. Married women have longer working hours in 2010, unlike single women, single mothers or married men. This is due to a large increase in the proportion of days not worked for these last three categories, as all individuals report longer work hours on working days. The stability in the proportion of days not worked for married women reflects two opposing trends: more days off for everyone

[19] "Saturdays and Sundays off" are weekends for non-workers and off-work weekend days for workers.

Table 2 Trends in individual meal times

	Unconditional mean (min/day)		Proportion of zeros (%)		Conditional mean (min/day)	
	1985	2010	1985	2010	1985	2010
Women in couple						
Meal	94.56	136.50	0.03	0.18	94.59	136.75
Meal as a secondary activity	1.28	8.94	95.81	87.66	30.51	72.42
Meal: away-from-home	15.65	33.66	73.14	61.79	58.25	88.08
Meal: at home	78.91	102.85	1.24	2.12	79.90	105.08
Meal: restaurant	7.11	14.46	85.63	76.91	49.47	62.66
Cooking	68.66	55.47	3.64	18.29	71.25	67.88
Meal chores	42.71	19.65	8.29	49.78	46.57	39.13
Work	194.05	217.95	53.27	51.22	415.28	446.83
Single women without children						
Meal	89.73	129.06	0.30	0.88	90.00	130.20
Meal as a secondary activity	1.39	7.97	94.63	90.50	25.89	83.89
Meal: away-from-home	26.01	44.98	54.41	51.69	57.04	93.11
Meal: at home	63.72	84.08	3.41	4.48	65.97	88.02
Meal: restaurant	14.94	19.91	71.60	70.62	52.60	67.79
Cooking	35.76	33.72	16.65	33.20	42.90	50.48
Meal chores	25.16	15.13	23.18	58.13	32.75	36.14
Work	308.44	250.66	33.97	49.22	467.10	493.65
Single mothers						
Meal	92.89	123.94	0.30	1.18	93.16	125.43
Meal as a secondary activity	3.26	7.45	95.73	90.13	76.42	75.48
Meal: away-from-home	26.07	33.62	56.59	53.08	60.06	71.66
Meal: at home	66.81	90.32	3.97	3.51	69.58	93.61
Meal: restaurant	15.92	17.33	74.42	68.63	62.21	55.23
Cooking	50.04	47.25	4.31	22.77	52.30	61.18
Meal chores	29.09	18.18	20.58	52.19	36.63	38.03
Work	299.65	275.00	34.13	41.45	454.89	469.67
Men in couple						
Meal	101.75	141.60	0.11	0.57	101.86	142.42
Meal as a secondary activity	2.25	8.97	92.16	89.44	28.70	84.88
Meal: away-from-home	23.39	42.97	59.84	51.41	58.25	88.43
Meal: at home	78.36	98.63	1.85	3.31	79.83	102.01
Meal: restaurant	12.59	22.28	77.24	66.92	55.32	67.35
Cooking	13.97	17.98	46.81	59.46	26.26	44.36
Meal chores	11.43	8.32	53.91	72.33	24.79	30.07
Work	356.45	327.25	30.24	38.56	510.98	532.66

Notes: See Table 1

on the one hand, and greater female participation in the formal labour market on the other.[20]

[20] The increase in the proportion of days off is largely due to the 35-h working week law that was adopted in February 2000. In many companies, unions and managers have agreed to maintain weekly working hours in exchange for additional days of holiday for employees.

Table 3 Descriptive statistics—estimation sample of partnered women

Variable label/definition		Mean (s.d.)		Variation
		1985 N = 3,162	2010 N = 3,827	(2010)–(1985)
Age		35.960 (9.853)	39.727 (9.826)	+3.766
Labour-market variables				
Observed wages		4.530 (4.458)	7.200 (5.596)	+2.671
Observed wages—workers		7.332 (3.409)	9.595 (4.330)	+2.263
Predicted wages		7.877 (1.993)	9.330 (2.729)	+1.453
Partner's observed wages		8.056 (4.452)	10.037 (5.854)	+1.981
Partner's observed wages—workers		8.709 (3.967)	11.270 (4.957)	+2.561
Partner's predicted wages		9.707 (3.014)	11.243 (3.644)	+1.536
Works		61.8%	75.0%	+13.3 pp
Works part-time		8.6%	14.2%	+5.6 pp
Partner works		92.5%	89.1%	−3.4 pp
Both partners work		56.6%	68.7%	+12.0 pp
Unearned income				
Unearned income [0;50] Euros/month		54.0%	30.2%	−23.8 pp
Unearned income [50;250] Euros/month		20.3%	17.2%	−3.1 pp
Unearned income [250;500] Euros/month		23.5%	23.7%	+0.2 pp
Unearned income [500;1000] Euros/month		1.8%	14.1%	+12.3 pp
Unearned income ≥ 1000 Euros/month		0.4%	14.8%	+14.3 pp
Unearned income missing		14.6%	15.0%	+0.4 pp
Kitchen equipment				
Has a freezer		41.5%	97.5%	+56.0 pp
Has a microwave		0.0%	93.0%	+93.0 pp
Has a freezer and a microwave		0.0%	90.9%	+90.9 pp
Kitchen technology: freezer + microwave + dishwasher		0.729 (0.696)	2.600 (0.578)	+1.871
Education				
EDUCA1	Primary school	40.8%	15.8%	−25.0 pp
EDUCA2	High school	34.9%	29.7%	−5.2 pp
EDUCA3	Baccalaureat	8.6%	21.2%	+12.6 pp
EDUCA4	Higher education	15.7%	33.3%	+17.5 pp
Partner's education				
PEDUCA1	Primary school	33.5%	14.5%	−19.1 pp
PEDUCA2	High school	43.4%	40.6%	−2.7 pp
PEDUCA3	Baccalaureat	9.4%	15.8%	+6.3 pp
PEDUCA4	Higher education	13.7%	29.1%	+15.5 pp

Notes: This table shows the descriptive statistics for the main control variables in the estimation sample of married women. The statistics are adjusted for individual-day sampling weights. The first column gives the variable definitions, the second and third columns the sample means and standard deviations in 1985 and 2010, and the last column the change between the two surveys. Abbreviation: *pp* percentage points

This major change in labour-force participation, together with the stability of cooking time for single women and single mothers, explains why we will particularly focus on married women. In addition, marital status is an important determinant of cooking and eating practices, with likely consequences on family health. We also

want to examine trends in the sharing of home cooking between spouses, to see whether labour-market incentives are moderated by norms regarding the gender division of household chores.

