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Culture, Gender, and Structural Transformation: The Case of Turkey

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Abstract

This paper studies how cultural norms shape female labor market participation during structural transformation. Turkey provides a motivating case, having experienced a sharp decline in agricultural employment accompanied by only limited reallocation of female labor to the service sector. To address this long-run and economy-wide question, I develop a quantitative general equilibrium model of sectoral labor allocation by gender incorporating cultural preferences representing family norms that discourage women's market work. The quantitative evaluation of culture relies on the cross-country approach. I first calibrate the main model parameters to match U.S. data. I then introduce a cultural term as a single parameter in the utility function to fill the gap between the model prediction and the Turkish data. The model predicts that, in Turkey, one additional hour of female market work generates disutility equivalent to a 10-minute loss of leisure relative to U.S. preferences. Extending the analysis to other middle-income countries reveals significant cultural barriers in Islamic-majority countries but negligible effects in Christian-majority countries. Complementary microeconometric evidence from the European Social Survey confirms that religiosity and patriarchal family structures reduce Turkish women's market employment, thereby validating the macroeconomic findings.

Keywords: Culture, Female Labor, Structural Transformation, Turkey

Journal of Economic Literature Classification Number: O11, D10, J16

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1 Introduction

The opportunity for women to participate in the workplace varies considerably across regions and social groups. The literature finds that, besides observable economic and social characteristics, cultural differences are also substantial (Fernández (2011)). In particular, the Middle East and North Africa (MENA) region has historically exhibited the lowest female labor force participation rates, often attributed to cultural norms (World Bank (2012)). Cultural norms emphasizing the male-breadwinner model and concerns about gender mixing in workplaces create significant barriers to women's economic participation.

Turkey presents an informative case for studying the interaction between culture and structural transformation. Female employment declined sharply from 72% in 1955 to 29% in 2011, largely reflecting the contraction of agriculture, where traditional family norms encourage women's participation in family-based work. In many countries, as suggested by the U-shaped hypothesis of Goldin (1994) and Tansel (2002), expanding service sector labor demand shifts women from agriculture to services and eventually raises participation rates. This recovery, however, did not occur in Turkey. Cultural norms discouraging female non-family employment, particularly social stigma associated with working alongside unrelated men, constrained women's transition into market services.

This Turkish case illustrates the significant role of culture in understanding long-run transitions of female employment patterns. However, measuring culture is a challenging task in economics. Alesina and Giuliano (2015) summarize three existing approaches: (i) direct measurement through subjective questions in social value surveys (Guiso et al. (2003)), (ii) the epidemiological approach of looking at second-generation immigrants to identify the culture inherited from their home countries (Fernández and Fogli (2009)), and (iii) experimental studies evaluating culture (mainly trust) as the deviation from the predicted outcome based on non-cooperative game theory (Henrich et al. (2001)). While these microeconomic approaches are valuable for identifying specific cultural mechanisms and establishing causal relationships at the individual level, they are less suited to capturing the aggregate, economy-wide effects of culture on long-run economic transitions such as those observed in Turkey.

In this paper, I use a macroeconomic approach to measure culture and its interaction with structural transformation to explain the long-run and dynamic trends of female labor market participation. According to Guiso et al. (2006) and Fernández and Fogli (2009), among others, cultural variation is interpreted as the difference in preference or belief across social groups. Following this

concept of culture, I measure cultural difference as cross-country variation in women's willingness to participate in the labor market, incorporated in a quantitative general equilibrium model. Following Ngai and Petrongolo (2017), I first construct a simple general equilibrium model of male and female labor inputs for agriculture, manufacturing, services, and home production. The model's parameters are calibrated so that the simulation result successfully captures the U.S. trend over a half-century. Then, the model is applied to Turkey by keeping the same parameters and changing only estimated sectoral productivities. The model fails to capture the evolution of sectoral hours by gender. In particular, the model counterfactually predicts a significant increase in the share of female time devoted to the service sector and a much too small drop in the percentage for agriculture.

I then modify the model to incorporate an additional factor representing cultural preferences. It is introduced as an additional time-invariant linear disutility term associated with female market hours of work. The modified model reasonably captures the evolution of hours by sector and gender in Turkey over a half-century. In particular, it improves the model's fit with the data not only for women but also for men through substitution in labor inputs. Although only one factor is added, it provides a consistent explanation for Turkish labor market trends by gender, sector, and over time. The culture term is quantitatively substantial. I evaluate the culture term's disutility from one additional hour of female non-agricultural work per week. This is equivalent to 10 minutes of leisure lost (leisure equivalence), which corresponds to a 17% higher wage required to compensate for the disutility (wage equivalence). It is also measured as a 0.68% reduction in total consumption (consumption equivalence).

I extend this analysis to other middle-income countries. In the Mediterranean region, I find similar high cultural effects in Egypt and Morocco, while it is small in Greece. In Southeast Asia, female market participation is higher relative to the Middle East. Nevertheless, the model finds that Indonesia and Malaysia exhibit cultural preferences similar to Turkey, while the effect is negligible in the Philippines. I also apply this method to Brazil and Mexico in Latin America and find a significantly smaller magnitude. This result suggests that the cultural factor is particularly strong in Islamic countries.

To complement the main macroeconomic finding, I directly examine this cultural factor using microdata from the European Social Survey (ESS). The ESS covers both Turkey and Greece, allowing for a direct cross-country comparison using the same econometric model. I estimate a Probit model for married women's employment, focusing on two cultural dimensions: religiosity

as a women's own individual factor and family gender division of labor as a proxy for patriarchal family norms. The results for Turkey show that both factors significantly discourage women's participation in market jobs. However, the interaction terms with family job availability are positive and significant, indicating that these same cultural factors encourage women to work in family businesses. This micro-level evidence aligns with the macroeconomic finding that female labor in Turkey is disproportionately allocated to agriculture (family work) rather than services (market work). Crucially, these patterns are absent in Greece, consistent with the model's prediction of a negligible cultural barrier there. This implication is also supported by using the Demographic and Health Survey (DHS) with particular focus on migration, which is closely related to structural transformation. The DHS data reveals that among urban women, those who migrated from rural areas and hold conservative values are more likely to work if a family job is available, suggesting that cultural factors persist even after migration.

Related Literature. This paper contributes to the growing literature on integrated models of structural transformation and female labor supply, including Akbulut (2010), Rendall (2025), Ngai and Petrongolo (2017), and Buera et al. (2019). Specifically, I build upon the framework of Ngai and Petrongolo (2017) by incorporating a distinct cultural parameter and extending their analysis to a cross-country setting. Recent work by Ngai et al. (2024) accounts for unpaid female work to explain the U-shaped historical trend of female labor supply in the U.S. Complementing this, my paper shows that cross-country variation in cultural preferences is essential to account for divergent female labor market outcomes. Brussevich et al. (2021) also introduce barriers to female labor market participation as productivity wedges to explain recent declines in China. In contrast, I interpret such barriers as cultural preferences and quantify their magnitude using a cross-country comparative approach.

Methodologically, my cross-country analysis of structural transformation is based on Duarte and Restuccia (2010). This is also related to Chakraborty et al. (2015), Bick and Fuchs-Schündeln (2018), and Duval-Hernandez et al. (2021) which emphasize the importance of tax systems to account for the cross-country difference in gender gaps in wage and hours of work. More broadly, my strategy of measuring culture is related to the estimation of *wedges* in the macroeconomic literature. For instance, Hsieh et al. (2019) capture long-run shifts in market, human capital, and preference frictions by gender and race as forms of misallocation. A few studies, such as Cavalcanti et al. (2007), Doepke and Zilibotti (2008), and Fernández-Villaverde et al. (2014), incorporate

culture into quantitative macroeconomic models within an overlapping-generations framework to study economic growth. In contrast, this paper focuses specifically on cross-country differences within the context of structural transformation.

My findings are closely related to the broader literature on the economics of culture. The dimension of culture I aim to identify is cross-country variation in women's willingness to participate in market work. Following Guiso et al. (2006) and Fernández and Fogli (2009), cultural variation is interpreted as differences in preferences or beliefs. Beliefs may evolve over time through intergenerational transmission or learning, as emphasized by Fogli and Veldkamp (2011) and Fernández (2013). In contrast, this paper abstracts from belief dynamics and instead models culture as a time-invariant cross-country preference difference. The concept of culture is also closely related to institutions (Alesina and Giuliano, 2015). In the model, the estimated cross-country wedge enters the utility function directly. Sensitivity analyses allow for alternative interpretations of the wedge as institutional or technological distortions; however, cultural preferences consistently play the dominant role. Moreover, the preference parameter can be interpreted as reflecting both women's own tastes and family-level constraints, particularly those imposed by patriarchal family norms. While the macroeconomic model does not distinguish between these channels, microeconometric evidence from the European Social Survey suggests that both are empirically relevant.

Finally, this paper complements the existing literature that evaluates cultural effects in Turkey through micro-level data.[1] I draw specifically on the epidemiological approach, which identifies culture by tracking the persistence of beliefs among immigrants and their descendants (e.g., Antecol (2000); Fernández (2007); Fernández and Fogli (2009)). Applying this framework to internal migration, Guner and Uysal (2014) identify the causal effects of religiosity on female labor participation among rural-to-urban migrants in Turkey. Complementing this objective approach with subjective indicators, Göksel (2013) and Dildar (2015) demonstrate the significance of self-reported measures of religiosity, patriarchy, and conservatism. Tunalı et al. (2021) document a sustained increase in labor participation among low-educated urban women and interpret this as evidence against binding cultural barriers. I argue this pattern is possibly reconcilable with the migration and culture hypothesis of Guner and Uysal (2014). Specifically, rural-to-urban migrants, who tend to be less educated, often transplant their rural working culture, characterized by unpaid family aid, into urban family businesses. In Section 5, I provide regression evidence using DHS data that supports this mechanism, showing that cultural factors persist in urban settings when family-based

[1] I also provide a detailed review of the sociological literature on patriarchal norms in Turkey in Section 2.2.

employment is available. Furthermore, Akyol and Ökten (2024) highlight the role of religious heterogeneity, finding divergent denominational norms between Sunni and Alevi Muslims regarding the labor supply of lower-educated women. Methodologically, these microeconomic studies employ strict identification strategies that likely estimate a *lower bound* for the total impact of culture. In contrast, the present paper establishes an *upper bound* from a macroeconomic perspective.

The remainder of the paper is organized as follows. Section 2 documents empirical facts about the Turkish female labor market that motivate the theory. Section 3 develops a general equilibrium model of sectoral labor allocation by gender. Section 4 explains the details of data construction and model calibration. Section 5 presents the quantitative results for Turkey and other middle-income countries, along with several sensitivity analyses. Section 6 presents microeconometric evidence from the ESS and the DHS. Section 7 concludes.

2 Some empirics of the Turkish female labor market

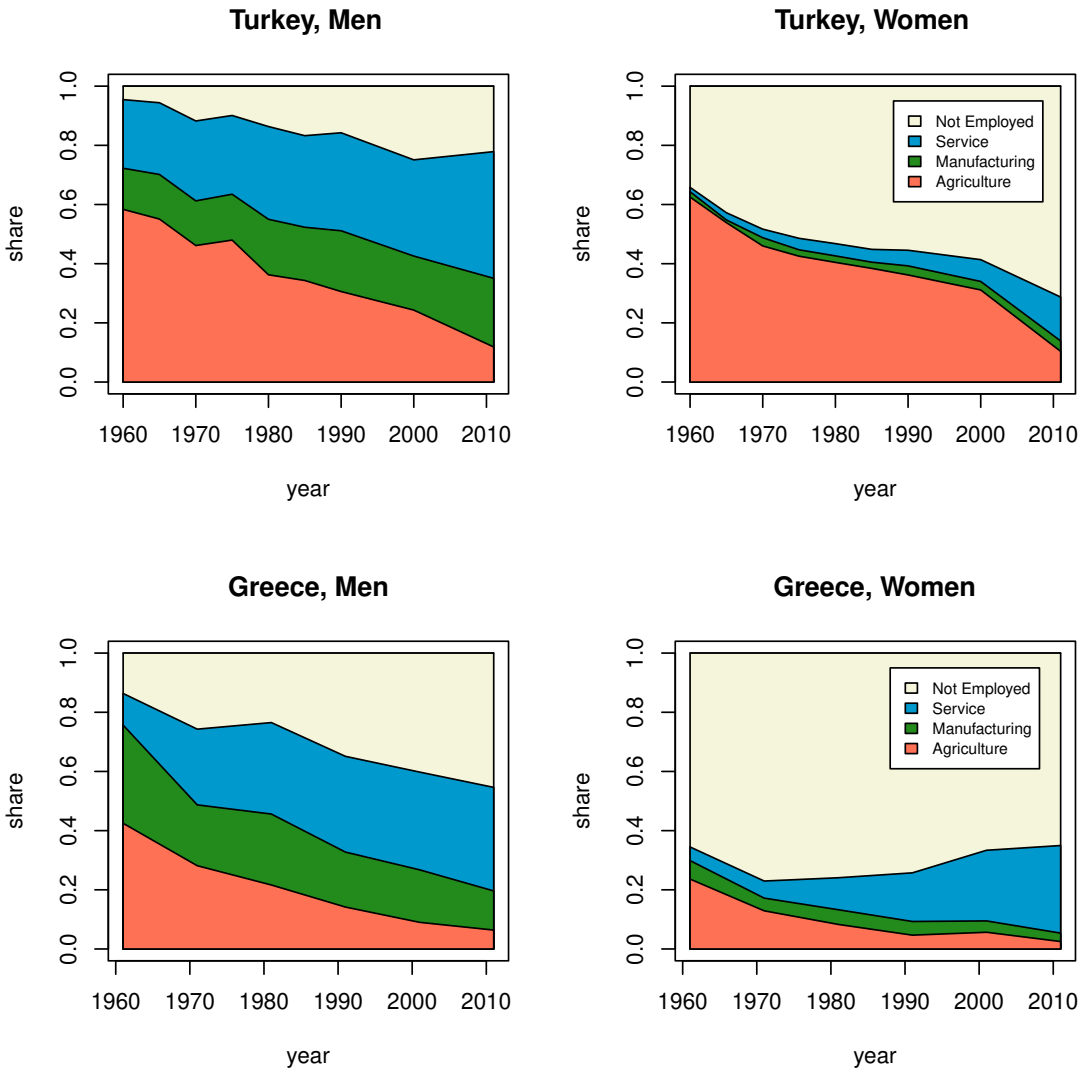
This section documents a set of empirical facts on female labor market outcomes that motivate the theoretical analysis. I begin by describing the long-run evolution of employment by sector and gender in Turkey and comparing it with Greece. Next, I review the sociological literature on patriarchal norms in Turkey. I then examine the small (or in some cases reversed) gender wage gap in the service sector, which may reflect restricted female labor supply induced by cultural factors. Finally, I document cross-country patterns of female service sector employment by comparing several middle-income Christian-majority and Islamic-majority countries.

2.1 Sectoral employment patterns by gender

I begin by addressing the allocation of workers across sectors. Turkey has experienced a dramatic shift from agriculture to non-agricultural sectors, mirroring trends in other countries. However, there is a notable difference in the gender division of labor. To examine this, Figure 1 classifies Turkish and Greek men and women as non-employed or employed in the services, manufacturing, and agriculture sectors.[2] Greece and Turkey are comparable in terms of geographical location and

[2]The share of non-employment has increased in both countries, mainly due to aging. Turkish and Greek historical data only provide population figures for those aged 15 and over. Consequently, retired individuals are included in the non-employment category. This change in share may also be partly driven by fluctuations in the number of unemployed workers. According to OECD Main Economic Indicators, the unemployment rate in Greece increased from 5.9% in 1961 to 18.1% in 2011. Applying this rate to male employment, the increase in the unemployment rate accounts for a 6.4% rise in the non-employed share of the total male population. Historical unemployment data for Turkey is missing.

Figure 1: Employment shares in Turkey and Greece by sector and gender



Note: The data for Greece are obtained from IPUMS International microdata, except for 1961. The 1961 data are taken from the published population and housing census report of March 19, 1961. The data for Turkey are obtained from Statistical Indicators 1923-2013. For each gender, I normalize the total population aged 15 and above who are not enrolled in school to one. An individual is defined as employed if he or she works for cash or receives income in kind. Within the total population, I compute the relative share of employment in each sector. All remaining individuals, including the unemployed, retirees, and homemakers, are classified as not employed.

aggregate industrial structure.[3]

The share of male employment shows a similar trend in both countries. Agricultural employment

[3]According to the GGDC 10-Sector Database, Turkish output per worker was 1.44 times the 1960 U.S. level in 2011, while that of Greece was 1.61. The value-added share of the service sector was 71% in Turkey and 77% in Greece in 2011. See Panel (b) of Figure 2 for visualization and Section 4 for data sources.

ratios have rapidly declined, and the labor force has shifted primarily to the service sector. However, the sectoral share of Turkish female employment differs substantially from the Greek pattern. Roughly half of the workers in the Turkish agriculture sector are women, whereas this sector is dominated by men in Greece and many other countries.[4] Given this large share of women in agriculture, the structural transformation in Turkey has reduced its female employment rate to a level below that of Greece. Another notable difference lies in the development of the service sector. It is well-known that service sector growth is a primary driver of female employment expansion in many countries. While the expansion of the service sector has also contributed to the increase in female service employment in Turkey, the rising demand for services is more biased toward men than it is in Greece.[5]

2.2 Patriarchal norms and sociological evidence

There are several studies in economics and sociology that document the cultural forces behind these patterns in Turkey. As shown in Figure 1, women historically participated extensively in family farming. Morvaridi (1992) provides an ethnographic account of women's roles in agricultural production in sugar beet and cotton growing regions, documenting that women disproportionately performed labor-intensive tasks such as hoeing and harvesting. Importantly, this work was culturally framed not as wage employment but as a moral duty associated with honor and propriety, and was often so gender-oriented that it was considered "inappropriate for men, even boys, as a matter of pride and honor." Kocabicak (2022) emphasizes that legal discrimination against women regarding the inheritance of agricultural land reduced women to a form of peasantry, working as unpaid family workers. Women typically do not migrate for education or paid employment, but rather through marriage to male breadwinners who provide regular income. Even after families migrate to urban areas, migrant rural women continue working as seasonal unpaid family workers for their relatives.

