Structural Transformation, Gender Norms and Intrahousehold Bargaining in Sub-Saharan Africa [*]

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June 12, 2024

Abstract

Structural transformation, or service expansion, has significantly widened the gender employment and wage gaps in Sub-Saharan Africa. This contradicts the previous findings in developed countries. To reconcile this fact, we build a two-sector general equilibrium model with social stigma against women working in the service sector to show that structural transformation can reduce the female-to-male wage ratio if the social stigma is large enough. The model generates additional predictions about the intrahousehold bargaining power of females. Given a high social stigma, structural transformation can prevent female empowerment. We test the model using sectoral employment and individual bargaining data from 16 SSA countries. Using two-way fixed effect and instrumental variable estimations, we find robust results consistent with the model.

Keywords: Structural transformation, social stigma, intrahousehold bargaining, Sub-Saharan Africa

JEL: J16, D91, J22, O12, D13, D58

[*]Acknowledgements: We are grateful for the funding support from the STEG PhD research grant and feedback from the STEG Review Committee. We thank Robert Akerlof, Sonia Bholotra, Stefano Caria, Douglas Gollin, and Rachel Ngai for the helpful comments and the participants at the Warwick Macro/International seminar and Warwick Applied Micro Research Away Day. We thank extraordinary research assistants Marco Disidoro, Mahdi Hosseini Gohar and Malick Dione.

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1 Introduction

Structural transformation has been salient in Sub-Saharan African (SSA)countries over the past decades, where labor moved out of the agriculture sector and into services. Nevertheless, the SSA countries showed different patterns of gender employment and wage gaps from the developed countries. Ngai and Petrongolo (2017) shows that structural transformation and marketization of home production lead to the rise of the service sector and raise women's relative wages and market hours as females have comparative advantages in services. Using SSA data, we find that the rise in services is associated with a lower female-to-male wage ratio, contradicting their findings in the US.

A well-known difference between SSA and developed countries is the prevalence of gender norms. Gender norms are often persistent in developing countries (Boudet et al., 2013), and cultural changes are relatively rare and slow (Guiso et al., 2015). In SSA, women's voice and agency remain limited, although it has one of the highest female labor force participation rates at the world level (World Bank, 2014). Therefore, to reconcile the empirical results, we build a two-sector general equilibrium model with social stigma against women working in the service sector. Similar to Field et al. (2021), we assume that the husband incurs utility losses when the wife works. Furthermore, we assume that utility losses only occur if the wife works in the service sector but not the non-service sector. As thoroughly examined in the comprehensive discussion by Jayachandran (2021) and Bursztyn et al. (2023), the influence of social norms in developing countries is one of the primary obstacles to female employment in the private sector (Field et al., 2021), including SSA countries (Dinkelman and Ngai, 2022).

In the model, each household has one male and one female, maximizing joint utility with their bargaining weights summing to one. Females have comparative advantages in the service sector, while males have comparative advantages in the non-service sector. However, if the female works in the service sector, the household incurs a utility loss due to the social stigma. Therefore, the wage for females in the service sector must be higher than in the non-service sector to compensate for the reduced utility.

Structural transformation moves labor out of the non-service sector as it grows faster and increases sectoral wages for both genders due to higher productivity. As wages increase, firms need fewer workers. More females than males should stay in the service since the former have higher comparative advantages. Therefore, the female-to-male wage ratio in the service sector should increase since female labor is relatively more productive. Nevertheless, if social stigma is large enough, the female wage in the service sector must increase much more to compensate for the utility loss. This can potentially push females back into the non-service sector. In the end, the stronger force determines the equilibrium gender wage ratio and the employment ratio.

The model can generate predictions consistent with the decreasing female-to-male wage ratio observed in data as well as provide new testable implications about gender bargaining power at home. As the relative wage is precisely a determinant of intrahousehold bargaining under a collective labor supply model, as demonstrated by Blundell et al. (2005), the model predicts that structural transformation and gender norms reduce female bargaining power at home.

To test the model, we collect the structural transformation data from the Economic Transformation Database and female empowerment measures from the Demographic and Health Surveys (DHS) for 16 SSA countries, including Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, and Zambia. The bargaining measure is based on questions about female decision-making participation variables in the DHS surveys. As we have multiple questions to measure the underlying female decision-making in household choices, we reduce the dimensionality of measures by exploratory factor analysis. Using a two-way fixed effect estimation with country-fixed effects and year-fixed effects, we find that service expansion is significantly negatively correlated with changes in female bargaining power in SSA. To further establish the causality, we follow the instrumental variable methods from Imbert et al. (2022). We instrument the changes in sectoral employment shares using shocks in international crop prices interacted with cropping patterns in exports. We find

that our instrumental variable estimates are similar to the two-way fixed effect estimates. For robustness check, we collect regional sectoral employment measures in SSA countries. In the end, we are able to merge regional sectoral employment measures for Lesotho and Mozambique. Controlling for regional fixed-effect and country-year fixed-effect, we find the regional estimates are similar to national estimates.

Finally, we validate the model mechanism by showing that the service expansion, or structural transformation, is associated with a higher female service employment share and a higher female-to-male service ratio, consistent with the observed patterns.

The findings of this paper have important policy implications for promoting gender equality and women's empowerment in SSA. Firstly, the study underscores the persistent challenges posed by deeply ingrained gender norms and social stigmas in the region. As economic transformation alone may not be sufficient to empower women, policymakers should prioritize targeted interventions to challenge and change these cultural norms. Gender stigma can significantly impede women from leveraging their comparative advantage in services. The research highlights the importance of creating opportunities for women in the evolving service sector in SSA countries. To harness the potential benefits of this economic shift, policymakers should invest in women's skills development and facilitate their access to the growing service industry. Labor market policies should be designed to reduce gender-based wage disparities and provide equal opportunities for women to participate in non-traditional sectors.

1.1 Related Literature

Structural transformation and gender dynamics The contribution of this paper is twofold. Firstly, it adds to the body of knowledge in the field of structural transformation and gender dynamics, building upon previous studies by (Ngai and Petrongolo, 2017; Dinkelman and Ngai, 2022; Gottlieb et al., 2023; Ngai et al., 2022; Ngai and Petrongolo, 2017). Specifically, Ngai and Petrongolo (2017) document the rise in the service sector in the United States since the late 1960s and show that it increased demand for female workers. Along-

side the marketization of home production, structural transformation reduced the gender wage gap and increased the working hours of women. Although this phenomenon is common in developed countries, it is less relevant in low-income countries. Dinkelman and Ngai (2022) show that in SSA countries, high female labor force participation coexists with low average market hours, and there is a persistent norms-based limitation on women's work. As thoroughly examined in the comprehensive discussion by Jayachandran (2021) and Bursztyn et al. (2023), the influence of social norms in developing countries is one of the primary obstacles to female labor force participation, particularly employment in private sector (Field et al., 2021). This leads to a substantial misallocation of labor resources within these countries. As Ashraf et al. (2022) document, these gender-related social norms can profoundly impact women's access to and engagement in the labor market, perpetuating a cycle of underutilized talent and contributing to economic inefficiencies. We contribute by building a novel model combining structural transformation and gender norms to provide a potential explanation of the coexistence of the service expansion and decreasing female-to-male gender wage ratio.

Second, this paper contributes to the literature by bridging the gap between the changes in sectoral composition from the macro perspective and the intra-household bargaining from the micro angle. Much of the pioneer theoretical work on intrahousehold bargaining with collective household labor supply models has been based on setups and data from developed countries such as (Chiappori, 1992, 1997; Chiappori et al., 2002; Blundell et al., 2007). Chiappori (1992) presents a model that departs from the traditional individual labor supply models and considers household decision-making as a collective process. In this model, he recognizes that household members make joint decisions regarding labor force participation and the allocation of their time to work and leisure. He highlights that household members negotiate to reach an optimal allocation of their labor supply, taking into account their preferences and relative bargaining power. Chiappori (1997) extends the collective labor supply model by explicitly incorporating the concept of household production. Chiappori et al. (2002) demonstrates that the sex ratio in the marriage market

affects the household members' bargaining position. Furthermore, Blundell et al. (2005, 2007) show that gender wage differences have a strong influence on bargaining power within couples. We provide valuable causal evidence on the intricate relationship between structural transformation and female empowerment in Sub-Saharan Africa and break new ground with an investigation of intrahousehold bargaining within the framework of a general equilibrium model.

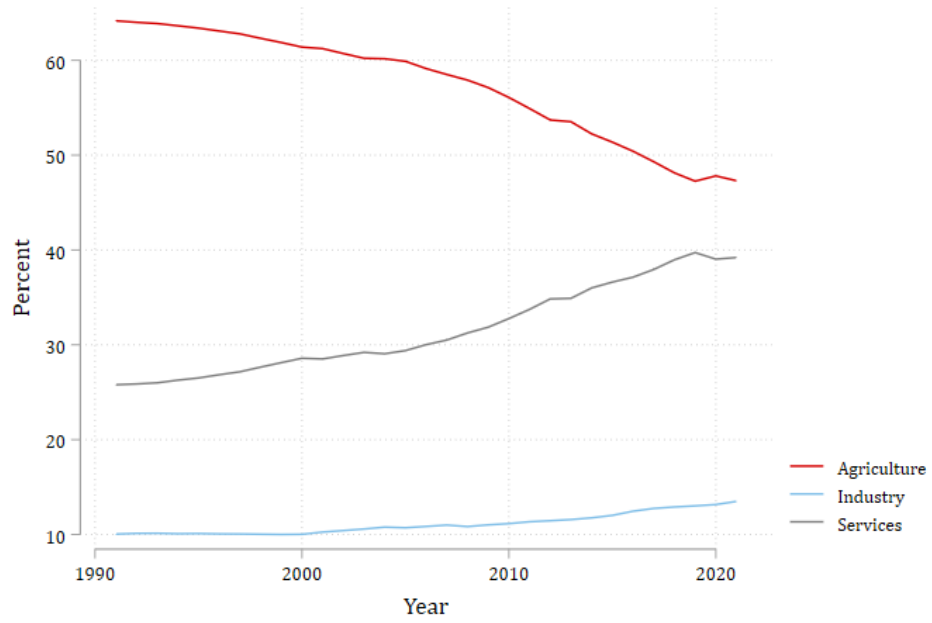
The structure of the paper is as follows. Section 2 presents empirical patterns for structural transformation and gender gaps we observed in the data. We set up the general equilibrium model of structural transformation with gender norm in section 3 and provide model predictions. Section 4 explains the data we use for testing the model. Section 5 presents the methods and the main empirical results. Section 6 presents the robustness check with regional employment measure by sector. Section 7 tests the model mechanism. Finally, Section 8 concludes.

2 Structural transformation in Sub-Saharan Africa

Figure 1 illustrates the dynamics in the distribution of labor across economic sectors in SSA. Notably, between 1990 and 2022, there was a noteworthy decline in the agriculture sector's share of employment while the service sector exhibited a marked increase, growing from approximately 26% to nearly 36%. The employment share in the industrial sector was relatively stable. Detailed description see Appendix B.

