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Article — Published Version

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Economica

Suggested Citation: Coskun, Sena; Sengul, Gonul (2026) : Unpacking the link between service sector and female employment: cross-country evidence, *Economica*, ISSN 1468-0335, Vol. 93, Iss. 371, pp. 913-929,
<https://doi.org/10.1111/ecca.70042>

This Version is available at:

<https://hdl.handle.net/10419/342731>

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Unpacking the link between service sector and female employment: cross-country evidence

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Abstract

This paper documents significant cross-country variation in the strength of the service sector pulling women into the market work. We find the composition of the service sector to be the crucial driver of this heterogeneity. Specifically, a larger public administration sector is associated with lower elasticity, while a higher female share within business services has a positive association. The relationship between female share within business services and elasticity also depends on the size of the food and accommodation services, reflecting a marketization channel. Service sector composition alone explains 54% of the cross-country variation, rising to 60% when controlling for labour market policies. These findings show that the sub-sectoral structure of the service sector is the critical determinant of its ability to pull women into market work.

KEYWORDS

female employment, structural transformation, service sector, cross-country variation, service sector elasticity

JEL CLASSIFICATION

J16; J21; J24

1 | INTRODUCTION

The rise in female employment is one of the most significant developments in advanced economies during the second half of the 20th century. This shift has contributed substantially to economic growth through a more efficient allocation of talent (Hsieh *et al.* 2019). A primary driver of rising female employment is structural transformation—the expansion of the service sector as economies develop. The conventional view links the shift in female employment to structural transformation (Ngai and Petrongolo 2017), arguing that women have a comparative advantage in service-oriented jobs, which are often less brawn-intensive and value different skill sets than industry (Rendall 2017).¹ This conventional link, based on gender traits, overlooks the hetero-

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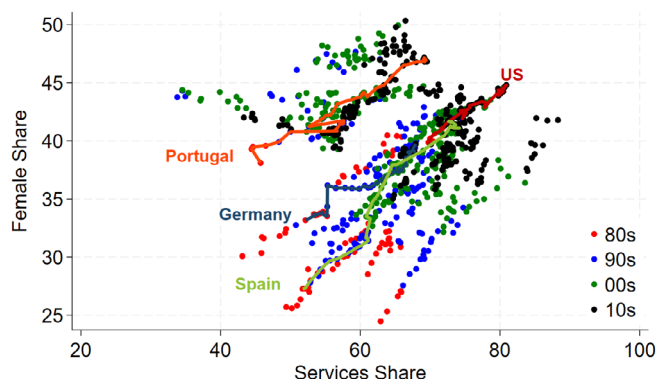


FIGURE 1 Female and service shares of total hours. *Notes:* Authors' calculation using an unbalanced panel from the EU-LFS for the European countries, and the CPS for the USA. Sample is from 1983 to 2019. Female share is computed as the share of female aggregate hours in total aggregate hours worked, and services share is the aggregate hours worked in service sector as a share of total aggregate hours. Values are in percentages.

geneity that we document below. When comparing countries with similar service sector sizes, such as Portugal and Spain (see Figure 1), we observe not only substantially different female employment shares for similar service shares, but also diverse time paths for female employment and service sector share.² Hence the association between service sector growth and change in female employment is not uniform across countries, which is what we explore in this paper.

This paper establishes the cross-country variations in services elasticity of female employment (the percentage change in female share of total hours in response to a 1% change in service sector share of total hours), using the harmonized European Union Labour Force Survey (EU-LFS) for European countries, and the Current Population Survey (CPS) for the USA. We first verify the link between structural transformation and female employment through a shift-share analysis, following Olivetti and Petrongolo (2016). We then estimate the service sector elasticities of female employment, and demonstrate the significant and substantial heterogeneity in these elasticities. For instance, the services elasticity of female employment is 0.60 for the USA, while it is around 0.4 for Spain.

We argue that the key to understanding the heterogeneity in the elasticity lies in ‘unpacking’ the service sector, moving beyond aggregate analysis. As such, we analyse whether the elasticity depends on sub-sector shares of services, and female shares within these sub-sectors (composition of services). Our analysis reveals a complex set of interactions between the service sector's composition and the elasticity. We find that service sector growth is more effective in drawing women into the workforce in countries with a smaller public sector size and a higher female share within business services. A larger public sector may push fewer women to the market sector as it provides secure jobs with shorter hours, while a larger female share in business services implies that an expansion in services will pull more women to the market. Furthermore, since the increase in female employment generates additional expansion in services through marketization, the effect of female share in business services on elasticity is greatly influenced by the size of food and accommodation services. Countries with high female intensity in business services and low concentration of food services experience larger elasticities (larger potential for growth in the food sector through marketization). The amplification of elasticity is less in countries with a larger food and accommodation sector (lower potential for growth).

Our main contribution is to show that there is a significant cross-country variation in services elasticity of female employment, and that variation is greatly explained by the composition of the service sector (the level of sub-sector shares of services and female shares within these sub-sectors). We find that the composition of services can explain 54% of the

cross-country heterogeneity in this elasticity. To analyse whether sector composition is the fundamental driver, we also investigate other factors known to affect female employment, such as attitudes towards gender norms, taxes, childcare expenditures and employment protection. We find that employment protection and gender gap in college-educated fraction of employment have an effect on the elasticity. These policy-related variables themselves can explain 34% of the variation. Moreover, controlling for these factors as well as the services composition increases the total explanatory power to 60%, leaving sector composition as the most important determinant.

This paper is related to the extensive literature linking the rise in female market work to structural transformation and the expansion of the service sector. The foundational view in this literature is that reallocation of labour to the service sector provides a ‘pull factor’, benefiting women due to their comparative advantage in these jobs (as modelled in Rendall 2017). Ngai and Petrongolo (2017) use a structural transformation model with male and female labour to show that uneven sectoral productivity growth for the USA, and the female labour’s comparative advantage over male labour in services, can explain a significant share of the increase in female employment over time.³ Moreover, Kuhn *et al.* (2024) argue that the link might also be from the increase in female employment towards the structural transformation. As we document the heterogeneity across countries in services elasticity of female employment, we argue that the link between the service sector and female employment is more complex than gender traits.