These institutional and cultural forces are classified as social constraints on women; however, the implications are more complex because such norms are also internalized by women themselves and transform into individual factors such as identities (Akerlof and Kranton, 2000). An influential

[4]This large share of women in agriculture is consistent with the Household Labor Force Survey conducted by TurkStat, provided that non-market family workers are included in the employed category.

[5]Cultural factors may not be the only explanation for the rapid decline in female agricultural employment. The relatively rigid sectoral reallocation of female labor suggests a slower reduction in female agricultural employment compared to male employment. This pattern likely reflects the fact that sectoral transitions typically depend on migration from rural to urban areas, where women often followed family migration decisions and consequently exited agricultural employment.

study by Kandiyoti (1988) provides a theoretical framework of *classical patriarchy* in the Middle East. Newlywed women enter their husband's family initially as subordinates to all men and senior women. Later, however, by controlling their own daughters-in-law and maintaining sons' loyalty, women maximize their authority and security in the family sphere by accepting the system's constraints. Kandiyoti (1988) calls this phenomenon the *patriarchal bargain,* whereby women collude in reproducing the patriarchal system. As a result, the transition to market work might be constrained not only by male pressure but also by women's own adherence to gendered identities. Using the 1998 Turkey Demographic and Health Survey (TDHS) data, Dildar (2015) constructs indices of internalized patriarchal norms and finds that women who express stronger agreement with traditional gender roles are significantly less likely to engage in paid market employment, especially in urban areas.

Patriarchal norms continue to shape women's labor supply even after urban migration, contributing to the slow expansion of female service employment observed in Figure 1. İlkkaracan (2012) conducted a field survey of women in urban areas and characterized them by paid-job status and desire to work. Among nonparticipating homemakers, roughly 70% report a desire to work for reasons such as personal income and self-fulfillment, although some face opposition from male family members. The remaining 30% express no desire for paid employment, citing housework and childcare responsibilities. While women are restricted by patriarchal norms, these constraints can be overcome, explaining the partial increase in service employment. Through a field study, White (2004) documents that migrant women in Istanbul often mobilize kinship and neighborhood networks to engage in home-based or informal production. These activities can be interpreted as an extension of family identity into the local community, rather than a transition into impersonal market work. This reframing of the family sphere represents a distinct form of internalized patriarchal norms, allowing women to establish an urban identity while preserving traditional gender roles. Using TDHS data, Gündüz-Hoşgör and Smits (2008) further show that although urban women are less conservative than rural women, traditional gender attitudes remain widespread: for example, approximately 49% of urban women (and 63% of rural women) agree that "women should not argue with men." Given the lack of easy access to unpaid family work in urban areas, the cultural effects on female work are more visible. The results of Dildar (2015) are particularly pronounced in urban areas. Göksel (2013) also constructs a conservatism index and finds a statistically significant negative effect on women's contribution to household income in urban areas. These factors jointly suggest the unique employment pattern of Turkish women with biased allocation to agriculture and

Table 1: Gender wage gap

			Panel A: Log hourly wage			
Sample	TR	TR	US	US	TR in US	TR in US
Wage gap	0.085	−0.078	−0.204	−0.160	−0.233	−0.151
Control	NO	YES	NO	YES	NO	YES
			Panel B: Log weekly earnings (full-time workers)			
Sample	TR	TR	US	US	TR in US	TR in US
Earning gap	−0.040	−0.146	−0.215	−0.231	−0.195	−0.201
Control	NO	YES	NO	YES	NO	YES

Note: Data sources are the Turkish Household Labor Force Survey and IPUMS USA covering the 2008-2012 period. Panel A includes all workers employed in the service sector, while Panel B is restricted to full-time workers (defined as those working 35 hours or more per week). The Turkish subsample in the U.S. is identified using theancestry variable in IPUMS USA. The dependent variables are log hourly wages (Panel A) and log weekly earnings (Panel B). The table reports the estimated coefficient on the female indicator. Control variables include age, age squared, marital status, education dummies (high school and college), urban residence, presence of a child aged 5 or younger, and part-time employment status. See Appendix B for the detailed regression results.

slow transition to services. In Section 5, I further examine heterogeneity in cultural norms and the role of migration using a microeconometric framework informed by this literature.

2.3 Gender wage gap in the service sector

The patriarchal norm interpretation carries another implication for the market wage structure, leading to the second empirical fact: the relatively small (or reversed) gender wage gap in the Turkish service sector. Panel A of Table 1 presents the log difference between female and male hourly wages in the service sector, estimated using the Turkish Household Labor Force Survey and IPUMS USA census data for the 2008-2012 period. I examine three samples: workers in Turkey (TR), workers in the United States (US), and workers of Turkish origin or descent living in the United States (TR in US). Without controlling for observable characteristics, female hourly wages in the Turkish service sector exceed male wages by 8.5%. In contrast, the unconditional gender wage gap in the U.S. service sector is −20.4%, indicating substantially lower female wages relative to male wages.

A potential explanation for this pattern is the restricted female labor supply induced by patriarchal cultural norms. The scarcity of female workers in the service sector may elevate their relative

wages through standard market equilibrium mechanisms. However, selection bias poses a significant concern, as emphasized by Olivetti and Petrongolo (2008): the few women who overcome cultural barriers to enter the service sector may possess unobservably high productivity. To partially address this issue, the second column of Panel A controls for major observable characteristics, including age, marital status, child status, and education. After controlling for these factors, the female wage in the Turkish service sector falls to 7.8% below the male wage. Notably, however, this conditional wage penalty is still smaller than the 16% gap observed in the United States. Furthermore, the wage gap for workers of Turkish origin in the U.S. (15.1%) closely resembles the overall U.S. gap (16.0%). This convergence suggests that the labor market equilibrium of the host country plays a notable role in gender wage gaps, in addition to portable individual characteristics or cultural traits.

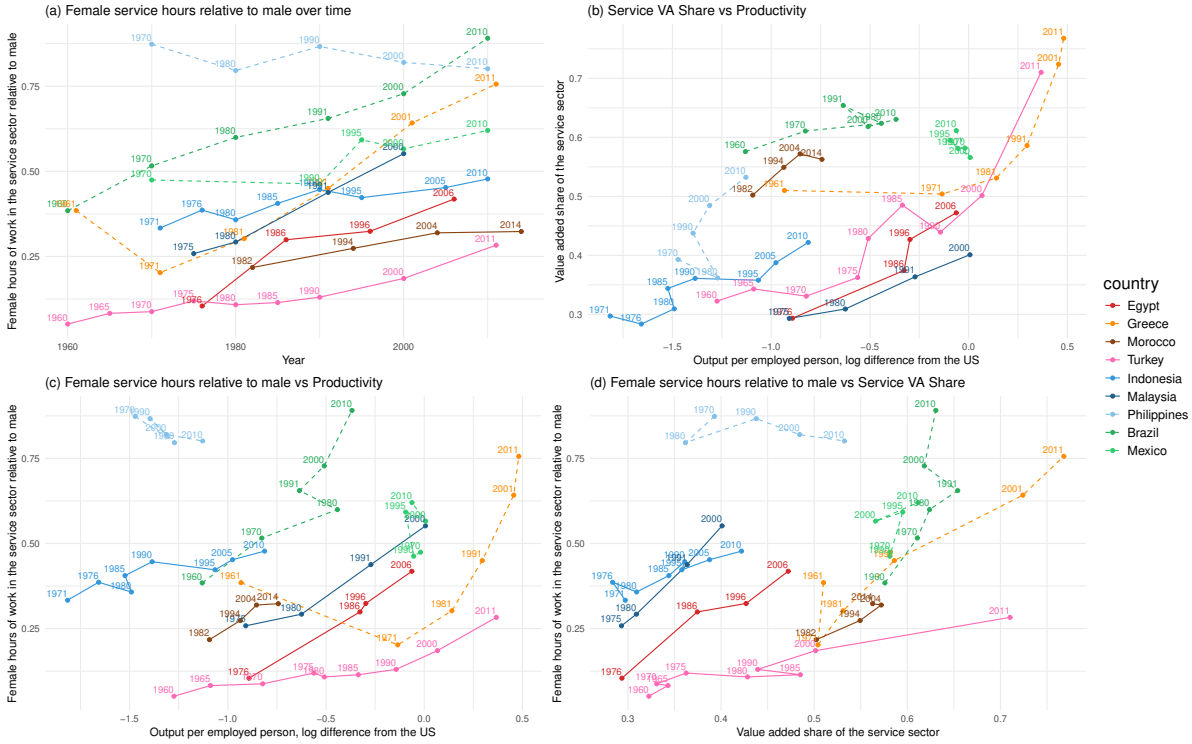
The institutional or cultural factors in the labor demand-side likely remain. Panel B extends the analysis by restricting the sample to full-time workers and using weekly earnings as the dependent variable. While the wage gaps in both countries become more negative (larger penalties for women) when restricting to full-time employment, the relative comparison holds: the conditional earnings gap in Turkey (14.6%) remains smaller than that in the U.S. (23.1%). Because part-time workers are excluded, the larger gaps observed in Panel B may partly reflect greater part-time penalties or lower workplace flexibility in both countries (Goldin, 2014). Overall, Table 1 suggests that while demand-side barriers and institutional frictions exist in Turkey, the Turkish gender wage gap in the service sector remains smaller than that in the United States. This pattern is consistent with a supply-side framework where patriarchal norms limit female labor participation, thereby creating relative scarcity and mitigating the downward pressure on female wages.

2.4 Cross-country evidence

To further explore the role of structural transformation in female labor market participation, I compare several middle-income countries in Figure 2. The main measure is aggregate female hours worked in the service sector relative to male hours. Aggregate service sector hours are constructed by multiplying the employment share in services by average weekly hours worked per worker, normalized so that 168 weekly hours equal one. I compute this measure separately for each gender and then take the ratio of female to male hours (see Section 4 for details).

In Figure 2, Islamic-majority countries are represented by solid lines, while Christian-majority countries are shown with dashed lines. The color scheme highlights geographic groupings: Mediter-

Figure 2: Cross-country comparison of female service sector participation



Note: See Section 4 for details on the data sources and variable construction.

ranean countries (Egypt, Greece, Morocco, and Turkey) appear in shades of red, Southeast Asian countries (Indonesia, Malaysia, and the Philippines) in blue, and South American countries (Brazil and Mexico) in green.

Panel (a) shows the evolution of female service hours relative to male hours over time. A clear distinction emerges between Christian-majority and Islamic-majority countries: the former consistently display higher female service hours relative to men. This suggests either deeper female integration into labor markets or service sector structures that disproportionately employ women. This divergence motivates turning to Panels (b)-(d) for structural explanations.

Panel (b), which plots service sector value-added shares against productivity, shows that Islamic countries tend to have lower service shares. The lower service sector value-added share in these countries reflects, in part, the lower participation of female workers in service employment. Turkey is notable for substantial improvements in both productivity and service sector value added.

Panel (c) relates female service hours to productivity and reinforces these cross-country differences. Within the Mediterranean group, Turkey's female-to-male service-hours ratio remains low

relative to its productivity compared with Greece, consistent with the patterns shown in Figure 1. Egypt and Morocco display somewhat higher ratios. Southeast Asian countries exhibit substantially higher female service-hours ratios than Mediterranean countries, with the Philippines clearly exceeding Malaysia and Indonesia. These patterns underscore that productivity alone does not map cleanly into gender allocation within services; sectoral structure and occupational norms continue to play an important role.

Panel (d) links female service hours directly to service sector value-added shares. Greece dominates Morocco and Turkey along both dimensions, while Egypt appears relatively high given its modest service share, likely reflecting the large role of public sector services. In Southeast Asia, the Philippines again exceeds Malaysia and Indonesia, consistent with Panel (c). Brazil and Mexico display relatively high female service sector participation despite slower service sector expansion than Turkey.

Taken together, Panels (b)-(d) indicate that structural differences in service sector expansion help account for the Christian-Islamic gap observed in Panel (a). In particular, Islamic-majority countries (and Turkey in particular) exhibit persistently lower female service sector participation even at comparable levels of productivity and service sector size.

2.5 Other factors

Finally, I note other factors that may contribute to women's labor supply decisions. The literature proposes several social and institutional changes as driving forces that encourage women to participate in the labor force (Greenwood et al. (2017)). Interestingly, Turkey also shares the major factors that were supposed to help women participate in the labor force.[6] From 1950 to 2010, the average female years of schooling increased from 0.63 to 6.33, the crude marriage rate declined from 9.51% to 7.98%, the crude divorce rate increased from 0.38% to 1.62%, and the total fertility rate declined from 6.12% (1960) to 2.09%. In addition, preprimary education, including child care, has expanded from 3% in 1985 to 26% in 2010. Home appliances have also been popular: electricity consumption (excluding industry) per person increased from 19 kWh in 1955 to 1295 kWh in 2010.

[6] Average years of schooling is taken from a data set created by Barro and Lee (2013). Marriage and divorce data, and electricity statistics are obtained from Turkish Statistical Institute (2014). Total fertility rate and preprimary education enrollment rates are provided by World Bank.

3 Model

In this section, I develop a general equilibrium model of sectoral labor allocation by gender. The model is designed to replicate sectoral hours of work in the United States. Accordingly, this baseline model traces the increase in female labor market participation observed in the U.S. over the second half of the twentieth century. Later, in Section 5, I introduce a cultural parameter to capture the decline in female hours of work in Turkey, providing a framework to quantify cross-country differences in cultural attitudes toward female employment.

The economy features four sectors: agriculture, manufacturing, market services, and home production. Structural transformation in this model is driven by two complementary mechanisms, each grounded in established theoretical frameworks. First, following Kongsamut et al. (2001) and Duarte and Restuccia (2010), I introduce non-homotheticity through a Stone-Geary utility function that incorporates a subsistence level of agricultural consumption. This feature captures income effects: as the economy grows and households become wealthier, the share of income devoted to agricultural goods declines because subsistence needs represent a smaller fraction of total consumption. Second, I incorporate unbalanced sectoral productivity growth rates following Ngai and Pissarides (2007). In this framework, sectors experience differential rates of technological progress, generating substitution effects that drive structural change. This mechanism is particularly important for capturing the reallocation from home production to market services. Because productivity grows faster in market services than in home production and these two goods are substitutes in consumption, households substitute away from home production toward market services. It is important to note that non-homotheticity operates through the final consumption expenditure channel, while unbalanced productivity growth operates through the value-added channel. Consequently, the calibration of the elasticity of substitution across market sectors requires careful consideration, as highlighted by Herrendorf et al. (2013).

Finally, following Ngai and Petrongolo (2017), I introduce gender-specific comparative advantages in production across sectors to capture gender asymmetries in sectoral hours of work. Women are assumed to have a comparative advantage in service sector production. As structural transformation shifts demand toward the market services sector, female hours of work in this sector increase both in absolute terms and relative to male hours.

Household A representative household consists of a man and a woman. The household's utility function is

$$U(C_t, L_{mt}, L_{ft}) = \alpha_C \log C_t + (1 - \alpha_C) \left(\frac{1}{2} \log L_{mt} + \frac{1}{2} \log L_{ft} \right), \tag{1}$$

where C_t is the aggregated consumption of the household. L_{mt} and L_{ft} are male and female hours of leisure, respectively. Throughout the paper, time is denoted by the subscript t, and the different sectors by specific subscripts—agriculture by A, manufacturing by M, market services by SM, and home production by SH. The household chooses a static allocation of hours each period, although it intends to capture the time-series trend. The dynamics are generated by changing sectoral productivities. This assumption greatly improves tractability. My approach follows Rogerson (2008) and Ngai and Petrongolo (2017), among others.

Each man and woman is endowed with one unit of time. It is allocated to market work in agriculture H_{gAt}, manufacturing H_{gMt}, market services H_{gSMt}, home production H_{gSHt}, and leisure L_{gt}, where gender $g = m, f$ denotes male and female.[7]

$$1 = H_{gAt} + H_{gMt} + H_{gSMt} + H_{gSHt} + L_{gt} \quad \text{for } g = m, f. \tag{2}$$

The aggregate consumption C_t consists of consumption in agriculture, manufacturing, and services.

$$C_t = \left[\alpha_A (C_{At} - \overline{C}_A)^\rho + \alpha_M C_{Mt}^\rho + (1 - \alpha_A - \alpha_M) C_{St}^\rho \right]^{1/\rho}, \tag{3}$$

where C_{At}, C_{Mt}, and C_{St} are agriculture, manufacturing, and service consumption, respectively, ρ is the elasticity of substitution parameter, and α_A and α_M are relative weights. I assume a subsistence level of agriculture consumption $\overline{C}_A$ so that the model captures the rapid decline in agriculture hours. Under $\rho < 0$, these three goods are gross complements. Herrendorf et al. (2013) suggest that the elasticity of substitution across sectors is close to 1 under the final-expenditure approach, while it is nearly 0 given the value-added approach. Later, I will calibrate the value of ρ that implies the sectoral elasticity of substitution 0.29. This value is reasonable as the combined

[7] This time allocation can be interpreted as the extensive margin: the social planner allocates a continuum of workers with mass 1 across sectors without any frictions. However, the market equilibrium interpretation is challenging. If each worker individually makes a discrete sectoral choice, some heterogeneity in worker productivity or preference is required to generate the extensive margin. Instead, I interpret the time allocation as the intensive margin, which is justified if each worker adjusts their hours of work. In the quantitative analysis, the hours of work recorded in surveys are accounted for.

model of demand-driven and supply-driven sources of structural transformation.

Additionally, the service consumption C_{St} is composed of market services C_{SMt} and home services C_{SHt}.

$$C_{St} = [\alpha_S C_{SMt}^{\eta} + (1-\alpha_S) C_{SH}^{\eta}]^{1/\eta}, \tag{4}$$

where α_S is the weight for market services, and η is the elasticity of substitution parameter. I assume $\eta > 0$ so that market services and home production are close substitutes. In my calibration, the service sector productivity growth rate exceeds that of home production in the U.S. This relative productivity change pushes the female home hours into market hours.

Technology The production function for each sector i is specified by the constant elasticity of substitution (CES) function F_{it} for male and female hours of work:

$$F_{it}(H_{mit}, H_{fit}) = \theta_{it} \left(\xi_i H_{mit}^{\sigma} + (1-\xi_i) H_{fit}^{\sigma}\right)^{1/\sigma}, \quad \text{for } i = A, M, SM, SH, \tag{5}$$

where θ_{it} is the time-varying sectoral productivity, and ξ_i is the time-fixed gender comparative advantage. In my calibration, ξ_{SM} and ξ_{SH} are smaller than ξ_A and ξ_M. As emphasized in Rendall (2025), this can be interpreted to mean that men have a comparative advantage in brawn jobs while women are relatively good at brain jobs.

