Is naturalization a passport for better labor market integration?
Evidence from a quasi-experimental setting

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Abstract

Better integration is beneficial for migrants and the host country. In this respect, granting citizenship is deemed to be an important policy to boost migrants' integration. In this paper, I estimate the causal impact of obtaining citizenship on migrants' labor market integration. I exploit a change in the law of naturalization through marriage in France in 2006. This reform amended the eligibility criteria of applicants by increasing the required number of years of marital life from 2 to 4, providing a quasi-experimental setting. Using administrative panel data, I first show evidence of the impact of the reform on the naturalization rates. I then use a dynamic triple differences model to estimate the labor market returns to naturalization. I find that, among those working, citizenship leads to an increase in annual earnings by 28%. It is driven by a significant increase in the number of hours worked, as well as an effect on hourly wages. A gender decomposition reveals that both men and women experience an increase in earnings, while the effect on the number of hours worked is stronger for men. I further show that obtaining the nationality potentially helps reducing discrimination by signaling better language proficiency. This paper thus provides evidence that naturalization acts as a catalyst for labor market integration.

JEL classification: J61, J71.

Keywords: Citizenship, Immigrants, Labor market, Mixed marriages.

1. Introduction

Obtaining the nationality of the host country is deemed as a sign of integration for foreigners. There is a long-lasting debate on whether naturalization is merely a reward for integration or rather can boost integration (Hainmueller, Hangartner, and Pietrantuono, 2017). This paper attempts to shed light on the matter by estimating the causal effect of naturalization on the labor market outcomes. I exploit a national-level reform in the law of naturalization through marriage in France in 2006, which increased the waiting time of a group of applicants. This exogenous shock provides a unique setting, allowing to overcome challenges such as self-selection, endogeneity, and reverse causality concerns that have so far limited this literature. The results suggest that naturalization significantly boosts the labor market integration of migrants. Differential effects on sub-groups provide pertinent insights on the mechanisms at play.

The debate on whether or not naturalization is a catalyst for further integration has led to the support of opposing policies. On one side, supporters of the idea that naturalization is merely a reward for integration prescribe that the rules for naturalization should be hardened to screen the best-integrated migrants. The second group, on the other hand, supports the relaxation of the rules since naturalization would help accelerate the integration of migrants, in which case, naturalization would be a potential tool for the integration of foreigners, at the hand of governments. Despite the substantial interest around this question and some suggestive evidence, there is so far, almost no causal evidence of such a link. In this paper, I aim to address this gap in the literature by estimating the causal impact of naturalization on the labor market outcomes of migrants.

Well-integrated migrant is a desirable condition for migrants themselves, as well as for the host country. Economic integration through the labor market participation leads to less dependence on the welfare benefits and positive net fiscal contributions (Dustmann and Frattini, 2014, d'Albis, Boubtane, and Coulibaly, 2016) as well as less crime and hence, more social cohesion in the host country (Freedman, Owens, and Bohn, 2018, Mastrobuoni and Pinotti, 2015). The literature has shown that different factors can boost migrants' socio-economic integration: better language skills

(Dustmann and Fabbri, 2003; Lochmann, Rapoport, and Speciale, 2019), networks, marriage to a national (Safi and Rogers, 2008; Meng and Gregory, 2005; Meng and Meurs, 2009). However, it is well-documented that migrants tend to remain at a disadvantage on the labor market when compared to natives (Chiswick, 1978; Baker and Benjamin, 1994; Dell'Aringa, Lucifora, and Pagani, 2015). Naturalization, in itself can boost foreigners' labor market integration, it could help in narrowing this gap.

There have been numerous attempts to establish the link between naturalization and the labor market in the literature. Chiswick (1978), at the onset of this literature, found a positive correlation between naturalization and labor market outcomes, by comparing the situation of naturalized to non-naturalized individuals in the U.S, confirmed by Bratsberg, Ragan, and Nasir (2002). While being the first few attempts at providing an insight into the link between naturalization and labor market outcomes, these studies suffer from issues of endogeneity and self-selection. Naturalization involves a double positive selection: firstly, individuals who chose to apply for the nationality are positively selected among the pool of all immigrants and secondly, those who end up obtaining the nationality are also positively selected among the group of applicants. Hence, comparing naturalized immigrants to non-naturalized ones leads to upward-biased estimates. Establishing the causal impact of naturalization is furthermore complicated given that while citizenship might lead to better labor market outcomes, the reverse is also likely to be true as well-integrated immigrants have higher chances of being naturalized. This would induce those who wish to apply for the nationality to invest in their human capital.

A more recent strand of the literature has exploited panel data to partly address these issues by taking into account time-invariant individual characteristics, and also finds a positive association (Bratsberg, Ragan, and Nasir, 2002; Fougère and Safi, 2009; Steinhardt, 2012). In France, comparing naturalized and non-naturalized migrants using panel data, Fougère and Safi (2009) found that obtaining French nationality is associated with a significant increase in the probability of being employed. However, individual fixed-effects only partially addresses the challenges in this literature, without properly tackling the issue of reverse causality or omitted variable bias such as language proficiency, not measured in the data.

A noticeable exception to this is a recent paper by Hainmueller, Hangartner, and Ward (2019) which attempts to estimate the effect of naturalization in a very particular setting in Switzerland, whereby in some municipalities, migrants' naturalization application is decided by direct democracy and voted by secret ballot by inhabitants of the town. By comparing immigrants who are naturalized or not by a very close margin, they show that naturalization has a long-run positive effect on earnings in that setting. However, it exploits a small-scale local-level referendum on migrants that have spent a substantial amount of time on the Swiss territory[1]. Critics of the direct referendum to grant citizenship in Switzerland put forward the potentially discriminatory practice[2]. The resulting unwelcome feeling felt by those who are refused the nationality by members of their own locality, might have induced an adverse behavioral change on the labor market of rejected candidates, negatively affecting the control group, and hence leading to an upward bias in the estimates.

In this paper, I analyze the causal impact of naturalization on the labor market outcomes of migrants, by exploiting a national-level reform in the law of naturalization through marriage in France. As laid down in section 2, the 2006 reform amended the eligibility criteria of applicants by increasing the required number of years of marital life from 2 to 4, providing a quasi-experimental setting. This unique design allows me to overcome the issues of endogeneity, self-selection, and reverse causality. This paper is, to the best of my knowledge, the first to provide causal evidence of the effect of naturalization on labor market outcomes, exploiting a nation-wide reform. Using administrative panel data described in section 3, I provide a first-stage analysis to show that the reform led to a differential rate of naturalization between the treated and control group. I then estimate the reduced-form analysis to estimate the effect of naturalization on labor market outcomes, showing that naturalization increases labor market integration. On the intensive margin, naturalization increases earnings mostly through an effect on the number of hours worked. I also show that these effects differ by gender and country of origin in section 4 and concludes in section 6.

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[1]Applicants need to have spent 12 years in Switzerland and passed a culture and language test.
[2]It has been declared unconstitutional and as violating international laws in 2003 by the Swiss Federal Court.

2. Context & Design

Like most developed countries, France has had a long history of political debate about the softening or hardening of its migration policies (Weil, 2002). Foreigners can obtain a legal stay in France through different types of visas, depending on their status and purpose of stay. These may be short-term ones (e.g. student visa, short-term work permits..) or longer-terms (e.g. 10 years residence permit). Upon satisfactory integration in France, foreigners become eligible for naturalization.

Applicants to naturalization are generally assessed based on their degree of integration in the country, by the French authorities. The two main channels through which a foreigner can apply for naturalization are through decree and through declaration[3]. The first channel, being the general process, requires significant proof of socio-economic integration. The second channel applies to individuals born in France to foreign parents, as well as to foreigners married to french nationals, which is the focus of this paper. Since both situations in themselves, constitute some level of integration, naturalization through declaration is deemed part of the natural order. While foreigners applying through decree have to show proof of substantial integration in the social and professional life in France, foreign spouses of French citizens are only required to fulfill three criteria: a certain number of years of marital life, a valid marriage, and a sufficient knowledge of French, their marriage to a French national being an adequate proof of integration.

The success rate among admissible files is estimated to be at around 70% for applications by decree and 90% for those through declaration. This gives an insight into the relative preference for the latter channel whenever possible. Rejections of applications of naturalization through marriage are rare and only occur in cases of ineligibility with respect to the main criteria or for invalid marriages determined through an in-depth inquiry by the local authorities. Despite the screening measures in place, this somewhat privileged access to naturalization has led many to fear that mixed marriages could be wrongly instrumentalized to obtain the French nationality. As

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[3]The bulk of applications (around 60% are through decree and 40% through declaration, of which half is through marriage.

a result, throughout time, the French government has attempted to harden the rules to applying through the channel of marriage, mainly by increasing the number of years of marriage to a French national required to be eligible. Apart from the 1998 reform, when this condition had been relaxed, all the other reforms increased this duration, the underlying justification being that longer marriage duration requirements are more costly and will deter individuals from contracting marriages for the sole reason of obtaining the French nationality.

