Adherence to Cultural Norms and Economic Incentives: Evidence from Fertility Timing Decisions *

Bastien Chabé-Ferret †

Abstract

I analyze the interplay between culture and economic incentives in decision-making. To this end, I study fertility timing decisions of second generation migrant women to France and the US. While I confirm that originating from a high fertility country correlates to having larger families, I also find that it does not predict earlier entry into motherhood. I propose a model that rationalizes these findings in which decisions are the result of a trade-off between an economic cost-benefit analysis and a cultural norm. The model predicts that decisions with a higher cost of deviation from the economic optimum should be less prone to cultural influence. This is consistent with substantial evidence showing that the timing of the first birth bears much larger costs for mothers in terms of labor market outcomes than that of subsequent births.

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†ISER, University of Essex and IZA Institute for Labor Economics, Bonn, email: b.chabeferret@essex.ac.uk

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"Well I think that progress is not possible without deviation. And I think that it's important that people be aware of some of the creative ways in which some of their fellow men are deviating from the norm, because in some instances they might find these deviations inspiring and might suggest further deviations which might cause progress, you never know."

Frank Zappa (1971)

1 Introduction

It is common in philosophy to think of humans as inherently social creatures, whose actions cannot be understood in isolation of their communities' behavior. In the relatively young field of economics however, the emphasis on humans' independent will pursuing self-interest has sometimes led to the questionable assumption that humans operate in a social vacuum. This cleavage is summarized by Elster (1989) as the opposition between Adam Smith's *homo economicus* and Emile Durkheim's *homo sociologicus*.[1] There has been recently a growing number of contributions in economics using quantitative methods to document the influence of cultural norms on different types of behavior, ranging from labor force participation to fertility, gender roles, living arrangements, violence, geographic mobility, savings behavior or demand for social insurance to name a few.[2]

Much less is known though as for which type of decision culture matters and why. Do

[1]This debate has had its extension in the fertility literature, as noted by Lee (2015).

[2]Alesina and Giuliano (2010); Alesina et al. (2013); Fernández and Fogli (2006); Giuliano (2007); Fernández and Fogli (2009); Boustan and Collins (2014); Grosjean (2014); Paule-Paludkiewicz et al. (2016); Eugster et al. (2011) study the role of culture in these decisions. See Guiso et al. (2006) for a field-opening contribution, from which I also take the definition of culture: "those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation". de la Croix and Perrin (2018) go as far as quantifying the respective contribution of rational choice against cultural diffusion in the Demographic Transition in France.

we rely on cultural norms to a similar extent for decisions that bear important consequences than for relatively harmless ones? Recent contributions have documented that people do incur substantial economic costs in order to comply with their cultural norm.[3] However there is to my knowledge no evidence that cultural adherence is responsive to this disincentive.

In this paper, I present evidence that there exists a trade-off between cultural compliance and economic optimality. I show that, in the context of birth timing decisions of second generation migrants to France and the US, cultural norms matter more for the decisions that bear relatively less drastic consequences. The rationale for looking at fertility choices is twofold. First, previous research has established that culture influences fertility.[4] Second, looking at different birth parities provides a variation in the economic cost of not following the norm. Indeed, there exists considerable evidence that the timing of the first birth bears much larger consequences than that of later births.[5] I start by building a model of decision-making featuring an interplay between an economic cost-benefit analysis and a cultural norm. The former reflects the economic and institutional incentives, while the latter is transmitted by the social environment.[6] The model implies that decisions with a higher cost of deviation from the economic optimum should be less prone to cultural influence. The intuition is that the utility gain of following a norm is less likely to exceed the cost of deviating from the economic optimum

[3] Atkin (2016) looks at food expenditures of internal migrants in India and show that some of them could get up to 7% more calories if they possessed their neighbors' preferences instead of those in their origin-state. Algan et al. (2013); Biavaschi et al. (2017); Abramitzky et al. (2016) study first name decisions in France and the US respectively. The first show that there would be 50% more babies with arabic sounding names if there were no economic cost associated in terms of labor market discrimination. The second find that name americanization to popular first names such as John or William led to a 14% increase in occupation-based earnings in a sample of migrants who naturalized by 1930. The third use data form the Age of Mass Migration to the US and find that brothers with more foreign first names were doing substantially worse in terms of educational and labor market outcomes.

[4] The seminal contribution by Fernández and Fogli (2009) documents that second generation migrant women to the US make fertility choices that are biased towards the fertility level of their country of origin and has been replicated in many different contexts since then.

[5] This hypothesis is crucial for the interpretation of the results. I review the literature that documents it in Appendix A.

[6] I do not make assumptions on whether cultural norms provide a direct utility gain through the feeling of inclusion in a community, or a more indirect gain stemming from the support provided by the community. Alternatively, cultural norms could also be beliefs transmitted by a community, in which case the gain of following the norm could be to avoid looking for information about what to do.

when this cost is large. Fertility norms should then matter less for the age at first birth, which is a costly decision to adjust, than for the timing of the second, third and subsequent births.

To test this hypothesis, I use two data sources on second generation migrants to France and to the US. Identification relies on the so-called epidemiological approach, also featured in Fernández and Fogli (2009); Blau et al. (2013); Stichnoth and Yeter (2016). Using data on second generation migrants allows to separate the effect of host-country specific economic and institutional incentives from the country-of-origin specific cultural norm. I assign to each migrant the total fertility rate (TFR) in the country of origin of their parents to proxy for culture. I then use a proportional hazard model to estimate the effect of fertility norms on the parity-specific hazard rate of having a child. I address issues of unobservable heterogeneity by exploiting on the one hand the richness of the French data, which allows to control for a large set of personal, parental and partner's characteristics, such as education, occupation, or even religion and religiosity, and on the other hand, by controlling for a wide array of country-level characteristics such as geographic, linguistic and genetic distances or average education of the diaspora.

I find that first and second births do not come earlier for women coming from a high fertility country.[7] On the other hand, those same women do transition at a higher rate from second to third births and have more children overall. To be more specific, I obtain that shifting up the TFR in the origin country by one standard deviation makes a woman 22 to 35% more likely to have three children or more conditional on having already two in the French data, 10 to 16% in the US case. Still, the same shift up in the cultural proxy does not yield any increase in the hazard rate of having a first or second child. The results are robust to changes in sample selection as well as in the choice of cultural proxies.[8] Although the magnitude differs,

[7]If anything, in France, first births tend to come at a later stage for women coming from a high fertility country.

[8]I for instance restrict to the sample of women in a relationship only in the French case, in order to control for partners' characteristics. As for cultural proxies, I use mean age at first birth instead of TFR to check whether different norms apply for the timing of the first birth and for completed fertility.

possibly due to more or less family friendly institutional features or to characteristics of the diasporas sorting into those two destination countries, obtaining comparable results in two different settings increases confidence in the external validity of the findings.[9]

This result is of primary importance for several reasons. First, the very existence of cultural norms of behavior is sometimes taken as evidence that humans do not act "rationally". If this were the case, then trying to understand human behavior as an optimizing process and designing policies based on that principle would not make sense. Providing evidence that there exists a cost-benefit analysis of complying to a norm allows to reconcile rational decision-making and cultural influence.[10] In particular, relying on cultural norms for harmless decisions may be part of a strategy of rational inattention.[11] People may choose to rely on norms for decisions that they know cannot have drastic consequences because the cost of acquiring information about what is appropriate to do exceeds the potential gain.

Second, there is now substantial evidence that the impact of culture on migrants' behavior depends on the intensity of cultural ties and the density of the diaspora. Fernández and Fogli (2009); Algan et al. (2013) find that the cultural effect is stronger in ethnically denser environments. Stichnoth and Yeter (2016); Blau et al. (2013) also document that the intensity of the cultural effect declines in the length of exposition to the norm, first generation migrants being more sensitive than their second generation counterparts. Spolaore and Wacziarg (2014) show that cultural distance, as proxied by genetic distance, curbed the diffusion of a low fertility norm in Europe during the demographic transition. There is as well some evidence that adequate policies may discipline culturally influenced behavior. For instance, Fisman and Miguel

[9] I discuss those differences in more details in Section 4.2.

[10] This way I contribute to the research agenda set by Stigler and Becker (1977) in their seminal contribution not to rely on differences in tastes to explain variation in behavior. Becker (1996) then develops the argument claiming that differences in behavior may arise in a fixed-preferences set-up from different levels of accumulation of either human, social or personal capital, themselves driven by different sets of income and prices.

[11] There exists a growing literature starting with the seminal contribution by Sims (2003) focusing on the implications of rational inattention, costly information acquisition and apparently mistaken choices. See for instance Caplin and Dean (2015).

(2007) find a strong effect of corruption norms on unpaid parking violations among UN officials in Manhattan and show that it disappeared with stronger legal enforcement, that is when incentives to comply were changed. Another recent example is Cottier (2018). He finds that, while there did not exist differences in male labor force participation close to retirement across cultural borders in Switzerland in the 1970s, those had increased significantly by the year 2000 following the introduction of early retirement laws that relaxed financial constraints and allowed room for culture to affect labor force participation. However, there is very little out-of-the-lab evidence that cultural adherence is responsive to economic incentives. This way, I contribute to the growing literature on "motivated beliefs", suggesting that cultural adherence is a form of motivated belief, as it "respond[s] to the costs, benefits, and stakes involved in maintaining different *self-views* and *world-views*, as Bénabou and Tirole (2016) put it.

Third, understanding for which type of decisions culture matters is a first step in answering bigger questions such as: why do we follow cultural norms and how are they enforced? How does culture evolve? Can norms be harmful, can they be efficient?[12] This paper suggests that norms that are costly to sustain because they are further away from the economic optimum should tend to disappear. One could therefore conjecture a principle of natural selection of cultural norms.[13]

Articles that point at the existence of a trade-off between costs and benefits of following or transmitting cultural norms are mainly theoretical. In their seminal contribution, Bisin and Verdier (2001) present a model where parental decisions to transmit their culture depend on perceived future benefits for children. In Doepke and Zilibotti (2008), parents decide to transmit the cultural trait that maximizes their children's fitness to the economic environment. In the framework of the present study, it could well be that parents exert less effort to enforce a

[12]See Elster (1989) for an extensive discussion on the efficiency of norms.

[13]Kanazawa (2001) for instance proposes that rational choice theory interacts with evolutionary psychology to offer a theory of values, preferences, norms and identities. Henrich (2015) argues that it is actually a process of culture-gene coevolution that opened a novel and extremely successful evolutionary pathway for the human species.

cultural norm when they know it will be costly for their children, as suggested by Melindi Ghidi (2012). The model developed in this paper builds on the seminal contribution of Akerlof and Kranton (2000) on the economics of identity, but similar testable implications could be obtained using a Bisin-Verdier framework instead.

On the empirical side, this article is related to the literature that studies the effect of cultural norms on human behavior. While Guiso et al. (2006) make a remarkable review of this literature, I will focus on papers more directly related to the present work. Hinde (2003) for instance observes that, while economic pressure may have led the middle-class in England to lower fertility in the late nineteenth century due to economic pressure, this low fertility behavior may have spread to groups closely associated, like those employed in domestic services. The importance of fertility norms has furthermore been tested in several works: for instance, Munshi and Myaux (2006) show evidence that reproductive social norms can explain the inertia of fertility behavior and contraceptive use in rural Bangladesh. Another example can be found in La Ferrara et al. (2012) who document that telenovelas, Brazilian soap operas, have conveyed a low fertility norm, specially among women who were the same age as the main characters. More closely linked to the current article are papers discussing the transmission across generations of such norms. Alesina and Giuliano (2010) show in particular that the strength of family ties in the country of origin of second generation migrants has a robust impact on various aspects of their behavior such as fertility, youth and female labor force participation, youth geographical mobility and home production. This result suggests that the strength of family ties is actually a cultural trait transmitted from parents to children.

2 A Model of Endogenous Cultural Norms

Consider the following indirect utility function, inspired by Akerlof (1997); Spolaore and Wacziarg (2014):

$$U_{i,h,n} = b_h f - \frac{c_h}{2} f^2 - \frac{\sigma}{2}(F_n - f)^2 \tag{1}$$

Individual i, living in institutional setting h and belonging to a cultural group n, makes a decision about the optimal amount of f, say number of children, considering two types of utility sources. First she looks at the economic cost and benefit, which Akerlof calls "intrinsic", of having f children given by the institutional setting in the country: b_h and c_h. Second there is a cultural component to the utility function that is always negative and proportional to the quadratic distance between the chosen f and the cultural prescription F_n. The intensity of this cost is exogenously given and noted σ.

