Structural Transformation and Intrahousehold Bargaining: Evidence from Sub-Saharan Africa [*]

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Abstract

A standard structural change model with intra-household bargaining, connecting Ngai and Petrongolo (2017) and Blundell et al. (2005), predicts that moving out of agriculture increases the female bargaining position by an increase in female-to-male wage ratio due to the rising service sector. However, we reject this prediction using rich micro-level data from Sub-Saharan Africa with both two-way fixed effects estimation and instrumental variable approach. Suggestive evidence shows that around 20 percent of the effect is explained by changes in the gender composition of the service sector. 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 female bargaining power if social stigma is larger than a threshold jointly determined by female comparative advantage and substitutability of labor input between genders. We stress that economic transformation alone may not suffice in achieving gender equality and call for active labor market policies ensuring gender-equal access to service sector jobs.

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

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

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1 Introduction

With little influence over resources and norms, women's voice and agency remain limited in Sub-Saharan Africa (SSA), although it has one of the highest female labor force participation rates at the world level (World Bank, 2014). Gender norms are often persistent in developing countries (Boudet et al., 2013) and cultural changes are relatively rare and slow (Guiso et al., 2015). As directly changing gender norms is challenging, this paper investigates whether economic transformation may influence female empowerment without explicitly targeting them.

Recent developments in SSA countries may bolster female bargaining power, where the service sector has steadily grown from 26 percent in 1991 to over 36 percent of total employment in 2020 (World Bank estimates). Ngai and Petrongolo (2017) show 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. The relative wage is precisely a determinant of intrahousehold bargaining under a collective labor supply model, as demonstrated by Blundell et al. (2005). Therefore, we test the prediction that moving out of agriculture increases female bargaining position by increasing the female-to-male wage ratio due to the rising service sector using rich microdata from SSA countries.

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 data from SSA rejects this prediction. Changes in the share of service employment (percent of total employment) are significantly negatively correlated with changes in

female bargaining power (a latent factor measured from 5 questions on women's decision-making over household choices).

To further establish the causality, we follow the instrumental variable methods from Imbert et al. (2022). We instrument the outflow of agricultural employment using shocks in international crop prices interacted with local cropping patterns. We find that our instrumental variable estimates are similar to the two-way fixed effect estimates.

For robustness check, we collect regional sectoral employment measure in SSA countries. In the end, we are able to merge regional sectoral employmetn measures for Lesotho and Mozambique. Regions in Mozambique meausred include Cabo Delgado, Gaza, Inhambane, Manica, Nampula, Niassa, Sofala, Tete, and Zambezia. Regions in Lesotho measured here are Berea, Botha-Bothe, Leribe, Mafeteng, Maseru, MohalesHoek, Mokhotlong, QachasNek, Quthing, and Thaba-Tseka. The regional estimates are similar to national estimates.

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 labor force participation, particularly employment in private sector (Field et al., 2021), including SSA countries (Dinkelman and Ngai, 2022).

In the model, each household has one male and one female. Females have comparative advantages in the service sector while males 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 has two effects in the model, moving labor out of the non-service sector as it grows faster and

increasing sectoral wages for both genders due to higher productivity. As wages increase, firms need fewer workers. More males than females should stay in the non-service since the former have higher comparative advantages. Therefore, the female-to-male wage ratio in the service sector should increase since female labour is relatively more productive.

Nevertheless, if friction is large enough, the female wage in the service sector must increase much more to compensate for the utility loss. Thus, with the assumption that the bargaining power is determined by the ratio of the total income of each gender, friction could potentially reverse the effect of structural transformation, resulting in a lower female-to-male wage ratio. With more females staying in the service sector with lower wages, males would have rising intra-household bargaining power. This leads to a vicious cycle, where females' wages have to be even higher to compensate for the utility loss. In other words, more females will return to the non-service sector due to the rising bargaining power of males.

Our model solution yields important insights. We show that structural transformation can reduce female bargaining power if social stigma is larger than a threshold jointly determined by female comparative advantage and substitutability of labor input between genders. We validate the model by estimating the magnitude of social stigma against women working in the service sector using empirical data in SSA. We find the estimates are aligned with the model assumption, indicating substantial labor market friction.

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 this sector. 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.

The contribution of this paper is threefolds. 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). Notably, it provides valuable causal evidence on the intricate relationship between structural transformation and female empowerment in Sub-Saharan Africa. Importantly, this study breaks new ground with an investigation of intrahousehold bargaining within the framework of a general equilibrium model.

Second, this paper contributes to female labor supply and gender norm literature Jayachandran (2021); Field et al. (2021); Ashraf et al. (2022); Bursztyn et al. (2023) by showing how social stigma can exert a notable influence on the direction of the impact of structural transformation on female empowerment.

The structure of the paper is as follows. Section 2 documents related literature and institutional background. Section 3 explains data and methods. Section 4 presents the main results. Section 5 presents the robustness check with regional employment measure by sector. 6 presents the general equilibrium model. Finally, Section 7 concludes.

2 Related Literature and Institutional Backgrounds

Structural Transformation and Gender

Firstly, this project contributes to the structural transformation literature by bridging the gap between the changes in sectoral composition from the macro perspective and the intrahousehold bargaining from the micro angle. Until recently, literature started to emphasize the impact of structural change on gender gaps (Ngai and Petrongolo, 2017; Dinkelman and Ngai, 2022; Gottlieb et al., 2023; Ngai et al., 2022).

Ngai and Petrongolo (2017) document the rise in the service sector in the United States since the late 1960s and show it increased demand for female workers. Alongside the

marketisation 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 labour force participation coexists with low average market hours and there is a persistent norms-based limitation on women's work.

Intra-household Bargaining

Much of the pioneer theoretical work on intrahousehold bargaining with collective household labor supply models have 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. (2007, 2005) shows that gender wage differences have a strong influence on bargaining power within couples.

Gender norms and female labor supply

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.

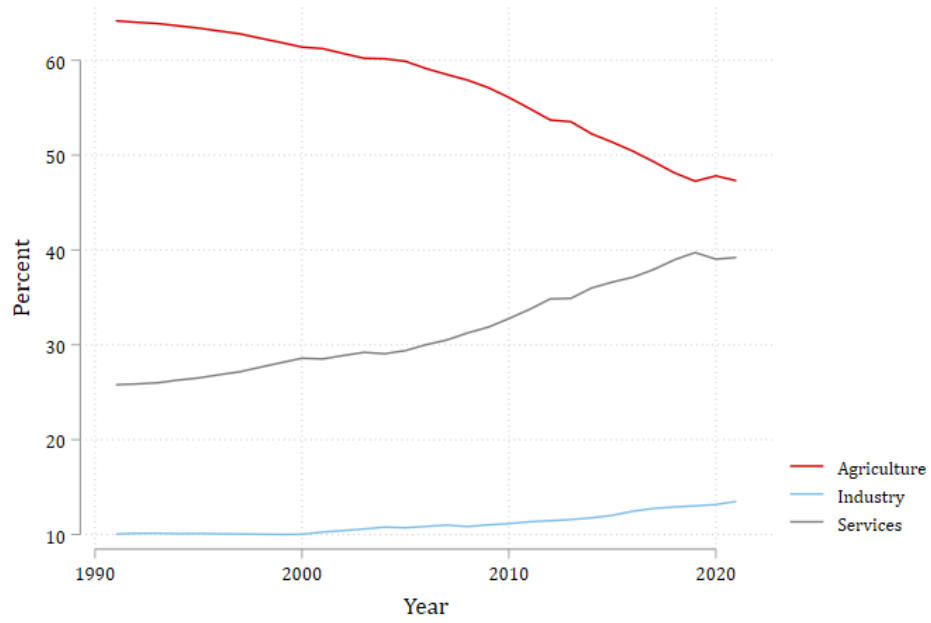
Institutional Background: Intra-household Bargaining in Sub-Saharan Africa

Intra-household 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. While most of the literature conducts case studies of certain countries or regions, we use cross-country panel data to show that structural change can impact women's intra-household bargaining power without directly targeting it.

Structural transformation in Sub-Saharan Africa

We begin our analysis with Figure 1, which illustrates the dynamics in the distribution of labor across economic sectors. Notably, between 1990 and 2020, we observe a noteworthy decline in the agricultural sector's share of employment, which has dipped from over 60% to slightly below 50%. In tandem with this decline, the service sector has exhibited a marked increase, growing from approximately 26% to nearly 36%. Remarkably, the industrial sector has shown relative stability, indicating a comparatively modest transformation during this period. Detailed description see Appendix B

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 Labour 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, Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

3 Data, Measurements, and Methods

3.1 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 1 documents the summary statistics of the DHS sample we use. The table presents a comprehensive overview of key characteristics and dynamics among women in Sub-

Saharan Africa (SSA) collected by DHS. On average, women in this region are 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.

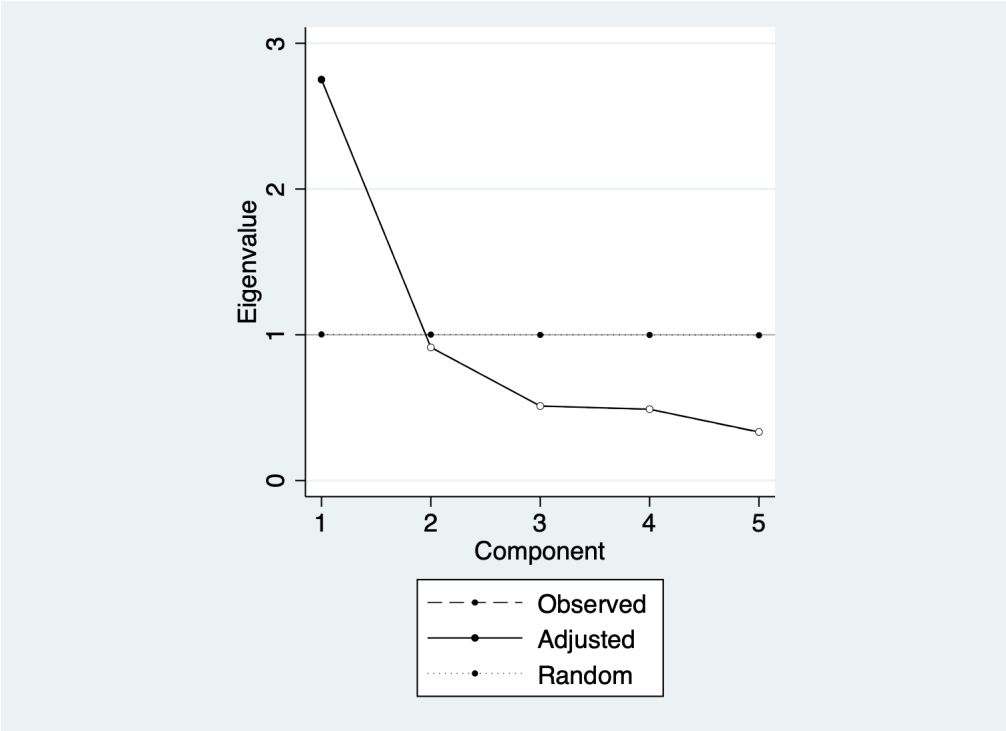
3.2 Outcome variable

The bargaining measure is based on questions about female decision-making participation variables.[1] 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 either the wife decides or the wife and husband jointly decide as participating in decision-making.

As we have multiple questions to measure the underlying female decision-making in

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

Figure 2: 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 either the wife decides or the wife and husband jointly decide as participating in decision-making. Source: Demographic and Health Surveys.

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 2 and the Kaiser's criterion (Cattell, 1966) as shown in Appendix figure A4. Both results suggest that there is only one underlying factor across different female decision-making in household choices.

3.3 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

Table 1: 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 2: 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.

16 countries consisting of Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia.

As shown in Table 3, wage levels vary significantly across sectors, with the service sector having the highest mean wage, followed by the industry, and 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 gender wage gap, with a ratio of 0.67, highlighting a notable disparity in earnings between male and female workers. In addition, Table 2 that the industry sector has the largest gender employment gap in SSA. For a detailed description of SSA economies, see the Appendix B.

3.4 Two-way fixed effect estimation

We use a two-way fixed effect estimation and instrumental variable estimation. First, the two-way fixed effect estimation is as follows,

$$Y_{idt} = \alpha + \beta C_{dt} + \gamma_d + \tau_t + \epsilon_{idt} \tag{1}$$

Table 3: 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.

where C_{dt} is the sectoral employment share of country d at year t, and Y_{it} is the outcome of interest. This specification includes year-fixed effects and country-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 explained in the following section.

3.5 Instrumental variable (IV) approach

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

We construct an index, denoted as the agricultural income shock (s_{ot}), based on two key variables: (1) Cropping patterns: This variable represents information about the potential agricultural output (q_{co}) for a specific crop (c) in a given country (o); (2) Innovation in commodity prices: We gauge this variable using Agricultural Producer Prices.

The instrumental variable equation (s_{ot}) 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 crop (c) in the initial year, averaged across countries and weighted by export share; q_{co} is the potential agricultural output for the crop (c) in the country (o) in the initial year; $\hat{\varepsilon}_{ct}$: Innovation in the logarithm of nominal prices for the crop (c) and the year (t), estimated using an AR(1) model.

The agricultural income shock (s_{ot}) for a particular country (o) and year (t) is computed as the average percentage deviation in crop prices, where the deviation is weighted by the expected share of each crop in the country's agricultural revenue.

As evident from the instrumental variable equation, an essential prerequisite for IV computation is the global price of the crop in an initial year, denoted as $\bar{p}_c$. We calculated the global price ($\bar{p}_c$) of each crop by dividing the "Value" by the "Quantity." Specifically, we derived each crop's global price by computing a weighted average across countries, with the weights based on their respective 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 crop across all countries except for the country in question (denoted as P_{oct}, where 'o' represents the country identifier). We then aggregate this variable across all countries, using export share weights, to obtain the global price.

3.6 Instrumental variable (IV) Data

Our dataset contains information on both the value and quantity of exported products. It covers exports at the Harmonized System HS4 level using data from the TRADE MAP from 2001 to 2022. [2] For the agricultural products, we focused on products within HS2 groups 06-24, specifically 06-15 (Vegetable Products) and 16-24 (Foodstuffs).

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. In contrast, other units displayed less consistency with the data, and retaining them would hinder cross-country price comparisons. As a result, 3,847 observations have been removed, leaving 44,903 remaining.

To calculate the international price of each crop, we divide the "Value" by the "Quantity." This approach is adopted due to the absence of global price data specific to agricultural products based on the HS code. Consequently, we compute the international price for each individual product by taking an average price across countries, weighted by their global export share.

We calculate the presence of agricultural products by year and country and select the

[2]The HS4 code, a subset of the Harmonized System (HS) 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.

year 2018 as the initial year due to the highest number of countries exporting crops. [3] Specifying the initial year for the $\bar{p}_c$ and q_{co} variables is necessary.

In Appendix C, we present summary statistics for our instrumental variable (IV) and a table outlining the crops subjected to IV. Additionally, we provide rankings of export quantity and value among Sub-Saharan African (SSA) countries.

3.7 Obtaining the Instrumental Variable

To obtain the instrumental variable (s_{ot}), we follow these steps:

1. The international price for each product in the initial year 2018: Computing by dividing the "value" by the "quantity" and then averaging across countries, weighted by their global export share.

2. Estimating AR(1) model parameters using OLS regression:

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

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

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

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

4. Utilizing the variables: Potential agricultural output in the initial year (q_{co}), and nominal international price in the initial year ($\bar{p}_c$) and innovations in commodity prices ($\hat{\varepsilon}_{ct}$).

5. Applying the instrumental variable equation to calculate s_{ot}

These steps collectively yield the instrumental variable (s_{ot}), which serves as a crucial component in our causal analysis of the relationship between structural transformation and female empowerment.