Similarly, the reform announced in March 2006 and acted in July 2006 changed the eligibility criteria of naturalization through marriage by increasing the number of years of marriage required to be eligible from 2 years to 4 years. Given the retroactive nature of the law, the relevant eligibility criteria for any given foreigner married to a French depended on their application date. It differently affected applicants before and after the reform in 2006 which translated into the unintended consequence of penalizing the cohort of marriage after 2004 compared to the couples married before 2004. In other words, in terms of application dates, applicants before July 2006 were required to have at least two years of marriage to be eligible, and conversely, any application after July 2006 had to fulfill the new requirement of at least four years of marriage to be eligible. This translated into the fact that marriages that were contracted before July 2004 were eligible for applying for naturalization after 2 years of marriage, while those married after July 2004 faced the hardened eligibility criteria and had to wait 4 years[4].

The identification strategy relies on the fact that the reform was unanticipated at the time of marriage: any couple married before the announcement of the reform in March 2006 expected to wait only two years after marriage to be eligible to apply for naturalization. Hence, there is no reason to expect mixed married couples before and after 2004 to be any different except for their differential probability of obtaining the nationality, due to this exogenous shock. The treatment is defined as the higher propensity to being naturalized and marriages within a window before July 2004 are thus defined as the treated group (by naturalization) and those after July 2004 as the control group (with respect to naturalization) as in Figure 1. Distortionary behavior due to

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[4]As an example, a foreigner married to a French national in January 2004 would be eligible as soon as January 2006 while a similar foreigner married in December 2004 would only have 2 years of marriage in December 2006, not enough to be eligible under the new law.

the announcement of the reform in March 2006 is taken into account by restricting the end date of the control cohort to February 2006. In the same way, the end date defining the treated cohort is limited to February 2004, to account for reaction delays. This takes into account the concern that individuals who would have been eligible to apply between March and June 2006 but would potentially not have enough time to apply by that date.
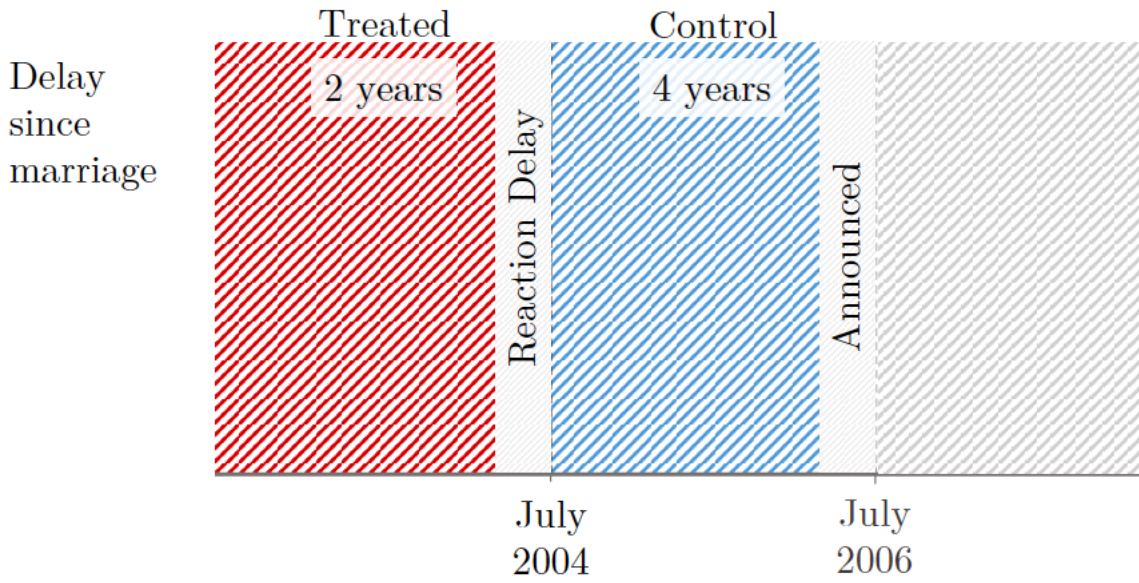

Fig. 1. Design

Conceptually, under a full compliance setting, we would expect a 0% naturalization rate among the treated and control group up to two years after marriage. If every individual applied as soon as they were eligible and there were no administrative delays and no rejection in obtaining the French nationality through marriage, then there would be a 100% naturalization rate among the treated group as from the third year after marriage. Under similar conditions, the control group would have a 0% naturalization rate up to 4 years after marriage and a 100% rate as from the fifth year after marriage (See Appendix Figure A.1). However, in practice, there are variations in the time between individuals' eligibility and application as well as administrative delays between the date of application and obtaining the nationality that is estimated to be almost a year on average[5].

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[5]Acquisitions et pertes de la nationalité française- Rapport annuel de la sous-direction des naturalisations, 2005

Additionally, there might be non-compliance since foreigners married to French nationals can also choose to apply for the French nationality through the general channel if they are eligible[6], despite not having the incentives to do so. There might also be cases of foreigners who are eligible but would not apply to the naturalization irrespective of the criteria. This setting is thus similar to an intention to treat (ITT) design whereby there would be untreated individuals in the treated group due to reaction delay as well as some treated individuals in the control group. Due to all of these reasons, the differential naturalization rate would look closer to Figure A.2. This is empirically tested in the first-stage analysis in section 4. The reduced-form analysis exploits the gap in naturalization rates to estimate its effect on labor market outcomes[7]. The reduced-form coefficients[8] would correspond to the effect of the treatment on the treated (TOT) and we can recover the local average treatment effect (LATE) by dividing the TOT by the differential propensity of being naturalized, obtained in the first-stage.

Given the reform of naturalization through marriage, this paper focuses on mixed marriages. These marriages between French and foreign nationals account for, on average, 13% of all marriages in France. Upon marriage to a French national, foreigners are eligible to a "Vie Privée et Familiale (VPF)"[9] visa, renewable every two to four years, which allows them to have a legal stay and authorization to work in France. On average, these foreigners are more likely to remain in France given their attachment to France due to their marriages. They might also be more familiar to the French institutions, labor laws, taxation, and social security systems. These specificities imply that part of the potential mechanisms put forward by the literature on the effect of naturalization on labor market outcomes can be put aside in this case. For instance, while there is a probability that naturalization might encourage foreigners to move from the informal to the formal sector, it might not be relevant for foreigners married to french nationals, given their

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[6]If for instance those who have been married for less than 4 years of marriage, have resided for at least 5 years on the French territory and can prove sufficient integration in the socio-economic life in France, then they could apply through the decree channel

[7]Extensive robustness checks show that there are no differential rates of migration out of the country due to this reform and the sample composition based on observable characteristics remains similar between treated and control group over time.

[8]Given the structure of the data and the sample under study, merging the three sources of data to perform a second-stage analysis is not feasible.

[9]Private and Family Life

interest in a long-term stay in France, as well as their relative familiarity with the system, as the contrary for other foreigners is often cited as reasons for preferring the informal sector.

3. Data & Empirical Setting

I exploit the French administrative panel data known as the *Echantillon Démographique Permanent (EDP)*. It is a panel that matches different administrative data sources for individuals born on certain dates of the year, providing the socio-demographic characteristics of individuals. Before 2004, the EDP constituted a sample of 1% of the total population and 4% thereafter[10]. In this paper, I focus on three main data sources of the EDP which are the civil registries of marriage, the population census, and the employees' panel data (Déclaration Annuelle de Données Sociales - DADS).

First, the civil registry of marriage allows me to identify the date of marriage of couples with at least one EDP individual, as well as other characteristics for both spouses at the time of marriage. This includes their nationality, gender, and age among others. Having categorized individuals into different types of marriage, namely endogamous marriages between two french or two foreigners, as compared to mixed marriages[11]. In line with the identification strategy, mixed marriages are defined as any marriage contracted between a foreign individual and a french person[12], as recorded at the date of marriage. Since Europeans are less likely to be affected by this reform, they are excluded from the analysis[13]. Only marriages contracted between January 2002 and February 2006[14] are kept in the analysis. The sample is limited to February 2006 to ensure that behavioral changes and resulting marriages affected by the announcement of the reform are excluded. Marriages between February 2004 and July 2004 are also taken out to minimize the

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[10]Before 2004, the EDP included individuals born on 4 dates of the year. The sample has increased to 16 dates of the year as of 2004. This was effectively applied to the civil registries in 2004 but to the population census only as of 2008. Independently, the employer-employee data had a sample of 4% of the population until 2001 and it has increased to 8% in 2002.

[11]Interchangeably used with the term "intermarriage".

[12]Irrespective of whether she/he is herself/himself a naturalized citizen or is a second-generation immigrant. Further distinction and heterogeneous analyses are carried out in section 6.

[13]Reference to non-french in this paper is interchangeable with non-Europeans.

[14]Excluding marriages between February 2004 and July 2004.

number of foreigners that were eligible but did not have enough time to apply before the change of the law.

