Published as: Irene van Staveren, 'Gender as a Macro Economic Variable', Chapter in New Frontiers in Feminist Political Economy, Shirin Rai and Georgina Waylen (eds.), London: Routledge, 2014, pp. 135-153.

GENDER AS A MACROECONOMIC VARIABLE

Irene van Staveren

Introduction

This chapter will analyse how gender can be used in a meaningful way in macroeconomic analysis. The challenge is that gender cannot be measured easily at the macro level. This is either because current gender variables are one-dimensional and miss out much gender –relevant information, or because relevant gender variables are available only for a small group of countries and a limited number of years. Another reason why gender is so much absent in macro economics is that it is not recognized as part and parcel of economic processes and policies. At most, it is recognized to be a minor influential exogenous variable – not part of the economic system. Hence, when we do see gender appearing in macro-level analysis it is in a rather limited way, for example in country level poverty analyses, where one or more gender-aware Millennium Development Goals are included, or in cross-country labour market studies in which differences in male and female labour force participation or the gender wage gap are included. For example, in a study on the economic losses of missing the Millennium Development Goals on gender equality, Klasen and Abu-Ghaida (2004) have calculated that off-track countries are likely to suffer between 0.1 and 0.3 percentage points per capita growth. Another example is shown in various analyses on EU economic growth in relation to an increasing dependency ratio due to the aging population. In such studies the relatively low female labour force participation rate has been identified as a constraint on economic growth and on the financial sustainability of pension systems. But this treats gender relations and gender inequalities simply as constraint on economic development, not as a variable that is partly determined in the economy itself.

The problem when gender is so marginalized in macroeconomic research is that it remains invisible at the macro level of research and policy advise. Trade analysis, growth decompositions,

economic reform policy, and poverty reduction strategies therefore still remain gender blind, and therefore often incomplete or ineffective (see for analyses of such gender-blind macroeconomic analysis, van Staveren et. al, 2007 on trade, van Staveren 2008 on poverty, and Berik et. al, 2011 on growth). For example, the collaborative volume that I co-edited with Diane Elson and two other colleagues, on gender and trade shows that the gender division of labour in the household, asymmetric gendered institutions affecting economic behavior of women and men, and labour market discrimination have significant economic effects. They limit gains from trade, reduce the supply response to exchange rate policy, support an exploitative competitive advantage, generate a trade-off between job gain and job security for women, and allow both competitive and concentrated industry to exploit the gender wage gap and women's weaker labour market position in strategic responses to globalization.

Instead of regarding gender as a minor, and mostly exogenous variable at the macro-level, I argue that gender must be understood as, first, shaping market processes in terms of access to and control over resources, such as education or incomes, second, as shaping people's choices and opportunities and constraints, for example in segmented labour markets with typically feminine and masculine jobs, third, as being inherently part of macroeconomic trends, for example through fluctuations in the female labour force participation rate, and forth as underlying the household gender division of labour leading to a large female intensive unpaid economy (van Staveren, 2011).

For the measurement of gender at the macro-level, we often need to go beyond a single dimension, simply because gender inequalities are everywhere: in access to resources, in discrimination and exploitation, in opportunities, in wellbeing, and in institutions. Therefore, several country-level measures of gender inequality, of gendered norms and values, and of gendered institutions have been developed over the past two decades. Indices, rather than single variables, represent broad-based measurement and can therefore include gender inequalities in a variety of economic, social, and governance areas. Well-known examples are the Gender Development Index and the Gender Empowerment Measure, both developed and published annually by the UNDP up to 2009. (In 2010 UNDP has developed an alternative in one variable, the Gender Inequality Index.) Other measures are included in broader databases such as the OECD online Gender and Institutions Database and in the Indices of Social Development by the Institute of Social Studies.

In this chapter, I will argue that such broad-based gender indices are suitable measures for macroeconomic analysis, but that they have their limitations. Below, I will introduce and compare five gender indices that are available in databases. Then I will analyse the extent to which the gender indices are related to key macroeconomic variables in a cross-country bi-variate regression analysis. Second, I will develop a disaggregate multivariate regression analysis of one of the gender indices, namely the one for which data is available for five years. The results indicate that there are different effects for different underlying indicators. More precisely, there are different effects for allocation variables, which measure contributions to economic outcomes, such as education, as compared to distribution variables, which measure conflicts over the distribution of economic outcomes, such as the gender wage gap.

This chapter points out that gender indices are well suited to track and monitor effects of macroeconomic policies and trends. At the same time, they may be less suitable to explain complex macroeconomic outcomes such as economic growth, precisely because they measure so many things at the same time. I will therefore conclude that gender indices are a useful tool for engendering macroeconomics, but they cannot replace individual, single-dimension gender variables, which has not only value for micro analysis but also for particular macro-level research questions.