The first order conditions of this problem yield an optimal choice of fertility given by:

$$f^*_{h,n} = \frac{b_h + \sigma F_n}{c_h + \sigma}. \tag{2}$$

$f^*_{h,n}$, although individually rational, is economically suboptimal provided that $\sigma > 0$ and $F_n \neq \frac{b_h}{c_h}$. Economic suboptimality is a form of inefficiency as a benevolent social planner could either set $\sigma = 0$ or $F_n = \frac{b_h}{c_h}$ and enhance welfare for everyone. One question is therefore why is the cultural component there in the first place. It could be that some decisions are particularly difficult to take because we face them only a limited number of times in life, have little feedback on outcomes and/or that this feedback comes too late for people to adjust their decisions. This behavioral argument would apply for instance if b and c were only observed with a noise by individuals for instance. Another reason can be that the economic problem has actually several optima, but for instance one is Pareto superior (due to externalities say). Cultural norms would serve as a coordinating device to guide individual decisions towards the efficient equilibrium.

Let us now hypothesize that the cultural prescription F_n actually evolves over time, depending on how individuals in the cultural group [and neighboring ones] actually behave. To keep the problem simple, we focus on culturally homogenous countries and all countries have the same population size. For instance, we consider the following law of motion for the cultural norm F_n:

$$F_{n,t+1} = \sum_j \frac{1 - d_{ij}}{D_i} f_{j,t} \qquad \text{with} \qquad D_i = \sum_j (1 - d_{ij}) \tag{3}$$

Where $d_{ij} = d_{ji}$ is the social distance between individual i and j. This distance represents the extent to which the behavior of a given person matters to determine the cultural norm. The cultural norm of the next generation in country n is therefore a weighted average of the observed behavior of all individuals in the world where the weights are inversely proportional to the social distance between countries. More specifically, some countries may be at a social distance of 1, resulting in no social influence across these countries. Moreover, I set $d_{ii} = 0$, that is social distance within a given country is nil. Let us take the polar case of an autarkic country to start the analysis: $d_{ij} = 1, \quad \forall j$. The law of motion of the cultural norm simplifies to:

$$F_{n,t+1} = f^*_{h,n,t} = \frac{b_h + \sigma F_{n,t}}{c_h + \sigma} \tag{4}$$

Looking for the fixed point of this equation, I obtain that the unique steady state is:

$$F^*_n = \frac{b_h}{c_h} \tag{5}$$

So that, at the autarkic steady state, there is no welfare cost of cultural norms. This steady state is moreover globally stable.[14]

[14] A way to see this is to notice that the optimal f is a convex combination of the economically optimal $f = \frac{b_h}{c_h}$ and the cultural norm F_n. Consequently, whatever the initial condition $F_{n,0}$, f^*_0 and consequently $F_{n,1}$ will lie between the initial norm and the economically optimal level. By iteration, I obtain that the norm will get arbitrarily close to the economic optimum as time goes by.

Let me now consider a situation where people actually migrate from one country to another in a process that is not modelled here. Say all countries were at a steady state to start with. Then some people move from a high fertility country H to a low fertility country L ($\frac{b_H}{c_H} > \frac{b_L}{c_L}$). Migration has a first order effect on the decision making of migrants in that it changes their institutional setting: they now face the same cost to benefit ratio $\frac{b_L}{c_L}$ as natives. However, migration does not affect the cultural norm F_H, which is considered acquired before reaching the age at migration. Let me for now assume that migrants keep on living in a cultural autarky.[15] Migrants then face the following problem:

$$U_{i,L,H} = b_L f - \frac{c_L}{2} f^2 - \frac{\sigma}{2}(F_H - f)^2 \qquad \text{where} \qquad F_H = \frac{b_H}{c_H} \tag{6}$$

The optimal choice of migrants is thus:

$$f^*_{L,H} = \alpha \frac{b_L}{c_L} + (1-\alpha) F_H \qquad \text{where} \qquad \alpha = \frac{c_L}{c_L + \sigma} \tag{7}$$

Hence, migrants choose an economically suboptimal fertility that lies in between the level given by their cultural norm and the economically optimal level (that is the one of natives). In this situation, migrants would be willing to pay in order not to be subject to their home country norm. More specifically, not being subject to their home country norm would represent the following utility gain:

$$\Delta U = U_{i,L,H}(f^*_{L,H}) - U_{i,L,L}(f^*_{L,L}) = \left[\frac{c_L}{2}(1-\alpha)^2 + \frac{\sigma}{2}\alpha^2\right]\delta^2 \qquad \text{where} \qquad \delta = \frac{b_H}{c_H} - \frac{b_L}{c_L} \tag{8}$$

It appears from this expression that the utility gain is strictly increasing in the distance between the economically optimal levels in the two countries.[16]

[15] The same predictions survive if I relax the assumption that people from different cultures live in autarky. This extension is shown in Appendix B.

[16] The chosen functional form induces the gain to be maximum when $c_L = \sigma$, that is when the cost of deviating

The position of the optimal $f^*_{L,H}$ with respect to the economic optimum and the home country cultural norm depends on α, which is the relative size of c_L and σ. The larger the economic cost of fertility c_L with respect to the cost of deviating from the cultural norm σ, the closer to the economic optimum, and conversely. The following comparative statics holds:

$$\frac{\partial f^*}{\partial F_H} > 0\,; \quad \frac{\partial^2 f^*}{\partial F_H \partial C_L} < 0\,; \quad \lim_{C_L \to \infty} \frac{\partial f^*}{\partial F_H} = 0 \tag{9}$$

From expressions in (9), I infer two testable implications:

1. The fertility choice of migrants should be positively correlated to the cultural norm in their origin country (Fernández and Fogli 2006, 2009 are the first to test these in their seminal contributions);

2. The influence of the home country cultural norm should be smaller as the economic cost in the host country c_L increases. More specifically, if $c_L >> \sigma$, as it might be the case for decision about the age at first birth, then the effect of the home country cultural norm should be negligible.

This is this second prediction that is taken to the data for the first time in this paper.

3 Data and samples

I construct two samples of women born in the host country (France or the US) from at least one foreign-born parent. The rationale for excluding first generation migrants is to avoid the potential direct impact of migrating on fertility.[17] It furthermore allows to assume that all women in the sample face the same institutional setting (such as the same education system,

from the economic optimum equals that of deviating from the cultural norm. This way, migrants choose a fertility level that is right in the middle of the economic optimum and the cultural norm, which maximizes the utility gain of getting rid of the norm.

[17]See Mayer and Riphahn (2000) for a discussion on disruption and catching-up effects of migration on fertility.

parental benefits or labor market regulations). I also exclude women who had twins in order to focus on strictly positive birth intervals.

Data on migrants to France

I use the TeO survey that interviewed 21800 persons in total aged 18 to 60 residing in metropolitan France late 2008. The sample gathers 17900 immigrants (8900 first generation, 9000 second generation), as well as a control group of 3900 French persons from metropolitan France.[18] They were asked a wide range of questions that provide a lot of information on their characteristics (age, educational attainment, marital status, number of siblings, place of residence, religion, religiosity), characteristics of their partner and parents as well as their respective origins. This data is specially interesting in two respects: it is among the very few surveys in France that report the country of origin of second generation migrants as well as religion, which are considered as sensitive data by the French authorities; it is moreover very rich in terms of information on parents and partners as well as on fertility timing (year and month of birth).

Data on migrants to the US

I use the June supplement of the 1995 Current Population Survey (CPS).[19] Indeed, it is the only wave of the CPS that reports not only the number of children ever born (FREVER variable, usual in the June fertility supplement) but also the timing of these births (age in months at each birth). The pitfall of using this data source with respect to the data from France is that the focus is not on migrants, so i) the number of second generation migrants observed is modest; ii) there is less information on family background (such as parental education and occupation, not to mention religion). However, it allows to improve substantially the external validity of

[18]Trajectoire et origines (TeO) - version complète - 2008 - (2008) [fichier électronique], INED et INSEE [producteur], Centre Maurice Halbwachs (CMH) [diffuseur]

[19]Sarah Flood, Miriam King, Steven Ruggles, and J. Robert Warren. Integrated Public Use Microdata Series, Current Population Survey: Version 4.0. [Machine-readable database]. Minneapolis: University of Minnesota, 2015. See Ruggles et al. (2015) for more on the IPUMS collaboration.

the results as not only the host country differs but also origin countries do not overlap much.

3.1 Origin country data

I assign to each individual the country of birth of the foreign born parent.[20] In the rare event that only a region of birth (e.g. South America) is given, I drop the observation. I furthermore include a categorical variable that indicates whether only the mother, the father or both parents are foreign born in order to test for different transmission channels of the cultural norm. I assign to each country of origin its total fertility rate (TFR) in order to proxy the fertility norm in vigor in the country of origin. In my preferred specification, I use the TFR when women were age 18 (tfr18) following the *impressionable years hypothesis* according to which beliefs crystallize between age 18 and 25.[21] I use alternatively the TFR in the year of birth of women in my sample (tfr0), considering that the relevant cultural proxy is the average fertility behavior of the parents' generation. For comparison purposes, I also reproduce the strategy in Fernández and Fogli (2006, 2009) by using the TFR in 1960 (from now on tfr1960). I use 1960 (rather than 1950 or 1970) because it is the first year for which the World Bank releases consistent TFR data for a large sample of countries. One criticism though is that women in my sample vary substantially in terms of age and therefore assigning the same cultural proxy could lead to a fair amount of measurement error, specially in those countries of origin experiencing a fast demographic transition. More specifically, women in my samples were born between 1930 and 1990. In order to mitigate this potential issue, my preferred specification uses a cultural proxy that varies with year of birth.

Finally, I replace TFR by Mean Age at First Birth (henceforth MA1B) in order to discard the possibility that TFR, a number of children, be only a noisy measure of a norm about fertility

[20]If the parents come from two different foreign countries, then I assign that of the mother. The results hold whether I decide to assign the country of the father or to exclude these observations.

[21]Giuliano and Spilimbergo (2014) rely on this hypothesis to identify the effect of growing up in a recession on preferences for redistribution.

timing, while age at first birth would be more suitable. Unfortunately this indicator has not been measured consistently for a long period. I thus use the most ancient data available I could find, which dates from the 1990s for most countries in my sample. For the French sample, I focus on observations for which all four indicators are available and I drop countries of origin for which I have fewer than 10 observations. For the US sample instead, because it is smaller to start with, I only restrict to those for whom I observe tfr18 (and thus tfr60).

I use data gathered by the World Bank from different sources[22], which I complement with a UN source[23], to obtain the TFR from 1948 to 1995. When using the TFR in the year of birth of migrants, I assign that in 1960 for all women born before (around 7% of the sample). As for MA1B, I use UN data[24] that reports either the mean age of women declaring a first birth in a given year, or the median age at first birth among women aged 25-29 at the date of the survey.

3.2 Destination country data, samples and summary statistics

I create two samples: 3805 second generation migrant women to France from 25 countries, 18 to 60 years of age, and 2644 second generation migrants to the US from 76 origin countries, aged 15 to 65. Figure 1 shows the distribution of tfr18 for the two samples at hand. Notice there are sizable variations in the cultural proxy and a similar pattern in both cases: a concentration of observations around 2 and then a long right tail. To ease the illustration, I divide both samples between high and low fertility individuals, setting the limit arbitrarily at 2.8.[25]

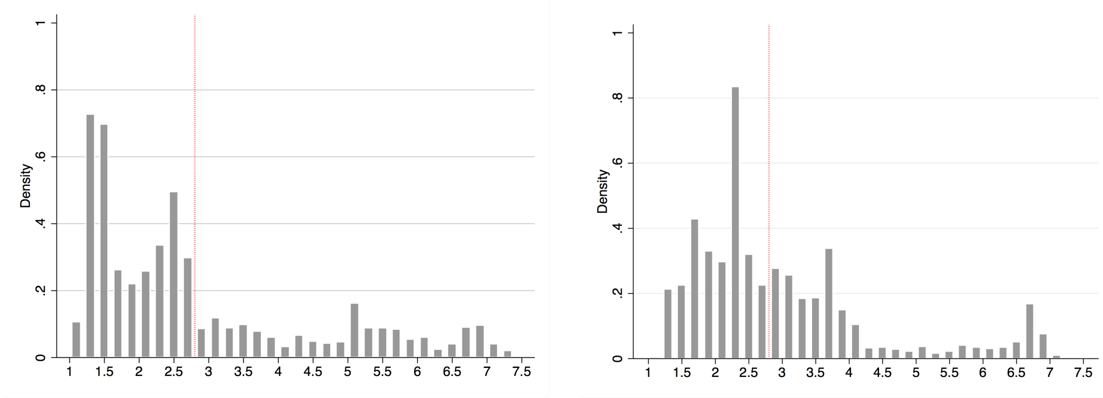
Tables C1 and C2 show summary statistics for the origin country data. In both cases,

[22](1) United Nations Population Division. World Population Prospects, (2) United Nations Statistical Division. Population and Vital Statistics Report (various years), (3) Census reports and other statistical publications from national statistical offices, (4) Eurostat: Demographic Statistics, (5) Secretariat of the Pacific Community: Statistics and Demography Programme, and (6) U.S. Census Bureau: International Database

[23]United Nations Demographic Yearbook, 1997, table 4.