We also relate to the literature that documents the cross-country evidence in female employment and structural transformation. Olivetti and Petrongolo (2016) document that the change of female share of aggregate hours is driven by between-sector factors (structural transformation) as well as within-sector factors (female shares within sectors). We extend the set of countries and confirm the relevance of structural transformation. Olivetti and Petrongolo (2014) investigate the skill dimension of gender gaps to understand the factors behind gender gaps across countries, and find differences in service share as an important factor. We provide further insights in finding that not only the industry composition of employment, but also the composition within the service sector is important in order to understand the link between structural transformation and female employment.

The role of marketization in the rise of female employment, as well as the cross-country variation in gender gaps, has been documented in the literature. Ngai and Pissarides (2008) show that substitution between home and market production can explain the hours worked over a long period of time. Duval-Hernández *et al.* (2023) argue that cross-country differences in hours worked across OECD countries stem from the differences in female hours worked and the size of the market services that are close substitutes to home production. Rendall (2018) shows that tax regimes can incentivize female labour market entry, leading to increased demand for market services and further service sector expansion (see also Gottlieb *et al.* 2024; Rogerson 2008). Cortés and Tessada (2011) and Cortés and Pan (2019) show that low-skill immigrant workers (through affecting the home-substitute sectors) increase average hours and relative earnings of women. We find that the composition is especially relevant in its capacity to immediately draw females to market (gender mix in services) as well as the additional capacity generated through marketization.

2 | SERVICE SECTOR AND FEMALE MARKET WORK

We begin the section with a shift-share decomposition to show the contribution of structural transformation to the female share of total hours. Then we analyse the variation across countries in the service sector elasticity of female hours, using CPS data for the USA, and the EU-LFS for other countries.⁴ Our data cover nearly all European countries from 2000 onwards. Consequently,

our sample not only encompasses developed countries for which the female labour force is well studied, but also includes countries with diverse structural transformation experiences, such as those in Eastern and Northern Europe. Furthermore, we conduct our analysis on three major industry groups: agriculture, industry and services.⁵

2.1 | Shift-share decomposition

We apply a shift-share decomposition to the the female share of total hours to quantify the contributions from factors that allocate labour across sectors (between-sector factors) and factors that change the female labour shares within sectors (within-sector factors). Details of how shift-share analysis is conducted are explained in Online Appendix Subsection A.2. Our shift-share decomposition confirms that on average, the between-sector factors contribution is the most significant driver of the overall change in female share of total hours. Countries in our sample had an average of 2.3 percentage points increase in the female share of total hours from 2000 to 2019.⁶ Of this rise, 1.9 percentage points were due to the reallocation of hours between sectors, while 0.4 percentage points were due to within-sector changes in female shares of total hours. Hence structural transformation (the between-sector factor) explains 80% of the increase in female share of total employment.⁷

While the sample averages confirm that structural transformation is a key driver of increase in female share of labour over time for a country, cross-country variation in these contributions reveals an interesting fact. Figures 2(a) and 2(b) show that there is a stronger positive correlation between the size of the within-sector factors and the change in female share of hours within a country over time. Moreover, we find that within-sector contributions are stronger in continental European countries but smaller (or even negative) in Eastern and Northern European countries.⁸ Between-sector changes contributed positively to the increase in the female share across all countries in our sample (Figure 2(b)). A larger contribution from between-sector factors to the rise of female labour share in our data, compared to what Olivetti and Petrongolo (2016) find, is precisely because within-sector contributions in these countries are negative. This observation aligns with Alon *et al.* (2025), who report higher sectoral segregation in countries with high female participation, driven by the within-sector component. Overall, our data confirm the positive association between structural transformation (the reallocation of labour from other sectors to services) and the rise in the female share of hours. They also show that within-sector factors contributed more to the cross-country variation in the change in female employment than they experienced.

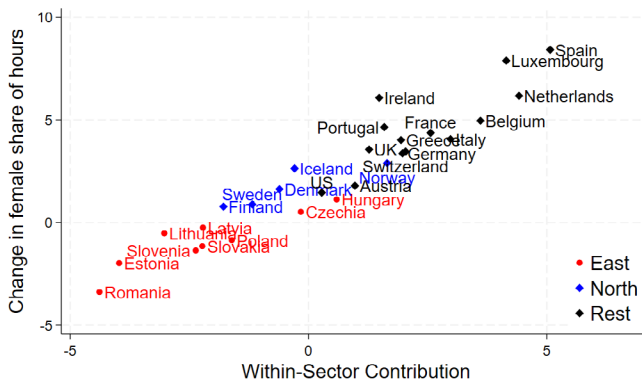
2.2 | Service sector elasticity of female market work

While the shift-share analysis above confirms that on average, the rise of services (between-sector reallocation) significantly contributed to the increase in the female share of total hours, we also observe substantial cross-country variation in the rise of the female share of total hours as well as the contribution of the expansion of services to that rise. Therefore we turn to the strength of that contribution across countries. To do so, we estimate the service sector elasticity of female share of hours using the regression

$$\Delta \ln(f_{it}) = \alpha + \beta_1 \Delta \ln(s_{it}) + \gamma_i I_i + \beta_{2i} I_i * \Delta \ln(s_{it}) + \delta_{1t} I_t + u_{it}, \quad (1)$$

where i represents the country, t represents time, I_i is the country dummy variable, I_t is the year dummy variable, and $\Delta \ln(f_{it})$ and $\Delta \ln(s_{it})$ are the growth rates of female share of hours and the service share of hours, respectively. Here, β_1 represents the percentage change in the female share

(a) Within-sector contribution



(b) Between-sector contribution

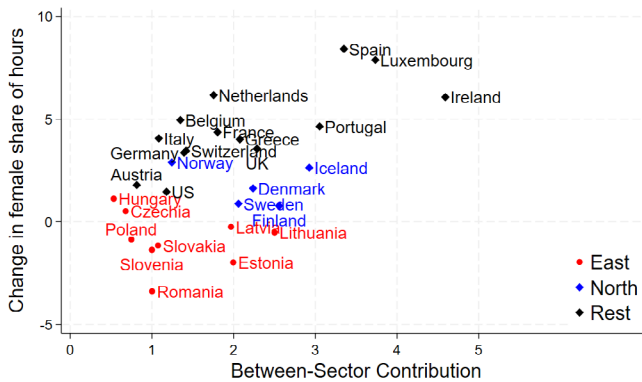


FIGURE 2 Between- and within-sector changes and female share. *Notes:* Data sources are the EU-LFS, and the IPUMS-CPS for the USA, covering 28 countries for years 1983–2019, and it is an unbalanced panel. See Online Appendix Subsection A.1 for more details.

associated with a 1% change in the service share for the reference country (the USA). We expect that $\beta_1 > 0$. Also, β_{2i} captures the additional change in the female share for country i compared to the USA.