Table 3 describes the changes in married women's characteristics in the estimation sample of individual-days between 1985 and 2010.[21] Labour-force participation increased by 13.3 percentage points (pp), from 61.8 to 75.0%. Part-time employment represents about 40% of this rise (+5.6 pp). Working women's real wages rose from 7.3 to 9.6 Euros/h (in 2010 Euros), while those of men grew slightly more (+2.6 Euros over the period, vs. +2.3 Euros for women). The distribution of non-labour income has changed (except for the proportion of missing values), with higher unearned incomes in 2010. For instance, 14.3% of the sample reported unearned incomes of over 500 Euros/month in 2010, as against 0.4% in 1985. Although these trends in unearned income are in line with observations from administrative and fiscal data (Piketty 2006; OECD 2007), we remain cautious about the accuracy of our measures here.

The lower part of Table 3 shows how kitchen equipment and education have changed. As almost all households have a freezer in 2010, we construct a dummy variable for the joint ownership of a freezer and a microwave in 2010. In 1985 less than half of households had a freezer and the questionnaire did not include the microwave which was very rare in France. Our index for household kitchen equipment, which adds up the ownership of a freezer, a microwave and a dishwasher, rose from 0.72 in 1985 to 2.60 in 2010.

The impact of educational expansion is massive, with 33.3% of married women now having a higher-education diploma (as against 29.1% for their partner). Educational expansion is likely to be an important confounder of the impact of changing labour-market incentives, as education is both a determinant of wages and has a direct impact on food and foodways through social norms and nutritional knowledge.

4 Empirical framework

We test hypotheses 1–3 by applying an Oaxaca-Blinder decomposition approach to the changes in unconditional mean cooking times between 1985 and 2010 in the FTUS. This section briefly presents this econometric method. Our empirical strategy largely relies on the comparison of decomposition results from two specifications. In the first, women's labour-market changes are given by their observed labour-market status and wages (which are set to zero for non-workers). In the second, we replace these choice variables by implicit wages, which pick up the change in the labour-market incentives faced by individuals, whatever their preferences. Section 4.2 proposes a non-technical presentation of the semi-parametric matching technique that we use to construct implicit wages. The technical details appear as online Supplementary Appendix.

[21] All statistics are adjusted for individual-day sampling weights, so that the statistics for 2010 are representative of individuals. Given our sample selection choices, we do not claim that our estimation sample is perfectly representative of the entire French population of married women.

4.1 Econometric model

Let $T_{i,t}$ be the time spent cooking by individual i on a given day in survey year $t =$ 1985, 2010. We model $T_{i,t}$ as a simple linear function of a set of regressors $X_{i,t}$, which include labour-market variables, non-labour income, two variables for time-saving kitchen equipment (a freezer and a microwave) and a large set of sociodemographic controls: age (in seven categories); the age difference between spouses and its square (continuous variables); family structure (four categories: at least one child aged under 4, at least one child aged strictly under 6 and no child aged under 4, all children aged 6 or over, no children); dummies for whether the individual is off on the diary day, and whether the diary day is a Saturday or a Sunday; five residential-area dummies (rural area, small town, middle-sized town, city, and Paris and its suburbs), and administrative region (8 dummies).[22]

We estimate the following equation by OLS for each survey year t:

$$T_{i,t} = \beta_t X_{i,t} + c_t + \epsilon_{i,t} \tag{5}$$

where β_t measures the association between $X_{i,t}$ and $T_{i,t}$ in survey year t, c_t is a constant and $\epsilon_{i,t}$ is an error term with mean zero.

The Oaxaca–Blinder method decomposes the changes in $T_{i,t}$ between two surveys and identifies the contribution of labour-market changes to changes in cooking time, holding all other characteristics constant *on average* (Blinder 1973; Oaxaca 1973). We construct the decomposition by first taking the unconditional mean of equation (5) in each survey year $t = 1985, 2010$:

$$\begin{cases} \mathbb{E}\left(\mathrm{T_{i,1985}}\right) = \beta_{1985}\mathrm{X_{i,1985}} + c_{1985} \\ \mathbb{E}\left(\mathrm{T_{i,2010}}\right) = \beta_{2010}\mathrm{X_{i,2010}} + c_{2010} \end{cases} \tag{6}$$

We can then write the change in the unconditional mean over time as:

$$\begin{aligned} \mathbb{E}\left(\mathrm{T_{i,2010}}\right) - \mathbb{E}\left(\mathrm{T_{i,1985}}\right) = & \underbrace{\beta_{2010}\left[\mathbb{E}\left(\mathrm{X_{i,2010}}\right) - \mathbb{E}\left(\mathrm{X_{i,1985}}\right)\right]}_{\textit{composition effect}} \\ & + \underbrace{\left[\beta_{2010} - \beta_{1985}\right]\mathbb{E}\left(\mathrm{X_{i,1985}}\right)}_{\textit{structure effect}} + \underbrace{c_{2010} - c_{1985}}_{\textit{unexplained variation}} \end{aligned} \tag{7}$$

The first term on the right-hand side of equation (7) refers to the composition effect. This will provide the answer to our main research question: To what extent do labour-market changes explain changes in cooking time? The second term is the structure effect: this measures the contribution of changes in the associations between the dependent variable and the covariates. The last term, *i.e.* the difference in the constants, is the residual change, which is explained by neither the changes in observed covariates nor the changes in the impact of these covariates. There may be

