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CULTURAL BARRIERS TO BREAST-CANCER SCREENING TAKE-UP

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Cultural barriers to breast-cancer screening take-up*

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Abstract

I study the cultural determinants of breast-cancer screening take-up, focusing on the role of religious beliefs. To isolate the effect of culture from the institutional environment to which women are exposed, I apply the epidemiological approach, comparing first- and second-generation immigrants living in the same European host country and exploiting cross-country of origin variation in religiosity. By merging individual data from SHARE and UKHLS with country-level information from the World Values Survey, I find that higher religious intensity significantly reduces the probability of mammography screening uptake.

Keywords: cancer screening, culture, religiosity, epidemiological approach

JEL classification: I12, Z10, Z12

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1. Introduction

As the second leading cause of death worldwide, cancer remains one of the most pressing and persistent challenges in global health (OECD, 2023; WHO, 2025). Recent data released by Eurostat (2024) indicate that, in 2021, the Member States of the European Union recorded approximately 1.1 million deaths from cancer, accounting for 21.6% of all deaths.

Beyond its human cost, this disease imposes a substantial economic burden on health care systems, and European countries are no exception. Hofmarcher et al. (2020) estimate that in 2018 the total cost of cancer in Europe amounted to € 199 billion, considering healthcare costs, informal care and productivity losses.

In recent decades, significant advancements have been made in the fight against cancer. Among these, early detection has emerged as one of the most cost-effective strategies to reduce cancer mortality (WHO, 2025). Screening enables cancer diagnosis at an earlier and more treatable stage, improving survival rates while reducing treatment intensity and associated costs, although not for all cancer types (American Cancer Society, 2023). As a result, population-based cancer screening campaigns have been widely promoted across Europe. The 2003 Recommendation of the European Council explicitly urges Member States to implement organized screening programs for breast, cervical, and colorectal cancer. It recommended, in particular, a biennial mammography in women aged 50 to 69, fecal occult blood screening for colorectal cancer in men and women aged 50 to 74, and a pap test for cervical cancer precursors starting not later than age of 30, for women, in association with HPV vaccination.

Among the various types of cancer, particular attention has been devoted to breast cancer. The latter is the most frequently diagnosed cancer among women in OECD countries and the second leading cause of cancer-related death in the female population. Timely mammography screening substantially improves survival rates by enabling earlier initiation of treatment (OECD, 2023). In most European countries, eligible women receive a standardized invitation letter that explains the benefits of mammography and provides information on how, when and where to access the free screening service (Guthmuller et al., 2023; Eibich et al., 2020).

Despite the substantial increase in mammography participation observed following the introduction of Organized Screening Programmes (Guthmuller et al., 2023), coverage in many countries still remains below the EU target of 90% (European Council, 2022). EUROSTAT (2024) data for 2022 reveal considerable heterogeneity across Member States, with participation rates ranging from 83% in Denmark to just 28.5% in Slovakia. These disparities are only partly explained by differences in healthcare infrastructure or access (Elmadani et al., 2025). Persistent under-participation, even in countries with free access and extensive information campaigns, points to the influence of non-material barriers, such as cultural and psychological factors. Among these, I focus on religious beliefs, which tend to be transmitted intergenerationally and constitute a persistent component of individuals' worldviews. Prior research in psychology, sociology and economics shows that religiosity is associated with health status, health behavior and decision-making under uncertainty (Mellor et al., 2011; Cooley et al., 2019; White et al., 2021). These features make religious beliefs a natural starting point for investigating whether inherited cultural traits contribute to differences in screening uptake.

In an effort to identify the causal effect of culture on screening take-up, while isolating her influence from potential confounding factors, I propose to use a strategy based on the so-called epidemiological approach (Fernandez & Fogli, 2009). When attempting to study the effect of culture, researchers typically face an

endogeneity problem: cultural traits, beliefs, and preferences coexist with the institutional and economic environment in a way that makes it difficult to isolate their independent impact.

