Gender Inequality and Marketisation Hypothesis in sub-Saharan Africa

Tendai Zawaira*, Manoel Bittencourt†, and Matthew W. Clance‡

Abstract

The marketisation hypothesis states that the growth of the services sector reduces gender inequality. Women have a comparative advantage in service jobs and consequently benefit more than men as the services sector grows. In recent years, the African service sector has grown considerably, however, gender inequality on the continent is still relatively high. Using a new dataset on gender inequality and panel data analysis, we study the relationship between service sector shares and gender inequality in 31 sub-Saharan African countries during the 1990-2014 period. Consistent with predictions of the hypothesis, services sector shares significantly reduce gender inequality and the results are robust after the inclusion of a wide range of controls. However, we find that this relationship is non-linear, suggesting that the size of the services sector reaches a threshold before we observe improvements in gender inequality.

Keywords: Gender, Marketisation Hypothesis, Africa
JEL Codes: J16, O11, 014, 047, 055

1 Introduction

Recent studies have shown that during the process of economic development, economies experience sectoral shifts or structural transformation from low skill labour intensive agriculture to high skill capital intensive services. These sectoral shifts transform the traditional roles of men and women in the labour market (Akbulut, 2011; Buera & Kaboski, 2012; Freeman & Schettkat, 2005; Rendall, 2011; Rogerson, 2008). The marketisation hypothesis is synonymous with structural transformation (Freeman & Schettkat, 2005). The hypothesis states that women benefit from the marketisation process whereby the services sector creates jobs particularly suited for women's skills and preferences (Goldin, 2006). Moreover, women have a greater comparative

*Corresponding Author, PhD Candidate: Department of Economics, University of Pretoria, Hatfield 0028, South Afica. *Tel:* +27 12 420 6914. *E-mail:* tendai.zawaira@up.ac.za

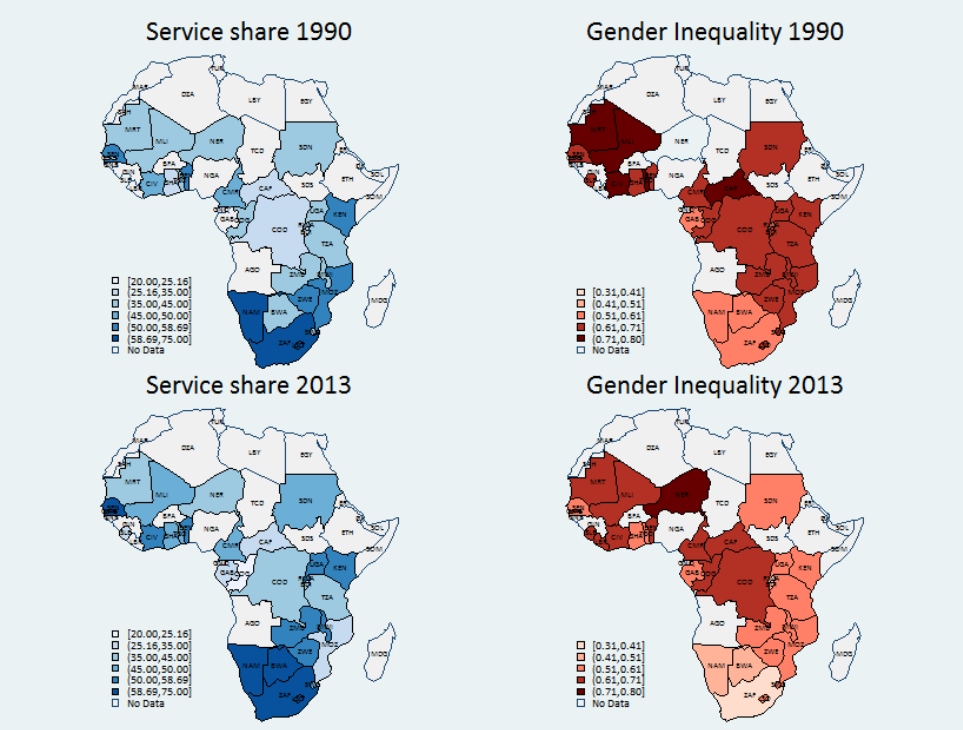
† School of Economic and Business Sciences, University of the Witwatersrand, E-mail: manoel.bittencourt@wits.ac.za

‡ Department of Economics, University of Pretoria, Hatfield 0028, South Afica. *E-mail:* matthew.clance@up.ac.za

advantage in service jobs compared to other sectors - "brain versus brawn argument" (Galor & Weil, 1996). The benefits are reinforced by the similarity between jobs in the services sector and in home production (Akbulut, 2011) and that women have traditionally dominated household production (Olivetti & Petrongolo, 2016).

To this effect, structural transformation which is generally considered a gender neutral shock to the economy yields unexpected gender-biased outcomes through the services sector by increasing female labour supply. On the other hand, increased female labour force participation has been known to improve overall gender outcomes (see Goldin, 1990, 2006; Ngai & Petrongolo, 2017). Olivetti and Petrongolo (2014) show that countries with smaller services sector shares have lower female labour force participation and larger gender gaps - suggesting an interplay between marketisation and overall gender inequality. Figure 1 below shows this link between marketisation and gender inequality in SSA . During the 1990s, most countries had lower service sector shares and consequently higher levels of gender inequality. Over the years, as countries' service sector shares grew, lower levels of gender inequality have been achieved as shown for the year 2013. However, this relationship has received very little attention (Ngai & Petrongolo, 2012), especially in sub-Saharan Africa.

Figure 1: Marketisation and Gender Inequality in SSA.



Source: Data on historically extended Gender Inequality Index (GII) obtained from Gonzales et al. (2015). Service sector shares data obtained from World Development Indicators.

In sub-Saharan Africa (SSA), the nature and pace of structural transformation (the source of marketisation) has been delayed by an under performing agricultural sector, an industrial sector experiencing zero to negative growth and a rising informal and subsistent services sector (Badiane, 2015; McMillan & Headey, 2014; Timmer, 2012). As a result, these structural dynamics may bear implications not only on the relevance of the marketisation hypothesis in SSA, but also the extent of its proposed impact on gender inequality. This paper proposes to investigate the following: What is the impact of marketisation on gender inequality in SSA and through which channel is it effective? We seek to answer this question because literature states that the channel is increased female labour force participation.

