Gender, Development and Economic Growth in Sub-Saharan Africa

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Abstract

A plethora of scholars have attempted to discern the causes of slow growth in the sub-Saharan Africa region. The effects of global economic integration, corruption, geography and ethnic diversity have been widely explored. Mainstream growth analyses, however, have not yet integrated the body of scholarship that identifies the linkages between gender, economic development and growth. This paper explores the theoretical and empirical macro-growth effects of gender inequality in sub-Saharan Africa. It further identifies two key policy avenues for promoting gender equality and thus growth: public investment to reduce the gender gap in care burdens, and a shift in emphasis of central bank targets to employment.

JEL classification: B54, E60, O11, O55

1. Introduction

Sub-Saharan Africa (SSA) is one of the few high-poverty regions of the world that has not substantially lowered poverty rates over the last 30 years. At the same time, growth rates of *per capita* GDP are on average stagnant at less than a third of one percent annually.[1] While the 2000s have witnessed an increase in growth rates in the region, this has been largely attributed to the 'China

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[1] This is based on authors' calculations from World Development Indicators data for 1980–2011.

factor'—the increased demand for commodities from emerging economies, especially China. But the China effect may well be transitory and underscores the need for SSA to identify a growth path that is internally driven as well as socially sustainable.

What are the possible policy levers to stimulate internally driven growth? Resurgent debates on the role of the state, industrial policy and trade have held centre stage in recent years (Fosu, 2008; Jomo, *et al.*, 2011). But these debates have often failed to adequately integrate important research on the growth effects of gender. This is a major lacuna, given the expanding body of research demonstrating that gender (in)equality is a macroeconomic variable with significant effects on development and on rates of economic growth. The size and direction of those effects has been found to vary with the structure of the economy, the degree and type of job segregation, and the macro-level policies in force (Berik *et al.*, 2009; Braunstein, 2012).

Gender and macroeconomics research is a subset of a broader body of scholarship on the relationship between intergroup inequality and growth in the tradition of Michael Kalecki (1954), a contemporary of John Maynard Keynes. Kaleckian macroeconomics emphasises the demand-side effects of inequality on growth and development.[2] Kaleckian/Keynesian research has not, however, explored the role of gender, nor focused much on the supply-side effects of inequality. In contrast, research on the relationship between gender and macroeconomics has identified both demand- and supply-side effects of gender inequality. These effects work on the macroeconomy in the short and long run and operate through the productive and reproductive sectors. The latter is particularly salient for understanding the extent to which macro policies are socially sustainable. Social sustainability refers to the use of human resources such that labour is able to produce and reproduce itself over time. Perhaps most significant in gender and macroeconomics research is the finding of a two-way causality between gender equality and macro outcomes. Thus, if gender equality is found to be a stimulus to growth, then macroeconomic policies that promote greater gender equality can contribute to a virtuous cycle of growth.

This body of work is particularly salient for SSA where, notwithstanding efforts to reduce gender differences in well-being, inequality is still prevalent in numerous domains.[3] Although gender equality is recognised as one of the

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[2] See, for example, Bhaduri and Marglin (1990), Taylor (1991), Blecker (2002), Palley (2002), Setterfield (2006), and Dutt (2010).

[3] Table A1 categorises countries in SSA by economic structure and Table A2 uses that data to summarize gender inequality for SSA, based on a country's economic structure for

United Nations' Millennium Development Goals, substantive progress has hardly been recorded (Olowu, 2012). For instance, according to the '2012 Human Development Report', seven out of the ten most gender-unequal countries in the world were found to be in SSA.[4] To the extent that greater gender equality in SSA is a stimulus to growth and development, targeted policies can produce a win–win outcome, with women as a group and society as a whole benefiting from equality-induced higher living standards.

Apart from these instrumental reasons to address gaps in well-being, gender inequality in access to resources and material outcomes is of intrinsic concern given the goal of economic development, which is to enhance the ability of people to provision for themselves and their families. Inequality constrains the achievement of human well-being because it translates into unequal political, social and economic power. Power differentials not only inhibit equality of opportunities and access to education, health and other capabilities, but also voice, due to the social hierarchy that emerges to justify material imbalances. Economic growth in SSA that is not broadly shared by gender (as well as ethnicity and class) fails to achieve the primary goals of economic development.

This paper explores the expanding body of research on gender and macroeconomics, identifying the structural features of SSA economies that influence the relationship between gender and growth. We explore the pathways by which gender affects macroeconomic variables and in turn the effect of macro-level forces on gender equality. We also offer some preliminary data showing the relationship between gender-equitable outcomes and food production and food imports, as well as the positive effect of public investment on women's relative access to employment. Finally, we explore the policy implications of these findings and suggest additional areas for research to expand our understanding of how gender and the macroeconomy interact in this region.

1991–2010. The method used to categorise countries by economic structure is as follows. First, countries were categorised into mutually exclusive groups according to the share of fuel exports as well as ores and minerals in total exports. Those with fuel exports above the SSA average of 36% over 1991–2010 were categorised as oil producers. Countries with ores and minerals as a share of exports above the SSA average of 10% were categorised as non-oil mineral exporting economies and those below as non-oil non-mineral exporters.

[4] These are Chad, Niger, Mali, Democratic Republic of Congo, Liberia, Central African Republic, and Sierra Leone. The UNDP's (2012) inequality measure is the Gender Inequality Index (GII), which reflects gender disadvantages in three dimensions: reproductive health, empowerment, and the labour market.

2. Gender effects on economic growth and development

The relationship between macroeconomic growth and gender is complex due to the two-way causality whereby gender inequality is shaped by macroeconomic policies and, in turn, influences the rate of macroeconomic growth. In this section, we explore theoretical and empirical research on the effects of gender (in)equality on development and growth, with an emphasis on developing countries, especially those in the SSA region.

An understanding of the role of gender in influencing development and growth must grapple with how we measure the independent variable. Do we consider only women's absolute well-being, or do we focus on relative well-being, a measure of inequality? If the latter, then we must answer the question 'inequality of what?' The emphasis of gender and macroeconomic theorising by feminist economists has been on women's relative well-being, rather than simply their absolute well-being. Whether the focus is the gender wage gap, educational differences or population ratios, we can think of these as measures of the extent of intergroup inequality. Broadly speaking, the gender distribution of well-being can be grouped into three domains: capabilities livelihoods and empowerment/agency. The impact of gender (in)equality on the macroeconomy varies with the specific measure of well-being.

Capabilities refers to the requisite functionings necessary to enter into productive work, be it paid or unpaid, and includes such measures as educational attainment and health. Livelihoods indicators assess the extent to which conditions exist for persons to put their functionings to productive use. Examples include access to credit, employment, wages and ownership of assets. Finally, agency refers to the ability to participate in decision-making at the household, community and national level and in the workplace, as evidenced, for example, by female share of parliamentary seats and women's share of supervisory and managerial positions.

The effect of gender inequality in well-being on the macroeconomy can differ, depending on the domain in which it is measured. The impact of micro-level gender relations on the macroeconomy will also be influenced by the structure of the economy (for example, agricultural, labour-intensive manufacturing or knowledge-intensive economies), which is typically accompanied by noticeable gender job segregation by sector and occupation. Table 1 provides a matrix outlining dimensions of gender inequality and macro-structural characteristics of economies. The signs of the coefficients on gender variables in the empirical and theoretical literature which are

Table 1: A matrix of gender effects on the macroeconomy

Gender equality indicator	Structure of economy					
	Agricultural		Semi-industrialised export-oriented		Industrialised	
	Short run	Long run	Short run	Long run	Short run	Long run
Capabilities	NA	+	NA	+	?	?
Opportunities	+	+	−	−	?	?
Agency	?	?	?	?	?	?

Note: NA is not applicable.

shown[5] make clear the fact that the effects of gender on the macroeconomy differ according to a variety of conditions. Based on research done thus far, it is evident that some effects may be positive and others negative.

Two distinct bodies of theoretical and empirical literature explore the effect of absolute and relative female inequality on macroeconomic outcomes. Mainstream neoclassical approaches explore the long-run effects of inequality on economic growth and largely focus on the impact of capabilities inequality. In contrast, structuralist macroeconomists and feminist economists emphasise the short run as well as long run, and the role of inequality in livelihoods, measured as access to employment, gender wage inequality and asset inequality. By virtue of the focus on income, wages and assets, this second strand of literature sheds light on the role of bargaining power in contributing to inequality and its effect on growth (Doss, 2006; Berik *et al.*, 2009).

We briefly review here the extant literature on developing countries with a primary goal of identifying the pathways by which gender affects macroeconomic outcomes. We first discuss short-run demand-side effects of gender inequality, moving then to a discussion of long-run supply- and demand-side effects.