Over the past fifteen years, the literature has increasingly addressed this issue by focusing on first and second-generation immigrants (Fernandez & Fogli, 2009). When individuals emigrate, they transmit elements of their original cultural background to their children, who internalize these cultural values while growing up in a host country that is institutionally and economically distinct from the country of ancestry. This separation between inherited cultural traits and the surrounding context makes immigrants a valuable group for empirical analysis. Indeed, since migrants from diverse cultural backgrounds are exposed to the same host- country institutions, cross-group differences can be attributed to inherited cultural values rather than to differences in institutional settings.

Using high quality survey data covering multiple European countries, I find that religious beliefs have a negative and statistically significant effect on breast-cancer screening uptake. The results remain robust when controlling for individual characteristics (age, socioeconomic status), country of origin economic and institutional confounders, and when restricting the sample to alternative definitions of immigrants (second-generation only, long-term first-generation). This evidence helps explaining cross-country differences in the effectiveness of similar screening programmes and contributes to the debate on health inequalities between migrant and natives in major European countries.
Several mechanisms may account for these findings. On the one hand, religious norms concerning gender roles and modesty could in principle discourage participation in a medical examination involving intimate body exposure. On the other hand, a large interdisciplinary literature documents that stronger religious beliefs may be associated with forms of religious fatalism, that implies lower perceived personal control over health outcomes. By reducing individual agency, such beliefs may diminish the perceived benefits of preventive behaviours, including cancer screening (Steel, J. et al., 2022)

2. Literature review

This paper contributes to the literature on barriers to participation in cancer screening programs. While some studies have focused on informational barriers - such as limited awareness of disease risk (Baccolini et al., 2022) or the way screening invitations are designed by public authorities (Bertoni et al., 2017) - others have emphasized organizational constraints, including geographical distance from assigned screening centers (Gazzè, 2022) or the trade-off between attending medical exams and working (Ambroggi et al., 2015).

I contribute to this literature by focusing on cultural barriers. My hypothesis is that, even in countries with efficient health systems and well-functioning Organized Screening Programmes that minimize knowledge gaps and structural obstacles, deeply rooted religious norms and beliefs may still discourage the use of mammography services.

Economists have long studied how religion shapes economic attitudes and behaviour. Classical contributions show that religious beliefs affect growth and civic engagement (Barro & McCleary, 2003; Guiso et al., 2003; Campante et al., 2015). A related strand of the literature has also documented that religiosity affects a wide range of health behaviours. Religious beliefs and participation in religious organizations can provide stronger social support networks, discourage unhealthy and risky behaviours (Fletcher et al., 2014; Mellor et al., 2011),

and offer coping strategies that mitigate stress and depression, improving therefore mental health conditions (Cooley et al., 2019).

However, the relationship between religiosity and the utilisation of preventive healthcare is far less clear. Some studies focusing on low screening rates among Muslim and Latina women show that religious norms emphasizing modesty and gender separation may stigmatize the exposure of intimate body parts -as required in procedures such as mammography - thereby discouraging participation (Ahmed & Mushahid, 2023; Ndikom & Ofi, 2012). On the other hand, a smaller body of work documents that religious fatalism, defined as the belief that health outcomes are ultimately determined by God's will, is associated with lower demand for preventive services, including cancer screening (Franklin et al., 2007; Steel, J. et al., 2022). Yet this evidence is largely correlational, limited to specific populations, and often conflates religious beliefs with socioeconomic disadvantage. Addressing this gap, the present work adopts the epidemiological approach, a strategy well established in the economics literature to tackle endogeneity concerns in the study of cultural determinants.

The seminal contribution in this literature is Fernandez and Fogli (2009) who studied the role of culture in shaping women's supply and fertility behavior in the U.S.A. Using as cultural proxies past values of female Labor Force Participation (LFP) and Total Fertility Rates (TFR) in the country of ancestry of second-generation American women, they found that culture has a positive and statistically significant effect on 1970 fertility and labor market outcomes.

Building on this approach, Algan (2010), using the component of trust inherited by different generations of Americans from their countries of ancestry, show that trust is able to explain a sizeable share of variability in growth across countries in the twentieth century.

Fuchs-Schündeln et al. (2020), analyzing the saving behavior of second-generation immigrants in Germany and United Kingdom, find that cultural traits such as thrift and wealth accumulation in the country of ancestry significantly affect saving rates in host countries.