[22] Following the economic and sociological literature on household decision making and marriage, age difference between spouses (or equivalently partner's age) is a potential confounding factor for the effect of wages on gains from marriage, spouses' bargaining powers. It is also related to norms regarding the division of household labour, see for instance Bozon (1991). The residential-area and region dummies control for cross-sectional variations in food prices. Conditional on these characteristics, the cross-sectional variations in local food prices are negligible as compared to time variations, because France is a small country with excellent transportation infrastructure.

some unobserved factors that influence cooking decisions beyond their indirect effect via the X variables. For instance, women may on average have fewer cooking skills in 2010 than in 1985, which would generate an unobserved composition effect. It may also be the case that cooking skills matter less now for producing a meal, which would yield an unobserved structure effect. The unexplained variation thus captures both unobserved composition and structure effects.

We here focus on composition effects. An important question, then, is whether we should evaluate the composition effect at the coefficients of 2010 or 1985.[23] The β_t coefficients reflect to a large extent the impact of period-specific preferences on choices. For instance, if individuals have a strong taste for home cooking, then we may expect only a small impact of wages on cooking time. Hence, as we want to analyse past changes from the perspective of current individuals, we choose 2010 as the reference year.

Another important question is whether modelling unconditional mean cooking time is appropriate. The statistics in Table 1 show that a large fraction of individuals report no cooking time on the diary day, especially in 2010. The changes in the unconditional mean observed between 1985 and 2010 seem to be largely driven by these zeros. However, we here take a long-run perspective on women's time use. In this context, we are not interested in day-to-day variations in time use, and the zeros reflect the infrequency of choices rather than long-term equilibrium outcomes of individual time-allocation decisions. These zeros do not affect our estimates of average long-run time use via OLS (Frazis and Stewart 2012; Stewart 2013).[24] However, we will test the robustness of our results by decomposing changes in the frequency of cooking, which is defined as the probability of having cooked at least 3 min on the diary day, i.e. $T^*_{i,t} = Prob\left(\mathrm{T_{i,t}} \geq 3 | X_{i,t}\right) = F(\beta_t \mathrm{X_{i,t}} + c_t)$. We use the extension of the Oaxaca-Blinder method in (Yun 2004), which uses a first-order linear approximation of the function $F(.)$. This approach will also be applied to eating away occasions.

4.2 Measuring labour-market changes

Labour-market changes can obviously be reflected in women's labour-force participation and observed wages. However, as we take a long-run perspective on our time-use data, labour-market decisions are endogenous. This is in line with the theoretical framework in Section 2. Individuals self-select into the labour market as a

[23] The following alternative decomposition also holds: $\mathbb{E}\left(\mathrm{T_{i,2010}}\right) - \mathbb{E}\left(\mathrm{T_{i,1985}}\right) = \beta_{1985}\left[\mathbb{E}\left(\mathrm{X_{i,2010}}\right) - \mathbb{E}\left(\mathrm{X_{i,1985}}\right)\right] + \left[\beta_{2010} - \beta_{1985}\right]\mathbb{E}\left(\mathrm{X_{i,2010}}\right) + c_{2010} - c_{1985}$. All decomposition are estimated using Ben Jann's Stata command Oaxaca (Jann 2008). with the use of heteroskedasticity-robust matrices of variance-covariance. The effects of categorical variables are normalized, following Gardeazabal and Ugidos (2004).

[24] This "long-run" perspective on time-use data assumes that day-to-day variations in time use are random and independent shocks that cancel out at the aggregate level, so that the unconditional mean can be estimated without bias by simple averages (Frazis and Stewart 2012). This does not hold for other statistics, like the median, and we thus do not consider decomposition techniques for distributions. Stewart (2013) also shows that OLS models yield better results than do Tobit models for the analysis of time-use data with zeros. The presence of zeros nevertheless requires the White correction of the variance-covariance matrix, as it likely produces heteroscedasticity in the residuals. Last, the separate modelling of the extensive and intensive margin, i.e. the zeros and the conditional mean, is of interest only when we consider short-term activity shifts in response to shocks, e.g. "do people cook more on sunny days"?

function of expected wages, which are unobserved for non-workers. As is usual in household-production analysis, we have to construct implicit wages. One common solution is to estimate a wage equation with correction for self-selection into employment. Implicit wages can then be predicted for non-workers (see for instance Hamermesh 2007).

A key challenge with this approach is that observed wages may depend on the number of hours worked, i.e. the budget constraint of the leisure-work choice problem is not linear. In France, many part-time workers benefit from specific wage regulations. To avoid this problem, we measure implicit wages by the wage that the individual would have earned in a full-time job. We define three labour-market statuses: non worker, part-time worker, and full-time worker. The latter includes all individuals with working time greater than or equal to the OECD threshold of 32 h. Note that this threshold is lower than the reference value of legal weekly working hours (39 h in 1985; 35 h in 2010), as in our dataset there are a considerable number of observations just under the legal reference level, suggesting the presence of individual- or firm-level agreements whereby full-time workers do not work a complete week. We assume that individuals can freely choose hours above these norm levels and/or jobs (e.g. managerial) that necessarily imply longer hours (and higher earnings). Those in part-time jobs or who do not work are considered to have potentially self-selected into these labour-market statuses. We then use a semi-parametric matching method to match each non-worker with a full-time worker, and each part-time worker with a full-time worker, by gender and survey year. We also apply this method to construct wages for the few full-time workers with missing wages. Section S.1 in the Supplementary Appendix provides additional details and statistics on the econometrics, implementation and statistical quality of the matching procedure.