[3] 2018 to 2022 have the highest presence of countries in exporting crops; We choose 2018.

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

Table 4 reports the coefficients from two-way fixed effects estimation with country-fixed effects and year-fixed effects. Changes in the service share of employment (percentage of total employment) are significantly negatively associated with changes in female bargaining power. Table 5 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 4: Female bargaining power and sector employment share

	(1)	(2)	(3)
Agriculture employment share	0.048***		
	(0.004)		
Manufacturing employment share		0.086	
		(0.060)	
Service employment share			-0.040***
			(0.006)
year fixed effect	Yes	Yes	Yes
country fixed effect	Yes	Yes	Yes
N	90131	90131	90131

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Malawi and Mozambique is not included due to data availability. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

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 explained in the following section, where we use variation in sector employment induced by crop-specific shocks in the international market. We report the first-stage results in Table 6 and Table 7 presents the IV estimates which are similar to previous estimates.

Table 5: Female bargaining power and sector employment share

	(1)	(2)	(3)
Service employment share	-0.042***	-0.043***	-0.034***
	(0.007)	(0.007)	(0.002)
Female Labor Force Participation		-0.016	
		(0.021)	
Gender employment ratio (Service)			-0.954***
			(0.153)
year fixed effect	Yes	Yes	Yes
country fixed effect	Yes	Yes	Yes
N	90131	90131	90131

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Malawi and Mozambique is not included due to data availability. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

Table 6: First Stage Results: Regressing Employment Share on IV

	(1)	(2)	(3)
	Agruculture	Manufacturing	Service
Crop Innovation	-3.025**	-1.153***	4.178***
	(1.231)	(0.212)	(1.421)
year fixed effect	Yes	Yes	Yes
country fixed effect	Yes	Yes	Yes
N	78764	78764	78764

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Malawi and Mozambique is not included due to data availability. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

5 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. As there isn't 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.

Table 7: Female bargaining power and sector employment share using IV of Price Shock.

	(1)	(2)	(3)
Agruculture employment share	0.030**		
	(0.012)		
Manufacturing employment share		0.079	
		(0.049)	
Service employment share			-0.022**
			(0.010)
year fixed effect	Yes	Yes	Yes
country fixed effect	Yes	Yes	Yes
N	78764	78764	78764

Notes: Standard errors are in parentheses, clustered at the country and year level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Malawi and Mozambique is not included due to data availability. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

Among the countries with overlapping yearly measures in economic transformation data and five measures of female decision-making, we look for any data sources that can 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 employmetn measures for Lesotho and Mozambique. Regions in Mozambique meausred include Cabo Delgado, Gaza, Inhambane, Manica, Nampula, Niassa, Sofala, Tete, and Zambezia. Regions in Lesotho measured here are Berea, Botha-Bothe, Leribe, Mafeteng, Maseru, MohalesHoek, Mokhotlong, QachasNek, Quthing, and Thaba-Tseka.

Table 8: Data Sources for regional measure

Country	**Year**	**Data Source**	**Comments**
Lesotho	2005	IPUMS international	
Lesotho	2010	Bureau of Statistics	Household Budget Survey
Lesotho	2014	Bureau of Statistics	Continuous Multi-Purpose Survey
Mozambique	1997	IPUMS international	
Mozambique	2003	National Statistics Institute	Household budget survey

Table 8: Data Sources for regional measure

Country	Year	Data Source	Comments
Mozambique	2004	National Statistics Institute	Integrated Labor Force Survey
Mozambique	2011	National Statistics Institute	Companies' economic and financial indicators

Here, we outline the comprehensive methodology employed to gather data on employment in the selected countries. The primary objective was to collect data from employment surveys as well as 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

The strata adapted in our study are those used in DHS survey data. For most countries, this involves aggregating administrative regions into blocks constituting strata. In this way, data obtained in several regions can be aggregated using the average to obtain the indicator of employment in the stratum making up these regions.

Let us denote the percentages of Agriculture, Services, and Manufacturing in the region j of strata i as A_{ij}, S_{ij}, and M_{ij}, respectively. The aggregate indicators at the strata level (AI_i, SI_i, MI_i) can be calculated as:

$$AI_i = \frac{1}{n}\sum_{j=1}^{n} A_{ij}, \quad SI_i = \frac{1}{n}\sum_{j=1}^{n} S_{ij}, \quad MI_i = \frac{1}{n}\sum_{j=1}^{n} M_{ij}$$

Data aggregation at main sector level (Agriculture, Service, Manufacturing)

For most data sources, indicators are given by sub-sector of activity, so the summation method for aggregating percentages by activity sector has been used. The three main sectors of activity are agriculture, manufacturing and service and we have three sub-sectors for each of them. P_{ij} represents the percentage of people employed in sub-sector i of sector

j, so the equation for aggregating indicators in sector j would be:

$$P_j = \sum_{i=1}^{n} P_{ij}$$

This means that for each activity sector j, we take the sum of all the percentages of people employed P_{ij} for all the sub-sectors i that belong to this sector j. For example, if A_{11}, A_{12} and A_{13} represent the percentages of people employed in the specific sub-sectors of agriculture, the equation for aggregating the percentages in the agricultural sector would be: $Agri = A_{11} + A_{12} + A_{13}$. As presented in Table **??**, regional estimates are similar to national estimates.

Table 9: female bargaining power and regional employment measure

	(1)	(2)	(3)
Agriculture employment share	0.017***		
	(0.000)		
Manufacturing employment share		0.006***	
		(0.000)	
Service employment share			-0.010***
			(0.000)
year FE	Yes	Yes	Yes
region FE	Yes	Yes	Yes
N	1992	1992	1992

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Lesotho and Mozambique. Regions in Mozambique meausred include Cabo Delgado, Gaza, Inhambane, Manica, Nampula, Niassa, Sofala, Tete, and Zambezia. Regions in Lesotho measured here are Berea, Botha-Bothe, Leribe, Mafeteng, Maseru, MohalesHoek, Mokhotlong, QachasNek, Quthing, and Thaba-Tseka. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

6 Model

In this section, we build a two-sector model featuring structural change and intra-household bargaining. Sectoral reallocation is standard in the structural change literature, while the inclusion of bargaining bridges the macro perspective with the micro one. Endogenizing the impact of income on bargaining, the model predicts that with the increase in

female employment share in the service sector, females lose bargaining power due to the higher sectoral wage.

6.1 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 labour 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 10 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 10: 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).

6.2 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:

$$Y_i = A_i L_i, i \in \{s, ns\}, \tag{2}$$

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

$$L_i = \left[\eta_i L_{fi}^{\frac{\sigma-1}{\sigma}} + (1-\eta_i) L_{mi}^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \quad i \in \{s, ns\}. \tag{3}$$

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,

$$\frac{w_{fi}}{w_{mi}} = \frac{\eta_i}{(1-\eta_i)} \left(\frac{L_{fi}}{L_{mi}}\right)^{-1/\sigma}. \tag{4}$$

Gender labour supply H is determined by households' utility maximization problem in section 4.2. Supply must be equal to the demand,

$$L_{f,ns} + L_{fs} = H_f \tag{5}$$

$$L_{m,ns} + L_{ms} = H_m. \tag{6}$$

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.

6.3 The household's problem

There are N households in the society. Every household consists of one man and one woman. Their joint utility comes from consumption. The total time endowment for each gender is normalised to one, and labour supply is inelastic. If the woman works in the service sector, there would be a disutility for the male and, thus, the household. The disutility level α_s is taken as given for households. The sharing rule λ is a function of the gender income share of the society but is exogenous to the household's decision.

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

$$U_m = \ln\left(\rho {c_{ns,m}}^{\frac{\nu-1}{\nu}} + (1-\rho)\, {c_{sm}}^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}} - \beta_s \mathbf{1}_{f,s} > 0$$

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

$$w_m + w_f = \sum_{j=\{m,f\}} p_{ns} c_{ns,j} + p_s c_{sj} \tag{7}$$

As the sectoral consumption ratio is the same for both genders and the non-service goods and services are poor substitution ($0 < \nu < 1$), the consumption ratio is a function of sectoral prices,

$$\frac{p_{ns}}{p_s} = \frac{\rho}{1-\rho}\left(\frac{c_{s,j}}{c_{ns,j}}\right)^{1/\nu} \tag{8}$$

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

$$\frac{c_{m,ns}}{c_{f,ns}} = \frac{c_{m,s}}{c_{f,s}} \tag{9}$$

Therefore, the ratio of the aggregate consumption depends on the bargaining weight λ,

$$\frac{C_m}{C_f} = \frac{\lambda}{1-\lambda} \tag{10}$$

We can solve for the consumption for the male as a function of total income, $C_m = \lambda(w_{f,j} + w_m), \;\; j \in \{s, ns\}$. If the female works in the service sector, the maximized household utility would be

$$U_s = \ln(w_{f,s} + w_m) - \lambda\beta_s - (1-\lambda)\ln\frac{1-\lambda}{\lambda} \tag{11}$$

Suppose the female works in the non-service sector, the maximized utility would be

$$U_{ns} = \ln(w_{f,ns} + w_m) - (1-\lambda)\ln\frac{1-\lambda}{\lambda} \tag{12}$$

Thus, the female will be indifferent to work in any sector if and only if

$$\beta_s = \frac{\ln w_{fs} - \ln w_{fns}}{\lambda} \tag{13}$$

and the wage gap between the service and the non-service sector is $\frac{w_{fs}}{w_{f,ns}} = \exp(\beta_s\lambda)$.

6.4 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 $L_{m,ns} + L_{ms} = H_s$.

6.5 Structural change and gender wage gap

The marginal product of labour for the female is given by

$$w_{fs} = p_s A_s \eta_s \left(\frac{L_s}{L_{fs}}\right)^{1/\sigma}, \tag{14}$$

or

$$w_{f,ns} = p_{ns} A_{ns} \eta_{ns} \left(\frac{L_{ns}}{L_{fns}}\right)^{1/\sigma}. \tag{15}$$

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

$$w_m = p_j A_j (1 - \eta_j) \left(\frac{L_j}{L_{mi}}\right)^{1/\sigma}, j \in \{s, ns\}. \tag{16}$$

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 labour share in each sector j can be written as

$$\frac{L_j}{L_{fj}} = \left(\frac{\eta_j}{S_{f,j}}\right)^{\frac{\sigma}{\sigma-1}}, j \in \{s, ns\} \tag{17}$$

Combine equations (14) and (16) to write the gender labour ratio as a function of the gender wage gap,

$$\frac{L_{ms}}{L_{fs}} = \left[\frac{w_{fs}}{w_m}\left(\frac{1 - \eta_s}{\eta_s}\right)\right]^{\sigma} \tag{18}$$

Similarly, combine (15) and (16) to get

$$\frac{L_{m,ns}}{L_{f,ns}} = \left[\frac{w_{f,ns}}{w_m}\left(\frac{1 - \eta_{ns}}{\eta_{ns}}\right)\right]^{\sigma} \tag{19}$$

Since we know $L_{i,s} + L_{i,ns} = 1$ for both gender i, we can solve for male workers in the service sector as a function of female workers,

$$L_{m,s} = \frac{L_{f,s}\kappa}{1 - L_{f,s} + L_{f,s}\kappa}, \tag{20}$$

where $\kappa = \left(\frac{1-\eta_s}{\eta_s}\frac{\eta_{ns}}{1-\eta_{ns}}\right)^{\sigma}\exp(\beta_s\lambda)$ is a constant. Using (18) again, we get that female labour in the service sector is negatively correlated with female to male wage ratio in that sector if $\kappa > 1$.

$$L_{fs} = \frac{(\frac{1-\eta_s}{\eta_s}\frac{w_{fs}}{w_m})^{\sigma} - \kappa}{(1-\kappa)(\frac{1-\eta_s}{\eta_s}\frac{w_{fs}}{w_m})^{\sigma}} \tag{21}$$

To solve for the wage ratio in equilibrium, we first calculate the price ratio using (16) to equalise males' wages in both sectors,

$$\frac{p_s}{p_{ns}} = \frac{A_{ns}}{A_s}\frac{1-\eta_{ns}}{1-\eta_s}\left(\frac{\eta_{ns}}{\eta_s}\right)^{\frac{1}{\sigma-1}}\left(\frac{S_{m,s}}{S_{m,ns}}\right)^{\frac{1}{\sigma-1}} \tag{22}$$

Combine the optimal consumption condition (8) with (22), we get

$$\frac{1-\rho}{\rho}\left(\frac{A_{ns}}{A_s}\right)^{\frac{1-\nu}{\nu}} = \theta\left(\frac{L_{m,s}}{L_{m,ns}}\right)^{\frac{\nu-1}{\nu(\sigma-1)}}\left(\frac{w_m L_{m,s} + w_{fs}L_{fs}}{w_m(1-L_{m,s}) + w_{f,ns}(1-L_{fs})}\right)^{\frac{\sigma-\nu}{\nu(\sigma-1)}} \tag{23}$$

where $\theta = \left(\frac{1-\eta_{ns}}{1-\eta_s}\right)^{1-\frac{\sigma}{\nu(\sigma-1)}}\left(\frac{\eta_{ns}}{\eta_s}\right)^{\frac{1}{(\sigma-1)}} > 0$. Based on the assumption that $0 < \sigma < \nu < 1$ and $T_{ns} > T_s$, the left-hand side is increasing over time. The ratio between male service to non-service labour share increases with the female labour share in the service sector,

$$\left(\frac{L_{m,s}}{L_{m,ns}}\right)^{\frac{\nu-1}{\nu(\sigma-1)}} = \left(\frac{1-L_{f,s}}{\kappa L_{fs}}\right)^{\frac{1-\nu}{\nu(\sigma-1)}}$$

Equation (18) and (19) tell us that an increase in female service labour is also negatively correlated with the female-to-male wage ratio, and thus the following expression will be higher,

$$\left(\frac{w_m L_{m,s} + w_{fs}L_{fs}}{w_m(1-L_{m,s}) + w_{f,ns}(1-L_{fs})}\right)^{\frac{\sigma-\nu}{\nu(\sigma-1)}} = \left(\frac{\frac{w_m L_{m,s}}{w_{fs}L_{fs}} + 1}{\exp(\beta_s\lambda)\frac{1-L_{fs}}{L_{fs}} + \frac{1-L_{ms}}{L_{fs}}\frac{w_m}{w_{fs}}}\right)^{\frac{\sigma-\nu}{\nu(\sigma-1)}} \tag{24}$$

We conclude that structural transformation can lead to an increasing female service labour share but a lower female-to-male wage ratio if friction is large.

So far, we have not explicitly modelled the bargaining rule λ. We assume that the

bargaining share depends on the ratio of total income, i.e. $\lambda = \frac{w_m L_m}{w_{fs} L_{fs} + w_{f,ns} L_{f,ns} + w_m L_m}$. Since $\exp(\beta_s \lambda) > 1$, we get λ increases with the rising number of female workers in the service sector. Now let us think about the dynamic impact of the rising bargaining power of males. The wage gap between the service and non-service sectors will increase over time, thus generating an opposite effect to the structural change. In other words, more females will return to the non-service sector due to the rising bargaining power of males.

6.6 Assumption validation

We test the assumption that Since $\exp(\beta_s \lambda) > 1$ using the empirical data of the SSA countries. Using 33 countries' wage and employment data, the estimated $lambda$ is .63 on average with a standard deviation of 0.06. As equation (13) holds for every period, we can calculate β_s using the wage gap and λ. The density of β_s is shown in Figure 3. Finally, we calculate the mean of friction $\exp(\beta_s \lambda)$ and find it has a mean of 3.17 and a s.d. of 2.63, indicating the model assumption is valid in the context of SSA. We employ a t-test to ensure that $\exp(\beta_s \lambda)$ is statistically different from one.[4] The results show that there is a large friction in the SSA labor market and this leads to a reduction in female bargaining power at the household level with the process of structural transformation.