2.1. The short run

Despite the shift of attention to long-run economic growth in the last two decades, the short run remains important for several reasons. First, short-run stabilisation remains a key concern of macroeconomists. In its own right,

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[5] These studies are discussed in more detail in Seguino (2010) and Seguino (2013). As will be noted, there is as yet little macro level research on the macroeconomic effects of gender equality in industrialised and post-industrial economies.

macroeconomic instability is cause for concern since a primary feature of material well-being is security and the reduction of material uncertainty. Beyond that, we also know from a great deal of research that economic crises more negatively affect those with fewer assets, income and savings. Finally, although some growth theorists have argued that shocks (such as policies that promote gender wage equality) result only in transitory departures from trend normal output growth, aggregate demand shocks have been shown to knock a country off its normal long-run growth path (Dutt and Ros, 2007). This can be due to hysteresis effects, among other factors. In sum, short-run demand-side effects of efforts to promote gender equality are of great interest and reveal information about the sustainability of efforts to narrow gender gaps.

Short-run effects of gender on the macroeconomy operate primarily through the livelihoods domain where the indicators (such as wages) are fast-moving variables with notable short-run effects. This contrasts with gender equality in capabilities (say, in educational attainment), which is likely to be transmitted to the macroeconomy with a substantial lag.

A straightforward framework for identifying the net effect of greater gender equality in the short run is to evaluate its impact on each of the components of the macroeconomic equilibrium condition in an open economy:

$$I + G + X = S + T + M \qquad (1)$$

where I is business spending, G is government spending, X is exports, S is savings, T is taxes and M is imports. The balance of payments constraint in the short run is simply net exports

$$\text{NX} = X - M \qquad (2)$$

where NX is net exports.[6]

Let's explore the case where the relevant measure of gender equality is wages. Specifically, how would an increase in female wages (say, through an increase in minimum wages) and thus a rise in the ratio of female-to-male wages affect macroeconomic equilibrium in the short run?[7] Analytically, an increase in female wages that leads to $I + G + X > S + T + M$ is expansionary and thus gender-cooperative. That is, gender wage equality can be consistent with an expansion of aggregate demand and job growth, thereby

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[6] For fully developed engendered macro models of this genre, see Braunstein (2000), Blecker and Seguino (2002), Seguino (2010), Seguino and Setterfield (2010), and Braunstein, van Staveren, and Tavani (2011).

[7] An increase in minimum wages will raise the gender wage ratio since women tend to be more concentrated in lower wage jobs.

benefiting both women and men. Conversely, if higher female wages result in leakages exceeding injections or $I + G + X < S + T + M$, then output and employment will fall. This is a potentially gender conflictive outcome since men's employment is likely to be negatively affected by economic contraction. Similarly, a narrowing of the gender wage gap that reduces X more than M worsens the current account and thus the balance of payments.

Taking the specific case of semi-industrialised economies (SIEs), women workers tend to be concentrated in labour-intensive export industries where (a) firms are mobile (they can easily relocate if local resource costs rise) and (b) product demand is price elastic because labour-intensive manufactured exports tend to be homogenous goods for which there are many substitutes. Given both of these conditions, the negative effect of higher female wages on investment and exports will be contractionary and quite large. These negative effects will be offset to some extent if women (a) have a much higher marginal propensity to consume than men [causing S to fall in equation (1)],[8] and if women's propensity to import is lower than men's. These effects would have to be quite large to offset the contractionary effects of declines in I and X, a scenario that is unlikely in semi-industrialised export-oriented economies. As such, both theoretical and empirical research indicate that greater gender wage equality is contractionary and gender conflictive in such economies (Blecker and Seguino, 2002; Mitra-Khan and Mitra-Khan, 2009; Seguino, 2000, 2010).[9]

Moreover, the evidence suggests that given existing patterns of job segregation, there has been a 'feminisation' of foreign exchange earnings. That is, women's labour figures prominently in major export industries in SIEs. Low female wages in export manufacturing industries have been found to contribute to low unit labour costs, which stimulates export demand, investment and growth (Busse and Spielmann, 2006). Higher female wages, then, can worsen the balance of payments. One SSA economy that falls into this

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[8] Floro and Seguino (2002) offer some empirical evidence that in SIEs, women's marginal propensity to consume is higher than men's. This may be a result of the fact that women employed in export industries tend to be young and unmarried, saving a large part of their earnings to send to families to educate brothers, or for dowries or both.

[9] Schober and Winter-Ebmer (2011), in contrast, do not find evidence of a negative effect of gender wage equality on economic growth. Their analysis is based on pooled data of countries with different economic structures. Further, rather than isolating the effects of the gender wage gap in manufacturing, the authors use residuals from gender wage decompositions across different sectors of the economy to measure gender wage inequality. Some of the controls in the wage regressions are actually measures of gender inequality. For a critique, see Seguino (2011).

category of countries is Mauritius. Women there are concentrated in labour-intensive manufacturing export industries, and their wages are less than half of men's, a gap that is only partially explained by productivity differentials (Nordman and Wolff, 2010).

Many other SSA countries, however, fall into the category of low-income agricultural economies (LIAEs), and there, gender effects differ from those in SIEs. In LIAEs, women are concentrated in (unpaid) subsistence food production (for example, food crops such as indigenous fruit, vegetable and staple food crops), and some off-farm waged labour. Despite their active role in the agricultural sector, women are disadvantaged due to cultural, socioeconomic and sociological factors, as exemplified by gender biases in asset ownership, land tenure systems, access to credit, education and extension services (Were and Kiringai, 2003; Blackden *et al.*, 2006; Ellis *et al*, 2007; Kiptot and Franzel, 2011; Oduro *et al*, 2011; Asiedu *et al.*, 2012). Macroeconomic and legal policies can play a major role in shaping gender outcomes in various domains. For instance, limits on women's right to own land puts them at a disadvantage in accessing credit from formal financial institutions since land is often used as collateral.

In LIAEs, men mainly dominate the cash crop and commercial agriculture sectors (Were and Kiringai, 2003; Kiptot and Franzel, 2011) as well as in mineral extraction, primarily an export industry. Doss (2002) notes that a strict division of labour in agriculture no longer exists. Women are increasingly engaging in commercial production, including as waged workers in the production of non-traditional agricultural exports (NTAEs) such as cut flowers in southern Africa. Moreover, women are increasingly employed in mining in such countries as South Africa. That said, food security in large part continues to depend on women's labour in SSA (see Table A3 in Appendix A for data on the female share of jobs by sector in SSA economies).

Given this division of labour, what would be the effect of greater gender equality, measured through wages? Large firms, especially those owned by multinationals, are primarily in infrastructure such as electricity and communications and disproportionately employ men. In any case, these firms are not very mobile, making employment less sensitive to wage increases. There is, thus, likely to be a weak net effect of higher female wages on investment and exports, even if negative. Given the structure of production in SSA, higher wages for women in off-farm employment might very well stimulate investment in on-farm production because this can increase access to technologies and production inputs (Doss, 2001).

With regard to the right-hand side of equation (1) in SSA, we have very little empirical evidence on which to evaluate the effect of higher female

wages on relative propensities to consume (and thus to save) and to import. With regard to imports, a general observation in intra-household bargaining research has been that women tend to spend a larger share of their income on education and health of children than do men (Xu, 2007).[10] Men, in contrast, spend a greater share of income on luxury items. Although some of those goods may be domestically produced (alcohol and gambling), others are imported, such as cell phones and other electronics, for example. There is, however, too little evidence on which to make any generalisations about differences in men's and women's marginal propensity to import in LIAEs.

All in all, the sparse empirical evidence available thus far, combined with what we know about gender segregation in employment and the structure of LIAEs, would imply that higher female wages are likely to have little negative effect on the macroeconomy in the short run and potentially a positive one. This is especially likely if women's marginal propensity to consume is higher than men's and their propensity to import is lower. Further, gender wage equality may improve the balance of payments by providing women with more resources to invest in on-farm food production, thereby reducing food imports.

Using data for a set of 41 SSA countries, the relationship between gender educational equality and food production is shown in Figure 1. The data indicate a positive correlation between the changes in the female–male ratio of primary school gross enrolment rates plotted against the change in food production for the period 1991 to 2010 in SSA. Figure 2 then plots the changes in food production against the food as a share of merchandise imports for the same period (import data are for 1995 to 2006). The partial correlations do not control for other factors influencing food production and food imports, but the results are nevertheless instructive and suggest the merits of further investigation into the nexus between gender, food output and the balance of payments.