However, alongside the significant structural transformation, we find the average female-to-male wage ratio was lower when the service sector grew. Moreover, if we multiply the average wage by the total employment, we still find a negative correlation between service employment growth and total income ratio (see Figure). This contradicts the finding in Ngai and Petrongolo (2017) where the structural transformation (or the service sector expansion) is associated with a higher female-to-male ratio as female has a comparative advantage in the service sector. A key feature of the SSA countries is the presence of gender norms, which the female has little say over, although SSA has one of the highest female

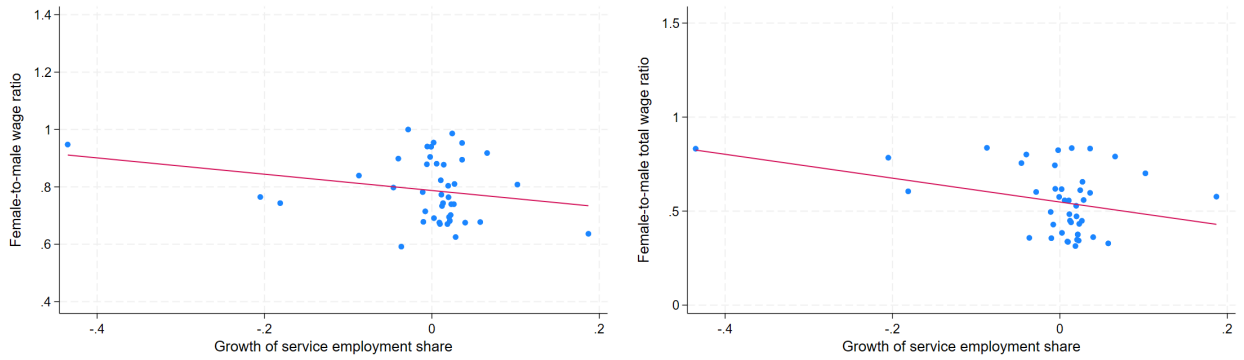
Figure 1: Percent of Employment in Each Sector in Sub-Saharan African Countries.



Notes: Data for this Figure represents the changes in economic sector employment in Sub-Saharan African (SSA) countries, calculated as a weighted average based on the working population aged 15 and above. The percentages have been derived from the International Labor Organization (ILO) database. The countries included are Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

labor force participation rates at the world level (World Bank, 2014). In the following section, we develop a model of structural transformation with gender norms preventing females from working in the service sector and show that if the norm is larger than a threshold, the model can generate results consistent with the empirical finding in Figure .

Figure 2: Growth of services and gender wage gap



Notes: These figures show the relationship between the growth of the service sector and the female-to-male wage ratio in Sub-Saharan African (SSA) countries from 2001 to 2022. The left panel uses the average wage ratio while the right panel uses the total wage of females over males (wage times employment). Both wage and employment data for each gender are from the International Labor Organization (ILO) database. The countries included in this exercise are Botswana, Cote d'Ivoire, Mauritius, Namibia, Rwanda, Senegal, South Africa, Uganda and Zambia.

3 Model

In this section, we build a two-sector model featuring structural change with friction due to gender norms. Sectoral reallocation is standard in the structural change literature, while the inclusion of gender norms can reverse the effect of structural transformation and lead to the opposite results. Moreover, the model generates testable implications for the intrahousehold bargaining power of each gender.

3.1 Assumptions

Two crucial assumptions are made according to the following stylized facts. First, the service sector has the lowest productivity growth rate, followed by agriculture and industry. We use GDP (constant 2015 USD, from the World Bank) per labor as a proxy for productivity. The annual growth rates for the three sectors of 46 SSA countries from 1991 to 2019, weighted by employment, is 1.19% for service, 2.24% for agriculture and 3.17% for the industry. A similar trend is observed when considering only a balanced panel of 37 countries

out of 46, with average growth rates of 1.25% for the service sector, 2.61% for agriculture, and 3.20% for the industry.

Second, we assume that women have the highest comparative advantage in the service sector. Table 1 presents the average monthly wages (PPP adjusted) for each gender across SSA countries during the sample period. Overall, women have much lower wages than men, especially in manufacturing. The gap shrinks dramatically when we focus on the service sectors. In specific sectors, such as transportation and storage and professional activities, females have higher salaries than males. The following subsections set up the model under these assumptions.

Table 1: Average monthly wages for men and women

Economic activity	Male	Female	Wage Ratio
A. Agriculture; forestry and fishing	356.0	249.1	0.76
B. Mining and quarrying	921.3	783.7	0.79
C. Manufacturing	558.0	406.9	0.74
D. Electricity; gas, steam and air conditioning supply	1166.9	1323.5	1.38
E. Water supply; sewerage, waste management and remediation activities	723.5	633.8	1.18
F. Construction	517.4	556.4	1.02
G. Wholesale and retail trade; repair of motor vehicles and motorcycles	547.4	392.9	0.74
H. Transportation and storage	643.1	856.0	1.40
I. Accommodation and food service activities	497.6	346.4	0.72
J. Information and communication	1224.7	974.4	0.81
K. Financial and insurance activities	1518.0	1083.6	0.84
L. Real estate activities	731.0	772.5	0.94
M. Professional, scientific and technical activities	1260.1	1261.3	1.28
N. Administrative and support service activities	530.3	531.5	1.04
O. Public administration and defence; compulsory social security	958.1	888.4	0.91
P. Education	1068.8	819.6	0.81
Q. Human health and social work activities	1041.2	792.6	0.78
R. Arts, entertainment and recreation	569.8	558.3	1.04
S. Other service activities	585.6	353.3	0.75
T. Activities of households as employers	260.9	192.4	0.82
U. Activities of extraterritorial organizations and bodies	1440.9	970.2	1.09
X. Not elsewhere classified	607.5	501.3	1.36

Note: The wages are calculated using an unbalanced panel of 33 Sub-Saharan African countries, covering the period from 2010 to 2021. The monthly wages are obtained from the World Bank and are Purchasing Power Parity (PPP) adjusted. The average wages are weighted by employment data from the International Labour Organization (ILO).

3.2 The firm's problem

There are two sectors, service (s) and non-service(ns). Firms in each sector produce output using a simple constant-return-to-scale function:

$$Y_i = A_i L_i, i \in \{s, ns\}, \tag{1}$$

and the labor input in each sector is an aggregate of female and male hours,

$$L_i = \left[\eta_i L_{fi}^{\frac{\sigma-1}{\sigma}} + (1-\eta_i) L_{mi}^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \quad i \in \{s, ns\}. \tag{2}$$

Technology A_i grows at an exogenous and constant rate T_i and $T_s < T_{ns}$. Females have comparative advantages in the service sector, $\eta_s > \eta_{ns}$. Since there is perfect competition in each sector, profit maximization implies the wage ratio equals the marginal rate of substitution. Therefore, the gender wage ratio in each sector equals,

$$\frac{w_{fi}}{w_{mi}} = \frac{\eta_i}{(1-\eta_i)} \left(\frac{L_{fi}}{L_{mi}}\right)^{-1/\sigma}. \tag{3}$$

Gender labor supply H is determined by households' utility maximization problem in section 3.3. Supply must be equal to the demand,

$$L_{f,ns} + L_{fs} = H_f \tag{4}$$

$$L_{m,ns} + L_{ms} = H_m. \tag{5}$$

The rise in the relative demand for females comes from the fact that the technology in the non-service sector grows faster than in the service sector. Females have a higher comparative advantage in the service sector. As aggregate consumption is a combination of both sectoral goods and the elasticity of substitution is low, the growth leads to a higher relative demand for females.

3.3 The household's problem

Consider a representative household problem with one man and one woman. Their joint utility comes from consumption. The total time endowment for each gender is inelastic. If the woman works in the service sector, there would be a disutility for the male β_s and, thus, the household. The disutility level β_s is taken as given for households. We only consider disutility in the service sector due to the prevalence of family farms in the agriculture sector in SSA and the low share of the manufacturing sector. The sharing rule λ is a function of the gender income share. Specifically, the maximization problem is the following

$$\max_{c_{ns},c_s,l_j} U = \lambda U_m + (1-\lambda)U_f$$

where the male's utility is given by

$$U_m = \ln\left(\rho {c_{ns,m}}^{\frac{\nu-1}{\nu}} + (1-\rho)\, {c_{sm}}^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}} - \beta_s \mathbf{1}(l_{f,j} = s)$$

and the female's given by

$$U_f = \ln\left(\rho {c_{ns,f}}^{\frac{\nu-1}{\nu}} + (1-\rho)\, {c_{sf}}^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}}$$

subject to the overall budget constraint and time constraint

$$w_m L_m + w_{f,s} L_{f,s} + w_{f,ns} L_{f,ns} = \sum_{j=\{m,f\}} p_{ns} c_{ns,j} + p_s c_{sj}, \tag{6}$$

where c is the consumption and the goods in service and non-service sectors are poor substitutes ($0< \nu <1$).

As the sectoral consumption ratio is the same for both genders, the consumption ratio is a function of sectoral prices,

$$\frac{p_{ns}}{p_s} = \frac{\rho}{1-\rho}\left(\frac{c_{s,j}}{c_{ns,j}}\right)^{1/\nu} \tag{7}$$

Moreover, the consumption ratio between the male and the female in the same sector is

$$\frac{c_{m,ns}}{c_{f,ns}} = \frac{c_{m,s}}{c_{f,s}} \tag{8}$$

To optimally allocate the female labor hours between service and non-service sectors, the gain from an additional hour working in service must be equal to the losses from the forgone utility caused by the lower hours in the non-service sector and the disutility from the gender norm,

$$\frac{w_{fs} - w_{f,ns}}{w_m L_m + w_{f,s} L_{f,s} + w_{f,ns} L_{f,ns}} = \lambda \beta_s.$$

Assuming the bargaining weight λ is determined by the income of the male to total income, i.e. $\frac{w_m L_m}{w_m L_m + w_{f,s} L_{f,s} + w_{f,ns} L_{f,ns}}$ and normalize L_m to be one, we get the gap between female service wage and non-service wage is proportional to male's wage and the social norm,

$$\beta_s = \frac{w_{f,s} - w_{f,ns}}{w_m}.$$

3.4 Competitive equilibrium

A competitive equilibrium is defined by sequences of market wages $\{w_{fst}, w_{f,ns,t}, w_{mt}\}_{t=0}^{\infty}$, prices $\{p_{nst}, p_{st}\}_{t=0}^{\infty}$, consumption $\{c_{ns,mt}, c_{s,mt}\}_{t=0}^{\infty}$, $\{c_{ns,ft}, c_{sft}\}_{t=0}^{\infty}$ such that:

1. Households maximize utility subject to the budget constraint and the time constraint.
2. Firms in each sector maximize profits.
3. Market clear in each sector for each gender, $\sum_i c_{ait} = Y_{at}, \sum_i c_{git} = Y_{gt}, \sum_i c_{sit} = Y_{st}, L_{f,ns} + L_{fs} = H_f$ and $L_{m,ns} + L_{ms} = H_m$.

3.5 Structural change and gender wage gap

The marginal product of labor for the female is given by

$$w_{fs} = p_s A_s \eta_s \left(\frac{L_s}{L_{fs}}\right)^{1/\sigma}, \tag{9}$$

or

$$w_{f,ns} = p_{ns} A_{ns} \eta_{ns} \left(\frac{L_{ns}}{L_{fns}} \right)^{1/\sigma}. \tag{10}$$

The wage is the same in both sectors for the males,

$$w_m = p_j A_j (1 - \eta_j) \left(\frac{L_j}{L_{mi}} \right)^{1/\sigma}, j \in \{s, ns\}. \tag{11}$$

Define total female wage share in the service sector and in the non-service sector as $S_{fs} = \frac{w_{fs} L_{fs}}{w_{fs} L_{fs} + w_{ms} L_{ms}}$, and $S_{f,ns} = \frac{w_{f,ns} L_{f,ns}}{w_{f,ns} L_{f,ns} + w_m L_{m,ns}}$, the female labor share in each sector j can be written as

$$\frac{L_j}{L_{fj}} = \left(\frac{\eta_j}{S_{f,j}} \right)^{\frac{\sigma}{\sigma - 1}}, j \in \{s, ns\} \tag{12}$$

Combine equations (9) and (11) to write the gender labor ratio as a function of the gender wage gap,

$$\frac{L_{fs}}{L_{ms}} = \left[\frac{w_m}{w_{fs}} \left(\frac{\eta_s}{1 - \eta_s} \right) \right]^{\sigma} \tag{13}$$

Similarly, combine (10) and (11) to get

$$\frac{L_{f,ns}}{L_{m,ns}} = \left[\frac{w_m}{w_{f,ns}} \left(\frac{\eta_{ns}}{1 - \eta_{ns}} \right) \right]^{\sigma} \tag{14}$$

Define $\omega \equiv \frac{w_m}{w_{fs}}$, then $\frac{w_{fs}}{w_{f,ns}} = \frac{1}{1 - \beta_s \omega}$. Since we know $L_{f,s} + L_{f,ns} = H_f$ and $L_{m,s} + L_{m,ns} = 1$, we can solve for male workers in the service sector as a function of female workers,

$$L_{m,s} = \frac{L_{f,s} \kappa}{H_f - L_{f,s} + L_{f,s} \kappa}, \tag{15}$$

where $\kappa = \left(\frac{1 - \eta_s}{\eta_s} \frac{\eta_{ns}}{1 - \eta_{ns}} \frac{1}{1 - \beta_s \omega} \right)^{\sigma}$ depends on the male-to-female wage ratio.