[24]United Nations, Department of Economic and Social Affairs, Population Division (2013). World Fertility Report 2012 (United Nations publication)

[25]The rationale for setting the limit TFR at 2.8 is to have all individuals reasonably close to 2 in the low fertility group, while the long right tail would be in the high fertility group. The illustrations I draw using this distinction are not very sensitive to small changes in the limit.



French sample *US sample*

Figure 1: Distribution of the cultural proxy for fertility: tfr18

I also report data on the host country using samples of native-born individuals both in TeO and the CPS. This allows to show that both France and the US are among the highest fertility countries of the low fertility group.

In the French sample, a large share of the sample comes from North Africa, while the remainder is divided between subsaharan Africa, Turkey, Europe (mostly Southern but also some from Eastern Europe) and South East Asia. As for the US sample, migrants mainly originate from neighbouring countries Mexico and Canada, but also from the Caribbean and Central America. Another large share comes from Europe, particularly from the historical providers of migrants to the US: the UK, Ireland, Germany, Italy, Poland. The remainder comes from other European countries, Russia and Asia. The coefficient of correlation of tfr18 with tfr0, tfr60 and ma1b is respectively 0.86, 0.67 and -0.68 in the French sample (0.84, 0.79 and -0.78 in the US sample). An interesting feature of these two samples is that they overlap relatively little in terms of country of origin, which gives further confidence that what I capture is not specific to migration from a given region.

Table C3 and C4 give summary statistics for the variables that I use as controls. Notice that the French sample allows me to control for many more potential confounders, such as number of siblings, parental education, religion and religiosity. In both instances, women in the high fertility subsample tend to be slightly older, slightly less educated, substantially less born to a mixed couple and in a relationship at the same rate than in the low fertility subsample. The main difference between the French and the US samples comes from labor force participation, which is clearly lower in the high fertility subsample in the US, while no such difference is observed in the French sample. Moreover, high fertility women in the French sample tend to have a substantially greater number of siblings and a relatively lower level of parental education. They also are more likely to be urban and muslim (as opposed to christian or atheist in the low fertility group). They instead do not differ much in terms of religiosity.

3.3 Empirical Strategy

I use a Cox proportional hazard model to estimate the instantaneous hazard rate of going from one regime to the next. I consider four regimes: childless, one child, two children and three or more children.[26] I consider that the at-risk period starts at the age of the first entry into motherhood in the sample, therefore 14 in the French case and 12 in the US sample.[27] The analysis time is therefore time between 14th (respectively 12th) birthday and first birth, time between first and second birth, and finally time between second and third birth, all measured in months. Coefficients can alternatively be interpreted as affecting the probability of having one, two and three or more children conditional on the previous birth order having occurred or the timing of each birth order. This model assumes that the hazard function λ is of the form given in equation (1) and I then estimate the coefficients by maximum likelihood.

$$\lambda \left(t \middle| \text{ norm }, X\right) = \lambda_0(t) e^{\beta \text{ norm }_{o,b} + \gamma X_i} \tag{10}$$

[26]I do not consider higher birth orders because it would considerably shrink the sample. Furthermore, I do not consider the age at which the relationship started because it is ill-measured (only age at marriage, nothing on age when the civil union took place e.g. for France, no information at all for the US) and because it might also be part of the cultural effect to marry sooner or later, or even to marry at all.

[27]The results are not sensitive to the choice of a different at-risk period.

where λ_0 is the baseline hazard and X_i a set of controls specific to individual i. "Norm$_{o,b}$" represents my variable of interest, namely the proxy for culture, which is always specific to country of origin o and in some specifications to year of birth b. I successively use the TFR in the country of origin when the observed woman was age 18 (tfr18), when she was born (tfr0), in 1960 (tfr1960) and then the mean age at first birth in the 1990s (ma1b). The third and fourth variables vary only across countries of origin, while the first and second also vary with their year of birth.

β identifies the causal impact of culture on the hazard rate of having children as long as the dispersion in the cultural proxy is uncorrelated to the error term, which would be the case if characteristics that influence fertility decisions were randomly distributed across countries of origin. Of course the distribution of labor market abilities among migrants could be country specific and correlated to fertility decisions in the country of origin. Indeed, women coming from countries where female wages are low may hold a lower ability because their parents did not invest much in them. Not controlling for abilities would therefore lead to impute to a cultural effect what is due to low returns to abilities, so that estimates might be biased upward. To overcome this problem, I include educational attainment of women and their parents as a proxy for ability. Nevertheless, educational attainment may be endogenous to the 'treatment' as women who come from a high fertility country may systematically be less educated because they are expected to raise large families rather than achieve a successful professional career. In this case, the coefficient on the fertility norm would be biased downward.

The same issue arises with further determinants like educational attainment and migration status of partners. There may exist country-of-origin specific patterns for these variables correlated to the fertility norm for reasons that are cultural or not.[28] For instance, women from high fertility countries may choose more often a migrant partner either because they prefer

[28]Fernández and Fogli (2006, 2009) plead for controlling as much as possible for anything that is not strictly speaking a fertility norm, while Blau et al. (2013) take the opposite stand to control for as little as possible not to bias downward the coefficient on the fertility norm.

someone with matching preferences regarding fertility, or because high fertility countries are also more conservative and it is less socially accepted to enter a partnership with someone from a different origin. I therefore adopt an agnostic view and perform the two exercises: with and without controlling, and thus obtain a lower and an upper bound of the cultural effect.

As apparent in equation (1), the model leaves the baseline hazard unspecified and assumes that covariates have a constant impact on the hazard rate over the whole at-risk period (the coefficients are independent of time). Actually one may think in the case of fertility of both negative (the older women get, the less fertile they become) and positive (reaching the situation in terms of employment, housing etc. to raise a child might take time) time dependence. As in previous studies (Gutiérrez-Domènech (2008)), I stick to the Cox model as a reasonable approximation. I furthermore test the proportional hazard assumption in Appendix D and do not find evidence against it.

4 Analysis and Results

4.1 French sample

I run for each birth parity the same set of regressions, increasing gradually the number of controls. I first test in specification (1) the raw bivariate correlation between the outcomes and the cultural proxies, while in (2) I include only region of residence, urban status and a second order polynomial in age of the mother. Urban status and region of residence pick up all the effects that local conditions could have such as price of housing or amenities. The polynomial in age ensures that time varying economic conditions or public policies that affect a whole cohort are controlled for.[29]

[29]See for instance Currie and Schwandt (2014); Schneider (2015); Hoem (2000); Hondroyiannis (2010); Chabé-Ferret and Gobbi (2018) for evidence of the impact of unemployment and economic uncertainty in general on fertility timing.

Table 1: **Relationship between fertility norm and birth timing - France**

	(1)	(2)	(3)	(4)	(5)
	Hazard rate of having a first child				
tfr18	-0.005	-0.001	-0.042**	-0.044**	-0.058***
	(0.018)	(0.015)	(0.020)	(0.022)	(0.019)
Observations	3805	3805	3805	3805	3805
Log Likelihood	-13793	-13713	-13663	-13576	-13566
	Hazard rate of having a second child				
tfr18	-0.008	-0.010	-0.019	-0.018	-0.055**
	(0.014)	(0.013)	(0.018)	(0.018)	(0.024)
Observations	1895	1895	1895	1895	1895
Log likelihood	-8505	-8471	-8461	-8460	-8430
	Hazard rate to having a third child				
tfr18	0.148***	0.184***	0.177***	0.171***	0.120***
	(0.036)	(0.023)	(0.027)	(0.028)	(0.034)
Observations	1249	1249	1249	1249	1249
Log likelihood	-2778	-2746	-2742	-2734	-2687
geography and age		x	x	x	x
grandparents' characteristics			x	x	x
gender of earlier children			x	x	x
education				x	x
religion					x
birth timing of earlier children					x

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18. S.E. are clustered at the country of origin level and shown in parenthesis. Geography contains 22 dummies for region of residence and urban status. A polynomial of degree 2 in age is also included. Grandparents' characteristics contain educational attainment of both maternal grandparents, whether they were both foreign born, only the grandmother or only the grandfather as well as their total number of children. Education contains a 6-level categorical variable for mother's educational attainment. Religion includes a 5-level variable for religion and a 4-level variable for religiosity. When applicable, I include a set of dummies for the gender composition and birth timing of earlier children.

In (3), I add controls for maternal grandparents' characteristics such as their educational attainment (two 6-level categorical variables), their nativity (which tells whether only the grandmother, only the grandfather or both maternal grandparents were foreign born) and the total number of children the maternal grandparents had (which corresponds to the sibship size of the women in the sample). The rationale here is to use some predetermined variables at the time of the fertility decision in order to control for part of the heterogeneity that could confound the cultural effect. Grandparental education could have an effect through intergenerational transmission of human capital, nativity through a low intermarriage rate in the grandparents' generation.[30] Sibship size is used in Fernández and Fogli (2006) as a proxy for personal experience as opposed to the country-of-origin specific cultural norm. When applicable, I also include the gender composition of previously born children. This ensure that my results are not driven by a potential preference for boys or for gender mixity, as observed in Almond et al. (2013); Kugler and Kumar (2017); Angrist and Evans (1998).

In (4), I include own education (a 5-level categorical variable). Own education is clearly an endogenous variable in the sense that fertility and education decisions may well be co-determined. Still, including educational attainment as a control allows to capture the residual effect of the cultural norm on fertility, net of the effect going through education.

In (5), I add religion and religiosity (which are two 6-level categorical variables), as well as birth timing at previous parities. These variables are all clearly endogenous as well. However the rationale for including them is to test whether even taking into account all available determinants of fertility, the cultural effect still remains. I include religion to check to what extent the cultural effect goes through this channel. Religion may play a direct role for instance promoting sexual intercourse as a reproduction device only, thus forbidding the use of contraception and abortion, but also discouraging women's work outside the household etc.

[30] I test the heterogeneity of the cultural effect along these dimensions in Section 4.3.

Lehrer (2004) reviews these mechanisms, among which she underlines the important impact of pro-natalist ideology of religions such as catholicism that raises the perceived benefit of having an additional child. Numerous papers like Adsera (2006a,b) show that, in a secular society, religion predicts both a higher fertility norm and actual fertility. Additionally, De la Croix and Delavallade (2018) look at how different religions' pronatalism is detrimental to growth via the fertility/education channel. Religiosity instead captures the possibility that level of practice, rather than type of faith, actually matters as suggested in Baudin (2015). When applicable, I also control for the timing of previous births in order to pick up potential biological correlations between the birth spacing across parities.

Because errors are likely to be correlated within countries of origin, I cluster the standard errors at the country of origin level in all specifications.

Table 1 shows the coefficients on the fertility norm using tfr18 for each birth parity. The main result is that a higher fertility norm does not increase the hazard rate of having a first or a second child, while it does very significantly for third births. If anything, women with a higher fertility norm tend to enter into motherhood later than comparable women with a low fertility norm. More precisely, using equation (10), I can compute the hazard ratio of having a first child for high fertility women relative to observably identical women with a low fertility norm:

$$\frac{\lambda\left(t \mid \text{ high norm }, X\right)}{\lambda\left(t \mid \text{ low norm }, X\right)}=e^{\beta}\left(\text{ high norm - low norm }\right) \tag{11}$$

The standard deviation of tfr18 in the sample is of 1.65, which corresponds roughly to the distance between the average woman from Germany, 1.38, and that from Morocco, 3.07. Now using -0.058, the coefficient in specification (5), which is the largest in absolute value, implies that the hazard rate of having a first child for a woman from Morocco is $e^{-0.057*1.65}=0.910$ that of a woman from Germany, which is a 9% difference.

There are two main reasons why a negative relationship is observed in this case. First, a substantial fraction of second generation migrant women with a high fertility norm in France are coming from North Africa. These women have been documented to delay childbearing in response to high prevalence of unemployment or insecure employment[31]. Additionally, the negative coefficient may arise from the correlation between the fertility norm and some plausibly endogenous controls I use in those specifications. For instance, the fertility norm is negatively correlated to grandparental and parental education, which strongly predict a later transition into motherhood. If education is somewhat caused by the fertility norm (one may choose to educate less as they plan to favor family over career), then it can be argued that it is a bad control.In this case, controling for it would bias the coefficient on the fertility norm downward, making it more negative than it should.