Much more research remains to be done in this area. For example, we have only modest evidence that marginal propensities to consume differ by gender. Floro and Seguino (2002), for example, find that for a set of SIEs, aggregate saving rates rise as women's wages increase relative to men's. In LIAEs, women in the labour force are more likely to be older and married with children than females in SIEs, possibly explaining differences in women's relative

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[10] A now large body of evidence has rejected the theoretical notion of a unitary household with a unique and harmonious set of preference. Research suggests household preferences are heterogeneous, and as a result, the home is a site of both cooperation and conflict, with bargaining power influencing the allocation of household resources and labour (Sen 1990; Agarwal 1997).
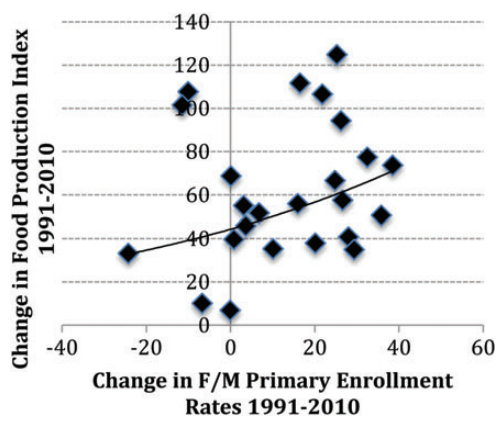
Figure 1: Improvements in gender equality in primary education and food production in SSA, 1991 to 2010. *Source*: Authors' calculations based on data from African Development Indicators online database.
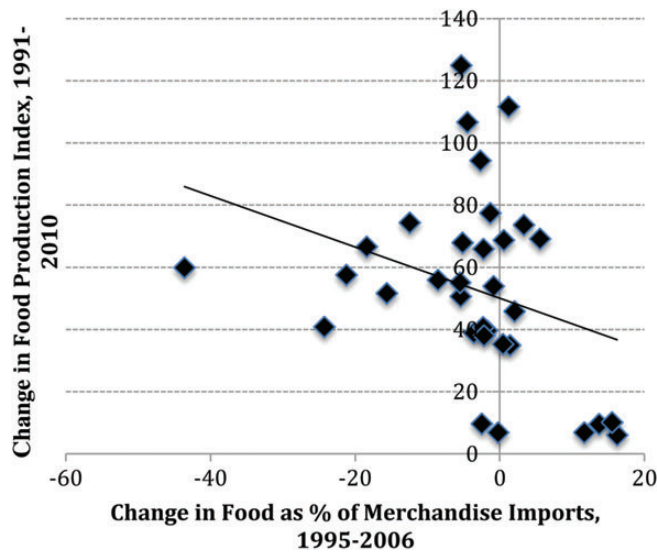

Figure 2: Change in food production and food as percentage of merchandise imports, 1991–2010. *Source*: Authors' calculations based on data from African Development Indicators online database.

marginal propensity to consume. Kiringai (2004) finds evidence for Kenya that women's consumption propensities exceed men's, for example, although detailed empirical work is needed to draw any firm conclusions that could inform theoretical models or computable general equilibrium (CGE)

models. In general, there is a dearth of empirical evidence to identify potential differences in gendered marginal propensities to import.

Other measures of gender equality that have short-run effects may be more salient than wages in LIAEs. These include access to credit (itself influenced by the right to land title), inputs, technology and extension services. While somewhat dated, a body of evidence suggests that gender equality in access to inputs (credit, fertiliser, extension services and land title) could raise on-farm productivity in a number of SSA economies (Saito, 1994; Udry *et al.*, 1995; Goldstein and Udry, 2008). For example, one study on Burkina Faso finds that fertiliser is more heavily applied to male plots, resulting in their greater productivity relative to female plots, controlling for weather conditions and types and characteristics of plots (Udry, 1996). Goldstein and Udry (2008) find that because of weaker property rights, women do not fallow their land enough, leading to lower productivity. The implication is that equalisation of inputs and land rights could raise yields on women's plots.

This is an important area that requires further research and empirical substantiation. To the extent that gender equality in inputs, credit and land title raises food production, the balance of payments may benefit due to reduced reliance on imported food goods. Additionally, society as a whole stands to benefit from the resulting food self-sufficiency. The data to assess both female and male access to resources (especially agricultural credit) are simply not yet widely available, however.[11]

The data challenges of empirically testing theoretical models, then, have been a constraint on research in this area. This is especially so in LIAEs where time-series data on female and male wages are severely lacking. One approach would be to identify a good proxy for wage inequality for which we do have extensive data. That is work, however, that remains to be done.

2.2 The long run

Gendered macro models treat all gender well-being indicators as flexible in the long run. This implies that along with livelihood of gender inequality, capabilities variables are also incorporated into these models. The pathways by which opportunities and capabilities indicators are hypothesised to affect the rate of economic growth depend on the theoretical framework.

[11] The Global Gender Asset Gap Project, launched in 2009 to collect data on gender gaps in assets and to demonstrate the feasibility of collecting such data, is an important step in the right direction. See Oduro, Baah-Boateng, and Boakye-Yiadom (2011) for an analysis of gender-disaggregated asset data for Ghana coming out of this project.

To explore this, we sketch a very rudimentary long-run growth model, drawing on Seguino (2010) in order to highlight the main distinctions between theoretical frameworks. Long-run growth of potential output is shown in equation (3). The determinants of productivity growth are summarised in equation (4). Equation (5) is the steady-state growth restriction that demand and supply growth rates are equal.[12] Specifically,

$$y^P = \lambda + \beta \tag{3}$$
$$\beta = \phi_0 + \phi_1 g + \phi_2 H(w_F) \tag{4}$$
$$g(w_F) = y^P \tag{5}$$

where y_p is potential output growth, λ is the growth rate of the labour force, β is productivity growth, ϕ_o is autonomous technical progress, g is the growth rate of output and ϕ_1 represents the Verdoorn effect or learning by doing (as well as economies of scale), H is a measure of human capital (or labour productivity), while w_F is female wages with male wages held constant. The wage variable is a proxy for any gender equality variable the model might use.

A number of long-run growth analyses have adopted a neoclassical theoretical framework based on the Solow model. Assuming Say's Law (that is, that economies do not face demand-side constraints and thus problems of excess capacity and unemployment), the supply side determines the rate of economic growth. In those models, equation (5) would be assumed to hold automatically as a result of price flexibility. In contrast, Keynesian/Kaleckian models allow for imbalances between potential output and demand.

The supply-side approach emphasises the positive impact of increases in factor inputs (physical and human capital, and labour supply) with endogenous growth theory further delineating determinants of productivity growth, typically underscoring the role of institutions such as the rule of law and property rights. Gendered neoclassical accounts emphasise the positive effects of gender equality in capabilities (in particular, women's health and education). Hence, the coefficient on H in equation (4) is assumed to be a positive function of measures of gender equality.

There are several pathways by which capabilities equality can raise economy-wide productivity. If innate abilities are similarly distributed across the genders, unequal educational investments in favour of boys lead to inefficiencies due to a selection distortion problem: overinvestment in less-qualified males and under-investment in more qualified females. This

[12] For simplicity, we ignore the interesting issues associated with gender and balance of payments constraints to long-run growth. For an exploration of these issues, see Seguino (2010).

can lower economy-wide efficiency, implying that gender equality in educational investments can stimulate productivity and economic growth. Several studies provide empirical support for this hypothesis (Hill and King, 1995; Knowles *et al.*, 2002; Klasen and Lamanna, 2009). Klasen and Lamanna (2009) provide estimates of the cost of education gaps in terms of foregone GDP in the Middle East and North Africa, South Asia and SSA. Costs amount to 1.74, 1.96 and 3.48 percentage points annually in forgone GDP growth, respectively, relative to East Asia over the period 1960–2000. The effects are both direct (on economy-wide productivity) and indirect (lower female relative productivity dampens business investment).[13]

A number of studies that separately evaluate the effect of female and male education on growth have found stronger positive effects of female education (Kalaitzidakis *et al.*, 2001; Klasen, 2002). Not many empirical studies focus exclusively on SSA countries. One exception is Boopen (2006), who finds positive evidence of female (and male) education on economic growth in Mauritius.

The benefits of greater educational equality for development and growth are also argued to operate through the impact on children's well-being. Whether due to greater bargaining power within the household or the enhanced ability to provide better care for children, women's increased educational attainment (relative to men's or absolutely) has been found to produce a positive effect on children's survival, health and education (Blumberg, 1988; Xu, 2007). One (indirect) pathway by which children's well-being may be enhanced is through the effect on fertility. As the opportunity cost of having children rises with more education, women's fertility declines, reducing the dependency ratio, which permits larger investments in children (Galor and Weil, 1996; Lagerlöf, 2003).

Greater gender equality in terms of the unpaid labour burden is also argued to promote growth. Unpaid work includes activities such as caring for children, producing subsistence crops for household consumption, home maintenance and home-based nursing care for the ill and elderly. A ubiquitous finding is that women perform substantially more caring labour than men, although the gender gap in performance of this work varies. Holding constant men's performance of unpaid labour, the reduction in time required for such tasks frees time up for women to spend in remunerative activities that can increase their bargaining power within the household and can reduce child labour. In some cases, this can directly impact girls'

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[13] See also Abu-Ghaida and Klasen (2004) for estimates on the costs of failure to meet MDG Goal 3 of gender equality in education.

education if they are differentially relied on to assist in unpaid labour, as is often the case in many SSA countries. Such improvements can be induced via public investments in infrastructure that reduce the time women must allocate to unpaid care work (Agénor *et al*., 2010). To the extent that women's relative capabilities, incomes and assets improve, their bargaining power within the household gives them greater control over their fertility.

The interlinkages between the productive (paid) economy and the reproductive (unpaid) economy are shown in Figure 3. Subsistence and caring work enhance a household's standard of living, promote human capital formation and support the functioning of the productive market economy. Unpaid care work, however, is often taken for granted and is not captured in the measurement of national output.