González & Rodríguez-Planas (2020) investigate the role of gender norms as determinants of domestic violence, finding that women whose parents come from more gender-inequal countries are more likely to experience Intimate Partner Violence (IPV) episodes.

The role of culture transmission has been also investigated in terms of language and national identity; exploiting the same identification strategy, Beblo et al. (2020) find negligible effect of speaking gendered languages on labour-market outcomes. Monscheuer (2023), instead, uses an IV strategy inspired by the epidemiological approach showing that parents' attachment to the origin country negatively affects the integration of their children.

Finally, De Phillippis & Rossi (2021) studied the contribution of parental attitudes in explaining cross-country differences in human capital. Focusing on second-generation immigrants, they show that within the same host country and even within the same school, students whose parents come from countries with higher average performance in standardized PISA tests tend to outperform peers from lower-scoring origins, despite being exposed to the same educational system and having comparable socio-economic backgrounds. Similarly, Hanushek et al. (2022) show that culturally transmitted time and risk preferences strongly affect student's educational performances.

As far as I know, this is the first study to employ the epidemiological approach to examine the role of culture on preventive health – behavior, and in particular in shaping the adherence to breast cancer screening.

3. Data

To conduct the analysis, I rely on micro-level data from the Survey of Health, Ageing and Retirement in Europe (SHARE), a large and representative European survey that collects detailed information on health, healthcare use, and socio-economic conditions, covering the population aged 50 and over in most European countries. A key advantage of SHARE for my purposes is the ability to identify immigrants across generations. I classify as first-generation immigrants those born abroad who subsequently migrated to the host country in which the interview takes place, and as second-generation immigrants those born in the host country with at least one foreign-born parent.

Crucially, SHARE records information on the country of birth of both the interviewee and her parents. For first-generation immigrants, I assign as country of ancestry their own country of birth; for the second generation, I follow standard practice and rely on the mother's country of birth, using the father's country only when the mother was born in the host country. This choice reflects evidence that maternal cultural transmission plays a particularly important role in shaping women's attitudes and behaviours (Beblo et al., 2020).

The main outcome is a binary indicator for whether a woman has had a mammography in the last two years. Since this question was asked only in waves 1, 2, 8 and 9, I construct a cross-sectional dataset by selecting, for each respondent, the first wave in which she reports this information. This approach mitigates concerns related to survival bias and differential attrition (Lynn, 2009).

To expand geographical coverage and increase variation in countries of ancestry, I complement SHARE with data from Understanding Society, the UK Household Longitudinal Study (UKHLS). Understanding Society is a large panel survey running since 2009. Waves 10 (2018–2020) and 12 (2020–2022) include a section on the use of health-services from which I recover the following question: "Have you had a breast screening in the last 12 months?". Although this measure is not perfectly aligned with the recommended biennial frequency of mammography, I adopt a conservative classification strategy: women are coded as compliant if they report a screening in at least one of the two waves.

After combining the two sources of data, I restrict the sample to immigrant women who, at the time of the interview, lived in a country operating an Organized Screening Program and were age-eligible for breast-cancer screening. The idea is simple: within the same host country, I want to compare women who receive the same standardized invitation letter, in order to isolate cultural determinants from potential informational barriers.

Following common practice in the literature (Fernandez&Fogli, 2009; Nollenberger et al., 2016), I also drop first and second-generation immigrants whose country of ancestry has fewer than ten observations in a given host country. I end up with a final sample of 3,126 women residing in 20 European countries and originating from 42 different countries (see Table 1 and Table 2). Mammography uptake averages 56.9% but varies substantially across cultural origins, from 19% among women of Pakistani ancestry to nearly 80% among those with Norwegian roots.

To link individual screening behaviour to culturally transmitted beliefs, I complement the micro-level data from SHARE and Understanding Society with cross-country measures of religiosity derived from the World Values Survey (WVS). WVS is a nationally representative survey on social values, beliefs and preferences, conducted in 108 countries and structured in seven waves from 1981 to 2022. I rely on the Integrated Time Series (1981–2022) dataset, which harmonises all survey waves into a consistent format. Using the full integrated series rather than a

single wave maximises coverage of countries of origin and therefore increases the number of immigrants to whom I can assign a cultural proxy.