Five Gender Indices

The gender indices that I have selected are all recent composite indices of gender inequality. The criteria for selecting these five are wide accessibility (they are all available online), reputable sources, and many country observations included (between 101 and 184). Moreover, they are all up to date, with GII replacing the old GDI and GEM, and four indices being published for the first time in 2010 and one since 2006. I use data for the year 2010, though many underlying indicators have values for one or two years earlier due to lack of more recent data. The gender indices used in the analysis are the following:

1. GEI:
Gender Equality Index, from the Indices of Social Development database of the Institute of Social Studies (part of Erasmus University Rotterdam). The GEI was first published in 2010. The values lie between 0 and 1, with seven digits after the comma, and the higher the number, the more equal gender relations are. The index consist of 21 indicators. They are available for 184 countries.

2. GII:
Gender Inequality Index, from the UNDP Human Development Reports. The GII was first published in 2010 and has replaced the two earlier gender indices, the Gender Development Index and the Gender Empowerment Index, that were first published in 1995. The values lie between 0 and 1, with three digits after the comma, and the higher the number, the more unequal gender relations are. The index consist of 5 indicators. They are available for 138 countries.

3. SIGI:
Social Institutions and Gender Index, SIGI, was developed in 2010 on the basis of the Gender and Institutions Database by the OECD. The values lie between 0 and 1, with seven digits after the comma, and the higher the number, the more unequal gender relations are. The index consist of 12 indicators. They are available for 101 countries – only developing countries.

4. GGGI:

Global Gender Gap Index, developed by the World Economic Forum, since 2006. The GGGI has values between 0 and 1, with four digits after the comma, and the higher the number, the more equal gender relations are. The index consist of 14 indicators. They are available for 134 countries.

5. WEOI:

Women's Economic Opportunities Index, developed by the Economic Intelligence Unit. The WEOI was first published in 2010. The values lie between 0 and 100, with two digits after the comma, and the higher the number, the more equal gender relations are. The index consist of 26 indicators. They are available for 184 countries. In order to make them comparable with the other four indices, they are divided by 100, to give a number between 0 and 1 with four digits after the comma.

Table 1. Pearson correlations of the gender indices

	GEI	**GII**	**SIGI**	**GGGI**	**WEOI**
GEI	1.00	-0.75	-0.77	0.79	0.72
GII	-0.75	1.00	0.50	-0.61	-0.81
SIGI	-0.77	0.50	1.00	-0.66	-0.64
GGGI	0.79	-0.61	-0.66	1.00	0.65
WEOI	0.72	-0.81	-0.64	0.65	1.00

Note: all correlations are statistically significant at the 1% level.

The bi-variate Pearson correlations between all five indices are modest but relatively high in some cases, between 0.50 and 0.81, with an average correlation of 0.69, see table 1. Most indices correlate positively with each other, while GII and SIGI correlate positively with each other but negatively with the other three indicators, because the more unequal gender relations are according to these two indices, the higher the value of the index is. One would assume that the overlaps are largely due to duplications of underlying indicators. Surprisingly, this is not the case. On average, only 20% of the underlying indicators occur in two or more of the five gender indices.

Another interesting finding from the descriptive statistical analysis of the gender indices is that their relationships are not entirely linear. This can most probably be attributed to the fact that they measure different dimensions of inequality, varying from access to resources and capabilities to institutional constraints (formal ones through laws, and informal ones though norms and attitudes) and wellbeing outcomes. I have plotted all ten pairs of gender indices and found that in all cases the nonlinear relationship is stronger than the linear one. The three diagrams below show scatter plots and regression lines for those pairs of gender indices, which show the strongest relationships.