Data on a sample of 31 sub-Saharan African countries[1] from 1990-2014 is used to investigate the hypothesis. Using panel data analysis methods, namely fixed effects and fixed effects with instrumental variables, we find evidence that the marketisation hypothesis holds in SSA. Growth in the services sector significantly reduces gender inequality. We also find that the marketisation hypothesis is effective in reducing gender inequality through social issues, such as reducing adolescent fertility, as well as a delayed effect through economic issues such as, increasing female labour force participation.

This study is related to literature on structural transformation and gender inequality. Research on the link between labour force participation and industry structure dates back to the work of Reid et al. (1934) and Fuchs (1968). However, most of these studies did not have a unified theoretical framework in which to analyse marketisation and home production. The seminal work by Galor and Weil (1996) provided a theoretical framework for analysing female labour force participation and industry structure. In their model, men and women have different endowments of "brain and brawn" which are necessary in the production of goods and services. Men have a comparative advantage in "brawn" which is typically necessary in the production of goods. This can be equated to the agricultural and manufacturing sectors, whilst women have a comparative advantage in "brain" which is more relevant in service production. Olivetti and Petrongolo (2016) propose that even if we take away the "brain versus brawn" argument due to technological advances, women will still have a comparative advantage in services related to the intense use of communication and interpersonal skills which cannot be easily automated.

Several authors subscribe to this view (Akbulut, 2011; Goldin, 1990, 2006; Ngai & Petron-

[1]These include Benin, Botswana, Burundi, Cameroon, CAF, DRC, Congo, Cote d'Ivoire, Gabon, Gambia, Ghana, Kenya, Lesotho, Malawi,Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Rwanda Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe. Sample selection is informed by data availability especially on the extended GII.

golo, 2017; Rendall, 2010; Weinberg, 2000). The services sector influences gender outcomes through the similarity of service jobs in home production and the market, together with the fact that women have traditionally done these jobs in the household (Olivetti & Petrongolo, 2016). The shift in female labour triggered by marketisation mirrors male labour shifts that occurred during industrialisation. According to Akbulut (2011), male labour shifted from agriculture to manufacturing sectors as the industrialisation process took root. Similarly, in recent years, female labour has begun to shift from unremunerated home production to more productive remunerated services sector. These shifts have gender implications in the labour market.

This work contributes to the existing literature in two ways, first it tests the relevance of the marketisation hypothesis in SSA. The transformation happening in Africa now has already happened in most developed countries as highlighted in several empirical studies. For example, (Heathcote, Storesletten, & Violante, 2010; Ngai & Petrongolo, 2017) examine the role of marketisation in explaining gender inequality in the form of hours worked by women in developed countries, whilst other studies have also used marketisation to explain gender gap variations in employment in the United States and the United Kingdom (Ngai & Pissarides, 2011; Rogerson, 2007, 2008). As such, the application of the marketisation hypothesis in a developing country context might provide new insights in filling in the gap in the literature on the determinants of gender inequality in Africa. Second, the research uses a new and more comprehensive dataset on gender inequality, the historically extended gender inequality index (GII) developed by the United Nations Development Programme (UNDP) and extended by Gonzales et al. (2015) as an overall measure of gender inequality.

2 Background

2.1 Gender Inequality and Structural Transformation in Africa

Gender inequality has been marked as an impediment to growth and development (African Development Bank, 2014; Elborgh-Woytek et al., 2013). Apart from being a social or welfare concern, it contributes to loss of human capital efficiency as it represents an underutilisation of women's potential in the labour market. Evidence in Cuberes and Teignier (2014b) shows that GDP per capita losses are as high as 27% in some regions of the world due to gender gaps in the labour market. Though gender inequality has been on the decline in all regions of the world, it has been persistently higher in Africa as shown in Figure 2.

Figure 2: Global Trends in Gender Inequality using historically extended GII

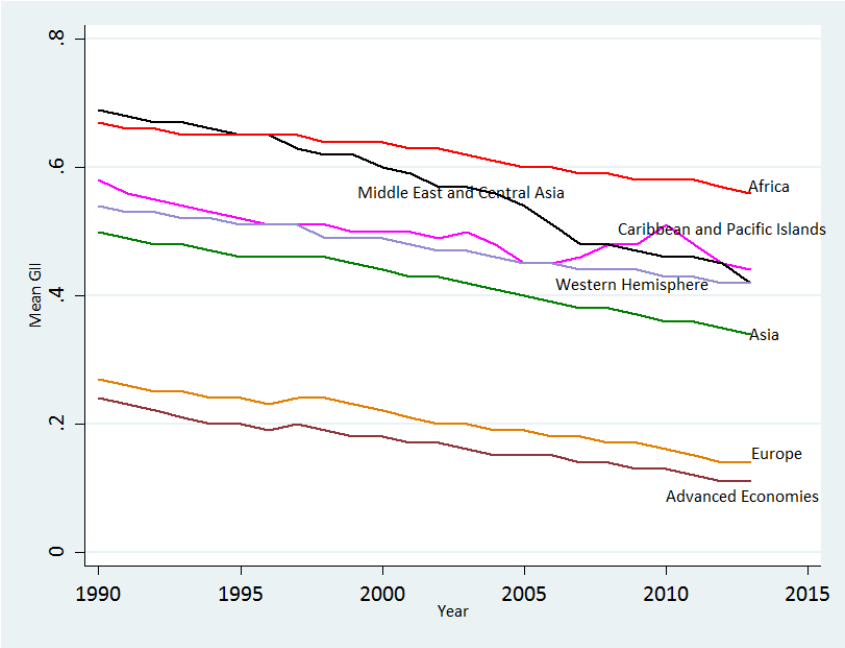


Figure 1 shows regional trends in gender inequality as measured by GII. Data on historically extended Gender Inequality Index (GII) obtained from Gonzales et al. (2015). Gender inequality has generally been on the decline in all regions of the world. However, it has been persistently higher in Africa than other regions.