Second, I match the marriage registries to the population censuses. As of 2004, the population census is based on a five-year rotating sample of around 14% of the population yearly. This annual structure of the population census gives information on the nationality of the individual every time they are surveyed in the census. This provides a proxy for naturalization. An individual is considered naturalized if he/she is recorded as non-french at the time of marriage and reports being french in subsequent years in the census[15]. Population census also contains extensive socio-demographic information such as country of birth, level of education, and marital status, providing an indication of divorces. Since the interest of this analysis is to look at the labor market outcomes, only the working population is kept in the sample (aged between 20 and 65 years old).

Finally, to look at the effect of naturalization on labor market outcomes of individuals, I match the marriage registry data to the employees panel data. This data is originally derived from a panelized version of the employer-employee linked data (DADS)[16]. It provides extensive annual information on employed individuals, namely their salary, type of contract, type of occupation, number of hours worked among others. Only foreign individuals who have worked at least once before 2002, hence entered the employee panel before their date of marriage, are kept in this panel to ensure that the results are not driven by new entrants.

The empirical strategy takes the form of an event-study analysis, centered around the date of marriage. In other words, each time period is expressed in terms of the distance from the date of marriage or simply the duration since marriage (Dur). A reasonable event-window of up to 10 years after marriage[17] is included in the analysis. The results are presented both in the static, as a simple triple difference coefficient, and in its dynamic form. In the static triple difference

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[15]Despite some measurement errors, this remains the best tool to measure naturalization. There is otherwise no official dataset that tracks naturalized foreign individuals, hence no information on the exact date and type of naturalization of foreign individuals.

[16]Déclaration Annuelle des Données Sociales

[17]It corresponds to 11 time periods, whereby d ranges from 0 (the year of marriage) to 10 (ten years after marriage)

analysis, a pre and post-treatment period is defined. Given the one-year administrative delay on average, the post-period is set at more than 3 years since the year of marriage.

In the first-stage, I show evidence of the effect of the reform on the naturalization rates among the treated and control groups. To do so, I match the marriage registry to the population census. I build an indicator of naturalization (Nat_{it}) for whether the foreign individual i at the time of their marriage, reports being French or foreigner at time t in the census. I estimate equation (1) where i is the individual, t is the calendar year, $Treat_i$ is a dummy of whether individual i is in treated or control group, $Post_{it}$ is a dummy for more than two or three years of marriage, depending on the specification. The coefficient of interest, λ gives the differential rate of naturalization between treated and control group.

$$Nat_{it} = \alpha + \delta Treat_i + \beta Post_{it} + \lambda(Post_{it} * Treat_i) + \epsilon_{it} \quad (1)$$

In the second step, I estimate the reduced form effect of naturalization on labor market outcomes[18]. To do so, I match the marriage registry data to the employee panel data. Since the main analysis is a cohort comparison design, the calendar year effects cannot be directly accounted for by including year fixed effects. To reduce any bias related to this, a similar group that is not affected by the reform is included to capture any year-specific effects through a triple-difference approach. Foreigners married to foreigners are not eligible to apply for naturalization through the marriage channel. Marriages between two foreigners are thus considered as never-treated groups since they are unaffected by the reform. To make sure that foreigners married to foreigners are similar in characteristics to those married to french, I implement a Coarsened Exact Matching (CEM) (Iacus, King, and Porro, 2012) on baseline characteristics such as the age group, year, gender, sector of employment, working full-time or not and earnings[19].

Given the setting, there should be no differential rate of naturalized between a similarly-defined "treated" and "control" group among the never-treated foreigner group. The triple-differences

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[18]Given the structure of the data and the sample under study, merging the three sources of data to perform a second-stage analysis is not feasible.

[19]Baseline here refers to pre-treatment period $Dur = 0$ to 2.

reduced form estimates of the effect of naturalization on labor market outcomes is obtained through the following specification:

$$Y_{it} = \alpha + \beta Post_{it} + \eta[Post_{it} * Mixed_i] + \lambda[Post_{it} * Treat_i] +$$

$$\gamma[Post_{it} * Treat_i * Mixed_i] + \mu_i + \epsilon_{it} \qquad (3)$$

where all variables are as described for equation (2) and; $Mixed_i$ is a dummy for whether the foreign individual is married to a french (group of interest) or to a foreigner (never-treated group). As in the specification (2), $Post_{it}$, as well as the interaction between $Post_{it}$ and treatment are included. In addition, in this specification, the interaction between the three are included. The term of interest, γ^d, provides the effect of naturalization on labor market outcomes at each duration since marriage for the treated group compared to the control group of the group of interest compared to the never-treated group. In other words, in the triple difference approach, the estimate is net of any effect that might arise due to the calendar year. This relies on the plausible assumption that both $Mixed_i$ groups are affected in similar ways. As previously, the simple triple difference model is also estimated in its dynamic form by including duration fixed effects.

A potential threat to this identification strategy is the fact that foreigners married to french who fulfill the requirements are also eligible to apply through the general channel. A toughening of the criteria to apply through the marriage channel can lead some of those in the control group to apply for and obtain the nationality in this way to overcome the longer waiting time. This would lead to a positive share of naturalized individuals in the control group. As long as the treated group has a sizable higher share of naturalized individuals this is not a concern. However, if these individuals exercise more effort on the labor market to maximize their chances of obtaining the nationality, the reduced form estimates may suffer from an attenuation bias due to the better labor market outcomes among the control group induced by their behavioral response to the longer waiting time. In practice, since foreigners married to french have a legal stay and an authorization to work through their marriage, these behavioral responses are likely to be on the margin.

Descriptive Statistics

Table 1 shows the descriptive statistics on demographic and labor market characteristics for the period under study. The average age and age difference between spouses at marriage is higher on average among mixed married couples compared to the average french couples and lower than foreign couples. There are on average more foreign men married to french women than marriages between foreign women and french men, as seen by the proportion of women in the sample of mixed marriages which is at 34%. Around 60% of the foreigners are from francophone countries and the majority comes from Algeria, Morocco, and Tunisia, which accounts for 54% of the sample of mixed marriages.

Table 1: Descriptive Statistics

	Foreigner - French		Foreigner - Foreigner	
	Mean	SD	Mean	SD
Demographic characteristics				
Age	36.14	7.41	38.82	8.57
Age diff	5.35	5.17	6.14	5.41
Female	0.34	0.47	0.45	0.50
Francophone	0.63	0.48	0.57	0.49
Nationality of origin				
Algerian	0.18		0.22	
Morrocan	0.27		0.15	
Tunisian	0.09		0.03	
Others	0.46		0.60	
Labor Market charateristics				
Prob. Panel	0.72	0.45	0.68	0.47
Net annual earnings	17216.6	13111.2	16763.3	12975.7
Number of hrs worked	1334.0	675.1	1349.0	676.5
Hourly wages	12.6	6.6	12.0	6.0
Full-time	0.72	0.45	0.70	0.46
Public Empl.	0.07	0.26	0.06	0.24
Obs	4919		3403	

In terms of labor market characteristics, the probability of observing the foreign individual in the married couple as being employed is around 70% for both groups. Mixed couples tend to earn slightly higher annual earnings on average due to higher hourly wages, despite a lower number of hours worked on average. Around 70% of employed are employed with a full-time contract.

The balancing test of the main covariates at baseline for the two groups as well as the difference of the differences are reported in Table 2. The average age at marriage has generally been increasing and spouses have an average age of 33 years at the time of marriage. Given this trend, the average age at marriage among the treated group (married before 2004) is automatically lower than that of the control group (married after 2004), especially in the group of interest (Panel A of Table 1). While there are some differences in the basic demographic characteristics, none of the labor market characteristics are significantly different between treated and control groups, as well as the difference of the differences.

Table 2: Balancing Test

| | Foreigner-French | | | Foreigner-Foreigner | | | |
	(1) Treated	(2) Control	(3) Diff	(4) Treated	(5) Control	(6) Diff	(7) Diff of Diffs
Age	31.30	33.14	-1.84***	34.80	34.52	0.28	-2.13***
	(6.14)	(7.71)	(0.41)	(8.21)	(7.67)	(0.54)	(0.66)
Age Diff.	5.66	5.27	0.38	6.95	5.52	1.43***	-1.05**
	(5.26)	(5.15)	(0.30)	(6.07)	(4.79)	(0.36)	(0.47)
% of women	0.33	0.33	0.00	0.48	0.44	0.04	-0.04
	(0.47)	(0.47)	(0.03)	(0.50)	(0.50)	(0.03)	(0.04)
Prob(Panel)	0.75	0.73	0.02	0.77	0.69	0.08***	-0.05
	(0.43)	(0.44)	(0.02)	(0.42)	(0.46)	(0.03)	(0.04)
Full-time	0.65	0.69	-0.04	0.63	0.68	-0.05	0.01
	(0.48)	(0.46)	(0.03)	(0.48)	(0.47)	(0.04)	(0.05)
No of hours	1140.5	1178.6	-38.1	1205.2	1278.5	-73.3	35.3
	(690.6)	(688.9)	(45.2)	(665.6)	(725.0)	(55.7)	(71.5)
Annual earnings	12264.5	13337.2	-1072.7	13459.0	14470	-1011	-61.8
	(10310.7)	(10008.5)	(664)	(10445.2)	(11329.1)	(872.2)	(1079.9)
Observations	531	768	1,299	342	588	930	2,229

4. Results

4.1. First-Stage

This section tests whether the reform has had an effect on the naturalization rates in the treated and control group, by estimating equation (1). Table 3 summarizes the results of the first stage analysis for the main group of interest (foreigners married to french) and the never-treated control group (foreigners married to foreigners) with a difference-in-differences approach. In the conservative approach and under the scenario with no administrative delay, the post-period is defined as after the second year of marriage, T2 (columns 1 and 3). As reported by the division on naturalization, the average delay between the time of application and an answer is almost a year. Hence, the post-period can also be established after T3 (columns 2 and 4). These results show that the probability of being naturalized is between 13 to 15% higher in the treated group compared to the control group for mixed marriages, the difference being highly significant.