Addressing the absence of attention to the care sector in macro models, Braunstein *et al*. (2011) develop an innovative macro model that incorporates the role of caring labour. They show that higher female wages, in addition to directly affecting production, could induce more investment at the household level in human capacities that can raise labour productivity and reduce unit labour costs.

In empirical work on SSA using a Solow growth accounting framework, Bandara (2012) estimates that gender equality in effective labour (the combined effect of gender gaps in labour force participation rates and education)
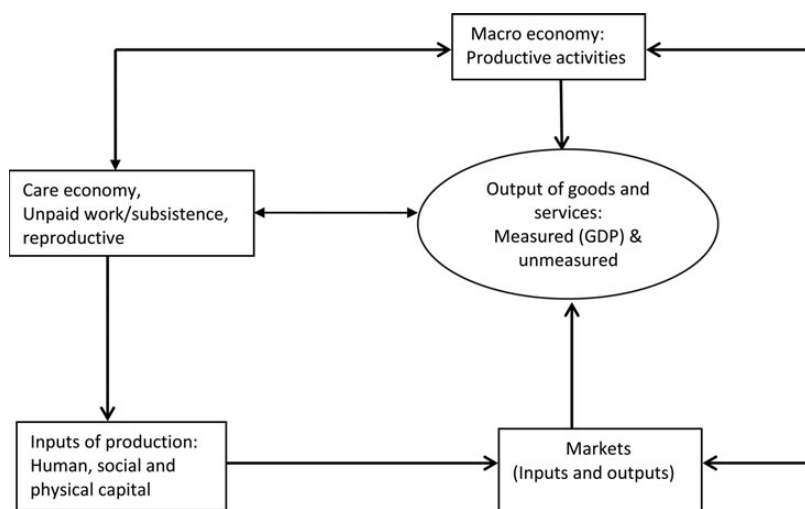

Figure 3: Interlinkages between macroeconomic productive economy and the care economy.

could raise output per worker in SSA between 0.3 and 0.5 percentage points annually for the period 1970–2010. Existing gender gaps in effective labour imply an annual cost of $60 billion in lost output for SSA, or roughly 10% of total SSA GDP (in constant 2010 international dollars).

A heterodox approach differs from neoclassical growth theory by underscoring that the growth of potential output (supply) must be matched by the growth of demand, itself influenced by the distribution of income. Second, it addresses the role of wages in influencing labour productivity growth via its effect on investment in physical capital. Taking the case of SIEs, the ability to hire women at low wages relative to their productivity can be a stimulus to investment and technological advancement [the second term in equation (4)]. This implies that higher female wages have a negative effect on the growth of output, dampening productivity growth. But this is offset, at least in part, by the positive effect of higher female wages on human capital [the third term in equation (4)]. The chain of causality is that higher relative wages improve women's bargaining power in the household with positive effects on investments in children's well-being and thus long-run economy-wide productivity growth. The net effect on productivity growth in SIEs is an empirical question to be determined on a country-by-country basis.[14]

The long-run growth effects of greater gender equality differ in LIAEs such as those in SSA. The dissimilarity turns on the effect of greater wage equality (and other opportunities such as credit, land and inputs) on growth of output in equation (4). Here the effect of greater gender equality is likely to be positive, suggesting that the benefits of gender equality in opportunities for growth are more unambiguously positive in these countries.[15] This brief summary demonstrates advances in our knowledge of the effect of micro-level gender relations on macro-level outcomes, and in particular, the pathways by which equality may stimulate economic growth and potentially development, defined as broadly shared improvements in well-being. That said, this research agenda is far from complete, and its boundaries have not been definitively drawn.

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[14] Neoclassical theory posits that, at least in the longer run, women's wages would rise to reflect their increased productivity. However, heterodox feminist economists argue that women's weak bargaining power inhibits their ability to raise their wages. This implies that under some conditions, gender equality in education combined with gender wage *inequality* can be a stimulus to long-run growth.

[15] For a useful summary of this literature as it pertains to SSA, see Blackden, Canagarajah, Klasen, and Lawson (2006).

3. Effects of macroeconomic aggregates and policies on gender equality

Gender in(equality) is, to some degree, an outcome of macroeconomic policies, whether intended or not. Because women and men have different roles and access to resources, the goal of broadly shared improvements in well-being requires a gender-disaggregated analysis of policy effects. While intrinsic reasons of equity and fairness are important, gender differences produce economy-wide effects, underscoring instrumental reasons for being concerned about inequality as well. Specifically, in cases where gender equality has a positive effect on growth, policies that reduce women's well-being relative to men can have the unintended effect of harming a country's growth prospects.

The literature on the gender effects of macro policy is by now extensive, having been initially stimulated by concerns over the impact of structural adjustment policies on developing countries in the 1980s (Baaker, 1994; Gladwin, 1994; Cagatay and Olzer, 1995; Elson, 1995). Rather than surveying that literature, we briefly identify some pathways by which gender equality is affected by macro policy.

3.1 Growth and gender equality

A number of scholars and institutions argue that growth is 'good for women' (Dollar and Gatti, 1999; Forsythe *et al.*, 2000). That is, economic growth is argued to differentially benefit women. Why might this be so? First, growth might generate public revenues that can be invested to reduce gender gaps in capabilities, such as education, health care and infrastructure that reduces women's time burden. Second, economic growth and the higher incomes that it generates might be more equitably distributed at the household level to females who otherwise may be at the back of the queue in terms of access to household resources. Third, if growth differentially generates employment for women, the opportunity cost of children rises, reducing fertility and leaving women with more time to spend in remunerative activities that improve their relative economic standing and bargaining power.

One approach to assessing the impact of growth on gender equality is to directly assess the growth elasticity of female and male employment. Elasticity estimates tell us something about women's relative access to employment. This is a useful exercise since gender job segregation is pervasive and there is no guarantee that job creation will equitably benefit women and men. Standing (1989) argued that during the period of globalisation

in which low labour costs have been a key factor in influencing product demand, there has been a feminisation of employment, with women's share of jobs rising globally. Braunstein (2012) estimates regional female and male employment elasticities for three sub-periods extending from 1991 to 2003 and finds that women's elasticities are higher than those of men, but that the employment response to growth is inelastic for both women and men.[16]

We extend that analysis for SSA, where gender-disaggregated data are available for 1991–2010. Before presenting those results, we note that women's employment rates (formal and informal combined) in the SSA region are lower than men's in all but three countries (Burundi, Mozambique and Rwanda) for which we have data (Table 2).

Estimates of the growth elasticity of female, male and relative female employment are shown in Table 3. Because economic structure is a key determinant of employment elasticity, regressions are run for countries grouped according to their industrial and trade structures.[17] These estimates reveal that the weakest employment effects of growth for both men and women are in oil-producing African countries, and the relative female–male employment effect only marginally benefits women. Employment elasticities are relatively larger in non-oil mineral exporting SSA economies, although again differential benefits in favour of women's employment are modest. In contrast, the largest employment effects are in non-oil non-mineral producing SSA economies, with elasticities close to 0.781 for women and 0.613 for men. The growth effects of employment in these countries have clearly been gender equalising.

While elasticity estimates are useful indicators of access to income (an opportunity or livelihood indicator), employment data are woefully inadequate in telling us about the quality of the job, its pay and the stability of earnings it generates. Other concerns include the inequitable distribution of growth outcomes across sectors, regions and individuals. Therefore, it is also useful to look at other measures of gender equality in well-being as they relate to economic growth.

Focusing on gender differences in literacy rates, Baliamoune-Lutz (2007) finds strong evidence that both trade integration and growth have negative gender effects in SSA. One might be tempted to link this outcome to slow growth in SSA, but even in rapidly growing Taiwan, Berik (2008) finds

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[16] See Braunstein and Seguino (2012) for Latin American estimates by economic structure.

[17] See footnote 3 for a description of the method used to categorise countries by economic structure.

Table 2: Average female and male employment-to-population rates, 1991–2010

	Female employment rate	Male employment rate	Male–female employment rates
Niger	34.2	84.8	50.6
Mauritius	34.4	74.3	39.9
Mauritania	15.7	52.3	36.6
Cote d'Ivoire	46.9	78.6	31.8
Mali	34.5	60.3	25.9
Senegal	55.9	81.7	25.7
Swaziland	31.8	56.9	25.1
Ethiopia	66.7	87.6	20.8
Nigeria	41.5	61.5	20.1
Lesotho	40.4	58.6	18.2
Benin	63.0	81.0	18.0
South Africa	30.3	48.2	17.9
Chad	59.4	74.3	14.9
Cameroon	58.0	72.4	14.4
Guinea Bissau	58.8	72.5	13.7
Namibia	38.6	52.3	13.7
Central African Republic	65.8	79.4	13.6
Eritrea	69.0	82.6	13.6
Guinea	62.3	75.4	13.2
Botswana	53.5	65.7	12.2
Gambia	65.3	77.2	11.9
Burkina Faso	75.8	87.4	11.6
Equatorial Guinea	74.7	85.6	10.8
Kenya	57.3	66.8	9.5
Angola	61.1	70.0	8.9
Zimbabwe	71.2	79.1	7.9
Gabon	46.7	54.6	7.9
Madagascar	80.2	86.9	6.6
Zambia	64.3	70.2	5.9
Togo	69.8	75.6	5.8
Malawi	71.5	76.5	5.0
Ghana	65.4	70.0	4.5
Tanzania	76.0	80.4	4.4
Liberia	55.3	59.6	4.3
Congo, DR	64.8	67.9	3.0
Uganda	76.5	79.4	2.9
Rwanda	86.1	85.4	−0.7
Burundi	79.4	78.1	−1.3
Mozambique	80.3	75.7	−4.7

Source: Authors' calculations for World Development Indicators online database, accessed 15 October, 2012.