Looking at the hazard rate of having a third child instead, coming from a high fertility country very robustly increases it whatever the specification. Using the same type of computations, a woman from Morocco is between 22 (specification 5) and 35% (specification 2) more likely to have a third child than one from Germany. Consistent with the discussion on whether or not to control for characteristics that could be influenced by cultural norms such as family arrangements, the more controls are included, the smaller the coefficient gets. I am therefore confident that what I propose is actually a range of magnitude between a lower and a higher bound for the cultural effect. Including controls for education, religion or timing of earlier births, the coefficient on norms decreases substantially but remains significant for third births. I interpret this result as a sign that the cultural effect goes partly, though not exclusively, through religious affiliation.

Full tables showing the coefficients on all controls and their interpretation can be found in Appendix E.

[31]See for instance the study by Dupray and Pailhé (2018) using a different survey for France.

Table 2: **Relationship between fertility norm and birth timing - US**

	(1)	(2)	(3)
	Hazard rate of having a 1st child		
tfr18	0.149***	0.048***	0.005
	(0.017)	(0.016)	(0.023)
Observations	2641	2641	2641
Loglikelihood	81.7	41559.4	65524.4
	Hazard rate of having a 2nd child		
tfr18	-0.007	-0.015	-0.026
	(0.016)	(0.014)	(0.017)
Observations	1766	1766	1766
Loglikelihood	0.2	195574.5	1912647.1
	Hazard rate of having a 3rd child		
tfr18	0.086***	0.110***	0.071***
	(0.017)	(0.029)	(0.023)
Observations	1385	1385	1385
Loglikelihood	25.1	2068817.6	7466319.6
geography and age		x	x
nativity		x	x
gender of earlier children		x	x
education			x
birth timing of earlier children			x

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18. S.E. are clustered at the country of origin level and shown in parenthesis. Geography contains 50 dummies for state of residence and a polynomial of degree 2 in age is also included. Education contains a 6-level categorical variable for own educational attainment, while nativity refers to whether both maternal grandparents were foreign born, only the mother or only the father. When applicable, I include a set of dummies for the gender composition and birth timing of earlier born children.

4.2 US sample

Because the US Census does not contain information about parental education or religion for instance, I run fewer specifications. In (1), I show the simple bivariate correlation. Then in (2), I include only a second order polynomial in age and state of residence (a 50-level categorical variable). When applicable, I also control for the gender composition of earlier born children. Finally in (3), I add own education (6-level variable) and, when applicable, the timing of earlier births.

Table 2 shows that results are overall similar to the French case. The positive effect of tfr18 on the hazard rate of having a child starts to kick in robustly after the second child. If anything, the hazard rate of having a second child decreases with tfr18, but this effect is never significant. The main difference resides in the fact that the raw correlation between tfr18 and the hazard rate of having a first child is positive and significant. It remains significant in specification (2) but three times smaller, about half the size of the coefficient observed for third births. It then becomes insignificant and very close to zero as soon as educational attainment is controlled for.

One reason why we observe a slightly different pattern in how the timing of first births correlates to the fertility norm in France and the US may be linked to the affordability of education in the two countries. Indeed, in France, education is virtually free for everyone, at all stages, while it is far to be the case in the US. Any difference in educational attainment correlated to the cultural norm might reveal a causal effect of the fertility norm on education in France, while in the US, those differences might rather pick up the fact that migrants from high fertility countries are generally poorer. To be specific, in the US, populations from less developed and higher fertility countries cannot afford to go to college and therefore enter motherhood earlier, but it is likely caused by the lack of access to education rather than by the fertility norm.

In terms of magnitude, Table 2 indicates that a one standard deviation change in tfr18, which is 1.39 in this sample and corresponds to the difference between the average woman from Denmark and that from Jamaica, increases the hazard rate of having a third child by 10 (specification 3) to 16% (specification 2). This magnitude is smaller than in the French case because i) the standard deviation in tfr18 is smaller in the US sample and ii) the estimated coefficients are also smaller. While the former reveals that the diaspora of second generation migrants is somewhat more homogenous in the US than in France, the latter could also be interpreted in light of the model as reflecting a different trade-off between cultural norm and economic optimum.

Indeed, the set of family policies available in both countries is very different. In France, there exist many policies that can be considered as encouraging larger families. They range from direct child allowances ("Allocations familiales") to tax rebates (the so-called "quotient familial"), not to mention more indirect, though very substantial, incentives like paid parental leave, publicly provided childcare, healthcare and education. In the US instead, similar policies are much smaller in scope and in general means-tested. For instance, the Aid to Families with Dependent Children instaured during the New Deal has been regularly criticized for encouraging low-income women to have children and has, as a result, been replaced by the more restrictive Temporary Assistance to Needy Families in 1996. There also exist a tax credit based on the number of dependent children age 17 or less, but it has been limited to 1000$ per child per year in 2012. Overall, the child-related expenditures left to the families are substantially higher in the US.

These differences in institutional features could be reflected in the model through a different economic optimum or through a different cost of deviation from the economic optimum. Indeed, one may think that the family friendly policies in France tilt the economically optimal number of children upward. However, the total fertlity rate in the two countries has been strikingly similar and stable around two children per women in the two countries since the mid-1970s. It therefore does not seem likely that both countries have vastly different economically optimal levels of fertility. What these policies may affect instead is the cost of deviating from the economic optimum. Indeed, it certainly is significantly less costly to have a third child in France than in the US. It follows that cultural norms should operate more strongly in France than in the US.

A second reason why the effect found in the US is weaker than in France is related to the larger proportion of mixed couples in the US sample, which is likely to dilute more the cultural effect as will be shown in the heterogeneity analysis in the next subsection. The important implication of this replication exercise on US data is that the pattern uncovered in the previous subsection is not due to particularities of the host country, nor to characteristics of the origin countries as they also differ widely.

4.3 Heterogeneity analysis

In this subsection, I consider the possibility that fertility norms do not affect all individuals in the same way. The rationale for this exercise is twofold: first, it could be that the absence of cultural effect for first and second births is actually the average of a positive and a negative effect for different subsamples of the population; second, I want to explore for which type of individuals in my sample is the cultural effect stronger. To this end, I estimate again specification (3) of Table 1 for each birth parity but this time interacting tfr18 with own education and nativity successively. Table 3 reports the marginal effects of tfr18 for each category of the interacted variable.

For first and second births, it appears that the lack of cultural effect is not driven by contradicting effects across individuals with different nativity status or educational attainment. Indeed, most often, the coefficient is not significantly different from zero. However it is sometimes negative and significant. Yet, there is no case of significant coefficients of opposite signs, which thus invalidates the hypothesis of contradicting effects in different subsamples. Additionally, the large cultural effect documented for third births does not seem to be concentrated on some subsamples. It is slightly larger for women whose parents are both foreign-born, which is consistent with a dilution of cultural transmission in mixed couples. The cultural effect is also present at all level of educational attainment, although it seems slightly less strong for those with at most secondary education. Stichnoth and Yeter (2016) find consistent results on German data for the heterogeneity in nativity status. Nevertheless, their results suggest a

Table 3: **Heterogeneous effect of the fertility norm - France**

	Hazard rate of having a					
	1st child		2nd child		3rd child	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Nativity						
Foreign-born mother	-0.062***		-0.055*		0.147***	
	(0.022)		(0.031)		(0.055)	
Foreign-born father	0.022		0.067		0.179*	
	(0.042)		(0.056)		(0.103)	
Both parents foreign-born	-0.048		-0.014		0.182***	
	(0.031)		(0.015)		(0.028)	
B. Education						
Up to secondary		-0.014		-0.042		0.120**
		(0.049)		(0.039)		(0.054)
Vocational		-0.068*		-0.016		0.190***
		(0.035)		(0.020)		(0.036)
High school grad		-0.070**		-0.030		0.200***
		(0.029)		(0.035)		(0.056)
2 years of college		-0.066*		-0.065		0.220***
		(0.037)		(0.055)		(0.070)
$>$ 2 years of college		-0.017		0.078*		0.216***
		(0.027)		(0.043)		(0.078)
Observations	3805	3805	1895	1895	1249	1249
Log Likelihood	-13574	-13574	-8458	-8456	-2734	-2733

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A and B are obtained after regressing hazard rates on tfr18 interacted with nativity status and educational attainment respectively. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education and sibship size. When applicable, gender of earlier children is included.

larger effect for less educated individuals. Further research is needed along these lines.

5 Discussion and robustness

5.1 Discussion

One potential concern regards the sample variation across birth parities. Indeed, the large cultural effect I estimate on third births is de facto based on the selected sample of women who had at least two children. The sample could therefore be composed of compliers (following the cultural prescription of their origin country) and defiers (acting orthogonally to their cultural background). In order to make the correlation between birth timing and cultural proxies insignificant for first and second births, while leaving it large and significant for third births, the share of defiers in the sample would need to be large for early birth orders and then drop sharply at the third birth. I rule out this possibility by running the regressions on first and second births on a sample restricted to women who had at least two children, so supposedly composed of a majority of compliers. Results remain unchanged.[32] Moreover, if defiers seldom have more than two children irrespective of their fertility norm, it may be because they put a larger weight on the economic optimum of having few children, in which case it is exactly what I intend to measure.

Second, I have claimed that migrants adapt to the local economic optimum for the first birth while they are more prone to cultural norms for the third child. However it could well be that the level at which migrants coordinate for first births is different from the local economic optimum. In Figure F1, I use the native samples in both TeO and the CPS to show how the timing of each birth parity differs between natives and migrants, both with a high and low fertility norm. For first births, natives tend to anticipate slightly with respect to both types

[32]Tables available upon request.

of migrants. This could be due to other forces that prevent migrants to adjust to the local economic optimum such as discrimination on the labor or housing market or in the access to schooling. Instead, there is virtually no difference in behavior across groups for second births. In terms of third births, natives fall in between low and high fertility migrants, but closer to the former, in both France and the US. This is expected as both host countries are low fertility countries when we consider the universe if origin countries in the sample, but they have a relatively high fertility when we restrict to the group of low fertility countries. All in all, this graph confirms that the behavior of migrants with different fertility norms is much more similar for the first two births (although slightly different from that of the natives in the US for first births) than it is for third births. This is consistent with a narrative of migrants coordinating on the local optimum when the economic cost of deviation is large enough compared to the cultural cost.

5.2 Country-of-origin specific controls

One substantial threat to identification is the existence of country-of-origin specific factors correlated to tfr18 that could systematically affect fertility choices without being cultural in nature. In this subsection, I control for five such factors: geographic, linguistic and genetic distance, GDP per capita in the country of origin and average education in the migrant network. These measures are all time-invariant or very slow-moving, except for GDP per capita. They are correlated to tfr18 to some extent, as shown in the first column of Table 4, and could have some direct influence on fertility behavior. For instance, various measures of distance may influence the way migrants self select into migration, their economic success in the host country as well as their perspective of return. I take geographic distance from Mayer and Zignago (2011), genetic distance from Spolaore and Wacziarg (2009), which they use as a proxy for cultural distance, and linguistic distance based on pronunciation comparison from Isphording and Otten (2014).

We take GDP per capita in the country of origin when individuals were 18 years old in order to capture aspirations or habit consumption. Average education is the share of people with at least some college in the second generation migrant population from that origin country in France. It may proxy for social capital, which could influence the quantity and quality of job opportunities migrants from a given country have access to through their diaspora.

Table 4: **Fertility norm and timing of 3rd birth with country-of-origin controls - France**

	correlation with tfr18	Hazard rate of having a 3rd child (1)	(2)	(3)	(4)	(5)	(6)
tfr18		0.191***	0.211***	0.089***	0.178***	0.186***	0.132***
		(0.028)	(0.029)	(0.033)	(0.025)	(0.029)	(0.050)
geographic dist.	0.45	-0.058					-0.026
		(0.045)					(0.032)
genetic dist.	0.40		-0.307**				-0.176
			(0.143)				(0.174)
linguistic dist.	0.53			0.029***			0.030**
				(0.011)			(0.012)
gdp (in K$)	-0.55				0.000		0.008
					(0.016)		(0.012)
average educ.	-0.26					0.544	0.403
						(0.855)	(0.844)
Observations		1249	1249	1249	1249	1249	1249
Log Likelihood		-2741	-2741	-2736	-2742	-2742	-2735

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education, nativity, sibship size and gender of earlier children.