Table 3: First Stage

	(1)	(2)	(3)	(4)
	Foreigner-French		Foreigner-Foreigner	
Cutoff	After T2	After T3	After T2	After T3
Treat x Post	0.13***	0.15***	-0.04	-0.04
	(0.02)	(0.03)	(0.04)	(0.04)
Observations	1,804	1,804	687	687
Adj R-squared	0.04	0.06	0.02	0.02
Individual FE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Figure 2 shows the underlying dynamic effects whereby each point estimate is the differential rate of naturalization in the treated group compared to the control group among intermarriages at each year since marraige[20]. T0 corresponds to the year of marriage and T10 refers to 10 years

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[20]The estimate of the rate of naturalization is conditional upon being observed in the population census. For instance, the coefficient of T4 is interpreted as a 20 percentage point higher naturalization rate among the treated group compared to the control group conditional of being in the population census 4 years after marriage. A series of robustness checks are carried out to show that there is no differential rate of attrition and stable population composition (available upon request).

after marriage. Since the treated group are those married before the 2004 threshold, they become eligible to apply to naturalization through marriage as soon as 2 years after marriage. On the contrary, having contracted a marriage after July 2004, the foreigners in the control group will only become eligible through this channel after 4 years of marriage. In addition, it takes a year on average for the French administration to process the application.

The rates of naturalization between the two groups do not seem to significantly differ in the "pre-treatment" period- from the year of marriage to two years after marriage, since none of the groups are eligible for naturalization through the channel of marriage. The difference gradually sets in as from the fourth year of marriage, likely due to the one-year administrative delay, at about 20-25 percentage points. The gap seems to close off as from 6 years of marriage, consistent with the timing at which the control group is likely to witness an increasing probability of being naturalized[21].
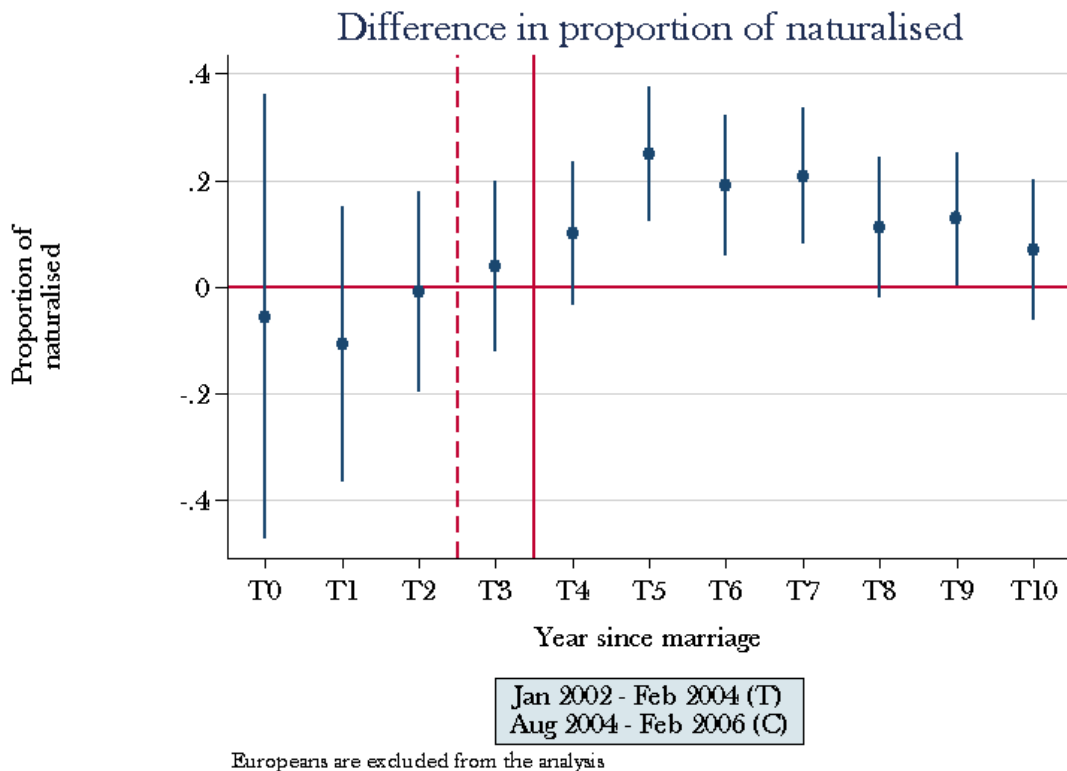

Fig. 2. Naturalization rate differences among mixed marriages

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[21]Robustness checks show that there are no differential probability of observing individuals in the treated and control group over time and the sample composition based on observable characteristics remains similar between treated and control group over time.

Different placebo analyses are undertaken to confirm the validity of the first stage. First, since foreigners married to foreigners are not eligible to apply to the nationality through the marriage channel, they are not impacted by the reform. Column 3 and 4 of table 3, as well as Figure 3 shows the result of a similar analysis with non-mixed foreign marriages. As expected, there are no significant difference in the naturalization rates between the "treated" and "control" groups in this never-treated group. The coefficients of the dynamic analysis are not different from zero when taken together. This supports the claim that the patterns seen in Figure 2 are driven by the reform for naturalization through marriage and it validates the use of the foreigners married to foreigners as a never-treated control group in the triple-difference analysis. In addition, a second set of placebo tests are presented in Appendix B, whereby the reform dates are altered and the first-stage exercise for the group of interest, foreigners married to french citizens, are presented.
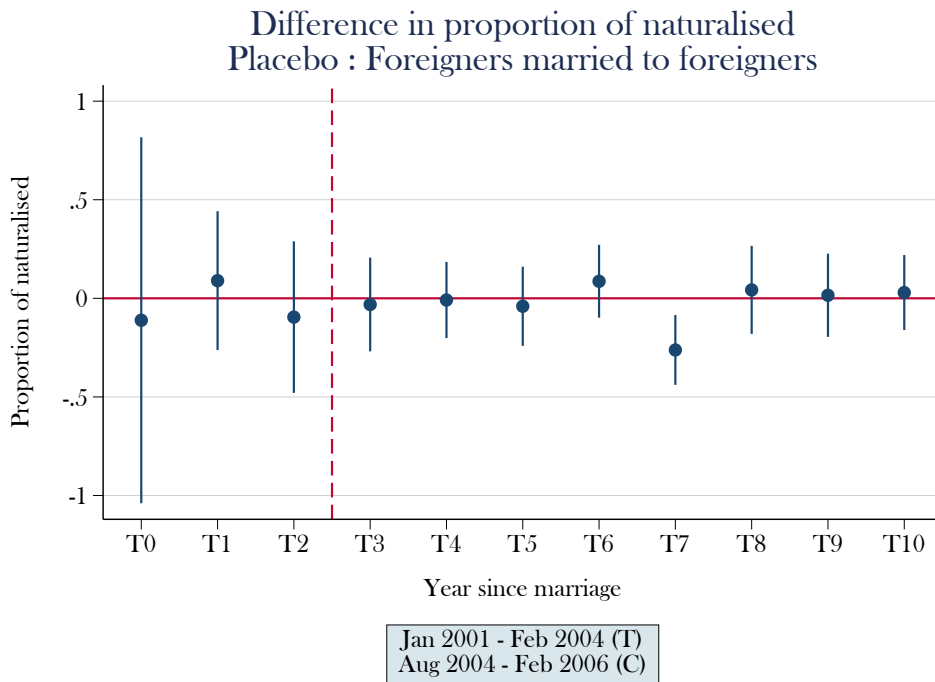