Diagram 1. Scatter plot and nonlinear regression line between GII and GEI

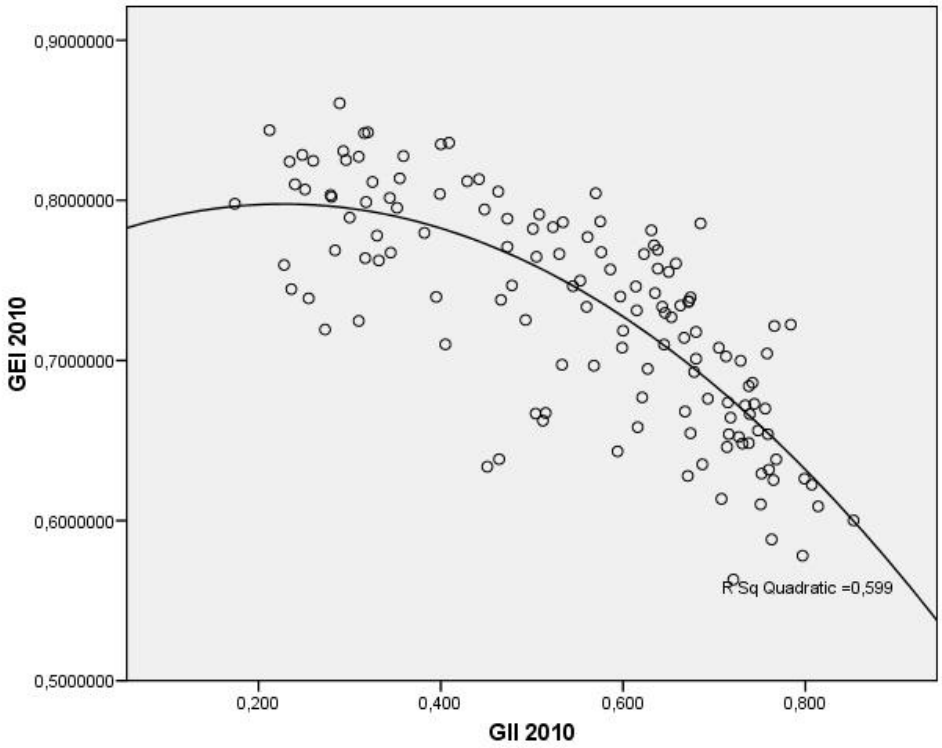


Diagram 2. Scatter plot and nonlinear regression line between WEOI and SIGI

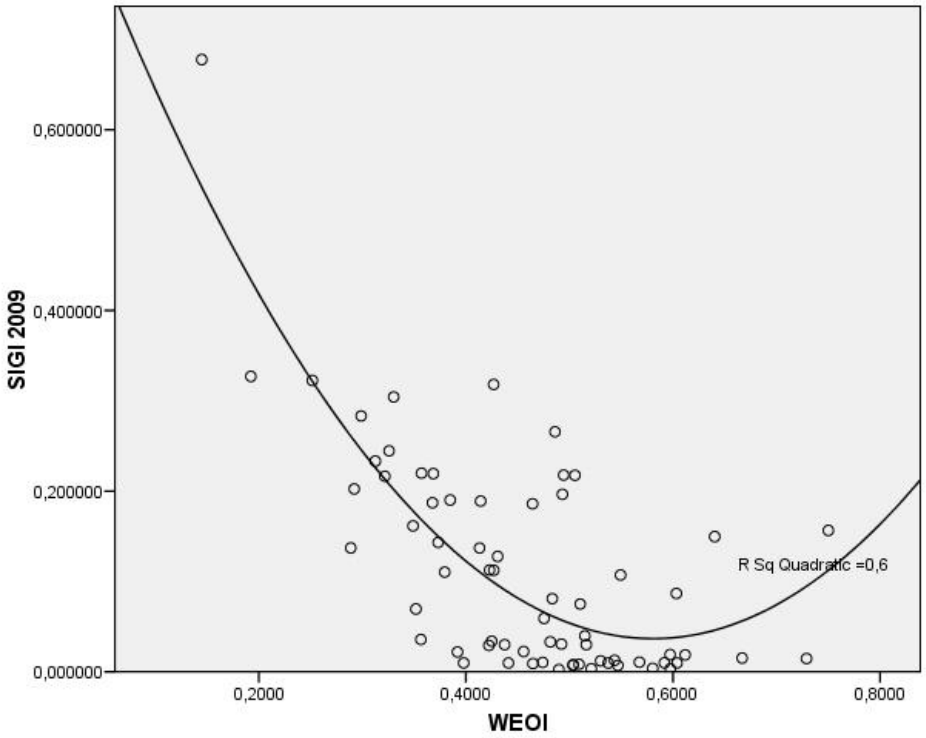
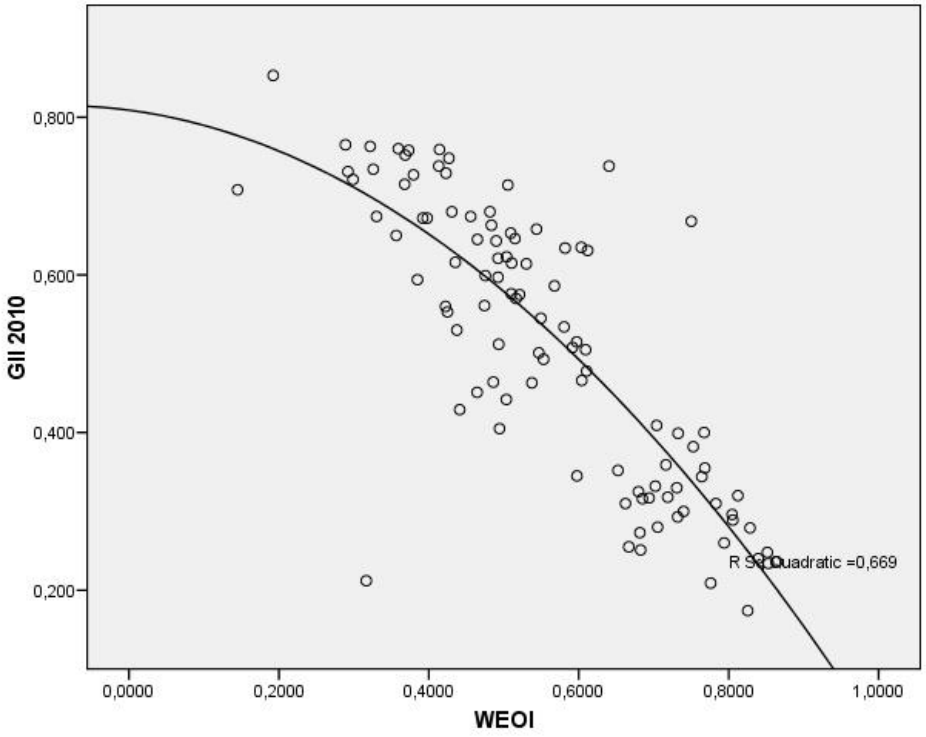


Diagram 3. Scatter plot and nonlinear regression line between WEOI and GII



Methodological Differences between the Indices

The main methodological differences considering measurement of the indices are the following:

- weights given to the different components of indices
- how a method deals with missing values for particular countries and years, and
- whether the method makes use of capping the values of variables to gender equality, or whether they allow for indices that show where women benefit over men (for example in life expectancy or secondary school enrolment as is the case in various developed and developing countries).