I add each of these variables one at a time and then altogether to specification (3) from Table 1. Table 4 reports the coefficients on tfr18 and the extra variables included for third births.[33] The main message from this Table is that including further country-of-origin controls, either separately or altogether, does not eliminate the effect of tfr18 on the hazard rate of having a third birth. The coefficient on tfr18 actually increases compared to its original value of 0.177 in column (3) of Table 1 in four out of six specifications. It decreases only in specifications

[33]The results for first and second births can be found in Tables G1 and G2. They show that the coefficients on tfr18 are not sensitive to the inclusion of country of origin level controls.

(3) and (6), that is when, respectively, linguistic distance and all controls are included. When included separately, only genetic and linguistic distance enter significantly, respectively at the 5 and 1% confidence level. Genetic distance enters negatively, while linguistic distance has a positive coefficient. This could be because on the one hand migrants from genetically distant countries are more selected and are therefore more inclined to work rather than having large families, and on the other hand those from a linguistically similar country have an advantage on the labor market and therefore a higher opportunity cost of having children.

5.3 Alternative measures of norms

In this subsection, I evaluate the sensitivity of the results to the use of alternative measures of cultural norms. More specifically, I use specification (3) in Table 1 and I replace tfr18 by the TFR in the country of origin when women were born, tfr0, in 1960, tfr60 and finally by the mean age at first birth ma1b. Each alternative measure changes the implicit identifying assumptions: tfr0 assumes that the relevant cultural norm is the behavior of people in the country of origin at the time they were born, which is roughly their parents' generation; tfr60 allows to derive results that are directly comparable to the seminal contribution by Fernández and Fogli (2006, 2009), but it assumes that cultural norms are strictly time-invariant (rather than slow-moving); moreover ma1b allows to make sure that age at first birth is not another culturally transmitted norm operating in parallel of the completed fertility norm and which would have a better explanatory power for low birth parities.

Results are shown in Table H1. The pattern remains the same as in Table 1. For the first two births, the coefficient on the cultural proxy is either insignificant or of the "wrong" sign. The positive coefficient on ma1b for second births for instance means that a higher mean age at first birth in the country of origin tends to accelerate the transition to the two children regime. For third birth instead, the coefficient is positive and significant when using tfr0 and tfr60, although slightly smaller than when using tfr18. One reason for this decrease in magnitude may be the *impressionable years hypothesis*, which states that people tend to form expectations between 18 and 15, making tfr18 a stronger predictor than tfr0. Another reason is that tfr60 is time-invariant, which does not allow to exploit the within-country of origin variation. Finally, when using ma1b, I find a negative and significant coefficient, which means that the higher the mean age at first birth in the country of origin (in other words, the lower the fertility norm), the lower the hazard rate of having a third child. In terms of magnitude, a one standard deviation increase in ma1b amounts to a decrease by 21% of the hazard rate of having a third child, which is in line with what I find using tfr18.

5.4 Partner's characteristics

In this subsection, I exploit the fact that the TeO survey asks a large set of questions about partners. Indeed, another threat to the identification of a fertility norm could be that it captures instead some tendency of second generation migrants who are most distant from the host country culture to intramarry or to pick less educated partners. In order to discard this possibility, I focus on a subsample of women whose partners are present in the household. I therefore control for a second order polynomial in their age, their nativity status (native, second or first generation migrant) and their educational attainment. Additionally I look at the heterogeneity of the cultural effect in this subsample along the own education, own and partner's nativity dimensions.

Results are shown in Tables I1 and I2. The general pattern present in Table 1 is still there: no robust positive correlation between norm and fertility for the first two births, while a robustly significant positive coefficient for the third birth. In terms of magnitude of the cultural effect for third births, the coefficient on tfr18 in specification (2) is larger in the partner's subsample than in the baseline sample. This could be because people in stable unions tend to be more influenced by cultural norms. From specification (3) to (5) however, the coefficient on tfr18 declines and is smaller in the partner's subsample. The fertility norm was then previously capturing some tendency of high fertility origin women to pick partners with a migration background rather than natives and with on average a lower educational attainment. That said, I still find a very significant coefficient on tfr18, suggesting that some of the cultural effect, however not all of it, is going through intramarriage. The results of the heterogeneity analysis are very much in line with those in the baseline. The cultural effect seems weaker for women who have only one foreign-born parent, pick a native partner and who are less educated.

6 Conclusion

In this paper, I have built a model of decision-making featuring a trade-off between an economic cost - benefit analysis and the influence of a cultural norm. I have shown that decisions characterized by a small cost of deviation from the economic optimum were most likely to be influenced by culture. I have brought this hypothesis to the data using birth timing decisions of second generation migrant women to France and the US. I exploit the fact that there are larger costs involved in the decision about the timing of entry into motherhood in terms of human capital acquisition and labor market outcomes as compared to that of subsequent childbearing. I indeed find that a high fertility norm, as measured by the TFR in the country of origin, does not correlate to a lower age at first birth, while it substantially increases the likelihood of having a third child.

This work allows to reconcile rational decision-making with cultural influence. It also opens a large area of public policy interventions that would nudge people away from inadequate cultural beliefs. Finally it suggests that cultural norms are subject to natural selection as the costliest to sustain should tend to disappear.

References

Abramitzky, R., Boustan, L. P., and Eriksson, K. (2016). Cultural assimilation during the age of mass migration. National Bureau of Economic Research, DP No. w22381.

Adda, J., Dustmann, C., and Stevens, K. (2017). The career costs of children. *Journal of Political Economy*, 125(2):293–337.

Adsera, A. (2006a). Marital fertility and religion in Spain, 1985 and 1999. *Population Studies*, 60(2):205–221.

Adsera, A. (2006b). Religion and changes in family-size norms in developed countries. *Review of Religious Research*, pages 271–286.

Akerlof, G. A. (1997). Social distance and social decisions. *Econometrica: Journal of the Econometric Society*, pages 1005–1027.

Akerlof, G. A. and Kranton, R. E. (2000). Economics and identity. *Quarterly journal of Economics*, pages 715–753.

Alesina, A. and Giuliano, P. (2010). The power of the family. *Journal of Economic Growth*, 15(2):93–125.

Alesina, A., Giuliano, P., and Nunn, N. (2013). On the origins of gender roles: Women and the plough. *Quarterly Journal of Economics*, 128(2):469–530.

Algan, Y., Mayer, T., and Thoenig, M. (2013). The economic incentives of cultural transmission: Spatial evidence from naming patterns across france. CEPR Discussion Paper.

Almond, D., Edlund, L., and Milligan, K. (2013). Son preference and the persistence of culture: Evidence from south and east asian immigrants to canada. *Population and Development Review*, 39(1):75–95.

Anderson, D. J., Binder, M., and Krause, K. (2002). The motherhood wage penalty: Which mothers pay it and why? *American Economic Review*, 92(2):354–358.

Angrist, J. D. and Evans, W. N. (1998). Children and their tarents' labor supply: Evidence from exogenous variation in family size. *American Economic Review*, 88(3):450–477.

Atkin, D. (2016). The caloric costs of culture: Evidence from indian migrants. *American Economic Review*, 106(4):1144–1181.

Baudin, T. (2015). Religion and fertility: The french connection. *Demographic Research*, 32(13):397–420.

Becker, G. S. (1996). *Accounting for tastes*. Harvard University Press.

Bénabou, R. and Tirole, J. (2016). Mindful economics: The production, consumption, and value of beliefs. *Journal of Economic Perspectives*, 30(3):141–164.

Bertrand, M., Goldin, C., and Katz, L. F. (2010). Dynamics of the gender gap for young professionals in the financial and corporate sectors. *American Economic Journal: Applied Economics*, 2(3):228–255.

Biavaschi, C., Giulietti, C., and Siddique, Z. (2017). The economic payoff of name americanization. *Journal of Labor Economics*, 35(4):1089–1116.

Bisin, A. and Verdier, T. (2001). The economics of cultural transmission and the dynamics of preferences. *Journal of Economic theory*, 97(2):298–319.

Blau, F. D., Kahn, L. M., Liu, A. Y.-H., and Papps, K. L. (2013). The transmission of women's fertility, human capital, and work orientation across immigrant generations. *Journal of Population Economics*, 26(2):405–435.

Boustan, L. P. and Collins, W. J. (2014). The origin and persistence of black-white differences in women's labor force participation. *Human Capital in History: The American Record*, page 205.

Caplin, A. and Dean, M. (2015). Revealed preference, rational inattention, and costly information acquisition. *American Economic Review*, 105(7):2183–2203.

Chabé-Ferret, B. and Gobbi, P. (2018). Economic uncertainty and fertility cycles: The case of the post-WWII baby boom. CEPR Discussion Paper No. DP13374.

Cottier, L. (2018). Culture, financial constraints, and retirement decision. *Labour Economics*.

Currie, J. and Schwandt, H. (2014). Short-and long-term effects of unemployment on fertility. *Proceedings of the National Academy of Sciences*, 111(41):14734–14739.

De la Croix, D. and Delavallade, C. (2018). Religions, fertility, and growth in Southeast Asia. *International Economic Review*, 59(2):907–946.

de la Croix, D. and Perrin, F. (2018). How far can economic incentives explain the french fertility and education transition? *European Economic Review*, 108:221–245.

Doepke, M. and Zilibotti, F. (2008). Occupational choice and the spirit of capitalism. *Quarterly Journal of Economics*, page 747.

Dupray, A. and Pailhé, A. (2018). Does employment uncertainty particularly impact fertility of children of north african immigrants in france? a gender perspective. *Journal of Ethnic and Migration Studies*, 44(3):401–424.

Elster, J. (1989). Social norms and economic theory. *Journal of Economic Perspectives*, pages 99–117.

Eugster, B., Lalive, R., Steinhauer, A., and Zweimüller, J. (2011). The demand for social insurance: does culture matter? *Economic Journal*, 121(556):F413–F448.

Fernández, R. and Fogli, A. (2006). Fertility: The role of culture and family experience. *Journal of the European Economic Association*, 4(2-3):552–561.

Fernández, R. and Fogli, A. (2009). Culture: An empirical investigation of beliefs, work, and fertility. *American Economic Journal: Macroeconomics*, 1(1):146–177.

Fisman, R. and Miguel, E. (2007). Corruption, norms, and legal enforcement: Evidence from diplomatic parking tickets. *Journal of Political economy*, 115(6):1020–1048.

Giuliano, P. (2007). Living arrangements in western europe: Does cultural origin matter? *Journal of the European Economic Association*, 5(5):927–952.

Giuliano, P. and Spilimbergo, A. (2014). Growing up in a recession. *Review of Economic Studies*, 81(2):787–817.

Grosjean, P. (2014). A history of violence: The culture of honor and homicide in the u.s. south. *Journal of the European Economic Association*, 12(5):1285–1316.

Guiso, L., Sapienza, P., and Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, 20(2):23–48.

Gutiérrez-Domènech, M. (2008). The impact of the labour market on the timing of marriage and births in spain. *Journal of Population Economics*, 21(1):83–110.

Henrich, J. (2015). *The secret of our success: how culture is driving human evolution, domesticating our species, and making us smarter*. Princeton University Press.

Herr, J. L. (2014). Measuring the effect of the timing of first birth on wages. *Journal of Population Economics*, pages 1–34.

Herr, J. L. et al. (2015). The labor supply effects of delayed first birth. *American Economic Review*, 105(5):630–37.

Hinde, A. (2003). *England's population: A history since the Domesday survey*. Hodder Arnold.

Hoem, B. (2000). Entry into motherhood in sweden: The influence of economic factors on the rise and fall in fertility, 1986-1997. *Demographic research*, 2(4):1–28.

Hondroyiannis, G. (2010). Fertility determinants and economic uncertainty: An assessment using european panel data. *Journal of Family and Economic Issues*, 31(1):33–50.

Isphording, I. E. and Otten, S. (2014). Linguistic barriers in the destination language acquisition of immigrants. *Journal of economic Behavior & organization*, 105:30–50.

Kanazawa, S. (2001). De gustibus est disputandum. *Social Forces*, 79(3):1131–1162.

Kind, M. and Kleibrink, J. (2012). Time is money–the influence of parenthood timing on wages. Rhur Economic Papers.

Kugler, A. D. and Kumar, S. (2017). Preference for boys, family size, and educational attainment in India. *Demography*, 54(3):835–859.

La Ferrara, E., Chong, A., and Duryea, S. (2012). Soap operas and fertility: Evidence from brazil. *American Economic Journal: Applied Economics*, pages 1–31.

Lalive, R. and Zweimüller, J. (2009). How does parental leave affect fertility and return to work? evidence from two natural experiments. *Quarterly Journal of Economics*, 124(3):1363–1402.