Table 3: Growth elasticity of employment and *Per Capita* GDP estimates for 40 Sub-Saharan economies, 1991–2010

Economic structure	Female elasticity	Male elasticity	F/M employment elasticities	Average annual growth rates of *per capita* GDP, 1991–2010
Oil	0.206	0.187	1.102	1.46
Mineral	0.540	0.532	1.015	1.25
Non-oil non-mineral	0.782	0.613	1.278	1.10

Source: Authors' calculations based on data from the World Development Indicators online database.

Note: See table A1 for a list of countries by economic structure. The following equation was estimated to obtain employment elasticities: $\ln E_{it} = \alpha_i + \beta \ln Y_{it} + \varepsilon_{it}$ where E is the level of employment (alternatively the ratio of female-to-male employment levels) in country i at time t α is the intercept, Y is real GDP, β is the growth elasticity of employment and ε is the normally distributed error term.

negative gender effects of trade and growth, in that case using wages as the measure of inequality. Other studies have used composite indices of gender equality in well-being that combine capabilities, livelihoods and agency indicators. Using these indices to explore the impact of growth during the globalisation period in Latin America and Asia, Seguino (2002, 2007c) finds a negative effect of growth on gender equality.

These studies underscore a weakness of earlier approaches that fail to account for the differential effect of various macroeconomic policies. That is, some macro-level policies may stimulate growth and be gender equalising while others worsen gender inequality, even if growth is stimulated (Berik and Rodgers, 2008; Braunstein, 2012) or simply maintain the status quo. This is because, whether by design or not, macroeconomic policies almost inevitably have distributional effects. Moreover, economic growth is itself an outcome of several policies, whether directly or indirectly. Understanding the impact of the macroeconomy on gender equality therefore requires us first to identify the specific policies in question and the measures of gender inequality we want to consider. With that in mind, we explore here several categories of macro-level policies and their impacts on gender equality. Our focus is primarily on macroeconomic policies adopted widely in Africa over the past three decades. Those policies mainly emphasise the following: restraint on public sector borrowing and spending (fiscal austerity), monetary contraction as a means to keep inflation low, and liberalisation of trade and capital flows.

3.2 Fiscal policy

Public sector spending has the potential to leverage greater gender equality of well-being in a variety of areas. Women's access to jobs is greater in the public sector than in the private sector. This is due in part to patterns of occupational segregation. Education and health care spending differentially contribute to employment opportunities for women.

Some of the most consistently negative gender effects recorded in SSA are those associated with the shrinkage of the public sector since the mid-1980s, and the more limited role of the state. Social infrastructure expenditures (on education and health) can reduce women's care burden, leaving them more time to engage in remunerative activities that improve the standing of females in households. The notable contraction of public sector spending as a share of GDP since the early 1980s (Figure 4) has resulted in cuts to health expenditures and food subsidies as well as to infrastructure (Roy and Heuty, 2009). The harmful gender effects stem from the fact that much of the care burden is identified primarily as women's work. It thus falls on women to accommodate public sector cuts to food subsidies or public health spending.

Apart from the negative growth effects and the job losses that weigh heavily on women's relative employment, infrastructure cuts can also impede gender equality because of the effects on women's care burden (Elson, 1995; Elson and Cagatay, 2000). Although they do not explore the role of gender, Calderón and Servén (2010) provide empirical estimates of the benefits of infrastructure investment for SSA growth and equality.[18] Consistent with those findings, a growing body of evidence finds that infrastructure improvements to roads, electricity and sanitation can reduce women's care burden, leaving them more time to engage in remunerative activities that improve the standing of females in households (Agénor *et al.*, 2010). This implies that cuts to social and physical infrastructure investments have negative feedback effects on long-run growth rates, via the impact on gender equality.

Two gender effects have been identified. Targeted infrastructure expenditures that reduce women's unpaid labour time free up time to spend in remunerative labour activities, with benefits for children's well-being and economy-wide long-run productivity growth (Agénor *et al.*, 2010). For example, improved water and sanitation facilities decrease illness and time spent fetching water, a major factor adding to the unpaid labour burden in a number of African countries. Transportation improvements reduce the time women spend in marketing goods, and they also improve women's

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[18] See also Bose, Haque, and Osborn (2007) on the effects of public expenditures on economic growth in developing countries.
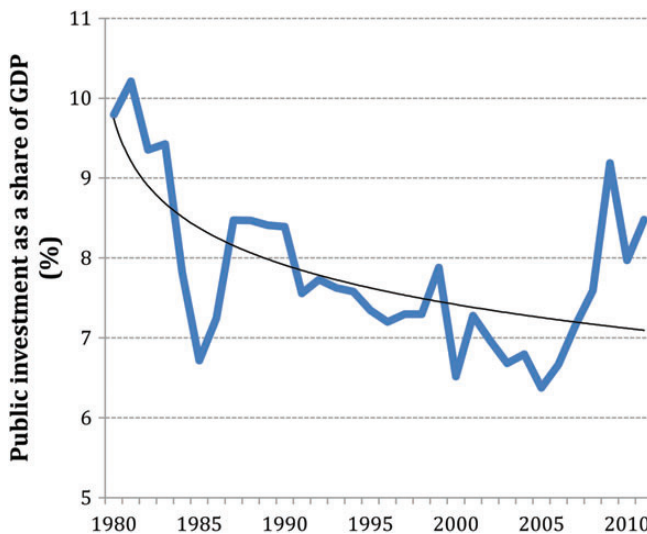
Figure 4: Public investment as a share of GDP in sub-Saharan Africa, 1980–2010.
Source: Authors' calculations from World Development Indicators online database.

access to health care and other services. Improvements in mothers' health have been found to affect children's health *in utero* with evidence of long-term positive effects on children's cognitive skills and thus productivity (Field *et al.*, 2008).

These issues are especially salient in SSA where women are time-poor due to their disproportionate responsibility for care work and the amount of time such care work requires, limiting time to spend in economic activities. In most rural areas, for example, women and girls have also been found to spend more time than men on gender-defined activities such as drawing water, firewood collection and accessing the rural markets (Blackden and Wodon, 2006). To give a sense of the magnitude of the care burden, it is estimated that 40 billion 'women-hours' annually are spent on fetching water in SSA (Agénor *et al.*, 2010).

Fontana and Natali (2008) use data from time use surveys in Tanzania to estimate the benefits of public sector infrastructure investments. They present simulations demonstrating the benefits for gender equality of initiatives that reduce time spent on water collection, home maintenance and other unpaid activities. We reproduce in Table 4 the results of their simulation. These data demonstrate the sizable gender benefits of public infrastructure investments that reduce the unpaid care burden and as a result raise the earnings potential of both women and men. The simulation results show that

Table 4: Potential gains from unpaid-work-reducing infrastructure investments in Tanzania, by activity and sex

Category of unpaid labour	Hours saved in a year (millions)	Potential full-time jobs	Resulting earnings (Tshs in millions)
Water collection			
Adult women	1128	644,655	390,338
Adult men	212	120,897	81,454
F/M ratio	*5.3*	*5.3*	*4.8*
Fuel collection			
Adult women	394	225,358	136,454
Adult men	231	132,163	89,045
F/M ratio	*1.7*	*1.7*	*1.5*
Food preparation			
Adult women	8034	4,590,742	2,779,694
Adult men	365	208,698	140,610
F/M ratio	*22.0*	*22.0*	*19.8*

Source: Fontana and Natali (2008), with permission from IFPRI. Calculations are from the 2006 Time Use Survey and Integrated Labour Force Survey.
Note: The infrastructure investments are those required so that those who perform these tasks would spend no more than the average amount of time spent on them—27 minutes a day for water, 24 minutes on fuel and 126 minutes on food preparation.

women benefit disproportionately from such investments, since they dramatically improve women's time available to engage in paid labour (or leisure). Using data on population and GDP *per capita* in purchasing power parity terms from the World Development Indicators, we estimate that the time released from unpaid work (using Fontana's and Natali's 2006 estimates of resulting increases in total earnings) would raise women's income by 17.7% relative to the economy-wide average income, and men's by 1.6% annually.[19]

In this era of rapid technological change in communications, access to information and communication technologies (ICTs) also have a role to play in lightening women's work burden and enhancing access to relevant information. In a study of 17 African countries, Gillwald *et al.* (2010) find gender differences in access to ICTs, especially where they depend on public access. The cost of communication (for example, use of batteries due to absence of

[19] This is based on an estimated average increase in women's annual earnings of $198 (compared to $19 for men), using the population of women and men between 15–64 years of age and the Fontana-Natali results on potential full-time jobs created.

power) was found to be a major challenge. Rural women were more likely to be deprived of access to any ICTs than rural men. Women's access to ICTs such as mobile phones was mainly constrained by income and level of education, implying that public investment in education and cheap sources of power can play a role in enhancing access to and use of ICTs.