Structural transformation is defined as the reallocation of economic activity across three broad sectors (agriculture, manufacturing, and services) that accompanies the process of modern economic growth (Herrendorf, Rogerson, & Valentinyi, 2013). This is typically a transition of the economy from low productivity and labour intensive economic activities to higher productivity and skill intensive activities. According to Timmer (2012), one of the means of achieving successful and fast structural transformation follows from the Lewis model where labour productivity is held constant in the industrial and service sectors and this allows them to absorb labour from the agriculture sector at the same rates as each sector itself expands. While the Asian experience closely resembles this, the African experience during most of the first five decades of their independence has been different.

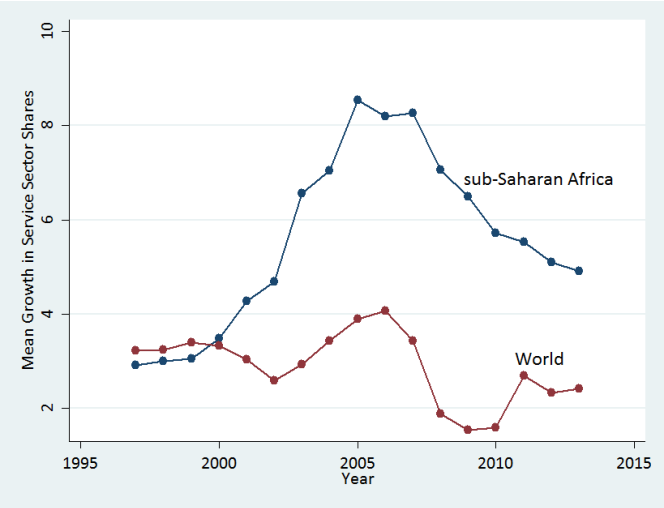
To date, agriculture remains the backbone of most African economies. Not only is the absolute number of workers in agriculture still rising, employing 70% of the population (African Development Bank, 2015) but so too is the share of agricultural labour in the total labour force. This is because labour productivity in both the industrial and services sectors has not been sufficient enough to "pull" out labour from agriculture (Timmer, 2012). Among low income

countries in SSA, average female share of agricultural labour force is around 50%, the highest in the world. Small-holder agriculture in SSA is often highly segmented by gender: with women typically engaged in the production, processing, and sale of domestic foodstuffs in domestic markets and men typically engaged in the production of cash crops, often for exporting (FAO, 2011).

According to Chen (2008), compared to the Asian experience, the industrial sector in Africa has never been quite significant, varied or robust, hence has not created much employment. In most countries, the industrial sector has experienced zero to negative growth. Some of the largest employment losses in Africa have been experienced in formal wholesale and retail trade (with higher productivity), whilst the largest employment gains have been experienced in community, personal and government services which are not as productive (McMillan & Headey, 2014). Most developing countries' industry and manufacturing sectors are heavily dominated by resource-processing sectors that are capital and energy intensive. However, there are country specific cases where manufacturing sector (textiles and garment) has had a significant role in the development process (for example Kenya, Lesotho, Madagascar, Mauritius and South Africa). The growth of the garment and textile industries provided much work for women outside of agriculture but this advantage for women is reduced due to the nature and size of manufacturing in the region. Moreover, due to increased competition from cheaper imports from other developing countries in the 1990s, female employment in manufacturing declined in a number of SSA countries such as Zimbabwe, Tanzania, Cote d'Ivoire, Nigeria, Kenya, Ghana, and South Africa (UNRISD, 2005).

According to the UNCTAD (2015) report, the service sector in Africa expanded at an extremely rapid pace to a share in GDP that is currently not justified by the level of development of African economies. The report states that African service shares grew by more than twice the world average rate during 2009-2012. In figure 3 below, we compare growth rates in service sector shares for SSA against the world based on data from the World Development Indicators. Based on this data, figure 3 shows that on average, since the early 2000s, SSA has been experiencing higher service sector growth rates compared to the rest of the world.

Figure 3: Growth of Service Sector Shares in GDP: SSA and the World



Source: WDI. Figure 3 compares the growth rates in service sector shares for SSA and the World. Since the early 2000s, data shows that SSA service sector shares have grown at a higher rate compared to the world as a whole.

The GDP share of the services sector in Africa is only slightly lower than the average share of Latin American countries, which have an average per capita income that is nearly eight times higher than the African average. However, the service sector that has emerged in Africa is highly informal, subsistent, non-tradable and less productive (McMillan & Headey, 2014).

3 Empirical Strategy and Data

To investigate the relationship between marketisation and gender inequality in SSA, we use data on 31 sub-Saharan African countries from 1990-2014. Due to the nature of this data, panel data analysis is used to estimate the impact of marketisation on gender inequality. Determinants of gender inequality are broadly classified into 2 groups: modernisation (i.e economic development) and institutions. The baseline model includes controls for these 2 groups of determinants to be described below and additionally a lagged dependent variable to account for persistence in gender inequality.The baseline model specification is:

$$GII_{it} = \alpha_i + \pi_t + \beta_0 GII_{it-1} + \beta_1 Service_{it} + \beta_2 X'_{it} + \epsilon_{it} (1)$$

where GII_{it} is the Gender Inequality Index (GII) score for country i at time t, and α_i and π_t are the country and time fixed effects. Inertia in gender inequality is modelled using the lagged

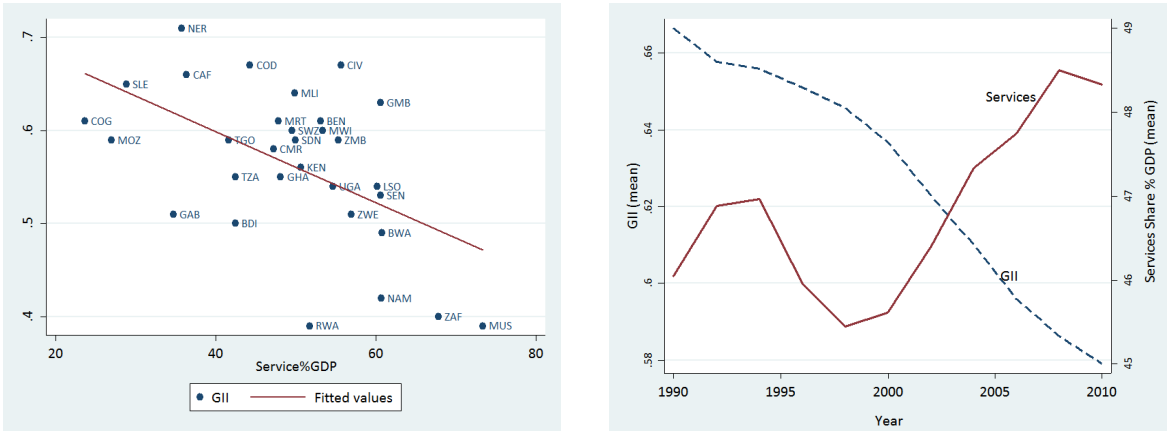
dependent variable $GII_{i,t-1}$ as an additional regressor. Gender inequality is estimated using the UN historically extended Gender Inequality Index, GII (Gonzales et al., 2015). It is a composite index capturing the loss of women's achievement due to gender biases. The index covers three aspects of a country's gender inequality, namely reproductive health, empowerment, and labour market participation. The index ranges from 0 (no inequality) to 1 (complete inequality).