Equilibrium The resource constraints are simple:

$$C_{it} = F_{it}(H_{mit}, H_{fit}) \quad \text{for } i = A, M, SM, SH, \tag{6}$$

The competitive equilibrium in this model can be defined as the solution to a planner's problem because there are no distortions. The equilibrium allocation is obtained by choosing labor inputs H_{git} for $g = m, f$ and $i = A, M, SM, SH$ to maximize the representative household's utility (1) subject to (2), (3), (4), (5), and (6), given sectoral productivities θ_{it} for $i = A, M, SM, SH$.

To capture the U.S. trend, the model generates two key mechanisms driving female labor reallocation (Ngai and Petrongolo, 2017). First, *structural transformation effects* shift labor from agriculture and manufacturing to services. Since sectors are complements, faster productivity growth in agriculture and manufacturing means fewer workers are needed to satisfy the relatively inelastic demand for these goods, allowing labor to shift into services where productivity growth

is slower. Second, *marketization effects* reallocate labor from home production to market services. Since market and home services are substitutes, rising productivity in market services relative to home production induces households to substitute toward market-produced services. Together, these forces drive labor reallocation from agriculture, manufacturing, and home production to market services. Finally, women are particularly affected because they have a comparative advantage in service production. As aggregate hours in market services rise, the demand for female labor increases disproportionately compared to male labor, leading to higher female labor force participation.[8]

4 Data

For the quantitative analysis, I collect long-term data on employment and hours of work by sector and gender, as well as sectoral productivities, for ten countries: Brazil, Egypt, Greece, Indonesia, Malaysia, Mexico, Morocco, the Philippines, Turkey, and the United States.

To construct macro-level hours of work by sector and gender, I first derive employment measures (extensive margin) using population census data. In each country, men and women aged 15 and over who are not in school are classified into four categories: agriculture, manufacturing, services,

[8]This intuition can be captured analytically. First, assume for simplicity that $\overline{C}_A = 0$ and $H_{it} = H_{mit} = H_{fit}$, which implies no subsistence level of agricultural consumption and no gender differentiation in production. Define the aggregate service productivity as $\theta_{St} \equiv \left[\alpha_S^{\frac{1}{1-\eta}} \theta_{SMt}^{\frac{\eta}{1-\eta}} + (1-\alpha_S)^{\frac{1}{1-\eta}} \theta_{SHt}^{\frac{\eta}{1-\eta}}\right]^{\frac{1-\eta}{\eta}}$ and aggregate service hours as $H_{St} \equiv H_{SMt} + H_{SHt}$. Then, by the property of the CES function, $C_{St} = \theta_{St} H_{St}$ holds. The first-order condition implies the structural transformation pattern:

$$\frac{H_{St}}{H_{jt}} = \left(\frac{1-\alpha_A-\alpha_M}{\alpha_j}\right)^{\frac{1}{1-\rho}} \left(\frac{\theta_{St}}{\theta_{jt}}\right)^{\frac{\rho}{1-\rho}},$$

for $j = A, M$. Since the sectors are complements ($\rho < 0$), faster productivity growth in agriculture and manufacturing relative to services leads to a reallocation of labor towards the service sector (structural transformation effect).

Moreover, within the service sector, the share of market service hours in total service hours is given by:

$$\frac{H_{SMt}}{H_{St}} = \alpha_S^{\frac{1}{1-\eta}} \left(\frac{\theta_{SMt}}{\theta_{St}}\right)^{\frac{\eta}{1-\eta}}.$$

Market and home services are substitutes ($\eta > 0$), so faster productivity growth in market services relative to home production leads to an increase in the share of market service hours (marketization effect).

Finally, relax the assumption and allow for gender differences ($H_{fit} \neq H_{mit}$). Since the marginal rate of technical substitution between female and male labor inputs equals the ratio of their marginal rates of labor disutility,

$$\frac{H_{fit}}{H_{mit}} = \left(\frac{1-\xi_i}{\xi_i}\frac{L_{ft}}{L_{mt}}\right)^{\frac{1}{1-\sigma}}$$

holds for each sector $i = A, M, SM, SH$, where the leisure ratio L_{ft}/L_{mt} on the right-hand side is independent of sector i. Since women have a comparative advantage in service production (i.e., ξ_{SM} is relatively small), H_{fSMt}/H_{mSMt} is high. Then, the structural transformation and marketization effects increase aggregate hours in market services, and sharply increase H_{fSMt}.

and non-employment. Macro-level hours for agriculture, manufacturing, and services are calculated as the product of the sectoral employment rate by gender g and the average weekly hours worked by sector i and gender g, normalized by the total weekly time endowment of 168 hours:

$$\text{Macro Hours}_{i,g} = \frac{\text{Employment Rate}_{i,g} \times \text{Average Hours per Employed}_{i,g}}{168}.$$

Since each gender is endowed with a unit mass of time per week, these macro hours represent the fraction of total time allocated to market work in each sector. The remaining time is allocated to home production and leisure, which are not separately identified in the data, with the exception of the United States.

4.1 Employment

The main dataset is IPUMS International microdata, which provides harmonized census microdata for a large number of countries. For Egypt (1976), Greece (1961), the Philippines (1970 and 1980), and all years for Turkey, I rely on published census tables due to the unavailability of microdata.[9] I select the population aged 15 and over who are not enrolled in school as the base sample. I do not exclude older individuals, as age-specific employment by gender and industry is unavailable in the published tables. Individuals who are currently employed are classified into agriculture, manufacturing, and services using the sector classifications of the harmonized IPUMS industry codes. This classification is also applied to non-market family workers if they are explicitly identified in the activity status variable.

An important data challenge concerns the measurement of female non-market family agricultural work. In many countries, census data misclassify women engaged in family agricultural activities as housewives rather than agricultural workers, leading to substantial underestimation of female agricultural employment. In most countries in my sample, census questionnaires define work for in-kind compensation or non-remunerated family assistance as employment; however, this option may not always have been salient to respondents, leading some women to report their status as homemakers instead.

Following Ngai et al. (2024), I implement a household-based reclassification procedure to correct for the undercounting of unpaid family workers. Using IPUMS International microdata, I reassign

[9]For Egypt, I use the Statistical Yearbook of Egypt (1980); for Greece, the Population and Housing Census Results of 19 March 1961; for the Philippines, the Census of Population and Housing for 1970 and 1980; and for Turkey, Statistical Indicators 1923-2013. Although Turkish employment data can be constructed from IPUMS microdata for 1985, 1990, and 2000, the resulting series is virtually identical to that obtained from the published reports.

Table 2: Data Construction and Imputation Details by Country

Country	Description of Data Sources and Methodology
Brazil	Employment (1960-2010) and hours (1991-2010) are sourced from IPUMS International. Actual hours are used for 1991-2010, while the average hours from 1991 are applied to 1970-1980. The unpaid family worker correction is applied.
Egypt	Employment combines IPUMS (1986-2006) and Census Reports (1976). Usual hours of work are derived from the ELMPS: 1988 data proxy for 1976 and 1986; 2006 data are used for the 2006 census. ELMPS 1998 only records market hours excluding home production. Total hours are imputed by multiplying market hours in 1998 and the market-to-total ratio observed in 2006. The adjusted 1998 hours are then used for 1996. The unpaid family worker correction is applied.
Greece	Employment (1971-2011) and hours are from IPUMS International, except for 1961 employment which comes from Census Reports. Hours for 1971-1991 are imputed using the average usual hours of work observed in 2001. No unpaid family worker correction is applied.
Indonesia	Data are sourced from IPUMS International (1971-2010). Actual hours are available and used for 1976-1995. For 2005 and 2010, the 1995 average is used; for 1971, the 1976 average is used. The unpaid family worker correction is applied.
Malaysia	Employment is sourced from IPUMS International. Due to missing microdata, hours for all years are based on the *Labour Force Survey Report 2003*. The unpaid family worker correction is applied.
Mexico	Data are sourced from IPUMS International (1970-2010). Actual hours are used for 1990-2010, while the average hours from 1990 are applied to the 1970 census. The unpaid family worker correction is applied.
Morocco	Employment is sourced from IPUMS International (1982-2014). As hours data are unavailable, hours from the Egypt ELMPS (1988) are used as a proxy for all years. The unpaid family worker correction is applied.
Philippines	Employment data combine IPUMS (1990-2010) and Census Reports (1970, 1980). Hours for all years are imputed using the 2010 Labor Force Survey microdata. The unpaid family worker correction is applied.
Turkey	Employment is sourced from the *Statistical Indicators Report* (1955-2011). Hours for all years are based on the average hours from the 2008-2012 Labor Force Survey. No unpaid family worker correction is applied.
United States	Employment and market hours are sourced from IPUMS International (1960-2010). Home production hours are estimated by MTUS.

non-employed married women to agricultural employment if they reside in households where the husband is self-employed in agriculture.[10] This approach mirrors the historical correction applied to U.S. data by Ngai et al. (2024), which recovers farm women's unpaid work systematically omitted from census tabulations. I apply this correction to Brazil, Egypt, Indonesia, Malaysia, Mexico,

[10]Microdata are unavailable for the Philippines in 1970 and 1980. For these years, I impute female agricultural employment by multiplying male agricultural employment reported in the census by the female-to-male agricultural employment ratio observed in 1990, calculated using IPUMS International microdata.

Morocco, and the Philippines. In these countries, reported female agricultural employment is otherwise less than 20% of male levels. Conversely, no adjustment is needed for Greece and Turkey because their census instruments explicitly include non-market family work. Similarly, I do not adjust U.S. data, as census definitions since 1960 explicitly classify non-market family agricultural workers as employed (Ngai et al. (2024)).

4.2 Average weekly hours of work

The second step is to obtain average weekly hours by sector and gender. For Brazil, Greece, Indonesia, Mexico, and the United States, IPUMS International microdata record weekly hours of work. I use "usual hours of work" if available (Greece and the United States); otherwise, I use "actual hours of work" (Brazil, Indonesia, and Mexico). However, data are missing for some years in several countries. In these cases, I impute missing hours using available years within the same country (see Table 2 for details). For Egypt, I use microdata from the Egypt Labor Market Panel Survey (ELMPS) to impute missing hours, taking advantage of the relatively early 1988 data.[11] For the Philippines and Turkey, I use labor force survey microdata to calculate the average hours per employed person by sector and gender for selected years and apply these averages to all other years. For Malaysia, where labor force survey microdata are unavailable, I use the hours by sector and gender reported in the 2003 public report. Data are also missing for Morocco, so I use the 1988 ELMPS hours from Egypt as a proxy. Since average hours vary much less over time and across countries than employment shares, the above method does not introduce significant bias in the construction of macro hours.

I also estimate home production hours in the United States for the calibration. I do this using IPUMS Multinational Time Use Survey (MTUS) microdata. First, I calculate the ratio of home production hours to market hours by gender for selected years: 1965, 1975, 1985, 1993, and 2003. Next, for the census years 1970, 1980, 1990, and 2000, I linearly interpolate the home-to-market hours ratio (and extrapolate for 1960). Finally, I derive home hours by multiplying the total market hours obtained from the IPUMS International census by the interpolated home-to-market ratio. This yields macro-level hours for agriculture, manufacturing, market services, and home production for both men and women. In the model, each gender holds one unit of time; I classify the remaining

[11] In 1988 and 2006, the ELMPS survey records total hours of work; I use the former for the 1986 census year and the latter for the 2006 census year. I apply the 1988 total hours by sector and industry to the 1976 census. In 1998, only market hours of work are available, which may underestimate total labor. To address this, I apply the ratio of market-to-total hours observed in 2006 to the market hours reported in 1998. This imputed average is then used in conjunction with employment data from the 1996 census.

time as leisure.

4.3 Productivity

Home productivity θ_{SHt} is estimated endogenously in the model simulation. Specifically, θ_{SHt} is chosen so that model-generated total market service hours, $H_{m,SM,t} + H_{f,SM,t}$, match the data. In other words, home productivity is inferred to ensure that the substitute (market services) aligns with observed hours. This approach is also applied in simulations for other countries where historical home hours are unobserved. In my U.S. estimation, θ_{SHt} grew by 0.5% annually in the 1960s and 1970s, but the growth rate slowed to 0.2% thereafter. This pattern is consistent with Bridgman (2016).[12]

Next, I compute sectoral productivities for the remaining countries using the model-based sectoral purchasing power parity (PPP) adjustment of Duarte and Restuccia (2010). They introduce this approach because sectoral value added data are reported only in domestic currency units, aggregate PPP conversion cannot be applied uniformly across sectors, and expenditure-side PPP measures are not appropriate for producer-side sectoral productivity comparisons. The procedure consists of three steps: (i) anchoring the aggregate level of market productivity using PPP-adjusted output; (ii) recovering baseline sectoral productivity levels so that the model matches observed sectoral labor allocations and aggregate productivity; and (iii) projecting sectoral productivities forward using within-country sectoral growth rates measured in constant local prices. This separation of level anchoring (across countries) from dynamics (within countries) avoids exchange-rate distortions and yields internationally comparable sectoral productivity paths.

For each country, I set the first year of the simulation as the baseline year and obtain PPP-converted aggregate market productivity in that year relative to the 1960 U.S. level from the Conference Board Total Economy Database. Given this aggregate anchor, I choose baseline values of sectoral productivities $\theta_{A,t}$, $\theta_{M,t}$, $\theta_{SM,t}$, and $\theta_{SH,t}$ so that the model matches four targets: (1) total hours in agriculture $H_{m,A,t}+H_{f,A,t}$; (2) total hours in manufacturing $H_{m,M,t}+H_{f,M,t}$; (3) total hours in market services $H_{m,SM,t}+H_{f,SM,t}$; and (4) aggregate PPP-adjusted market productivity. I then construct the time paths for sectoral productivities in agriculture, manufacturing, and market services after the baseline year using sector-specific productivity growth rates from the GGDC 10-Sector Database, measured as value added per worker.[13] Home productivity $\theta_{SH,t}$ is estimated

[12]The home productivity growth rate varies in the literature: -0.2% per year in Rogerson (2008), 0.2% in Akbulut (2010), and 0.45% in Ngai and Petrongolo (2017).

[13]Long-term sectoral value added and employment are missing for Greece and Turkey. For Greece, sectoral value

Table 3: Calibrated Parameters and Moments

Parameter		**Target Moment**		
Variable	Value	Variable	Description	Value
Matched to 1960 gender-sector hours:				
α_A	0.0001	$H_{m,A,1960}$	Men's hours in Agriculture	0.0201
α_M	0.038	$H_{m,M,1960}$	Men's hours in Manufacturing	0.0784
α_S	0.452	$H_{m,SM,1960}$	Men's hours in Market Services	0.0880
α_C	0.241	$H_{m,SH,1960}$	Men's hours in Home Services	0.0613
ξ_A	0.708	$H_{f,A,1960}$	Women's hours in Agriculture	0.0013
ξ_M	0.617	$H_{f,M,1960}$	Women's hours in Manufacturing	0.0170
ξ_{SM}	0.545	$H_{f,SM,1960}$	Women's hours in Market Services	0.0496
ξ_{SH}	0.410	$H_{f,SH,1960}$	Women's hours in Home Services	0.1790
Matched to 2010 aggregate sectoral hours:				
$\overline{C}_A$	0.0049	$H_{m,A,2010} + H_{f,A,2010}$	Total hours in Agriculture	0.0053
ρ	-2.493	$H_{m,M,2010} + H_{f,M,2010}$	Total hours in Manufacturing	0.0603
$\theta_{SH,2010}$	1.376	$H_{m,SM,2010} + H_{f,SM,2010}$	Total hours in Services	0.2300

endogenously within the model simulation to match observed market service hours, as in the U.S. calibration.

5 Quantitative Analysis

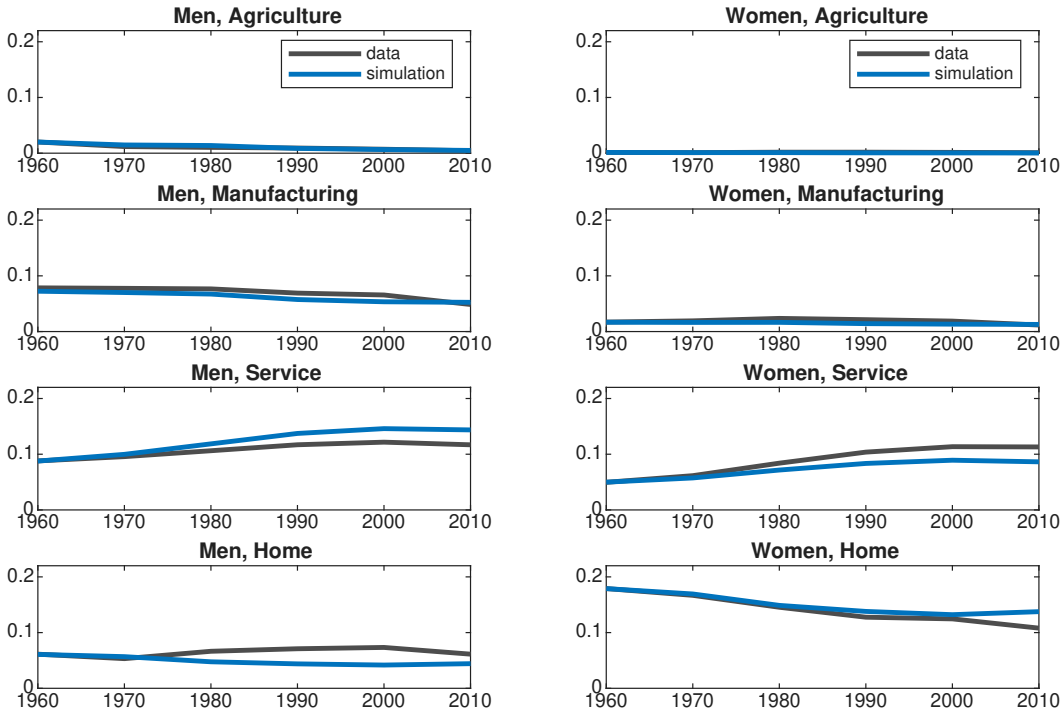
5.1 Parameter Calibration with the U.S. data

I first calibrate the model using the U.S. data to establish a baseline. The calibration period spans from 1960 to 2010, capturing the significant structural transformation and female labor market participation increase during this era.