Landais, C. (2007). Coût de l'enfant et fécondité. l'impact des incitations financières. *Informations sociales*, (137):118–129.

Lee, R. (2015). Becker and the demographic transition. *Journal of demographic economics*, 81(01):67–74.

Lehrer, E. L. (2004). Religion as a determinant of economic and demographic behavior in the United States. *Population and Development Review*, 30(4):707–726.

Loughran, D. S. and Zissimopoulos, J. M. (2009). Why wait? The effect of marriage and childbearing on the wages of men and women. *Journal of Human resources*, 44(2):326–349.

Lundborg, P., Plug, E., and Rasmussen, A. W. (2017). Can women have children and a career? IV evidence from IVF treatments. *American Economic Review*, 107(6):1611–37.

Mayer, J. and Riphahn, R. T. (2000). Fertility assimilation of immigrants: Evidence from count data models. *Journal of Population Economics*, 13(2):241–261.

Mayer, T. and Zignago, S. (2011). Notes on CEPII's distances measures: The GeoDist database. CEPII Discussion Paper.

Melindi Ghidi, P. (2012). A model of ideological transmission with endogenous parental preferences. *International Journal of Economic Theory*, 8(4):381–403.

Miller, A. R. (2011). The effects of motherhood timing on career path. *Journal of Population Economics*, 24(3):1071–1100.

Munshi, K. and Myaux, J. (2006). Social norms and the fertility transition. *Journal of development Economics*, 80(1):1–38.

Paule-Paludkiewicz, H., Fuchs-Schündeln, N., and Masella, P. (2016). Cultural determinants of household saving behavior. Kiel und Hamburg: ZBW-Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft.

Ruggles, S., McCaa, R., Sobek, M., and Cleveland, L. (2015). The IPUMS collaboration: Integrating and disseminating the world's population microdata. *Journal of Demographic Economics*, 81.

Schneider, D. (2015). The great recession, fertility, and uncertainty: Evidence from the united states. *Journal of Marriage and Family*, 77(5):1144–1156.

Silles, M. A. (2015). The impact of children on womens labour supply and earnings in the uk: Evidence using twin births. *Oxford Economic Papers*, 68(1):197–216.

Sims, C. A. (2003). Implications of rational inattention. *Journal of monetary Economics*, 50(3):665–690.

Spolaore, E. and Wacziarg, R. (2009). The diffusion of development. *Quarterly journal of economics*, 124(2):469–529.

Spolaore, E. and Wacziarg, R. (2014). Fertility and modernity. Tufts University Discussion Paper.

Stichnoth, H. and Yeter, M. (2016). Cultural influences on the fertility behaviour of first-and second-generation immigrants in germany. *Journal of Demographic Economics*, 82.

Stigler, G. J. and Becker, G. S. (1977). De gustibus non est disputandum. *American Economic Review*, 67(2):76–90.

A Review of the literature on the cost of children by birth order

The interpretation of the results hinges particularly upon the hypothesis that the cost of deviating from the economic optimum is larger for the first birth than for subsequent ones. More specifically, anticipating the first birth by, say, a year should represent a larger welfare loss than anticipating the second or the third by the same margin. There are several mechanisms that support this hypothesis.

First, it could be that there exists economies of scale in the production of children, making the first one more expensive than the subsequent ones.[34] Early childbearing may also interrupt a woman's studies or career at an age when human capital is acquired more easily and will yield returns on a longer time-horizon. Additionally starting late can be a commitment to having few children (given the biological constraints), which may open better professional opportunities. Therefore, the age at entry into motherhood is of particular importance for outcomes such as educational attainment, employment, wages and earnings of mothers. For instance, using biological fertility shocks as instruments, Miller (2011) shows on US data that delaying birth by one year, while holding completed fertility constant, leads to a 9% increase in earnings, 3% in wages and 6% in hours worked of mothers. Herr (2014); Herr et al. (2015) find a 5% wage premium for a one year delay, also on US data, while Kind and Kleibrink (2012) use a similar methodology on German data and find a 7% wage premium.

A large literature has more broadly focused on the career costs of children using various methodologies. Anderson et al. (2002) follow a fixed-effect estimation strategy on the panel of the NLSYW to show that there are substantial wage penalties associated to motherhood, ranging from 3-4% for one child to 5-8% for two or more children. Extending this study with the use of later cohorts of the NLSY and NLSYW, Loughran and Zissimopoulos (2009) apply a similar strategy and confirm the negative impact of children on female wages and labor force participation. They also find suggestive evidence that a second child has no incremental effect on female wages. On a more selected web-based survey conducted on University of Chicago MBAs from the graduating classes of 1990 to 2006, Bertrand et al. (2010) show that women's earnings drop by 30 log points at three or more years after the birth of a child, through a

[34] Although a large part of the cost of children is arguably incompressible parental time, there could still be room for some economies of scale to exist, due for instance to the re-use of children's clothing, stroller or other equipments. In addition, there could be some learning by doing, making parents more efficient at every extra birth. The Oxford equivalence scale does not take this possibility into account as it considers that all individuals below 14 years of age count for half a consumption unit, while the square root scale, which has been adopted by the OECD, considers that the marginal cost of a child falls with birth order. In any case, these scales fail to account for forgone earnings implied by childbearing, which as will become clear, seem to make up for the bulk of the cost of children.

combination of, mainly, decreased hours worked as well as, more modestly, a cut in hourly wages. Importantly, they also find that the birth of a second child has little additional adverse effect on women's labor supply and earnings. Adda et al. (2017) build a dynamic life-cycle model of labor supply, fertility and savings, incorporating occupational choices, which they estimate using German data, and find comparable results: "the cost of a second child is lower than the cost of the first child. For instance, a first child at age 20 induces a total career costs of 31% (in terms of net present value of life-cycle earnings computed at age 15) compared to a scenario without children. A second child conceived at age 22 increases these costs to 36%".

Consistent with these findings, the seminal contribution by Angrist and Evans (1998), using the preference for mixed gender composition of offsprings, shows that a third child does reduce the labor supply of mothers, but that the effect is actually small and even close to inexistent for educated mothers or mothers married to a high-wage husband. Alternatively, Silles (2015) uses twin births at different parities as instruments for family size and documents similar results: an extra child does have a negative impact both on the extensive and intensive margins of labor force participation and earnings (although less robustly). Effects are overall larger at first parity.

The most recent piece of evidence comes from Lundborg et al. (2017), who use exogenous variation in fertility coming from the success rate of IVF (in vitro fertilization) treatment on Danish administrative data. They show that fertility has large negative effects on earnings, which are long-lasting and much stronger at the extensive margin than at the intensive margin.

Another potential important determinant of the cost of children can be government benefits. As regards the countries under scrutiny in this study, France has an extensive pro-fertility set of policies, like parental leave, family allowances, childcare subsidies or even direct tax cuts, while the US does not have any policy that explicitly aims at promoting fertility. Strikingly enough, both countries have yet ranked among the highest fertility countries within the OECD for the past 25 years. One potential issue for the present study would be that some policies may affect the incentive to have an extra child differently for migrants of different origins and at different birth orders.

More specifically, if some policies induce migrants from high fertility countries to have their third child earlier (but not their first or their second), then we may attribute to culture what actually comes from the economic and institutional environment. In the US, the federal program "Aid to Families with Dependent Children" that ran from 1935 to 1996 has been criticized for giving incentives to very low income families to have more children. There is no reason though that this extra incentive played a role for third births only. The French system instead has many pro-fertility policies, some targeted at the poor (family allowances, publicly-provided childcare), some benefitting more the rich (tax cuts known as the "quotient familial", tax credit for childcare expenses) and some that are arguably neutral (paid parental leave).[35] There has been some variations in the extent to which these policies were more or less favorable for a given birth order. In particular, the "quotient familial" has represented a substantial benefit for third births. Using policy changes, Landais (2007) estimates that this policy has had a very tiny effect on fertility overall. If we moreover consider that migrants coming from low fertility countries tend to be wealthier, this would actually lead to a downward bias in our estimates.

The main result remains consistent across host countries, the US and France, where policies regarding fertility substantially differ. I am therefore confident that it is not an artefact of the particular scheme of fertility subsidies in France. The minimal feature required for the interpretation of the result relying on economic incentives to hold is that the marginal cost of children should be non-increasing in the number of children.

Most of the evidence presented in this section applies to the difference between first and second birth. There is to my knowledge little evidence that there exists a substantial variation in cost between second and third births. However the result in this paper is that the cultural effect kicks in at the third birth only. My interpretation for this apparent inconsistency is that there exists a contradicting effect particularly strong for that birth parity. Indeed, low fertility individuals may also be more attached to the labor market and those who wish to have two children could therefore want to speed up the second birth in order to limit the total time during which the mother would be on and off of the labor market. This may explain why we do not observe any cultural effect for second births.

B Non-autarkic case

Now let me relax the assumption that migrants live in a social autarky. Consider instead that they are at a social distance $d_{HL}(= d_{LH})$ of the host country native population. The problem they face now becomes:

$$U_{i,L,H} = b_L f - c_L f^2 - \sigma_i (F_H^1 - f)^2 \qquad \text{where} \qquad F_H^1 = \frac{1}{2-d_{HL}} \times \frac{b_H}{c_H} + \frac{1-d_{HL}}{2-d_{HL}} \times \frac{b_L}{c_L} \quad (12)$$

The optimal choice of migrants is then:

$$f^*_{L,H} = \frac{b_L + \sigma_i F_H^1}{c_L + \sigma_i} = \frac{c_L + \dfrac{\sigma(1-d_{HL})}{2-d_{HL}}}{c_L + \sigma} \times \frac{b_L}{c_L} + \frac{\sigma/(2-d_{HL})}{c_L+\sigma} \times F_H \quad (13)$$

[35] Lalive and Zweimüller (2009) for instance find that extended legal parental leave increases the probability of a second child, as well as fertility in the long-run.

The optimal choice of fertility of migrants is still a convex combination of the two norms (home and host country), but now the weight put on the host country level depends negatively on the social distance between the two country. The comparative statics given by expressions (9) with respect to c_L and F_n still hold. Therefore the model's implications tested in this paper are not sensitive to the relaxation of the cultural autarky assumption. Furthermore, I can uncover an extra direction of comparative statics, deriving with respect to the cultural distance parameter, d_{HL}:

$$\frac{\partial^2 f^*}{\partial F_H \partial d_{HL}} > 0 \tag{14}$$

The idea is that the effect of the home country cultural norm will fade away faster the lower the social distance. I have tried to test this implication as well, but it turns out that cultural distance (as measure by genetic distance for instance) is substantially correlated to the cultural norm itself. A problem of collinearity therefore arises and does not allow me to identify the heterogeneity of the cultural effect along the cultural distance dimension. Somehow it is a direct corollary of the cultural diffusion channel developed in Spolaore and Wacziarg (2014) that a high TFR should be correlated with a large cultural distance.