Full-time wages are modelled as a linear function of a set of variables W that are commonly used in wage equations: age and age-squared, seven education categories (Nothing, primary school, incomplete lower secondary school—general, lower secondary school—technical, upper secondary school—general, upper secondary school—technical, two-year university degrees, three or more year university degrees).[25] An individual's implicit wage can then be written as the sum of an expected wage conditional on W and an individual-specific error term reflecting unobserved ability. Propensity-score matching is applied to predict this error term for each non-worker and part-time worker. The propensity scores depend on a set of variables Z that includes the W variables, but many variables in Z are excluded from W. We thus use additional exclusion restrictions to obtain more precise estimates (Heckman et al. 1997).

The exclusion restrictions *potentially* include the following variables that commonly appear in work on labour-market participation or time use (Bloemen and Stancanelli 2014; Hamermesh 2007; Kimmel and Connelly 2007; Duguet and Simonnet 2007): number of children aged under three (children go to school at three in France) and aged under six, total number of children; whether there is free help for child care; whether the household has to pay for child care; whether the individual's

[25] We do not include years of experience on the labour market as this was not measured in the 2010 survey. The impact of labour market experience is absorbed by the age and education variables.

mother was active or not, four socio-occupational dummies (private-sector managers, private-sector intermediate professions, private-sector workers, and public-sector employees); and interactions between age and the socio-occupational dummies. These interactions capture cohort differences in the relative unemployment risk faced by individuals with different professional skills. We carefully select an optimal subset of exclusion restrictions to avoid "weak instrument" bias and impose a strict common support condition. Finally, we remain cautious about the causal interpretation of our results, as we do not exploit quasi-natural shocks to identify wages. Table 3 shows mean implicit wages in 1985 and 2010, and the change between the two surveys. The implicit wages have converged to observed wages, which means that selection into employment now depends less on unobserved characteristics affecting wage offers.

5 Results

Tables 4 and 5 present the main regression and decomposition results for married women. Three specifications are tested: specification 1 controls for labour-market choices (observed wages and labour-market status) and unearned income; specification 2 replaces labour-market choices by implicit wages; and specification 3 adds the kitchen-equipment and education controls. All specifications include controls for non-labour income being missing, household structure, partner's age, type of diary day, type of residential area, and region. All regressions use individual-day survey sample weights and, for 2010, cluster standard errors at the individual level (as there are two days per individual).[26]

Table 4 presents the main regression results by survey year. In columns 1–6, the dependent variable is unconditional cooking time, and three specifications are estimated for each year. Columns 7 and 8 show the results of logit regressions for the frequency of cooking (defined as cooking ≥ 3 min on the diary day) for specification 3 only. Table 5 presents the decomposition results for unconditional mean cooking time (left panel) and the frequency of cooking (middle panel), for all specifications. The right panel of Table 5 shows additional decomposition results for restaurant eating (time spent eating at a restaurant ≥ 3 min on the diary day).[27]

5.1 Labour-market choices vs. labour-market incentives

Columns 1 and 2 of Table 4 show the estimation results for specification 1. The coefficients on women's wages and working status are both negative and significant at the 1% level. The impact of labour-force participation rose from −22.5 min in 1985 to −40.2 min in 2010. In 1985, this effect was attenuated for women in part-

[26] See Table S2 in the Supplementary Appendix for the descriptive statistics of the variables. Table S11 in the Supplementary Appendix provides robustness checks with alternative time-use measures for 2010: these are calculated as 5/7 of the week day measure + 2/7 of the week-end measure, when the two diary days are available. Table S13 proposes additional results with cooking time including meal chores. The results for labour market variables are qualitatively similar.

[27] The full table of results appear in the online Supplementary Appendix, Section S.2.

Table 4 Cooking time of partnered women—regression results by year

Specification—Technique	**(1)—OLS**		**(2)—OLS**		**(3)—OLS**		**(3)—Logit**	
Dependent variable	Cooking time		Cooking time		Cooking time		Cooking frequency	
(Column) Year	*(1) 1985*	*(2) 2010*	*(3) 1985*	*(4) 2010*	*(5) 1985*	*(6) 2010*	*(7) 1985*	*(8) 2010*
Wages								
Implicit wages			−2.776*** (0.474)	−2.560*** (0.523)	−1.381** (0.583)	−1.608*** (0.548)	−0.159** (0.073)	−0.090*** (0.028)
Partner's implicit wages			−0.642** (0.307)	−0.390 (0.483)	−0.008 (0.330)	0.224 (0.507)	0.033 (0.034)	0.013 (0.021)
Observed wages	−1.533*** (0.363)	−1.189*** (0.385)						
Partner's observed wages	−0.685*** (0.248)	−0.448 (0.293)						
Labour market status								
Works	−22.555*** (6.866)	−40.168*** (11.832)						
Works part-time	13.432*** (2.964)	1.331 (3.139)						
Partner works	6.682 (5.411)	−22.665* (11.923)						
Both partners work	−5.842 (6.386)	17.362 (11.807)						
Kitchen equipment								
Has a freezer					0.099 (1.638)	−5.858 (11.211)	0.428* (0.221)	0.315 (0.448)
Has a freezer and a microwave						−4.119 (5.465)		0.060 (0.270)
Controls for education	*No*	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	94.161*** (6.215)	109.154*** (12.927)	99.128*** (6.133)	82.129*** (9.621)	69.579*** (8.966)	60.473*** (17.671)	3.560*** (1.091)	1.607** (0.655)
Observations	3,162	3,827	3,162	3,827	3,162	3,827	3,162	3,827
R-squared	0.245	0.158	0.135	0.096	0.148	0.123		

Notes: The additional control variables are unearned income, unearned income missing, observed wages missing (Columns 1 and 2), household structure/children, partners' age difference and its square, regular day off, week-end, type of residential area and region. Each individual-day observation is weighted by its FTUS sampling weights. The standard errors in parentheses are clustered at the individual level (two observations per individual in 2010). *** = significant at the 1% level, ** at the 5% level, * at the 10% level. Full regression results in Table S5 (Supplementary Appendix)