The two elasticity parameters, η and σ, are taken from the literature, following Ngai and Petrongolo (2017). Gelber and Mitchell (2011) estimate the elasticity of substitution between home and services to be 2.7, which corresponds to $\eta = 0.63$. Acemoglu et al. (2004) estimate the elasticity of substitution between male and female labor inputs to be approximately 3, which corresponds to $\sigma = 0.67$. The remaining parameters are calibrated using U.S. data from 1960 and 2010 given the normalized market productivities in 1960 and estimated productivities in 2010. I calibrate four sectoral preference parameters (α_A, α_M, α_S, α_C) and four gender comparative

added is obtained from Papaelias et al. (2014), and sectoral employment is derived from IPUMS International microdata and population census reports. For Turkey, both sectoral value added and employment are obtained from the Statistical Indicators Report. The GGDC 10-Sector Database does not cover Morocco in 2014; it is complemented by the Economic Transformation Database (ETD; De Vries et al., 2021), which is available since 1990.

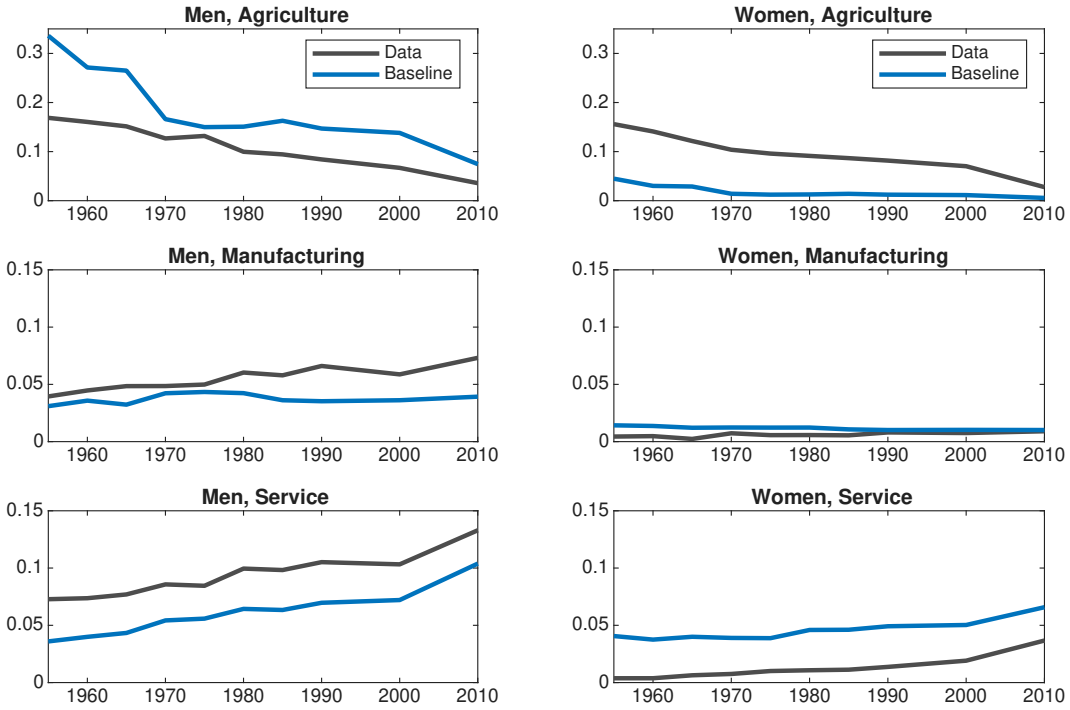
Figure 3: Simulation result of the United States



advantage parameters (ξ_A, ξ_M, ξ_{SM}, ξ_{SH}) using 1960 data on male and female hours of work by sector. The subsistence level of agricultural consumption $\overline{C}_A$ is calibrated to trace the decline in agriculture, and the sectoral elasticity of substitution parameter ρ captures the transition in manufacturing hours from 1960 to 2010. Specifically, these two parameters target total hours of work in agriculture, $H_{m,A,2010} + H_{f,A,2010}$, and manufacturing, $H_{m,M,2010} + H_{f,M,2010}$. Finally, as previously explained, home productivity $\theta_{SH,2010}$ is estimated endogenously to target total market services hours, $H_{m,SM,2010} + H_{f,SM,2010}$.

Table 3 summarizes the calibrated parameters and targeted moments. The sectoral elasticity of substitution parameter ρ is negative, indicating that agriculture, manufacturing, and services are gross complements. The U.S. simulation results are shown in Figure 3. Although the calibration does not target the gender gap in sectoral hours, the model reasonably captures the evolution of male and female hours of work by sector. In particular, the model traces out the sharp increase in female market services hours as well as the sharp decline in female home hours.

Figure 4: The baseline model's simulation result of Turkey



5.2 Application to Turkey

I first apply the calibrated model to Turkey. As shown in Figure 4, the model fails to replicate the Turkish data. Female hours of work in agriculture are substantially underestimated, while hours in manufacturing and services are overpredicted. The pattern for men is asymmetric: simulated male hours are too high in agriculture and too low in manufacturing and services. As a result, the model predicts an increase in female labor market participation in Turkey over the sample period, as rising service hours more than offset the decline in agricultural employment, as observed in other countries. This counterfactual prediction implies that, under U.S. preferences and technology, Turkey would not exhibit its distinctive female labor supply transition. The failure of the model therefore points to the presence of an additional factor that differentially affects gender specific labor allocation in Turkey.

To capture the Turkish data, I modify the model to include a cultural term. Following Guiso et al. (2006) and Fernández (2011), I interpret cultural differences as cross-country variation in

preferences, which is incorporated into the utility function as follows:

$$U = \alpha_C \log C_t + (1-\alpha_C)\left(\frac{1}{2}\log L_{mt} + \frac{1}{2}\log L_{ft}\right) + d\big[(H_{fAt} + H_{fSHt}) - (H_{fMt} + H_{fSMt})\big]. \quad (7)$$

The added term, $d\big[(H_{fAt} + H_{fSHt}) - (H_{fMt} + H_{fSMt})\big]$, captures cultural preferences over the allocation of female labor across sectors. The parameter d represents the relative reluctance toward female employment in manufacturing and the services compared to family-based work in agriculture and home services. When $d > 0$, reallocating female hours from family to non-family work reduces household utility. This specification captures social barriers to female market work as well as patriarchal family norms emphasizing women's obligations in agriculture (Morvaridi, 1992; Dildar, 2015). Importantly, this formulation preserves neutrality between total hours of work and leisure. If all female sectoral hours H_{fAt}, H_{fSHt}, H_{fMt}, and H_{fSMt} increase by the same fixed amount, sectoral labor allocation remains unchanged and the cultural effects are cancelled out. In this case, the culture term does not affect the marginal trade-off between work and leisure and only governs substitution across sectors.

The cultural parameter d is estimated for Turkey to minimize the sum of squared differences between the simulated results and the data in the manufacturing and market services sectors for both genders, as follows:

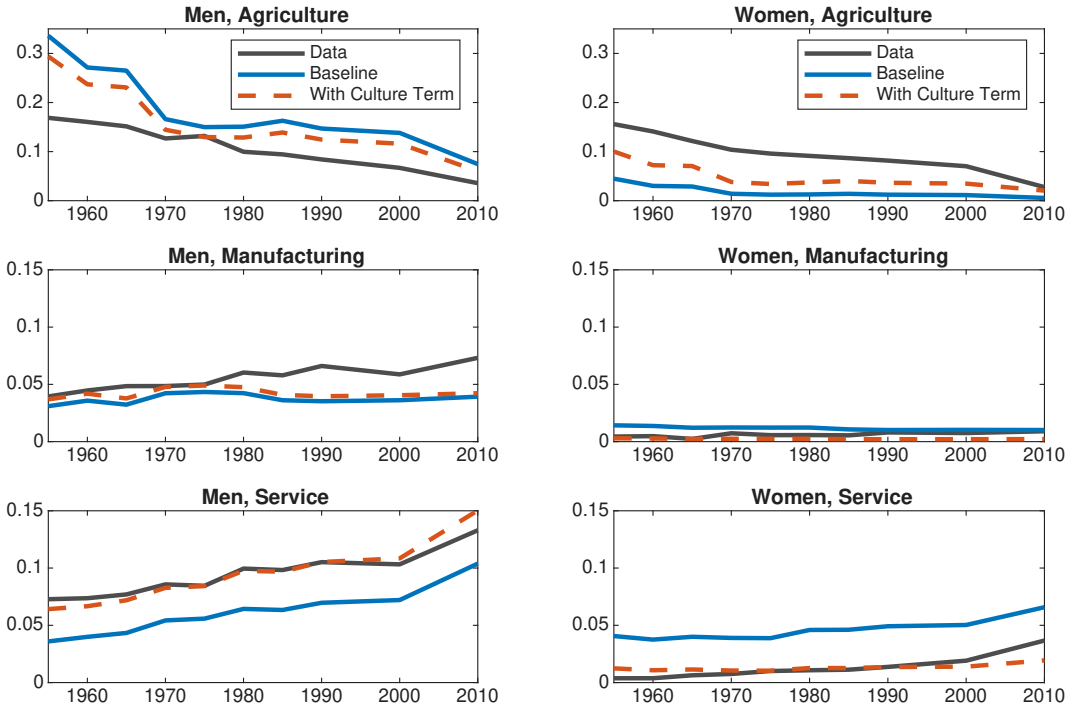
$$d = \arg\min_{d} \sum_{t} \left\{ \sum_{i \in \{M,SM\}} \left[(H^{data}_{m,i,t} - H^{sim}_{m,i,t})^2 + (H^{data}_{f,i,t} - H^{sim}_{f,i,t})^2 \right] \right\}. \quad (8)$$

I exclude agricultural hours due to the measurement issues discussed earlier. Numerically, I perform Nelder-Mead simplex optimization to solve equation (8). The estimated value of d is 0.276.[14]

Figure 5 presents the simulation results with the cultural term. The cultural term directly depresses female hours in the service sector, substantially improving the model's fit. In particular, the model captures both the low level of female service hours and their slow increase over time. The modification also affects male service hours, as male labor reallocates in response to changes in female labor supply. Although the model still fails to capture the increase in female service hours, especially in 2011, the overall improvement is reasonable. Next, the model's fit for agricultural hours is also improved, though the magnitude of the improvement is modest. Female agricultural

[14]The model aims to capture six series of hours (three sectors for each gender) across 10 periods between 1955 and 2011. I use four targets for the PPP conversion in 1955, the estimation of θ_{SHt} for each period between 1960 and 2011, and the cultural parameter d. Hence, there are 46 data points to be explained.

Figure 5: Simulation result of Turkey with the culture term



hours shift upward for all years, capturing the declining trend over time. Through substitution effects, male agricultural hours shift downward and move closer to the data. Quantitatively, these improvements are moderate, but they are in the correct direction. Finally, the model's predictions for manufacturing hours also improve, although the magnitude of the improvement is limited.[15] Although the cultural term is introduced as a single, parsimonious modification, it improves the model's predictions across all sectors. While the model still misses some dynamics, particularly in manufacturing hours, the consistent improvements across dimensions support interpreting these results as indirect evidence of social barriers to female labor supply in Turkey.[16]

I evaluate the magnitude of the cultural factor using leisure and consumption equivalence. I consider a hypothetical scenario in which one additional hour of female market work per week gen-

[15]The large improvement in service hours and the more limited improvement in other sectors may depend on the estimation of home productivity θ_{SHt}, which serves as a substitute for market services. However, even if θ_{SHt} is instead estimated to match manufacturing or agricultural hours, or estimated jointly by minimizing the sum of squared deviations across sectors, the quantitative results remain largely unchanged.

[16]If I did not apply the Ngai et al. (2024) imputation, female agricultural hours—and therefore total agricultural labor input—would be substantially understated. This would mechanically shrink the measured agricultural sector and make female hours in manufacturing and services appear higher relative to agriculture, bringing the sectoral allocation closer to the U.S. pattern. As a result, the baseline model could appear to fit the Turkish data more easily, reducing the need for a large cultural wedge and therefore biasing the estimated cultural term downward.

erates disutility through the cultural term. I then compute how much leisure or consumption must increase to offset this disutility. Because this exercise involves a marginal change, the calculation requires a reference point. I therefore simulate the disutility associated with one additional hour of female market work evaluated at the allocation observed in the United States in 2010.

Leisure equivalence is defined as the value of x_L that satisfies

$$\frac{1}{2}(1-\alpha_C)\cdot\log\left(L^{USA}_{f,2010}+\frac{x_L}{168}\right)-\frac{d}{168}=\frac{1}{2}(1-\alpha_C)\cdot\log(L^{USA}_{f,2010}),$$

where $L^{USA}_{f,2010}$ denotes female leisure in the United States in 2010. Similarly, consumption equivalence is defined as the value of x_C that satisfies

$$\alpha_C\cdot\log\big(C^{USA}_{2010}\cdot(1+x_C)\big)-\frac{d}{168}=\alpha_C\cdot\log(C^{USA}_{2010}),$$

where C^{USA}_{2010} denotes aggregate consumption in the United States in 2010.

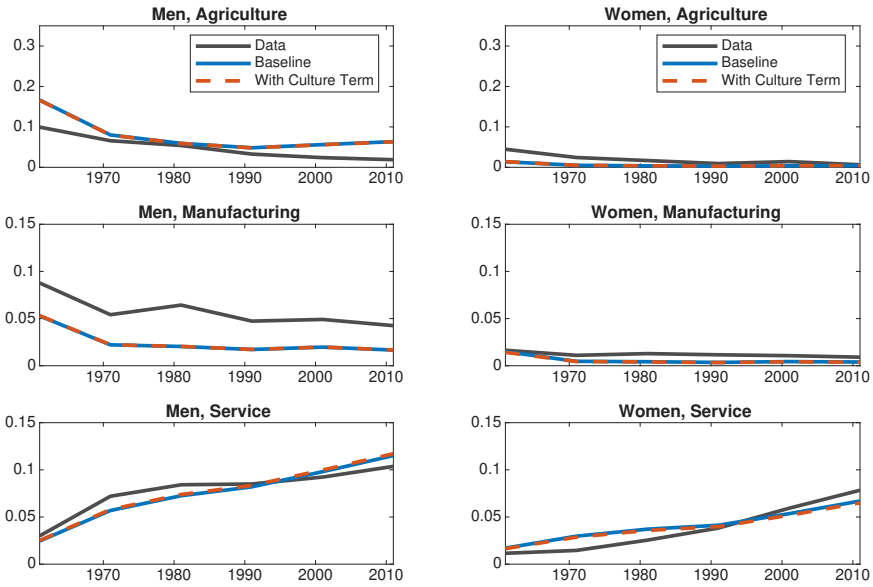
The quantitative magnitude of the cultural term is substantial. The marginal disutility implied by the estimated cultural parameter for Turkey ($d = 0.276$) is equivalent to a reduction of 10.2 minutes of leisure per week. Equivalently, wages would need to be approximately 17% higher than in the absence of the cultural term to compensate for this additional disutility. In terms of consumption equivalence, the disutility associated with one additional hour of female market work per week corresponds to 0.684% of aggregate household consumption.[17]

5.3 Application to other countries

I apply the same quantitative exercise to other middle-income countries. I begin with Greece. Figure 6 presents the simulation results. Even without the cultural term, the model already fits the Greek data well, particularly in tracing the transition of both male and female hours in the service sector. Introducing the cultural term leaves the simulation results almost unchanged. The estimated cultural coefficient is very small, $d = 0.008$, which corresponds to a leisure equivalence of 0.3 minutes per week or a consumption equivalence of 0.02% evaluated at the U.S. 2010 level. A sizable gap in male manufacturing hours remains, and the cultural term does not improve the fit

[17]The implied gender wage ratio can be recovered from the simulation results. Using equation (5), the female-to-male wage ratio in sector i is given by $\frac{1-\xi_i}{\xi_i}\left(\frac{H_{fit}}{H_{mit}}\right)^{\sigma-1}$. The predicted wage ratios are plotted in Figure A.1 in Appendix A. In the baseline simulation, the wage ratio remains slightly below one in manufacturing and the service sector, consistent with the estimated wage gaps reported in Table 1. When the cultural term is introduced, however, the model substantially overpredicts the wage ratio. In this sense, the specification focuses primarily on matching hours and may be too parsimonious to jointly account for wage gaps.

Figure 6: Simulation result of Greece

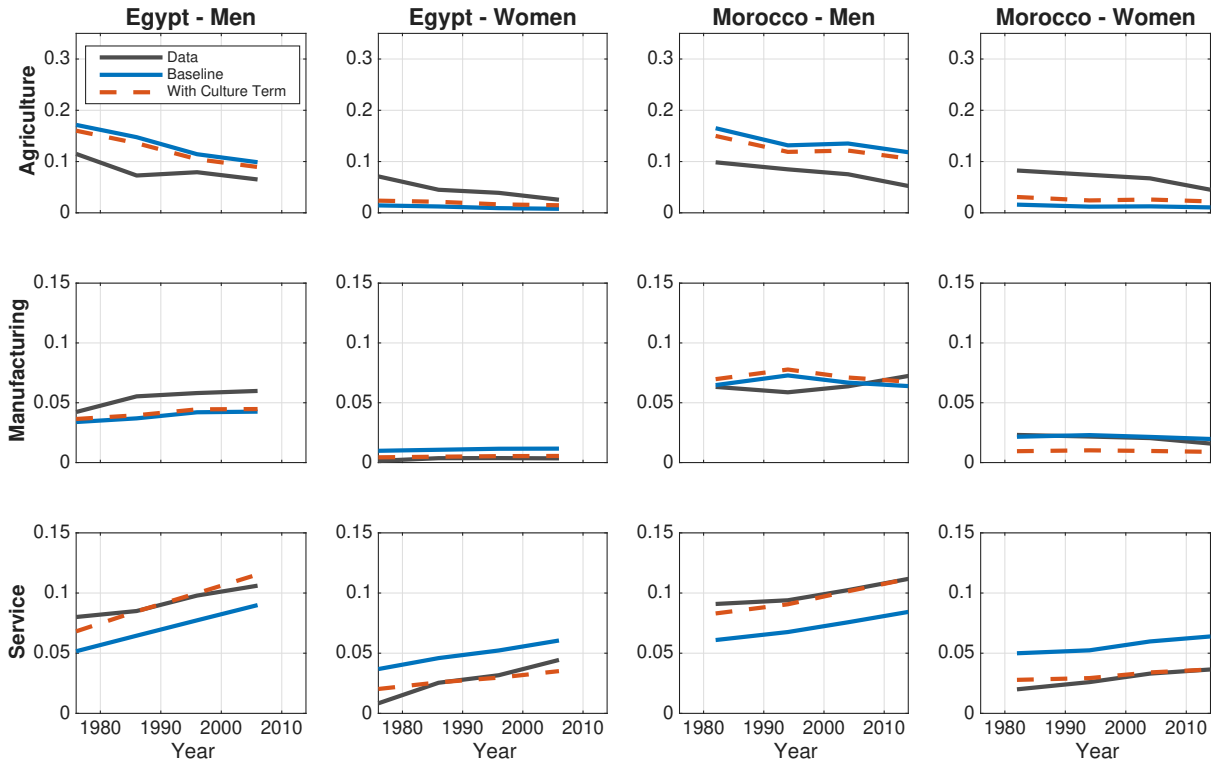


along this dimension. This outcome arises because the cultural term primarily affects service hours through substitution between home and market services. If the coefficient d were large enough to influence manufacturing hours, the model's fit in the service sector would deteriorate. Overall, the near-zero cultural coefficient suggests that Greek social preferences regarding female market work are similar to those in the United States.