3.3 Trade and investment liberalisation

The transmission effects from trade and investment liberalisation to gender equality are complex and often contradictory. For example, tariff reductions can result in reduced revenues for the state, with negative effects on public sector expenditures and the gender effects outlined earlier. On the other hand, to the extent that liberalisation raises productivity and employment, women workers may differentially benefit, depending on which sectors respond most dynamically (Standing, 1989; van Staveren *et al.*, 2007). The positive association between trade liberalisation and female share of employment is strongest in semi-industrialised countries specialising in the export of labour-intensive (homogenous) manufactured goods. In contrast, trade liberalisation has resulted in de-industrialisation in some developing countries including several in SSA, measured as the decline in manufacturing value-added as a share of GDP (Jalilan and Weiss, 2000).

With regard to wages, there is more consistent evidence that investment liberalisation raises the bargaining power of firms, especially in mobile labour-intensive industries. This has been shown to hold down wage growth (Hoekman and Winters, 2005; Van der Hoeven and Lubker, 2006; Seguino, 2007a). These are precisely the industries in which women's labour is concentrated. So increases in access to employment may be offset by slower or negative wage growth. It is not yet possible to generalise about the size and direction of trade and liberalisation effects on gender equality. We highlight here, however, some of the major findings.

Papyrakis *et al.* (2012) provide a comprehensive review regarding evidence on linkages between trade liberalisation and gender inequality with respect to wages and employment. The evidence they offer points to an overall beneficial impact of trade expansion on female employment in developing countries, both in relative terms and in absolute terms. However, the employment opportunities are largely concentrated in unskilled manufacturing. Additionally, there is evidence of persistent or widening of raw or productivity-controlled gender wage gaps (Artecona and Cunningham, 2002; Berik *et al.*, 2004; Busse and Spielmann, 2006; Braunstein and Brenner, 2007; Menon and Rodgers, 2009; Standing, 1989).

With regard to SSA, the extent of the feminisation of labour due to increased trade openness in the manufacturing sectors is lower than in the Asia region. In most SSA countries, the majority of the employment opportunities have been generated in export processing zones (EPZs) associated with clothing and textiles and non-traditional agricultural exports (NTAEs) such as the cut flower industry in Kenya. The expansion of these industries has provided employment opportunities for women, but there have been concerns about the unfavourable working conditions in these jobs, the increased casualization of the workforce, and low wages (Dolan and Southerland, 2002; Tallontire et al., 2005; Were, 2011). Even in industries that are female-dominated, such as garments, male worker incomes may improve more than female workers as a result of trade expansion, as Nicita and Razzaz (2003) show for Madagascar. In a more recent cross-country study on the determinants of the ratio of female-to-male employment rates in SSA, Wamboye and Seguino (2012) find evidence that trade expansion since 1990 has had a negative effect on women's absolute and relative employment chances in non-oil non-mineral exporting SSA economies.

Some researchers also note that trade liberalisation shifts bargaining power and labour demands in the household and productive activities (Darity, 1995; Warner and Campbell, 2000). With trade liberalisation that increases the demand for export cash crops (typically controlled by men), the resulting income inequality within the household may weaken women's bargaining power both in terms of the distribution of household resources, and in the use of their own time. For example, men may demand more of women's time to work on cash crops, but because men also control the income from such crops, women may not be better off. Further, this may result in women reducing the time they spend on subsistence production with negative effects on children's nutrition and education, especially girl children. This may be linked to Baliamoune-Lutz's (2007) finding that greater openness in the region (measured as the ratio of exports and imports to GDP) has had a negative effect on adult and youth literacy rates.

Notwithstanding the employment benefits of trade expansion, gender gaps in labour force participation and employment in SSA still persist as previously shown in Table 2. Further, women are disproportionately engaged in the informal sector, while employment in the formal sector is male-dominated.

In Kenya, for instance, the share of female employment in the formal wage sector constitutes only about 30%. Further, it has been estimated that 85% of female-owned businesses are in the informal sector (Ellis et al., 2007). Using

Social Accounting Matrix (SAM) multiplier analysis, Wanjala and Were (2009) find that investments in Kenya's agriculture sector accounted for the highest increase in employment income, which mainly benefits skilled labour and disproportionately men. On the other hand, the manufacturing sector accounted for the largest share of job creation. Although women stood to benefit more from the employment creation, most of their employment opportunities are in the informal sector where wages are relatively low. Wanjala and Were (2009) conclude that Kenya's gender disparities are a reflection of existing disparities in its labour market and socioeconomic structure.

3.4 Monetary policy

Inflation targeting has become the dominant and almost exclusive focus of most central banks. This approach addresses inflationary pressures by raising interest rates (usually through raising the policy rate), thus discouraging borrowing and spending. Some of the pressures to keep inflation low come from financial liberalisation with wealth holders avoiding countries with high inflation rates because this reduces the real rate of return on their investments. As a result, the target set in developing countries is now most commonly in the narrow range of 4–6% inflation (Epstein, 2007), while other goals of monetary policy have been sidelined or abandoned.

The inflation-targeting framework has been criticised for putting too much emphasis on low inflation at the expense of other economic policy objectives—for example, reducing aggregate demand at the cost of slower growth and higher unemployment.[20] That is, inflation targeting as a monetary policy is deflationary. Although most of the inflation targeters are developed and emerging market economies, African countries are increasingly under pressure, partly from multilateral financial institutions like the International Monetary Fund (IMF), to adopt the inflation-targeting framework. However, for many countries, especially in SSA, the problem of inflationary pressures is related to international oil price shocks and poor weather conditions such as drought and floods that

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[20] Adherents to inflation targeting argue that the short-run costs are outweighed by the long-run growth stimulus of low inflation rates, which enhance the credibility of monetary policy, reducing the sacrifice ratio in the future. The evidence that inflation targeting has had the intended effect is, however, disputed (Bernanke, Laubach, Posen, and Mishkin 1999). Genc, Lee, Rodriguez, and Lutz (2011) observe that lower inflation levels in inflation targeting countries cannot be solely attributed to the adoption of inflation targeting.

affect production and distribution of staple foods, thus leading to a rise in prices.

Inflationary pressures have also been attributed to low productivity due to widespread health problems such as HIV/AIDs, poor transportation networks, constrained food supplies and exchange rate volatility (Heintz and Ndikumana, 2011). These are largely supply-side constraints that contractionary monetary policy cannot adequately or efficiently deal with. Indeed, given the source of inflationary pressures, the tools to address them are better suited to targeted fiscal policy expenditures than contractionary monetary policy *per se*. Focusing on the case of Kenya, Misati *et al.* (2012) and Were and Kaminchia (2011) indicate that adoption of a strict inflation-targeting framework poses a challenge, given the structural source of inflationary pressures. More broadly, evidence that inflation rates under 20% a year are not harmful to a country's growth suggest low inflation targets are not necessary, especially when weighed against the livelihood costs of such policies (Pollin and Zhu, 2006).[21]

The gender effects of contractionary monetary policy, although not yet widely studied, are hypothesised to operate primarily through the competition over jobs. There is some evidence for developing countries that in episodes of contractionary monetary policy in which aggregate employment falls, women experience greater job losses than men (Braunstein and Heintz, 2008). This should not be surprising, given gender norms that continue to identify men as the 'breadwinners' and more deserving of employment, when jobs are scarce (Seguino, 2007b). This suggests that financial liberalisation can influence gender inequality indirectly, by inducing central banks to adopt deflationary macroeconomic policies that exacerbate competition for jobs. This area of research is in its early stages and while broad sweeping generalisations cannot be made, it underscores the importance of looking at all components of macro-level policies for their intended or unintended gender effects, including some seemingly gender-neutral policy areas such as capital controls and monetary policy.

4. Empirical estimates of infrastructure effects on gender gaps in employment

We test the hypothesis advanced in the previous section that physical infrastructure in SSA, which potentially reduces women's care burden, also

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[21] This should not be misconstrued to imply that high inflation rates or regimes are good for growth or should be welcomed.

improves their relative employment opportunities. To do this, we employ fixed-effects and two-stage least-squares (TSLS) estimation on panel data from 1991 to 2010 for 38 SSA countries. We do not have data to directly test effects on time use and of unpaid labour on employment. Therefore, our empirical model simply posits that the gap between female and male employment-to-population ratios is a function of the degree of infrastructure development, and we control for a variety of additional factors, including demand-side factors, economic structure and human capital measures.