[4]The 95% confidence interval for the t-test is [2.48, 3.85].

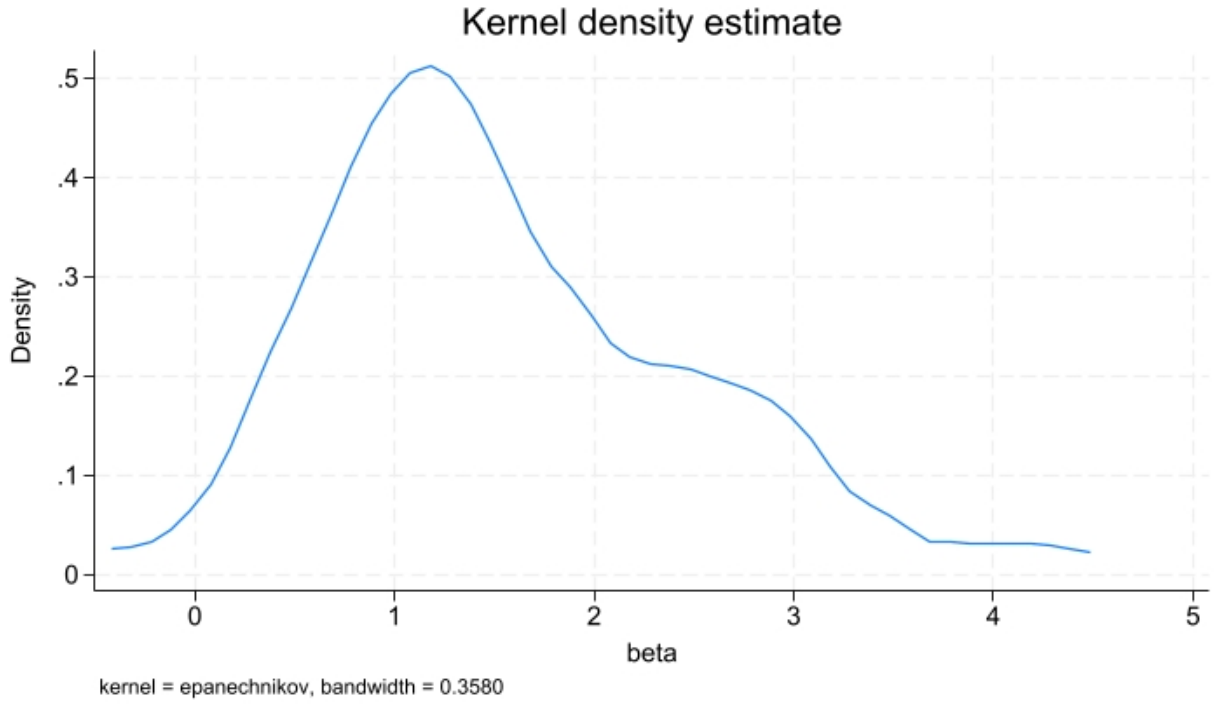


Figure 3: Density of β_s

7 Conclusion

This paper set out to investigate the complex interplay between structural transformation, particularly the burgeoning service sector, and women's empowerment and bargaining power within households in Sub-Saharan Africa (SSA). Our findings reveal a nuanced and intricate relationship, where the positive economic advancements in SSA could, paradoxically, be contributing to a diminishment of women's bargaining power due to prevailing social norms and stigmas against women working in the service sector.

The substantial growth of the service sector, characterized by its high potential for women's participation, has not translated into increased bargaining power for women within households as anticipated. The empirical evidence obtained from 16 SSA countries has indeed contradicted our initial predictions, demonstrating a significant negative correlation between the rise in service employment and women's bargaining power within households.

Our innovative two-sector general equilibrium model, fortified with social stigma constraints, elucidates the underlying mechanisms at play. It illustrates how gendered social norms and stigma can act as formidable barriers, requiring female wages in the service sector to disproportionately increase to offset the incurred utility loss due to social stigma, thereby potentially leading to a decline in women's intra-household bargaining power. This exploration provides a critical dimension to understand the intricate interactions between economic transformation and gender norms.

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

A.1 Household's problem

Write the Lagrangian as (time subscript is omitted for simplicity),

$$\begin{aligned} L = &(1-\gamma_j)\ln\left(\rho_1 c_{aj}{}^{\frac{\nu-1}{\nu}} + \rho_2 c_{gj}{}^{\frac{\nu-1}{\nu}} + (1-\rho_1-\rho_2)\, c_{sj}{}^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}} + \gamma_j ln l_j \\ &+\mu\left(\frac{w_j\left(N_j-l_j\right)}{w_f\left(N_f-l_f\right)+w_m\left(N_m-l_m\right)}y + w_j\left(L_j-l_j\right) - \ p_a c_{aj} - p_g c_{gj} - p_s c_{sj}\right), \end{aligned} \tag{25}$$

where $j \in \{m, f\}$.

Define $C_j = \left(\rho_1 c_{aj}{}^{\frac{\nu-1}{\nu}} + \rho_2 c_{gj}{}^{\frac{\nu-1}{\nu}} + (1-\rho_1-\rho_2)\, c_{sj}{}^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}}$, the first order conditions

1. w.r.t. $[c_a]$ $(1-\gamma_j)C_j^{\frac{1-\nu}{\nu}}\rho_a c_{aj}^{\frac{-1}{\nu}} = \mu p_a$
2. w.r.t. $[c_g]$ $(1-\gamma_j)C_j^{\frac{1-\nu}{\nu}}\rho_g c_{gj}^{\frac{-1}{\nu}} = \mu p_g$
3. w.r.t. $[c_s]$ $(1-\gamma_j)C_j^{\frac{1-\nu}{\nu}}\rho_s c_{sj}^{\frac{-1}{\nu}} = \mu p_s$
4. w.r.t. $[l_j]$ $\frac{\gamma_j}{l_j} = \mu\left(\frac{w_j w_k (N_k - l_k)}{(w_f(N_f-l_f)+w_m(N_m-l_m))^2}y + w_j\right)$

Combine 1 and 2 yields

$$\frac{p_a}{p_g} = \frac{\rho_a}{\rho_g}\left(\frac{c_g}{c_a}\right)^{1/\nu}. \tag{26}$$

Similarly, combining 2 and 3 yields

$$\frac{p_g}{p_s} = \frac{\rho_g}{\rho_s}\left(\frac{c_s}{c_g}\right)^{1/\nu} \tag{27}$$

Finally, the ratio of leisure is

$$\frac{\gamma_m l_f}{\gamma_f l_m} = \frac{w_m w_f (N_f - l_f)y + w_m(w_f(N_f-l_f)+w_m(N_m-l_m))}{w_m w_f (N_m - l_m)y + w_f(w_f(N_f-l_f)+w_m(N_m-l_m))} \tag{28}$$

A.2 Proof of proposition 1

We can derive the relationship between the wage ratio and the share of females in the service sector by substituting the right-hand side of (18), using equations (21)-(22),

$$\frac{L_a}{L_s} = \left[\frac{1-\eta_a+\eta_a\left(\frac{\eta_a}{1-\eta_a}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}{1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}\right]^{\frac{\nu}{\sigma-1}}\left(\frac{A_a}{A_s}\right)^{\nu-1}\left(\frac{(1-\eta_a)\rho_a}{(1-\eta_s)\rho_s}\right)^{\nu}. \tag{29}$$

and

$$\frac{L_g}{L_s} = \left[\frac{1-\eta_g+\eta_g\left(\frac{\eta_g}{1-\eta_g}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}{1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}\right]^{\frac{\nu}{\sigma-1}}\left(\frac{A_g}{A_s}\right)^{\nu-1}\left(\frac{(1-\eta_g)\rho_g}{(1-\eta_s)\rho_s}\right)^{\nu}. \tag{30}$$

Combine (23) with (29)-(30) to get

$$\frac{L_{ma}}{L_{ms}} = \left[\frac{1-\eta_a+\eta_a\left(\frac{\eta_a}{1-\eta_a}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}{1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}\right]^{\frac{\sigma-\nu}{\sigma-1}}\left(\frac{A_a}{A_s}\right)^{\nu-1}\left(\frac{(1-\eta_a)\rho_a}{(1-\eta_s)\rho_s}\right)^{\nu}. \tag{31}$$

and

$$\frac{L_{mg}}{L_{ms}} = \left[\frac{1-\eta_g+\eta_g\left(\frac{\eta_g}{1-\eta_g}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}{1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}\right]^{\frac{\sigma-\nu}{\sigma-1}}\left(\frac{A_g}{A_s}\right)^{\nu-1}\left(\frac{(1-\eta_g)\rho_g}{(1-\eta_s)\rho_s}\right)^{\nu}. \tag{32}$$

As the share of female in the service sector is

$$\frac{L_{fs}}{H_f} = \left[1+\frac{x_g^{-1}L_{mg}}{x_s^{-1}L_{ms}}+\frac{x_a^{-1}L_{ma}}{x_s^{-1}L_{ms}}\right]^{-1}, \tag{33}$$

we calculate the derivatives with respect to the gender wage ratio. Here we use the manufacturing and service sector ratio as an example for proof.

Proof.

$$\frac{\partial \frac{L_{mg}}{L_{ms}}}{\partial \frac{w_f}{w_m}} = \left(\frac{A_g}{A_s}\right)^{\nu-1} \left(\frac{(1-\eta_g)\rho_g}{(1-\eta_s)\rho_s}\right)^{\nu} \left[\frac{1-\eta_g+\eta_g\left(\frac{\eta_g}{1-\eta_g}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}{1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}}\right]^{\frac{1-\nu}{\sigma-1}}$$
$$(\nu-\sigma)\left(\frac{w_f}{w_m}\right)^{-\sigma} \frac{\left[(1-\eta_s)\eta_g\left(\frac{\eta_g}{1-\eta_g}\right)^{\sigma-1} - (1-\eta_g)\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\right]}{\left(1-\eta_s+\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\left(\frac{w_f}{w_m}\right)^{1-\sigma}\right)^2} \tag{34}$$

Note that $\left[(1-\eta_s)\eta_g\left(\frac{\eta_g}{1-\eta_g}\right)^{\sigma-1} - (1-\eta_g)\eta_s\left(\frac{\eta_s}{1-\eta_s}\right)^{\sigma-1}\right] < 0$ under the assumption that female has the highest comparative advantage in the service sector. As everything else is positive except for $\nu-\sigma$, we need to further assume $\nu-\sigma > 0$. Under the same assumption, we get a similar result for the agriculture sector, $\frac{\partial \frac{L_{ma}}{L_{ms}}}{\partial \frac{w_f}{w_m}} < 0$. Thus $\frac{\partial \frac{L_{fs}}{H_f}}{\partial \frac{w_f}{w_m}} > 0$. □

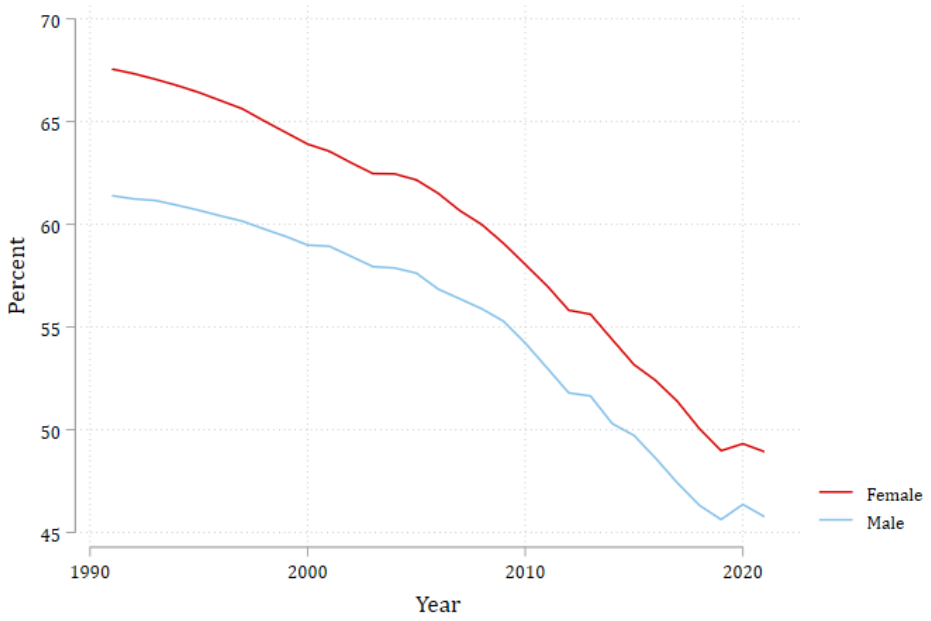
B Appendix SSA Economies

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 relatively in agricultural employment, suggesting a convergence in male and female participation.

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

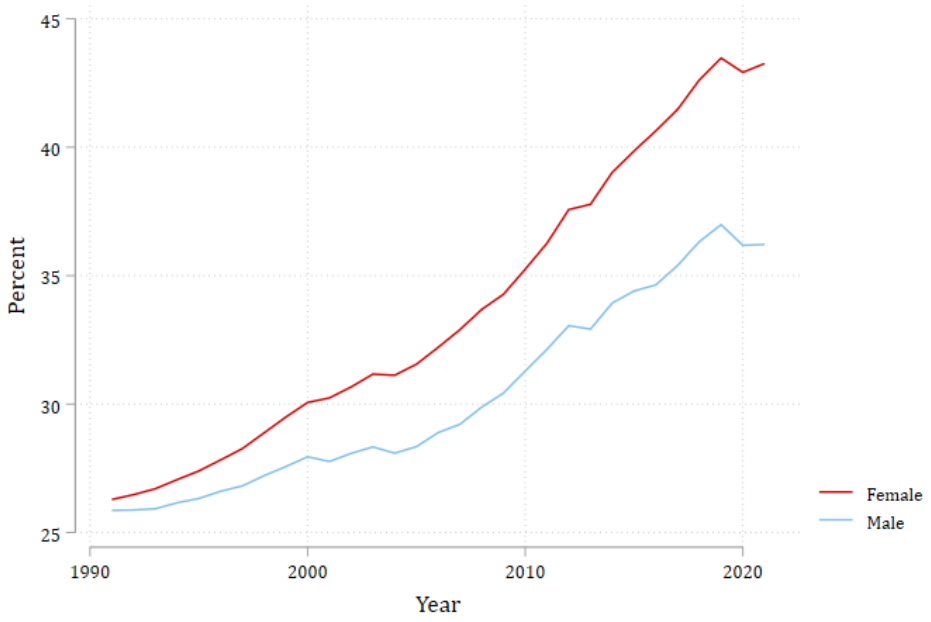
Appendix Figure A1: Percent of Each Gender Employment in Agriculture Sector in Sub-Saharan African Countries.



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 Labour 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, Zimbabwe. Please note that the figures have been aggregated to provide a regional perspective and may not reflect individual country-level variations.