Table 5 Decomposition of the change in mean cooking times

Dependent variable:	**Cooking time (min/day)**			**Cooking frequency (% of days)**			**Restaurant eating**	
Specification—technique	(1)—OLS	(2)—OLS	(3)—OLS	(1)—Logit	(2)—Logit	(3)—Logit	(2)—Logit	(3)—Logit
Variations								
2010	55.465*** (1.455)	55.465*** (1.487)	55.465*** (1.474)	0.817*** (0.009)	0.817*** (0.009)	0.817*** (0.009)	0.231*** (0.010)	0.231*** (0.010)
1985	68.657*** (0.867)	68.657*** (0.869)	68.657*** (0.869)	0.964*** (0.004)	0.964*** (0.004)	0.964*** (0.004)	0.144*** (0.006)	0.144*** (0.006)
Change 2010–1985	−13.192*** (1.694)	−13.192*** (1.722)	−13.192*** (1.711)	−0.147*** (0.010)	−0.147*** (0.010)	−0.147*** (0.010)	0.087*** (0.012)	0.087*** (0.012)
Composition effects of covariates of interest: see Tables S6, S7, S8 *for the full results*								
Implicit wages		−3.720*** (0.727)	−2.336*** (0.765)		−0.015*** (0.004)	−0.019*** (0.006)	0.028*** (0.005)	0.018*** (0.006)
Partner's implicit wages		−0.599 (0.677)	0.343 (0.709)		0.000 (0.004)	0.003 (0.005)	0.004 (0.005)	−0.004 (0.005)
Observed wages	−3.175*** (0.880)			−0.031 (0.085)				
Partner's observed wages	−0.886 (0.547)			−0.013 (0.033)				
Works	−5.328*** (1.580)			−0.031 (0.086)				
Works part-time	0.074 (0.169)			0.003 (0.009)				
Partner works	0.779* (0.440)			0.003 (0.009)				
Both partners work	2.090 (1.354)			0.015 (0.045)				
Unearned income	−1.309 (0.976)	3.564*** (0.985)	3.413*** (0.986)	0.006 (0.030)	0.017** (0.008)	0.019** (0.009)	−0.029*** (0.009)	−0.031*** (0.009)
Has a freezer			−3.279 (6.125)			0.025 (0.039)		−0.082 (0.052)
Has a freezer and a microwave			−3.743 (4.694)			0.008 (0.035)		0.013 (0.046)
Education			−3.714*** (1.385)			0.005 (0.012)		0.037*** (0.013)
Partner's education			−3.062*** (1.018)			−0.016** (0.008)		0.019** (0.009)
Structure effects and unexplained changes: see Tables S6, S7 and S9								

Notes: These are decomposition results for the 1985–2010 change in mean cooking times on the diary day for *partnered women*. The upper panel shows unconditional average cooking times in 1985 and 2010, their change between 1985 and 2010, and the change explained by covariates (the overall composition effect estimated for coefficients fixed at their 2010 values). The middle lower panel details the composition effects estimated for a number of variables of interest. The structure effects, which measure the impact of changes in coefficients for the average values of covariates fixed at their 1985 levels, appear in detail in Table S6, S7 and S9 of the Supplementary Appendix. The decomposition results are obtained by applying Oaxaca-Blinder decompositions to (1) OLS estimates of linear regression models for cooking time estimated separately for 1985 and 2010 (see Table 4 and S5); or (2) estimates of Logit regression models for cooking frequency and restaurant eating, also estimated separately for 1985 and 2010 (See Table 4, S5 and S8). The regressions control for the following additional covariates (not shown in the Table): unearned income missing, household structure/children, regular day off, week-end, region, and type of residential area. Specification (1) controls additionally for: own wage missing (composition effect: 0.121, not significant) and partner's wage missing (composition effect <1e−3, not significant). Each individual-day observation is weighted by its FTUS sampling weights. The standard errors in parentheses are clustered at the individual level (two observations per individual in 2010). *** = significant at the 1% level, ** at the 5% level, * at the 10% level

time jobs, who cooked 13.4 min longer than women in full-time jobs. This is not the case in 2010. The estimated coefficient on wages is significant and similar over time: −1.5 and −1.2 min per additional Euro of hourly earnings in 1985 and 2010 respectively. Columns 3 and 4 of Table 4 report the results for specification 2. The coefficient on women's implicit wages is negative and significant in 1985 and 2010 and of similar size, with point estimates of −2.8 min/Euro in 1985 and −2.6 min/Euro in 2010. The regression results for specification 2 are in line with the main predictions of household economics regarding time allocation. This is in line with Hypothesis 1.

The increase in wages shown in Table 3, combined with the negative marginal effects in Table 4, produces the negative composition effects in Table 5. The upper-left panel of Table 5 reports the values of unconditional mean cooking time in 1985 and 2010 and the difference between them. The middle-left panel displays the composition effects for the covariates of interest.[28]

The first column of Table 5 shows that the contribution of changing labour-market outcomes to the reduction in married women's time spent cooking is −8.4 min (−3.175–5.328 + 0.074). This is the sum of the composition effects from wages, working and working part-time. Labour-market changes then represent 63.9% (CI 95: [34.1%; 93.7%]) of the overall decline observed over the period (−13.2 min). The second column of Table 5 applies the decomposition to specification 2. The contribution from women's rising implicit wages is −3.7 min, i.e. 28.2% of the overall decline (CI 95: [13.5%; 42.8%]). It is also worth noting that the increase in unearned income yields a positive contribution (+3.6 min), which was not the case in specification 1.