Fig. 3. Difference in naturalization rate among foreign non-mixed marriages

4.2. Reduced-Form

Exploiting the 2006 reform shock on the naturalization propensity of two otherwise comparable groups, I estimate the causal effect of naturalization on the labor market outcomes of foreigners. In this section, the reduced-form equations (2) are estimated and results based on the triple differences approach are reported in static and dynamic forms[22].
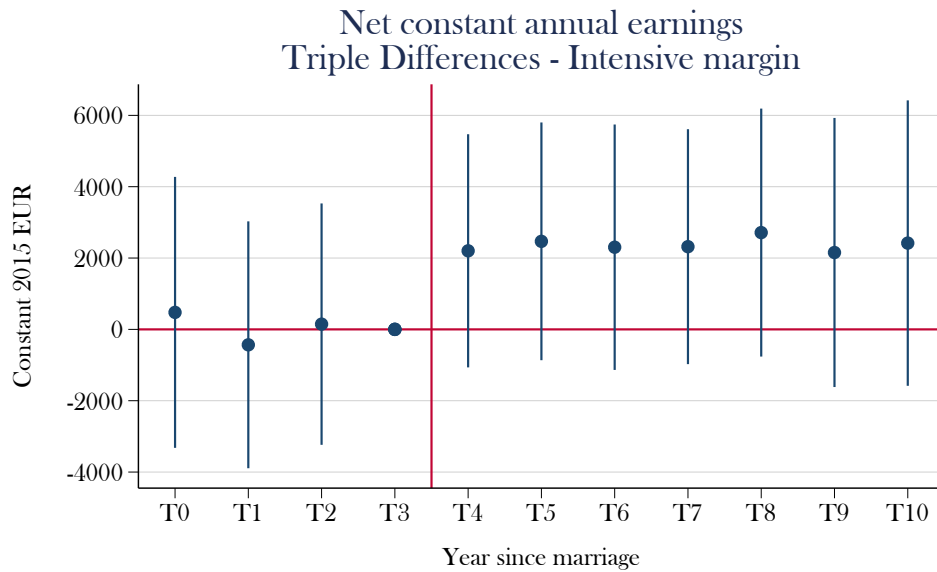
Table 4: Triple differences

VARIABLES	(1) Prob. Panel	(2) No of hours worked	(3) Hourly wages	(4) Net annual earnings	(5) Log earnings	(6) Full-time emp.	(7) Pub. sector emp.
Post x Treat x Mixed	0.03	113.64*	0.91***	2,328.46***	0.28**	0.08*	0.03
	(0.04)	(64.97)	(0.43)	(880.74)	(0.12)	(0.05)	(0.02)
Observations	7,965	5,504	5,504	5,504	5,504	5,504	5,492
Adj R-squared	0.44	0.45	0.69	0.72	0.45	0.36	0.69
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The pre-period consist of T0 - T3 and the post-period is defined as T4 - T10.

The main result of this triple difference analysis is presented in Table 4. Column 2-7 is conditional on being in the DADS panel. Naturalization led to a 2328 € or a 28% increase in annual earnings. The treated group has on average a higher number of hours worked and hourly wage. The model explains up to 72% of the variations in annual earnings. These results are similar in magnitude to the difference-in-differences analysis, reported in Appendix Table 6, suggesting that accounting or not for the year effects does not significantly change the results.
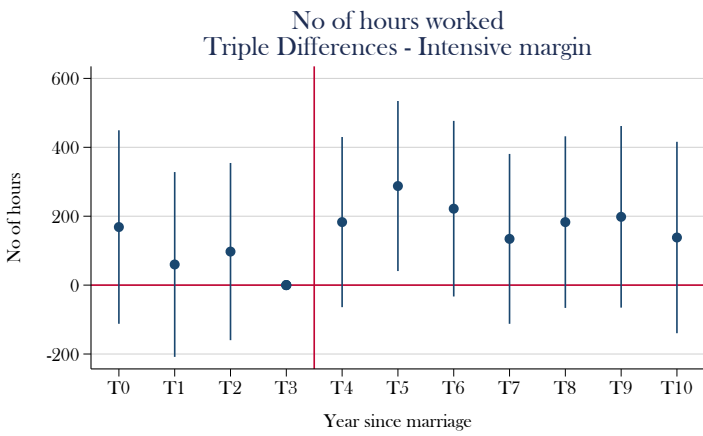
Figure 4 provides the dynamic effect of naturalization on earnings, conditional of working. There is no significant difference between the treated and control group up to 3 years since marriage, hence no pre-trend, and the effect of naturalization kicks in as from T4, as expected. The effect of naturalization on annual earnings can be decomposed into its effect on the number of hours worked and hourly wages. Figure 5 shows a positive jump in the number of hours worked with no clear discernible effect in the hourly wages.

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[22]All confidence intervals are at the 95% as standard in the literature.
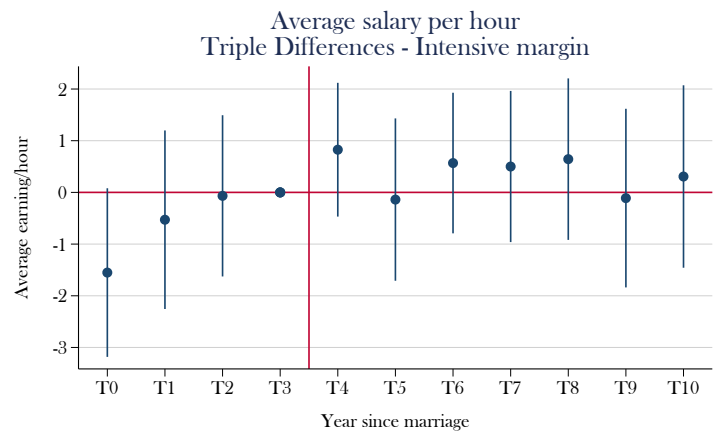
Fig. 4. Net constant annual earnings

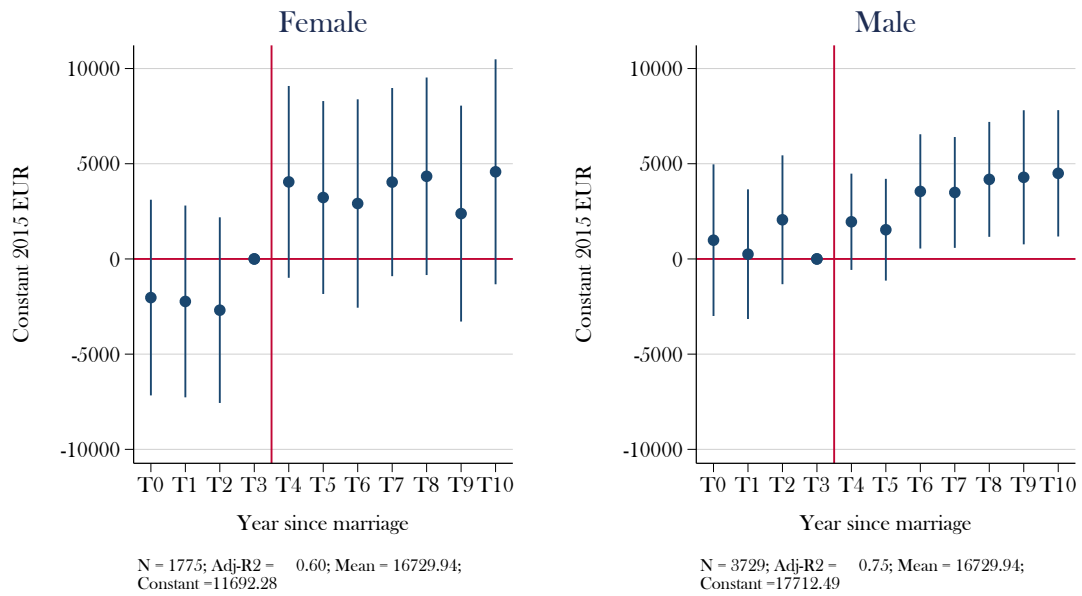

Fig. 5. Number of hours worked and hourly wages

4.3. Gender decomposition

These results mask underlying gender differences. Figure 6 to 8 show the effect of naturalization on annual earnings, the number of hours worked, and hourly wages, decomposed by gender. It reveals

that the effects on annual earnings are similar for sexes in absolute terms but stronger for women in relative terms. Both women and men witness a significant increase in their annual earnings by around 5000 € on average. While both gender experience an upward trend in the number of hours worked, men have a higher and significant absolute increase. There is no significant effect on hourly wages both for men and women.

Net constant annual earnings
Triple Differences- Intensive margin

N = 1775; Adj-R2 = 0.60; Mean = 16729.94; Constant =11692.28

N = 3729; Adj-R2 = 0.75; Mean = 16729.94; Constant =17712.49

Triple difference regression. Coefficients plotted are the interaction terms between treatment, duration and type of marriage. With Individual FE. Robust SE
Missing values not taken into account

