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Gender equality as a confounder in the epidemiological approach

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Abstract

A rapidly growing literature uses the epidemiological approach (Fernández & Fogli, 2009) to explore the impact of "culture" on economic behavior in a wide variety of geographical contexts. To better understand potential threats to identification, we apply the method to a recent European data set. We find that proxies of country-of-origin culture affect second-generation immigrant women`s labor force participation and fertility in Europe. The effect is economically and statistically significant among women descending from countries in which gender equality is relatively high, but it is far less pronounced or absent among women descending from low gender equality countries. These findings suggest that parental selection into migration, as well as intergenerational spillover effects, are important confounders in applications of the epidemiological approach.

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1 Introduction

A growing body of literature investigates the role of culture — defined broadly as a set of preferences, beliefs, and behavioral norms shared by socially or geographically differentiated groups — in explaining variation in economic outcomes. This literature largely follows the influential paper by Fernández and Fogli (2009), who show that variation in the labor market and fertility behavior of second-generation immigrant women in the US in the 1970s is in part explained by "culture" in the country of ancestry. In the present paper, we revisit these behaviors, but focus on second-generation immigrant women living in Europe around the year 2010. Our sample includes descendants from a much larger set of countries of ancestry compared to the original paper. Combined with a measure for gender inequality in those countries, our data allow us to gain new insights with regard to selective migration and how it may complicate applications of the so-called 'epidemiological approach'.

Studies employing the epidemiological approach by and large assume that concerns about selection can be disregarded in samples of second-generation immigrants. Yet, this seems to disaccord with another strand of recently evolving literature, which suggests that immigrant parents *do* transmit their characteristics to their children (e.g., Dohmen et al., 2012). Despite these conflicting views, a formal analysis of selection issues in the epidemiological approach is still lacking. This paper offers a first step toward filling this void.

A better understanding of selective migration can provide guidance in interpreting the multitude of findings that emerged in previous applications of the epidemiological approach in the European context, using country-of-ancestry female labor force participation (FLFP) and total fertility (TFR) as proxies for ancestral preferences, beliefs, and behavioral norms. In case of fertility, Cygan-Rehm (2014), Stichnoth and Yeter (2016), and Chabé-Ferret (2019) find a sizeable positive impact of TFR in the country of ancestry on migrants' fertility in general (though larger for higher-order births or the first generation). With regard to the effect of FLFP on immigrant women's labor force participation, results are more heterogeneous. Some confirm a positive correlation (see, e.g., Bredtmann and Otten, 2015), others offer partly conflicting evidence and even document a negative relationship (see, e.g., Kok et al., 2011; Köbrich León, 2013; Mocan, 2019).

We hypothesize that the heterogeneity in results may in part be driven by differential selection into migration that may obfuscate the measurement of "culture" effects. Our argument is in line with the theoretical model presented in Beblo et al. (2020), which posits that the characteristics of women selecting into migration might differ in countries of ancestry of low vs. high gender equality. For instance, if behavioral norms in a country impose very strong restrictions on women's freedom, e.g., to supply labor to the market, incentives to emigrate from these countries might be particularly high for women who reject these behavioral norms. Thus, women descending from low gender equality countries might be less representative of the 'average woman' in her society of origin compared to women originating from countries of relatively high gender equality. If some immigrant women reject the behavioral norms in their country of origin, they may also be less likely to pass them on to their daughters, who in turn will be less likely to behave congruently with these norms. As

a result, whether applications of the epidemiological approach find an impact of country-of-ancestry culture depends on the set of countries of ancestry in the sample.

To substantiate this argument, we apply the epidemiological approach to study the labor force participation and fertility behavior of second-generation immigrant women in the European Social Survey (ESS) waves 2004-2016. As a starting point, we replicate the estimation strategy and sample selection criteria applied in the original Fernandez-Fogli paper as closely as possible. Next, we compare these baseline estimates to the ones we obtain using the larger set of sending countries in our European data and evaluate how our estimates respond to sending countries' degree of gender equality. Our results replicate the impact of ancestry "culture" on labor force participation and fertility for second-generation immigrant women in Europe who stem from countries with similar levels of gender equality as in the set of ancestry countries used in the Fernández and Fogli (2009) paper. Consistent with differential selection based on gender equality in the country of origin, our effects lose magnitude and precision once we extend the sample to countries that rank lower on the gender equality spectrum.