Obviously, gender indices are constructed precisely as indices of inequality, by comparing male-female values for indicators and including specific indicators for dimensions that signal gender inequality, like, for example, the sex ratio in a population, the extent of early marriage of girls, and people's views about women's roles. WEOI is the only index that does not measure gender gaps but constraints to women's economic opportunities as well as indicators for the general business environment for men and women in a country.

A first measurement problem that we find among the gender indices is that one index, GGGI, includes income, as the gender differences in earned income. However, earned income is in most country statistics an estimated value based on data on labour force participation and wage differences. Hence, it would be better to replace the income variable with a female labour force participation variable (see also Klasen and Schüler, 2011). GGGI, however, includes both, which implies a tautology.

The number of indicators also influences their relative importance, in comparison with other indices. Here, we see a second difference arising among the gender indices: two indices include a relatively small number of variables, as compared to the other three. This implies that each variable in those two indices – SIGI and GII – count more as compared to individual indicators in the other three indices. Thirdly, indices may differ in the way they deal with gender differences that favour women, for example in the case of life expectancy for most countries and for a few countries where women have higher school enrolment rates in secondary and/or tertiary education. GII allows for compensation of female disadvantage by male disadvantage, whereas the other indices use a cap, treating any advantage of women over men the same as an equal score for both sexes. Fourthly, all but one indicator is inequality averse. In SIGI high inequalities in a sub-index count stronger than low inequalities, by using squared values of the sub-indices in order to obtain the general index. Fifthly, weights imply value judgments, namely about the relative importance of indicators in an index and the extent to which they measure quite similar things or not – issues of breadth and depth. Weights can be applied at two levels: between categories of indicators (sub-indicators) and between individual indicators. If averages are calculated using a simple average (arithmetic mean), indicators with a higher standard deviation would receive more weight. SIGI and GGGI indicators have weights in the sub-indices. Sixthly, the averaging of the indices differs: whereas four out of the five take a mean (either arithmetic or geometric), the GEI uses the matching percentiles method. This is a ranking method in which each additional indicator adapts the previous ranking, a method that is repeated 1,000 times (Monte Carlo simulation) with a randomly chosen master variable, the first variable for which the country ranking is done.

The methodological differences indicate that, even though all indices have values between 0 and 1, their substance and construction varies considerably. This has implications for the use of the indices, both for tracking and monitoring purposes of gender equality, as well as for quantitative analyses using the indices for studying relationships between gender and macroeconomic change.

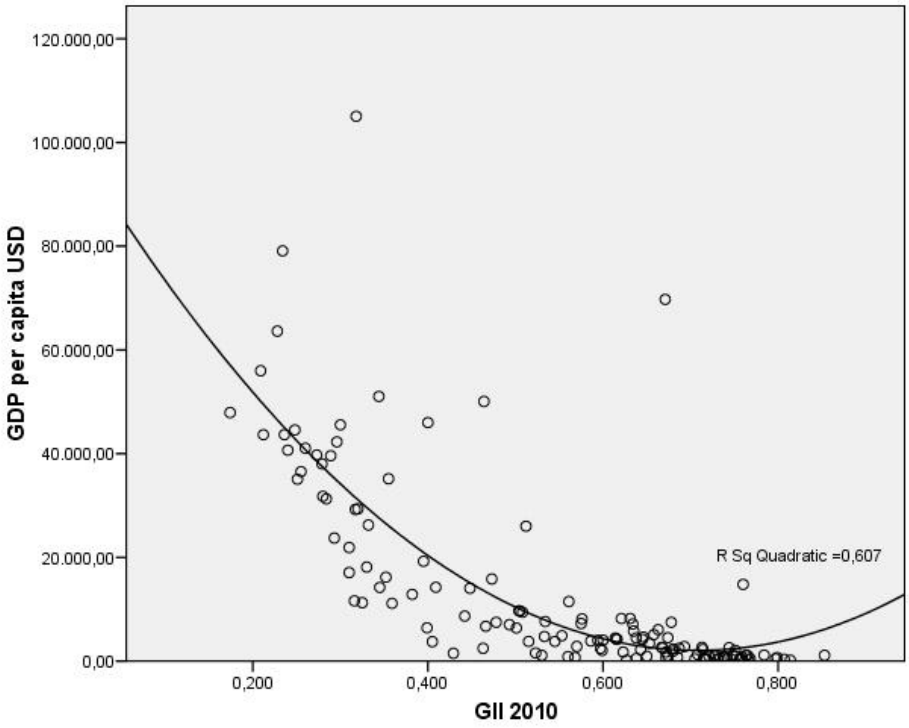
Bi-variate regression analysis of gender at the macroeconomic level