The service sector elasticity of the female share of hours $E_{base,i}$ implied by this baseline model for any country i is given by $E_{base,i} = \beta_1 + \beta_{2i}$. We aim to explore the extent to which β_{2i} varies across countries. As the link between the rise of services and the increase in female employment is often attributed to women's comparative advantage in the service sector due to gender traits, a cross-country variation in elasticity suggests that factors beyond gender traits amplify or mitigate the effect of service sector expansion on the female share of hours. We should note that we do not interpret this association as a causal relationship. Instead, we use it to highlight cross-country variation in the relationship between these two variables.⁹

The estimation results are displayed in Table 1, and specification (3) is our baseline estimation. We find $\beta_1 = 0.6$, meaning that a 1% increase in the service share of hours raises the female share by 0.6% for the USA. We also run regressions with different specifications. Without year fixed effects, we find a lower elasticity, but our main finding of cross-country variation in elasticity remains.

TABLE 1 Elasticity estimation results.

	Elasticity				
	(1)	(2)	(3)	(4)	(5)
ΔSS	0.339*** (0.003)	0.242*** (0.002)	0.596** (0.017)	0.486*** (0.002)	0.569*** (0.000)
F within S growth				0.619*** (0.000)	0.729*** (0.000)
F within I growth					0.100*** (0.000)
Year fixed effects	No	Yes	Yes	Yes	Yes
Interaction terms	No	No	Yes	Yes	Yes
N	532	532	532	532	532
Within R^2	0.179	0.255	0.338	0.729	0.870

Notes: Data are from the CPS for the USA, and from the EU-LFS for other countries, and the sample is from 2000 to 2019. The dependent variable is the growth rate of female share in total hours. Here, ΔSS is the growth rate of the service sector's share in total hours. 'F within S' refers to the growth rate of female share within services hours, while 'F within I' refers to female share within industry. Standard deviations are reported in parentheses.

*, **, *** denote significance at the 10%, 5%, 1% level, respectively.

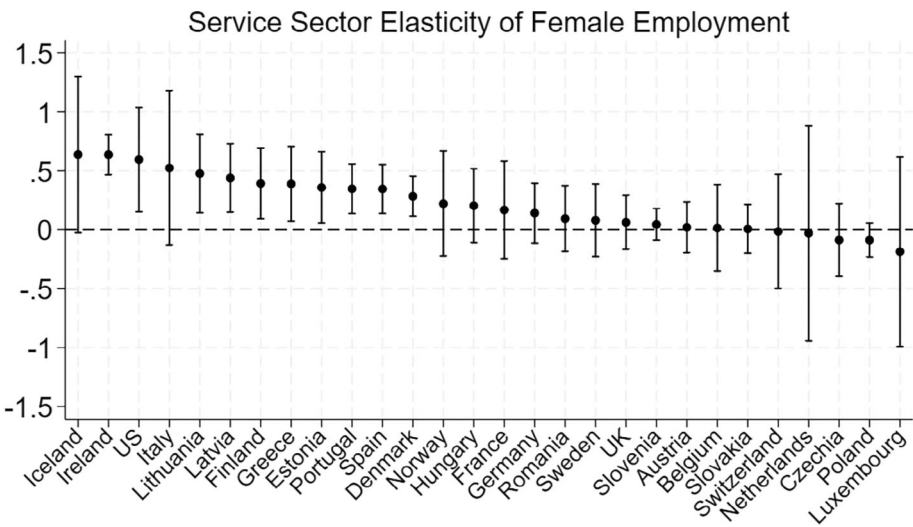


FIGURE 3 Estimation results—country elasticities. *Notes:* Data are from the CPS for the USA, and from the EU-LFS for other countries. Sample is from 2000 to 2019. Dots are estimates of the service share elasticity of the female share of employment. Baseline country is the USA; values for all other countries are the baseline coefficient added to the interaction term. Bars are 95% confidence intervals.

We find the average elasticity in the baseline estimation (equation (1)) as 0.22, while the standard deviation is 0.24. We report the elasticity estimates for each country $E_{base,i}$ ($= \beta_1 + \beta_{2i}$) for the baseline model together with their confidence intervals in Figure 3 (using estimation results for specification (3) in Table 1). This figure highlights the cross-country variation in the services elasticity of the female share. For instance, we estimate the elasticity for France to be 0.17, which is less than one-third of the US elasticity. For Ireland, a 1% increase in services share is associated with a 0.64% increase in female share.

3 | EXPLORING CROSS-COUNTRY VARIATION IN SERVICES ELASTICITY OF FEMALE EMPLOYMENT

In this section, we explore the relationship between services elasticity of female hours and various factors to understand the variation in country elasticities. As the shift-share decomposition documented a large difference across countries in the contribution of within-sector versus between-sector factors to the overall rise of female employment, we begin with examining whether the composition of the service sector contributes to cross-country variation in elasticity. We consider the shares of sub-sectors of services and female share of hours within services sub-sectors as well as the factors that are often cited in the literature as affecting female employment.

3.1 | Elasticity of female hours and service sector composition

To examine the effect of the composition of the service sector on the elasticity, we consider the following five sub-sectors of services: (i) wholesale and retail trade (trade hereafter); (ii) accommodation and food services activities (food hereafter); (iii) health and education (health hereafter); (iv) public administration and defence (public hereafter); and (v) all remaining sub-sectors such as administrative and support services, financial and insurance activities, telecommunication and information services (business hereafter).¹⁰ Data at this aggregation level are available starting from 2008 in the EU-LFS. Hence we re-estimate our baseline model for 2008 onwards, confirm that elasticities remain similar (Online Appendix Figure A.2), and continue our analysis with a shorter sample for 2008–2019.

We first investigate the correlation between these sub-sector shares, female share within each sub-sector and country-specific point estimates of elasticity documented in Figure 3. We find a significant correlation between country elasticities and public sector size (Figure 4(b)), and female share within business services (Figure 4(a)). We report correlations with all sub-sector related shares in Online Appendix Table A.2. Countries with a high female share in business services have high elasticities, and countries with a high public sector share have low elasticities.