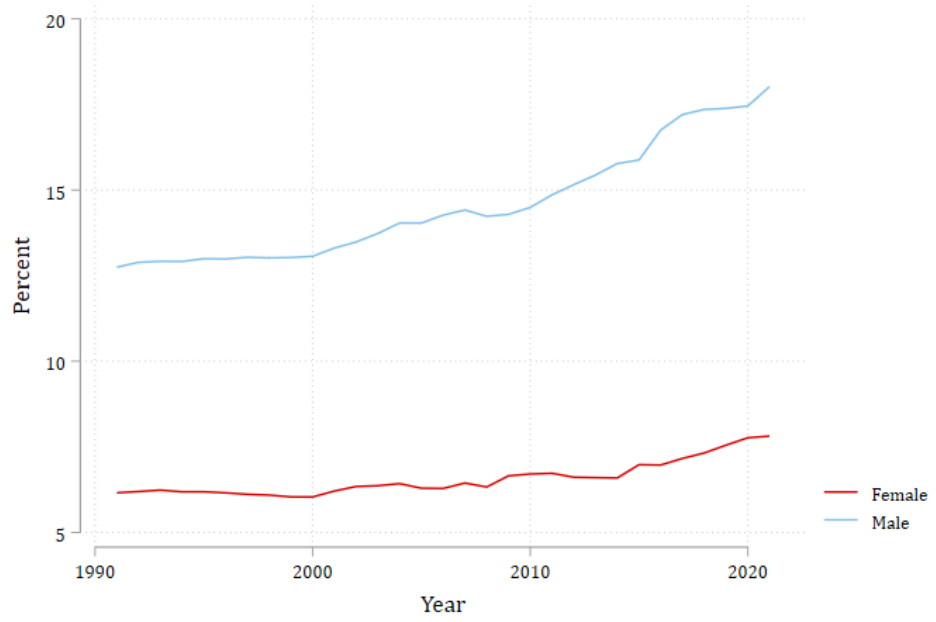
refer to the Appendix D.

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 Labour 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, 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 Labour 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, 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 agricultural 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

Note: 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 agricultural 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 industry: 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, sug-

gesting 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.

Appendix Table A4: 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 a 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 female employment rate in sector x over male employment rate in sector x.

Appendix Table A5: Female employment and prominence of economic sectors

	Female employment rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Employment share agriculture	0.64***	0.37***				
	(0.01)	(0.02)				
Employment share manufacturing			-1.45***	-0.45***		
			(0.04)	(0.02)		
Employment share service					-0.00***	-0.00***
					(0.00)	(0.00)
Log GDP	-0.69***	-1.72***	-1.83***	-2.21***	-0.40***	-1.08***
	(0.15)	(0.27)	(0.18)	(0.30)	(0.13)	(0.25)
Constant	39.28***	78.19***	119.77***	116.40***	95.70***	97.94***
	(3.70)	(6.68)	(4.14)	(6.84)	(3.02)	(5.78)
Observations	2,016	2,016	2,016	2,016	2,016	2,016
R-squared	0.68	0.27	0.51	0.20	0.71	0.30
Country FE	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Columns (1) to (6) each report estimates from an OLS regression of the female employment rate on the variables listed in the rows. Columns (1), (3), (5) add year fixed effects only, while Columns (2), (4), (6) add country and year fixed effects. The regression includes different observations for each country corresponding to different years. The female employment rate is retrieved using the World Bank data as shown in the Appendix. It is computed as the number of women employed out of the female working age population for each country and year and it is expressed in percentage points. The independent variables are the shares of employment associated to each economic sector measured in percentage points. Independent and control variables are obtained from the World Bank data and Economic Transformation Database. The only control variable is GDP in logs and it is added in each specification. Robust standard errors are reported in parentheses. Coefficients signed with * (**,***) are significant at the 10% (5%,1%) level.

Appendix Table A6: Male employment and prominence of economic sectors

	Male employment rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Employment share agriculture	0.34***	0.29***				
	(0.01)	(0.02)				
Employment share manufacturing			-0.61***	-0.26***		
			(0.04)	(0.03)		
Employment share service					-0.00***	-0.00***
					(0.00)	(0.00)
Log GDP	-1.30***	1.38***	-2.01***	0.83**	-1.02***	1.32***
	(0.16)	(0.31)	(0.18)	(0.32)	(0.15)	(0.32)
Constant	82.51***	23.32***	126.07***	56.02***	111.75***	48.07***
	(4.39)	(7.60)	(4.09)	(7.32)	(3.22)	(7.16)
Observations	2,016	2,016	2,016	2,016	2,016	2,016
R-squared	0.50	0.19	0.26	0.07	0.62	0.08
Country FE	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Columns (1) to (6) each report estimates from an OLS regression of the male employment rate on the variables listed in the rows. Columns (1), (3), (5) add year fixed effects only, while Columns (2), (4), (6) add country and year fixed effects. The regression includes different observations for each country corresponding to different years. The male employment rate is retrieved using the World Bank data as shown in the Appendix. It is computed as the number of men employed out of the male working age population for each country and year and it is expressed in percentage points. The independent variables are the shares of employment associated to each economic sector measured in percentage points. Independent and control variables are obtained from the World Bank data and Economic Transformation Database. The only control variable is GDP in logs and it is added in each specification. Robust standard errors are reported in parentheses. Coefficients signed with * (**,***) are significant at the 10% (5%,1%) level.

Appendix Table A7: Gender ratio and prominence of economic sectors

	Gender ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
Employment share agriculture	0.49***	0.27***				
	(0.01)	(0.03)				
Employment share manufacturing			-1.30***	-0.41***		
			(0.02)	(0.03)		
Employment share service					-0.00***	-0.00***
					(0.00)	(0.00)
Log GDP	0.31***	-4.39***	-0.49***	-4.59***	0.40***	-3.43***
	(0.11)	(0.49)	(0.11)	(0.48)	(0.13)	(0.47)
Constant	46.39***	168.04***	108.94***	193.23***	91.60***	174.33***
	(2.62)	(12.19)	(2.69)	(10.97)	(2.85)	(10.57)
Observations	2,016	2,016	2,016	2,016	2,016	2,016
R-squared	0.49	0.14	0.47	0.14	0.43	0.20
Country FE	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Columns (1) to (6) each report estimates from an OLS regression of the gender ratio on the variables listed in the rows. Columns (1), (3), (5) add year fixed effects only, while Columns (2), (4), (6) add country and year fixed effects. The regression includes different observations for each country corresponding to different years. The gender ratio is retrieved using the World Bank data as shown in the Appendix. It is computed as the ratio of the female employment rate over the male employment rate for each country and year and it is expressed in percentage points. The independent variables are the shares of GDP associated to each economic sector measured in percentage points. Independent and control variables are obtained from the World Bank data and Economic Transformation Database. The only control variable is GDP in logs and it is added in each specification. Robust standard errors are reported in parentheses. Coefficients signed with * (**,***) are significant at the 10% (5%,1%) level.

Appendix Table A8: Regressions employment on employment shares

Dependent variables	Female employment rate		Male employment rate		Gender ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
Employment share agriculture	0.14**	-0.28***	0.14**	0.49***	0.11	-0.83***
	(0.07)	(0.04)	(0.06)	(0.04)	(0.09)	(0.07)
Employment share manufacturing	-0.02	-0.52***	0.77***	0.11***	-0.75***	-0.85***
	(0.07)	(0.03)	(0.06)	(0.03)	(0.08)	(0.05)
Employment share service	-0.00***	-0.00***	-0.00***	0.00***	-0.00**	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log GDP	-0.44***	-0.34	-0.67***	0.92***	0.00	-2.02***
	(0.13)	(0.27)	(0.14)	(0.30)	(0.11)	(0.45)
Constant	82.75***	108.11***	90.34***	14.60*	90.38***	218.27***
	(7.75)	(5.74)	(6.63)	(7.88)	(9.61)	(11.17)
Observations	2,016	2,016	2,016	2,016	2,016	2,016
R-squared	0.71	0.40	0.69	0.20	0.50	0.32
Country FE	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Columns (1) to (6) each report estimates from an OLS regression of the dependent variables stated on the variables listed in the rows. Columns (1), (3), (5) add year fixed effects only, while Columns (2), (4), (6) add country and year fixed effects. The regression includes different observations for each country corresponding to different years. The employment rate and gender ratio is retrieved using the World Bank data as shown in the Appendix. The female (male) employment rate is computed as the ratio of the female (male) employment rate over the male (female) employment rate for each country and year and it is expressed in percentage points. Gender ratio is computed as the ratio of the female employment rate over the male employment rate for each country and year and it is expressed in percentage points. The independent variables are the shares of employment associated to each economic sector measured in percentage points. Independent and control variables are obtained from the World Bank data and Economic Transformation Database. The only control variable is GDP in logs and it is added in each specification. Robust standard errors are reported in parentheses. Coefficients signed with * (**,***) are significant at the 10% (5%,1%) level.

Appendix Table A9: Marriage and sector employment share

	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture employment share	0.020*			0.019***		
	(0.010)			(0.003)		
Manufacturing employment share		0.078*			0.067***	
		(0.039)			(0.017)	
Service employment share			-0.018**			-0.017***
			(0.008)			(0.001)
Female labor force participation				0.061***	0.059***	0.060***
				(0.007)	(0.012)	(0.005)
year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	90131	90131	90131	90131	90131	90131

Notes: Standard errors are in parentheses, clustered at the country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Database with the coverage of Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Uganda and Zambia. Source: The Demographic and Health Survey (DHS) and Economic Translation Database.

C Instrumental Variable

In this appendix, we present three statistical summary tables related to our instrumental variables. Table A10 provides a year-based overview of IV, table A12 offers insights based on different countries, and table A14 ranks agricultural products used in constructing IV by export volume and quantity.

Appendix Table A10: 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				

Note: 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 A12: 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				

Note: 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.

Product	Value Ranking	Quantity Ranking
Cocoa beans, whole or broken, raw or roasted	1	4
Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes ...	2	8
Unmanufactured tobacco; tobacco refuse	3	16
Tea, whether or not flavoured	4	15
Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled	5	9
Other oil seeds and oleaginous fruits, whether or not broken (excluding edible nuts, olives, ...	6	7
Citrus fruit, fresh or dried	7	5
Cocoa paste, whether or not defatted	8	25
Cane or beet sugar and chemically pure sucrose, in solid form	9	6
Cut flowers and flower buds of a kind suitable for bouquets or for ornamental purposes, fresh, ...	10	36
Maize or corn	11	3
Cocoa butter, fat and oil	12	41
Grapes, fresh or dried	13	19
Dried leguminous vegetables, shelled, whether or not skinned or split	14	11

Palm oil and its fractions, whether or not refined (excluding chemically modified)	15	10
Wine of fresh grapes, incl. fortified wines; grape must, partly fermented and of an actual ...	16	27
Apples, pears and quinces, fresh	17	14
Cigars, cheroots, cigarillos and cigarettes of tobacco or of tobacco substitutes	18	78
”Other vegetables, fresh or chilled (excluding potatoes, tomatoes, alliaceous vegetables, edible ...	19	20
Vanilla	20	132
Other nuts, fresh or dried, whether or not shelled or peeled (excluding coconuts, Brazil nuts ...	21	51
Bananas, incl. plantains, fresh or dried	22	12
Fruit juices, incl. grape must, and vegetable juices, unfermented, not containing added spirit, ...	23	23
Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens, fresh or dried	24	22
Fruits, nuts and other edible parts of plants, prepared or preserved, whether or not containing ...	25	32
Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs	26	56
Cocoa shells, husks, skins and other cocoa waste	27	45
Chocolate and other food preparations containing cocoa	28	62

Groundnuts, whether or not shelled or broken (excluding roasted or otherwise cooked)	29	26
Food preparations, n.e.s.	30	48
Soups and broths and preparations therefor; food preparations consisting of finely homogenised ...	31	50
Rice	32	18
”Manufactured tobacco and manufactured tobacco substitutes and ””homogenised”” or ””reconstituted”” ...	33	93
Beer made from malt	34	29
Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other ...	35	40
Sugar confectionery not containing cocoa, incl. white chocolate	36	52
Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, ...	37	13
Wheat or meslin flour	38	21
Sauce and preparations therefor; mixed condiments and mixed seasonings; mustard flour and meal, ...	39	58
Cloves, whole fruit, cloves and stems	40	94
Live plants incl. their roots, cuttings and slips; mushroom spawn (excluding bulbs, tubers, ...	41	57
Waters, incl. mineral waters and aerated waters, containing added sugar or other sweetening ...	42	31

Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, ...	43	1
Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion ...	44	49
Leguminous vegetables, shelled or unshelled, fresh or chilled	45	53
Lac; natural gums, resins, gum-resins, balsams and other natural oleoresins	46	65
Preparations of a kind used in animal feeding	47	30
"Fresh strawberries, raspberries, blackberries, back, white or red currants, gooseberries and ...	48	81
Undenatured ethyl alcohol of an alcoholic strength of ¡ 80%; spirits, liqueurs and other spirituous ...	49	74
Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing ...	50	66
Cocoa powder, not containing added sugar or other sweetening matter	51	75
Fixed vegetable fats and oils, incl. jojoba oil, and their fractions, whether or not refined, ...	52	55
Soya beans, whether or not broken	53	33
Extracts, essences and concentrates, of coffee, tea or maté and preparations with a basis of ...	54	108
Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen ...	55	67

Groundnut oil and its fractions, whether or not refined, but not chemically modified	56	44
Cereal groats, meal and pellets	57	24
Oilcake and other solid residues, whether or not ground or in the form of pellets, resulting ...	58	35
Apricots, cherries, peaches incl. nectarines, plums and sloes, fresh	59	59
”Ginger, saffron, turmeric ””curcuma””, thyme, bay leaves, curry and other spices (excluding ...	60	63
Wheat and meslin	61	34
Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled	62	28
Margarine, other edible mixtures or preparations of animal or vegetable fats or oils and edible ...	63	69
Pasta, whether or not cooked or stuffed with meat or other substances or otherwise prepared, ...	64	46
Oilcake and other solid residues, whether or not ground or in the form of pellets, resulting ...	65	17
”Prepared foods obtained by the swelling or roasting of cereals or cereal products, e.g. corn ...	66	77
Vegetables, uncooked or cooked by steaming or boiling in water, frozen	67	80
Seeds, fruits and spores, for sowing (excluding leguminous vegetables and sweetcorn, coffee, ...	68	99
Vegetable products, n.e.s.	69	87

Animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, ...	70	70
Roots and tubers of manioc, arrowroot, salep, Jerusalem artichokes, sweet potatoes and similar ...	71	47
Soya-bean oil and its fractions, whether or not refined (excluding chemically modified)	72	43
Undenatured ethyl alcohol of an alcoholic strength of ¿= 80%; ethyl alcohol and other spirits, ...	73	54
Locust beans, seaweeds and other algae, sugar beet and sugar cane, fresh, chilled, frozen or ...	74	83
Cereal flours (excluding wheat or meslin)	75	38
Grain sorghum	76	37
”Coconut ””copra””, palm kernel or babassu oil and fractions thereof, whether or not refined, ...	77	73
Potatoes, fresh or chilled	78	39
Plants and parts of plants, incl. seeds and fruits, of a kind used primarily in perfumery, ...	79	96
Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the ...	80	101
Swedes, mangolds, fodder roots, hay, alfalfa, clover, sainfoin, forage kale, lupines, vetches ...	81	42
Prepared or preserved meat, offal or blood (excluding sausages and similar products, and meat ...	82	105
Fats and oils and their fractions of fish or marine mammals, whether or not refined (excluding ...	83	95

Cider, perry, mead and other fermented beverages and mixtures of fermented beverages and non-alcoholic ...	84	88
Flours and meals of oil seeds or oleaginous fruits (excluding mustard)	85	68
Vegetable saps and extracts; pectic substances, pectinates and pectates; agar-agar and other ...	86	126
Molasses resulting from the extraction or refining of sugar	87	2
”Dried apricots, prunes, apples, peaches, pears, papaws ””papayas””, tamarinds and other edible ...	88	111
Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved (excluding smoked)	89	138
Ice cream and other edible ice, whether or not containing cocoa	90	104
Tomatoes, fresh or chilled	91	60
Vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar ...	92	107
Dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared	93	90
Jams, fruit jellies, marmalades, fruit or nut purée and fruit or nut pastes, obtained by cooking, ...	94	86
Yeasts, active or inactive; other dead single-cell micro-organisms, prepared baking powders ...	95	106
Other sugars, incl. chemically pure lactose, maltose, glucose and fructose, in solid form; ...	96	84