Over the past twenty years, feminist economists have developed the area of feminist macroeconomics. It has led to important empirical research results and theoretical insights. The literature has developed along three lines. First, a substantial amount of research has analyzed relationships between gender inequality on the one hand and macroeconomic aggregates on the other hand. In particular aggregates such as economic growth and exports. Second, the literature has increasingly shown that there are two-way relationships between gender and macroeconomics. Not only gender effects of particular macroeconomic strategies, trends and policies, but also macroeconomic effects of particular patterns of gender inequality or of particular gender policies. Third, impact analyses of macroeconomic strategies and policies have demonstrated that if these policies have been designed and implemented in a gender-blind way, they often lead to negative effects on gender equality or women's empowerment. All three

strands of the literature on gender and macroeconomics, however, have shown that under particular conditions, macroeconomic policy can both benefit gender equality and macroeconomic outcomes, such as growth, gains from trade, and investment (van Staveren et al., 2007; Berik et al., 2011).

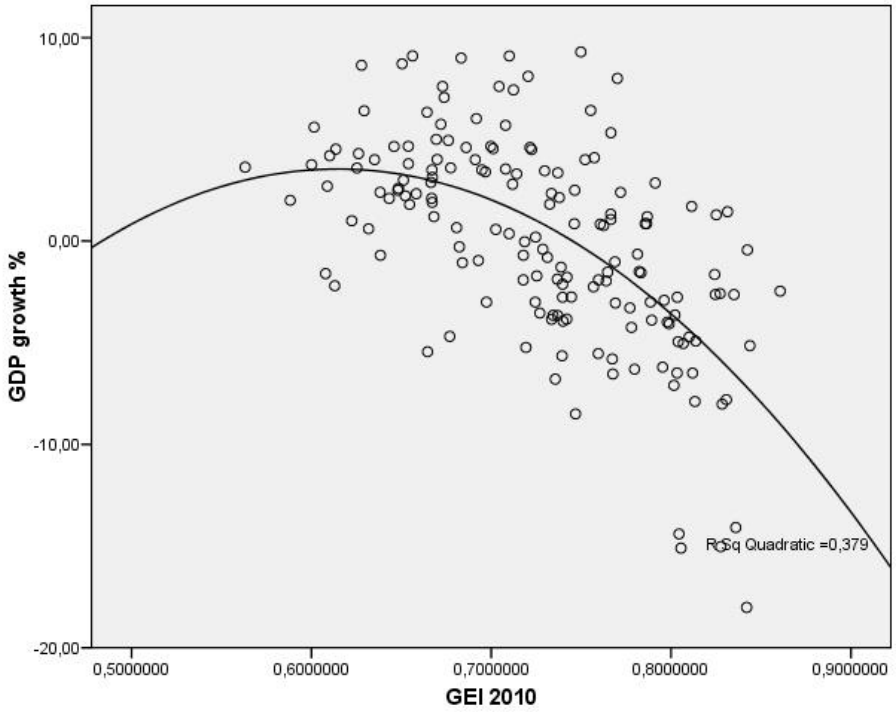
This chapter tries to bring some structure in the discussion, thanks to the availability of the five gender indices and underlying gender indicators. The two diagrams below show two scatter plots with fit lines for two major macroeconomic variables: GDP per capita and GDP growth and for all countries for which data is available. I have selected the relationships with R square higher than 0.30 and for the gender index which shows the best fit with each of the two macroeconomic variables. The strongest relationships appear to be nonlinear, as was also the case for the relationships between the gender indices, shown above.

Diagram 4. Scatter plot and fit line for GDP and gender inequality



Note: GII is measured negatively: the higher GII, the more inequality.

Diagram 5. Scatter plot and fit line for GDP growth and gender equality



Note: The GEI is measured positively: the higher GEI, the more equality.

Diagram 4 shows that there is a relatively strong correlation between gender inequality and GDP per capita: the more inequality, the lower the level of economic development. The relationship is nonlinear, but this may be partly due to outliers. So, with more gender equality we also see higher levels of economic development. This suggests that women's human resources are better used with more gender equality, which contributes to higher levels of GDP per capita. It may also imply that economic development helps to improve gender equality, through investment in reducing gender gaps in resources, capabilities and wellbeing achievements. Diagram 5 shows a surprising result for GDP growth. In fact, all five gender indices have a negative correlation between economic growth and gender equality, which suggests that the negative sign of the relationship is robust. So, whereas gender equality is positively related to the *level* of economic development, it is negatively correlated with the *increase* in economic development. The faster economic growth, the lower gender inequality, implying that the benefits of growth do not reduce gender gaps, or, alternatively, that more gender equality is costly for fast growth. The outliers in diagram 5 showing high gender inequality with medium and high economic growth are all Arab countries. The two outliers on the other side, with high growth and low gender inequality, are Norway and Luxembourg. The first one also oil-rich but having a diversified economy and using its oil revenues for public social investment, and the second country specializing in the financial sector, with less inclusion of women in the economy but low social and political gender inequalities due to effective social policies.