2 Data and Methods

We apply the epidemiological approach to a sample of second-generation immigrant women in the European Social Survey (ESS) (2017). The ESS is a cross-sectional survey, conducted biannually in many European countries. We use a pooled data set across 29 European countries from 2004-2016. Immigrants of the second generation are individuals born in the country in which the interview took place, but whose mothers were born in a different country, which we use to assign cultural ancestry.[1] Our sample includes women aged 30–45; this slightly larger window compared to Fernández and Fogli (2009) reflects the European fertility timing patterns around 2010 more accurately. To increase sample size we also include immigrants of the 1.5th generation, i.e. individuals who arrived in the host country before the age of 14, for whom the migration decision is as plausibly exogenous as for 'true' second-generation immigrants.[2] Our final sample contains 1,705 observations, which is smaller than the sample of Fernández and Fogli (2009) (6,774) who could exploit information on country of origin in census data. The two samples also differ with regard to other characteristics, in line with what is to be expected given the differences in time and place of survey collection. The US census data from the 1970s includes only 25 different countries of ancestry, 17 of which are European. By contrast, we observe more than 90 different countries of ancestry among our European-based survey respondents, many of those in Africa, the Middle East, and Asia. Consistent with general trends of increasing female labor force participation and declining fertility over time, the average country-of-origin measures we use in our analyses also differ from those of Fernandez and Fogli (for FLFP 42.2 compared to 24.4; for TFR 3.1 vs. 3.7 as defined below).

[1] The literature shows that the mother's cultural background matters more for economic outcomes of children (see, e.g., Black and Devereux, 2011; Niknami, 2016). Using the father's country of origin results in a weaker effect but does not substantially change our conclusions otherwise.

[2] Our results are robust to excluding the 1.5th generation.

We estimate the following model:

$$Y_{ijct} = \beta_0 + \boldsymbol{\beta_1 X_i} + \beta_2 Z_j + \delta_c + \theta_t + \varepsilon_{ijct} \quad (1)$$

Y_{ijct} is the outcome variable of interest of woman i of ancestry j living in host country c at year t. As in Fernández and Fogli (2009), we consider weekly working hours and number of children. Both measures are self-reported in our data, as "hours normally worked per week" and "number of children living in the household."

Z_j is our main variable of interest, the proxy for culture. Depending on whether the outcome is hours worked or number of children, we use female labor force participation or total fertility rate in the mother's country of origin, obtained from the International Labour Organization (ILO) (2017) and World Bank (2018), respectively. FLFP is the share of the female working population in employment and hypothetically ranges from zero to 100. TFR is defined as births per woman and takes values between zero and ten in the data. Following Fernández and Fogli (2009), we use measures of these variables recorded around 20 years earlier than our outcomes, in order to more adequately reflect preferences, beliefs, and behavioral norms in the country of origin around the time of the mothers' migration. To minimize incidences of missing values for FLFP and TFR, we take the mean of all measures available for the years between 1985 and 1995. Summary statistics are available on request.

The vector $\boldsymbol{X_i}$ contains a set of individual-level controls, closely matching the one used by Fernández and Fogli (2009): age, age squared, and parents' education, measured as individuals' highest level of (< secondary, secondary, or tertiary) education. θ_t captures time trends and δ_c is a set of dummy variables on the host countries. As in Fernández and Fogli (2009), we cluster standard errors at country-of-ancestry level.

3 Results

Table 1 shows the estimation results for working hours (panel A) and number of children (panel B). The first column of each panel replicates the preferred specification of Fernández and Fogli (2009) most closely and refers only to respondents descending from the same set of countries as in the original paper.[3] With regard to working hours, the basic specification in column 1 shows a large positive effect of country-of-ancestry FLFP, which is statistically significant at the 5-percent level. Thus, a one-percentage point higher FLFP in the country of ancestry raises women's hours worked per week by .12. This translates to an increase of about 2.5 hours in weekly working time for an increase in country-of-ancestry FLFP by one standard deviation, compared to 0.82 hours in Fernández and Fogli (2009). Panel B shows that, similarly, the coefficient on country-of-ancestry TFR is large and statistically significant, suggesting that respondents whose mother originated from a country with higher TFR have more children themselves. An increase in ancestry TFR by one child (or standard deviation) is associated with .15 (.13) more children (.4 in Fernández and Fogli, 2009).