Using (13) again, we get that female labor in the service sector is

$$\frac{L_{fs}}{H_f} = \frac{\frac{\kappa}{H_f} - (\frac{1 - \eta_s}{\eta_s} \frac{w_{fs}}{w_m})^{\sigma}}{(\kappa - 1)(\frac{1 - \eta_s}{\eta_s} \frac{w_{fs}}{w_m})^{\sigma}} = \frac{(\frac{\eta_{ns}}{1 - \eta_{ns}})^{\sigma} (\frac{w_s}{w_{fs}})^{\sigma} - 1}{\kappa - 1} = \frac{(\frac{\eta_{ns}}{1 - \eta_{ns}})^{\sigma} (\omega)^{\sigma} - 1}{\kappa - 1} \tag{16}$$

To get a sense of how social stigma (disutility β_s) changes the service female employ-

ment share, note the derivative of $\frac{L_{fs}}{H_f}$ with respect to wage ratio ω is

$$\frac{\sigma\sigma_1\sigma_2(\sigma_1-\sigma_2+H_f\beta_s\omega-\beta_s\omega\sigma_1)}{\omega\left(1-\beta_s\,\omega\right)(\sigma_1-\sigma_2)^2} \tag{17}$$

where $\sigma_1=\left(\frac{\eta_{ns}\omega}{(1-\beta_s\omega)\,(1-\eta_{ns})}\right)^{\sigma}$ and $\sigma_2=\left(\frac{\eta_s\,\omega}{1-\eta_s}\right)^{\sigma}$.

If $\beta_s=0$, the derivative is always negative as $\sigma_1<\sigma_2$, indicating that the female service share will always be negatively associated with a higher male-to-female wage ratio. Similar results can be found for male service employment share, indicating the service sector expansion is associated with a lower male-to-female ratio. However, if β_s is large enough and $\sigma_1>\sigma_2$, *i.e.* $\left(\beta_s>\frac{1}{\omega}(1-\frac{\eta_{ns}(1-\eta_s)}{\eta_s(1-\eta_{ns})}\right)$, then the derivative turns positive under certain conditions. [1]

Therefore, if the gender norm is large enough, a higher male-to-female (or a lower female-to-male wage ratio) is associated with a higher female service share (or the total service employment share), which is consistent with the stylized fact.

Proposition 1: *Even females have a comparative advantage in services, a higher service employment share for both genders is associated with a lower female-to-male wage ratio if the gender norm is large enough.*

Next, we show that structural transformation is associated with service expansion in SSA countries. To solve for the wage ratio in equilibrium, we first calculate the price ratio using (11) to equalize males' wages in both sectors,

$$\frac{p_s}{p_{ns}}=\frac{A_{ns}}{A_s}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\sigma}{\sigma-1}}\left(\frac{S_{m,s}}{S_{m,ns}}\right)^{\frac{1}{\sigma-1}} \tag{18}$$

Combine the optimal consumption condition (7) with (18), and use the goods market

[1] There are two possible cases. Case 1: $H_f>\sigma_1>\sigma_2$, meaning that $\frac{1}{\omega}-H_f^{-1/\sigma}\frac{\eta_{ns}}{(1-\eta_{ns})}>\beta_s>\frac{1}{\omega}\left(1-\frac{\eta_{ns}(1-\eta_s)}{\eta_s(1-\eta_{ns})}\right)$. Case 2: If $\sigma_1>H_f$, then we need $\frac{\sigma_1-\sigma_2}{\omega(\sigma_1-H_f)}>\beta_s>\frac{1}{\omega}\left(1-\frac{\eta_{ns}(1-\eta_s)}{\eta_s(1-\eta_{ns})}\right)$. Note these conditions are sufficient for a higher male service share.

clearing conditions $c_{m,s} + c_{f,s} = Y_s, \quad c_{m,ns} + c_{f,ns} = Y_{ns}$, we get

$$\theta \left(\frac{A_{ns}}{A_s}\right)^{\nu-1} = \left(\frac{L_{mns}}{L_{ms}}\right)^{\frac{\nu-1}{\sigma-1}} \left(\frac{w_m L_{ms} + w_{fs} L_{fs}}{w_m L_{mns} + w_{fns} L_{fns}}\right)^{\frac{\nu-\sigma}{\sigma-1}} \tag{19}$$

where $\theta = \left(\frac{\rho}{1-\rho}\right)^{\nu} \left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{(\nu-1)\sigma}{\sigma-1}}$ is a constant.

Since $\frac{w_{fs}L_{fs}}{w_m L_{ms}} = \omega^{\sigma-1} \left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma}$ and $\frac{w_{fns}L_{fns}}{w_m L_{m,s}} = \left(\frac{\omega}{1-\beta_s\omega}\right)^{\sigma-1} \left(\frac{\eta_{ns}}{1-\eta_{ns}}\right)^{\sigma}$, the right-hand side of (20) can be simplified to

$$\left(\frac{L_{mns}}{L_{ms}}\right)^{\frac{\nu-1}{\sigma-1}} \left(\frac{w_m L_{ms} + w_{fs} L_{fs}}{w_m L_{mns} + w_{fns} L_{fns}}\right)^{\frac{\nu-\sigma}{\sigma-1}} = \frac{L_{mns}}{L_{ms}} \left(\frac{1 + \omega^{\sigma-1} \left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma}}{1 + \left(\frac{\omega}{1-\beta_s\omega}\right)^{\sigma-1} \left(\frac{\eta_{ns}}{1-\eta_{ns}}\right)^{\sigma}}\right)^{\frac{\sigma-\nu}{1-\sigma}} \tag{20}$$

Suppose β_s is zero, a higher ω indicates a lower service labor share, and thus $\frac{L_{mns}}{L_{ms}}$ increases in ω. Moreover, as since $\eta_s > \eta_{ns}$, the last term also increase in ω. Therefore, the structural transformation must be associated with a lower male-to-female wage ratio to make the equation hold, contradicting the empirical pattern.

Now if the gender norm is large enough, as the ratio between male service to non-service labor share increases with the female labor share in the service sector, equation (14) indicates higher ω leads to a higher female service labor share, and thus a lower non-service share in the economy. Therefore, the first term on the right-hand side of (20) decreases over time (as κ also increases in ω). Finally, the second term on the RHS decreases with ω if $\frac{1}{2} < \beta_s\omega < 1$ or $\frac{1-2\beta_s\omega}{(1-\beta_s\omega)^{2-\sigma}} > \left(\frac{\eta_s}{1-\eta_s}\frac{1-\eta_{ns}}{\eta_{ns}}\right)^{\sigma}$.

Proposition 2: *The structural transformation decreases female-to-male wage ratio if the gender norm is large enough.*

The model also generates predictions of intrahousehold bargaining power, represented by the expenditure share of male to total household income, i.e. $\lambda = \frac{w_m L_m}{w_m L_m + w_{fs} L_{fs} + w_{fns} L_{fns}}$. As the female-to-male income ratio is decreasing in the male-to-female wage ratio ω, the structural transformation leads to a lower (higher) bargaining power of females (males) at home.

Proposition 3: *The structural transformation and gender norms reduce female bargaining*

power at home. All else equal, a higher gender norm β_s is associated with a lower intrahousehold bargaining power of females.

In the following sections, we test the model using cross-country structural transformation data and household-level bargaining power to test the model in the context of SSA. Specifically, we test if the empirical pattern is in line with the model predictions.

4 Background and empirical data

Intrahousehold bargaining as a determinant of household decision-making has attracted significant research interest since the elevation of gender equality as a global agenda in the Millennial Development Goals (MDGs) in 2000 and the Sustainable Development Goals (SDGs) in 2015. Doss (2013) and Ringdal and Sjursen (2021) show that household members bargain from a wide range of things, ranging from consumption and expenditure to production, and this occurs both implicitly and explicitly. Women's bargaining power has been shown to be essential for a household's consumption of food, education, utilities and children's health (Doss, 1996; Afoakwah et al., 2020; Novignon et al., 2019). Historically, most SSA societies have been patriarchal and run by men (Shoola, 2014). This patriarchal nature of many societies in SSA limits the roles of women in household decision-making. In a study of intrahousehold bargaining and distributional outcomes regarding new agricultural technology deployed among agricultural households in rural Uganda, it was found that though the deployment of the technology improved the economic fortune of the households, the proceeds do not necessarily get into the women's pockets. Women are benefactors and men are beneficiaries of the new technology (Lodin, 2012). This is partially consistent with our findings that structural change or technological progress weakens females' bargaining power at home. In the following sections, we present the data and empirical specifications we use to test the model.

4.1 Demographic and Health Surveys

Our main data source is the Demographic and Health Surveys (DHS). DHS are nationally representative household-level surveys carried out in developing countries around the world. For Sub-Saharan Africa, we assembled all the publicly available DHS between 1986 and 2021, resulting in a total of 73 surveys across 40 countries. However, merging both the economic transformation database and available bargaining variables leads to a panel dataset of 16 countries consisting of Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia.

Table 2 documents the summary statistics of the DHS sample we use. The table presents a comprehensive overview of key characteristics and dynamics among women in SSA collected by DHS. Women in these countries are, on average, approximately 31.4 years old, with a relatively high marriage rate (73.1%) and a significant proportion currently engaged in work (92.7%). The average age at first cohabitation is 18.3 years, while the age at first sexual experience is slightly earlier at 15.9 years. Women express an ideal number of children around 5.1, reflecting their family size preferences. In terms of household characteristics, the average number of children in households is 3.6, and husbands/partners tend to be older (40.3 years) with about 6.8 years of education. Notably, only a small percentage (4.2%) of women report earning more than their husbands or partners. Furthermore, women's involvement in decision-making within their households varies but is relatively high for decisions related to the money they earn (83.9%) and healthcare (56.5%). However, fewer women are involved in decisions about large household purchases (48.3%). The table also highlights concerning aspects, with a notable proportion of women reporting experiences of physical harm, particularly from husbands/partners (11.5%), underscoring the need for attention to gender-based violence in SSA. These insights are drawn from a substantial dataset comprising 90,131 observations, providing a comprehensive snapshot of the multifaceted dynamics of women's lives in the region.

4.2 Outcome variable

The bargaining measure is based on questions about female decision-making participation variables.[2] Five questions ask the female correspondent who usually decides what to do with the money the respondent earns; the person who usually decides on the respondent's health care; the person who usually decides on large household purchases; the person who usually decides on household purchases for daily needs; the person who usually decides on visits to family or relatives. We consider the answer to be either the wife's decision or the wife and husband jointly deciding and participating in decision-making.

As we have multiple questions to measure the underlying female decision-making in household choices, we reduce the dimensionality of measures by exploratory factor analysis (EFA) using oblique quartimin rotation (Gorsuch, 1983). EFA is used to summarize the relevant household choice measures into aggregate indexes of female intrahousehold bargaining power. The number of factors to be retained is determined using both Horn (1965)'s parallel analysis, as shown in figure 3 as well as the Kaiser's criterion (Cattell, 1966) shown in Appendix figure A4. Both results suggest that there is only one underlying factor across different female decision-making in household choices.