Foliage, branches and other parts of plants, without flowers or flower buds, and grasses, mosses ...	97	109
Melons, incl. watermelons, and papaws (papayas), fresh	98	89
Starches; inulin	99	76
Waters, incl. natural or artificial mineral waters and aerated waters, not containing added ...	100	61
Oilcake and other solid residues, whether or not ground or in the form of pellets, resulting ...	101	64
Tomatoes, prepared or preserved otherwise than by vinegar or acetic acid	102	97
Buckwheat, millet, canary seed and other cereals (excluding wheat and meslin, rye, barley, ...	103	72
Sausages and similar products, of meat, offal or blood; food preparations based on these products	104	114
Malt, whether or not roasted	105	91
Animal or vegetable fats and oils and their fractions, boiled, oxidised, dehydrated, sulphurised, ...	106	102
Fruit and nuts, provisionally preserved, e.g. by sulphur dioxide gas, in brine, in sulphur ...	107	98
Carrots, turnips, salad beetroot, salsify, celeriac, radishes and similar edible roots, fresh ...	108	85
”Flour, meal and powder of peas, beans, lentils and other dried leguminous vegetables of heading ...	109	79
Vegetable materials of a kind used primarily for plaiting, e.g. bamboos, rattans, reeds, rushes, ...	110	117

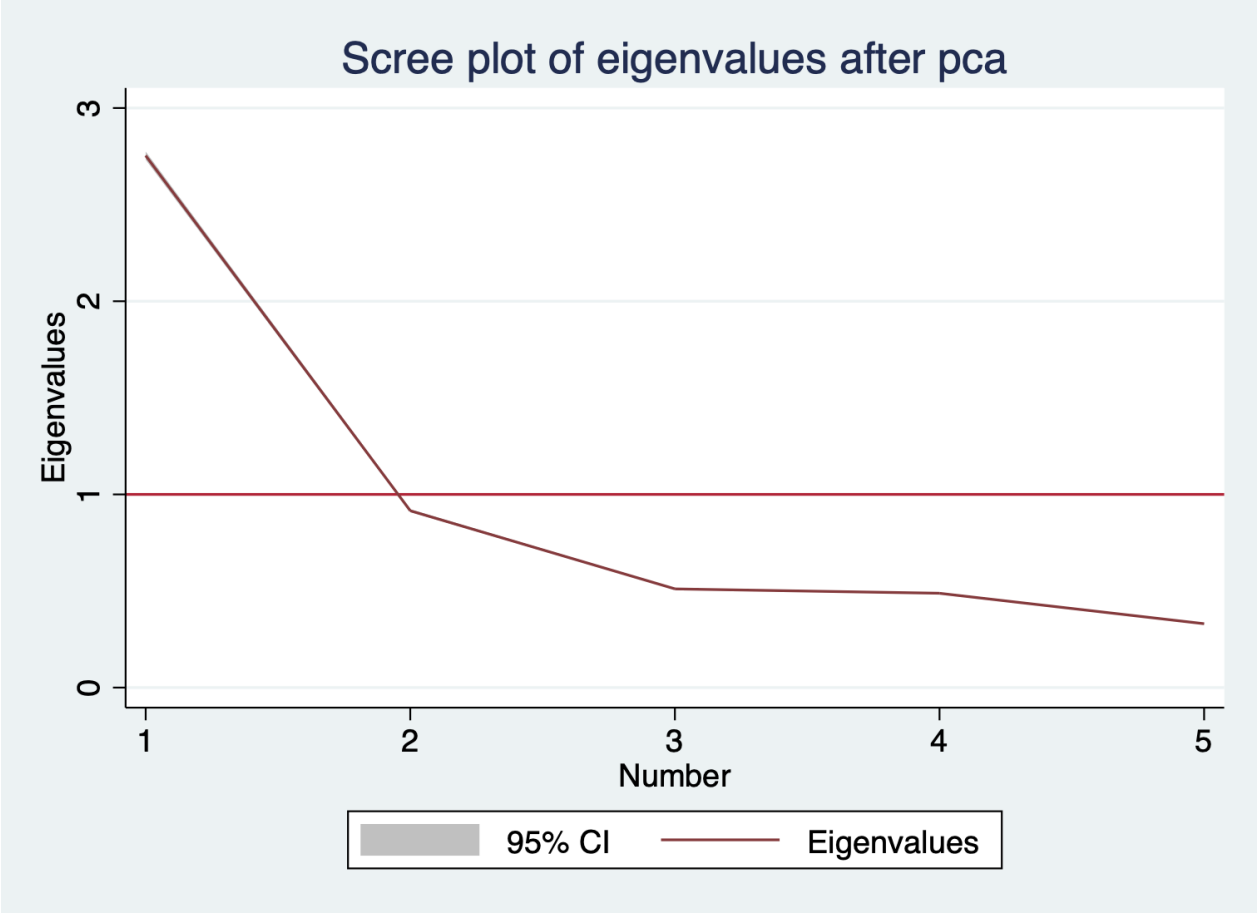
Cereal grains otherwise worked, e.g. hulled, rolled, flaked, pearled, sliced or kibbled; germ ...	111	92
Fruit and nuts, uncooked or cooked by steaming or boiling in water, frozen, whether or not ...	112	118
Cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form ...	113	82
Sunflower seeds, whether or not broken	114	110
Cabbages, cauliflowers, kohlrabi, kale and similar edible brassicas, fresh or chilled	115	103
Vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen (excluding ...	116	116
Vegetable waxes, beeswax, other insect waxes and spermaceti, whether or not refined or coloured ...	117	135
Residues of starch manufacture and similar residues, beet-pulp, bagasse and other waste of ...	118	71
Flour, meal, powder, flakes, granules and pellets of potatoes	119	115
Other oils and their fractions, obtained solely from olives, whether or not refined, but not ...	120	121
Cinnamon and cinnamon-tree flowers	121	131
Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries	122	130
Olive oil and its fractions obtained from the fruit of the olive tree solely by mechanical ...	123	142

Bulbs, tubers, tuberous roots, corms, crowns and rhizomes, dormant, in growth or in flower, ...	124	143
”Lettuce ””Lactuca sativa”” and chicory ””Cichorium spp.””, fresh or chilled”	125	112
Rape or colza seeds, whether or not broken	126	119
Lard stearin, lard oil, oleostearin, oleo-oil and tallow oil (excluding emulsified, mixed or ...	127	123
Rape, colza or mustard oil and fractions thereof, whether or not refined, but not chemically ...	128	128
Vegetables provisionally preserved, e.g. by sulphur dioxide gas, in brine, in sulphur water ...	129	127
Barley	130	113
Peel of citrus fruit or melons, incl. watermelons, fresh, frozen, dried or provisionally preserved ...	131	134
Fats of bovine animals, sheep or goats (excluding oil and oleostearin)	132	122
Hop cones, fresh or dried, whether or not ground, powdered or in the form of pellets; lupulin	133	145
Vinegar, fermented vinegar and substitutes for vinegar obtained from acetic acid	134	124
”Vegetables, fruit, nuts, fruit-peel and other edible parts of plants, preserved by sugar ””drained, ...	135	144
Oats	136	129
Glycerol, crude; glycerol waters and glycerol lyes	137	137

Tapioca and substitutes therefor prepared from starch, in the form of flakes, grains, pearls, ...	138	125
Vermouth and other wine of fresh grapes, flavoured with plants or aromatic substances	139	147
Extracts and juices of meat, fish or crustaceans, molluscs and other aquatic invertebrates	140	146
Degras; residues resulting from the treatment of fatty substances or animal or vegetable waxes	141	100
Acorns, horse-chestnuts, marc and other vegetable materials and vegetable waste, vegetable ...	142	120
Cucumbers and gherkins, fresh or chilled	143	140
Nutmeg, mace and cardamoms	144	150
Linseed, whether or not broken	145	141
Wheat gluten, whether or not dried	146	139
Rye	147	133
Wool grease and fatty substances derived therefrom, incl. lanolin	148	151
Mushrooms and truffles, prepared or preserved otherwise than by vinegar or acetic acid	149	149
Copra	150	136
Other animal fats and oils and their fractions, whether or not refined, but not chemically ...	151	148
Mate	152	155

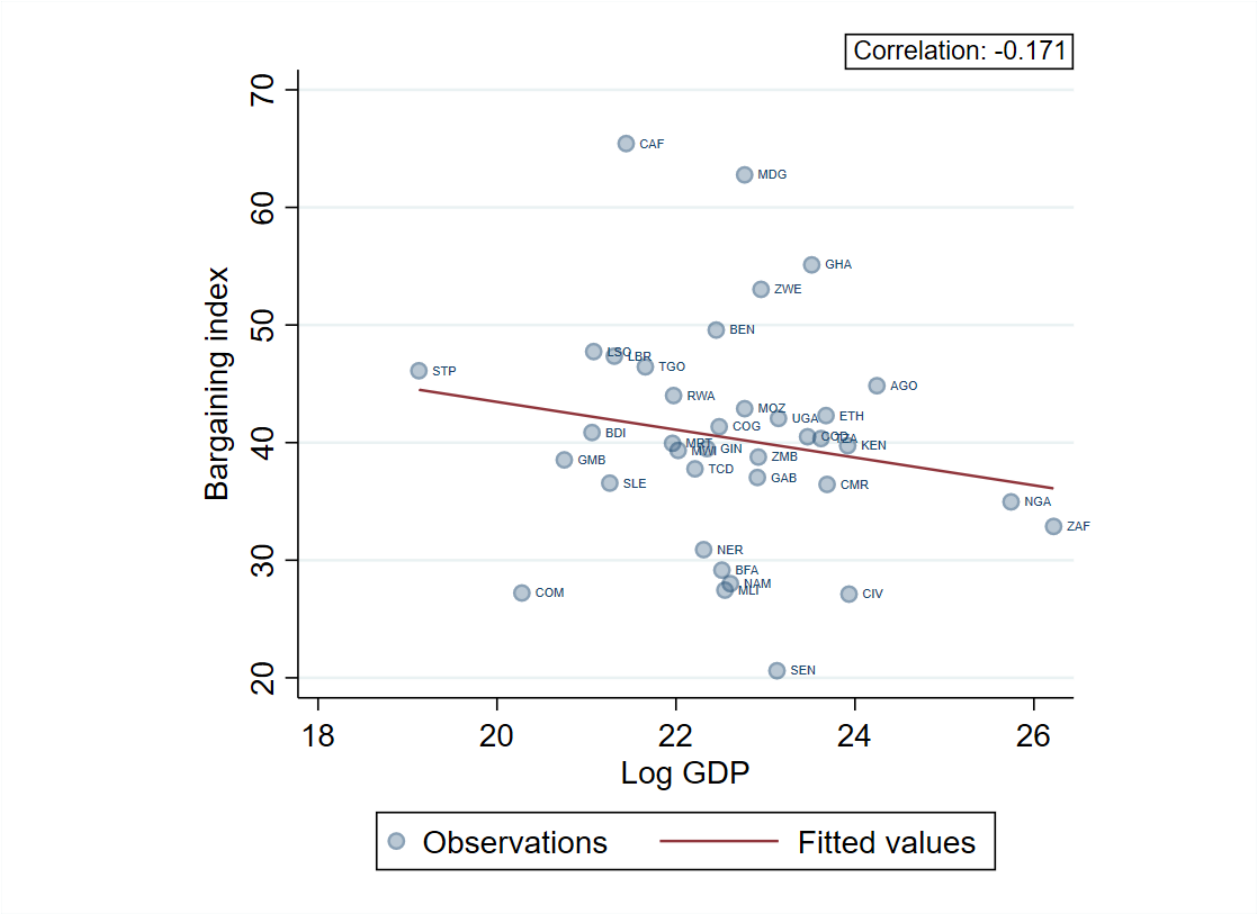
Pig fat, incl. lard, and poultry fat, rendered or otherwise extracted (excluding lard stearin ...	153	154
Products containing tobacco, reconstituted tobacco, nicotine, or tobacco or nicotine substitutes, ...	154	157
Wine lees; argol	155	153
Vegetable materials, such as broom-corn, piassava, couch-grass and istle, of a kind used primarily ...	156	152
Vegetable materials of a kind used primarily as stuffing or as padding, e.g. kapok, vegetable ...	157	156

D Additional Figures



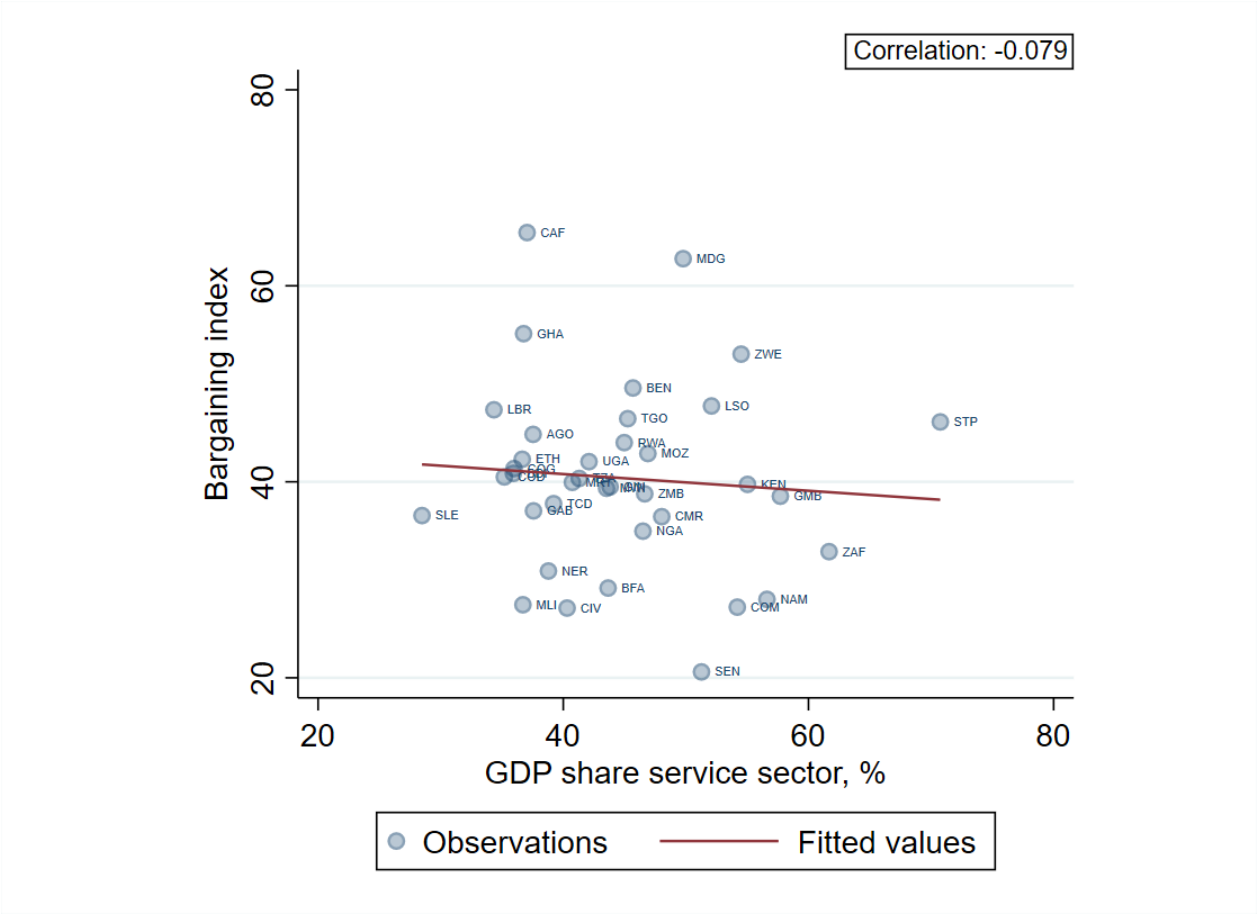
Appendix Figure A4: Factor analysis of female decision making in household choices. the Kaiser criterion, scree plot (Cattell 1966)