The GII builds on previous gender indices used in the Human Development Reports (HDRs): the gender-related development index (GDI) and the gender empowerment measure (GEM). The GDI measures gender inequalities in achievement in three basic dimensions of human development: health, measured by female and male life expectancy at birth; education, measured by female and male expected years of schooling for children and female and male mean years of schooling for adults ages 25 years and older; and command over economic resources, measured by female and male estimated earned income (UNDP, 2015).

The GEM focuses on political participation (measured by women's shares of parliamentary seats), economic participation (shares of high level and professional positions) and power over economic resources (income gaps). These gender measures had some important limitations, for example, the previous indices combine absolute and relative achievements such that a country with low absolute income scores poorly, even with perfect gender equity (UNDP, 2010). Moreover, nearly all indicators in the GEM arguably reflect a strong urban elite bias and use some indicators more relevant to developed countries. Some of the advantages of GII over other indices are: 1) it measures inequality between genders over three dimensions, mentioned above, 2) it removes income, the most controversial component of the GDI and GEM, and 3) it does not allow for high achievement in one dimension to compensate for low achievement in another dimension (UNDP, 2010).

The main variable of interest is $Service_{it}$. It captures marketisation and is measured as the sectoral share of services in GDP for country i at time t and β_1 is the parameter of interest. Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Following the marketisation hypothesis, we expect the relationship between service sector shares and gender inequality to be negative (Akbulut, 2011; Olivetti & Petrongolo, 2014, 2016). Figures 4 below shows trends of GII and service sector share in GDP. A negative relationship between between gender inequality and service sector share in GDP is observed and more generally, countries with larger service sector shares in GDP also have lower levels of gender inequality

Figure 4: Trends in GII and Service Shares



(a) (b)

Source: WDI and Gonzales et al. (2015). Figures 4a and 4b below show a scatter plot and time trends of GII and service share in GDP respectively. A negative relationship between between gender inequality and service sector share in GDP is observed and more generally, countries with larger service sector shares in GDP also have lower levels of gender inequality.

The variable X'_{it} is a vector of additional control variables and ϵ_1 is an i.i.d. error. GDP per capita is the proxy for modernisation (economic development). The relationship between economic development and gender inequality has mixed results with one strand of literature suggesting that as economies develop, gender inequality levels decline, whilst the other argues that (see Boserup, 1970; Duflo, 2012; World Bank, 2011). Whilst The variable Polity captures the quality of institutions and is a score that varies between -10 and +10, and increases with the quality of institutions. More democratic societies are assumed to have greater freedom of self in general and this works to improve the conditions of previously marginalised groups, women included. As such, improved institutional quality is expected to reduce levels of gender inequality. However, the adoption and spread of new forms of institutions in society is believed to be strongly linked to and reinforcing of inherent forms of institutions in a particular area. SSA is generally patriarchal, placing the man as the household head. Therefore, the relationship could go either way (Cooray & Potrafke, 2011; Inglehart & Norris, 2003). The polity score is normalised to between 0 and 1. All variables except are logged.

From the empirical strategy applied, the growth of the service sector can significantly reduce gender inequality as more women are inclined to work in the services sector because of the strong similarity of the work done at home and in the service market. On the other hand, with more women working, this might trigger an even greater demand for market produced services such as child care and cooked meals among others − giving rise to the endogeneity problem. To correct

for this problem, the relationship is also estimated using a historical variable, state history index as well as the lagged service share as instruments that would give more exogenous variation for service sector shares in Africa.

The state history index developed by Bockstette, Chanda, and Putterman (2002) summarises whether present day countries had states from 1 - 1950CE.[2] The state history index ranges from 0 - 50, with 50 representing presence of a government that was locally based and had control of more than 50% of the present day country territory. Lower values indicate some or no government at all in the case of 0. The dataset is divided into 50-year periods and hence captures 39 different time points. In order to use this data, each of the 39 time points is hypothesised as representing a long lag of a particular year within the current sample. With a sample period of 24 years, 24 time points from the state history dataset were used and hence this long lag dates from 651 - 1950CE (we opted for this period as it had the most observed data besides 0s). The data is standardised so that it ranges between 0 - 1 and state history increases with the score.

The index proposes that present day countries that have been the site of states, kingdoms or empires over long spans of history have achieved more rapid economic development in recent decades which we can observe as a greater transition from agriculture and manufacturing. The use of the index as an instrument is based on the fact that one of the features of economic development is a growing service sector and thus more generally, countries with longer state histories, are more developed and thus also have larger service shares today.

3.1 Descriptive Statistics

Tables 1 and 2 below provides for the description of the data as well as correlations respectively. Table 1 highlights the heterogeneity present in the sample of countries with the GII ranging from as low as 0.36 (Mauritius) to 0.83 (Niger). However, average inequality in the region remains high at 0.62. Services sector share in GDP for the region on average is below 50%, which shows that there is room for the sector to grow as a result of continued structural transformation in the region. There is considerable variation in the service sector share in GDP across countries within the region - as low as 12.9% in Sierra Leone and as high as 73% in Mauritius.

Interestingly, gender inequality is lowest in Mauritius wherein services share in GDP is the highest suggesting some correlation between the 2 variables. Income per capita also shows a lot

[2]We also use the extended state history index updated by Borcan, Olsson, and Putterman (2018). The extended index goes back to 3500BCE

of heterogeneity in the region with a huge gap between Liberia and Gabon for example, with GDP per capita levels of US115.40 and US11907 respectively. Swaziland has the lowest polity score at 0, while Mauritius records the highest at 10.