To systematically investigate the link between the composition of the service sector and the country elasticities suggested by Figure 4, we estimate the regression equation

$$\Delta \ln(f_{it}) = \alpha + \beta_1 \Delta \ln(s_{it}) + \sum_j \beta_{2j} Z_{jit} + \sum_j \beta_{3j} \Delta \ln(s_{it}) Z_{jit} + \gamma_i I_i + \delta_{1t} I_t + u_{it}, \quad (2)$$

where Z_{jit} is the share variable for a sub-sector j of services for country i . In this regression, the services elasticity of female hours for country i will be $E_{share,i} = \hat{\beta}_1 + \sum_j \hat{\beta}_{3j} \bar{Z}_{ji}$, where $\bar{Z}_{ji}$ is the average value for country i . We consider shares of sub-sectors in services as well as the share of female hours within these sub-sectors with significant coefficient for interaction. The public sector's share and female share within business sector are relevant for the elasticity (specification (5) in Table 2).¹¹

We find that the relative size of the public sector affects the elasticity negatively. As one can expect the public sector to offer job security, stable hours worked and higher wages, a larger public sector could dampen the service sector's ability to pull more women into the market. We also run regression equation (2) with each sub-sector share separately, and find no significant contribution from other sub-sectors (results are reported in Online Appendix Table A.5).

The second variable related to the composition of services that affects the elasticity (in specification (5) in Table 2) is female hours share within business services. We find that female share

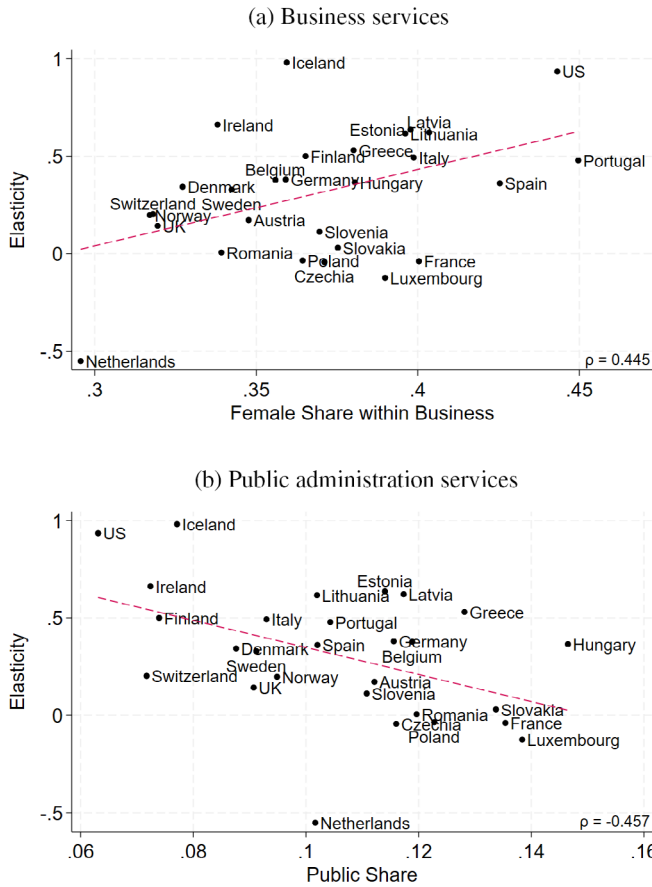


FIGURE 4 Elasticity and composition of services. *Notes:* Data are from the EU-LFS and the CPS. Elasticity values are estimation coefficients from regressing female share of hours on services share of hours, using data from 2008 to 2019. Sector shares are the averages of 2008–2019.

within business services amplifies the services elasticity of female hours. As a business-related service sector (administrative and support services, financial and insurance activities, telecommunication and information services) is more likely to have higher paying and longer hours jobs that employ more educated women, an increase in the share of females might increase demand for home-substitute market services, thereby further increasing the service sector's strength to pull women to the market (marketization). When we run the regression equation (2) with female share within each sub-sector separately (i.e. have one Z_{ji} in the regression as the female share of hours in sector j), we find that female share within all but trade sub-sectors have significant and positive effect on the elasticity (see Online Appendix Table A.4). The marketization channel, though present in many sub-sectors, is strongest for the business-related sectors. Indeed, female share within business is the only remaining variable among these female shares within sub-sectors when put in a horse race.¹²

Since elasticity is higher when the female share within services is larger, and since a large female share generates additional services demand for sectors that are close substitutes for home production, we expect the food sector to also be related to the elasticity. Figure 5 shows that countries with higher female share within business services also tend to have a higher share of food services, reinforcing our expectation. Noting that the regression analysis failed to find a linear and direct link, we look for a conditional and non-linear relationship. We estimate the regression

TABLE 2 Elasticity and the composition of the service sector.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔSS	0.935*** (0.000)	-1.095* (0.072)	0.353 (0.134)	1.149*** (0.009)	-0.549 (0.395)	-3.115*** (0.007)	-3.127*** (0.010)	-2.592** (0.040)
Fem. sh. business		0.198** (0.012)			0.173*** (0.007)	0.244 (0.181)	0.145 (0.236)	0.144 (0.333)
Fem. sh. business $\times \Delta SS$		3.749** (0.021)			4.773*** (0.001)	9.296*** (0.002)	12.539*** (0.000)	11.434*** (0.002)
Sh. food			-0.292* (0.061)			-0.076 (0.881)	-0.440 (0.314)	-0.307 (0.571)
Sh. food $\times \Delta SS$			-0.248 (0.920)			30.094** (0.025)	38.882** (0.017)	40.064** (0.019)
Sh. public				-0.019 (0.804)	0.043 (0.630)		0.006 (0.939)	-0.034 (0.694)
Sh. public $\times \Delta SS$				-7.193** (0.033)	-8.300*** (0.009)		-10.104** (0.012)	-7.802*** (0.004)
Sh. food $\times$ Fem. sh. business						-0.576 (0.709)	0.363 (0.759)	0.303 (0.835)
Sh. food $\times$ Fem. sh. business $\times \Delta SS$						-82.371** (0.015)	-108.818** (0.010)	-104.371** (0.015)
Policies	No	No	No	No	No	No	No	Yes
N	336	336	336	336	336	336	336	297
Within R^2	0.490	0.407	0.357	0.370	0.440	0.434	0.478	0.458

Notes: Data are from the CPS for the USA, and from the EU-LFS for other countries. Sample is from 2008 to 2019. ΔSS is the log-difference in services share of aggregate hours. 'Fem. sh. business' is the female share within the business sub-sector, which includes services related to businesses, such as financial services, real estate services and administrative support services. 'Sh. public' and 'Sh. food' refer to the share of the public and defence sub-sector and the share of food and accommodation in aggregate services hours, respectively. All the regressions except the last have country fixed effects, and all regressions have year fixed effects. 'Policies' refers to employment protection for regular contracts. Standard deviations are reported in parentheses.