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

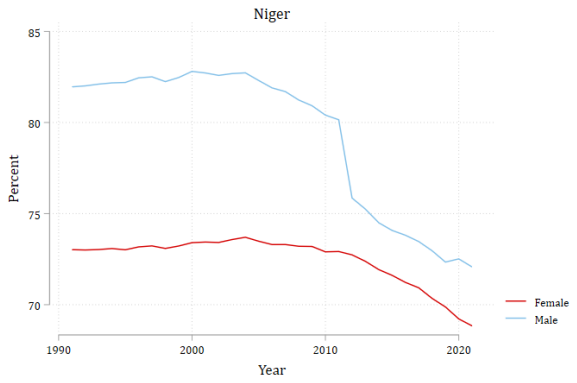


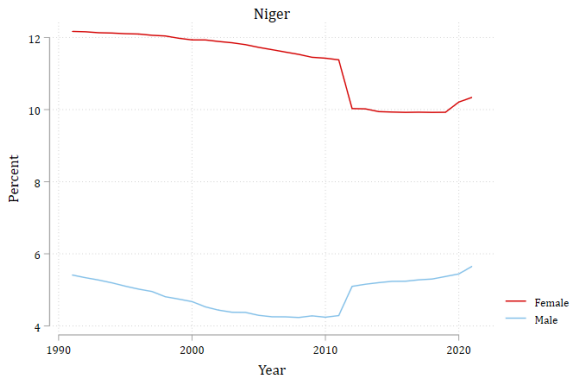
The graph shows the bargaining index associated to each observation in relation with the GDP for each observation. GDP is expressed in logs. The bargaining index also varies on a scale from 0 to 100. The red line is the linear regression fit. The slope of the line, which is equivalent to the correlation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

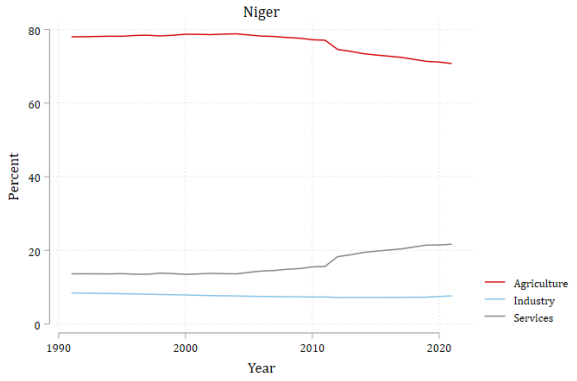
Appendix Figure A6: Correlation between bargaining index and GDP share of service sector

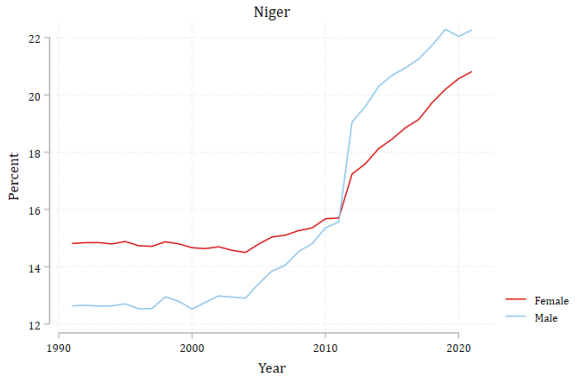


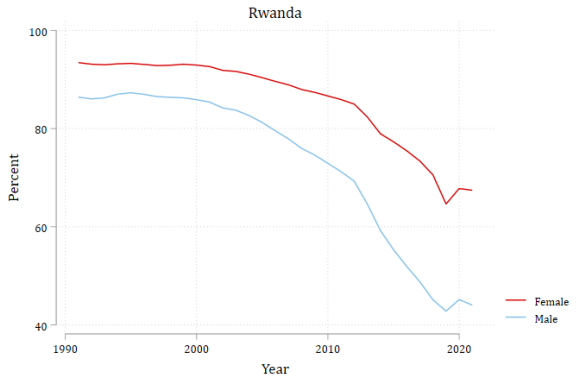
The graph shows the bargaining index associated to each observation in relation with the share of GDP represented by the service sector for each observation. GDP share of service sector is expressed in percentage points. The bargaining index also varies on a scale from 0 to 100. The red line is the linear 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.