I next apply the same analysis to Egypt and Morocco in the Mediterranean region. Figure 7 shows that both countries exhibit patterns similar to Turkey. In the baseline model without the cultural term, female service and manufacturing hours are overestimated, while female agricultural hours are underestimated. Through substitution between male and female labor inputs, male service and manufacturing hours are underestimated and male agricultural hours are overestimated. Introducing the cultural term improves the model's fit primarily in the service sector, while changes in agriculture and manufacturing are more modest. The estimated cultural coefficients are $d = 0.129$ for Egypt and $d = 0.142$ for Morocco. These values are smaller than that for Turkey but remain quantitatively substantial. The implied leisure equivalences are 4.8 minutes for Egypt and 5.3 minutes for Morocco, while the corresponding consumption equivalences are 0.32% and 0.35%, respectively.

I extend the analysis to seven additional middle-income countries: Brazil, Indonesia, Malaysia, Mexico, and the Philippines. Figure 8 compares service hours across all countries, grouped by

Figure 7: Simulation result of Egypt and Morocco



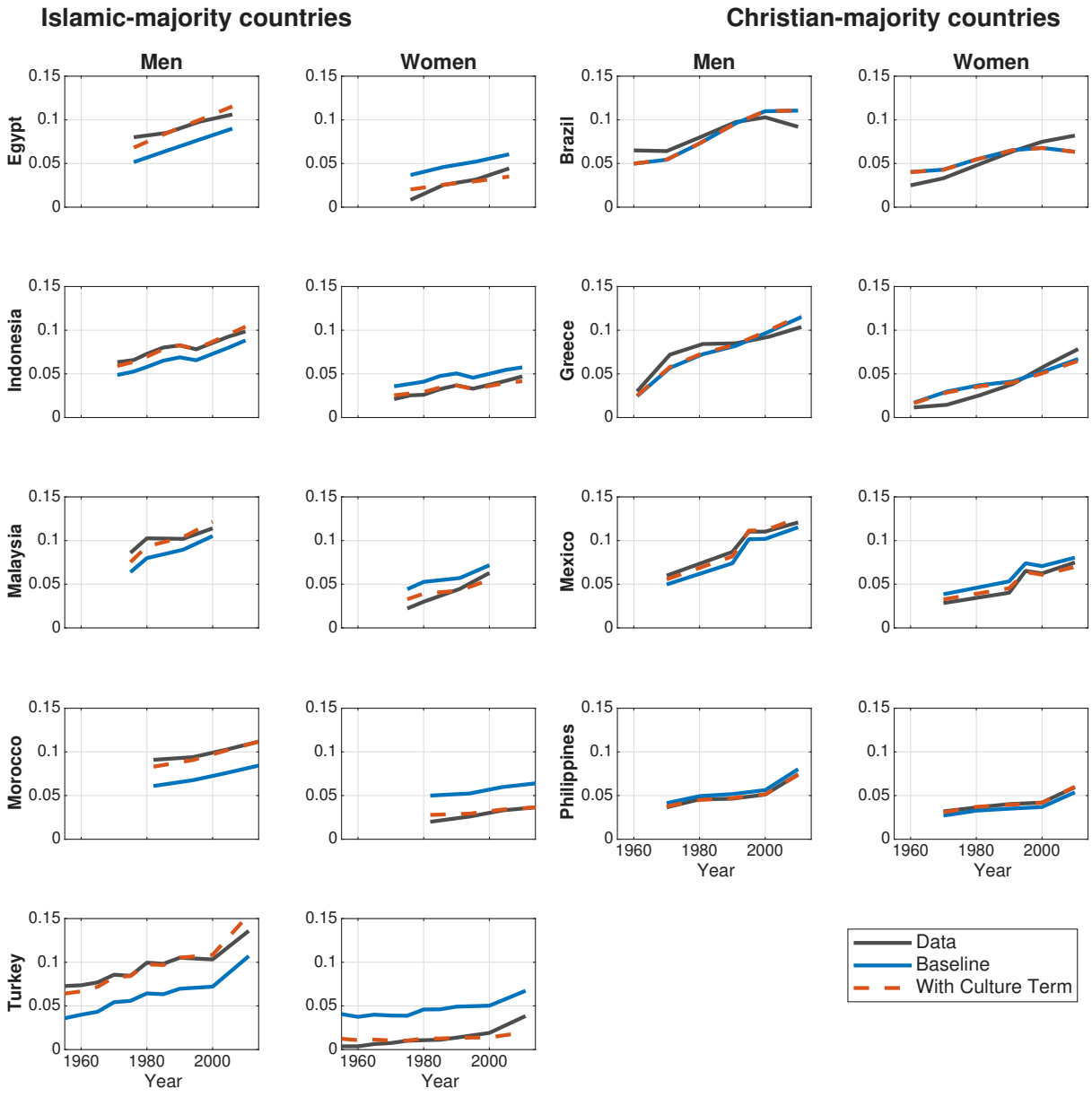
Note: The x-axis range is normalized to 1955-2014 to cover the common sample period.

Table 4: Estimated Culture Coefficients and Equivalences across Countries

Country	Culture Coef. (d)	Leisure Equiv. (min.)	Consumption Equiv. (%)
Brazil	0.000	0.018	0.001
Egypt	0.129	4.772	0.319
Greece	0.008	0.281	0.019
Indonesia	0.076	2.804	0.188
Malaysia	0.069	2.547	0.170
Mexico	0.040	1.468	0.098
Morocco	0.142	5.250	0.351
Philippines	−0.029	−1.074	−0.072
Turkey	0.276	10.208	0.684

religious composition. (See Appendix C for full simulation results.) The figure shows that the model closely tracks the evolution of male and female service sector hours in Christian-majority countries, while it overestimates female service hours and underestimates male service hours in Islamic-majority countries. Introducing the cultural term leads to only minor improvements in Christian-majority countries but substantially enhances the model's fit in Islamic-majority coun-

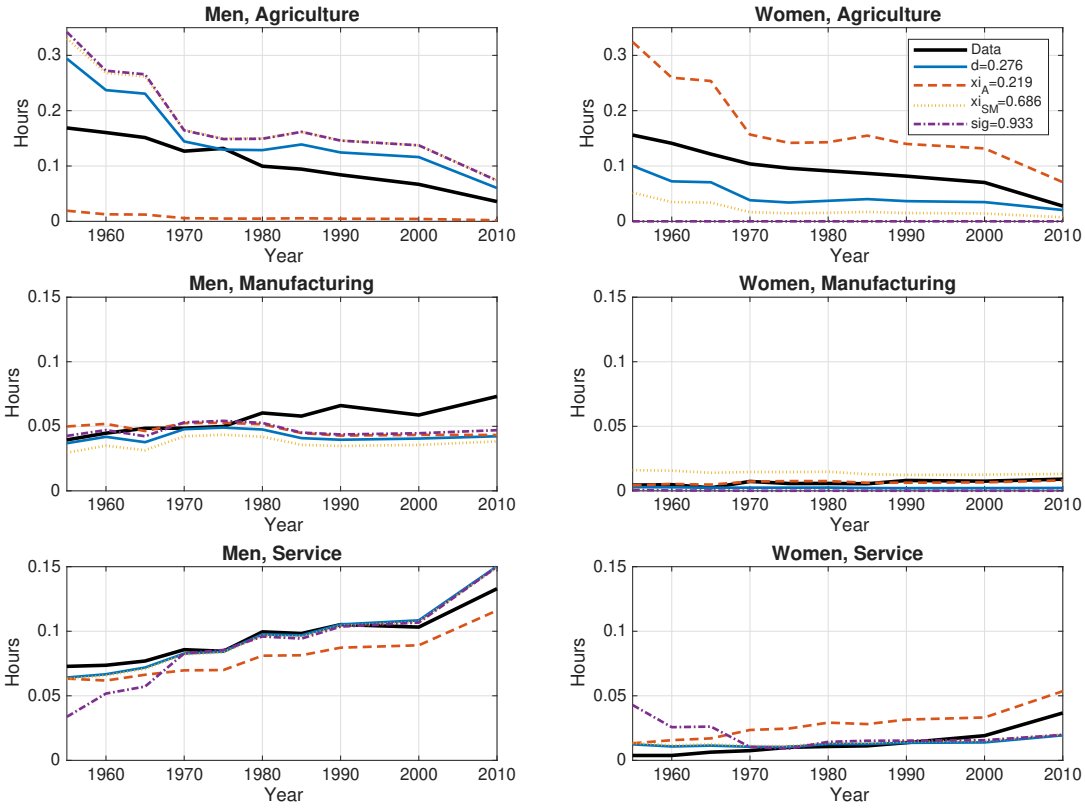
Figure 8: Service sector hours by religious composition



Note: The range of years is normalized as 1955-2014 to cover all available years for all countries.

tries. The estimated cultural coefficients and their corresponding equivalence measures are summarized in Table 4. The estimated coefficients d are large in Islamic-majority countries, particularly in the Mediterranean group consisting of Turkey, Egypt, and Morocco. Islamic-majority countries in Southeast Asia, namely Indonesia and Malaysia, exhibit more moderate cultural coefficients. In contrast, the estimated cultural coefficients are very small or even negative in Christian-majority countries, including Brazil, Mexico, Greece, and the Philippines. Overall, these results highlight

Figure 9: Simulation result of Turkey with selected parameter changes



substantial cross-country variation in cultural attitudes toward female market work, which appears to be systematically associated with religious composition.

5.4 Sensitivity Analysis

Although introducing the cultural term for Turkey substantially improves the model's fit, alternative modifications may appear plausible. For example, adjusting the comparative advantage parameter in the service sector, ξ_{SM}, could potentially yield better performance. To examine this possibility, I vary other parameters one at a time and evaluate the resulting model fit. As in the estimation of the cultural coefficient d, I select each modified parameter value to minimize the squared sum of distances between model predictions and the data across years, industries (manufacturing and services), and genders, following equation (8). The results are summarized in Panel A of Table 5.

I first examine changes in the sector-share parameters α_C, α_A, α_M, and α_S, which govern the aggregate industry structure. Adjusting these parameters yields only limited improvements and suggests that Turkey's distinctive labor allocation patterns are unlikely to be driven by distortions

Table 5: Sensitivity Analysis and Joint Estimation

Panel A: Changes in single parameters

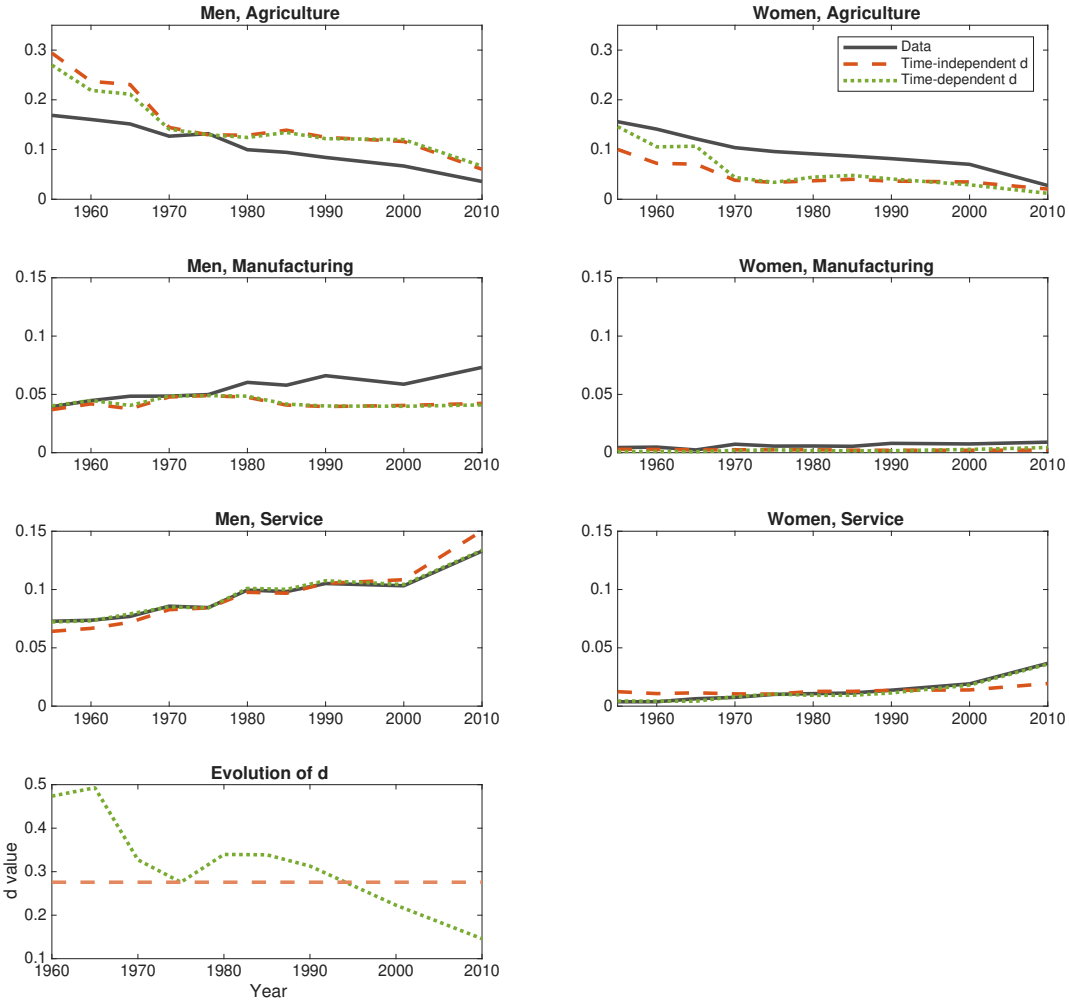
Parameter	symbol	original value	modified value	sqr dist.
No modification				0.026
Culture term coefficient	d	0.000	0.276	0.0038
Consumption preference	α_C	0.241	0.324	0.022
Agriculture preference	α_A	7.097×10^{-5}	5.961×10^{-6}	0.023
Manufacturing preference	α_M	0.038	0.089	0.025
Service preference	α_S	0.452	0.447	0.026
Gender com. adv. in agriculture	ξ_A	0.708	0.219	0.0067
Gender com. adv. in manufacturing	ξ_M	0.617	0.676	0.026
Gender com. adv. in market services	ξ_{SM}	0.545	0.686	0.0060
Gender com. adv. in home services	ξ_{SH}	0.410	0.003	0.017
Elast. of sub. btw. market & home	η	0.630	0.843	0.026
Gender elast. of sub. in all sectors	σ	0.670	0.933	0.0077
Sectoral elasticity of substitution	ρ	-2.493	-1.224	0.022

Panel B: Joint changes in parameters

	Parameter values			Squared sum of distances		
Parameter	original	individual	joint	original	individual	joint
α_C	0.241	0.324	0.866	0.026	0.022	0.0059
α_A	7.10×10^{-5}	5.96×10^{-6}	0.005	0.026	0.023	0.0059
α_M	0.038	0.089	0.322	0.026	0.025	0.0059
α_S	0.452	0.447	0.043	0.026	0.026	0.0059
ξ_A	0.708	0.219	0.508	0.026	0.0067	0.0029
ξ_M	0.617	0.676	0.694	0.026	0.026	0.0029
ξ_{SM}	0.545	0.686	0.645	0.026	0.0060	0.0029
ξ_{SH}	0.410	0.003	0.259	0.026	0.017	0.0029
σ_A	0.670	–	0.371	0.026	–	0.0067
σ_M	0.670	–	0.856	0.026	–	0.0067
σ_{SM}	0.670	–	1.401	0.026	–	0.0067
σ_{SH}	0.670	–	1.453	0.026	–	0.0067
Time-dependent d_t	0.0	0.276	Figure 10	0.026	0.0038	0.0028

in structural transformation. Next, I vary gender comparative advantage parameters ξ_i for sectors $i = A, M, SM, SH$. While these changes do not outperform the cultural term, adjustments to ξ_A and ξ_{SM} generate relatively good fits in terms of the squared distance criterion. However, these

Figure 10: Simulation result of Turkey with time-dependent culture term



modifications perform poorly in matching non-targeted agricultural hours. As shown by Figure 9, changing ξ_A induces excessive substitution between male and female labor in agriculture, while adjusting ξ_{SM} still results in a poorer fit for female agricultural hours than the introduction of the cultural term d. Finally, I vary the elasticity parameters η and σ, as well as the sectoral elasticity of substitution ρ. The gender-neutral parameters η and ρ do not improve the fit. In contrast, increasing σ, the elasticity of substitution between male and female labor, yields a relatively good fit in targeted manufacturing and service hours. However, Figure 9 shows substantial reduction in non-targeted female agricultural hours to nearly zero. Overall, none of these single parameter modifications outperform the cultural term in improving the model's fit, including along non-

targeted agricultural employment.

In addition, I allow several parameters to vary jointly to further improve the model's fit. Panel B of Table 5 summarizes the estimated values from these joint parameter changes. Joint estimation of the industry preference parameters (α_C, α_A, α_M, α_S) substantially improves the model's fit, reducing the squared error to 0.0059, which is close to the fit achieved by the cultural term (0.0038). Similarly, jointly estimating the comparative advantage parameters (ξ_A, ξ_M, ξ_{SM}, ξ_{SH}) further improves the fit to 0.0029, slightly outperforming the specification with the cultural term. I also allow the elasticity of substitution between male and female labor, σ, to vary by sector (σ_A, σ_M, σ_{SM}, σ_{SH}) in order to further improve the fit. However, the gains from this joint estimation are limited: the squared error declines only from 0.0077 under the single-parameter change to 0.0067 under sector-specific elasticities. Since introducing the single cultural parameter d already yields a reasonable fit relative to these joint estimations, I focus on the cultural interpretation in the subsequent analysis.