*, **, *** denote significance at the 10%, 5%, 1% level, respectively.

$$\begin{aligned}
 \Delta \ln(f_{it}) = & \alpha + \beta_1 \Delta \ln(s_{it}) + \beta_2 Z_{sfood,it} + \beta_3 \Delta \ln(s_{it}) * Z_{sfood,it} \\
 & + \beta_4 Z_{fbus,it} + \beta_5 \ln(s_{it}) * Z_{fbus,it} + \beta_6 Z_{sfood,it} * Z_{fbus,it} \\
 & + \beta_7 \Delta \ln(s_{it}) * Z_{sfood,it} * Z_{fbus,it} + \beta_8 Z_{spub,it} \\
 & + \beta_9 \Delta \ln(s_{it}) * Z_{spub,it} + \gamma_i I_i + \delta_{1t} I_t + u_{it},
 \end{aligned} \quad (3)$$

where Z_{sfood} and Z_{spub} are the shares of food and public sub-sectors in service hours, and Z_{fbus} is the female share within the business services sub-sector.

Regression results for equation (3) are reported in Table 2 as specification (7). Results reveal that the change in food and accommodation share affects the elasticity—indeed, in a complex and interdependent fashion. The coefficients estimated for interaction terms of both shares and elasticity are positive, while the coefficient of triple interaction term is negative. The elasticity varies with the levels of share of females in business services and the share of food in services. Note that in equation (3), the elasticity is

$$E_{comps,i} = \beta_1 + \beta_3 Z_{sfood,i} + \beta_5 Z_{fbus,i} + \beta_7 Z_{sfood,i} Z_{fbus,i} + \beta_9 Z_{fbus,i}, \quad (4)$$

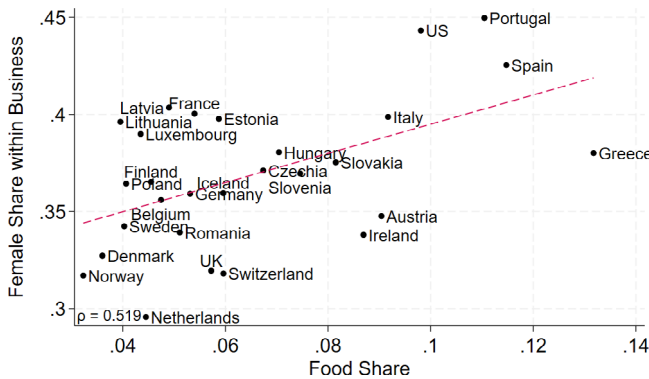


FIGURE 5 Females in business services and size of food services. *Notes:* Authors' calculation using EU-LFS and CPS data. Sector shares are the averages of 2008–2019.

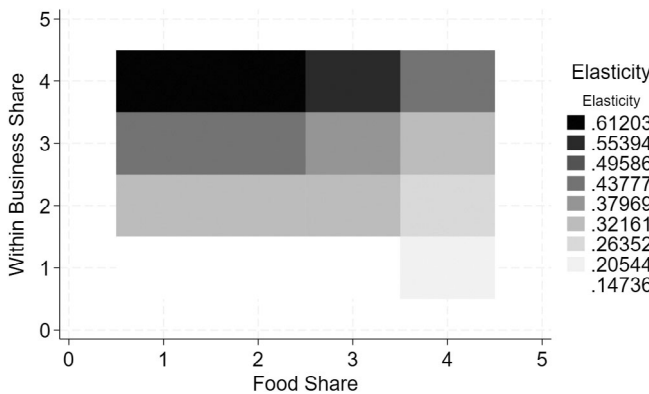


FIGURE 6 Food share and within-business share implied elasticity. *Notes:* The plot is for elasticity computed for different quartiles of female share within business and food share within services. The computation formula is based on a regression of growth rate of female share on growth rate of service share of total hours, female share within business, food share within services, their interaction terms, public share within services and its interaction with service sector growth rate. Elasticities are computed for the average of public share in services. Data are from the CPS for the USA, and from the EU-LFS for other countries. Sample is from 2008 to 2019. The regression has country and year fixed effects.

where $Z_{j,i}$ is the value for variable Z_j for country i . We compute the elasticity E_{comps} for different values of Z_{sfood} and Z_{fbus} . As such, we rank all country–year values for these shares, then divide them into four quartiles. We use the overall average value for Z_{fpub} . We report 16 different values of the elasticity implied by quartile pairs of Z_{sfood} and Z_{fbus} in Figure 6.

Figure 6 visualizes the effect of these compositions on elasticity. For a given value of food share, elasticity is higher for higher female shares in business services. Similarly, for a given share of females in business services, a larger food services share is associated with a larger elasticity. The services elasticity of female employment is the highest if food share is low while the female share within business services is high. We interpret this figure as follows. While the variation in the share of females in business services has a tighter association with the elasticity, the relative size of food sector mitigates this effect (lighter shades when food share is in quartile 4 versus quartile 1, with increase in within-business female share moved from a lower quartile to a higher one). When female shares are high, an expansion of service sector (increase in female employment) increases demand for home-substitute sectors more. If the share of food and accommodation is initially low, then the additional demand would expand this sector more, delivering a higher elasticity. A