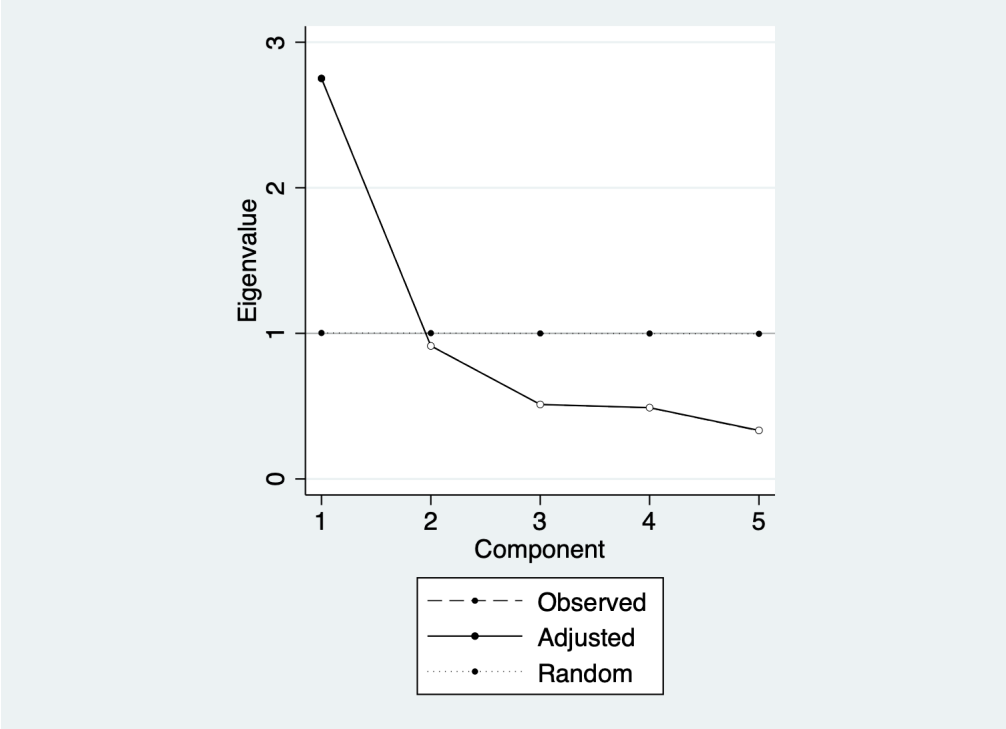
4.3 Economic Transformation Database

Employment share by sector is from the Economic Transformation Database. Merging both the economic transformation database and bargaining measures leads to a panel dataset of 16 countries consisting of Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia.

As shown in Table 4, wage levels vary significantly across sectors, with the service sector having the highest mean wage, followed by the industry, and the agriculture. The service sector also demonstrates the smallest gender wage gap, with a gender wage ratio of 0.88, indicating that women in this sector earn 88 percent of what men earn. Agriculture follows closely with a gender wage ratio of 0.86. In contrast, the industry sector exhibits the largest

[2]Note the bargaining question is not available across all countries in DHS.

Figure 3: Horn's (1965) parallel analysis for the number of factors for female decision-making in household choices.



Notes: Five questions ask the female correspondent who usually decides what to do with the money the respondent earns; the person who usually decides on the respondent's health care; the person who usually decides on large household purchases; the person who usually decides on household purchases for daily needs; the person who usually decides on visits to family or relatives. We consider the answer to be either the wife's decision or the wife and husband jointly deciding and participating in decision-making. Source: Demographic and Health Surveys.

Table 2: Summary Statistics of Females in Sub-Saharan Africa

	Mean	S.D.
Individual characteristics		
Age	31.435	8.741
Married	0.731	0.444
Currently working	0.927	0.261
Age at first cohabitation	18.348	4.279
Age at first sex	15.936	5.074
Ideal number of children	5.076	2.548
Household characteristics		
Number of children	3.643	2.795
Husband/partner's age	40.279	11.352
Husband/partner's number of years of education	6.760	5.023
Respondent earns more than husband/partner	0.042	0.202
Women say they are involved in decision on		
The money they earn	0.839	0.367
Their health care	0.565	0.496
Large household purchases	0.483	0.500
Household purchases for daily needs	0.623	0.485
Visits to family or relatives	0.628	0.483
Women who have ever been physically hurt by		
Husband/partner	0.115	0.402
Mother/step mother	0.062	0.332
Father/step father	0.048	0.313
Daughter/son	0.006	0.238
Sister/brother	0.033	0.286
Observations	90131	

Notes: Number of children refers to the total number of children that female respondents ever born. Women are counted as having ever been physically hurt by a husband/partner if a "Yes" response is recorded for any one of several variables pertaining to specific results of a husband or partner's violent actions. Source: Demographic and Health Surveys.

Table 3: Gender differences in summary Statistics of employment in Sub-Saharan Africa

	Male		Female		Difference
	Mean	S.D.	Mean	S.D.	
Unemployment rate	6.826	7.095	8.276	9.487	-1.450*
Employment rate in agriculture	59.719	15.362	62.643	20.732	-2.924*
Employment rate in industry	12.003	5.195	7.266	5.553	4.737***
Employment rate in service	28.280	10.854	30.092	17.261	-1.812
Total employed in agriculture	3696.129	4262.174	3239.281	3014.869	456.848
Total employed in industry	631.389	704.425	427.534	690.026	203.855***
Total employed in service	1681.324	2358.085	1728.814	2825.604	-47.490
Labour force participation rate	78.857	8.442	68.909	13.521	9.948***
Observations	435	435	435	435	870

Notes: The last column shows the result from a two-sample t-test unpaired data with unequal variance. Total employment in each sector is measured in thousands. Data is from the Economic Transformation Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia.

gender wage gap, with a ratio of 0.67, highlighting a notable disparity in earnings between male and female workers. In addition, Table 3 shows that the industry sector has the largest gender employment gap in SSA.[3]

4.4 Gender Norm

To measure gender norms, we collect data from the World Bank Gender Data Portal. The Women, Business and the Law (WBL) Group collected data from over 2,000 respondents in each country and used standardized questionnaires to ensure comparability across economies. Then a country-level WBL index is constructed by the unweighted average of the indicator-level scores. There are 8 indicators in total and each contains 4 to 5 yes-no questions, covering mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension. We use the WBL index in our main specification. However, we also use the pay indicator alone as a robustness check, as the questions covered by the indicator are the most relevant to the work conditions of females. [4]

[3]For a detailed description of SSA economies, see Appendix B.
[4]See the questions in Appendix

Table 4: Summary Statistics of earnings and employment in Sub-Saharan Africa

	mean	sd
Panel A: Wage		
Agriculture	123.82	92.55
Industry	288.25	278.94
Service	354.39	265.63
Total	251.28	191.68
N	54	
Panel B: Purchasing power parity		
Agriculture	269.53	183.43
Industry	604.06	485.56
Service	754.47	440.19
Total	532.95	330.66
N	56	
Panel C: Gender wage ratio		
Agriculture	0.86	0.43
Industry	0.67	0.22
Service	0.88	0.23
Total	0.75	0.16
N	56	
Panel D: Gender employment ratio		
Agriculture	0.95	0.30
Industry	0.53	0.36
Service	0.90	0.30
Total	0.90	0.14
N	435	
Panel E: GDP share		
Agriculture	16.33	9.63
Industry	26.44	6.14
Service	49.56	6.05
Total	100.00	0.00
N	48	

Notes: Data is from the Economic Transformation Database and covers Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Malawi and Mozambique are not included (for the gender employment ratio) due to data availability. Wage is measured in US dollars. The wage ratio refers to the ratio of female to male wages. The employment ratio refers to the ratio of female to male employment.

5 Empirical test: Intrahousehold Bargaining Power

Our main goal is to test the impact of structural transformation on the intrahousehold bargaining power of females in SSA countries, taking into account the potential influence of gender norms. We start with a two-way fixed effect estimation and then conduct an instrumental variable estimation to control for the endogeneity of the structural transformation.

5.1 Two-way fixed effect estimation

First, the two-way fixed effect estimation is as follows,

$$Y_{iot} = \alpha + \beta C_{ot} + \gamma_o + \tau_t + \epsilon_{idt} \tag{21}$$

where C_{ot} is the sectoral employment share of country o at year t, and Y_{iot} is the outcome of interest. This specification includes country-fixed effects γ_o and year-fixed effects τ_t.

However, there might be time-varying omitted variables as confounding if they influence both sectoral employment share and outcome variables. This would cause bias as the effect of the omitted variable would be attributed to the impact of sectoral share. Therefore, we employ an instrumental variable strategy, which is explained in the following section.

5.2 Instrumental variable (IV) approach

To further investigate the causal effect of structural transformation on female empowerment, we employ international price shocks as an instrument for local structural transformation as in Imbert et al. (2022). Agricultural income shocks have been shown to significantly influence the labor outflow from the agriculture sector, which is the key to the structural transformation. Following a similar empirical strategy, we instrument the sectoral employment shares using variations in international crop prices.

We construct an index, denoted as the agricultural income shock (s_{ot}), based on two

key variables: (1) agricultural patterns: potential agricultural export for a specific product in a given country; (2) Innovation in commodity prices, measured by agricultural producer prices. s_{ot} for a particular country o and year t is computed as the average percentage deviation in product prices, where the deviation is weighted by the expected share of each product in the country's agricultural revenue. Specifically, the instrumental variable equation is represented as follows

$$s_{ot} = \frac{\sum_c \bar{p}_c q_{co} \hat{\varepsilon}_{ct}}{\sum_c \bar{p}_c q_{co}},$$

where $\bar{p}_c$ is the nominal international price for the product in the initial year, averaged across countries and weighted by their export shares; q_{co} is the potential export for the agricultural product c in the country o in the initial year; $\hat{\varepsilon}_{ct}$: Innovation in the logarithm of nominal prices for the product c and the year t, estimated using a first-order auto-regressive model.

5.3 Instrumental variable data

Data from 2001 to 2022 is collected from the TRADE MAP wherever available, which contains information on both the value and quantity of exported products at the Harmonized System 4 (HS4) level. [5] For the agricultural products, we focused on products within HS2 groups 01-24, covering animal and animal Products (01-05), vegetable products (06-15), and foodstuffs (16-24).

To calculate the price, we excluded rows with units other than "Tons" and with zero or missing values. We focused on the "Tons" unit due to its dominance across multiple years, countries, and products (see table 5). In contrast, other units displayed less consistency with the data, and retaining them would hinder cross-country price comparisons. As a result, 5,357 observations have been removed, leaving 58,610 remaining.

[5] The HS4 code represents a more specific four-digit product classification within the international trade classification system, facilitating the identification of product categories for customs and trade purposes.

Table 5: Different units of agricultural products

Name	Freq.	Percent
Cubic meters	183	0.30
Mixed	105	0.17
No quantity	1,570	2.59
Thousands	4	0.01
Tons	58,610	96.72
Units	128	0.21
Total	60,600	100.00

We calculated the global price ($\bar{p}_c$) of each agricultural product by dividing the "Value" by the "Quantity". Specifically, we derived each product's global price by computing a weighted average across countries, with the weights based on their export shares. We employ a specific exclusion method as Imbert et al. (2022). First, for each country-product combination, we calculate the average price of that particular product across all countries except for the country of interest. We then aggregate this variable across all countries, using export share weights, to obtain the global price.

We calculate the presence of agricultural products by year and country and select the earliest year 2001 as the initial year to control for endogeneity. In Appendix 5.2, we present summary statistics for our IV and a table outlining the crops subjected to IV. Additionally, we provide rankings of export quantity and value among SSA countries.

5.4 Obtaining the instrumental variable

To obtain the instrumental variable (s_{ot}), which serves as a crucial component in our causal analysis of the relationship between structural transformation and female empowerment, we follow four steps:

1. Compute the international price for each product by dividing the "value" by the "quantity" and then averaging across countries, weighted by their global export share.