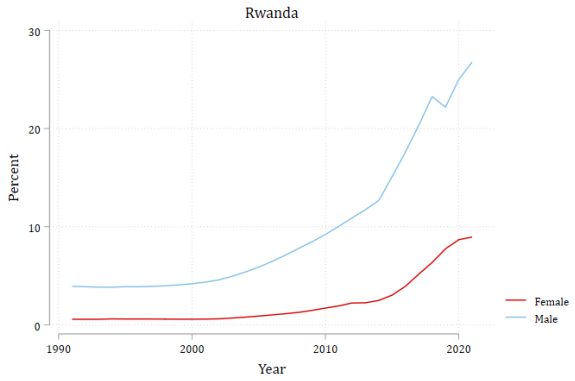

Niger
Percent
Year
Female
Male

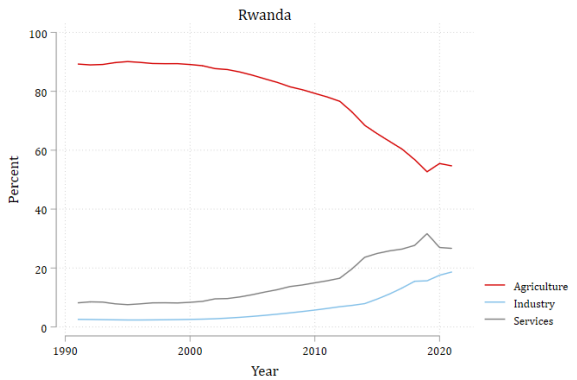

Niger
Percent
Year
Female
Male

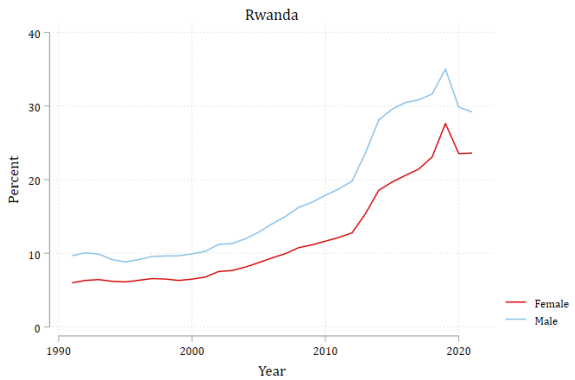

Niger
Percent
Year
Agriculture
Industry
Services

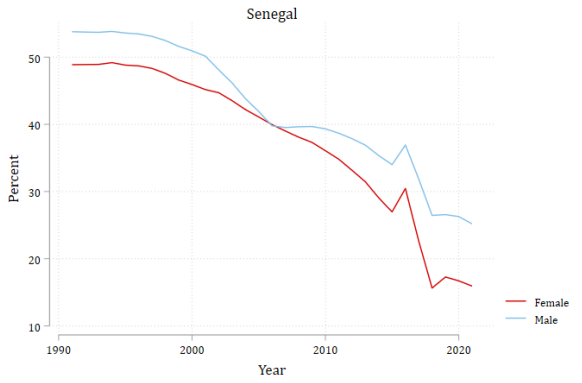

Niger
Percent
Year
Female
Male

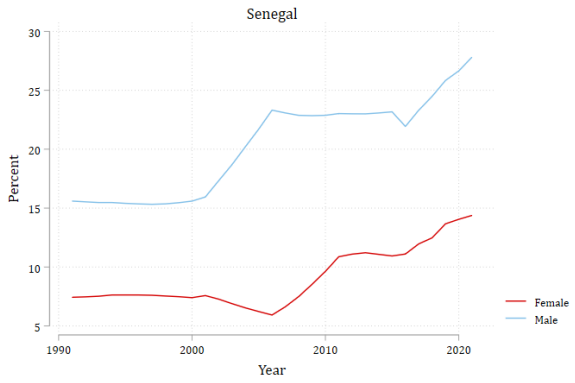

Rwanda
Percent
Year
Female
Male

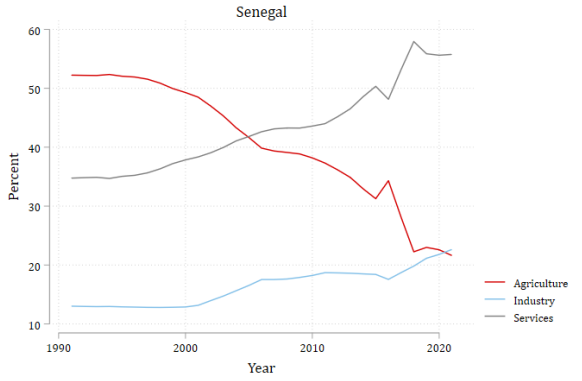

Rwanda
Percent
Year
Female
Male

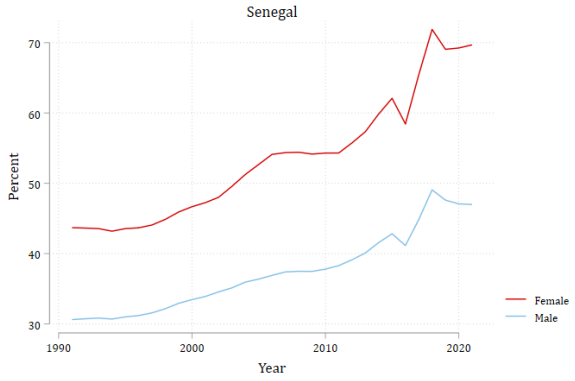

Rwanda
Percent
Year
Agriculture
Industry
Services

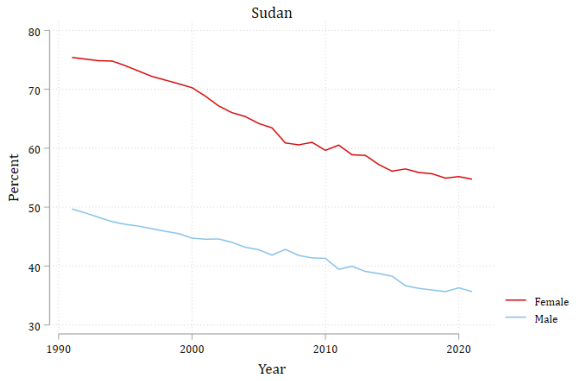

Rwanda
Percent
Year
Female
Male

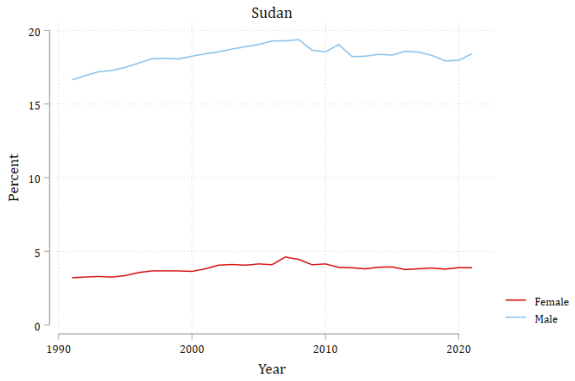

Senegal
Percent
Year
Female
Male

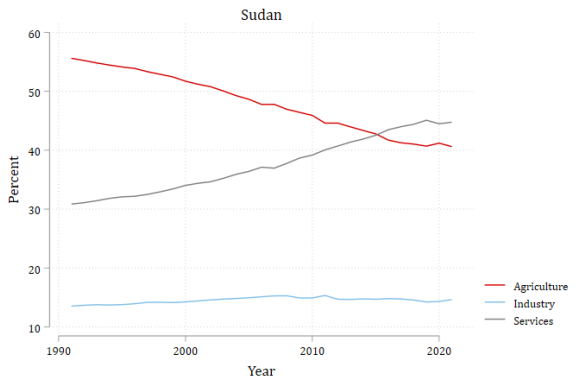

Senegal
Percent
Year
Female
Male

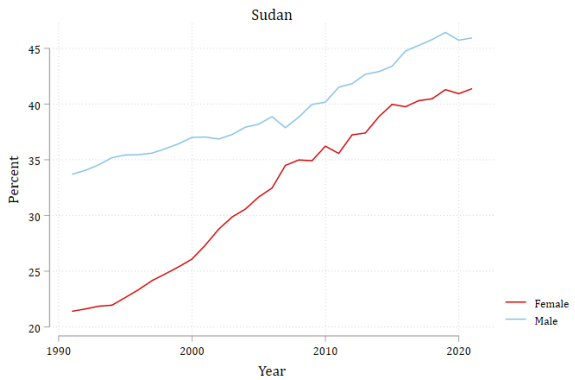

Senegal
Percent
Year
Agriculture
Industry
Services

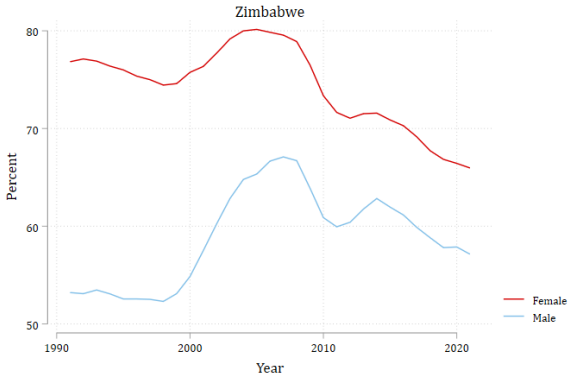

Senegal
Percent
Year
Female
Male

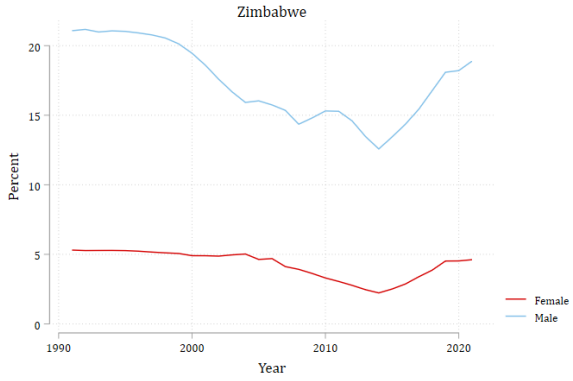

Sudan
Percent
Year
Female
Male

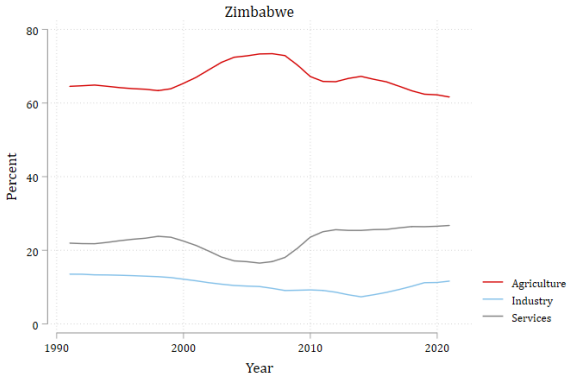

Sudan
Percent
Year
Female
Male

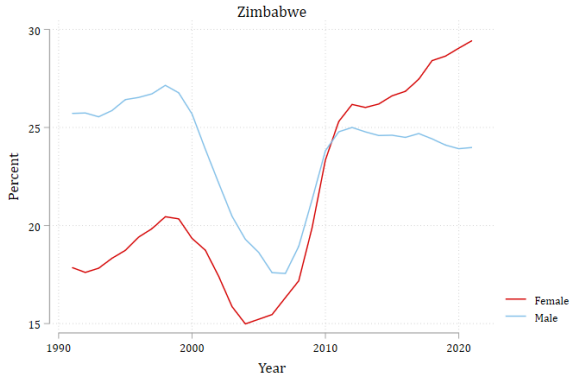

Sudan
Percent
Year
Agriculture
Industry
Services

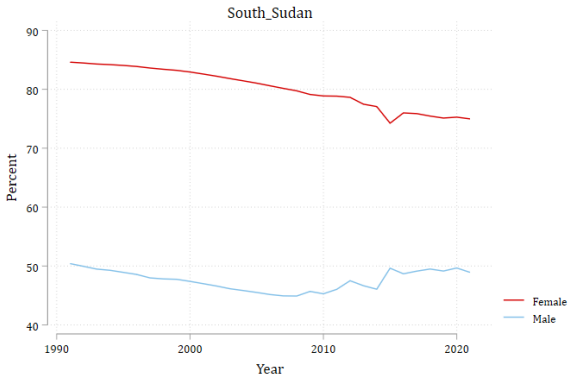

Sudan
Percent
Year
Female
Male

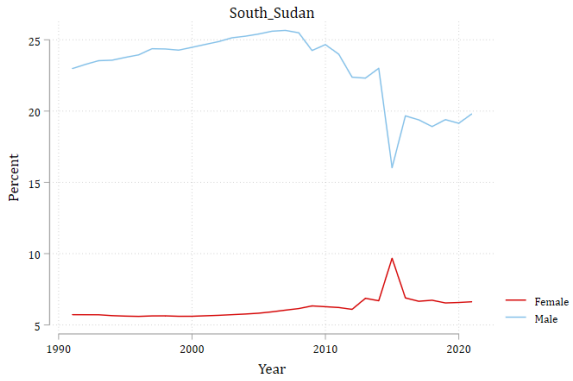

Zimbabwe
Percent
Year
Female
Male

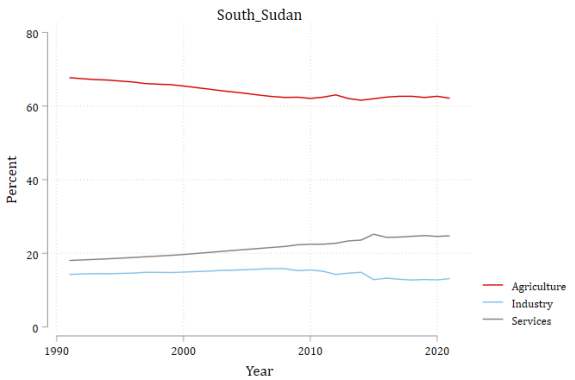

Zimbabwe
Percent
Year
Female
Male

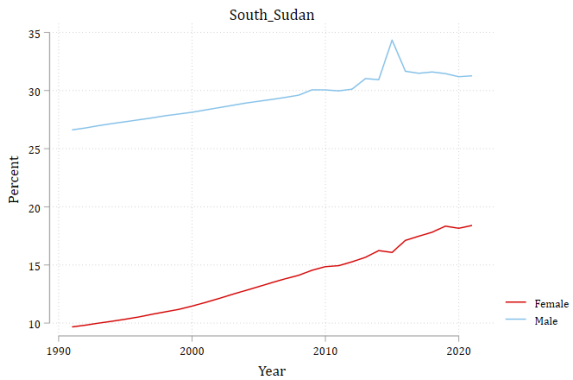

Zimbabwe
Percent
Year
Agriculture
Industry
Services

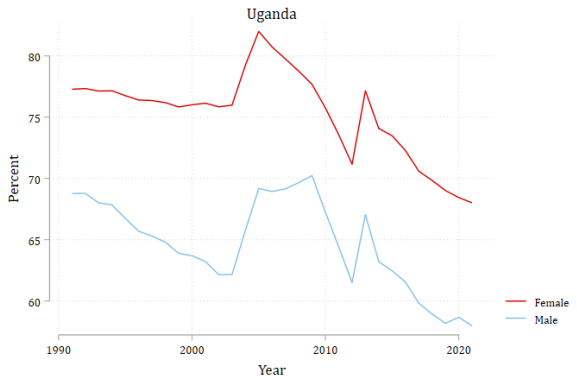

Zimbabwe
Percent
Year
Female
Male

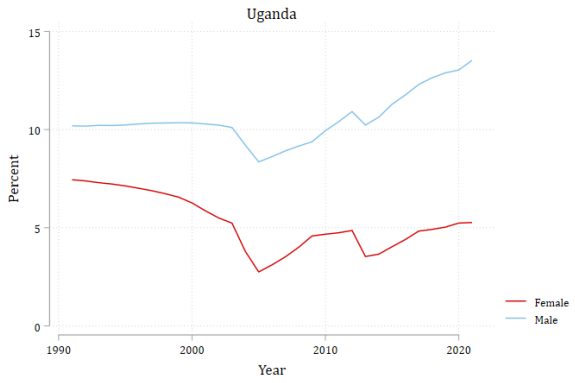

South_Sudan
Percent
Year
Female
Male

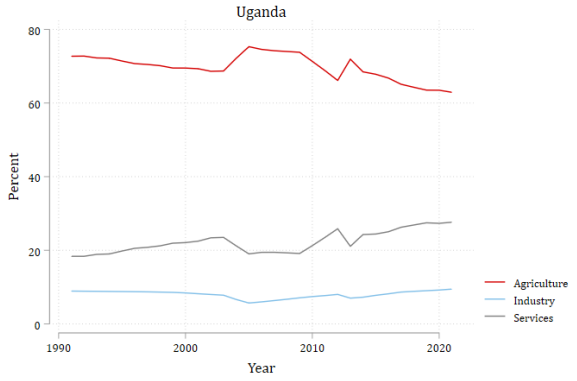

South_Sudan
Percent
Year
Female
Male

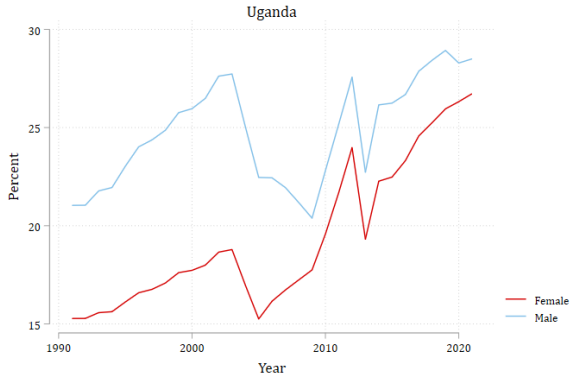

South_Sudan
Percent
Year
Agriculture
Industry
Services

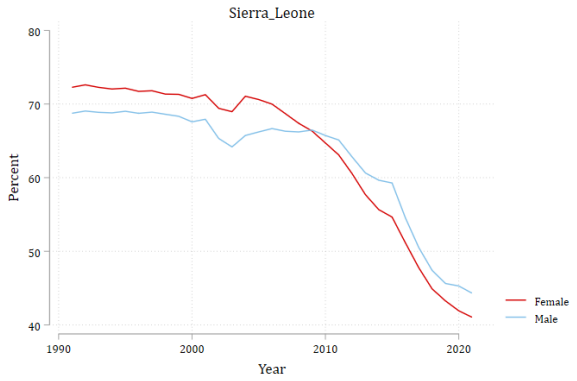

South_Sudan
Percent
Year
Female
Male

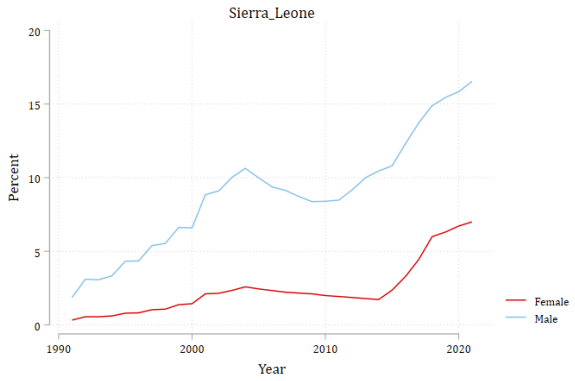

Uganda
Percent
Year
Female
Male

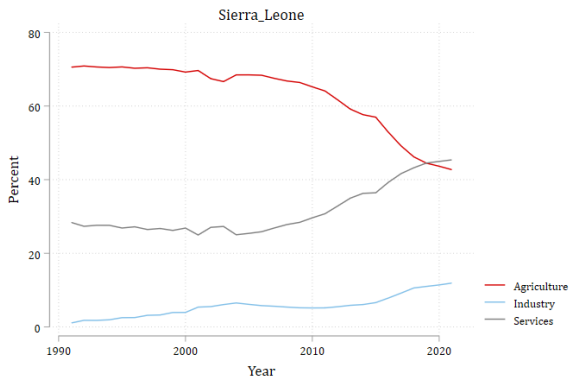

Uganda
Percent
Year
Female
Male

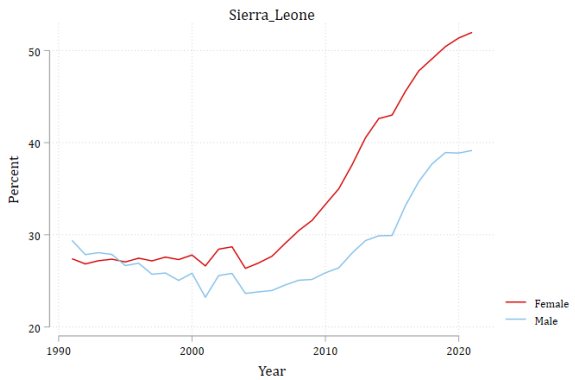

Uganda
Percent
Year
Agriculture
Industry
Services

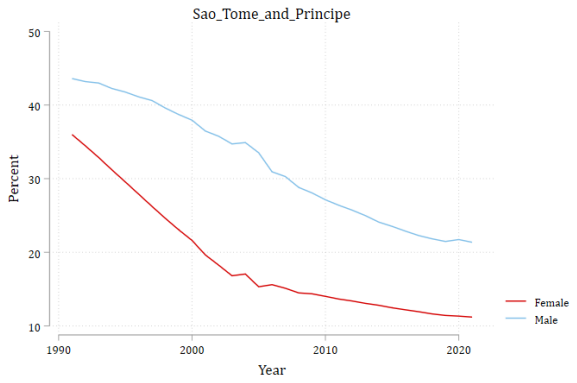

Uganda
Percent
Year
Female
Male

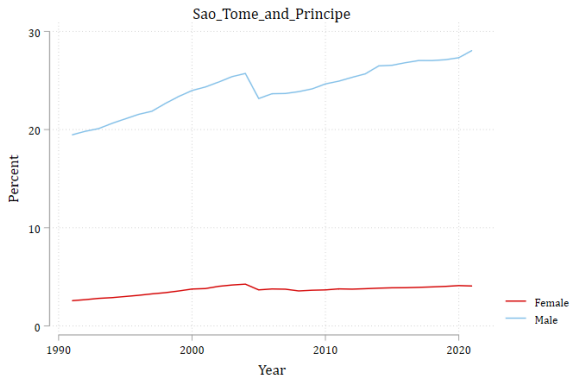

Sierra_Leone
Percent
Year
Female
Male