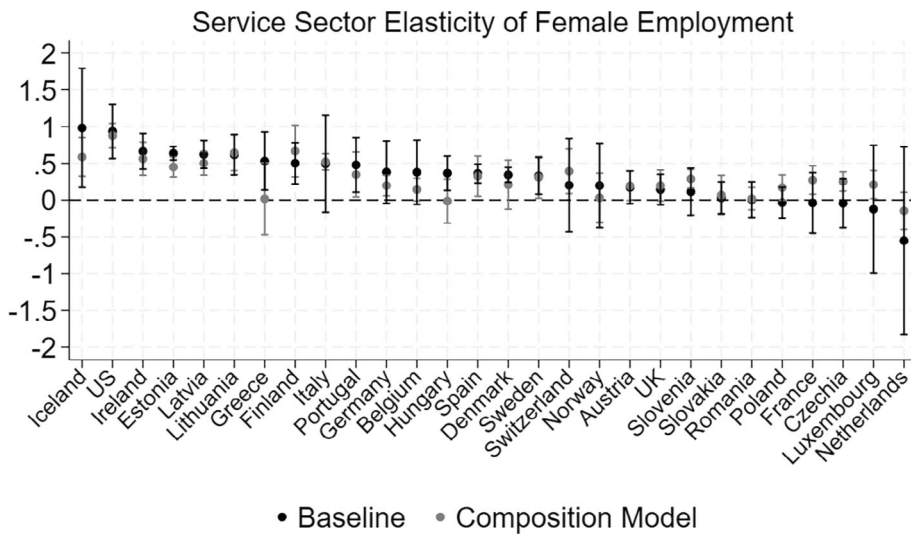


FIGURE 7 Elasticity and composition of the service sector. *Notes:* The plots are for elasticity estimations from different models. Baseline mode has baseline country as the USA, and values for all other countries are the baseline coefficient added to the interaction term for countries. The composition model plot is for elasticity computed using averages of female share within business, and shares of food and public. The computation formula is based on a regression of growth rate of female share on growth rate of service share of total hours, female share within business, food hours share within services, and all interaction terms, as well as the public share of services and its interaction with the growth rate of services. Data are from the CPS for the USA, and from the EU-LFS for other countries. Sample is from 2008 to 2019. The regressions have country and year fixed effects.

higher share of food and accommodation saturates the amplification effect of female intensity in services.

As Figure 6 shows that the elasticity can vary greatly with the composition of the service sector, we now turn to exploring how much of the cross-country variation this complex compositional relation can explain. Figure 7 plots the elasticity for each country (equation (4)) based on the average shares of services and the regression coefficients for specification (7) in Table 2. Once we account for the shares of public and food services, and the female share in the business services (taking into account the interaction with food services), estimation results from this ‘composition model’ and the country estimates from the baseline model greatly overlap for many of the countries. In fact, if we test whether the baseline elasticity estimation and the elasticity implied by the compositions are the same, then we fail to reject that hypothesis for all countries but Estonia.

We also quantify the contribution of composition of the service sector to the cross-country variation in elasticity. We use the share of cross-country variation that is explained by the sector composition. As such, let $E_{base,i} = E_{comps,i} + e_i$, where $E_{base,i}$ is the elasticity for country i implied by the baseline model, while $E_{comps,i}$ is the elasticity for country i implied by the compositions model (equation (4) evaluated at the country averages for shares). The share of cross-country variation that is not explained by the sector composition is the ratio of the variance of e_i , $\text{Var}(e_i)$, to the variance of $E_{base,i}$, $\text{Var}(E_{base,i})$. Hence we are interested in the share that is explained, which is $1 - \text{Var}(e_i)/\text{Var}(E_{base,i})$. We find that 54% of the cross-country variation in services elasticity of female employment can be explained by the composition of the service sectors that these countries have.

Is the effect of the composition of services on elasticity specific to female share within business services or to the share of food and accommodation sub-sector? To answer these questions, we (i) replace the share of females within business with female shares in other sub-sectors and re-run regression (3), and also (ii) re-run it while replacing the share of food services with the

shares of other sub-sectors. Results are reported in Online Appendix Tables A.7 and A.8. We find that the effect works for female shares of hours in all sub-sectors but trade, and it works through only the food and accommodation sub-sector.¹³ This finding further supports the argument that increasing intensity of female hours in market work creates additional demand for home-substitute market services, strengthening the link between the service sector and female employment. Moreover, the food and accommodation sector affects that link through its capacity to expand as a home-production substituting sector.

3.2 | Elasticity of female hours, gender norms and policies

We also consider the interaction of other factors associated with female employment with the elasticity. Our focus is whether the variables that are often considered to affect female employment would also affect the link between the rise of the services and the rise of female employment. As such, we run the regression (2) for different sets of explanatory variables (Z_{jit}). We first consider sets of variables for gender norms in societies, tax policies of countries, and other labour-market-related relevant variables such as employment protection policies, low-skill immigrant composition in the labour force, college graduation rate differentials and the gender wage gap. Then we combine the ones among these that are significantly associated with the elasticity to determine the variables that are jointly relevant.

We begin with whether attitudes towards gender norms can affect the elasticity. Olivetti and Petrongolo (2014) link the variation in gender gaps in the labour market to structural transformation. More specifically, they find variation in service share of hours across countries to be an important factor. They argue that attitudes towards gender norms, as they relate to the marketization of home production, can affect the size of the services. Bertrand *et al.* (2021) show a positive relationship between the divergence between skilled and unskilled women's marriage outcomes and conformity to gender norms, and use a model to show that lower marriage outcomes for skilled women is a result of a stronger work/marriage trade-off in more conservative cultures. We gather norms data merging the World Value Survey (Inglehart *et al.* 2020) and European Value Survey (2020) datasets. Following Olivetti and Petrongolo (2014), we use women's and men's answers to the questions about whether being a housewife is as fulfilling as working, and whether men should be preferred over women as hires for scarce jobs. We report the findings for significant relationships in Table 3. A higher value of the gender norm variable is associated with more conservatism. Hence in more conservative societies (that think that men should be preferred over women for scarce jobs), the service sector's strength to pull women to the market declines (specifications (1) and (2) in Table 3).¹⁴ Services elasticity of female employment is larger in societies in which women assign a higher value to being a housewife (specification (3) in Table 3). Olivetti and Petrongolo (2014) find negative and significant correlation of service share with female's attitudes towards men getting scarce jobs (negative and insignificant regression coefficient for men), and positive and insignificant correlation for answers to the comparative value of being a housewife.

As they may alter the return to market work and the substitution of home production, tax regimes can also affect female employment (see, for instance, Rendall 2018; Bick and Fuchs-Schündeln 2018; Olivetti and Petrongolo 2014; Rogerson 2008). Can they affect the elasticity? We use average tax wedge data for singles and couples with two children, and the marginal tax wedge of the second earner in double-income households with two children, all from the OECD (2025) labour tax database. We also use average tax rate data from McDaniel (2007) on consumption, income and social security. We find that only the social security tax and the average tax wedge for singles affect the elasticity. Having larger taxes reduces the elasticity (specifications (4) and (5) in Table 3).¹⁵ Both these taxes, as they reduce the value of market work, are expected to reduce market participation, thereby affecting the elasticity.