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.	N	Source
GII	0.616	0.084	0.36	0.830	751	Gonzales et al. (2015)
Service share	45.936	10.805	12.872	73.319	758	WDI
GDP/capita	1981.028	2736.346	115.436	11906.569	825	WDI
Polity	0.506	0.28	0	0.952	677	Center for Systemic Peace

All variables are logged.

Table 2 shows that the sign of the correlation coefficient between service share in GDP and gender inequality is negative and significant as expected. The correlation results also establish negative and significant relationships between income per capita and gender inequality, polity and gender inequality as expected.

Table 2: Cross-correlation table

	GII	Service	GDP/c	Polity
GII	1			
Service	-0.505***	1		
GDP/capita	-0.576***	0.335***	1	
Polity	-0.349***	0.415***	0.168***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Results

4.1 The Impact of Marketisation on Gender Inequality

Table 3 reports the estimates of equation 1 and each column includes a common time varying shock. In columns 1-3, a negative relationship between marketisation and gender inequality is observed, suggesting that as the services sector shares in GDP increase, we can expect gender inequality to decline. A 10% increase in the share of services in GDP will reduce gender inequality by around 5%. Column 4 includes the services share squared to test for possible non-linear relationship. Results confirm that the relationship between marketisation and gender inequality in SSA is non-linear. Figure 5 corroborates this result. At lower levels of service shares, gender inequality increases until a certain threshold in the services sector is sufficient enough to trigger reductions in gender inequality.

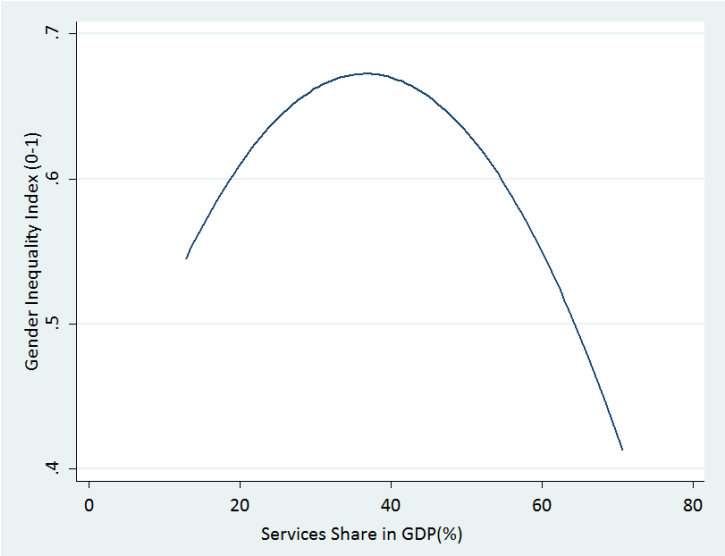
Table 3:

Marketisation and Gender Inequality SSA- Fixed Effects Results

	(1)	(2)	(3)	(4)	(5)
Dependent: GII	FE	FE	FE	FE	FE
Service share	-0.052*	-0.042	-0.048*	0.468***	1.317*
	(0.028)	(0.027)	(0.028)	(0.132)	(0.698)
GDP/capita		-0.065*	-0.064*	-0.059***	-0.189***
		(0.035)	(0.034)	(0.011)	(0.060)
Polity			0.001	0.001	-0.003*
			(0.001)	(0.001)	(0.002)
Service share (squared)				-0.073***	-0.188*
				(0.019)	(0.098)
GII_{t-1}					0.354**
					(0.162)
Observations	558	558	558	558	484
R-squared	0.709	0.727	0.729	0.737	0.436
Number of i	31	31	31	31	31
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	11.06***	21.81***	27.98***	58.62***	13.63***

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1. All variables are logged

Figure 5: GII and Services Share in GDP (SSA)



Source: WDI and Gonzales et al. (2015).

The non-linear relationship between gender inequality and services shares in Africa is plausible given that at lower levels of development, most economies have lower capital stocks thus the nature of services is subsistent, that is it still requires more brawn (male labour) than brain in which women have been posited to have a comparative advantage (Galor & Weil, 1996). Moreover, women are likely to be engaged in farm work or even operating out of the formal labour market (Mammen & Paxson, 2000). In this case, men will continue to outperform women until such a point when women's comparative advantage (Galor & Weil, 1996) takes effect in the services sector.

Table 4 shows the estimations that address endogeneity using fixed effects instrumental variables method. We use the lagged service share and state history index respectively as instruments. The identifying instruments in the first stage regression are statistically significant. The F test for joint significance is also statistically significant − thus the model does not suffer from weak instruments. Both the lagged service share and state history index are positively and statistically related to the share of services in GDP as expected. The results are still robust - showing that marketisation significantly reduces gender inequality. The coefficients of the share of services in GDP are significantly larger compared to the fixed effects estimates indicating that the external variation from the instruments is reducing the endogeneity bias.

Table 4:

Marketisation and Gender Inequality SSA- Fixed Effects with Instruments Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent:GII	FE-IV	FE-IV	FE-IV	FE-IV	FE-IV	FE-IV	FE-IV	FE-IV
Service share	-0.055***	-0.045***	-0.104***	-0.098*	-0.101*	-0.127**	-0.117***	-3.346*
	(0.013)	(0.013)	(0.017)	(0.059)	(0.057)	(0.056)	(0.018)	(1.889)
GDP/capita		-0.059***	-0.034***		-0.066***	-0.029	-0.017	-0.034*
		(0.010)	(0.012)		(0.014)	(0.020)	(0.015)	(0.019)
Polity			0.001*			0.002*	0.001	0.001
			(0.001)			(0.001)	(0.001)	(0.001)
Service share (squared)								0.445*
								(0.257)
Observations	656	656	537	634	634	528	508	508
Number of i	31	31	31	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
F	76.54***	79.17***	67.59***	67.37***	69.85***	63.39***	70.99***	46.60***
R-squared	0.199	0.459	0.451	0.247	0.499	0.429	0.369	0.124
First Stage Regressions								
(**Lagged Service Share**)	0.718***	0.718***	0.617***					
	(0.028)	(0.026)	(0.032)					
(**State History Index**)				0.130***	0.131***	0.136***		
				(0.03)	(0.029)	(0.029)		
Lagged Service							0.598***	0.005***
							(0.034)	(0.030)
State History Index							0.080***	0.004***
							(0.022)	(0.002)
(**F test for weak instruments**)	252.0***	188.0***	180.1***	225.1***	170.0***	163.3***	184.2***	109.1***

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1. All variables are logged.