C Summary statistics

Table C1: **Summary statistics for origin country data - French sample**

origin	# of obs.	tfr1960	tfr0	tfr18	ma1b
Algeria	708	7.65	6.82	4.06	24.90
Morocco	421	7.07	5.43	3.07	24.90
Tunisia	208	7.04	5.32	2.84	24.50
Senegal	135	6.95	7.06	5.50	19.30
Mauritania	16	6.78	6.25	5.28	21.90
Mali	83	6.70	7.06	6.84	18.60
Ivory Coast	40	7.35	6.90	5.27	19.20
Togo	17	6.52	6.99	5.32	19.20
Benin	18	6.28	6.88	6.26	19.80
Cameroon	33	5.65	6.46	5.91	19.70
Congo (Brazzaville)	28	5.88	5.72	5.18	19.80
Democratic Rep. of Congo	27	6.00	6.90	6.77	20.20
Vietnam	113	6.35	4.87	2.48	22.60
Cambodia	92	6.97	5.97	3.55	21.80
Turkey	227	6.30	3.83	2.40	21.80
Portugal	466	3.16	2.42	1.53	25.80
Spain	408	2.86	2.55	1.62	28.40
France	1569	2.85	2.42	1.96	28.10
Italy	455	2.37	2.16	1.46	28.00
Greece	11	2.23	1.88	1.39	26.60
Germany	103	2.37	1.97	1.38	28.10
United Kingdom	27	2.69	1.95	1.76	26.50
Belgium	74	2.54	2.05	1.66	27.50
Netherlands	13	3.12	2.53	1.70	28.40
Hungary	11	2.02	2.01	1.76	23.40
Poland	71	2.98	2.58	1.97	23.80
Total (excl. France)	3805	5.20	4.39	2.83	24.97
Standard deviation		(2.17)	(2.08)	(1.65)	(2.69)

Source: World Bank, World Fertility Report 2012 (United Nations publication)

Table C2: **Summary statistics for origin country data - US sample**

origin	**# of obs.**	**tfr1960**	**tfr0**	**tfr18**	**ma1b**
Dominican Rep	21	7.55	5.98	3.90	21.20
Philippines	16	7.15	6.40	5.69	23.10
Colombia	17	6.81	5.58	3.49	22.40
Mexico	455	6.78	6.45	4.82	20.80
El Salvador	62	6.73	6.34	5.38	20.50
Ecuador	11	6.69	5.71	4.40	21.60
Pakistan	19	6.60	6.60	6.51	22
Vietnam	11	6.35	5.97	3.56	22.60
South Korea	17	6.16	3.73	1.69	27.10
India	15	5.87	5.31	4.14	19.50
China	35	5.76	5.57	3.60	.
Jamaica	21	5.42	5.09	3.81	19.20
Puerto Rico	201	4.66	3.78	2.71	.
Cuba	40	4.18	3.92	2.23	.
Canada	398	3.81	3.20	2.71	26.40
United States of America	25,687	3.65	2.98	2.38	24.50
Ireland	120	3.78	3.59	3.38	.
Portugal	35	3.16	3.01	2.49	25.80
Netherlands	21	3.12	2.37	2.38	28.40
Poland	110	2.98	2.91	2.88	23.80
France	31	2.85	2.59	2.19	28.10
Norway	20	2.85	2.82	2.47	26.50
Yugoslavia	22	2.75	2.82	2.61	23.50
Austria	24	2.69	2.38	1.93	25.60
United Kingdom	195	2.69	2.40	2.20	26.50
Denmark	11	2.57	2.52	2.32	27.40
Belgium	14	2.54	2.36	2.14	27.50
Former USSR / Russian Fed	83	2.52	2.70	2.55	22.60
Germany	223	2.37	2.11	1.76	28.10
Italy	318	2.37	2.36	2.12	28.00
Greece	55	2.23	2.31	1.96	26.60
Sweden	12	2.17	2.29	2.10	27.20
Former Czechoslavakia	21	2.09	2.42	2.60	22.90
Hungary	40	2.02	2.40	2.14	23.40
Japan	49	2.00	2.25	2.27	27.50
(...)					
Total (Excl. USA)	2644	4.03	3.74	3.00	24.71
Standard deviation		(1.61)	(1.59)	(1.42)	(2.32)

Source: World Bank, World Fertility Report 2012 (United Nations publication). Only origin countries with 10 observations or more have been reported. Full Table available upon request.

Table C3: **Summary statistics for control variables - French sample**

	low fertility	high fertility	natives
# obs	2787	1218	1569
Age	30.24	31.91	38.85
# siblings	2.90	5.02	2.36
Education			
up to secondary	0.20	0.23	0.20
vocational	0.21	0.21	0.25
high school grad	0.28	0.25	0.23
2 years in college	0.14	0.14	0.16
$>$ 2 years in college	0.17	0.17	0.17
Mother's education			
$\geq$ high school grad	0.26	0.22	0.34
Father's education			
$\geq$ high school grad	0.29	0.23	0.38
Nativity			
foreign-born mother	0.27	0.21	/
foreign-born father	0.20	0.07	/
both parents foreign-born	0.54	0.71	/
Marital status			
not in a relationship	0.48	0.49	0.67
Live in towns $\leq$ 50,000 inhab.	0.29	0.14	0.49

	low fertility	high fertility	natives
Labor force status			
employed	0.64	0.62	0.73
unemployed	0.09	0.10	0.07
student	0.17	0.14	0.06
other inactive	0.10	0.13	0.14
Religion			
Atheist	0.30	0.25	0.43
Christian	0.40	0.18	0.56
Muslim	0.27	0.49	0.00
Jewish	0.01	0.02	0.00
Buddhists and others	0.02	0.04	0.00
Unkown	0.01	0.02	0.01
Religiosity			
$\geq$ once a week	0.03	0.05	0.02
$\geq$ once a month	0.05	0.05	0.04
for religious celebrations	0.17	0.18	0.10
for ceremonies in the family	0.33	0.24	0.36
never	0.11	0.21	0.04
unknown	0.31	0.27	0.44

Source: Enquête Trajectoire et Origines, INED 2008.

Table C4: **Summary statistics for control variables - US sample**

	low fertility	high fertility
# obs	1492	1152
Age	39.35	43.20
Education		
high school dropout	0.10	0.18
high school grad	0.33	0.34
some college, no degree	0.22	0.22
associate's degree	0.09	0.07
bachelor's degree	0.17	0.12
master's degree or more	0.09	0.07
Nativity		
foreign-born mother	0.31	0.24
foreign-born father	0.36	0.32
both parents foreign-born	0.33	0.44
Labor force status		
in the labor force	0.70	0.64
Marital status		
divorced or widowed	0.17	0.20
never married	0.26	0.24

Source: US Current Population Survey, June supplement 1995.

D Test of the proportional hazard assumption

Figure D1: **Kaplan-Meier Vs predicted Cox estimates**

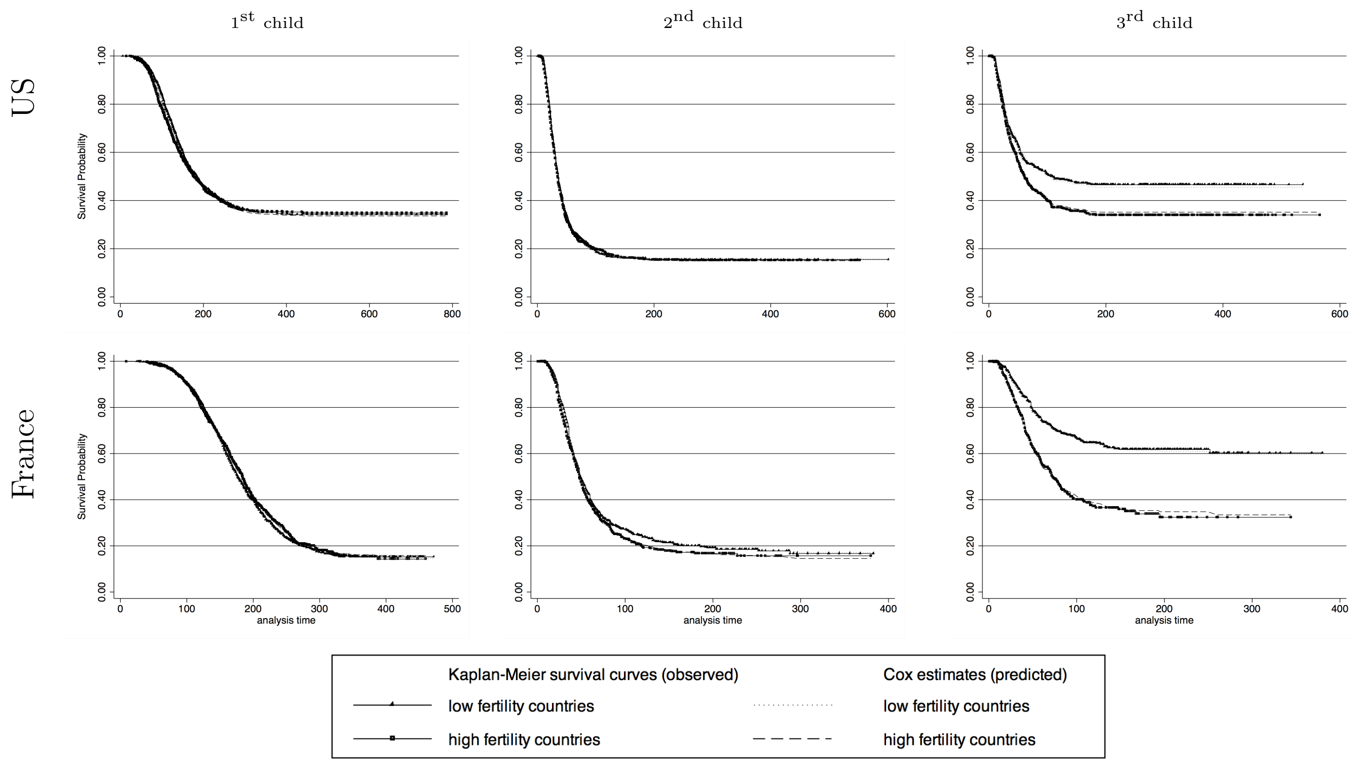


Figure D plots Kaplan-Meier observed survival curves and compares them with the Cox predicted curves for low and high fertility individuals separately (as defined by individuals having a tfr18 below or over 2.8), for each birth parity, both in the French and US sample (six panels in total). Observe that the Cox estimates do not differ substantially from the Kaplan-Meier survival curves in any of the panels, suggesting the proportional hazard assumption is not violated.

E Full baseline tables

Table E1: **Relationship between fertility norm and timing of first birth, full table - France**

	(1)	(2)	(3)	(4)	(5)
	Hazard rate of having a first child				
tfr18	-0.005	-0.001	-0.042**	-0.044**	-0.058***
	(0.018)	(0.015)	(0.020)	(0.022)	(0.019)
baseline: foreign-born mother					
Foreign-born father		-0.070	-0.075	-0.053	-0.055
		(0.072)	(0.069)	(0.066)	(0.067)
Both parents foreign-born		0.040	-0.145*	-0.128**	-0.156***
		(0.077)	(0.082)	(0.063)	(0.052)
# of siblings			0.033***	0.025***	0.024***
			(0.010)	(0.009)	(0.008)
baseline: up to secondary					
vocational				-0.284***	-0.289***
				(0.103)	(0.108)
high school grad				-0.613***	-0.622***
				(0.117)	(0.122)
2 years in college				-0.768***	-0.776***
				(0.133)	(0.138)
> 2 years in college				-0.948***	-0.953***
				(0.114)	(0.114)
baseline: Atheist					
Christian					-0.160
					(0.510)
Muslim					-0.010
					(0.573)
Jewish					0.469
					(0.527)
Buddhist and other					-0.258
					(0.521)
unknown					-0.114
					(0.291)
baseline: unknown					
≥ once a week					0.428
					(0.564)
≥ once a month					0.300
					(0.506)
for religious celebrations					0.212
					(0.504)
for ceremonies in the family					0.203
					(0.537)
never					0.181
					(0.549)
Observations	3805	3805	3805	3805	3805
Log Likelihood	-13793	-13713	-13663	-13576	-13566
geography and age		x	x	x	x
grandparental education			x	x	x

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18. S.E. are clustered at the country of origin level and shown in parenthesis. Geography contains 22 dummies for region of residence and urban status. A polynomial of degree 2 in age is also included. Grandparental education refers to the educational attainment of both maternal grandparents.

Table E2: **Relationship between fertility norm and timing of third birth, full table - France**

	(1)	(2)	(3)	(4)	(5)
	Hazard rate to having a third child				
tfr18	0.148***	0.184***	0.177***	0.171***	0.120***
	(0.036)	(0.023)	(0.027)	(0.028)	(0.034)
baseline: foreign-born mother					
Foreign-born father		-0.108	-0.111	-0.055	-0.085
		(0.164)	(0.152)	(0.141)	(0.155)
Both parents foreign-born		-0.129	-0.118	-0.095	-0.198*
		(0.096)	(0.112)	(0.116)	(0.113)
# of siblings			0.009	0.005	-0.002
			(0.009)	(0.009)	(0.009)
baseline: up to secondary					
vocational				-0.136	-0.005
				(0.100)	(0.109)
high school grad				-0.478**	-0.329**
				(0.186)	(0.167)
2 years in college				-0.406**	-0.225
				(0.197)	(0.206)
$>$ 2 years in college				-0.602***	-0.324*
				(0.156)	(0.189)
baseline: two boys					
girl then boy			-0.258*	-0.231*	-0.211*
			(0.139)	(0.125)	(0.126)
boy then girl			-0.005	-0.007	-0.029
			(0.122)	(0.123)	(0.151)
two girls			0.279**	0.275***	0.308**
			(0.109)	(0.101)	(0.134)
baseline: Atheist					
Christian					-0.508
					(1.010)
Muslim					0.175
					(1.118)
Jewish					0.618
					(1.054)
Buddhist and other					-1.424
					(1.076)
unknown					0.508
					(0.524)
baseline: unknown					
$\geq$ once a week					1.130
					(0.972)
$\geq$ once a month					0.695
					(0.913)
for religious celebrations					0.284
					(1.031)
for family ceremonies					0.317
					(1.045)
never					0.267
					(1.102)
timing to 1^{st} birth					-0.007***
					(0.001)
timing to 2^{nd} birth					-0.014***
					(0.001)
Observations	1249	1249	1249	1249	1249
Log Likelihood	-2778	-2746	-2742	-2734	-2687
geography and age		x	x	x	x
parental education			x	x	x

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18. S.E. are clustered at the country of origin level and shown in parenthesis. Geography contains 22 dummies for region of residence and urban status. A polynomial of degree 2 in age is also included. Grandparental education refers to the educational attainment of both maternal grandparents.