Fig. 6. Net annual earnings by gender

No of hours worked
Triple Differences- Intensive margin
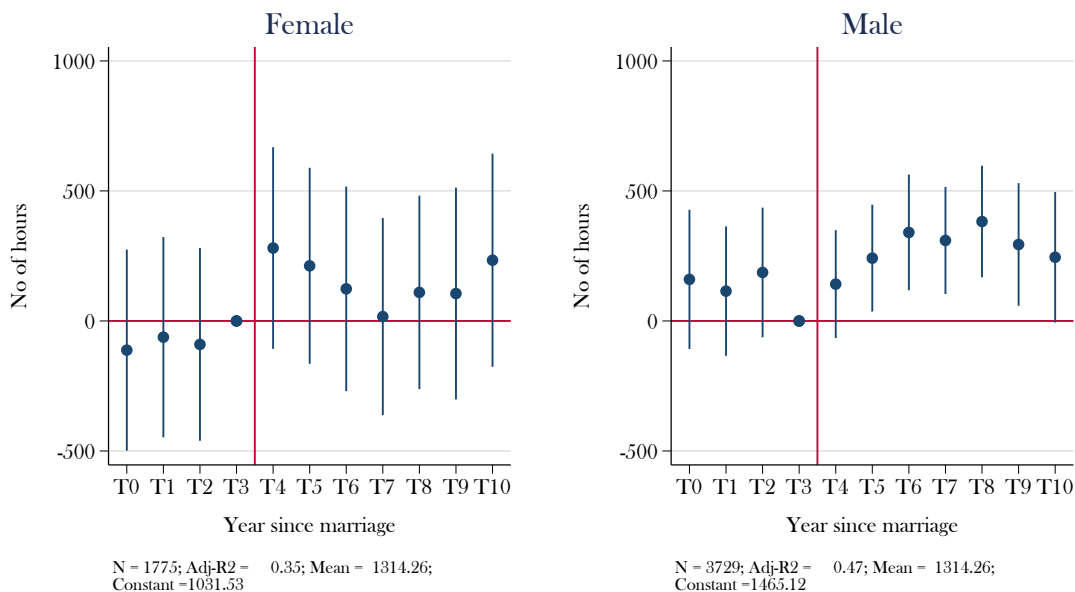
Female

Male

N = 1775; Adj-R2 =   0.35; Mean = 1314.26;
Constant =1031.53

N = 3729; Adj-R2 =   0.47; Mean = 1314.26;
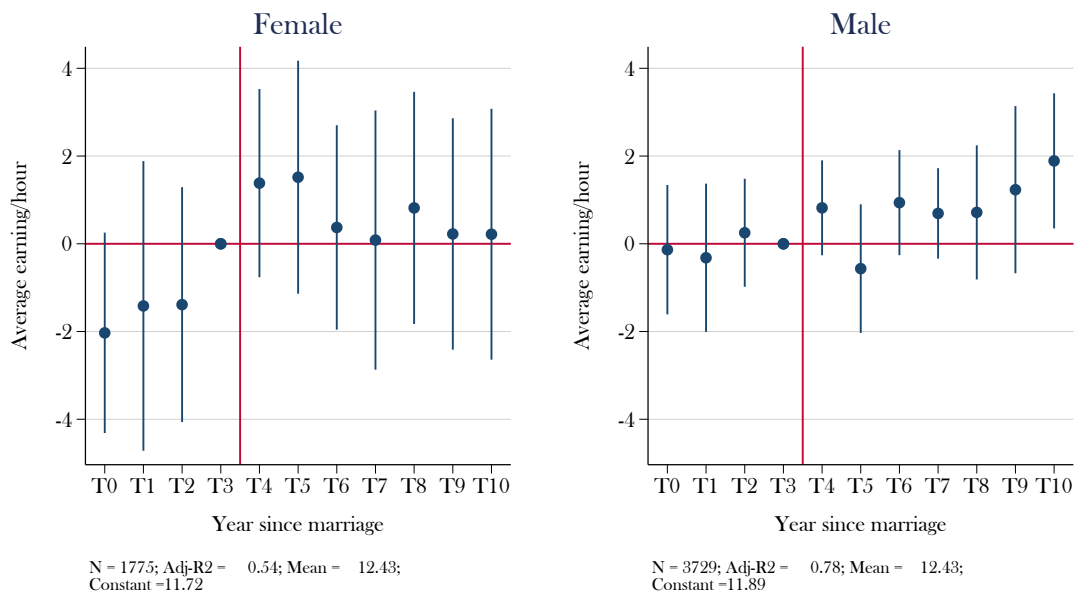Constant =1465.12

Triple difference regression. Coefficients plotted are the interaction terms between treatment,
duration and type of marriage. With Individual FE. Robust SE
Missing values not taken into account

Fig. 7. Number of hours worked by gender

Average salary per hour
Triple Differences- Intensive margin

Female

Male

N = 1775; Adj-R2 =   0.54; Mean =   12.43;
Constant =11.72

N = 3729; Adj-R2 =   0.78; Mean =   12.43;
Constant =11.89

Triple difference regression. Coefficients plotted are the interaction terms between treatment,
duration and type of marriage. With Individual FE. Robust SE
Missing values not taken into account

Fig. 8. Hourly wages by gender

5.   Mechanisms

The literature puts forward different potential mechanisms through which naturalization could lead to better economic integration. Focusing on mixed marriages allows me to put aside some of these potential factors since these foreigners are eligible for a family visa that provides a permit for a long-term stay and work authorization, as well as access to the welfare benefits. In this case, the mechanisms related to these factors are likely to be irrelevant.

One of the main factors at play when obtaining the nationality is the unrestricted access to the labor market. In fact, in the case of France, Fougère and Safi, 2009 document that around 20% of the labor market, of which a large part of the public sector, is not accessible to foreigners. The effect of naturalization on public sector employment in France is thus tested and the results in Col 7 in Table 2 suggest that there does not seem to be an effect of naturalization on the probability of being employed in the public sector. Figure C.2 shows the dynamic effects over the ten years after marriage and the null effect seems to hold over the whole period. This might be driven by the fact that entry in the public sector[23] is costly at later stages in a person's career. Further analysis to identify whether naturalization led to an increase in the probability of employment in other jobs that are restricted to French nationals.

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[23]In France, public sector jobs are obtained through national competitions.

Proportion in Public Emp.
Foreign-French- Intensive margin

Simple regression with only foreign-french marriage. With Individual FE.
Robust SE Missing values not taken into account
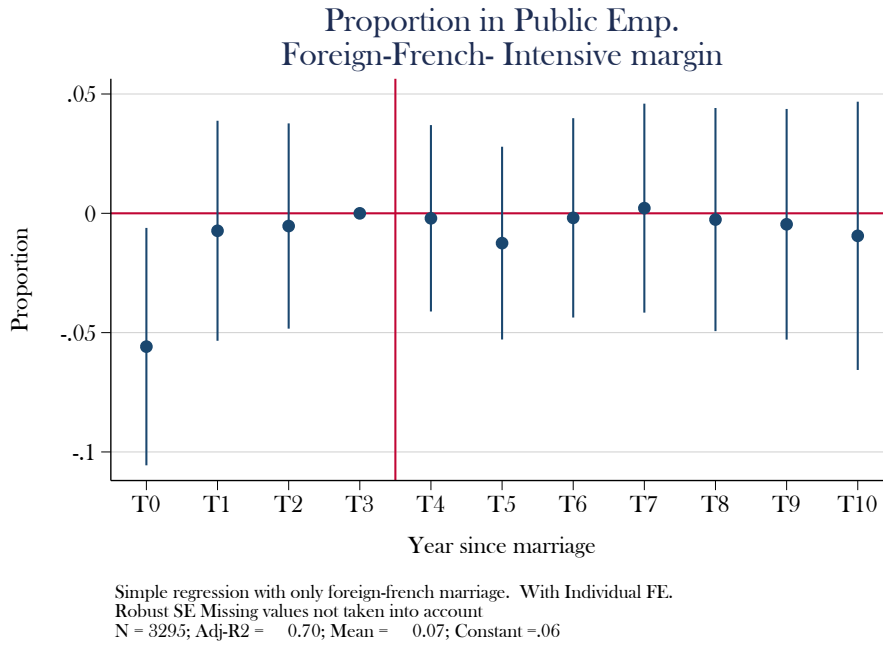N = 3295; Adj-R2 = 0.70; Mean = 0.07; Constant =.06

Fig. 9. Probability of public sector employment

Another important factor pushed forward in this literature is in terms of discrimination. The literature on discrimination in hiring has extensively shown that employers tend to discriminate against foreigners or foreign-sounding names. In France, a recent study has shown that french individuals with foreign-sounding names had a 20 - 30 % lower chance of being called back when compared with a fellow citizen with a french-sounding name. Duguet et al., 2010 show that obtaining the nationality for a Moroccan-origin with a foreign-sounding name increases the call-back success rate of an application by 1.45% with no additional effect of having a french-sounding name.

One of the potential signal sent through the nationality is language proficiency. Firms can discriminate, whether taste-based or statistically, against nationalities from countries that are non-francophone. Having the French nationality, irrespective of the foreign-sounding name, could help send a signal of better language skills. In this case, the benefit of obtaining the nationality would be lower for foreigners coming from francophone countries compared to those with a nationality from a non-francophone country. To test this, I adopt a triple difference approach and estimate an equation similar to equation (3). Instead of $Mixed_i$, in this setting, I include a dummy for

having the nationality of a non-francophone country. Column 1 of Table 5 shows the coefficient of the interaction terms. A foreigner from a non-francophone country tends to have lower annual earnings on average, even if not significant. Obtaining the nationality significantly increases their earnings compared to foreigners from francophone countries.

Table 5: Effect on annual earnings

VARIABLES	(1) Non-Francophone	(2) Foreign-born Spouse
Post x Variable	-807.4 (906.2)	-1075.3 (868.7)
Post x Variable x Treat	3789.1*** (1432.9)	2511.4* (1463.7)
Observations	3301	3301
Adj R-squared	0.72	0.71
Ind. FE	Yes	Yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The pre-period consist of T0 - T3 and the post-period is defined as T4 - T10. Standard errors are robust.