The negative bi-variate relationship between GEI and GDP growth may be explained in a political economy perspective. The literature points out that there is a negative relationship between economic growth based on export strategies on the one hand and the gender wage gap on the other hand (Seguino, 2000a and 2000b; See also the discussion between Schober and Winter-Ebmer, 2011 and Seguino, 2011). Research into this relationship also points out that with high growth export strategies, women's jobs tend to be more vulnerable (Ozler, 2007).

Below, I show the results of some simple bi-variate OLS regression analyses for the year 2010, the only year for which data was available for all five gender indices. The bi-variate regression analyses, with every time one macroeconomic variable as dependent variable, include a constant. Table 2 shows the results, which are only indicative because of the limitations of a bi-variate cross-country regression analysis.

Table 2. Bi-variate regression results for gender indices and macroeconomic variables (2010)

	GEI (positively measured)	**GII (negatively measured)**	**SIGI (negatively measured)**	**GGGI (positively measured)**	**WEOI (positively measured)**
FDI inflow USD	0.264*** (3.589)	-0.290*** (-3.488)	-0.031 (-0.305)	0.172** (1.981)	0.255*** (2.769)
Food production index	-0.211*** (-2.860)	0.426*** (5.485)	-0.004 (-0.035)	-0.309*** (-3.726)	-0.457*** (-5.369)
Interest rate	-0.057 (-0.664)	0.142 (1.476)	0.082 (0.737)	-0.036 (-0.366)	-0.218** (-2.057)
Credit % GDP	0.480*** (6.998)	-0.691*** (-10.939)	-0.234** (-2.324)	0.424*** (5.295)	0.634*** (8.552)
Tax revenue % GDP	0.321*** (3.570)	-0.235** (-2.420)	-0.386*** (-3.290)	0.331*** (3.504)	0.386*** (3.924)
Exports % GDP	0.178** (2.292)	-0.342*** (-4.167)	-0.181 (-1.776)	0.110 (1.243)	0.263*** (2.829)
Capital formation % GDP	-0.41 (-1.774)	0.119 (1.362)	0.097 (0.934)	-0.204** (-2.351)	-0.309*** (-3.343)
Value added industry % GDP	-0.137 (-1.698)	0.065 (0.0.715)	0.106 (0.999)	-0.138 (-1.522)	-0.099 (-0.997)
GDP growth	-0.579*** (-9.094)	0.547*** (7.503)	0.557*** (6.530)	-0.412*** (-5.033)	-0.517*** (-6.242)
lnGDP per capita USD	0.596*** (9.558)	-0.841*** (-17.962)	-0.365*** (-3.826)	0.462*** (5.867)	0.794*** (13.654)
Terms of Trade	-0.163** (-1.999)	0.147 (1.568)	0.183 (1.725)	-0.235** (-2.491)	-0.075 (-0.713)

Notes: Regressions with constant; reported are standardized coefficients (beta); t-statistics in brackets. Levels of significance: *** p<0.01; ** p<0.05.

The bi-variate regressions results indicate that in the majority of cases the correlations are statistically significant. The only economic variable that shows no statistical significant result with any of the five gender indices is value added of industry. Perhaps this is due to two contrary mechanisms: on the one hand, low women's wages reflecting and contributing to low value added in labour intensive industries,

and on the other hand high women's employment shares in labour intensive industry enabling perhaps higher value added than in agriculture. Checking the signs of all bi-variate estimations, the table shows that most of these are as expected. The positive correlations of macroeconomic variables contributing to economic development with gender equality for the statistically significant parameters are the following: FDI (+), the interest rate (-), domestic credit (+), tax revenue (+), exports (+), and GDP per capita (+). More FDI goes together with more gender equality, probably in employment shares in manufacturing; more domestic credit parallels gender equality, perhaps because of more access to credit by women; tax revenues increase with more gender equality, probably through the labour market participation of women; higher exports and higher gender equality go hand in hand, again most likely through the higher female share in manufacturing employment; and higher gender equality goes together with higher GDP per capita. The sign for the interest rate is negative, meaning that more equality goes together with lower interest rates, stimulating investment. This may indicate that more gender equality does not generate a risk premium on investments but may rather help the efficiency of loan allocations in credit markets. Alternatively, more lending may also extend to women.

There are four negative correlations of macroeconomic variables with gender equality: food production (-), capital formation (-), GDP growth (-) and Terms of Trade (-). For food production, the four statistically significant correlations are all negative with gender equality, indicating that higher food production in a country goes together with less gender equality – perhaps because it extracts more labour from women at low or no pay, through women's generally high participation in unpaid farm labour. At the same time, higher food production may be advantageous for urban women, because it tends to keep food prices down, and hence, the burden on women's household budgets limited. For capital formation, contrary to the availability of domestic credit, the sign is negative for the two gender indicators, GGGI and WEOI, for which the parameter is statistically significant. Apparently, capital formation goes at the cost of gender equality, or, the other way around, more gender equality reduces capital formation. This result is in line with Stephanie Seguino's (2000a and 2000b) finding that low relative women's wages in labour intensive export economies is correlated with high capital formation through returns reinvested from profits. The higher profits made possible by paying women lower wages than men allow for higher capital formation, she has argued. Hence, this may be the mechanism that the above bi-variate regression results seem to confirm, even though these results are preliminary. A third exception of sign is for economic growth, as we already discussed above with the scatter plot. The literature, including the above referred to key articles by Seguino, indicates that higher growth rates for developing countries are often related to a labour intensive export strategy, which employs women at very low wages. Hence, more growth implies less gender equality in earnings. In an earlier paper, I have shown with bi-variate regression analysis that there is a statistically significant positive relationship between female and male vulnerable employment on the one hand and FDI inflows and even the volatility of FDI inflows on the other hand (van Staveren, 2011). Also that result seems to be supported by the bi-variate results in table 2, namely through the channel of low labour standards through outsourcing and subcontracting. The fourth and final negative correlation with gender equality