2. Estimating an AR(1) model for the annual global price:

$\log(p_{ct}) = \theta \log(p_{ct-1}) + \eta_t + \nu_c + \varepsilon_{ct}$

3. Calculating $\hat{\varepsilon}_{ct}$ by finding the residual between actual and predicted prices.

$$\hat{\varepsilon}_{ct} = \log(p_{ct}) - (\theta \log(p_{ct-1}) + \eta_t + \nu_c)$$

These residuals represent innovations in the logarithm of nominal prices after considering the auto-regressive relationship and other factors specified in the model.

4. Use potential agricultural export in the initial year (q_{co}), nominal international price in the initial year ($\bar{p}_c$) and annual innovations in commodity prices ($\hat{\varepsilon}_{ct}$) to calculate s_{ot}.

5.5 Main results: two-way fixed effects estimation and instrumental variable estimation

Table 6 reports the coefficients from two-way fixed effects estimation with country- and year-fixed effects. Note we standardized the dependent and independent variables. Changes in one standard deviation in the service share of employment (percentage of total employment) are significantly negatively associated with a 0.57 standard deviation of changes in female bargaining power. Column (4) suggests that around 20 percent of the association is driven by changes in the gender composition in the service sector. In contrast, accounting for shifts in female labor force participation yields negligible effects, implying that the crucial factor lies in the gender disparity within the structural transformation of employment opportunities.

Table 6: Female bargaining power and service employment share

	(1)	(2)	(3)	(4)
Service employment share	-0.573***	-0.577***	-0.483***	-0.463***
	(0.089)	(0.084)	(0.011)	(0.018)
Female LFP rate		-0.016		
		(0.022)		
Female unemployment rate			-0.034***	
			(0.003)	
Service gender ratio				-0.915***
				(0.159)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	90131	90131	90131	90131

Notes: Standard errors are in parentheses, clustered at the country and year level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Countries include Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. The service gender ratio is the number of females employed in service over the males employed, collected by the World Bank. The labor force participation rate and the unemployment rate are from the World Bank. Bargaining power data is from the Demographic and Health Survey (DHS) and service employment share is from the Economic Translation Database. All data covers 1991 to 2020. We control for country- and year-fixed effects.

However, there might be time-varying omitted variables as confounding if they influence both sectoral employment share and outcome variables. This would cause bias as the effect of the omitted variable would be attributed to the impact of sectoral share. Therefore, we employ an instrumental variable strategy, which was explained in the previous section. We first test the exclusive reaction and find that the IV does not have any significant correlation with female bargaining power. Then we report the first-stage results in Table 7. The F statistics show that the IV is not weak. Column (1) in Table 8 presents the IV estimates, which are similar to the two-way fixed effect estimates. A one standard deviation increase in the service employment share leads to about a 0.45 standard deviation decline in the female bargaining power index.

Next, we test whether structural transformation towards the service sectors impacts female bargaining power is stronger in countries with less restrictive gender norms. We construct a gender norm index equal to one to a country if its WBL index (discussed in section 4.4) is smaller than the median in each year and to zero otherwise. We then interact the GN index with the service employment share. Column (2) in Table 8 shows that service

Table 7: First Stage Results: Regressing Employment Share on IV

	(1) Agriculture	(2) Manufacturing	(3) Service
IV	-0.143***	-0.126***	0.241***
	(0.021)	(0.028)	(0.036)
Year fixed effect	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes
N	78764	78764	78764
F-stat	48.13	19.72	43.98

Notes: Standard errors are in parentheses, clustered at the country and year level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variables are the employment shares in the agriculture, manufacturing, and service sectors, collected from the Economic Transformation Database. We control for country- and year-fixed effects. The Kleibergen-Paap F statistic is reported.

employment share has a more negative impact on bargaining power in countries with more restrictive gender norms on jobs. Columns (2) and (3) control for the respondent's age and work status additionally. The results do not change much.

Table 8: Female bargaining power, service employment share and gender norms using IV

	(1)	(2)	(3)	(4)
Service employment share	-0.449***	-0.449***	-0.427***	-0.418***
	(0.056)	(0.056)	(0.051)	(0.048)
Gender norm × Service share		-0.308***	-0.249***	-0.249***
		(0.019)	(0.021)	(0.020)
Age			0.027***	0.027***
			(0.004)	(0.004)
Work				0.141***
			(0.015)	
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	78764	78764	78764	78562

Notes: The dependent variable is female bargaining power. The key independent variable is the service sector's employment share, where an instrument variable of international agricultural shock is used. Gender norm is a dummy that equals one when the gender norm index described in section 4.4 is smaller than the median, indicating a strong restrictive gender norm. Age is the female respondent's current wage and worked is a dummy equal one when the respondent worked in the last 12 months. We control for country and year-fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6 Robustness check: regional measures of sector employment composition

So far, we leverage within-country variation across time in sector employment composition obtained from the Economic Transformation Database (ETD). As there is no available regional economic measure in SSA, we collect sub-national measures across various data sources aiming to construct consistent regional measures of sectoral employment share to investigate if such a negative relationship between structural transformation and female bargaining power also exists while using within-country geographic variation.

Among the countries with overlapping yearly measures in ETD and five measures of female decision-making, we look for data sources that can be used to compute regional measures of sectoral employment for the same year where household bargaining power is measured, and aggregate sector employment is available. In the end, we are able to merge regional sectoral employment measures for Lesotho and Mozambique (see Table 9). [6]

Table 9: Data Sources for regional employment measures

Country	Year	Data Source
Lesotho	2005	IPUMS
Lesotho	2010	Bureau of Statistics: Household Budget Survey
Lesotho	2014	Bureau of Statistics: Continuous Multi-Purpose Survey
Mozambique	1997	IPUMS
Mozambique	2003	National Institute of Statistics: Household Survey
Mozambique	2004	National Institute of Statistics: Household Survey

Here, we outline the methodology employed to gather data on employment in the selected countries. The primary objective was to collect data from employment surveys and secondary data sources focusing on the agriculture, manufacturing, and service sectors. The research process involved accessing the official websites of national and international organizations and contacting national statistical institutions directly for data requests.

Data aggregation at sector level

We first aggregate all sub-sectors into the three main sectors (agriculture, manufacturing

[6] Regions in each country can be found in the Appendix **??**.

and service) in each region r. For most data sources, we have three sub-sectors for each main sector. Use $P_{kj,r}$ to represent the percentage of people employed in sub-sector k of sector j in region r, the equation for aggregating indicators in sector j would be: $P_{j,r} = \sum_{k=1}^{J} P_{kj,r}$, where $j \in \{a, m, s\}$.

Data aggregation at regional level

Then we aggregate administrative sub-regions into blocks constituting regions, following the definition in DHS surveys. We use the average for all R sub-regions in each region to obtain the employment indicator. Denote the percentages of agriculture, manufacturing and services in the sub-region r of region i as $P_{a,ir}$, $P_{m,ir}$ and $P_{s,ir}$, respectively. The aggregate indicators at the strata level ($P_{a,i}$, $P_{m,i}$, $P_{s,i}$) can be calculated as:

$$P_{a,i} = \frac{1}{R}\sum_{r=1}^{R} P_{a,ir}, \quad P_{m,i} = \frac{1}{R}\sum_{r=1}^{R} P_{m,ir} \quad P_{s,i} = \frac{1}{R}\sum_{r=1}^{R} P_{s,ir}.$$

We then run equation (21) again using our regional-level data, where we change the country-fixed effects into region-fixed effects. As presented in Table 10, regional estimates are similar to our cross-country estimates, where service employment share shows a negative correlation with female intra-household bargaining power.

Table 10: female bargaining power and regional employment measure

	(1)	(2)	(3)	(4)	(5)	(6)
Service Employment Share	-0.287*	-0.287*	-0.287*	-0.287***	-0.287***	-0.287***
	(0.147)	(0.147)	(0.147)	(0.000)	(0.000)	(0.000)
Year FE	Yes	Yes		Yes	Yes	
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes		No	Yes	
Country-Year FE	No	No	Yes	No	No	Yes
N	6628	6628	6628	6628	6628	6628

Notes: Standard errors are in parentheses, clustered at the region level in columns (1)-(3) and country level in columns (4)-(6). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The database covers Lesotho and Mozambique. The bargaining index is constructed in section 4.2. Regions in each country can be found in Table A9. Data sources can be found in Table 9.

7 Mechanism validation

The mechanism the model works through on bargaining power is closely related to the gender employment share and wage ratio. Here, we show that the model generates predictions of gender employment shares in line with empirical patterns. First, based on proportion 1, if the gender norm is large enough, the model predicts that with the structural transformation, more females should move to the service sector. Second, since $\frac{w_{fs}}{w_{f,ns}}$ is increasing in the male-to-female wage ratio, the female service-to-nonservice wage ratio should increase along with service expansion. Finally, female to male service employment ratio should be increasing based on equation (12). Table 11 shows that the service expansion, or structural transformation, is associated with a higher female service employment share, and a higher female-to-male service ratio in columns (2) and (3). Although the female service-to-nonservice ratio shows a negative coefficient in column (1), it is insignificant. [7] Overall, the model mechanism is consistent with the empirics.

Table 11: Gender employment, wage and structural transformation

	(1) Female Sectoral Wage Ratio	(2) Female Service Employment Share	(3) Female to Male Service ratio
Service employment share	-0.122	1.380***	1.261***
	(1.998)	(0.109)	(0.439)
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	113	113	113

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All data are from the ILO, covering 2000 to 2022. Countries include Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Chad, Comoros, Congo, Dem. Rep., Cote d'Ivoire, Eswatini, Ethiopia, Gambia, The, Ghana, Guinea-Bissau, Kenya, Lesotho, Madagascar, Mauritania, Mauritius, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe. Service employment share is calculated as total service employment over total employment. The female sectoral wage ratio is the average wage of females in service over in non-service. The female service employment share is the ratio of female service employment over total female employment. The female-to-male service ratio is the ratio of total female employment over male employment in the service sector. We control for country- and year-fixed effects.

[7] There are some outliers driving this result. A 99% winsorization turns the coefficient into a positive.

8 Conclusion

This paper investigates the complex interplay between structural transformation, particularly the burgeoning service sector, and gender gaps in Sub-Saharan Africa (SSA). The service expansion in SSA is associated with a decreasing female-to-male wage ratio, opposite to the developed countries.

We build a novel general equilibrium model, combining structural transformation with gender norms to reconcile the facts. We show that even females have comparative advantages in services; if the gender norms are large enough, it can reverse the effect and lead to a lower female-to-male wage ratio in services. The model generates additional predictions about the intrahousehold bargaining power of females. If the norm is large enough, structural transformation can prevent female empowerment. We test the model using empirical data from 16 SSA countries and find consistent results with the prediction. We provide causal evidence using international income shock as an instrument for structural transformation and robustness checks using regional measures within Lesotho and Mozambique. We confirm that service expansion reduces female intrahousehold bargaining power in SSA.

Our work underscores the profound implications of enduring gender norms and social stigmas, which continue to curtail the potential for female empowerment even amidst progressive economic transformations. It stresses that economic transformation alone may not be sufficient in the pursuit of gender equality and women's empowerment in SSA.