The main country-level cultural measure is based on the WVS question: *"Do you believe in God?"* (Yes/No). For each country, I compute the share of respondents who report believing in God and assign this value to all immigrants originating from that country. Importantly, I interpret this measure as capturing the social salience of religious worldviews in the country of origin.

To validate the interpretation of faith as a cultural and intergenerationally transmitted trait, I regress individual religiosity in WVS on country fixed effects: country dummies alone explain a sizeable share - around 30% - of the total variance in belief in God. Moreover, faith displays substantial cross-country heterogeneity: the share of believers ranges from about 18% in China to nearly 100% in Egypt, with considerable variation even among countries sharing the same dominant religion.

By merging the aggregate faith indicator with individual screening data, I obtain a measure of the cultural environment in which each immigrant (or her parents) was socialised. This allows to study whether the prevalence of religious beliefs in the country of ancestry shapes the likelihood of breast-cancer screening uptake after migration.

4. Identification strategy

My identification strategy exploits cross-country-of-origin variation in religious intensity: restricting the sample to first- and second-generation immigrants living in the same country, I compare individuals who share the same economic and institutional environment and are exposed to the same health system but differ in terms of cultural traits inherited from their parents. If the aggregated measure of faith in the country of ancestry is able to explain part of the variability in screening outcomes, this should be indicative of a causal relationship between inherited religious beliefs and preventive health behaviour.

I estimate the following empirical model:

$$Screening_{ickt} = \beta_0 + \beta_1 \cdot Faith_k + \beta_2 \cdot X_{ickt} + \mu_{ct} + \varepsilon_{ickt}$$

where $Screening_{ickt}$ is a dummy equal to one if woman i, living in host country c, and originating from country k (either directly or through her parents), has undergone a mammography in the past two years. The main explanatory variable $Faith_k$ is the share of individuals believing in God in the country of ancestry k. The vector X_{ickt} includes individual controls such as a polynomial in age and socio-economic status.

To ensure that identification relies exclusively on variation within each residence country, I include a full set of host country-by-wave fixed effects μ_{ct}, which absorbs all time-varying institutional, economic and health-system characteristics of the residence country. Standard errors are clustered at the country-of-ancestry level.

Under the identifying assumption that, conditional on host country-by-wave fixed effects and individual controls, variation in religious intensity at the country-of-origin level is orthogonal to unobserved determinants of screening uptake in the host country, the coefficient β_1 captures the causal effect of inherited religious beliefs on mammography participation.

5. Results

I now turn to the empirical results, summarized in Table 3. Column 1 documents a negative and statistically significant relationship between country-of-origin religious beliefs and breast-cancer screening uptake among immigrant women living in European countries. Specifically, a 10 percentage-point higher share of believers in the country of origin is associated with a 2.4 % lower probability of having undergone a mammography in the past two years.

In Column 2, I introduce a rich set of individual controls, including a polynomial specification of age, equivalized household income, and education measured according to the standard ISCED classification. Controlling for individual socioeconomic characteristics is crucial because countries with higher religiosity also tend to be poorer on average. If this cross-country income gap translates into worse socioeconomic conditions after migration, failing to control for post-migration SES would mechanically attribute to religious culture what is in fact driven by economic disadvantage, thus biasing the estimated effect. At the same time, both education and income could represent transmission channels through which religious beliefs influence screening behaviour, for instance by shaping female educational attainment and labour-market participation. By conditioning on these variables, I therefore adopt a conservative approach, which absorbs part of the indirect pathways linking faith to preventive behaviour and allows to identify a more direct effect of religious culture. Consistently with this interpretation, the coefficient on faith decreases in magnitude but remains highly statistically significant.

Finally, Column 3 further controls for economic and institutional conditions in the country of origin, including past and contemporaneous GDP. These controls are intended to ensure that the cultural proxy is not confounded with broader economic or institutional differences across ancestry countries. Across all specifications, the results consistently point to a strong and negative effect of religious culture on cancer screening take-up. Importantly, the magnitudes are not trivial: given that the baseline probability of undergoing breast-cancer screening in the sample is approximately 58 percent, an estimated reduction of 1.5–2.5 percentage points correspond to a relative decline of about 3–4 percent with respect to the baseline mean.