is with the Terms of Trade, which is statistically significant for four of the five gender indices. In all these cases, improved Terms of Trade correlates with less gender equality, implying, in line with the other cases of negative correlations discussed here, that better export prices, relative to import prices, go together with more inequality in women's employment conditions, most likely women's wages and/or women's employment share in vulnerable jobs.

Comparing the regressions, the statistical significance is not always for the same economic variable. Nine out of eleven economic variables is statistically significant in the WEOI, the most financial-economic defined gender index. Hence, this comes as no surprise. And only three out of eleven economic variables are statistically significant in the SIGI, the least economically defined gender index, again, as expected. This suggests that for the explanation or prediction of economic outcomes, WEOI seems a suitable gender index. This is particularly the case for financial-economic variables, such as the interest rate and capital formation, which are not statistically significant in any of the other gender indices (interest rate), or only once (capital formation). This result, however, is partly based on endogeneity effects, because the WEOI includes some non-gender disaggregated financial economic indicators similar to or exactly the same as the economic variables included in the regressions. Moreover, three other gender indices come close in terms of the number of statistically significant economic variables: GEI and GGGI each have eight significant economic variables and GII has seven significant economic variables. Hence, all gender indices except for SIGI appear to be adequate measures for monitoring gender effects of macroeconomic trends and policies, at least, in a preliminary regression analysis. Obviously, more detailed analysis is necessary, both in terms of adding control variables as well as in an expansion to time-series or panel data analysis.

Multivariate Growth Regression Analysis for GEI and its Indicators

The multivariate regression analysis presented in this section focuses on one key macroeconomic variable: economic growth. This choice was made because in the bi-variate regressions, this relationship came out negative and statistically significant for all five gender indices. This finding is not consistent with some findings in the literature using particular gender indicators, such as the gender gap in education (Klasen, 1999). The analysis will be done with one gender index only, namely GEI. This is the only index for which data is available for a long period of time (twenty years, divided in five observations with every time five years in between), and for a large number of countries. The analysis makes use of panel data for four periods of average annual economic growth: 1990-1994; 1995-1999; 2000-2004; 2005-2010. The independent variables are capital as a percentage of GDP (average per period), labour force participation (average per period), and GEI or its underlying indicators (base year per period), with lnGDP per capita as a control variable (base year per period, logarithm). The method used is a fixed effects estimation, in order to address the problem of possible unobserved variables at the country level[1].

GEI consists of 21 indicators, of which 12 are likely to have an impact on economic growth and have a sufficient number of observations for the panel estimations. In order to separate the gender variables that are likely to have a positive effect on GDP growth from those that are likely to have a negative growth impact, I distinguish between allocation variables and distribution variables. The allocation variables are expected to contribute positively to economic growth by crowding in women's labour, human capital and managerial capabilities. The distribution variables reflect distributional conflicts through discrimination and exclusion, which contribute positively to economic growth (measured in the short run, for five year periods) at the cost of women, through exploitation.

Table 3 shows the results for the GDP per capita growth regression, with country fixed effects, with GEI as gender variable, for all countries and years available (n = 626).

Table 3: Growth fixed effect regression results for GEI

lnGDPpc	-6.28*** (-7.19)
Capital	0.21*** (5.58)
Labour force Participation	-0.33*** (-3.36)
GEI	-3.58* (-1.69)
Constant	75.94*** (8.77)
Rsq	0.21
n	626

Notes: t-statistics in brackets; levels of significance: *** p<0.01; * p<0.1.

The results shown in table 3 indicate that all the independent variables in the growth regression are statistically significant. GDP per capita has a negative sign, which points at convergence of income levels between countries, in line with the growth literature. Capital, as a percentage of GDP, has, as expected, a positive effect, whereas labour force participation has a negative effect, probably because labour force participation the declines with higher average levels of education, due to more years in school rather than on the labour market in developing countries. GEI has a negative sign, as was expected on the basis of the scatter plot and bi-variate regression results shown in the previous section. The size of the coefficient for GEI is large, as compared to the coefficients for capital and labour, which are all three measured between zero and one and therefore comparable. The next two tables will unpack the GEI variable and show the results for the disaggregated gender variables. Table 4 gives the results for the allocation variables in GEI and table 5 for the distribution variables in GEI.