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A Appendix Model

Combine the optimal consumption condition (7) with (19), and use the goods market clearing conditions $c_{m,s} + c_{f,s} = Y_s, \quad c_{m,ns} + c_{f,ns} = Y_{ns}$, we get

$$\left(\frac{A_{ns}}{A_s}\right)\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\sigma}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{1}{\sigma-1}} = \left(\frac{1-\rho}{\rho}\right)\left(\frac{c_{ns,j}}{c_{s,j}}\right)^{1/\nu} = \left(\frac{1-\rho}{\rho}\right)\left(\frac{Y_{ns}}{Y_s}\right)^{1/\nu} \tag{22}$$

$$\Rightarrow \quad \left(\frac{\rho}{1-\rho}\right)^{\nu}\left(\frac{A_{ns}}{A_s}\right)^{\nu-1}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\sigma\nu}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{\nu}{\sigma-1}} = \frac{L_{ns}}{L_s} \tag{23}$$

Since

$$\frac{L_{ns}}{L_s} = \frac{L_{mns}}{L_{ms}}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\sigma}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{\sigma}{\sigma-1}} \tag{24}$$

$$\Rightarrow \quad \left(\frac{\rho}{1-\rho}\right)^{\nu}\left(\frac{A_{ns}}{A_s}\right)^{\nu-1}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\nu\sigma}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{\nu}{\sigma-1}} = \frac{L_{mns}}{L_{ms}}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{\sigma}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{\sigma}{\sigma-1}} \tag{25}$$

$$\left(\frac{\rho}{1-\rho}\right)^{\nu}\left(\frac{A_{ns}}{A_s}\right)^{\nu-1}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{(\nu-1)\sigma}{\sigma-1}}\left(\frac{S_{ms}}{S_{mns}}\right)^{\frac{\nu-\sigma}{\sigma-1}} = \frac{L_{mns}}{L_{ms}} \tag{26}$$

$$\text{Define} \quad \theta = \left(\frac{\rho}{1-\rho}\right)^{\nu}\left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{\frac{(\nu-1)\sigma}{\sigma-1}} \tag{27}$$

$$\theta\left(\frac{A_{ns}}{A_s}\right)^{\nu-1} = \frac{L_{mns}}{L_{ms}}\left(\frac{S_{mns}}{S_{ms}}\right)^{\frac{\nu-\sigma}{\sigma-1}} \tag{28}$$

$$\theta\left(\frac{A_{ns}}{A_s}\right)^{\nu-1} = \frac{L_{mns}}{L_{ms}}\left(\frac{w_m L_{mns}}{w_m L_{mns} + w_{fns} L_{fns}}\right)^{\frac{\nu-\sigma}{\sigma-1}}\left(\frac{w_m L_{ms} + w_{fs} L_{fs}}{w_m L_{ms}}\right)^{\frac{\nu-\sigma}{\sigma-1}} \tag{29}$$

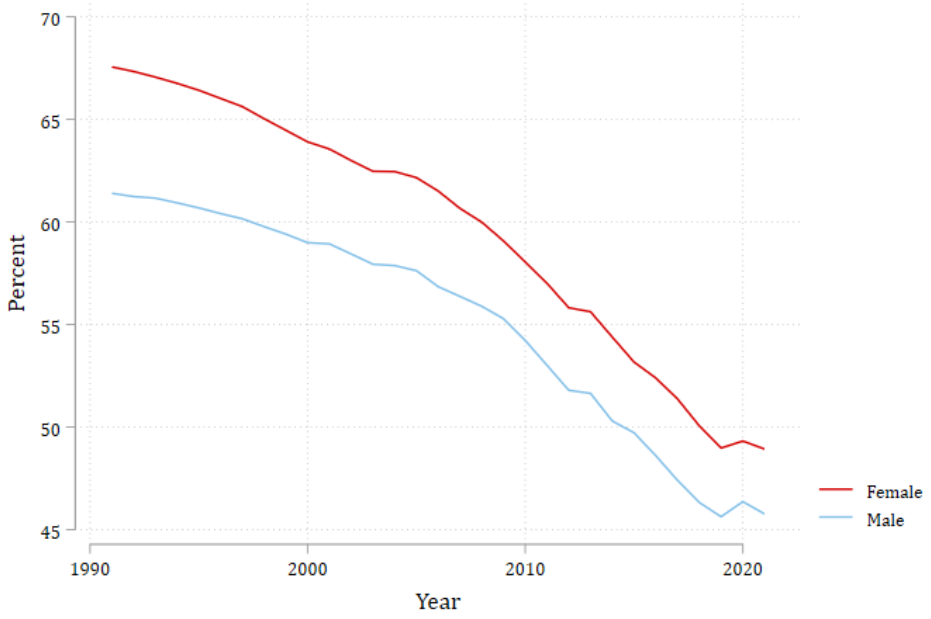
$$\theta\left(\frac{A_{ns}}{A_s}\right)^{\nu-1} = \left(\frac{L_{mns}}{L_{ms}}\right)^{\frac{\nu-1}{\sigma-1}}\left(\frac{w_m L_{ms} + w_{fs} L_{fs}}{w_m L_{mns} + w_{fns} L_{fns}}\right)^{\frac{\nu-\sigma}{\sigma-1}} \tag{30}$$

B Appendix SSA Economies

B.1 Changes in economic sectors over time

In this section, we offer a comprehensive overview of the evolving economic sectors in Sub-Saharan African (SSA) countries over the past three decades. Turning our attention to the subsequent figures, Figures A1, A2, and A3 delve into the gender dimensions within the agricultural, service, and industrial sectors, respectively. Figure A1 Firstly, echoes the observed decline in employment within this sector. Secondly, it reveals a narrowing gender gap in agricultural employment, suggesting a convergence in male and female participation.

Appendix Figure A1: Percent of Each Gender Employment in Agriculture Sector in Sub-Saharan African Countries.

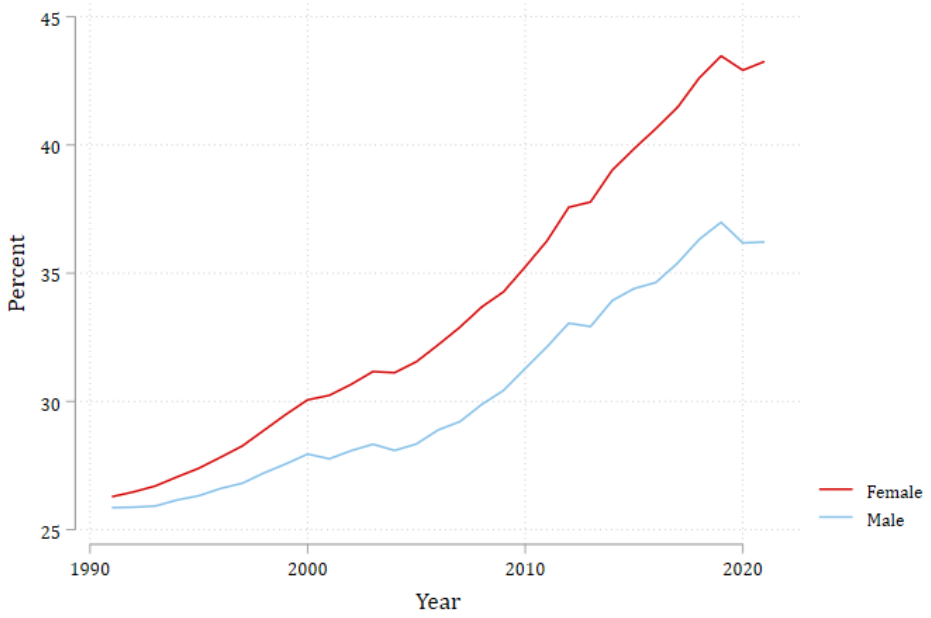


Notes: Data for this Figure represents the changes in economic sector employment in Sub-Saharan African (SSA) countries, calculated as a weighted average based on the working population aged 15 and above. The percentages have been derived from the International labor Organization (ILO) database. The countries included are Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

In contrast, Figure A2 paints a divergent picture within the service sector. As employment within this sector grows, the gender disparity widens relatively. Lastly, Figure A3

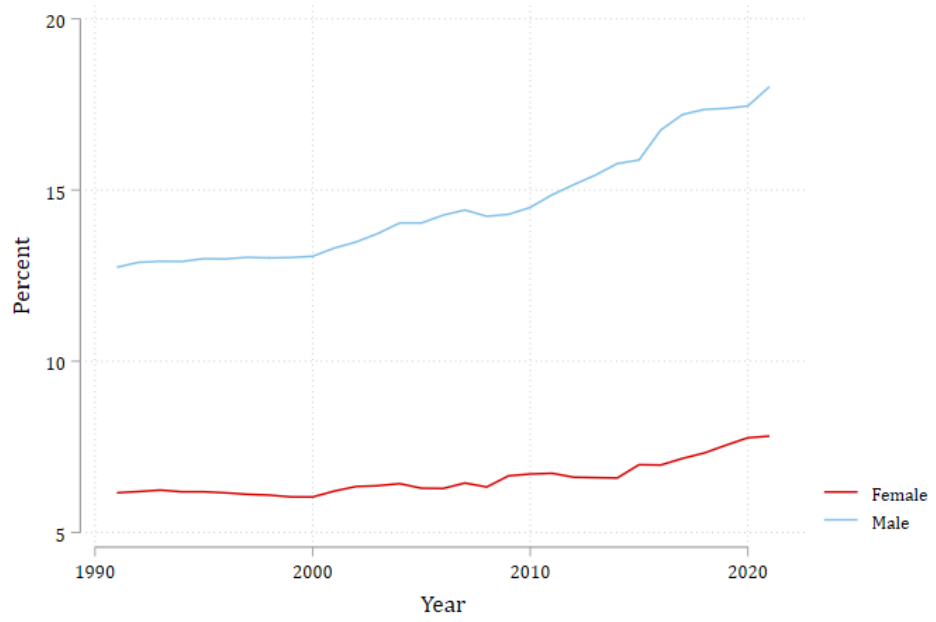
brings the industrial sector into focus. Here, a consistent pattern emerges, with women's participation in this sector remaining relatively steady, while men experience a gradual uptick in employment. For a detailed breakdown of changes at the country level, please refer to the Appendix E.

Appendix Figure A2: Percent of Each Gender Employment in Service Sector in Sub-Saharan African Countries.



Notes: Data for this Figure represents the changes in economic sector employment in Sub-Saharan African (SSA) countries, calculated as a weighted average based on the working population aged 15 and above. The percentages have been derived from the International labor Organization (ILO) database. The countries included are Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

Appendix Figure A3: Percent of Each Gender Employment in Industry Sector in Sub-Saharan African Countries.



Notes: Data for this Figure represents the changes in economic sector employment in Sub-Saharan African (SSA) countries, calculated as a weighted average based on the working population aged 15 and above. The percentages have been derived from the International labor Organization (ILO) database. The countries included are Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

A brief description of the distribution of employment within the 3 sectors of activity in the study countries shows the dominance of the agriculture sector as a provider of employment.

Appendix Table A1: Share of employment by sector

Sector	N	Mean/Proportion	SD
Agriculture	347	0.51	.277
Manufacturing	323	0.10	.0878
Service	323	0.39	.24

Notes: Aggregate share of employment from the sub-national indicators.

More specifically, the following table provides information about the distribution of employment across three economic sectors (Agriculture, Manufacturing, and Service) for different years spanning from 1987 to 2020.

Appendix Table A2: Share of employment by economic sector and year

Year	Agriculture	Manufacturing	Service
1987	0.74	0.09	0.18
1989	0.43	0.09	0.48
1996	0.67	.	.
1997	0.77	0.15	0.08
1998	0.47	0.07	0.45
2000	0.85	0.07	0.07
2001	0.52	0.08	0.40
2002	0.72	.	.
2003	0.85	0.03	0.12
2004	0.82	0.12	0.06
2005	0.54	0.12	0.34
2008	0.58	0.05	0.37
2010	0.51	0.05	0.45
2011	0.51	0.07	0.42
2012	0.59	0.11	0.30
2013	0.42	0.07	0.51
2014	0.27	0.10	0.63
2015	0.62	0.12	0.26
2016	0.32	0.13	0.55
2018	0.33	0.18	0.47
2019	0.35	0.24	0.42
2020	0.39	0.37	0.25

Note: The values in the table represent the share of employment in each economic sector for the respective years. Missing data for 1996 and 2002 are due to the fact that for these years, we do not have data for the country concerned: Zambia.

Table A2 shows how the distribution of employment has changed over time. For instance, in 1987, Agriculture accounted for the highest share of employment at 74%, followed by Service (18%) and Manufacturing (9%).