Previous research has found a positive effect of infrastructure on foreign direct investment, employment and economic growth in SSA (Asiedu, 2002; Calderón and Servén, 2010). Infrastructure is typically captured by measures of telecommunications, roads and power (Estache *et al.,* 2006; Ayogu, 2007). None of the studies on SSA have explored gender effects of infrastructure. In our estimations, we capture infrastructure with two variables—the percentage of the population with access to improved sanitation facilities and telephone lines per 1000 people.[22] Improved sanitation is expected to have a positive effect on the gap between female and male employment through, for example, a reduction in time spent fetching water. This is expected to increase women's time available for work in the productive (as compared with reproductive) economy. The effect of telephone lines on relative access to employment is indirect, and this variable proxies for other direct measures of time-saving infrastructure improvements for which data are more sparse—roads, electricity consumption and births attended by skilled health personnel (the latter is a measure of social rather than physical infrastructure). For the 38 countries in our sample, the correlations of telephones with roads, electricity consumption and births attended by skilled health personnel, respectively, are 0.257, 0.902 and 0.638.

On the demand side, we use the log of real *per capita* GDP (to account for variations in level of development and a measure therefore of convergence) and the growth rate of *per capita* GDP. To the extent that growth differentially creates jobs for women, the coefficient on the latter variable should be positive. As a measure of economic structure, we use industry value-added as a share of GDP. We hypothesise this variable will be negatively related to the female−male employment rate gap, due to patterns of gender job concentration with women less likely to gain jobs in the industrial sector. Finally, we use

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[22] With the rapid change of technology from landlines to mobile telephones (cell phones), we acknowledge that the latter may be a better measure but data on the former is readily available and it suffices to use for purposes of this paper.

the ratio of female-to-male secondary education rates as our measure of gendered human capital.

Our empirical model then is:

$$\text{Gap}_{it} = \alpha + \mu_i + \beta_1 S_{it} + \beta_2 T_{it} + \beta_3 \text{GDP}_{it} + \beta_4 \text{GR}_{it} + \beta_5 \text{IND}_{it}$$
$$+ \beta_6 \text{ED}_{it} + \varepsilon_{it} \tag{6}$$

where Gap is the (log) female employment rate minus the (log) male employment rate in country i in time t, α is the intercept, μ is the time-invariant country fixed effect, S is the percentage of the population with improved sanitation facilities, T is telephone lines per 1000 people, GDP is real *per capita* GDP, GR is the growth rate of *per capita* GDP, IND is industry value-added as a share of GDP, *ED* is the ratio of female-to-male secondary school enrolment rates and ε is the error term. All right-hand-side variables, with the exception of GDP growth, are measured in natural logs.

Given our previous discussion of the literature that finds a positive effect of gender equality on growth, we also use TSLS to address the potential endogeneity of GDP growth. Instruments for GDP growth are as follows: the share of gross fixed capital formation in GDP, OECD growth rates, the female share of the labour force and the ratio of female-to-male secondary enrolment rates. The latter two variables draw from Bandara's (2012) analysis, which finds a positive effect of gender equality of effective labour (that is, the female-to-male ratio of education-adjusted labour force participation rates) on growth rates.

Results are presented in Table 5. Equations (1)–(6) are step-wise fixed-effects results, while equation (7) provides results from TSLS estimation. The coefficient on infrastructure variables is stable with the inclusion of additional explanatory variables [with the exception of sanitation in equation (2)], although the size of the coefficients declines with the addition of the remaining explanatory variables. The level of *per capita* GDP is inversely related to female relative employment. That is, the female–male employment gap favours women more in lower-income countries. This may be due to the greater possibilities for employment expansion in lower-income countries than in higher ones (where employment rates may already be higher). Although the coefficient on GDP growth is positive, it is insignificant, consistent with the weak growth elasticities of employment shown in Table 3. Industry as a share of GDP exerts a negative effect on the female–male employment gap, and this is consistent with what we know about women's weaker access to employment in this sector. Finally, gendered secondary educational equality has a positive effect on the female–male

Table 5: Empirical estimates of effect of infrastructure effects on gender employment-to-population rate gap

	Fixed effects						TSLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sanitation (log)	0.101*** (0.037)	0.056 (0.035)	0.071* (0.036)	0.068* (0.036)	0.068** (0.027)	0.085*** (0.026)	0.057** (0.025)
Telephones (log)		0.044** (0.836)	0.056*** (0.778)	0.057*** (0.79)	0.053*** (0.724)	0.038** (0.573)	0.052*** (0.013)
GDP *per capita* (log)			−0.080** (1.961)	−0.085** (1.94)	−0.080* (2.041)	−0.080 (2.208)	−0.111*** (0.032)
Per capita GDP growth				0.001 (0.022)	0.0004 (0.018)	0.0003 (0.031)	0.006 (0.004)
Industry value-added (log)					−0.004 (0.94)	−0.0262 (1.203)	−0.032** (0.015)
F/M secondary enrolment (log)						0.131* (2.595)	0.106*** (0.031)
Constant	0.607*** (0.116)	0.451*** (0.113)	−0.0118 (0.199)	0.0292 (0.204)	0.017 (0.20)	−0.567** (0.241)	
Observations	748	747	747	746	696	422	413
R-squared	0.11	0.214	0.247	0.25	0.244	0.301	0.113
Cragg–Donald Wald *F* statistic							2.563
Anderson LM statistic							10.217
Number of countries	38	38	38	38	38	37	35

Source: all variables are from the World Development Indicators online database with the exception of OECD growth rates, which are from the World Bank's Global Development Finance database.

Notes: Countries in the sample are all those listed in Table A1 with the exception of Somalia and Sudan. GDP growth is treated as endogenous in equation (7), and instruments are gross fixed capital formation as a share of GDP, OECD growth rates, female-to-male secondary school enrolment rates (logged) and the female share of the labour force (logged). The Cragg–Donald Wald *F* statistic is a test of weak instruments, while the Anderson LM statistic is a test of weak identification. Dependent variable: (log) female employment rate − (log) male employment rate.

*** denotes significance at the 1% level, ** at the 5% level and * at the 10% level.

employment gap. The size of that effect is quite large and roughly equal to the combined effects of our two infrastructure variables.

The TSLS results are broadly similar to the fixed-effects estimations, although the size of the coefficients on sanitation and education fall by about a third. Diagnostic tests indicate that while the model does not suffer from weak identification (based on the Anderson LM test), it does suffer from weak instruments (tested using the Cragg–Donald Wald F test). Several alternative instruments were employed to address this problem (real interest rates and trade as a share of GDP, for example), but these did not improve the results of the Cragg–Donald test. Consequently, these results should be viewed with some caution. That said, the fact that the results are quite similar to those obtained from fixed-effects estimation leads to greater optimism that our results are reliable.

All in all, these results suggest that even when we control for the level of development, growth rates of GDP that drive employment and gendered educational differences, we find that infrastructure continues to exert a positive and significant effect on the female–male employment gap. This finding could beneficially inform the identification of priority macroeconomic policy targets.

5. Gender-equitable macroeconomic policies

Under the right conditions, a more equitable gender distribution of income and opportunities can be a stimulus to growth in SSA, funding further investments in human development. Developing the policies to create those conditions is the central challenge for any gender-aware macroeconomic programme. We discuss here two areas for which pursuit of gender-equitable policies is likely to yield positive developmental effects: (a) public investment to address women's care burden and inflationary bottlenecks and (a) monetary policy that gives priority to employment rather than merely focusing on inflation targets.

5.1 Public investment in social and physical infrastructure

An understanding of gender relations should be integral to defining a public investment strategy. Both physical and social infrastructure public investment can improve gender equality and stimulate long-run growth by raising economy-wide productivity. In this sense, such investments are

also anti-inflationary if targeted to address supply-side bottlenecks that drive up prices in the economy.

As we have noted, research identifies a strong link between physical infrastructure expenditures and women's unpaid care burden. Depending on the type of economy, public investments in both physical and social infrastructure can also close gender gaps in job access and raise incomes. In agricultural economies, for example, targeted expenditures to women farmers can raise agricultural productivity. Women are credit-constrained due to lack of land rights but even this constraint can be overcome with appropriate monetary and financial sector policies that promote access to finance, a point we take up in more detail later.

Social infrastructure investment a relatively new and underdeveloped concept, has important gender dimensions. These investments have a public goods quality with positive-spillover effects for the rest of the economy and can include, for example, investments in education and training of health care workers. The evidence that closing the education gap between boys and girls can raise *per capita* GDP growth rates suggests that expenditures of this type should not be classified as social welfare, but rather as investments that produce a stream of financial and human development returns into the future, thus generating the resources to pay down the debt incurred by the initial investment. Investments in social infrastructure tend to be especially beneficial for gender equality since women disproportionately work in sectors associated with providing these goods and services and thus benefit from the job creation it implies. Improved health care and better sanitation also lessen women's time and work burden of caring for sick children and the elderly.