With regards to other regressors, the impact of GDP per capita on gender inequality is negative and mostly significant suggesting that as economies develop, gender inequality levels decline . This result is consistent with the findings from (Dinkelman, 2011; Doepke & Tertilt, 2009; Duflo, 2012; Fernández, 2014; Greenwood, Seshadri, & Yorukoglu, 2005; Miller, 2010; World Bank, 2006). The impact of institutional quality on gender inequality is positive and mostly insignificant suggesting that institutional quality in SSA may still require improvement before it can have an impact on gender equality (Beer, 2009; Cooray & Potrafke, 2011).

4.2 Channels of marketisation in SSA

Given the significant negative impact of marketisation on gender inequality in sub-Saharan Africa, we disaggregate the GII to establish the channels through which the marketisation process is working to reduce gender inequality. The GII is made up of the following components; maternal mortality ratio, adolescent fertility rate, proportion of parliamentary seats occupied by females, proportion of females aged 25 years and older with at least some secondary education and labour force participation rate of female population aged 15 years and older. The results in

Table 5 shows that the marketisation process is most effective in reducing adolescent fertility.

The decline in adolescent fertility rates may be a direct result of the labour market incentives that the services sector offers to women. With a possibility of remunerated work in services, women are discouraged from having children early on in life and rather focus on accumulating the human capital necessary to enter the services sector. There is thus a trade off between child quantity and quality. We also find this result in line with the arguments made earlier that the services sector is transforming traditional roles of women from home-makers, having to get married early and start a family early into more educated working wives.

Table 5:

Impact Marketisation on GII Components Fixed Effects Estimation Results: SSA

	(1)	(2)	(3)	(4)	(5)	(6)
SSA Sample	Maternal Mortality	Politics	Labour(Female)	Adolescent Fertility	SecEducation (Female)	Labour(Fe
Service share	-0.076	0.535	-0.011	-0.099*	0.086	-0.256*
	(0.067)	(0.342)	(0.020)	(0.057)	(0.180)	(0.122)
Service share(squared)						0.034**
						(0.017)
Observations	558	408	558	558	327	558
R-squared	0.425	0.436	0.378	0.686	0.684	0.383
Number of i	31	31	31	31	29	31
Controls	All	All	All	All	All	ALL
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
F	22.00***	7.831***	4.912***	12.11***	52.50***	12.99**

Robust standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1. Controls include GDP/capita and Polity.

The results also show that there is a delayed response through female labour force participation. The marketisation process reduces female labour force participation in SSA up to a certain point before the sector is sufficiently large enough to start pulling female labour into the market, an effect captured by the service share (squared) term in column 6.

4.3 Comparative results with OECD countries

We conduct a comparative study with a sample of developed countries to test if the marketisation hypothesis is sensitive to sample selection. We also focus on this region because the transformation happening in Africa now happened in most OECD countries almost 50 years ago and today, these countries are characterised by large service economies and lower gender inequality levels than most regions of the world. We run a fixed effects regression on 21 OECD

countries [3] over the same period of time.

Table 6:

Marketisation and Gender Inequality - OECD vs. SSA Fixed Effects Results

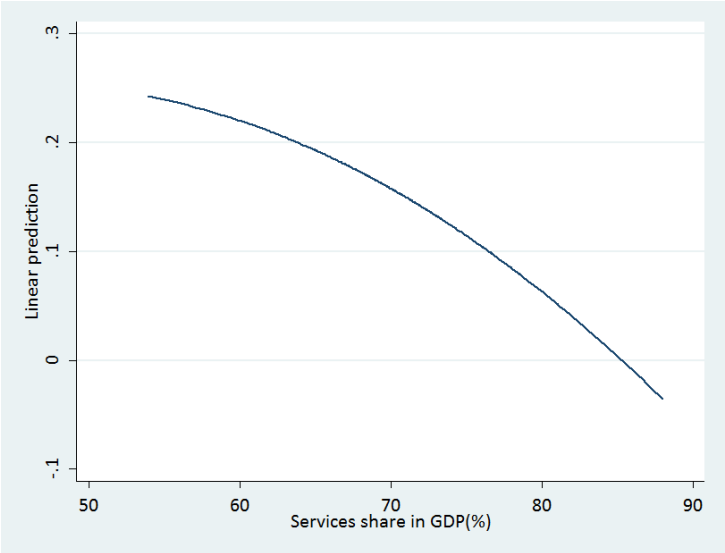
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent:GII	OECD	OECD	OECD	OECD	SSA	SSA	SSA	(SSA)
Service share	-3.727***	-2.115***	-2.042***	46.895	-0.052*	-0.042	-0.048*	0.468*
	(0.918)	(0.710)	(0.702)	(27.978)	(0.028)	(0.027)	(0.028)	(0.234)
GDP/capita		-1.124***	-1.116***	-0.998***		-0.065*	-0.064*	-0.059*
		(0.275)	(0.272)	(0.225)		(0.035)	(0.034)	(0.033)
Polity			2.629***	2.194***			0.001	0.001
			(0.381)	(0.488)			(0.001)	(0.001)
Service squared				-5.804*				-0.073**
				(3.323)				(0.033)
Observations	448	448	448	448	558	558	558	558
R-squared	0.363	0.555	0.564	0.582	0.709	0.727	0.729	0.737
Number of i	21	21	21	21	31	31	31	31
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
F	243.17***	243.17***	182.80***	147.53***	11.06***	21.81***	27.98***	45.25***

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1

Table 6 shows that the negative impact of marketisation on gender inequality is robust in both samples. However, also apparent is that the effect is much more pronounced within the OECD than in SSA. For example, a 10% increase in service GDP can be expected to reduce gender inequality by 20% in an OECD country, compared to a 5% reduction in a SSA country. Figure 6 also shows a different picture from the non-linear relationship between GII and services in SSA shown in Figure 5. For the OECD sample, the relationship between GII and marketisation is negative throughout the sample period, whilst in figure 5, the relationship in SSA is non-linear.