Finally, I allow the cultural coefficient d to vary over time to capture potential changes in social attitudes toward female market work. I estimate year-specific values d_t for $t = 1955, \ldots, 2010$ by minimizing, separately for each year, the sum of squared distances between the model's predictions and the data for both genders in the manufacturing and service sectors. The estimated values are reported in the bottom row of Table 5 and plotted in Figure 10. Allowing d to vary over time reduces the squared error modestly, from 0.0038 under the time-invariant specification to 0.0028. Given that the magnitude of improvement is limited, and that the time-invariant specification already captures the levels of hours well in Figure 10, the time-invariant cultural term captures the main features of historical trends in Turkish labor allocation.

Nevertheless, examining the time-varying estimates of d_t remains informative. The time-varying specification improves the fit for female agricultural hours in the early years and more closely captures the increasing trend in both male and female service hours. The estimated cultural coefficient d_t exhibits a downward trend over time, suggesting a gradual relaxation of patriarchal norms in Turkey. This finding offers an interesting contrast with Turkey's political history. Since the transition to multi-party elections in the 1950s, voters have frequently supported conservative, often religiously oriented center-right parties, while the Kemalist military has intervened when political developments were perceived to threaten the secular, unitary republic. As discussed in Çarkoğlu and Kalaycıoğlu (2009), this history might suggest a resurgence or accommodation of conservative identities, particularly in the post-Cold War period. In contrast, the simulated labor

market allocation patterns analyzed here indicate that, in terms of economic behavior, Turkish preference has gradually moved closer to the Western pattern.

6 Microeconometric estimation of the cultural factor

This section shows that the cultural factor identified by the macroeconomic model is supported by micro-level evidence. The key explanatory variables are direct measures of individual- and family-level cultural attitudes drawn from subjective survey questions. The macroeconomic model implies that patriarchal norms discourage women's willingness to engage in non-family occupations while encouraging their participation in family-based work. As a result, the presence of family jobs may reverse the effect of cultural factors on female employment. In the regression analysis, this mechanism is captured by interaction terms between cultural measures and indicators of family job availability. These hypotheses are examined using microdata from the European Social Survey (ESS) and the Demographic and Health Survey (DHS).

6.1 Microeconomic evidence from the ESS: Turkey and Greece

I utilize a sample of married women from the European Social Survey (ESS) for the years 2004 and 2008. The ESS is a nationally representative survey that has been conducted across European countries since 2001. It measures the attitudes, beliefs, and behavior patterns of diverse populations in more than thirty nations. Importantly, the ESS is a harmonized survey that covers both Turkey and Greece. Turkey is included in these waves, reflecting its customs union agreement with the European Union and its status as a prospective member state.

The following Probit model is evaluated:

$$\begin{aligned} Y_i^* = \beta_0 \ + \ \beta_1 \times RLG_i \ + \ \beta_2 \times GD_i \ + \ \beta_3 \times FJ_i \\ + \beta_4 \times RLG_i \times FJ_i + \beta_5 \times GD_i \times FJ_i + X_i'\beta_6 + \varepsilon_i. \end{aligned} \tag{9}$$

$$Y_i = \begin{cases} 1 & \text{if } Y_i^* > 0, \\ 0 & \text{if } Y_i^* \leq 0. \end{cases} \tag{10}$$

where Y_i^* is the latent propensity to work, Y_i is a binary indicator for employment status, RLG_i measures religiosity, GD_i captures family gender division norms, FJ_i indicates family job availability, and X_i is a vector of control variables. $Y_i = 1$ indicates employment status, covering both family

and non-family occupations.[18] Due to the lack of detailed job information, I cannot distinguish between market work and family work directly using this measure.[19]

The first key variable is the measure of religiosity, RLG_i, which is the subjective answer to the question "How religious would you say you are?", scaled from 0 to 10. This variable captures the woman's own individual beliefs rather than the family's preference. One interpretation is that it reflects cultural conservatism internalized as a woman's preference as part of her self-identity (Akerlof and Kranton, 2000). As White (2004) and Göksel (2013) discuss, women often internalize norms favoring home-based contributions, redefining economic work as *not work* to preserve this identity.

The second key variable is the measure of family gender division, GD_i. It is constructed as a composite index based on two household decision-making questions: "Who generally gets their way on occasional expensive household purchases?" and "Who generally gets their way on how to divide housework?" Specifically, GD_i takes a value of 1 if wife i reports that she "always" or "usually" gets her way on either question, and 2 if she reports doing so on both questions. Data for GD_i are available only for the 2004 wave. I interpret this variable as the gender division norm in the family, drawing on Kandiyoti (1988)'s concept of the patriarchal bargain. Under this framework, women in classic patriarchal settings accept exclusion from the public sphere in exchange for authority within the private sphere. Consequently, higher values of GD_i indicate that wives exercise greater control over household decisions, effectively exchanging this domestic authority for adherence to a patriarchal division of labor. Unlike the individual preference captured by RLG_i, the variable GD_i reflects the norms governing the family unit.

In addition, FJ_i denotes family job availability, taking a value of 1 if the main source of family income is self-employment or a family business, and 0 otherwise. This variable serves as a proxy for the opportunity to engage in unpaid family labor within the household's economic sphere. Assuming that the wife's earnings are secondary to the total family income, the husband's job type effectively determines the availability of family work for the wife. X_i includes other observable characteristics: household size, child status, urban status, region, and the educational attainment of both the husband and wife.

The interaction terms $\beta_4 \times RLG_i \times FJ_i$ and $\beta_5 \times GD_i \times FJ_i$ are the primary variables of interest,

[18] This corresponds to a "Yes" answer to the question: "Using this card, which of these descriptions applies to what you have been doing for the last 7 days?" The card includes the option: "In paid work (or away temporarily) (employee, self-employed, working for your family business)."

[19] The specification of the Probit model is $P(Y_i = 1|RLG_i, GD_i, FJ_i, X_i) = \Phi(Y_i^*)$, where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution.

Table 6: Labor market participation and individual/family values using the ESS

	Dependent variable:						
	Employment dummy						
Turkey	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religiosity	−0.028	−0.027	−0.045*				−0.146***
	(0.023)	(0.023)	(0.025)				(0.043)
Gender Division				−0.132	−0.133	−0.229*	−0.226*
				(0.114)	(0.114)	(0.130)	(0.133)
Family Job		−0.041	−0.952*		−0.090	−0.489*	−2.776***
		(0.128)	(0.516)		(0.177)	(0.296)	(0.835)
Religiosity × Family Job			0.119*				0.295***
			(0.065)				(0.096)
Gender Division × Family Job						0.484*	0.564**
						(0.275)	(0.283)
Observations	852	842	842	365	363	363	362
Greece							
Religiosity	−0.015	−0.016	−0.038				−0.041
	(0.031)	(0.031)	(0.037)				(0.038)
Gender Division				−0.001	−0.003	−0.005	−0.006
				(0.015)	(0.017)	(0.019)	(0.019)
Family Job		−0.034	−0.534		−0.023	−0.038	−0.583
		(0.137)	(0.487)		(0.156)	(0.182)	(0.532)
Religiosity × Family Job			0.069				0.073
			(0.065)				(0.068)
Gender Division × Family Job						0.007	0.013
						(0.045)	(0.046)
Observations	969	966	966	489	487	487	485

See Table C.3 and Table C.4 for the full results. *p<0.1; **p<0.05; ***p<0.01

as they capture the potential reversal in the relationship between culture and female employment. The presence of a family job fundamentally alters the nature of the labor supply decision. When $FJ_i = 0$, the woman's choice $Y_i \in \{0, 1\}$ represents the standard trade-off between being a homemaker and entering the formal labor market, a domain often stigmatized by conservative norms. However, when $FJ_i = 1$, the choice shifts to one between being a homemaker and engaging in family production. In this context, cultural norms that value family cohesion and patriarchal cooperation may actually encourage women to work, as their labor contributes directly to the family enterprise without violating social restrictions on female mobility or public visibility. Therefore, FJ_i effectively modifies the occupational choice set for women, shifting the relevant margin from market participation to family contribution.[20]

[20]Note that if a family job is available, the likelihood of outside market work is negligible. According to the Turkish Household Labor Force Survey, which explicitly identifies unpaid family workers, 87% of employed women whose husbands are self-employed engage in family jobs.

The results are summarized in Table 6. For Turkey, Regressions (1), (2), and (3) examine the role of individual religiosity (RLG_i). In specifications (1) and (2), the coefficient on religiosity is negative but statistically insignificant. This lack of significance likely arises because the regression conflates two opposing effects: the discouragement of market work and the encouragement of family work. Once the interaction term with family job availability is included in Regression (3), the results become sharp and significant. The negative coefficient on RLG_i (-0.045) indicates that, in the absence of family jobs (i.e., when $FJ_i = 0$), more religious women are significantly less likely to participate in the labor market. This aligns with the women's identity argument, where market work is viewed as incompatible with traditional values. However, the interaction term $RLG_i \times FJ_i$ is positive and large (0.119), dominating the negative main effect. This implies that when a family job is available, religious women are actually more likely to work than their secular counterparts. Thus, individual religiosity does not discourage work per se, but specifically discourages work outside the family sphere.

Regressions (4), (5), and (6) present a parallel analysis for the gender division of labor (GD_i), which proxies for the patriarchal bargain within the family. Similar to religiosity, the main effect of GD_i in Regression (6) is negative and significant (-0.229), suggesting that women with greater decision-making power in the private sphere are less likely to engage in market work. However, the interaction term $GD_i \times FJ_i$ is positive and significant (0.484). This indicates that the patriarchal family structure encourages women to contribute to the family business, consistent with the notion that women's labor is utilized for the family's economic benefit while being shielded from the public market.

Regression (7) includes both RLG_i and GD_i simultaneously. The results remain robust: both individual religiosity and family gender norms independently contribute to the observed employment patterns. The coefficients on the main effects remain negative, while the interaction terms with family job availability remain positive and significant. This suggests that the individual preference and the family norm are distinct but complementary mechanisms driving female employment in Turkey. They both act to suppress market employment while promoting unpaid family labor, thereby explaining the high female participation rates in agriculture (family jobs) and low participation in services (market jobs) consistent with the macroeconomic model's implications.

In stark contrast, the results for Greece (lower panel of Table 6) show no such patterns. This finding is consistent with the macroeconomic model's implication that the cultural coefficient d is

almost negligible in Greece.[21]

6.2 Microeconomic evidence from the DHS: migration in Turkey

I next investigate the sample of married women using pooled data from the Demographic and Health Surveys (DHS). The DHS are cross-country, nationally representative household surveys supported by the United States Agency for International Development (USAID) and implemented through The DHS Program (ICF). While the primary focus of the DHS is to monitor indicators related to population, health, and nutrition, the surveys also provide standardized and detailed microdata on women's empowerment and household characteristics. I use the samples of married women from the Turkey Demographic and Health Survey (TDHS) collected in 2008 and 2013.[22] Although the DHS does not cover Greece, it contains specific variables that capture the history of migration from rural to urban areas. These variables have direct implications for the macroeconomic model, as the structural shift from agriculture to the service sector is intrinsically tied to the migration of families from rural origins to urban centers.

The dependent variable representing female employment status, Y_i, is defined identically to equation (10).[23] The latent variable specification for the Probit model is modified as follows:

$$\begin{aligned} Y_i^* = \beta_0 \; + \; \beta_1 \times CON_i \; + \; \beta_2 \times FJ_i + \beta_3 \times CON_i \times FJ_i \\ + \beta_4 \times MI_i + \beta_5 \times CON_i \times MI_i + X_i'\beta_6 + \varepsilon_i. \end{aligned} \tag{11}$$

The cultural factor CON_i is an index of conservativeness ranging from 0 to 3, constructed based on the respondent's attitudes toward family life. The index increments by 1 for each of the following responses: disagreeing that "Men should also do housework like cooking, washing, ironing, and cleaning"; disagreeing that "Women should be more involved in politics"; and agreeing that "Women should be virgins when they get married." These three questions are consistent across the 2008 and 2013 survey waves. Migration status is captured by the dummy variable MI_i, which takes a value of 1 if the respondent resided in a subdistrict or village (rural) at age 12 but resided in a province or district center (urban) at the time of the survey. The remaining variables are

[21] In Appendix C, Table C.5 presents the results for single women as a robustness check. Because family job availability is undefined for single women, only Regression (1) is estimated. As in Table 6, the coefficient on religiosity is statistically insignificant in both countries.

[22] I omit the 2003 survey because the questions regarding cultural factors are inconsistent with subsequent waves.

[23] This corresponds to a "Yes" answer to the question: "Did [respondent's name] work in a regular or an irregular job whether paid or unpaid in the past week?"

Table 7: Labor market participation, conservativeness, and migration status using the DHS

	Dependent variable:					
	Employment Dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
Conservativeness (CON)	0.016	0.016	−0.014	−0.016	0.008	0.009
	(0.023)	(0.023)	(0.025)	(0.025)	(0.051)	(0.051)
Family Job (FJ)		0.330***	0.020	0.023	0.031	0.036
		(0.055)	(0.099)	(0.100)	(0.101)	(0.101)
CON × FJ			0.251***	0.255***	0.248***	0.246***
			(0.068)	(0.068)	(0.069)	(0.069)
Migration (MI)				0.185***	0.052	0.014
				(0.044)	(0.078)	(0.084)
CON × MI					0.112**	0.134**
					(0.054)	(0.059)
Husband's MI	NO	NO	NO	NO	NO	YES
Observations	8,717	8,715	8,715	8,707	8,707	8,703

See Table C.6 for the full results. *p<0.1; **p<0.05; ***p<0.01

constructed following the same definitions as in the ESS regression, except that X_i additionally controls for work experience and the wealth index.

The results are summarized in Table 7. Regressions (1), (2), and (3) broadly confirm the ESS findings reported in Table 6. Conservativeness by itself has no statistically significant effect on female employment. However, the interaction between conservativeness and family job availability is positive and highly significant in regression (3). This pattern indicates that conservative attitudes do not discourage female employment per se, but rather shape the type of work women engage in, discouraging non-family market work while encouraging participation in family-based activities. Regression (4) introduces the migration indicator. Because current urban residence is already controlled for in X_i, the positive coefficient on migration implies that, among urban married women, those who migrated from rural areas are more likely to be employed than urban natives. Although this effect may partly reflect economic necessity, it persists even after controlling for household wealth.

Regression (5) adds an interaction between conservativeness and migration status. The interaction term is positive and statistically significant, while the main effect of migration becomes insignificant. This result implies that conservativeness increases female employment only for a specific group: women from conservative households who migrated from rural to urban areas. This

finding is consistent with the historical role of patriarchal norms in organizing female labor within family-based production. As emphasized by Morvaridi (1992), in rural agriculture, patriarchal norms frame women's labor contributions as an obligation to the family. After migration to urban areas, these norms may persist even when agricultural family work disappears, as argued by Guner and Uysal (2014). In this context, conservativeness may continue to discourage participation in formal market jobs, while simultaneously encouraging women to contribute to family income through home-based or small-scale activities. This positive interaction aligns with ethnographic evidence from White (2004), who shows that kinship networks maintained from rural origins provide safe environments for small-scale production in urban areas.

Finally, regression (6) shows that these results are robust to controlling for the husband's migration status. The coefficients on conservativeness, family job availability, and their interactions remain largely unchanged, indicating that the identified mechanism operates primarily through women's own migration histories rather than spousal characteristics.

7 Conclusion

This paper studies why female employment in Turkey declined sharply during structural transformation, deviating from the U-shaped recovery observed in many developed economies. Using a calibrated general equilibrium model of sectoral labor allocation by gender, I identify a quantifiable wedge in preference that inhibits women's transition from agriculture into market services. The estimated magnitude of this cultural term is economically meaningful: one additional hour of female market work per week entails a disutility equivalent to approximately ten minutes of lost leisure or a 0.68% reduction in household consumption relative to a U.S. benchmark. Extending the analysis across countries shows that this friction is pronounced in Islamic-majority middle-income economies but small or negligible in secular or Christian-majority peers. Micro-level evidence further supports this interpretation, indicating that patriarchal norms discourage women's participation in non-family market work while encouraging labor within the family sphere, a pattern that persists even after rural-to-urban migration.

In my macroeconomic framework, culture is modeled parsimoniously as a household preference favoring family-based work over non-family market employment. While this reduced-form approach is effective for quantifying aggregate effects, it abstracts from the underlying sources of cultural constraints. Micro evidence suggests that these constraints may arise from women's own

internalized preferences, family-level gender division, or barriers operating on the demand side of the labor market, such as employer discrimination. Distinguishing among these mechanisms is essential for normative and policy analysis and would require a richer model incorporating multiple cultural channels. In addition, the analysis treats culture as time invariant. Developing a dynamic framework in which norms evolve endogenously, potentially through education, intergenerational transmission, migration, or media exposure, would offer a more complete account of long-run female labor market transitions.