5.2 Impact of technology and partner's labour-market variables

The regression results for specification 3 appear in columns 5 and 6 of Table 4. The impact of kitchen equipment (freezer) is zero in 1985, but strongly negative in 2010. Having a freezer and a microwave is associated with almost 10 min less per day home cooking. However, this effect is only imprecisely estimated, as they are very few unequipped households. In column 3 of Table 5, the diffusion of microwave and freezers is associated with 7.0 min less mean cooking time, which is however insignificant. Our second empirical hypothesis seems not to hold, but this is likely due to a lack of cross-sectional variation in our equipment variables in 2010. We have tested this explanation by replacing the two equipment dummies by our index for household kitchen technology, which is treated as a continuous variable and has more cross-sectional variation. Column 4 of the Supplementary Appendix Table S6 reports the results. The decomposition effect of technology is now large (−10 min) and significant at the level of 5%.

Specifications 1 and 2 produce negative coefficients on partner's wages and working status (Table 4). As shown in the second column of Table 5, a rise in partner's implicit wages reduces women's time spent cooking. These results imply

[28] The structure effects and other composition effects appear in Table S6. The structure effects are mostly insignificant, except for those regarding age.

the rejection of our third empirical hypothesis, as within-household bargaining would produce positive effect from partner's wage.

5.3 Education effects

As shown by columns 3–6 of Table 4, controlling for education clearly attenuates the coefficients on wages, the marginal effect of which is now −1.4 min/Euro in 1985 and −1.6 min/Euro 2010. These coefficients again do not change significantly over time. The fall in the marginal effect of wages is explained by the joint impact of education on wages and cooking time.[29] As a result, the decomposition results in the fourth column of Table 5 show a fall in the contribution of women's rising implicit wages. This latter is now estimated to be −2.3 min over the period, representing 17.7% of the overall decline in time spent cooking (CI 95:[4.5%; 30.9%]). The increase in female education has had a larger effect, at about −3.7 min.

When we control for education, the marginal effect of partner's wages becomes slightly positive in 2010 (see column 6 of Table 4), albeit not significant. Our third empirical hypothesis about spousal bargaining is then definitely rejected. The negative estimated coefficient on partner's wages in specifications 1 and 2 likely reflected the income effect of partner's wages, as well as the omission of education. The rise in partner education has also reduced women's cooking time (−3.1 min).

5.4 Frequency of cooking and restaurant eating

The middle panel of Table 5 replicates the results for cooking frequency. The results are globally similar to those for unconditional mean cooking times, although with some differences. The composition effects estimated from specification 1 show that observed labour-market choices have large, negative, but not significant effects on the fall in cooking frequency. The sum of these composition effects is −6.2 pp, for a total reduction of −14.7 pp. The results reported in columns 5 and 6 show that the estimated contribution of women's implicit wages fluctuates between −1.5 pp and −1.9 pp. This contribution increases slightly with controls for technological innovation and education. The rise in women's education has not significantly affected the probability of cooking, while the rise in partner education has had a large negative effect. In additional regressions, we have decomposed conditional mean cooking time, i.e. the time spent cooking for those women who declare at least 3 min cooking. The estimates of specification 3 show that the composition effects of implicit wages on conditional mean cooking time is small and not significant.[30] Changing labour-market incentives then affected unconditional mean cooking time more through lower cooking frequency, i.e. via the day-to-day possibility of substituting with food-away or batch-cooking, than through large reductions in conditional mean cooking time.

[29] Controlling for kitchen equipment but not education does not change the estimated wage effects.

[30] See Table S12 in the online Supplementary Appendix, Section S3

As implicit wages rise and technological innovations lower the price of food-away, households may substitute food-away for cooking time. We test this prediction by decomposing the increase in the frequency of eating at restaurants.[31] The right panel of Table 5 shows the decomposition results for specifications 2 and 3. The frequency of restaurant eating is 8.7 pp higher in 2010 than in 1985. As expected, implicit wages play a role with an estimated contribution of +1.8 pp over the period in specification 3.[32] Educational expansion still appears as a key driver, with a contribution of +3.7 pp to the change in restaurant frequency, rising to +5.6 pp when we add partner education.

6 Discussion

There are three conclusions from our estimation results. First, women's implicit wages and non-labour income have respectively negative and positive effects on their time spent home cooking. This is in line with the predictions of household-production theory, so that Hypothesis 1 is confirmed. Second, technology has reduced cooking time, supporting Hypothesis 2, although the estimates are not precise. This underlines the importance of labour-saving technological innovations for home production. Third, men's implicit wages do not affect women's cooking. Intra-household bargaining over home cooking is then only weakly related to spousal wages, and Hypothesis 3 is rejected. We have done a similar analysis for partnered males' cooking and eating away, which shows that women's implicit wages are positively correlated with their partners' cooking (+0.679 min/Euro), although this correlation is not statistically significant. Women's implicit wages only significantly affect men's cooking frequency.[33] Our results thus confirm that cooking does not seem to be an activity that can easily be transferred from one spouse to another. This confirms previous qualitative findings in sociology on female cooking as an input to the "proper family meal".

The estimated wage effects are qualitatively similar to findings in Bittmann (2015) and Sofer and Thibout (2015). They find negative correlations between women's *observed* wages and their domestic work, and no significant effect of their partner's domestic work. We add to these studies with evidence that the impact of labour market participation and wages on the decline of cooking time is largely explained by women's self-selection into employment based on observable and unobservable preference shifters. Once we account for self-selection, the rise in wage offers explains 28% of the decline in cooking time, i.e. less than half of the total effect of changing labour market participation. When we additionally control for education and kitchen equipments, the composition effect of implicit wage explains no more

[31] The results for eating-away are qualitatively similar: see Tables S8 and S9 in the online Supplementary Appendix.

[32] These decomposition results are based on logit regressions. These reveal a fall in the implicit wage coefficient between 1985 and 2010, from 0.135 to 0.068 in the restaurant regression for instance. However, the marginal effects estimated at covariate sample means are the same: +1.014 pp/Euro in 1985 and +1.004 pp/Euro in 2010.