[3] An even closer replication using respondents' and their spouses' level of education yields similar results.

Table 1: Regression results

	(1)	(2)	(3)
Panel A: Hours worked			
FLFP 1985-1995	0.119*	0.074**	0.051
	(0.058)	(0.029)	(0.033)
Panel B: No. of children			
TFR 1985-1995	0.148**	0.080*	0.082
	(0.061)	(0.045)	(0.051)
Observations	701	1705	1213
No. of clusters	23	93	71

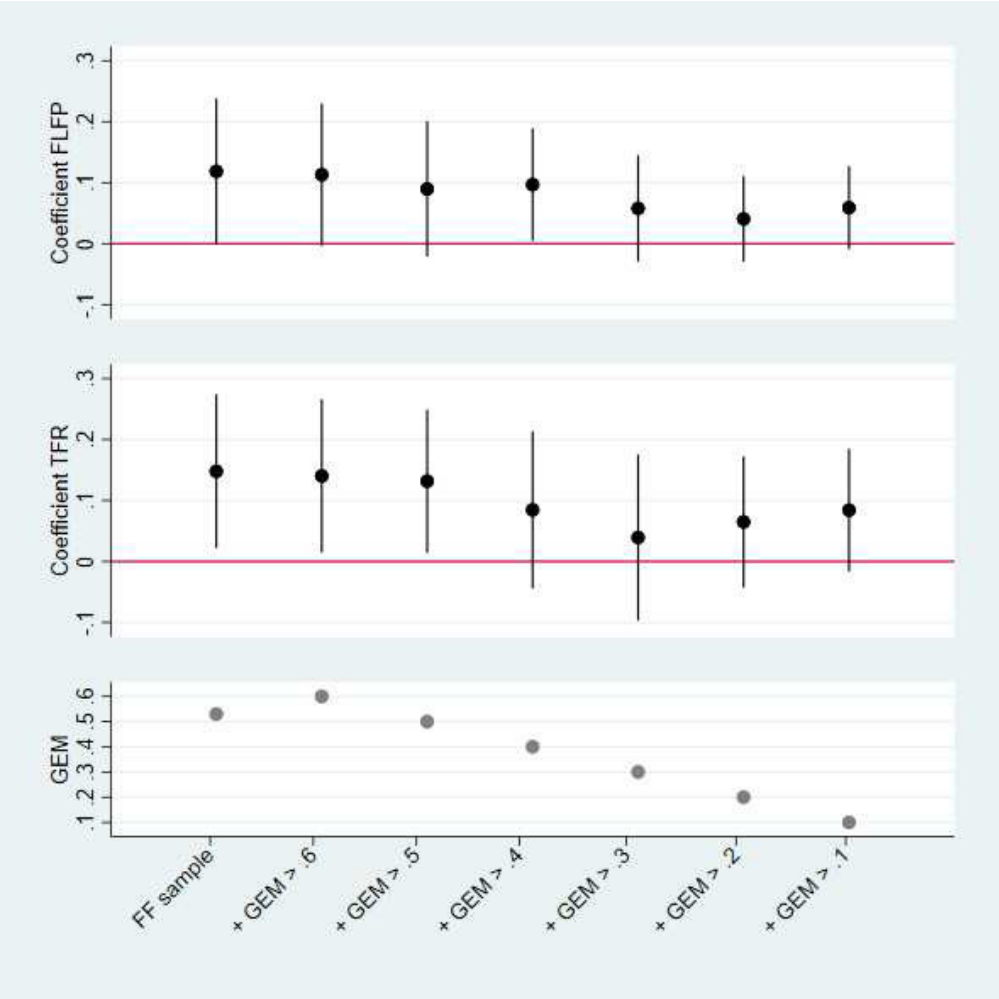
All specifications include survey-year and host-country fixed effects, as well as controls for age, age squared and parents' education. Standard errors (in parentheses) are clustered at the country-of-ancestry level.

In column 2, we expand the sample to include respondents from all countries of ancestry available in the ESS data, which almost quadruples the number of countries and more than doubles the number of observations. The coefficient on country-of-ancestry FLFP (TFR) is only about two thirds (one half) the size we obtained for the reduced sample, albeit still significant at the 5(10) -percent level. Overall, we are able to replicate a positive effect of preferences, beliefs and behavioral norms in the ancestry country on hours worked and number of children, but the rather sizeable effects in the restricted set of countries dilute as we include more countries of ancestry.