It is interesting to note that by 2000, Agriculture's share had dropped significantly to 85%, while Manufacturing and Service sectors saw slight increases in their shares.

The data suggests a notable shift away from Agriculture towards the Service sector. This shift is indicative of economic development and a transition towards a more diversified economy.

There is noticeable variability in the share of employment across the years, indicating potential economic shifts, policy changes, or external factors influencing the labor market.

Appendix Table A3: Descriptive Statistics by Country

Country	Variable	Mean	Std. dev.	Min	Max
Angola	Agriculture	0.354	0.192	0.019	0.594
	Manufacturing	0.127	0.064	0.038	0.255
	Service	0.520	0.160	0.322	0.910
Benin	Agriculture	0.426	0.226	0.071	0.752
	Manufacturing	0.118	0.061	0.034	0.268
	Service	0.456	0.192	0.195	0.806
Burkina Faso	Agriculture	0.854	0.181	0.321	0.964
	Manufacturing	0.028	0.035	0.002	0.110
	Service	0.120	0.149	0.033	0.571
Gabon	Agriculture	0.556	0.196	0.418	0.694
	Manufacturing	0.303	0.018	0.291	0.316
	Service	0.140	0.178	0.014	0.266
Gambia	Agriculture	0.145	0.128	0.030	0.420
	Manufacturing	0.248	0.073	0.169	0.395
	Service	0.609	0.153	0.328	0.761
Ghana	Agriculture	0.320	0.288	0.004	0.761

	Manufacturing	0.121	0.056	0.009	0.220
	Service	0.560	0.240	0.172	0.837
Kenya	Agriculture	0.430	0.244	0.016	0.643
	Manufacturing	0.090	0.075	0.029	0.265
	Service	0.480	0.211	0.294	0.890
Lesotho	Agriculture	0.314	0.142	0.066	0.692
	Manufacturing	0.107	0.075	0.016	0.317
	Service	0.580	0.158	0.231	0.850
Liberia	Agriculture	0.633	0.141	0.388	0.752
	Manufacturing	0.041	0.017	0.024	0.061
	Service	0.326	0.151	0.210	0.589
Malawi	Agriculture	0.808	0.022	0.792	0.852
	Manufacturing	0.035	0.008	0.029	0.050
	Service	0.161	0.020	0.120	0.174
Mali	Agriculture	0.634	0.275	0.017	0.936
	Manufacturing	0.097	0.087	0.017	0.334
	Service	0.271	0.246	0.047	0.840
Mozambique	Agriculture	0.812	0.160	0.100	0.929
	Manufacturing	0.104	0.106	0.010	0.544
	Service	0.084	0.069	0.020	0.356
Namibia	Agriculture	0.385	0.194	0.030	0.671
	Manufacturing	0.058	0.067	0.000	0.204
	Service	0.557	0.162	0.329	0.889
Nigeria	Agriculture	0.565	0.215	0.006	0.929
	Manufacturing	0.046	0.037	0.010	0.205
	Service	0.389	0.201	0.061	0.879
Rwanda	Agriculture	0.589	0.251	0.068	0.945
	Manufacturing	0.113	0.116	0.019	0.411

	Service	0.298	0.211	0.030	0.778
Senegal	Agriculture	0.493	0.275	0.089	0.928
	Manufacturing	0.101	0.070	0.022	0.217
	Service	0.406	0.234	0.051	0.813
South Africa	Agriculture	0.081	0.016	0.062	0.097
	Manufacturing	0.125	0.017	0.109	0.149
	Service	0.794	0.023	0.778	0.829
Uganda	Agriculture	0.540	0.234	0.199	0.799
	Manufacturing	0.117	0.058	0.047	0.194
	Service	0.344	0.188	0.145	0.621
Zambia	Agriculture	0.498	0.261	0.050	0.920
	Manufacturing	0.135	0.109	0.027	0.409
	Service	0.412	0.146	0.189	0.791

Agriculture: The average share of employment in the agriculture sector varies significantly between the countries on the list. On average, agriculture employs a substantial share of the workforce in these countries. Burkina Faso, with an average of 75.3%, stands out as a country heavily dependent on agricultural employment. Malawi and Mozambique also show high average values of 80.0% and 81.2% respectively, indicating a similar dependence on agriculture for employment. South Africa, on the other hand, has a significantly lower average value of 8.1%, indicating a lesser emphasis on agricultural employment. This disparity highlights the diversity of employment landscapes and levels of agricultural employment in these countries.

Manufacturing: On average, manufacturing accounts for a smaller share of employment than agriculture and services. Average values for manufacturing employment range from 3.1% in Burkina Faso to 13.0% in Gabon. This indicates that while some countries place greater emphasis on employment in manufacturing, others have a much smaller industrial sector in terms of employment. The generally lower mean values for manufacturing

employment suggest that in many of these countries, manufacturing plays a less important role in employment. Even in countries with higher average values for manufacturing employment, this sector still lags behind agriculture and services in terms of employment.

Services: The service sector tends to employ the largest share of the workforce in the countries listed in the table. On average, it accounts for a substantial share of employment. South Africa stands out with an average share of employment in the service sector of 79.4%, indicating a high dependence on services for employment. Other countries such as Ghana (56.0%) and Uganda (34.4%) also emphasize the service sector for employment. However, countries such as Mali (27.1%) and Burkina Faso (12.0%) have lower average values, suggesting a relatively lower dependence on services for employment than the other countries on the list. Overall, the service sector appears to be a crucial source of employment for most of these countries.

In summary, agriculture tends to be a major source of employment in some countries, particularly those with higher mean values like Burkina Faso, Malawi, and Mozambique. Manufacturing, while providing employment, is generally less significant compared to agriculture and services. The service sector stands out as the dominant employer across most of the listed countries, with South Africa, Ghana, and Uganda placing a particularly strong emphasis on services for employment.

C Instrumental Variable

In this appendix, we present three statistical summary tables related to our instrumental variables. Table A4 provides a year-based overview of IV, table A6 offers insights based on different countries, and table **??** ranks agricultural products used in constructing IV by export volume and quantity.

Appendix Table A4: IV Summary Statistics by Year

	count	mean	sd	min	max
2002	30	.84014	1.048234	-.8627502	3.194736
2003	29	1.127054	.96128	-.3201246	3.08895
2004	28	.9391813	.8385278	.1200225	2.893203
2005	28	.7450318	.3360716	-.0302603	1.803669
2006	27	.8992034	.3838274	.0128626	1.616729
2007	31	.7127174	.4624275	-.3848705	1.517791
2008	31	.6328908	.3769852	.1447704	2.169792
2009	31	.8347374	.6292063	-.3108367	2.187717
2010	32	.8756746	.4359233	.1741101	1.76253
2011	32	.7645016	.4173134	-.0953832	1.382237
2012	33	.6690807	.6117865	-1.460788	1.537709
2013	31	.9094586	.5674945	.2474891	2.264309
2014	33	.9240179	.5321107	.0793697	2.166818
2015	33	1.053264	.6535563	.239143	2.459091
2016	33	1.260708	1.208406	-1.816544	3.63974
2017	34	1.22084	1.050562	.0000681	3.651386
2018	35	1.328039	.9524011	.5631435	3.367186
2019	35	1.221426	.8924515	.1152462	3.302193
2020	35	1.086205	.8740828	-.0966114	3.067011
2021	35	.9451484	.8406081	.2248661	2.888695
2022	35	1.199293	.8083981	.0679952	2.820261
Observations	671				

Notes: Database with the coverage of Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Côte d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Appendix Table A6: IV Summary Statistics by Country

	count	mean	sd	min	max
Angola	15	.594477	.7749616	-1.460788	1.644825
Benin	21	.5674474	.3049361	-.0966114	1.251516
Burkina_Faso	21	.7377423	.4055134	.180092	1.898033
Burundi	20	.8557092	.4939018	-.8627502	1.514211
Cameroon	21	.697915	.1552022	.2903164	.8720431
Central_African_Republic	19	.6546983	.3191835	-.0953832	1.16686
Chad	21	.4691703	.5797241	-.7056506	1.960169
Comoros	20	2.427278	.9254685	.3582278	3.651386
Côte_d'Ivoire	21	1.27113	.894125	.5126299	3.355211
Ethiopia	21	.7826924	.222522	.4471005	1.210539
Gabon	21	.3150991	.2433997	-.3201246	.7317373
Ghana	20	.9760553	.1823918	.7209092	1.439759
Guinea	20	.7569071	.2648846	.1708559	1.083379
Kenya	21	1.591254	1.097148	.533461	3.63839
Lesotho	15	.4660785	.3200222	.1137899	1.123021
Liberia	6	.6569173	.0846047	.564144	.7989284
Madagascar	21	2.350598	.9578089	.3611815	3.639135
Malawi	21	.6941421	.3286147	-.2890849	1.077734
Mali	17	.8226734	.1505556	.6232975	1.160086
Mauritania	20	1.33667	.5287776	.3449293	2.811631
Mozambique	21	.6487248	.3417686	.1755651	1.230089
Namibia	21	.2568207	.5245692	-1.816544	.819002
Niger	21	.8068849	.1024728	.5709414	.991987
Nigeria	17	.7392597	.2909336	.2503111	1.149808
Rwanda	21	.894733	.2411388	.4939668	1.565192
Sao_Tome_and_Principe	21	.4337911	.1679995	.0704261	.7118413
Senegal	21	.8544438	.14434	.5106372	1.103286
Sierra_Leone	10	.5133894	.0758042	.4234671	.617883
South_Africa	21	2.380673	.9144521	.3610597	3.636064
Sudan	11	.9288298	.1287268	.7377234	1.145315
Tanzania	21	.9219285	.1870671	.4845144	1.388535
Togo	20	.7990307	.4009715	-.5466008	1.491007
Uganda	21	2.383877	.9162816	.3596743	3.643715
Zambia	21	.8414789	.1599296	.5761247	1.088757
Zimbabwe	21	.7239581	.2671886	-.1209268	1.115515
Observations	671				

Notes: Database with the coverage of Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Côte d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

D Addtional tables

Appendix Table A8: Mean employment variables across countries and years by sector