[33] See Table S10 in the online Supplementary Appendix.

than 18% of the decline, vs. 57% in a specification with the observed labour-market variables and the same set of control variables (not reported here). The observed increase in implicit wages may *a priori* result from both supply and demand shocks on labour. With perfect labour markets, an increase in women's employment driven by a shift in preferences may have a depressive effect on wages. This would imply that the estimated composition effect of changing labour market incentives is lower than what would have been expected in the absence of preference changes. However, we do not think that we are under-estimating the composition effect, because the French labor market is characterized by important rigidities that largely limit downward adjustments of wages (high minimum wage, high unemployment benefits, strict employment protection, powerful labour unions).[34] In addition, wage increases have largely been driven by innovations and technological changes, which have played an important role in the demand for skills. This has in turn stimulated women's investment in education and human capital, with spillovers in terms of improved productivity of the labour force and technological development.[35] Hence, a non-negligible share of the estimated composition effect of implicit wages might also well have been caused by women's increasing preference for work, implying that we would still overestimate the direct composition effect of changing labour-market incentives.

Our results also suggest that educational expansion has been an important direct determinant of changes in cooking time, beyond its indirect effects through wages. A last question, then, is whether our conclusions still hold across education or social groups. We investigate this question by replicating the analysis separately for women under the "Baccalaureat" (A-level), and women with the 'Baccalaureat' or over. Since there are few less educated women in 2010 (N = 800), we cannot robustly evaluate the composition effects at the coefficients of 2010. We thus compute these effects using the coefficients obtained from pooled regressions on the 2010 and 1985 education subsamples.

Table 6 presents the decomposition results for unconditional cooking time and restaurant eating (specification 3 only). The change in cooking time is about the same for the two education groups (−9.3 and −7.2 min).[36] The more educated cook less than the less educated, both in 1985 and 2010. The more educated eat at restaurants

[34] Edo and Toubal (2017) evaluate the impact of immigrant female workers on wages, over the period 1990–2010. Over this period, immigrant female workers contributed to an increase of about +3 percentage point in women's employment. The study concludes that the estimated effect on native women's wages is −0.11%. If we apply these numbers to our estimation sample, and assume that the entire rise in women's employment is due to changing preferences, then we under-estimate the composition effect by 2.7% only.

[35] For the evolution of the demand for skills in the U.S., see Goldin and Katz (2007). Goldin (2006) and Mulligan and Rubinstein (2008) discuss the human capital effects of the changing expectations of women regarding returns to education. Piketty and Saez (2014) argue that "the supply and demand for skills have increased approximately at the same pace in Europe" (p. 842), and the macroeconomic literature on growth has documented the empirical link between skills, productivity and growth.

[36] These falls in cooking time are smaller than the fall for the entire sample (−13.2 min) due to the composition effects of education.

Table 6 Decomposition of changes in cooking times by education

Dependent variable	Cooking time		Restaurant eating	
Subsample	Education < Baccalaureat	Education ≥ Baccalaureat	Education < Baccalaureat	Education ≥ Baccalaureat
Change in average cooking time				
2010	63.388*** (2.392)	48.843*** (1.703)	0.166*** (0.013)	0.285*** (0.015)
1985	72.709*** (1.028)	56.045*** (1.493)	0.125*** (0.007)	0.202*** (0.014)
Change 2010–1985	−9.321*** (2.604)	−7.202*** (2.265)	0.041*** (0.015)	0.083*** (0.021)
Overall composition effect	−2.314 (4.673)	0.830 (3.747)	−0.055 (0.037)	−0.033 (0.035)
Detailed composition effects: change in covariates				
Implicit wages	−0.798 (0.619)	−1.117** (0.446)	0.009** (0.004)	0.010** (0.004)
Partner's implicit wages	1.527 (0.966)	−0.295 (0.273)	−0.001 (0.005)	−0.004 (0.003)
Unearned income	4.546*** (1.540)	2.489*** (0.937)	−0.040*** (0.011)	−0.036*** (0.012)
Kitchen technology	−8.655** (4.309)	−6.101** (3.056)	−0.018 (0.030)	0.031 (0.041)
Age	−2.280*** (0.616)	0.086 (0.111)	−0.006 (0.008)	−0.004 (0.008)
Education	−3.008*** (0.655)	0.119 (0.227)	0.012*** (0.005)	0.001 (0.001)
Partner's education	−0.798 (0.619)	−1.117** (0.446)	0.007* (0.004)	0.003 (0.003)

Notes: These are decomposition results for the 1985–2010 change in average cooking times on the diary day for partnered women, by education – specification (3) only. Each individual-day observation is weighted by its FTUS sampling weights. The decomposition effects are estimated using coefficients from pooled OLS or logit regressions using both years, and reweighting sample weights to give equal total weight to both years. The standard errors in parentheses are clustered at the individual level (two observations per individual in 2010). *** = significant at the 1% level, ** at the 5% level, * at the 10% level. Other comments as in Table 5. Structure effects and unexplained changes: estimates available upon request

more often, and their frequency of restaurant eating increased by 8.3 pp, as against +4.1 pp for the less educated.[37]

For cooking, the composition effect of implicit wages is significant only for the more educated (−1.1 min for cooking). As the average rise in implicit wages between the two groups is similar (about +1 Euro over the period), the difference between education subgroups is explained by the estimated coefficients. The estimated marginal effect of wage is −0.96 min/Euro for the less educated (significant at the 10% level), as against −1.42 min/Euro for the more educated (significant at the 5% level). For restaurant eating, the composition effect of wages is significant and does not differ by education level. Kitchen technology is associated with large significant negative composition effects on cooking, whatever the education level, but it has no impact on restaurant eating. The composition effect of non-labour income is always significant and of the expected sign.[38] There is a residual composition effect of education for the less-educated, associated to the decline in the proportion of women with very low education.

[37] This finding is also reflected in the structure effects of education, which are positive for cooking (Table S6) but negative for eating away (Table S7).