TABLE 3 Elasticity and norms, taxes and other variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ΔSS	0.504*** (0.007)	0.435*** (0.008)	−0.284 (0.261)	0.730** (0.011)	0.588*** (0.002)	1.389*** (0.000)	0.019 (0.791)	−0.170 (0.310)	1.175*** (0.002)	−2.592** (0.040)
Scarce jobs—women	−0.001 (0.710)									
Scarce jobs—women × ΔSS	−0.915** (0.027)									
Scarce jobs—men		−0.006** (0.050)								
Scarce jobs—men × ΔSS		−0.493* (0.060)								
Housewife—women			−0.004* (0.095)							
Housewife—women × ΔSS			0.878** (0.046)							
Av. tax wedge—singles				−0.020 (0.495)						
Av. tax wedge—singles × ΔSS				−1.174* (0.066)						
Social security tax					−0.050 (0.284)					
Social security tax × ΔSS					−1.507** (0.031)					
Empl. protect.—reg. contracts						0.011*** (0.003)			0.011*** (0.003)	0.004 (0.124)
Empl. protect.—reg. contracts × ΔSS						−0.435*** (0.000)			−0.411*** (0.003)	−0.238*** (0.004)
Gender diff. coll. frac.							−0.002 (0.964)		0.020 (0.471)	
Gender diff. coll. frac. × ΔSS							2.027*** (0.006)		1.108* (0.064)	
Coll. frac. labour force								−0.014 (0.344)		
Coll. frac. labour force × ΔSS								1.232** (0.030)		
Service sector composition	No	No	No	No	No	No	No	No	No	Yes
Country fixed effects	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	532	532	513	513	468	297	413	413	283	297
Within R ²	0.256	0.251	0.242	0.279	0.294	0.357	0.304	0.304	0.367	0.458

Notes: The dependent variable is the growth rate of female share in total hours. ΔSS is the growth rate of services share in total hours. Data are from the CPS for the USA, and from the EU-LFS for other countries, and the sample is from 2008 to 2019. Other variables are from different sources, which are explained in Online Appendix Subsection A.1. ‘Scarce jobs’ and ‘Housewife’ are value survey answers to the questions about whether men should be preferred over women when jobs are scarce, and whether being a housewife is as fulfilling as working in the market, respectively. ‘Women’ and ‘Men’ indicate the answers given by women and men. ‘Av. tax wedge—singles’ is the labour tax paid by singles as a percentage of total labour costs. ‘Social security tax’ is the average tax rate for social security payments. ‘Empl. protect.—reg. contracts’ is the employment protection for regular contracts. ‘Gender diff. coll. frac.’ is the difference between males and female as a fraction of their labour force with a college degree. ‘Coll. frac. labour force’ is the college rate for the whole labour force. All regressions have year fixed effects. Standard deviations are reported in parentheses.

*, **, *** denote significance at the 10%, 5%, 1% level, respectively.

As is widely argued in the literature, skill composition of the (female) labour force as well as the gender wage gaps are also tightly linked to female employment (see, for instance, Olivetti and Petrongolo 2016; Cortés and Pan 2019; Cortés and Tessada 2011). Using EU statistics on income and living conditions (EU-SILC) data, we analyse several indicators related to college-educated fraction of employment, its gender difference, and gender wage gap. We find that as a higher fraction of the labour force have college degrees, or as there are more female workers with college degrees compared to men, elasticity increases (specifications (7) and (8) in Table 3).

We also consider several other factors that may affect female employment. Following Olivetti and Petrongolo (2014) and Bick and Fuchs-Schündeln (2018), we consider different policies related to support for having children, such as spending on childcare, and leave days generosity for mother and fathers. Following Olivetti and Petrongolo (2014), we check whether employment protection policies are associated with elasticity. Following Cortés (2023), we also investigate the share of low-skill migrants, as they may also affect the marketization channel. Among all these variables, we find only employment protection for regular contracts to play a role, and we present the result in Table 3 (specification (6)).¹⁶ When there are more regulations, elasticity is lower. As women are more likely to have career breaks, firms might be less likely to hire them if there are stronger protections for regular employees. Hence the effect of service sector expansion on female employment may be less pronounced in countries with stronger regulations than in those with fewer regulations.

When we consider all the variables that are contributing to elasticity together, we find that only the employment protection and the gender gap in college rate affect elasticity (specification (9) in Table 3).¹⁷ We find that these policy-related variables can explain 34% of the variation in the baseline estimation elasticities. Though they have some effect on the elasticity, these policies are not as crucial as the composition of the service sector to explain the heterogeneity in services elasticity of female hours across countries.

3.3 | Elasticity, service sector composition, and other factors

We have established that the composition of the service sector (female intensity within services, and the shares of public and food and accommodation sub-sectors) affects the elasticity. Moreover, we also observe that employment protection policy and the gender gap in the fraction of employment with college degrees also affect the elasticity. Now we turn to their joint power to explain the cross-country variation in elasticity. We add the gender gap in fraction of employment with college degree and employment protection variables (along with their interactions with services growth) to the triple interaction model in equation (3) along with their interaction with the growth of service sector. Once we include both policy-related variables and service sector composition, the gender gap in the fraction of employment with college degrees becomes insignificant. Hence we use only the employment protection variable along with services composition. Specification (8) in Table 2 reports coefficients on composition variables, while specification (10) in Table 3 reports coefficients on employment protection. Figure 8 plots the resulting country elasticities along with the elasticities from the baseline model. We observe that both the composition of the service sector and the employment protection policies matter for the elasticity.

To what extent does controlling for the labour market dynamics of economies (through the employment protection variable) increase the explanatory power of our model for the variation in elasticity across countries? Considering all the countries for which we have data for employment protection (Romania and Switzerland do not have data), all countries except Latvia have elasticities that are not significantly different from the baseline estimations. Hence the extended model (that includes not only service sector composition but also the employment protection variable) also does very well to account for the cross-country variation: it explains 60% of the variation in the baseline estimation. As the additional explanatory effect of employment protection