To further validate the causal interpretation of the estimates, I next consider two alternative migrant samples. The choice of which migrant sample to use in the epidemiological approach, in fact, is subject to debate. On the one hand, following Fernandez and Fogli (2009), focusing exclusively on second-generation immigrants reduces the influence of migration-related disruptions to normal behavior, such as difficulties linked to language acquisition. Moreover, it attenuates the risk that results are driven by institutional factors in the country of origin: for example, the quality of the healthcare system to which migrants were exposed before arrival may foster a general distrust in medical science. On the other hand, instead, focusing solely on second-generation immigrants may attenuate the true size of cultural effects, since cultural transmission takes place primarily through parents and ethnic networks rather than through society as a whole. Cultural assimilation – also known as acculturation – may also occur rapidly, exacerbating the attenuation bias described above (Fernandez & Fogli, 2009).

Table 4 reports the estimates obtained when restricting the sample to second-generation immigrants only. Despite the substantial reduction in sample size and in the number of ancestry-country clusters, the estimated effect of faith remains negative, precisely estimated, and economically meaningful across all specifications. The coefficient remains robust to the inclusion of individual controls as well as to economic and institutional characteristics of the country of origin.

In Table 5, I consider a sample including both second-generation immigrants and first-generation immigrants who migrated before the age of 25. This restriction is intended to limit the influence of prolonged exposure to the institutional environment of origin during adulthood. The magnitude of the coefficient is comparable to that

obtained in the baseline estimates and in the second generation-only sample, confirming that the results are not driven by late migration or by direct institutional exposure prior to arrival.

6. Discussion and conclusion

Low participation in cancer screening programs remains a pressing public health concern, even in countries where access barriers have largely been removed through organized screening programs. Understanding the determinants of these persistent gaps is crucial for designing more effective and equitable prevention policies. This paper contributes to this debate by focusing on the role of culture, and in particular on religious beliefs as a persistent and intergenerationally transmitted component of individual worldviews.

To address endogeneity concerns, I exploit cross-country-of-origin variation in religiosity among immigrants exposed to the same institutional and healthcare environment. The results consistently show that higher religious intensity in the country of ancestry is associated with a significantly lower probability of undergoing breast-cancer screening. My findings suggest that cross-country gaps in screening uptake are not fully explained by differences in the design and implementation of Organized Screening Programs but also reflect deep cultural values.

Nevertheless, some limitations should be considered. A first concern of the epidemiological design is potential selection into migration (Fuchs-Schündeln et al., 2020): migrants could have preferences and beliefs that are not representative of their country's culture. Moreover, different migrant selectivity across ancestry countries, if correlated with the cultural trait of interest, may introduce biased estimates. Finally, religiosity is likely correlated with other inherited cultural traits – trust, time and risk preferences, gender norms – that may also affect preventive health behaviour. While I control for a broad set of economic and institutional characteristics at origin, the possibility of residual cultural confounding cannot be fully excluded.

Despite these limitations, my results provide robust evidence that religious beliefs operate as a meaningful cultural barrier to breast-cancer screening. Although cultural traits tend to evolve slowly over time, my findings still have important policy implications. In particular, they suggest that standard information campaigns may be insufficient to fully close participation gaps. Recent evidence shows that culturally and religiously tailored communication strategies - such as messages framed in ways that are compatible with religious values - can substantially increase the effectiveness of health interventions (Padela et al., 2018; Armand et al., 2024). Incorporating these insights into the design of screening policies may represent a promising avenue to enhance uptake among culturally diverse populations and to reduce persistent inequalities in preventive health care.