Another interesting aspect of the effect of naturalization is to disaggregate the effect of naturalization by the origin of the French spouse. So far, mixed marriages have been defined as marriages between foreigners and French citizens. In practice, the French spouse in the mixed couple can be of French or foreign origin or being herself or himself naturalized. Obtaining the nationality in these two cases can have different implications. In this section, I disaggregate the effect by building a proxy of the origin of the french spouse which is the country of birth of the French spouse, the intuition being that a foreign-born French has a higher probability of being of foreign origin and conversely, a French-born French has a higher probability of being of French descendant. This is only a rough approximation of origins given that the latter could be second or third-generation immigrants. I estimate a triple difference equation similar to equation (3), with a dummy for having a foreign-born spouse. The result in column 2 of Table 5 suggests that foreigners with a foreign-born French spouse tend to have lower earnings on average, even if not statistically different. However, obtaining the nationality seems to increase their earnings more

than foreigners with a French-born French spouse. This could be interpreted by the fact that since mixed marriage with a french origin spouse represents a higher level of integration (Meng and Meurs, 2009), these couples have less to gain from obtaining the French nationality.

6. Conclusion

Given the known benefits of economically well-integrated migrants, efforts should be put in further integrating them into the labor market of the host country. One of the policies at the disposal of every government is the naturalization process of migrants. Due to the rising fear towards migrants, countries tend to become stricter in terms of their naturalization rules. In the same line, France has increasingly hardened the rules and thus restricting the path to naturalization. The channel of naturalization through marriage, traditionally thought to be a natural process for well-integrated citizens, has not been spared by the tightening of rules.

In this paper, I exploit such a reform in the law of naturalization through marriage in France in 2006 as an exogenous shock on mixed married couples in France. To the best of my knowledge, it is the first paper to exploit a national-level reform that provides a quasi-experimental setting, allowing to overcome the main issues of the existing literature: endogeneity, selection and reverse causality. Using a triple-difference strategy with matching, I show that naturalization has a positive effect on annual earnings. This is explained by a positive effect both on the number of hours worked, as well as the hourly wages. A gender decomposition reveals that the effects on earnings are stronger for women as compared to men in relative terms and stronger for men in terms of the number of hours worked. These results are also evidences that the 2006 reform has had a negative effect on the labor market outcomes of individuals who were prevented from applying for naturalization, without any clear evidence of having attained its stated aim.

Of the potential mechanisms put forward by the literature for the positive association between naturalization and labor market outcomes, unrestricted access to the local labor market does not seem to have played a role, at least in terms of public sector employment. In terms of discrim-

ination, it seems that nationality can play a role in reducing discrimination by signaling better language proficiency. Looking at the heterogeneous effect, the results suggest that naturalization benefits more those who are otherwise less integrated.

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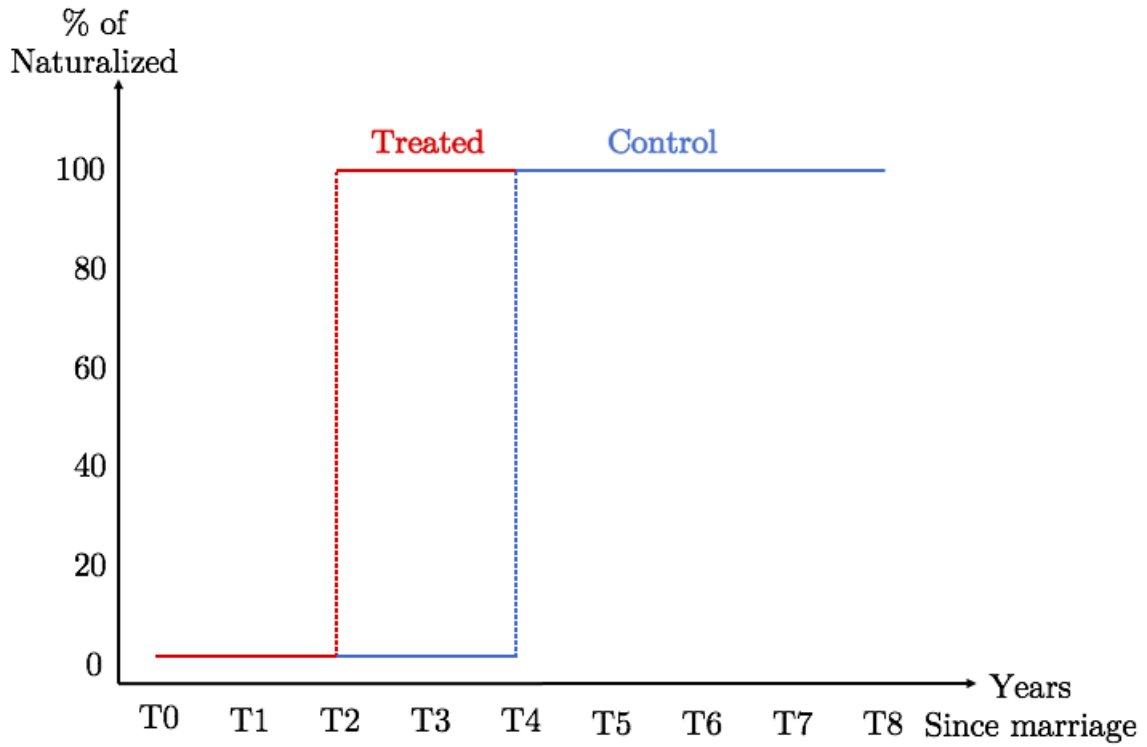
Appendix A.   Design

Fig. A.1. Under full compliance and no delay
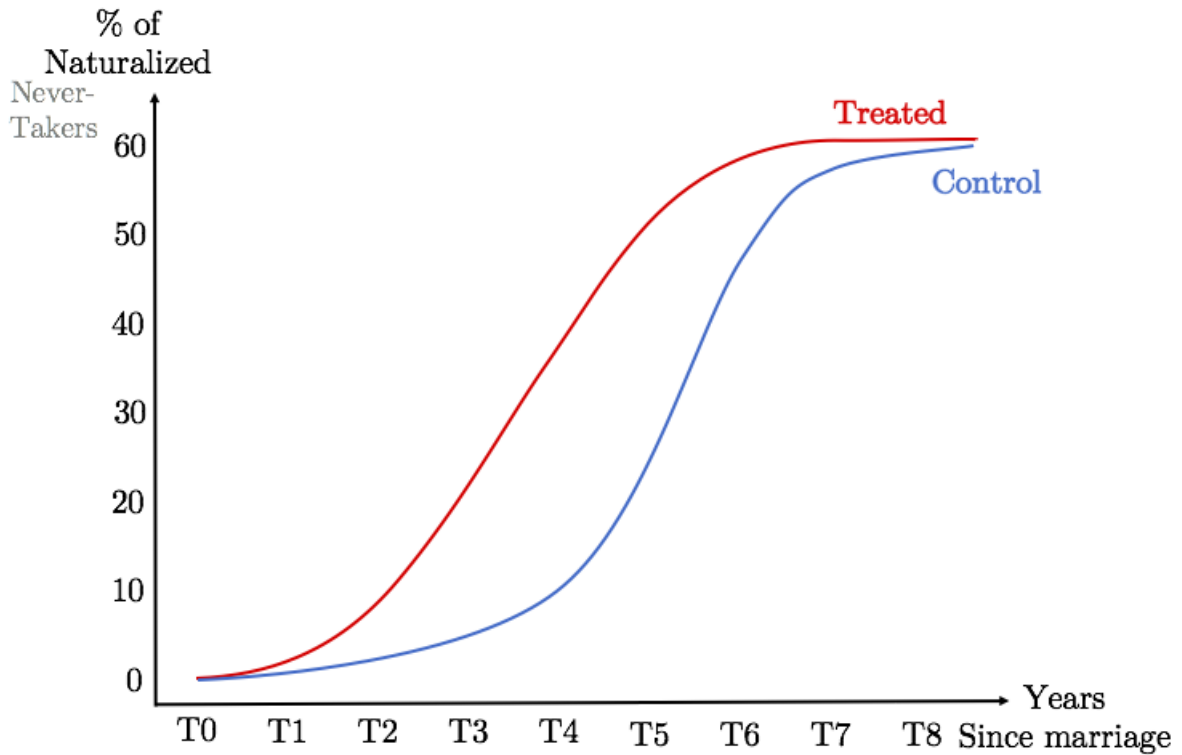