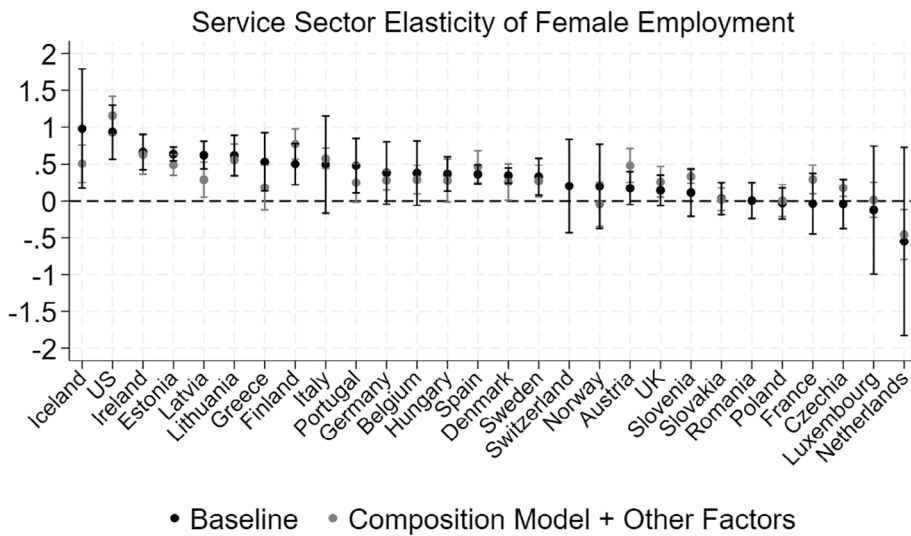


FIGURE 8 Elasticity, composition of the service sector, and labour market variables. *Notes:* The plots are for elasticity estimations from different models. Baseline mode has baseline country as the USA, and values for all other countries are the baseline coefficient added to the interaction term for countries. The composition model elasticity is elasticity computed using averages of female share within business, and shares of food and public. The computation formula is based on a regression of growth rate of female share on growth rate of service share of total hours, female share within business, food hours share within services, and all interaction terms, as well as the public share of services and its interaction with the growth rate of services. ‘Composition Model + Other Factors’ is the elasticity estimation from adding an employment protection variable and its interaction term with growth rate of service share to the composition model. Data are from the CPS for the USA, and from the EU-LFS for other countries. Sample is from 2008 to 2019. The regressions have country and year fixed effects. Dots are estimates of the service share elasticity of the female share of employment. Bars are 95% confidence intervals.

is relatively very small, we conclude that the composition of the services is the main driver of the cross-country variation in services elasticity of female hours.

4 | CONCLUSION

This paper investigates the relationship between the growth of the service sector and female employment in a cross-country context. The conventional wisdom is that women have a ‘comparative advantage’ in the service sector due to gender traits that make them more employable in services. As a result, as the service sector expands, female employment should increase. One implication of this view is that the strength of this effect should be the same across countries since gender traits are universal. However, our findings reveal substantial heterogeneity in the service sector elasticity of the female share of total hours, highlighting the interplay of other factors that influence the strength of this relationship.

To explore this variation, we examine the association between country elasticities and potential explanatory factors. We find that the composition of the service sector—more specifically, female share within business services and the shares of food and public sub-sectors—plays a crucial role. Variation across countries in the compositions of their service sectors explains 54% of the divergence in their services elasticity of female hours. Moreover, how composition affects elasticity reveals complex and non-linear dynamics. We find elasticity to be the largest for high female share within business services and lower share of food services. This finding confirms not only the importance of the marketization channel to draw females to the market (as the literature

has shown) but also the strength with which service sector expansion pulls women to the market work. Other differences across countries in labour market experiences, taxes, norms and other relevant policies are at best a secondary factor to the composition to generate the variation in elasticity. We conclude that the strength of the relationship between service sector expansion and female employment growth extends beyond gender traits and warrants further investigation.

ACKNOWLEDGMENTS

In this paper, we use the harmonized EU-LFS between 1983 and 2019, and EU-SILC between 2004 and 2019. Funding by the Schoeller Foundation is gratefully acknowledged. We thank our anonymous referees, Husnu C. Dalgic, Matthias Doepke and Moritz Kuhn for their helpful comments on this paper. Open Access funding enabled and organized by Projekt DEAL.

ENDNOTES

- ¹ For the U-shaped relationship between female employment and economic development, see also Goldin (1995), Tam (2011), Ngai *et al.* (2024) and Gottlieb *et al.* (2024).
- ² Online Appendix Figure A.1(a) displays the percentage point change in service and female shares of hours over the sample period to illustrate this variation. To ensure that the variation is not solely due to the relative sizes of service sectors, Figure A.1(b) displays changes as fractions of their values in the first year.
- ³ See also Goldin (1995), Akbulut (2011), Ngai *et al.* (2024) and Blau (2025).
- ⁴ Data are from 2000 to 2019. The survey starts earlier for some countries. To maintain a balanced panel, we begin the sample in 2000. See Online Appendix Subsection A.1 for details.
- ⁵ We treat agriculture as a separate sector instead of combining it with industry, as Eastern European countries started the period with an average agriculture share of 13.6%, and ended it with an average of 7.1%. Other countries had averages of 5.6% and 3.7%, respectively. Details of sector classifications can be found in Online Appendix Subsection A.1.
- ⁶ See Online Appendix Table A.3 for decomposition result for all countries.
- ⁷ This is a larger contribution compared to the 57% that Olivetti and Petrongolo (2016) find. Our findings differ as our analysis includes a larger set of countries, and is missing Australia, Canada, Japan and Korea, which are present in the sample of Olivetti and Petrongolo (2016). See Sample 1 averages in Online Appendix Table A.3 for decomposition results for countries in their sample.
- ⁸ We include the UK and Ireland in this category because data suggest so.
- ⁹ In fact, when we run the same regression with the service share as the dependent variable and the female share as the independent variable, similar to Kuhn *et al.* (2024), we obtain comparable results.
- ¹⁰ Details are presented in Online Appendix Subsection A.1, and Table A.2 reports summary statistics for these variables.
- ¹¹ Regression results with single Z_j variables are reported in Online Appendix Tables A.4 and A.5). The process that yields specification (5) in Table 2 is reported in Online Appendix Table A.6.
- ¹² Online Appendix Table A.4 confirms that the coefficient of the interaction term for business sector is the highest.
- ¹³ While the triple interaction term for trade sub-sector is positive, female share within the business and growth rate of services interaction term is not significant.
- ¹⁴ All gender-norm-related regression results are reported in Online Appendix Table A.9.
- ¹⁵ Regression results for all tax-related variables are reported in Online Appendix Table A.10.
- ¹⁶ Regression results for all the variables are reported in Online Appendix Table A.12.
- ¹⁷ See Online Appendix Table A.11 for regression results of all variables considered.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Coskun, S. and Sengul, G. (2026). Unpacking the link between service sector and female employment: cross-country evidence. *Economica*, 93(371), 913–929. <https://doi.org/10.1111/ecca.70042>