Public investments in physical infrastructure (for example, roads, transportation and irrigation) also stimulate job growth and expand the economy's productive capacity. Feeder and rural access roads facilitate access to markets and facilities such as health care centres. This is particularly beneficial to women in rural and remote areas. These investments tend to create 'male' jobs, however. Countries can make such investments more gender-responsive by ensuring women's equitable access to employment created by public infrastructure projects as India has done with its public employment guarantee scheme (Dutta *et al.*, 2012).

What about fiscal space? Many countries might be construed as lacking sufficient fiscal space to undertake public investment, even if economically desirable. The degree of space is circumscribed by limits placed on a country's debt to GDP ratio. Debt ceilings that do not factor in the

growth-expanding potential of public investments unduly constrain such investments, which, by their very nature, generate returns in the longer term. The appropriate timeframe that should be used to assess the feasibility of this type of borrowing then is about 10 years. Within that time, appropriately targeted public investments will have begun to expand the productive base of the economy, generating (taxable) incomes with which to pay down the debt. Such investments then are both fiscally sound and sustainable. Key here is that gender-responsive investment itself creates fiscal space by adding to the productive base of the economy.

Fiscal space can also be created by enhancing efficiency in the delivery of services and proper prioritisation of public expenditures. In the past, public spending in a number of African countries has been associated with high inefficiency, wastage, corruption and poor planning leading to 'white elephant' projects. Savings generated from these types of inefficiencies and loopholes in revenue collections can go a long way in improving the social and physical infrastructure development.

5.2 Employment as the primary target of central banks' monetary policy

A new role for central banks is also required. As noted, for many countries, especially in SSA, inflationary pressures are related to supply-side constraints and low productivity based on low investments in children's well-being and gender inequality as well as physical infrastructure inadequacies. This suggests that inflation might be more efficiently addressed with public investment rather than contractionary monetary policy. This hypothesis is consistent with Heintz and Pollin's (2008) results showing that economic growth tends to be associated with lower, not higher, rates of inflation in SSA.[23]

For SSA countries, central banks have an important part to play in helping to develop the financial sector and to promote financial inclusion and access by both women and men. Their role in managing exchange rates is also critical. This is because, as net importing countries, the exchange rate has a direct impact on the citizenry, with far-reaching hidden gender impacts, depending on the nature of the imported products and the marginal propensities to import/export by either sex.[24] However, as earlier alluded to, this is an area for further research.

[23] They also note the effect of exchange rate volatility on inflation in the region.

[24] A highly depreciated domestic currency, while being favourable for the exporting sector that may be male-dominated, can increase women's health care burden by increasing the

In an alternative framework that emphasises inclusive monetary policy, the central bank would identify a 'real' target—one that focuses on key social and economic problems to be addressed by policy. An obvious one is employment, with the central bank's policy goal shifting to employment targeting in place of inflation targeting. If a country has a particular problem with generating good jobs for women or marginalised ethnic groups, the real targeting approach can accommodate such needs. We are, however, cognizant of the challenges that direct implementation of such a framework may face, which range from poor data on employment and the quality of jobs, to poor monetary policy transmission mechanisms in most SSA countries. These challenges are not insurmountable since specific employment generating sectors and projects can be targeted, as proposed later.

Based on this approach, Heintz and Pollin (2008) provide an alternative framework for designing macroeconomic policies in SSA.[25] Though they do not explicitly address the issue of gender equality, many of the policies they propose that are designed to target employment growth would also contribute to greater gender equality. Key to their approach, the central bank would identify priority sectors or groups and provide loan guarantees to banks that extend loans in these areas. In agricultural economies where women are subsistence farmers, small-scale agriculture is an obvious choice. Loan guarantees are a good way to overcome the credit constraints women face, given restrictions on their ownership of land and thus lack of collateral. As Asiedu *et al.* (2012) note, female-owned firms are also more credit-constrained than male-owned firms in SSA. Priority might also be given to small- and medium-sized businesses that are labour-intensive and disproportionately employ women. In this framework, the private sector would still provide the bulk of credit, but it would be characterised by low interest rates leveraged with government loan guarantees.

Much more intellectual work is needed to flesh out a viable gender-equitable macroeconomic framework. Policies to manage trade, investment and financial flows will also be required in order to promote gender-equitable macroeconomic well-being. Moreover, we lack good empirical estimates of

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cost of medicines and basic health care equipment that are largely imported. These pressures can translate to domestic inflation as the higher importation costs are passed through to consumers.

[25] See also Pollin, Heintz, Epstein, and Ndikumana (2006) and Pollin, wa Githinji, and Heintz (2008) for related proposals for South Africa and Kenya, respectively.

the benefits of targeted public infrastructure investments for gender equality and the extent to which these improve long-run growth prospects.

6. Conclusion

The important objective of identifying strategies to raise *per capita* incomes in SSA can benefit from an integration of scholarship on the important influence of gender relations in achieving that goal. More so than in semi-industrialised economies, preliminary theorising and evidence suggest that gender equality is likely to be a stimulus to growth in SSA and improve the balance of payments. These effects operate not only on investment in the short run (a demand-side effect), but also in the longer run, on the development of human capacities that contribute to economy-wide productivity growth.

Given the role of gender in stimulating growth, it is critical for policy-makers to identify the impact of macroeconomic policies on gender equality to avoid the possibility that such policies self-defeatingly reduce gender equality and thereby slow growth. We discuss the pathways by which macro-level policies affect the degree of gender equality and identify two key areas of alternative gender-aware policies—public investment in physical and social infrastructure and monetary policy. We suggest particularly, for SSA, that the primary roles of fiscal and monetary policies should be redesigned, with fiscal policy targeting inflationary bottlenecks and monetary policy adopting employment support as its primary target. Central banks also have an important role to play in promoting financial access. By appropriately targeting such policies to reduce gender inequality, SSA economies may indeed generate a virtuous cycle of growth, where policies promote gender equality, which further contributes to growth.

More research, both theoretical and empirical, remains to be done to understand country-specific conditions that mediate between macro policy and gender relations at the micro level. A major constraint is insufficient data. That said, there is much promise for informing growth analysis of integrating the large body of gender research that has emerged in the last 15 years.

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Appendix A

Table A1: Classification of sub-Saharan economies by economic structure

Oil exporters	Non-oil mineral exporters	Non-oil non-mineral producers
Angola	Botswana	Benin
Cameroon	Central African Republic	Burkina Faso
Chad	Congo, DR	Burundi
Côte d'Ivoire	Gabon	Eritrea
Nigeria	Ghana	Ethiopia
Sudan	Guinea	Gambia
	Mauritania	Guinea Bissau
	Mozambique	Kenya
	Namibia	Lesotho
	Niger	Madagascar
	Rwanda	Malawi
	Senegal	Mali
	South Africa	Mauritius
	Tanzania	Swaziland
	Togo	Uganda
	Zambia	
	Zimbabwe	

Note: See footnote 3 for a description of the method to categorise countries by structure.

Table A2: Gender equality indicators for sub-Saharan Africa by economic structure: 1991–2010 averages

Gender indicator	Oil-producing countries	Non-oil non-mineral producing countries	Mineral exporting countries
Female share of employment	38.2	44.3	45.3
Female employment-to-population rate	79.6	78.0	81.5
F/M gross primary school enrolment rate	80.7	86.0	89.2
F/M gross secondary school enrolment rate	60.9	79.1	77.0
Maternal mortality rate (per 1000 female adults)	740.4	538.5	586.0
F/M life expectancy	105.4	105.4	104.5
F/M population ratio	99.2	102.9	101.4
F/M percent with loans in past year (15+, 2011)	98.5	93.7	92.2
F/M age at first marriage	77.7	80.2	82.4
Age dependency ratio (% working age population)	89.7	89.8	89.5

Source: data on loans and first marriage are from the World Bank's Gender Statistics database accessed on 15 October 2012. The remaining data are from the World Development Indicators online database, also accessed on 15 October 2012.
Note: See Table A1 for classification of SSA countries according to economic structure.

Table A3: Female share of employment by sector in SSA

	Agriculture and fishing (%)	Mining and quarrying (%)	Mfg. (%)	Data source	Year of survey	Ages included in sample
Botswana	38.8	12.1	55.5	1	2006	12+ including armed forces
Ethiopia	32.1	10.6	50.4	1	2006	10+
Lesotho	39.3	20.3	63.5	1	2000	10+
Madagascar	49.7	45.0	23.3	2	2005	6+
Mali	29.8	26.1	50.1	1	2004	15+
Mauritius	27.4	0.0	43.2	1	2008	12+
Namibia	36.8	21.9	49.1	1	2004	15–69
Nigeria	36.6	20.9	52.5	1	2007	Civilians (no age specified)
Senegal	34.3	18.5	17.0	2	2006	15+
Sierra Leone	51.4	14.0	21.4	3	2004	10+
South Africa	33.1	11.0	32.1	1	2008	15–64
Tanzania	51.8	47.1	34.1	1	2002	15+
Uganda	55.2	33.5	40.3	1	2003	10+
Zambia	49.6	5.0	27.0	3	2000	12+

Source: Laborstat, Table 2b, accessed 1 October 2012.
Note: Data sources are (1) labour force survey, (2) household survey and (3) population census. Mfg. = Manufacturing sector.