[3]These include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK and the US. Sample selection is informed by data availability especially on the extended GII.

Figure 6: GII and Services Share in GDP (OECD)



Source: WDI and Gonzales et al. (2015). For the OECD sample, the relationship between GII and marketisation is negative throughout the sample period.

Interestingly, when we disaggregate the GII for the OECD sample, we find that the channels in Table 7 are different compared to those working in SSA. In the OECD countries, the marketisation process is effective through increasing women's participation in parliament, the female labour force participation and adolescent fertility.

Table 7:

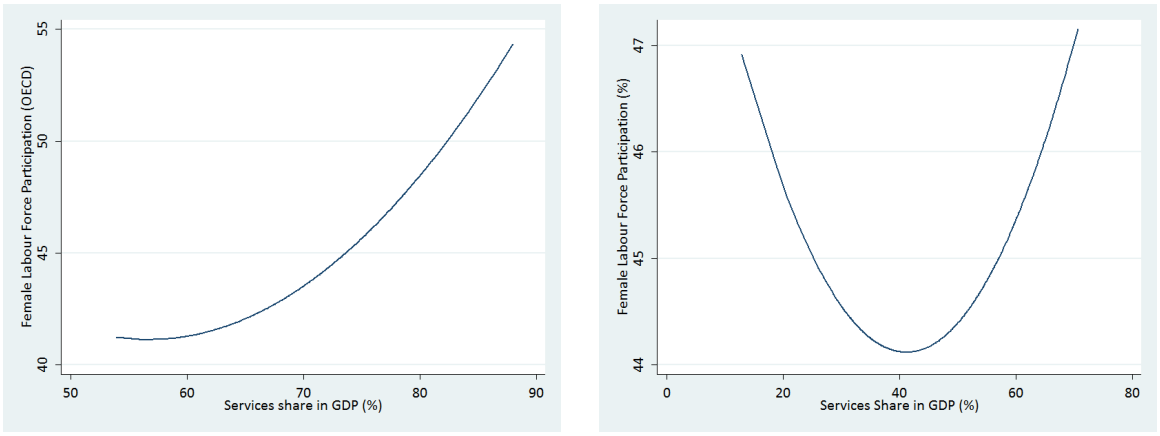
Impact Marketisation on GII Components Fixed Effects Estimation Results: OECD

	(1)	(2)	(3)	(4)	(5)
OECD Sample	Maternal Mortality	Politics	Labour(Female)	Adolescent Fertility	SecEducation (Female)
Service share	0.037	1.471*	0.239**	1.280**	0.435
	(0.545)	(0.719)	(0.093)	(0.507)	(0.269)
Observations	467	372	467	467	448
R-squared	0.668	0.640	0.700	0.718	0.263
Number of i	21	21	21	21	21
Controls	All	All	All	All	All
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1. All variables are logged

Figure 7 below shows the relationship between marketisation and female labour force participation within the 2 samples. The female labour outcome is important in this analysis as it gives support to the theoretical propositions from the literature on the link between marketisation and gender inequality. In the OECD sample, there is a positive relationship whilst for SSA that relationship is non-linear. Increasing female labour force participation triggers positive feedback effects in other dimensions of women's lives such as educational opportunities, more informed lifestyle and health choices together with greater bargaining power within the home and outside. This could be the gap which makes gender outcomes different in the two regions, with gender inequality being much lower within the OECD sample compared to the SSA sample.

Figure 7: Female labour force participation and service shares in GDP OECD vs. SSA



(a) (b)

Source: WDI. Figures 7a and 7b show the impact of marketisation on female labour force participation in OECD and SSA countries respectively.

5 Robustness Tests

We also perform robustness checks by including other possible confounders such as urbanisation and religion in the estimations. It is highly likely that services sector will be located in the more urban sections of the country. On the other hand, religion in the form of Christianity and Islam is a fairly new form of social institution in Africa compared to most regions of the world. Religion has an impact on people's decision making concerning their sets of values, norms and beliefs (Cagé & Rueda, 2017). Moreover, given that religion acts as a form of central power, it will impact on individual choices regarding education and investment in public goods. Put together, the channels cause religion to impact on economic outcomes (Barro & McCleary, 2003; McCleary & Barro, 2006). The religion data is obtained from the Association of Religion Data Archives and measures the ratio of the total population who are Catholic, Protestant and Muslim is used. Table 8 shows a summary of the estimations.

Table 8:

Marketisation and Gender Inequality - Fixed Effects Robustness Check Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent:GII	FE	FE	FE	FE	FE	FE	FE
Service share	-0.049*	-0.036	-0.044*	-0.046*	-0.043	0.053	0.468*
	(0.026)	(0.033)	(0.025)	(0.027)	(0.027)	(0.049)	(0.234)
Religion	19.399***						
	(1.948)						
Muslim		0.669*					
		(0.359)					
Catholic			-0.885***				
			(0.083)				
Protestant				-0.436***			
				(0.043)			
Urbanisation					-0.096***		
					(0.035)		
Urbanisation*Service share						-0.096***	
						(0.035)	
Service share-squared							-0.073**
							(0.033)
Observations	558	558	558	558	558	558	558
R-squared	0.696	0.391	0.694	0.719	0.748	0.748	0.737
Controls	All	All	All	All	All	All	All
Number of i	31	31	31	31	31	31	31
Country FE	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	NO	NO	N0	YES	YES	YES
F	32.51***	14.29***	33.94***	32.98***	63.35***	63.35***	45.25***

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1

Columns 1 to 4 show that the coefficients of marketisation remain mostly negative and statistically significant even after controlling for religious influences. Generally, religion increases gender inequality. Of the different forms of religion analysed, Islam has a positive and

statistically significant impact on gender inequality, whilst affiliation to both Catholicism and Protestantism significantly reduce gender inequality. These findings are generally consistent with the literature on religion and its impact on gender inequality and attitudes (see Cooray & Potrafke, 2011; Inglehart & Norris, 2003; Phillips, 2009; Seguino & Lovinsky, 2009).