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Appendix A Additional simulation results

Figure A.1: Simulation result of the female/male wage ratio in Turkey

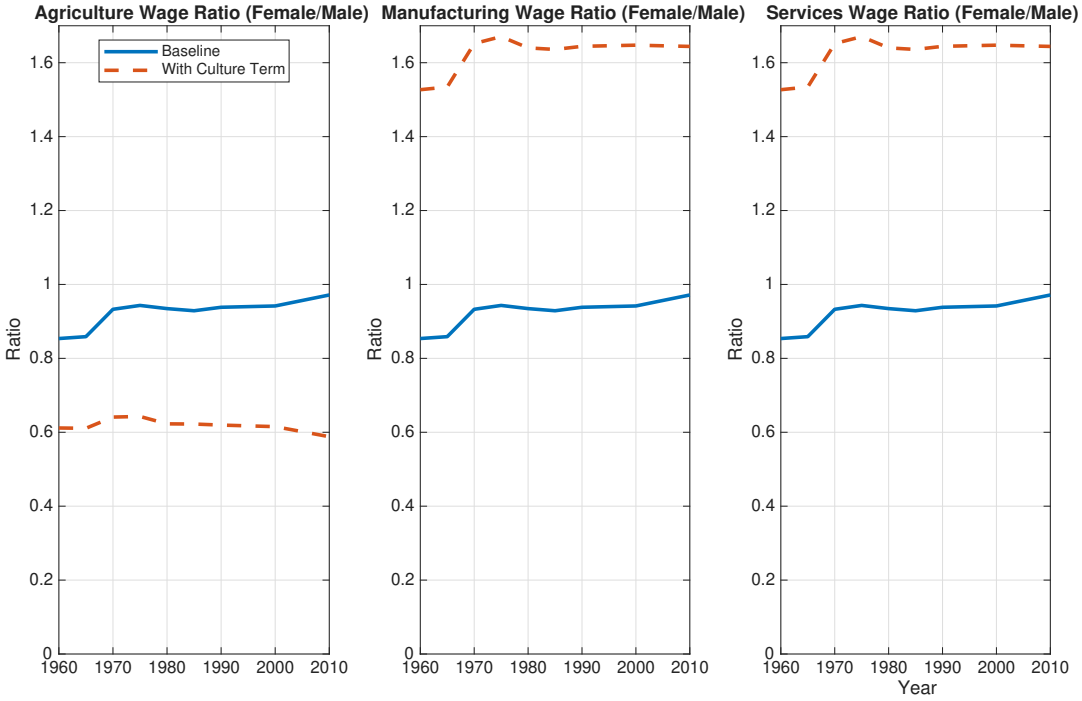


Figure A.2: Simulation result of Brazil

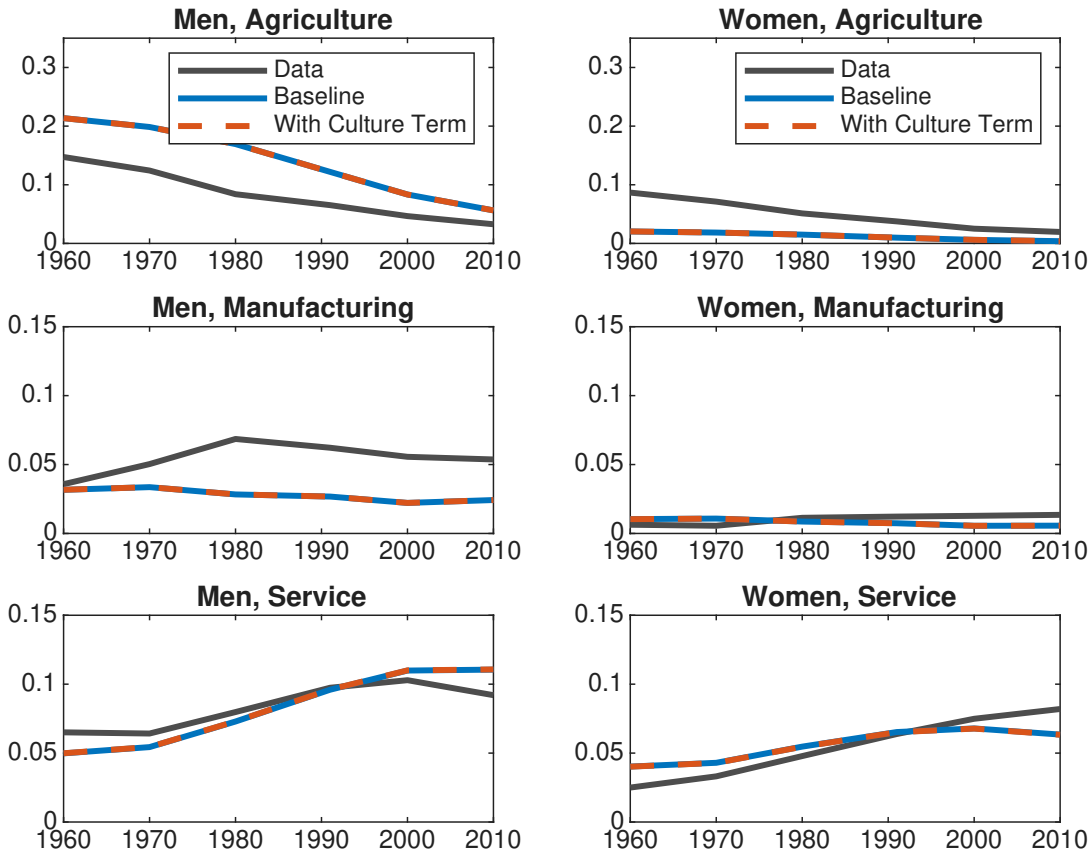


Figure A.3: Simulation result of Indonesia

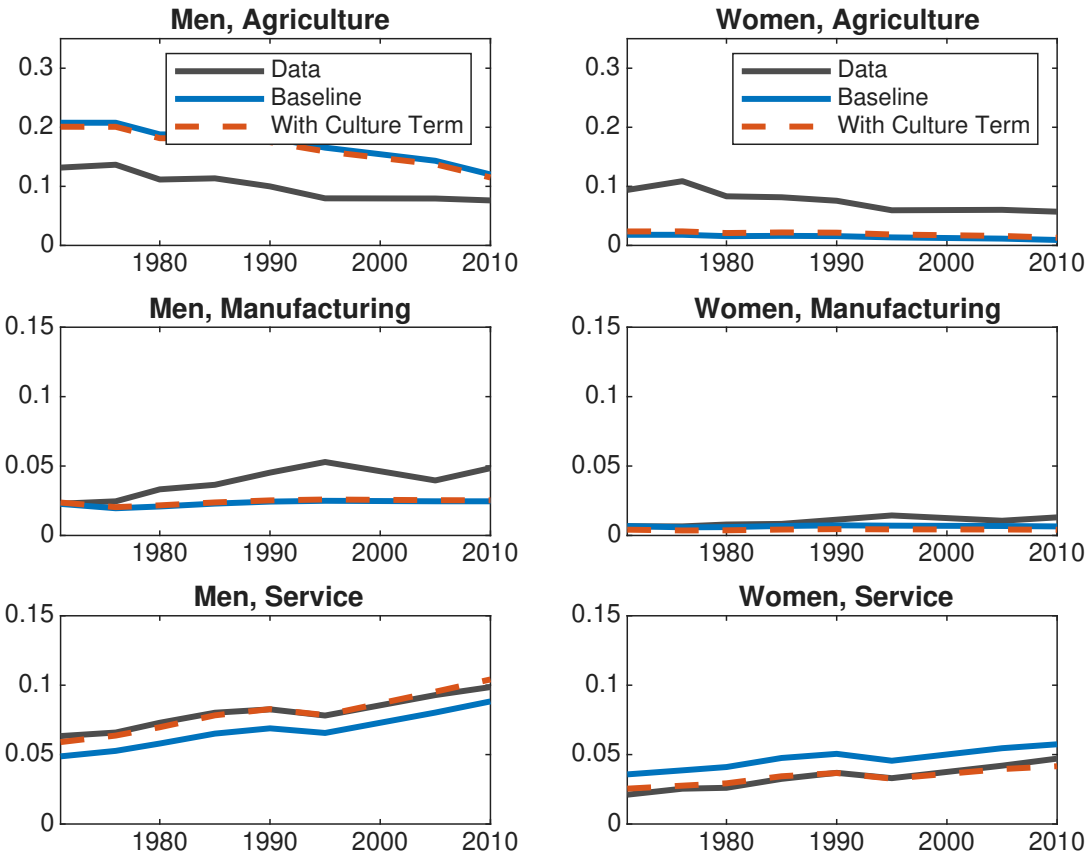


Figure A.4: Simulation result of Malaysia

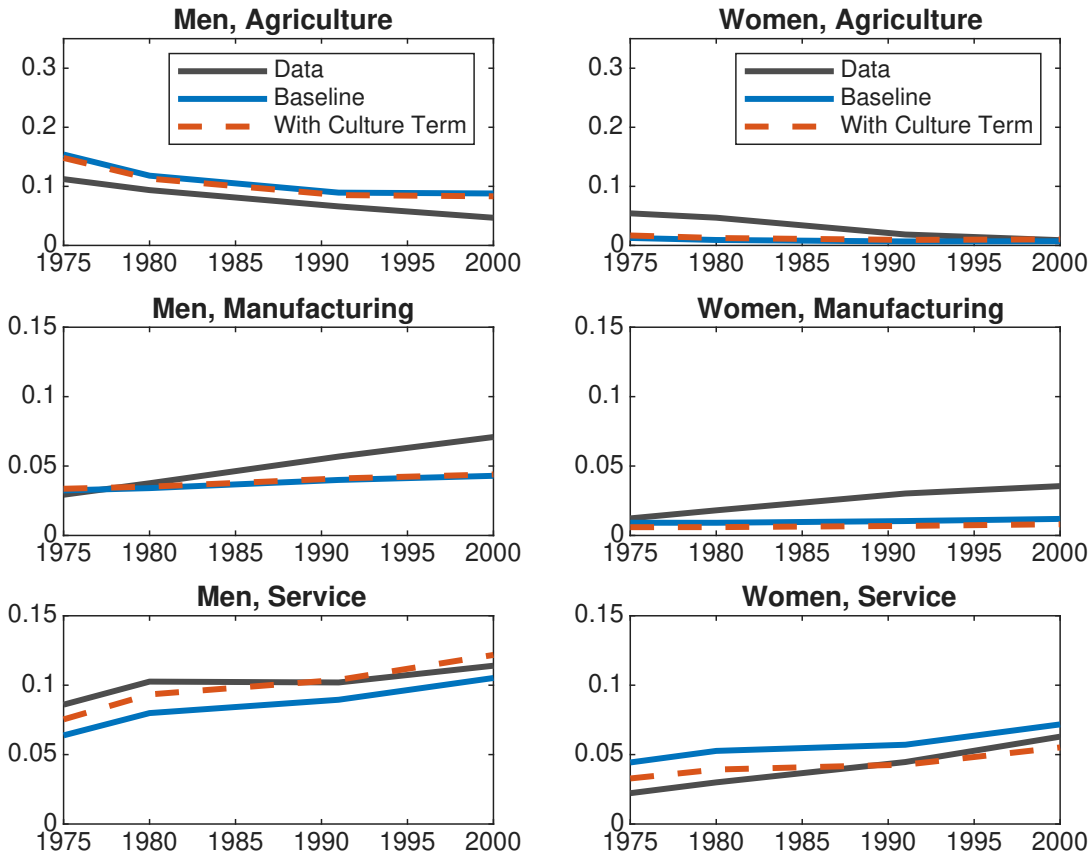


Figure A.5: Simulation result of Mexico

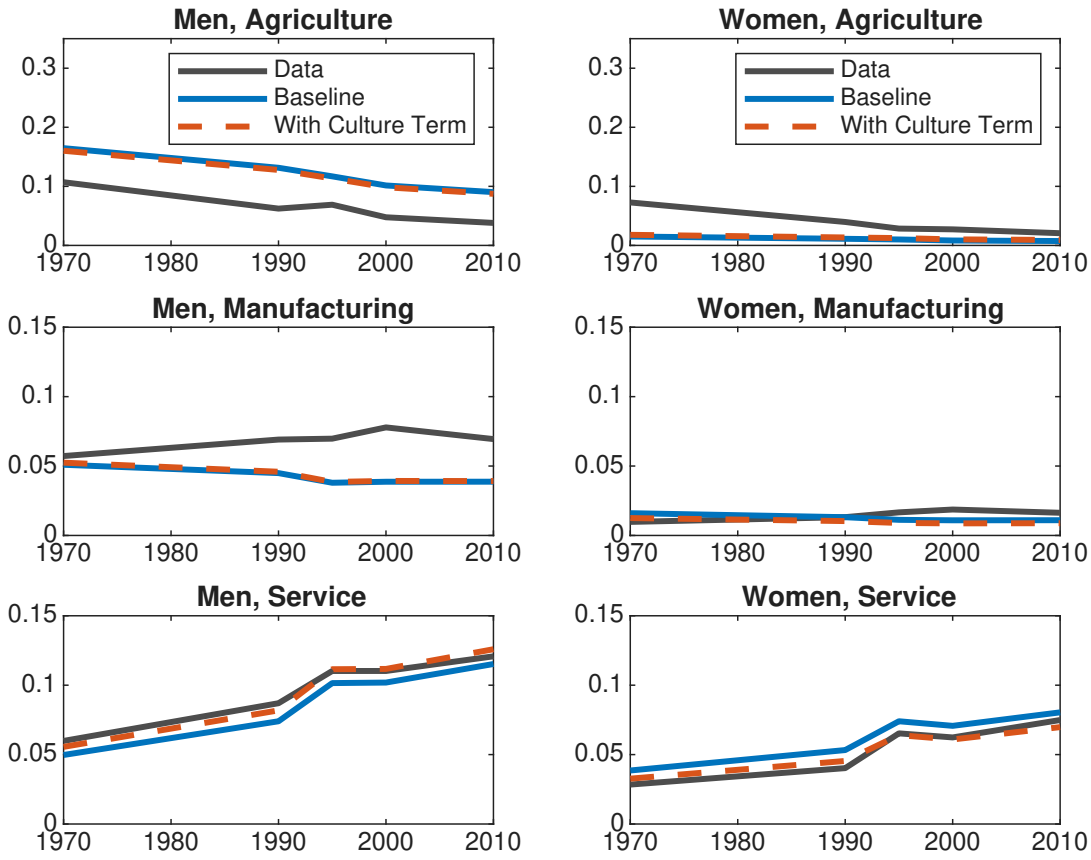


Figure A.6: Simulation result of Morocco

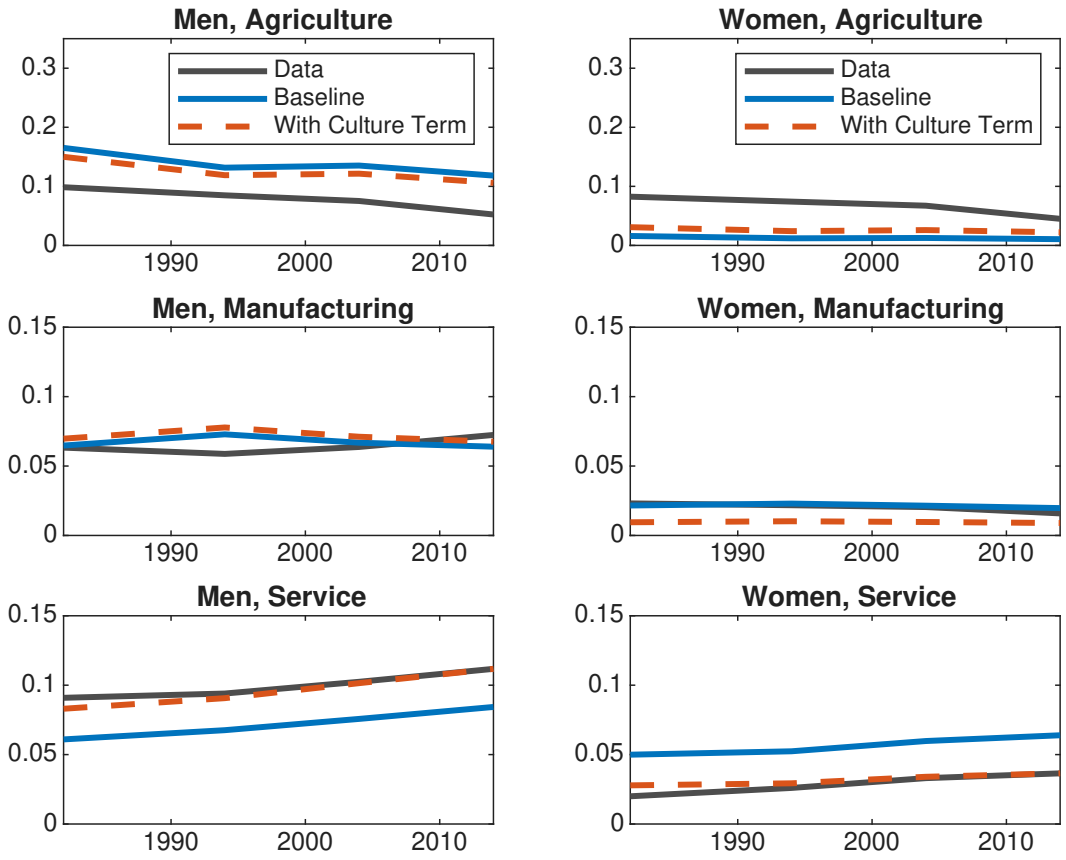
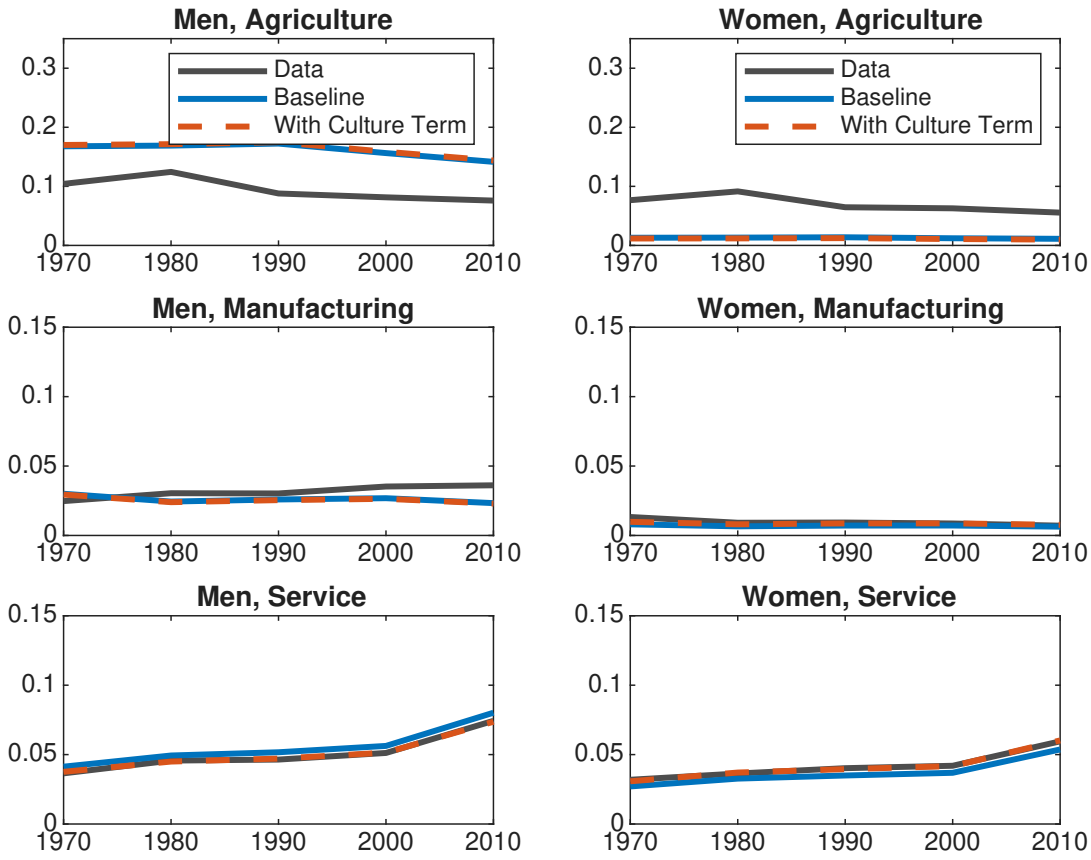


Figure A.7: Simulation result of Philippines



Appendix B Full regression results of Table 1

Table 1 The Turkish data come from the Turkish Household Labor Force Survey (LFS) covering the period 2008-2012. The U.S. data are drawn from the Integrated Public Use Microdata Series (IPUMS USA) on the same 2008-2012 period. In the regression, the year dummies are required for the Turkish sample but not for the U.S. data because IPUMS USA already eliminates the year effects. Both samples include service sector workers who are not students, have positive hours worked, and report positive income. The IPUMS data include ancestry and origin variables that allow us to identify individuals of Turkish origin.