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Table 1: first- and second-gen immigrants by host-country

Host Country	Freq.	Percent
Austria	114	3.65
Germany	215	6.88
Sweden	131	4.19
Netherlands	59	1.89
Spain	25	0.80
France	150	4.80
Denmark	26	0.83
Switzerland	55	1.76
Belgium	95	3.04
Israel	92	2.94
Czech Republic	115	3.68
Poland	43	1.38
Ireland	22	0.70
Luxembourg	31	0.99
Slovenia	226	7.23
Estonia	353	11.29
Croatia	332	10.62
Lithuania	41	1.31
Latvia	161	5.15
United Kingdom	840	26.87
Total	3126	100.00

Table 2: first- and second-gen immigrants by country of origin

Country of origin	Freq.	Percent
Algeria	72	2.30
Australia	18	0.58
Bangladesh	72	2.30
Bosnia and Herzegowina	377	12.06
Belarus	70	2.24
Canada	17	0.54
Colombia	12	0.38
Croatia	95	3.04
Cyprus	21	0.67
Czech Republic	32	1.02
Finland	76	2.43
Germany	381	12.19
Ghana	27	0.86
Hong Kong	19	0.61
Hungary	19	0.61
India	211	6.75
Indonesia	29	0.93
Iraq	22	0.70
Kenya	42	1.34
Latvia	11	0.35
Lithuania	20	0.64
Morocco	85	2.72
Netherlands	29	0.93
New Zealand	14	0.45
Nigeria	37	1.18
Norway	31	0.99
Pakistan	171	5.47
Poland	197	6.30
Romania	29	0.93
Russian Federation	430	13.76
Serbia	77	2.46
Slovakia	62	1.98
Slovenia	61	1.95
South Africa	29	0.93
Spain	28	0.90
Switzerland	10	0.32
Tunisia	12	0.38
Turkey	17	0.54
Uganda	22	0.70
Ukraine	90	2.88
United Kingdom	22	0.70
United States of America	30	0.96
Total	3126	100.00

Table 3: OLS estimates of the effect of faith on cancer screening take-up - full sample

	(1) screen	(2) screen	(3) screen
Faith $_k$	-0.250***	-0.146***	-0.176***
	(0.068)	(0.052)	(0.063)
Age		0.098***	
		(0.031)	
age^2		-0.001***	-0.000*
		(0.000)	(0.000)
Educ (omitted: low educ ISCED 0-2)			
Educ (ISCED 3-4)		0.085***	0.085***
		(0.028)	(0.028)
Educ (ISCED 5-6)		0.119***	0.119***
		(0.026)	(0.025)
Household income (log)		0.025**	0.024*
		(0.012)	(0.012)
GDP $_{k\ 1960\text{-}2024\ (log)}$			-0.006
			(0.014)
Country-wave FE	YES	YES	YES
N	3098	2291	2291
Clusters	42	40	40

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: OLS estimates of the effect of faith on cancer screening take-up – sample of second-generation immigrants

	(1) screen	(2) screen	(3) screen
Faith $_k$	-0.213***	-0.194***	-0.220**
	(0.049)	(0.055)	(0.087)
Age		0.102*	0.104*
		(0.050)	(0.052)
age^2		-0.001*	-0.001*
		(0.000)	(0.000)
Educ (omitted: low educ ISCED 0-2)			
Educ (ISCED 3-4)		0.091**	0.091**
		(0.041)	(0.042)
Educ (ISCED 5-6)		0.126**	0.126**
		(0.051)	(0.052)
Household income (log)		0.015	0.016
		(0.020)	(0.020)
GDP $_k$ 1960-2024 (log)			-0.006
			(0.019)
Country-wave FE	YES	YES	YES
N	1042	738	738
Clusters	25	23	23

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: OLS estimates of the effect of faith on cancer screening take-up – sample of second-generation immigrants and long-term first-generation immigrants.

	(1) screen	(2) screen	(3) screen
Faith $_k$	-0.250***	-0.173***	-0.147**
	(0.067)	(0.061)	(0.073)
age		0.088**	0.087**
		(0.036)	(0.036)
age^2		-0.001**	-0.001**
		(0.000)	(0.000)
Educ (omitted: low educ ISCED 0-2)			
Educ (ISCED 3-4)		0.065*	0.064*
		(0.034)	(0.034)
Educ (ISCED 5-6)		0.118***	0.117***
		(0.028)	(0.028)
Household income (log)		0.031**	0.031**
		(0.012)	(0.012)
GDP $_{k\ 1960\text{-}2024}$ (log)			0.005
			(0.014)
Country – wave FE	YES	YES	YES
N	2428	1797	1797
Clusters	38	36	36

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$