Columns 5 and 6 in Table 8 control for the level of urbanisation and and its interaction with service shares respectively. The impact of marketisation on gender inequality remains negative but insignificant with the level of urbanisation. In column 6, marketisation on its own would increase gender inequality though not significantly. However, its interaction with the level of urbanisation significantly reduces gender inequality. This result supports our proposition that services are more likely to be located in more urbanised settings. The impact of urbanisation on gender inequality in SSA is consistent with some of the findings of Tacoli (2012). Column 7 in Table 8 reinforces the non-linear relationship between marketisation and gender inequality.

6 Conclusion

In this study, we test the marketisation hypothesis that services sector growth reduces gender inequality. We find that the hypothesis holds for a sample of African countries, specifically through reducing adolescent fertility and increasing female labour force participation. Moreover, we find evidence of a non-linear relationship. The results suggest that at lower levels of development, countries are generally more inclined to be low skills intensive economies, requiring more brawn than brain. In this period, men are more likely to be employed in the formal labour market thus a higher gender inequality gap. However, as countries increase levels of development and transition to high skills intensive economies, the opportunities for women to enter the labour market increase, reducing the gender inequality gap.

The results also show that while the services sector growth has been effective in reducing adolescent fertility in SSA, there has been a delay in its effect in increasing female labour force participation. From a theoretical perspective, we perceive increases in female labour force participation as a necessary condition for marketisation to significantly reduce gender inequality. The delay observed in SSA may explain the differences in the gender inequality gap between developing countries (SSA) and developed countries (OECD). However, such differences are left open for further research.

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A Appendices

B Other Traditional Measures of Gender Inequality

B.1 Life Expectancy

Table A1:

Marketisation and Gender Inequality SSA- Life Expectancy Measure

	(1)	(2)	(3)	(4)	(5)
Life Expectancy Ratio (f/m)	FE	FE	FE	FE	FE
Service share	-0.015*	-0.014**	-0.015*	0.084	0.266
	(0.008)	(0.007)	(0.007)	(0.087)	(0.173)
GDP/capita		-0.003	-0.003	-0.002	-0.026*
		(0.012)	(0.012)	(0.011)	(0.013)
Polity			0.000	0.000	-0.001
			(0.000)	(0.000)	(0.000)
Service share (squared)				-0.014	-0.037
				(0.013)	(0.025)
$D.LifeExpectancyRatio(f/m)_{t-1}$					0.829**
					(0.320)
Observations	528	528	528	528	464
R-squared	0.413	0.413	0.414	0.418	0.221
Number of i	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	4.459***	5.534***	6.215***	9.456***	3.223***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B.2 Female Labour Force Participation

Table A2:

Marketisation and Gender Inequality SSA- Labour Measure

Labour Force Participation Ratio (f/m)	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE
Service share	0.031	0.047	0.031	-2.825***	-2.886
	(0.083)	(0.091)	(0.090)	(0.883)	(1.881)
GDP/capita		-0.084	-0.083	-0.112	-0.010
		(0.186)	(0.188)	(0.184)	(0.115)
Polity			0.002	0.003	0.003
			(0.004)	(0.004)	(0.004)
Service share (squared)				0.402***	0.410
				(0.131)	(0.263)
$D.LabourForceParticipationRatio(f/m)_{t-1}$					0.219
					(0.260)
Observations	528	528	528	528	464
R-squared	0.098	0.107	0.110	0.190	0.088
Number of i	29	29	29	29	29
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	1.883***	4.462***	6.860***	20.24***	1.339***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B.3 Parliamentary Representation

Table A3:

Marketisation and Gender Inequality SSA- Parliamentary Measure

Parliamentary Representation Ratio (f/m)	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE
Service share	0.390	0.368	0.360	-1.003	1.471
	(0.286)	(0.281)	(0.286)	(2.780)	(4.889)
GDP/capita		0.168	0.171	0.158	1.683***
		(0.388)	(0.394)	(0.391)	(0.481)
Polity			0.002	0.002	0.036
			(0.018)	(0.018)	(0.030)
Service share (squared)				0.191	-0.144
				(0.390)	(0.669)
$D.ParliamentaryRepresentationRatio(f/m)_{t-1}$					0.371***
					(0.079)
Observations	407	407	407	407	300
R-squared	0.442	0.443	0.443	0.444	0.259
Number of i	31	31	31	31	31
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	16.98***	17.73***	17.83****	18.27****	13.22****

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B.4 Education Measure

Table A4:

Marketisation and Gender Inequality SSA- Education Measure

	(1)	(2)	(3)	(4)	(5)
Education Ratio (f/m)	FE	FE	FE	FE	FE
Service share	-0.029	-0.026	-0.046*	0.104	-1.928**
	(0.021)	(0.022)	(0.025)	(0.241)	(0.787)
GDP/capita		-0.015	-0.014	-0.013	0.220**
		(0.043)	(0.040)	(0.041)	(0.082)
Polity			0.003*	0.003*	0.009***
			(0.002)	(0.002)	(0.003)
Service share (squared)				-0.021	0.254**
				(0.036)	(0.105)
$D.EducationRatio(f/m)_{t-1}$					-0.027
					(0.048)
Observations	498	498	498	498	424
R-squared	0.814	0.814	0.820	0.821	0.267
Number of i	30	30	30	30	29
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	93.11***	88.92***	88.43***	84.73***	28.40***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B.5 Education Measure (Secondary School Enrolment)

Table A5:

Marketisation and Gender Inequality SSA- Sec School Enrolment Measure

	(1)	(2)	(3)	(4)	(5)
Secondary School Enrolment Ratio (f/m)	FE	FE	FE	FE	FE
Service share	-0.035	-0.034	-0.056	1.185	-0.052
	(0.063)	(0.063)	(0.058)	(1.289)	(1.279)
GDP/capita		-0.020	-0.025	-0.014	0.165**
		(0.081)	(0.075)	(0.079)	(0.060)
Polity			0.004	0.003	-0.001
			(0.002)	(0.002)	(0.003)
Service share (squared)				-0.167	0.012
				(0.177)	(0.170)
$D.SecondarySchoolEnrolmentRatio(f/m)_{t-1}$					0.026
					(0.136)
Observations	324	324	324	324	206
R-squared	0.445	0.447	0.464	0.471	0.200
Number of i	29	29	29	29	25
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO
F	23.50***	16.43***	18.69***	436.9***	2.018***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1