Hourly income is computed by dividing real income by usual hours worked. For Turkey, we first convert nominal income to real income by adjusting for the Consumer Price Index (CPI). For the United States, income data from IPUMS are already expressed in real terms. I top-code hourly income at the 99th percentile in each sample.

The control variables include age, age squared, marital status, education levels (high school and college), urban residence, presence of a child aged 5 or younger, and part-time employment status.

Table B.1: Gender hourly wage gap among all workers

	Dependent variable:					
	Log hourly wage					
	(1)	(2)	(3)	(4)	(5)	(6)
Sample	TR	TR	US	US	TR in US	TR in US
Female	0.085^{***}	-0.078^{***}	-0.204^{***}	-0.160^{***}	-0.233^{***}	-0.151^{***}
	(0.003)	(0.002)	(0.001)	(0.001)	(0.036)	(0.032)
Age		0.089^{***}		0.075^{***}		0.056^{***}
		(0.001)		(0.0002)		(0.008)
Age squared		-0.001^{***}		-0.001^{***}		-0.0004^{***}
		(0.00001)		(0.00000)		(0.0001)
Married		0.119^{***}		0.143^{***}		0.107^{***}
		(0.003)		(0.001)		(0.036)
High school		0.392^{***}		0.359^{***}		0.443^{***}
		(0.002)		(0.001)		(0.067)
College		1.001^{***}		0.864^{***}		1.038^{***}
		(0.002)		(0.001)		(0.065)
Urban		0.069^{***}		-0.076^{***}		0.066^{*}
		(0.003)		(0.001)		(0.035)
Child age ≤ 5		-0.017^{***}		0.069^{***}		0.083^{*}
		(0.002)		(0.001)		(0.046)
Part-time		0.324^{***}		-0.558^{***}		-0.639^{***}
		(0.005)		(0.001)		(0.044)
Year, 2008	-0.092^{***}	-0.076^{***}				
	(0.004)	(0.003)				
Year, 2009	-0.052^{***}	-0.012^{***}				
	(0.004)	(0.003)				
Year, 2010	-0.049^{***}	-0.023^{***}				
	(0.004)	(0.003)				
Year, 2011	-0.041^{***}	-0.022^{***}				
	(0.004)	(0.003)				
Constant	2.981^{***}	0.593^{***}	6.707^{***}	4.460^{***}	6.860^{***}	4.587^{***}
	(0.003)	(0.011)	(0.001)	(0.004)	(0.023)	(0.178)
Observations	269,384	269,384	4,963,550	4,963,550	3,302	3,302
R^2	0.005	0.502	0.012	0.276	0.013	0.254
Adjusted R^2	0.005	0.502	0.012	0.276	0.012	0.252
Residual Std. Error	8.674	6.134	4.207	3.602	4.759	4.143

Note: *p<0.1; **p<0.05; ***p<0.01

Table B.2: Gender weekly earning gap among full-time workers

	Dependent variable:					
	log(realincome)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	−0.040***	−0.146***	−0.215***	−0.231***	−0.195***	−0.201***
	(0.003)	(0.002)	(0.001)	(0.001)	(0.037)	(0.033)
Age		0.079***		0.087***		0.062***
		(0.001)		(0.0002)		(0.010)
Age squared		−0.001***		−0.001***		−0.001***
		(0.00001)		(0.00000)		(0.0001)
Married		0.095***		0.147***		0.093**
		(0.003)		(0.001)		(0.037)
High school		0.301***		0.427***		0.276***
		(0.002)		(0.002)		(0.075)
College		0.761***		0.972***		0.923***
		(0.002)		(0.002)		(0.073)
Urban		0.101***		−0.080***		0.037
		(0.002)		(0.001)		(0.037)
Child age ≤ 5		−0.014***		0.052***		0.012
		(0.002)		(0.001)		(0.047)
Year, 2008	−0.075***	−0.065***				
	(0.004)	(0.003)				
Year, 2009	−0.038***	−0.007***				
	(0.004)	(0.003)				
Year, 2010	−0.036***	−0.016***				
	(0.004)	(0.003)				
Year, 2011	−0.029***	−0.015***				
	(0.004)	(0.003)				
Constant	6.970***	4.926***	10.657***	7.994***	10.792***	8.487***
	(0.003)	(0.010)	(0.001)	(0.004)	(0.022)	(0.206)
Observations	245,937	245,937	3,452,518	3,452,518	2,497	2,497
R^2	0.003	0.454	0.017	0.261	0.011	0.212
Adjusted R^2	0.003	0.454	0.017	0.261	0.011	0.209
Residual Std. Error	7.034	5.204	3.790	3.287	4.206	3.761

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix C Full regression results in Section 6

Table C.3: Labor market participation and individual/family culture in Turkey using the ESS

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
(Intercept)	76.841	74.779	76.199	−5.735***	−5.810***	−5.859***	−5.479***
	(50.103)	(50.566)	(50.805)	(1.581)	(1.601)	(1.638)	(1.661)
Religiosity	−0.028	−0.027	−0.045*				−0.146***
	(0.023)	(0.023)	(0.025)				(0.043)
Gender Division				−0.132	−0.133	−0.229*	−0.226*
				(0.114)	(0.114)	(0.130)	(0.133)
Family Job		−0.041	−0.952*		−0.090	−0.489*	−2.776***
		(0.128)	(0.516)		(0.177)	(0.296)	(0.835)
Religiosity × Family Job			0.119*				0.295***
			(0.065)				(0.096)
Gender Division × Family Job						0.484*	0.564**
						(0.275)	(0.283)
Kids less than 5	−0.142*	−0.143*	−0.144*	−0.036	−0.039	−0.039	−0.029
	(0.083)	(0.083)	(0.083)	(0.116)	(0.117)	(0.118)	(0.121)
Kids 5 to 12	0.051	0.045	0.042	0.071	0.060	0.050	0.024
	(0.075)	(0.076)	(0.076)	(0.109)	(0.112)	(0.113)	(0.118)
Age	0.187***	0.185***	0.184***	0.228***	0.232***	0.238***	0.279***
	(0.050)	(0.050)	(0.050)	(0.083)	(0.084)	(0.086)	(0.090)
Age Squared	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***	−0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban	0.014	0.008	−0.002	0.057	0.051	0.020	−0.089
	(0.111)	(0.112)	(0.112)	(0.162)	(0.162)	(0.164)	(0.171)
Household Size	0.056	0.058	0.052	0.077	0.081	0.087	0.092
	(0.041)	(0.041)	(0.041)	(0.056)	(0.057)	(0.058)	(0.060)
Lower Secondary Completed	0.269	0.265	0.257	0.493**	0.487*	0.449*	0.382
	(0.169)	(0.169)	(0.170)	(0.251)	(0.251)	(0.254)	(0.266)
Upper Secondary Completed	0.846***	0.843***	0.837***	0.963***	0.957***	0.991***	0.853***
	(0.154)	(0.154)	(0.154)	(0.240)	(0.240)	(0.242)	(0.250)
Post Secondary Completed	2.743***	2.732***	2.716***	2.936***	2.935***	2.921***	2.768***
	(0.239)	(0.239)	(0.240)	(0.363)	(0.364)	(0.366)	(0.371)
Lower Secondary Completed Husband	−0.020	−0.032	−0.028	−0.780***	−0.792***	−0.837***	−0.970***
	(0.142)	(0.143)	(0.144)	(0.295)	(0.296)	(0.300)	(0.325)
Upper Secondary Completed Husband	−0.448***	−0.450***	−0.440***	−0.554**	−0.569***	−0.565**	−0.493**
	(0.149)	(0.150)	(0.150)	(0.217)	(0.219)	(0.222)	(0.226)
Post Secondary Completed Husband	−0.625***	−0.625***	−0.631***	−0.799***	−0.808***	−0.850***	−0.794**
	(0.208)	(0.209)	(0.210)	(0.307)	(0.309)	(0.313)	(0.318)
year	−0.041	−0.040	−0.040				
	(0.025)	(0.025)	(0.025)				
Pseudo R^2	0.276	0.275	0.278	0.314	0.314	0.319	0.331
AIC	890.219	890.154	887.724	506.499	507.540	506.455	493.299
BIC	1013.656	1018.020	1020.326	603.996	608.794	611.604	606.157
Log Likelihood	−419.109	−418.077	−415.862	−228.249	−227.770	−226.228	−217.650
Deviance	873.325	871.350	867.985	420.430	419.562	416.652	400.802
Num. obs.	852	842	842	365	363	363	362

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table C.4: Labor market participation and individual/family culture in Greece using the ESS

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
(Intercept)	−179.814***	−179.387***	−179.865***	−2.725*	−2.669*	−2.608*	−2.738*
	(63.291)	(63.481)	(63.515)	(1.428)	(1.426)	(1.427)	(1.527)
Religiosity	−0.015	−0.016	−0.038				0.027
	(0.031)	(0.031)	(0.037)				(0.065)
Gender Division				−0.090	−0.092	−0.194	−0.191
				(0.165)	(0.165)	(0.199)	(0.199)
Family Job		−0.033	−0.534		0.000	−0.247	−0.186
		(0.136)	(0.487)		(0.202)	(0.329)	(0.858)
Religiosity × Family Job			0.069				−0.008
			(0.065)				(0.107)
Gender Division × Family Job						0.327	0.340
						(0.346)	(0.350)
Kids less than 5	−0.138	−0.134	−0.133	−0.118	−0.112	−0.121	−0.130
	(0.120)	(0.120)	(0.120)	(0.185)	(0.185)	(0.186)	(0.187)
Kids 5 to 12	−0.154	−0.152	−0.158	−0.196	−0.192	−0.195	−0.200
	(0.111)	(0.111)	(0.112)	(0.186)	(0.187)	(0.187)	(0.187)
Age	0.123**	0.122**	0.124**	0.153**	0.151**	0.152**	0.149**
	(0.049)	(0.049)	(0.049)	(0.069)	(0.069)	(0.069)	(0.069)
Age Squared	−0.002***	−0.002***	−0.002***	−0.002**	−0.002**	−0.002**	−0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban	−0.114	−0.122	−0.118	−0.132	−0.132	−0.144	−0.136
	(0.152)	(0.154)	(0.154)	(0.232)	(0.234)	(0.235)	(0.236)
Household Size	−0.036	−0.038	−0.035	−0.064	−0.069	−0.069	−0.071
	(0.062)	(0.062)	(0.062)	(0.087)	(0.088)	(0.088)	(0.088)
Lower Secondary Completed	−0.062	−0.074	−0.059	−0.114	−0.126	−0.122	−0.120
	(0.212)	(0.212)	(0.213)	(0.319)	(0.319)	(0.320)	(0.323)
Upper Secondary Completed	−0.028	−0.042	−0.025	−0.049	−0.064	−0.062	−0.056
	(0.206)	(0.207)	(0.208)	(0.289)	(0.290)	(0.291)	(0.293)
Post Secondary Completed	0.490*	0.475*	0.489*	0.262	0.219	0.228	0.248
	(0.255)	(0.255)	(0.256)	(0.376)	(0.381)	(0.381)	(0.383)
Lower Secondary Completed Husband	−0.003	−0.004	−0.008	−0.155	−0.140	−0.159	−0.156
	(0.199)	(0.200)	(0.200)	(0.288)	(0.290)	(0.290)	(0.294)
Upper Secondary Completed Husband	0.038	0.024	0.025	−0.076	−0.081	−0.099	−0.101
	(0.193)	(0.195)	(0.195)	(0.287)	(0.292)	(0.292)	(0.294)
Post Secondary Completed Husband	0.181	0.171	0.154	0.137	0.160	0.149	0.151
	(0.236)	(0.238)	(0.239)	(0.361)	(0.366)	(0.367)	(0.369)
year	0.089***	0.088***	0.089***				
	(0.032)	(0.032)	(0.032)				
Pseudo R^2	0.089	0.090	0.091	0.083	0.082	0.085	0.084
AIC	502.104	500.609	500.457	178.133	179.036	180.837	184.183
BIC	614.258	617.565	622.286	270.365	275.366	281.356	292.971
Log Likelihood	−228.052	−226.305	−225.229	−67.067	−66.518	−66.419	−66.091
Deviance	608.276	606.123	604.987	269.721	268.736	267.855	267.273
Num. obs.	969	966	966	489	487	487	485

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table C.5: Labor market participation and individual culture of singles using the ESS

	Turkey	Greece
(Intercept)	113.665**	−285.250***
	(45.182)	(93.364)
Religiosity	−0.033	0.010
	(0.021)	(0.042)
Kids less than 5	−0.323**	0.255
	(0.130)	(0.354)
Kids 5 to 12	−0.174*	−0.233
	(0.093)	(0.306)
Age	0.251***	0.304***
	(0.028)	(0.044)
Age Squared	−0.003***	−0.004***
	(0.000)	(0.001)
Urban	−0.011	0.210
	(0.106)	(0.234)
Household Size	0.063**	0.012
	(0.027)	(0.076)
Lower Secondary Completed	0.505***	0.312
	(0.148)	(0.413)
Upper Secondary Completed	0.781***	0.907**
	(0.132)	(0.382)
Post Secondary Completed	1.142***	1.077***
	(0.171)	(0.392)
year	−0.060***	0.139***
	(0.023)	(0.046)
Pseudo R^2	0.310	0.421
AIC	1188.480	207.734
BIC	1295.168	306.108
Log Likelihood	−571.240	−83.867
Deviance	1116.442	269.258
Num. obs.	764	1011

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table C.6: Labor market participation, conservativeness, and migration status using the DHS

	Dependent variable:					
	wrk					
	(1)	(2)	(3)	(4)	(5)	(6)
CON	0.016	0.016	−0.014	−0.016	0.008	0.009
	(0.023)	(0.023)	(0.025)	(0.025)	(0.051)	(0.051)
FJ		0.330***	0.020	0.023	0.031	0.036
		(0.055)	(0.099)	(0.100)	(0.101)	(0.101)
CON × FJ			0.251***	0.255***	0.248***	0.246***
			(0.068)	(0.068)	(0.069)	(0.069)
MI				0.185***	0.052	0.014
				(0.044)	(0.078)	(0.084)
CON × MI					0.112**	0.134**
					(0.054)	(0.059)
MI (husband)						0.095
						(0.081)
CON × MI (husband)						−0.052
						(0.058)
City Dummy	−0.657***	−0.605***	−0.600***	−0.689***	−0.610***	−0.630***
	(0.051)	(0.051)	(0.051)	(0.056)	(0.092)	(0.094)
CON × City Dummy					−0.067	−0.058
					(0.058)	(0.059)
Wealth	−0.060***	−0.060***	−0.059***	−0.048***	−0.048***	−0.047**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Work History Dummy	3.100***	3.108***	3.122***	3.116***	3.117***	3.116***
	(0.146)	(0.146)	(0.147)	(0.146)	(0.146)	(0.146)
Child age ≤ 5	−0.615***	−0.622***	−0.624***	−0.610***	−0.618***	−0.616***
	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)
Child age $5-12$	−0.215***	−0.213***	−0.216***	−0.203***	−0.207***	−0.206***
	(0.058)	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)
Age	0.169***	0.172***	0.173***	0.172***	0.172***	0.173***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Age squared	−0.002***	−0.002***	−0.002***	−0.002***	−0.002***	−0.002***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Age (husband)	0.023	0.022	0.020	0.020	0.019	0.019
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Age squared (husband)	−0.0003	−0.0003	−0.0003	−0.0003	−0.0003	−0.0003
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Family size	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Middle school	0.026	0.038	0.034	0.033	0.031	0.031
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)
High school	−0.041	−0.053	−0.054	−0.022	−0.024	−0.022
	(0.052)	(0.052)	(0.052)	(0.053)	(0.053)	(0.053)
College	0.596***	0.589***	0.578***	0.619***	0.609***	0.609***
	(0.070)	(0.070)	(0.070)	(0.071)	(0.071)	(0.071)
Secondary school (husband)	−0.029	−0.025	−0.020	−0.014	−0.013	−0.013
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)
High school (husband)	−0.085*	−0.072	−0.073	−0.069	−0.068	−0.066
	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
College (husband)	0.136**	0.167***	0.166**	0.173***	0.169***	0.173***
	(0.064)	(0.064)	(0.064)	(0.065)	(0.065)	(0.065)
Constant	−5.368***	−5.476***	−5.435***	−5.424***	−5.446***	−5.458***
	(0.473)	(0.476)	(0.476)	(0.476)	(0.481)	(0.481)
Pseudo R-squared	0.377	0.38	0.381	0.383	0.383	0.383
Observations	8,717	8,715	8,715	8,707	8,707	8,703
Log Likelihood	−3,528.009	−3,508.569	−3,501.820	−3,489.777	−3,486.553	−3,485.065
Akaike Inf. Crit.	7,092.018	7,055.138	7,043.639	7,021.555	7,019.106	7,020.130

Note: *p<0.1; **p<0.05; ***p<0.01