[38] The composition effect of unearned income is larger for the cooking time of the less educated. This might reflect a statistical artefact: as outlined in Section 3, unearned income are not well-measured. Alternatively, this large composition effect may be explained by the progressive concentration of low-educated people in the bottom of the income distribution. The rise in means-tested social benefits observed over the period has then acted as an incentive to favour household production over employment. Laroque and Salanié (2002) show that the disincentive effects of means-tested benefits can be large, especially for women with an unemployed husband.

The picture that emerges from Table 6 is that better-educated women are slightly more prone to trade cooking time for market work when faced with changing labour-market incentives. We may then ask whether the differences in responses to incentives by education are related to a weakening of the gender-related norm of the "proper family meal" in more educated couples. For instance, the latter might be more likely to move away from having women specializing in cooking in order to increase their joint consumption of eating-away occasions, and more generally leisure. Table 6 shows that the more educated have more restaurant occasions, and that the gap with the less educated increased between 1985 and 2010. A closer analysis of spouses' synchronized times reveal however that going to the restaurant with the partner seems exceptional: this represents only about 10% of restaurant occasions in 2010, whatever the education level. This is in line with results from Barnet-Verzat et al. (2011), who find that education has no significant impact on leisure synchronization in dual-earners French couples. Most restaurant occasions are indeed lunch meals during work days. Since 1967, employers have the legal requirement to propose to their employees either a subsidized access to a worksite restaurant, or vouchers to eat at commercial restaurants or to buy takeaways. Increasing labour market participation (the extensive margin of employment) thus explains part of the rise in restaurant eating.

We can also explore the question of changes in the proper family-meal norm via the family meals and via the share of total household cooking time provided by women. The average number of family meals has decreased only slightly between 1985 and 2010, from 1.92 to 1.85 meals/day. There are no significant differences in trends by week days/week-ends, or by education level. We then create a first dummy for the woman's share being over 95% (no sharing) and a second for the share being over 50% (signaling whether sharing is more or less favorable to the woman). Table 7 shows that, in the full sample, the proportion of couples who do not share cooking rose by 7.0 pp between 1985 and 2010, from 37.8 to 44.8%. On the other hand, the proportion of households where women cook more than their partner fell by 11.7 pp, from 87.1 to 75.4%. Is this polarization of the gender balance related to education? The statistics in the middle and right panels of Table 7 show that this is not the case. There is rather a convergence between education groups, with 47.4% of the less educated women fully in charge of home-cooking in 2010, vs. 42.6% of the more educated women. The difference was larger in 1985 (41.5% for the less educated, 26.3% for the more educated). While men's cooking time represented 32% of their partner's cooking time in 2010, as against 20% in 1985, this move to more balanced task-sharing hides a polarization between more equal households and households where women remain in charge of almost all the cooking. The rise in women's implicit wages has improved the sharing of cooking within households, as predicted by models of household decision-making, but not in all households or not on a daily basis.

In line with our discussion in Section 2.2, we can thus conclude that social norms (the "proper family meal") mitigate the explanatory power of standard economic theories of the household, even amongst the more educated. Another potential and complementary explanation is that many men feel, rightly or wrongly, that they do not have the required skills to cook.

Table 7 Decomposition of the changes in the sharing of cooking time between partners within households

Woman's share of total household cooking time > x%						
Sample	Full sample		Education < Baccalaureat		Education ≥ Baccalaureat	
Out come	Share ≥ 95%	Share ≥ 50%	Share ≥ 95%	Share ≥ 50%	Share ≥ 95%	Share ≥ 50%
Change in unconditional probability						
2010	0.448*** (0.014)	0.754*** (0.012)	0.474*** (0.021)	0.788*** (0.018)	0.426*** (0.018)	0.724*** (0.015)
1985	0.378*** (0.009)	0.871*** (0.006)	0.415*** (0.011)	0.889*** (0.007)	0.263*** (0.016)	0.814*** (0.017)
Change 2010–1985	0.070*** (0.017)	−0.117*** (0.014)	0.060** (0.024)	−0.101*** (0.019)	0.163*** (0.024)	−0.090*** (0.023)

Note: This Table reports the 1985–2010 change in the probability that women's cooking time is greater than or equal to 95% or 50% of the total household cooking time reported in the diary day for partnered women in households with non-missing information on both partners and a non-zero cooking time. Each individual-day observation is weighted by its FTUS sampling weights. The standard errors in parentheses are clustered at the individual level (two observations per individual in 2010). *** = significant at the 1% level, ** at the 5% level, * at the 10% level. Other comments as in Table 4

7 Conclusion

Our work here has revealed that, in France, the estimated contribution of changing labour-market incentives to the decline in home cooking between 1985 and 2010 is much smaller than that of rising female labour-market participation. This has two implications. First, as implicit wages should continue to rise with productivity, people will certainly cook less and less. They will increasingly rely on processed food, kitchen technologies and food-away, even in countries with a strong culinary culture such as France. Second, although labour-market choices have a considerable impact on time use, these choices largely reflects individual preferences over household production vs. market work, rather than just changing relative prices. The impact of policies promoting home cooking may thus depend on whether they can provide advices to help households to conciliate labour market participation with meal preparation at home, for instance by increasing the productivity of cooking time through the use of appropriate and health-preserving technologies. In a public health perspective, the improvement of the quality of food prepared away also appears as a complementary objective.

Our results also confirm the lack of substitution between men and women in home cooking. Our analysis of the changes in the sharing of cooking reveals rising polarization. The proportion of 'absolutely unequal' households as well as that of "more equal" households has grown. However, more equality does not imply that the rise in men's cooking frequency has offset the decline in women's cooking time. While the pervasiveness of the gendered norm of the "proper family meal" partially explains this result, it is also likely that men lack the required cooking skills to prepare everyday meals.

We last note that a large part of the fall in home cooking remains unexplained by the composition effects we observed, and specifically by monetary time costs. Future research may aim to quantify the contribution of other determinants of home cooking, such as cooking skills and the changes that have occurred in leisure markets.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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