Fig. A.2. With delay and defiance

Appendix B.   Placebo Analysis

Figure B.1 shows the differential naturalization rate between treated and control groups when changing the reform timing. The top left panel corresponds to the actual date of the reform, July 2006 and is exactly the same as Figure 2. The top-right panel of Figure B.1 shows the differential rates under the assumption that the reform occured in July 2008. In the bottom left and right panels, the reform date is assumed to be in July 2010 and 2012 respectively[24]. There seems to be no significant differential naturalization rates under the three placebo scenarios.
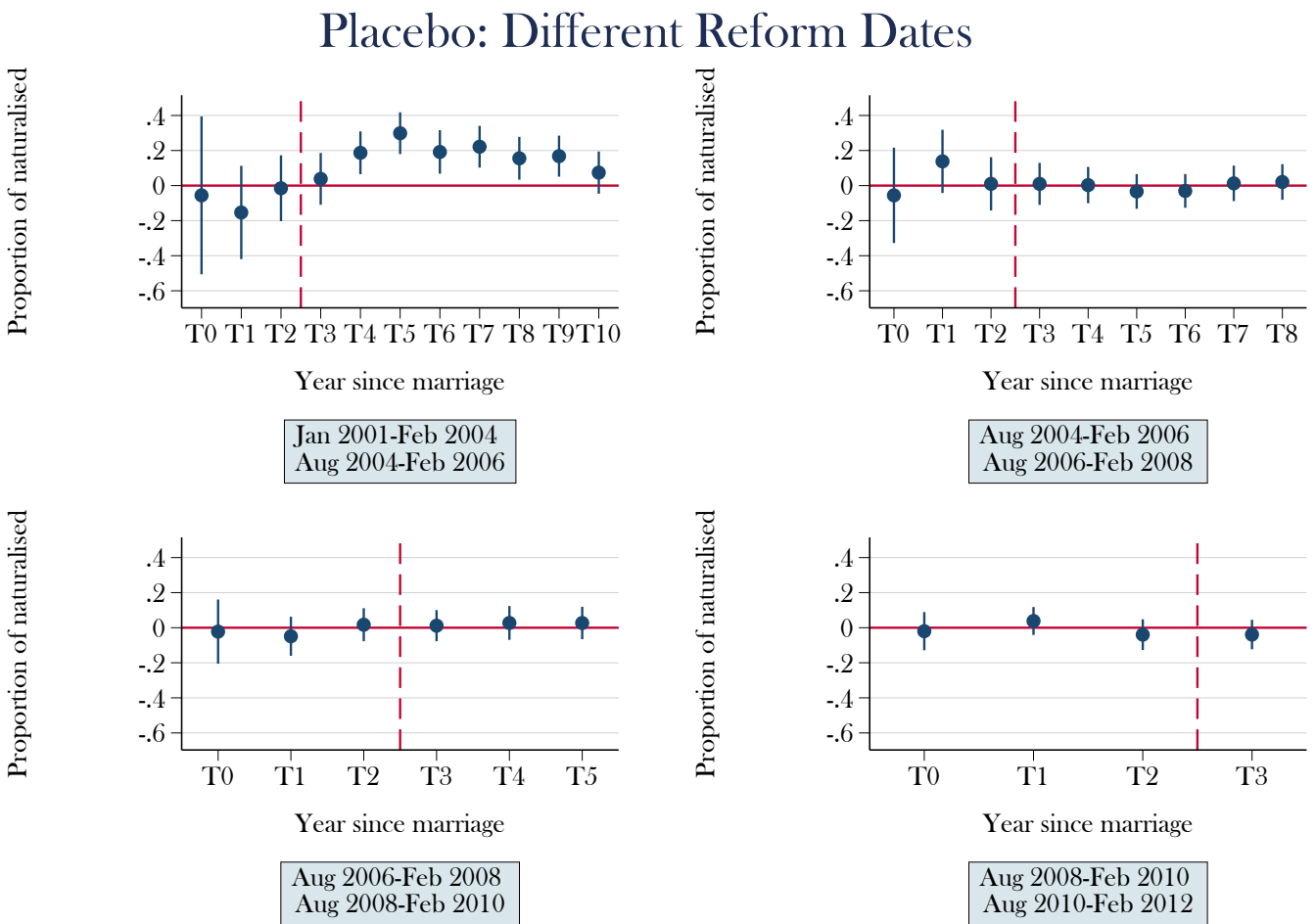
Excluding Europeans

Fig. B.1. Placebo: Difference in naturalization rate with different reform dates

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[24]Choosing a more recent reform date restricts the number of periods after marriage that can be observed in the data, knowing that the latest year for which population census data is available is 2016.

Appendix C.   Difference in difference

The reduced form analysis can alternatively carried out with a simple difference-in-difference approach, looking only at mixed marriages between foreigners and french. While the triple differences strategy is the preferred specification, the results for the double difference analysis is presented here. Naturalization leads to a 2292 € or 26% increase in annual earnings among the

Table 6: Main results

VARIABLES	(1) Prob. Panel	(2) No of hours worked	(3) Hourly wages	(4) Net annual earnings	(5) Log earnings	(6) Full-time emp.	(7) Pub. sector emp.
Post x Treat	0.03	116.91***	0.47*	2,291.66***	0.26***	0.03	0.01
	(0.02)	(40.34)	(0.28)	(549.75)	(0.07)	(0.03)	(0.01)
Observations	4,763	3,301	3,301	3,301	3,301	3,301	3,295
Adj R-squared	0.44	0.46	0.66	0.71	0.46	0.36	0.70
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The pre-period consist of T0 - T3 and the post-period is defined as T4 - T10.

employed population. This result seems to be largely driven by a positive effect on the number of hours worked and on hourly wages. Contrary to the triple differences results, there does not seem to be an effect on the probability of full-time employment, likely due to a lack of statistical power. On the other hand, there seems to no discernable effect on public sector employment.
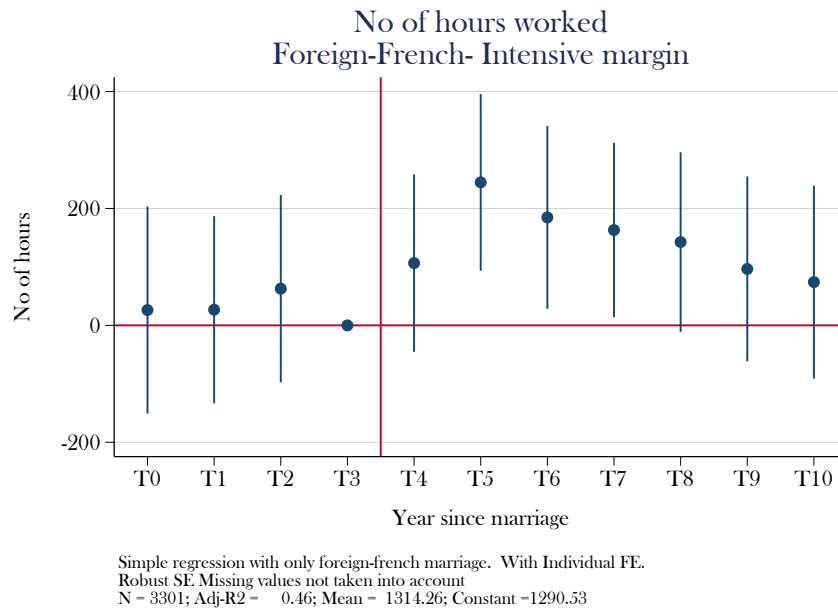
Number of hours worked

No of hours worked
Foreign-French- Intensive margin

Simple regression with only foreign-french marriage. With Individual FE.
Robust SE Missing values not taken into account
N = 3301; Adj-R2 =   0.46; Mean = 1314.26; Constant =1290.53

Fig. C.1. Probability of full-time employment

Hourly wages

Average salary per hour
Foreign-French- Intensive margin

Simple regression with only foreign-french marriage. With Individual FE.
Robust SE Missing values not taken into account
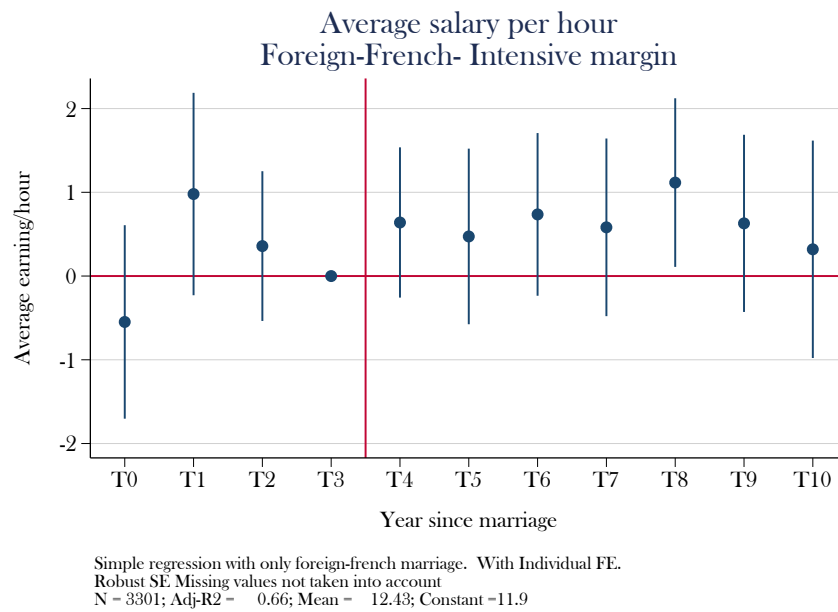N = 3301; Adj-R2 =   0.66; Mean =   12.43; Constant =11.9

Fig. C.2. Probability of full-time employment