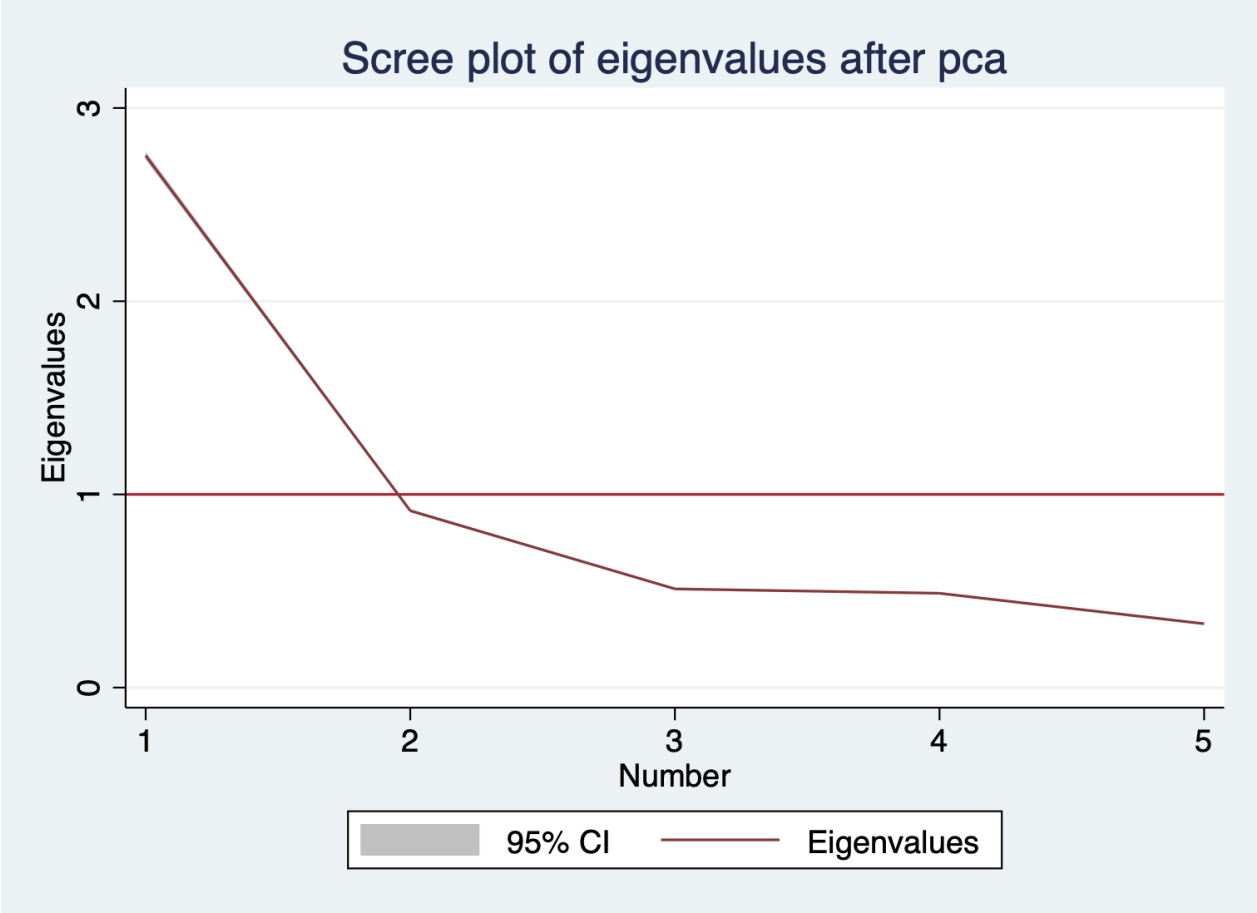
	Male employment rate, %	Female employment rate, %	Male employed, thousands	Female employed, thousands	Employment gender ratio	GDP share, %	Log GDP
Agriculture	38.395	34.143	1854.837	1669.538	0.841	23.460	22.545
	(18.043)	(21.205)	(2933.370)	(2365.034)	(0.317)	(14.375)	(1.507)
Industry	10.211	4.392	405.378	206.665	0.446	24.905	22.545
	(4.924)	(3.453)	(612.850)	(436.388)	(0.340)	(12.733)	(1.507)
Service	21.815	17.576	959.912	897.038	0.798	44.914	22.545
	(7.403)	(8.562)	(1632.674)	(1841.662)	(0.294)	(10.763)	(1.507)
Total	70.419	56.111	3220.086	2773.195	0.787	100.000	22.545
	(11.214)	(17.752)	(4747.507)	(4151.709)	(0.187)	(0.000)	(1.507)
Observations	1363	1363	1363	1363.000	1363	1243	1239

The table reports the average across the countries in our sample and over time of the main employment outcomes by economic sector. The male (female) employment rate in sector x is the ratio of men (women) employed in sector x out of the male (female) working age population. The gender ratio in sector x is simply the ratio of the female employment rate in sector x over the male employment rate in sector x.

Appendix Table A9: Regions by Country: Lesotho and Mozambique

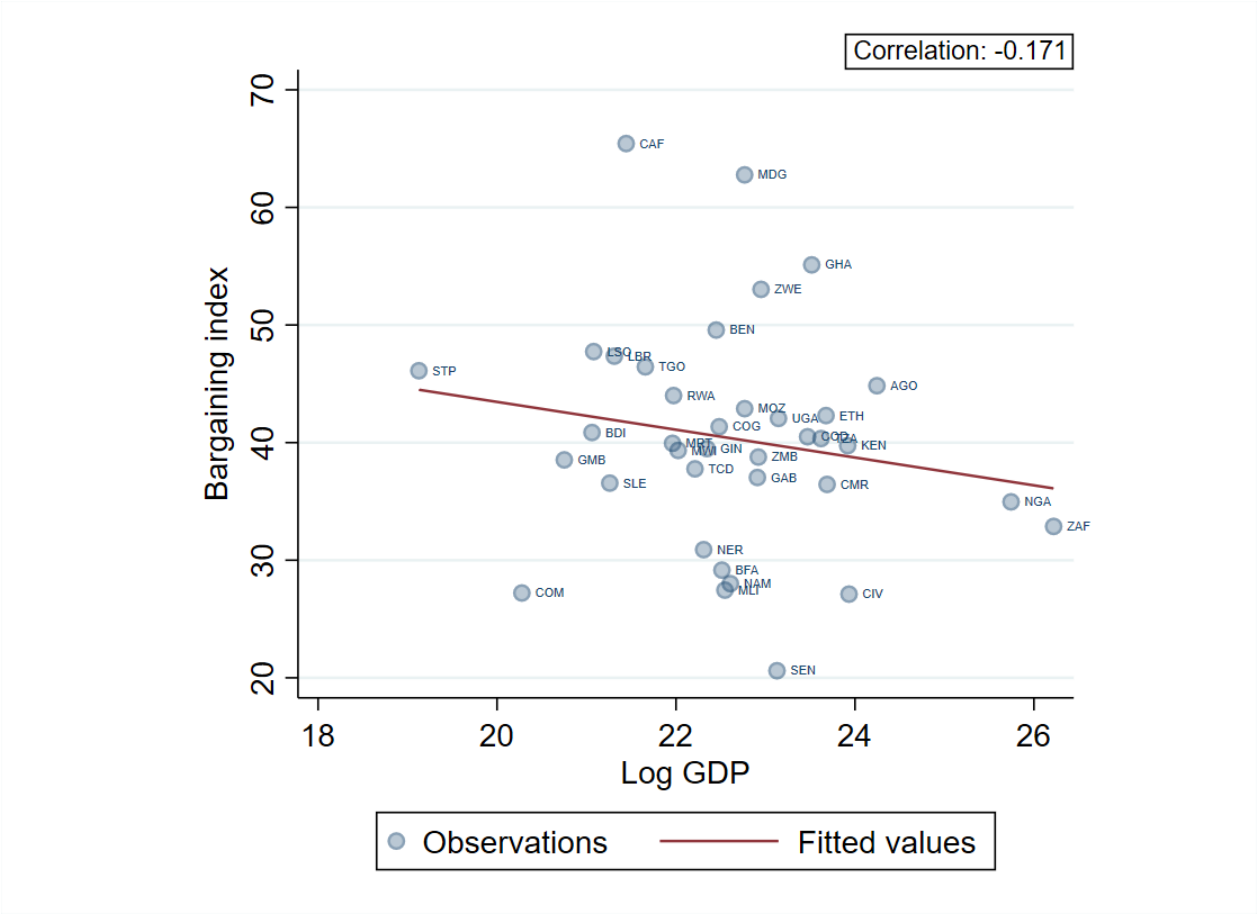
Lesotho	**Mozambique**
Berea	Cabo Delgado
Botha-Bothe	City of Maputo
Leribe	Gaza
Mafeteng	Inhambane
Maseru	Manica
Mohales Hoek	Maputo Provincia
Mokhotlong	Nampula
Qachas Nek	Niassa
Quthing	Sofala
Thaba-Tseka	Tete
	Zambezia

E Additional Figures



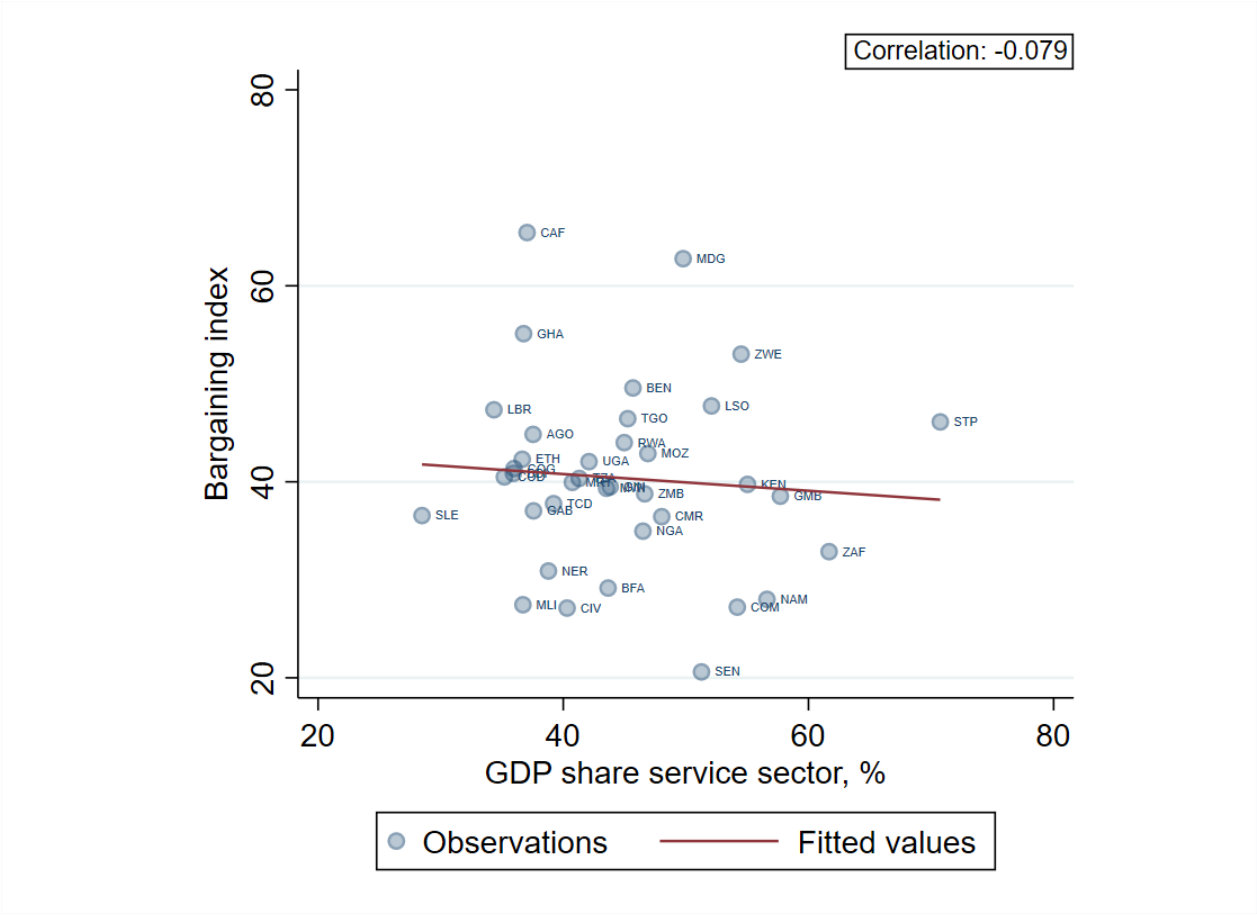
Appendix Figure A4: Factor analysis of female decision-making in household choices. the Kaiser criterion, scree plot (Cattell, 1966).

Appendix Figure A5: Correlation between bargaining index and GDP in logs



Notes: The graph shows the bargaining index associated with each observation in relation to the GDP for each observation. GDP is expressed in logs. The bargaining index also varies on a scale from 0 to 100. The red line is the linear regression fit. The slope of the line, which is equivalent to the correlation coefficient, is 0.013, as reported in the top-right part of the graph. Country codes are reported next to each marker.

Appendix Figure A6: Correlation between bargaining index and GDP share of service sector



The graph shows the bargaining index associated with each observation in relation to the share of GDP represented by the service sector for each observation. The GDP share of the service sector is expressed in percentage points. The bargaining index also varies on a scale from 0 to 100. The red line is the linear regression fit. The slope of the line, which is equivalent to the correlation coefficient, is 0.013, as reported in the top-right part of the graph. Country codes are reported next to each marker.