To understand how these additional countries differ from the original set and how this may explain differential behavior among second-generation immigrants, we examine gender equality conditions in the countries of ancestry. If gender equality is low and cultural norms stigmatize women's participation in the labor market, women with higher labor-market orientation may be more likely to emigrate than women who agree with the culture in their country of birth, as formally modeled in Beblo et al. (2020). If the disagreement with country-of-ancestry culture is particularly strong among female immigrants from low-gender-equality countries, this may well transmit to their children, i.e., the daughters we observe in our sample. In fact, the extended sample contains more ancestry countries from North Africa and the Middle East, which rank lower on the Gender Equality Measure (GEM) (United Nations Development Program (UNDP), 1995)[4] compared to the predominantly European ancestries in Fernández and Fogli (2009). This is consistent with the findings reported by Docquier et al. (2020), who document more gender egalitarian views among individuals from MENA countries who intend to migrate compared to those who report no such intentions. In column 3, we repeat the estimation for a subsample of 71 ancestry countries with non-missing GEM values. The estimated culture effects are similar in size, but not precision, to those in column 2.

[4]The GEM is supposed to 'examine whether women and men are able to actively participate in economic and political life and take part in decision-making' (UNDP 1995: p.72). GEM ranges from zero to one, with higher scores indicating more gender equality. We use the earliest available measure from 1995.

Figure 1: Coefficients of FLFP and TFR when decreasing mean GEM in the sample



Note: The upper two panels display the coefficient estimates (and their 95%-confidence intervals) of the country-of-ancestry FLFP variable (upmost) or TFR variable (middle) for each sample, defined by range of country-of-ancestry GEM score in the lowest panel. The leftmost estimate and score correspond to the Fernández and Fogli (2009) sample, the following to samples that include respondents descending from countries with lower GEM scores, grouped into 0.1 GEM intervals and added in descending order.

To trace the relationship between GEM in the country of ancestry and the effect of culture, we group respondents by 0.1-GEM score intervals of their countries of ancestry and run a series of regressions where we add the groups sequentially, starting with respondents originating from the country sample of Fernández and Fogli (2009). The lowest panel of Figure 1 plots the country-of-ancestry GEM threshold for the most recently added group of respondents. The upper panels show the resulting coefficients on the country-of-ancestry FLFP or TFR variable for each newly extended sample. Since the first coefficients stem from the regressions with the restricted Fernández and Fogli (2009) sample, the GEM value in the lowest panel corresponds to the mean GEM score in these countries. Similarly, the

last data points in the upper panel refer to the regressions with the full sample in column 3 of Table 1.
As the figure shows, this stepwise extension of the sample reduces the point estimates of the coefficient of interest, in magnitude and in accuracy. For fertility, the effect is statistically significant until descendants from countries with a GEM below 0.5 are included in the regression. For labor, including countries with a gender equality measured below 0.4 diminishes the coefficient to well below 0.1 (with a confidence interval including zero). This systematic link between GEM score and estimate seems to support our hypothesis that the reduction in the effect when expanding the Fernández and Fogli (2009) sample is driven by non-random differences in gender equality in the origin countries. In additional analyses, we ruled out ancestry country GDP as an alternative explanation for the pattern. We conclude that differential selection into migration might obfuscate effects of culture on economic outcomes in applications of the epidemiological approach. In combination with intergenerational transmission of parental characteristics, selection might introduce considerable bias to the resulting estimates.[5]

4 Conclusion

The present paper offers insights into selection effects that might obfuscate the measurement of effects of "culture" on economic outcomes using the epidemiological approach. While our implementation of the original identification strategy by Fernández and Fogli (2009) in a contemporary European data set largely confirms an influence of ancestral culture on labor force participation and fertility behavior, it also highlights the limitations of the epidemiological approach. Our results point to selection into migration as a potential concern for identification—even in a sample of second-generation immigrants—that may extend to other contexts. The selection mechanism we find support for in our data may also explain why previous epidemiological studies based on European data sets have produced mixed results.

[5]This of course implies that there is considerable selectivity in the first generation of migrants and indeed, our analyses for the first generation offer support for this notion. Results are available on request.

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