In this Section, I comment on the coefficients on the control variables for the hazard rate to have a first and third birth (the table for second births is available upon request but does not feature any particularities worth noting). First, being born to a mixed couple seems to increase the hazard rates of both first and third birth, which might be a bit counterintuitive but might hide an heterogeneous effect along the cultural dimension. Indeed, when I include an interaction term between nativity status and the cultural norm as in Section 4.3, I find that being born to a mixed couple has a delaying effect only for individuals with a low enough fertility norm. The effect changes sign for high enough levels of the norm.

Second, educational attainment is a key determinant of fertility. Here I choose to show only own education but parental education does matter as well even when controlling for own. The usual result holds that highly educated women tend to postpone first births and to be less at risk of experiencing a third.

Third, unlike Fernández and Fogli (2006), I find an effect of personal experience, as measured by the number of siblings mothers have. However it holds only for the timing of the first birth, and its magnitude is relatively small, as compared to that of the fertility norm for third births. It becomes insignificant and very close to zero for third births.

As for religion, I find no significance whatsoever. Christians and Muslims seem to postpone childbearing of the 1st birth, while Muslims and Jewish (who are mainly from Tunisia in my sample) seem to be more likely to have a third birth. That said, I include religion and religiosity at the same time, which could be very correlated and therefore prevent the precise estimation of their association to fertility. Even though never significant, the coefficients on high religiosity are positive and of a size that would imply a substantial impact. Finally, as expected, women with already two girls are way more likely to experience a third birth. Timing of previous births has a significant though relatively small effect on the timing of the third.

F Comparison with natives

Figure F1: **Kaplan-Meier survival curves by nativity and birth order**

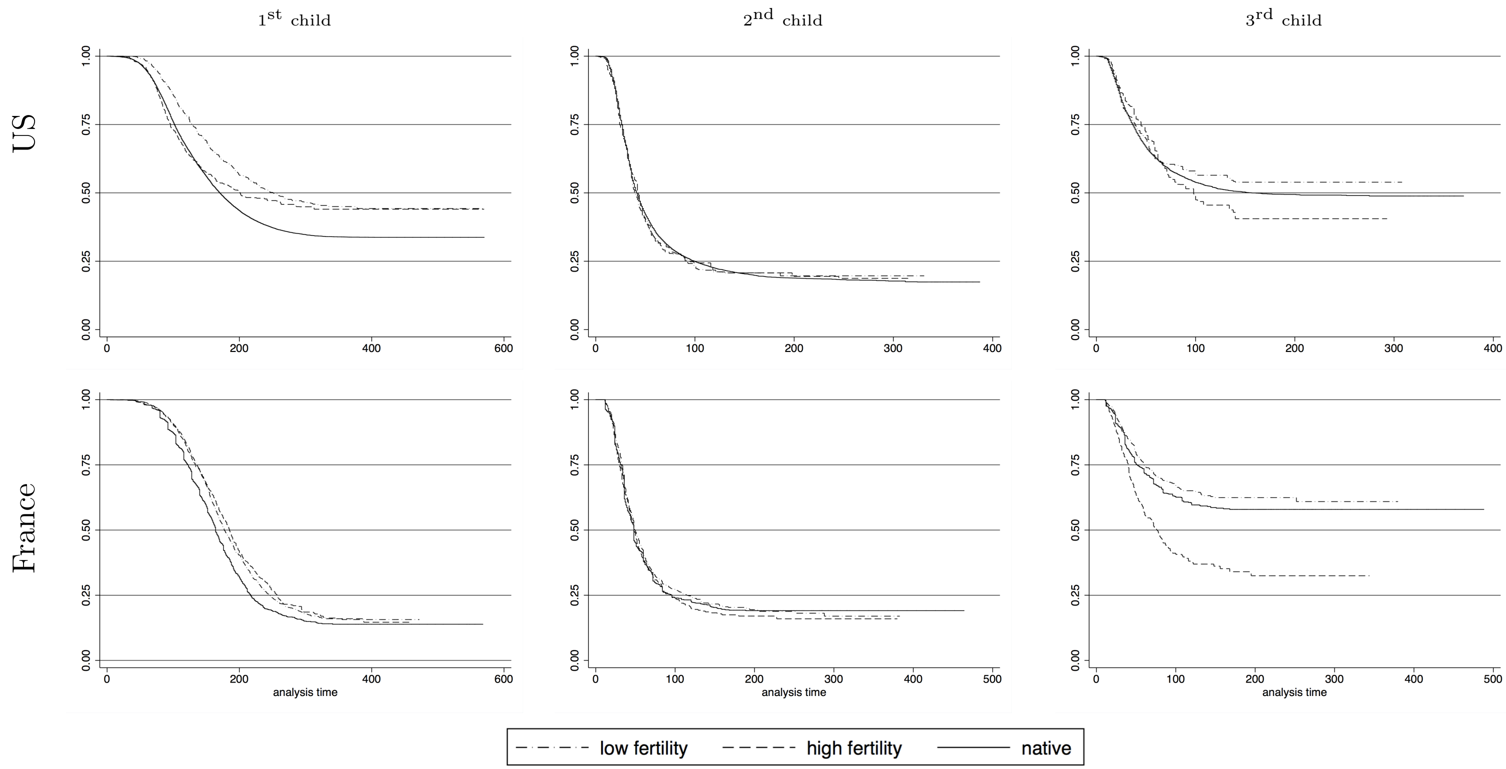


Figure F1 plots Kaplan-Meier survival curves for high and low fertility individuals (as defined by individuals having a tfr18 above or below 2.8) as well as for natives (defined as individuals born to two parents born in the country), for each birth parity, both in the French and US sample. The native sample is composed of 1,569 and 25,687 individuals respectively in the French and the US case. 9,942 observations for whom tfr18 would have been above 2.8 were removed from the US native sample to ensure consistency.

G Country of origin controls

Table G1: **Fertility norm and timing of 1st birth with country-of-origin controls - France**

	Hazard rate of having a 1st child					
	(1)	(2)	(3)	(4)	(5)	(6)
tfr18	-0.039*	-0.053**	-0.056***	-0.058***	-0.059**	-0.112***
	(0.022)	(0.026)	(0.020)	(0.022)	(0.024)	(0.024)
geographic dist.	-0.008					-0.036*
	(0.016)					(0.019)
genetic dist.		0.077				0.306*
		(0.139)				(0.159)
linguistic dist.			0.006**			0.007**
			(0.003)			(0.003)
gdp (in K$)				-0.008		-0.003
				(0.007)		(0.007)
average educ.					-0.987*	-0.944*
					(0.550)	(0.484)
Observations	3805	3805	3805	3805	3805	3805
Log Likelihood	-13663	-13663	-13660	-13662	-13659	-13652

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education, nativity and sibship size.

Table G2: **Fertility norm and timing of 2nd birth with country-of-origin controls - France**

	Hazard rate of having a 2nd child					
	(1)	(2)	(3)	(4)	(5)	(6)
tfr18	-0.004	0.001	-0.035	-0.017	-0.023	-0.027
	(0.017)	(0.019)	(0.021)	(0.019)	(0.022)	(0.028)
geographic dist.	-0.054***					-0.074**
	(0.020)					(0.037)
genetic dist.		-0.164				0.108
		(0.134)				(0.213)
linguistic dist.			0.005			0.006*
			(0.003)			(0.003)
gdp (in K$)				0.001		-0.001
				(0.007)		(0.006)
average educ.					-0.190	0.195
					(0.457)	(0.482)
Observations	1895	1895	1895	1895	1895	1895
Log Likelihood	-8459	-8460	-8460	-8461	-8461	-8457

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education, nativity, sibship size and gender of earlier children.

H Alternative measures of norms

Table H1: **Fertility norm and birth timing, alternative measures of norms - France**

	1st child			2nd child			3rd child		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
tfr0	-0.030*			-0.001			0.161***		
	(0.018)			(0.015)			(0.029)		
tfr60		-0.020			0.004			0.165***	
		(0.020)			(0.014)			(0.030)	
ma1b			0.004			0.030			-0.094***
			(0.017)			(0.019)			(0.031)
Observations	3805	3805	3805	1895	1895	1895	1249	1249	1249
Log Likelihood	-13664	-13666	-13667	-8462	-8462	-8460	-2739	-2738	-2752

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education, nativity, sibship size and gender of earlier children, when applicable.

I Partner's characteristics

Table I1: **Fertility norm and birth timing, controlling for partner's characteristics - France**

	(1)	(2)	(3)	(4)	(5)
	Hazard rate of having a first child				
tfr18	-0.010	0.007	-0.081***	-0.064***	-0.079***
	(0.018)	(0.016)	(0.015)	(0.017)	(0.025)
Observations	2523	2523	2523	2523	2523
Log likelihood	-11105	-11051	-10934	-10791	-10777
	Hazard rate of having a second child				
tfr18	0.014	0.023**	-0.007	-0.008	-0.025
	(0.010)	(0.011)	(0.016)	(0.017)	(0.020)
Observations	1586	1586	1586	1586	1586
Log likelihood	-7147	-7117	-7099	-7082	-7060
	Hazard rate to having a third child				
tfr18	0.174***	0.212***	0.175***	0.167***	0.122***
	(0.039)	(0.023)	(0.023)	(0.026)	(0.031)
Observations	1102	1102	1102	1102	1102
Log likelihood	-2493	-2462	-2451	-2434	-2396
geography and age		x	x	x	x
grandparental characteristics			x	x	x
partner's nativity and age			x	x	x
gender of earlier children			x	x	x
education (for both partners)				x	x
religion					x
birth timing of earlier children					x

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18. S.E. are clustered at the country of origin level and shown in parenthesis. Geography contains 22 dummies for region of residence and urban status. A polynomial of degree 2 in age is also included. Grandparents' characteristics contain educational attainment of both maternal grandparents, whether they were both foreign born, only the grandmother or only the grandfather as well as their total number of children. Partner's nativity contains whether fathers are natives, first or second generation migrants. Education contains a 6-level categorical variable for both mother's and father's educational attainment. Religion includes a 5-level variable for religion and a 4-level variable for religiosity. When applicable, I include a set of dummies for the gender composition and birth timing of earlier children.

Table I2: **Heterogeneous effect of the fertility norm using partner's characteristics - France**

	Hazard rate of having a								
		1st child			2nd child			3rd child	
A. Own nativity									
Foreign-born mother	-0.062**			-0.040			0.129***		
	(0.024)			(0.025)			(0.039)		
Foreign-born father	-0.047			0.065			0.158		
	(0.055)			(0.056)			(0.098)		
Both parents foreign-born	-0.082***			-0.002			0.209***		
	(0.025)			(0.017)			(0.031)		
B. Partner's nativity									
Native partner		-0.057***			-0.025			0.139***	
		(0.017)			(0.022)			(0.033)	
Second gen. partner		-0.029			0.079**			0.208***	
		(0.040)			(0.032)			(0.056)	
First gen. partner		-0.122**			-0.015			0.230***	
		(0.056)			(0.029)			(0.060)	
C. Own education									
Up to secondary			-0.048			-0.050			0.166**
			(0.042)			(0.037)			(0.064)
Vocational			-0.110***			0.032			0.129***
			(0.024)			(0.024)			(0.040)
High school grad			-0.089***			-0.037			0.235***
			(0.028)			(0.034)			(0.054)
2 years of college			-0.070**			-0.076			0.201**
			(0.036)			(0.060)			(0.081)
> 2 years of college			-0.031			0.065			0.233***
			(0.031)			(0.043)			(0.080)
Observations	2523	2523	2523	1586	1586	1586	1102	1102	1102
Log Likelihood	-10849	-10847	-10848	-7096	-7095	-7094	-2442	-2442	-2442

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Panel A, B and C are obtained after regressing hazard rates on tfr18 interacted with own and partner's nativity status and educational attainment respectively. Each column estimates a different Cox proportional hazard model, each cell shows the coefficient for tfr18 at a given value of the interacted variable. S.E. are clustered at the country of origin level and shown in parenthesis. All specifications include geography, age, grandparental education, sibship size, as well as partner's age. When applicable, gender of earlier children is included.