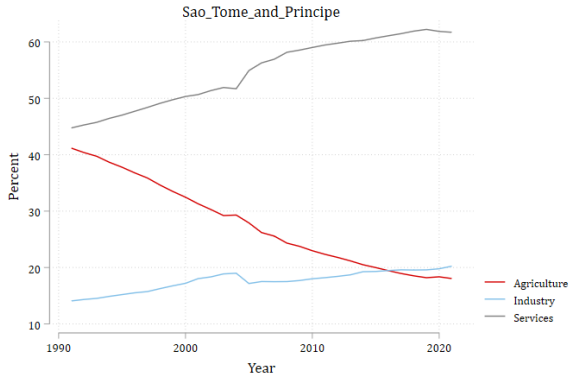

Sierra_Leone
Percent
Year
Female
Male

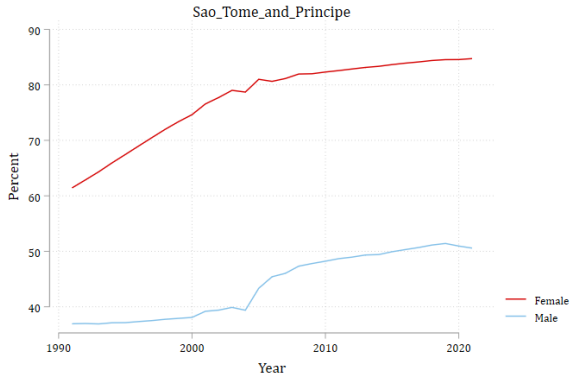

Sierra_Leone
Percent
Year
Agriculture
Industry
Services

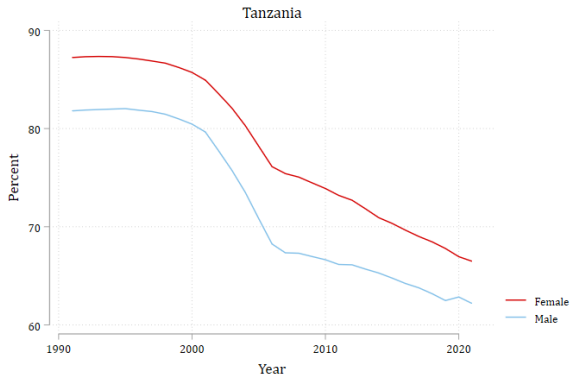

Sierra_Leone
Percent
Year
Female
Male

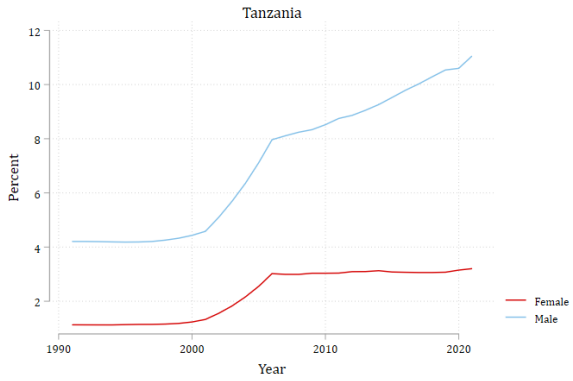

Sao_Tome_and_Principe
Percent
Year
Female
Male

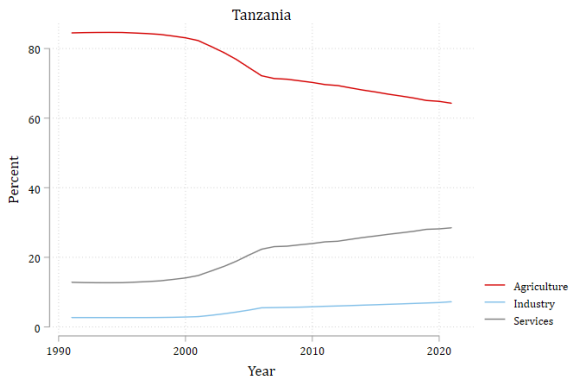

Sao_Tome_and_Principe
Percent
Year
Female
Male

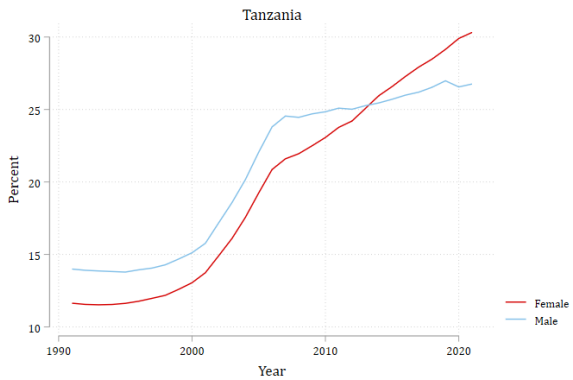

Sao_Tome_and_Principe
Percent
Year
Agriculture
Industry
Services

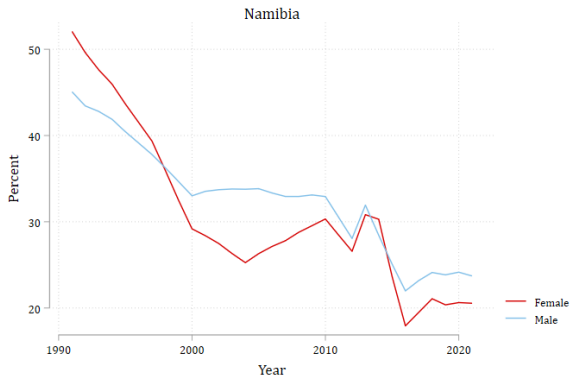

Sao_Tome_and_Principe
Percent
Year
Female
Male

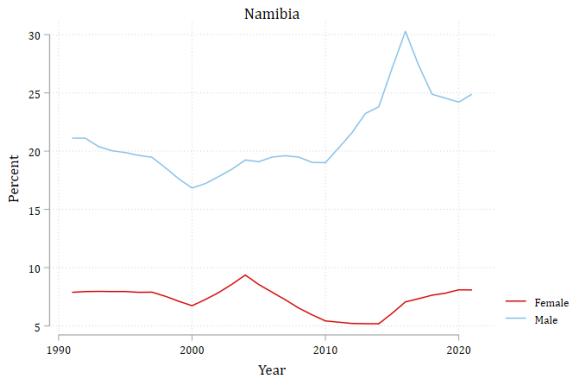

Tanzania
Percent
Year
Female
Male

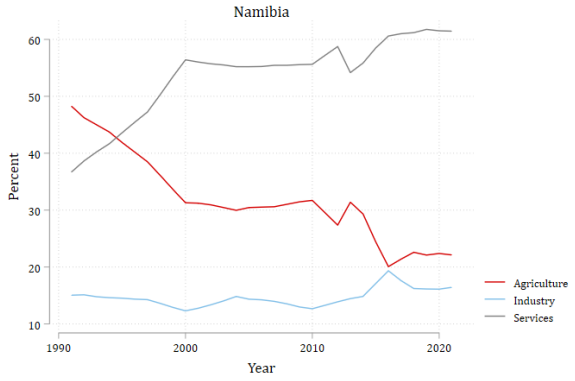

Tanzania
Percent
Year
Female
Male

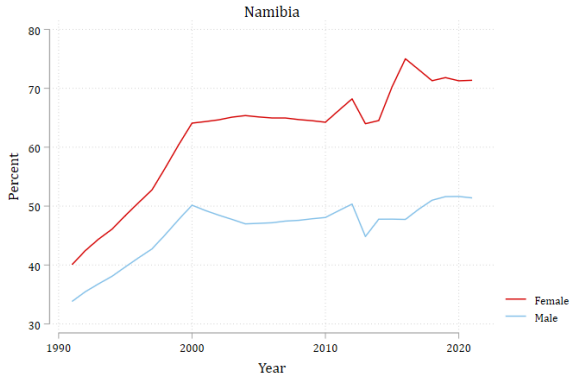

Tanzania
Percent
Year
Agriculture
Industry
Services

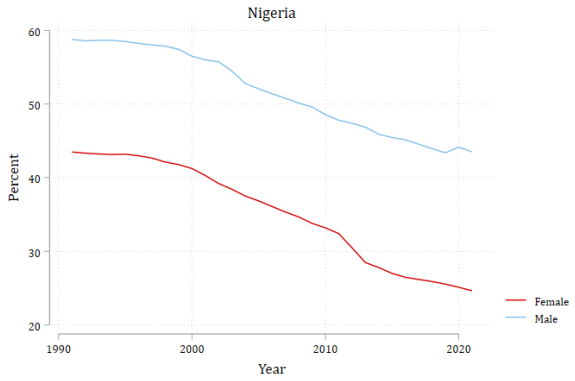

Tanzania
Percent
Year
Female
Male

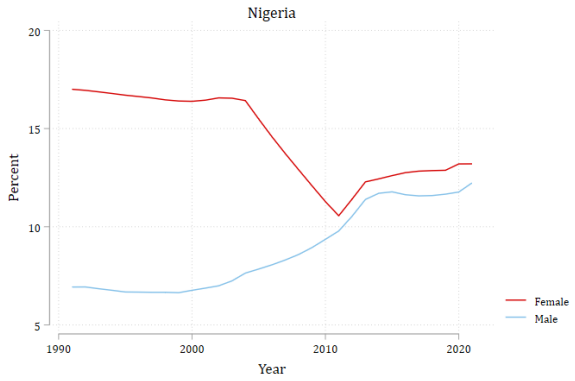

Namibia
Percent
Year
Female
Male

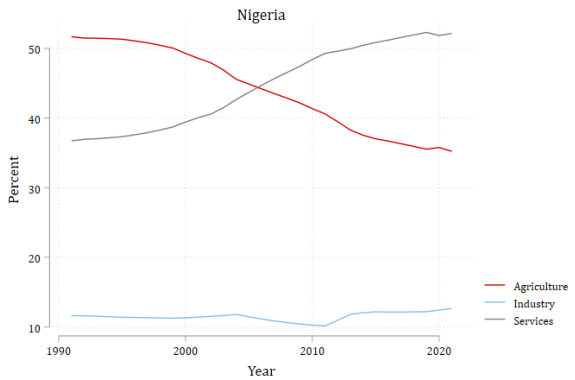

Namibia
Percent
Year
Female
Male

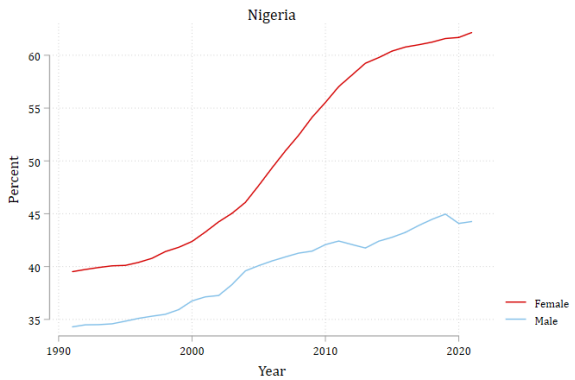

Namibia
Percent
Year
Agriculture
Industry
Services

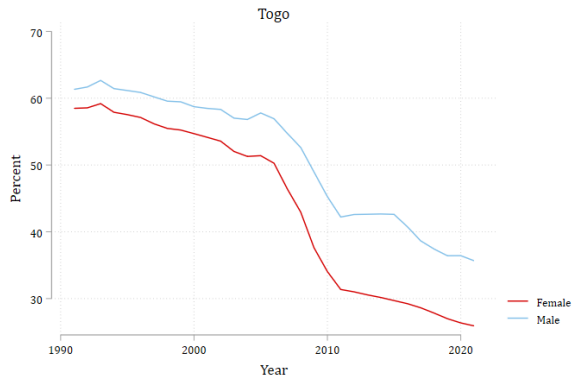

Namibia
Percent
Year
Female
Male

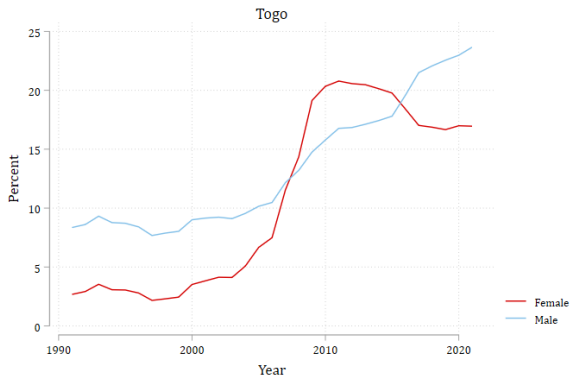

Nigeria
Percent
Year
Female
Male

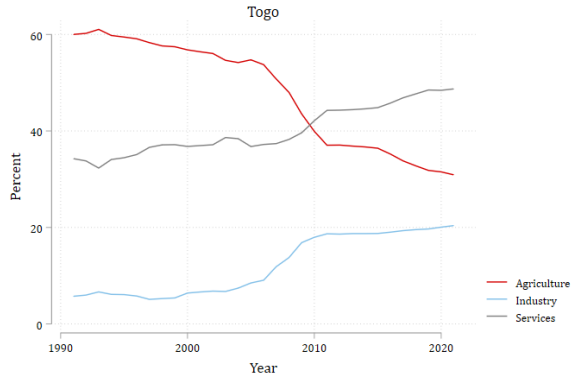

Nigeria
Percent
Year
Female
Male

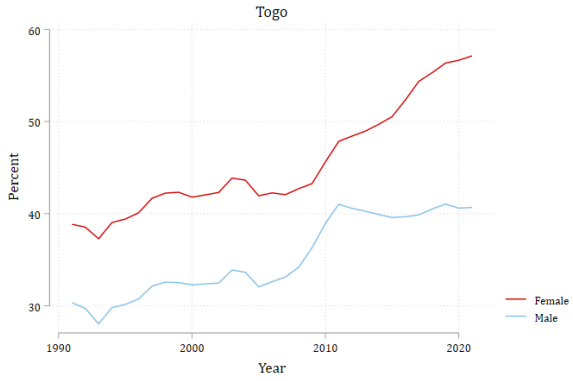

Nigeria
Percent
Year
Agriculture
Industry
Services

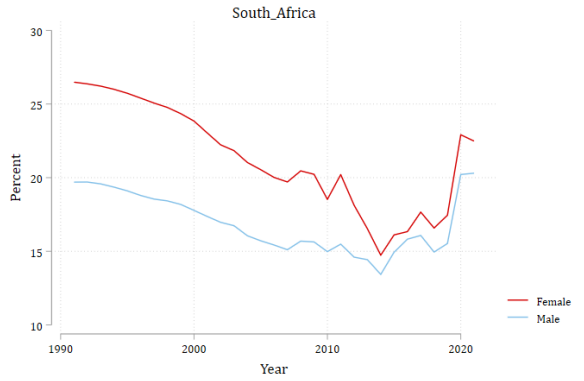

Nigeria
Percent
Year
Female
Male

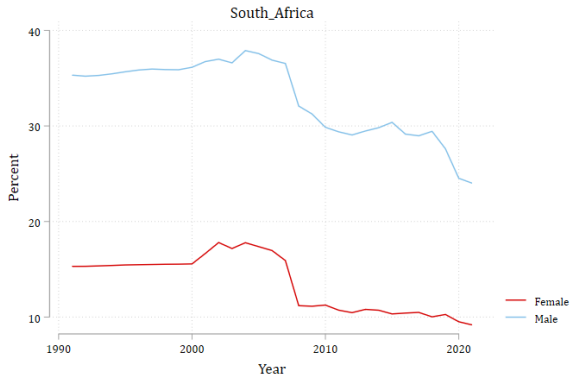

Togo
Percent
Year
Female
Male

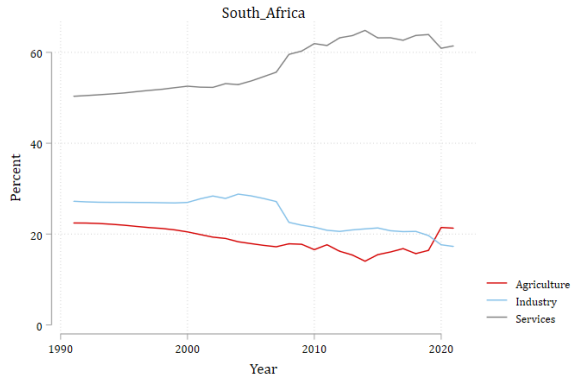

Togo
Percent
Year
Female
Male

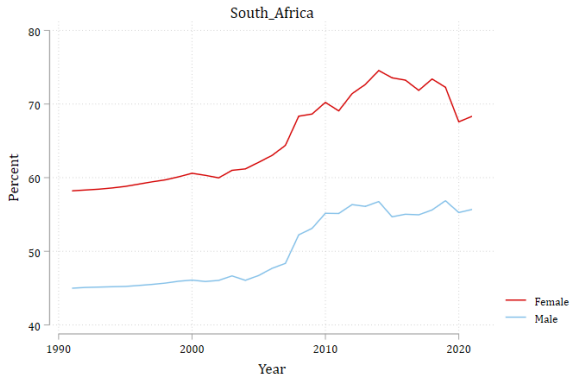

Togo
Percent
Year
Agriculture
Industry
Services

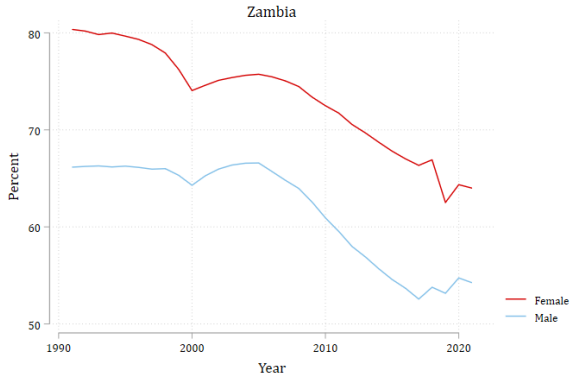

Togo
Percent
Year
Female
Male

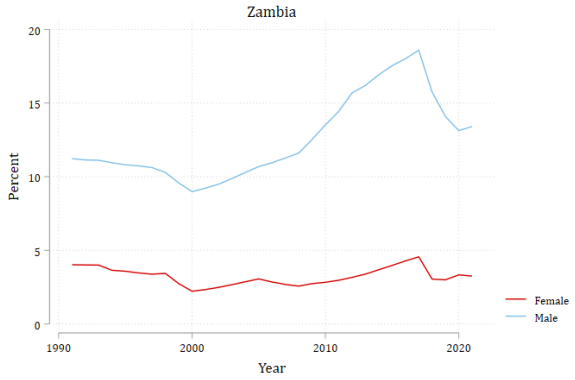

South_Africa
Percent
Year
Female
Male

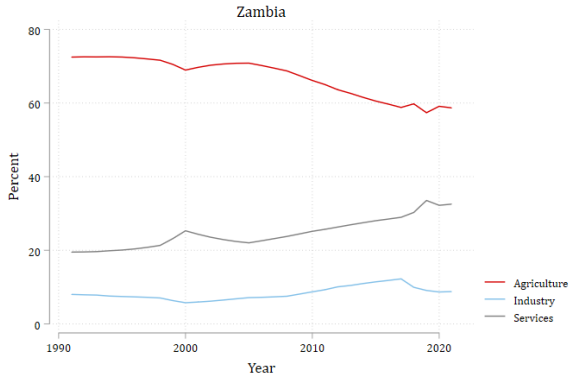

South_Africa
Percent
Year
Female
Male

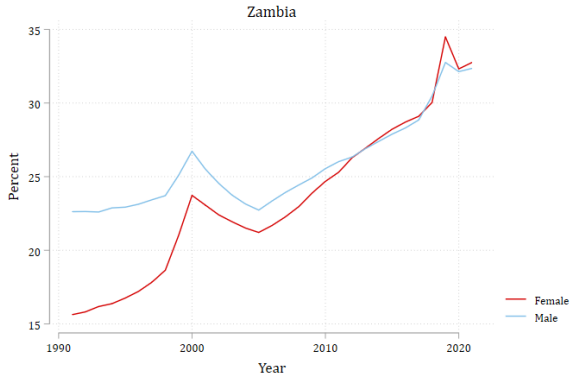

South_Africa
Percent
Year
Agriculture
Industry
Services


South_Africa
Percent
Year
Female
Male


Zambia
Percent
Year
Female
Male


Zambia
Percent
Year
Female
Male


Zambia
Percent
Year
Agriculture
Industry
Services


Zambia
Percent
Year
Female
Male