Table 4: Growth fixed effect regression results for allocation variables in GEI

	(1)	(2)	(3)	(4)	(5)	(6)
lnGDPpc	-6.96***	-4.82***	-3.92***	-5.58***	-9.41***	-9.55***
	(-8.25)	(-5.54)	(-2.71)	(-3.51)	(-4.26)	(-6.61)
Capital	0.23***	0.17***	0.10**	0.35***	0.20**	0.22***
	(6.26)	(4.97)	(2.00)	(5.67)	(2.02)	(3.92)
Labour force participation	-0.63***	-0.14	0.14	-0.53***	-0.10	-0.23**
	(-5.70)	(-1.45)	(0.85)	(-3.95)	(0.56)	(-2.54)
F/M labour force particip	0.28***					
	(5.44)					
F/M primary education		6.19				
		(1.63)				
F/M second education			7.422			
			(1.21)			
F/M tertiary education				13.30***		
				(3.04)		
F/M administrators					14.34	
					(1.27)	
F/M professionals						11.94***
						(6.87)
Constant	78.90***	44.69***	19.55	67.86***	78.67***	97.29***
	(9.11)	(4.77)	(1.16)	(4.92)	(3.72)	(7.11)
Rsq	0.24	0.21	0.11	0.24	0.26	0.33
n	640	442	235	360	136	265

Notes: R square reports the result measured within countries, which is the most relevant for fixed effects estimation, as compared to 'R square between' and 'R square overall'; t-statistics in brackets; levels of significance: *** p<0.01; ** p<0.05.

Table 4 shows the results for six regressions, each with a different allocation gender variable. We see that all the allocation gender variables have the expected positive sign. They are statistically significant in three out of six cases: for the female/male ratio in labour force participation, tertiary education and professionals. So, even though the overall labour force participation rate shows a negative sign, when the female share in the labour force increases, this benefits growth. All gender variables are measured between zero and one, so that their coefficients can be compared. What is striking is that the sizes of the coefficients are relatively high for the education variables and the management variables, relative to those for capital and labour. The positive results can all be explained, as hypothesized, by the crowding

in of female production and productivity, which benefits growth through the law of diminishing marginal returns.

Table 5: Growth fixed effect regression results for distribution variables in GEI

	(1)	(2)	(3)	(4)	(5)	(6)
lnGDPpc	-2.45*	05.34***	-5.18***	-7.69***	-3.30	-7.10***
	(-1.93)	(-5.86)	(-5.56)	(-4.38)	(-1.44)	(-8.02)
Capital	0.25***	0.22***	0.22***	0.22	0.13	0.21***
	(3.71)	(5.55)	(5.75)	(1.66)	(0.84)	(5.17)
Labour force participation	-0.30**	-0.34***	-0.29***	-0.65***	-0.11	-0.37***
	(-2.30)	(-3.50)	(-2.85)	(-4.94)	(-0.56)	(-3.59)
F/M wage	-0.04					
	(-0.86)					
W economic rights		-0.25				
		(-0.41)				
W social rights			0.63			
			(1.23)			
Men right to job				-15.48***		
				(-4.85)		
Men better leaders					0.47	
					(0.10)	
F/M mortality						3.83
						(0.95)
Constant	42.71***	55.59***	60.39***	113.84***	37.50	80.56***
	(3.37)	(7.27)	(6.30)	(6.65)	(1.59)	(8.44)
Rsq	0.18	0.17	0.15	0.44	0.08	0.22
n	187	593	591	160	101	611

Notes: R square reports the result measured within countries, which is the most relevant for fixed effects estimation, as compared to 'R square between' and 'R square overall'; t-statistics in brackets; levels of significance: *** p<0.01; ** p<0.05; * p<0.1.

Table 5 shows the results for six regressions with distribution gender variables. Only one result is statistically significant and with the expected negative sign: the more people believe that men have more rights to a job than women, when jobs are scarce, the lower economic growth. This form of discrimination, through a gendered institution reflecting an asymmetric norm, benefits men in employment but goes at the cost of growth. The effect is relatively large compared to the other variables in the same equation and also compared to the variables in the other equations in this table and the

previous one, in which all the gender variables are measured between zero and one. Apparently this form of gender discrimination in the labour market does not benefit growth, even not in the short run of five year growth periods. The other five distribution gender variables are not statistically significant, but not necessary uninteresting. We find that, in line with the literature, an increase in women's relative wages as compared to men's wages reduces economic growth, because less exploitation of women results in a lower competitive cost price advantage in exports and a lower profit ratio for investment in future growth. The size of the coefficient is small, and probably varies between export-oriented countries and other countries (Blecker and Seguino, 2002). For the two rights variables, we find opposite results. Higher economic rights for women reduce growth whereas higher social rights for women increase growth. This result runs parallel to the findings by David Kucera, who found that FDI is attracted by lower female wages but also by better protection of women's labour rights (Kucera, 1999). The variable whether men make better leaders than women shows a positive relationship, indicating that the more people think that men make better leaders than women, the higher economic growth. Perhaps this points at a self-fulfilling prophesy effect of the old boys' network: the stronger this network, the higher the adaptation costs of breaking the norm. Finally, the results for the female/male mortality rate shows a positive relationship to growth, indicating a perverse effect. The more economic growth is directed towards women's health care, the slower growth. Perhaps it is only in the long run that a positive effect of better relative female health is translated into higher economic growth. Or perhaps the negative relationship indicates the higher marginal costs of investing in female health, because in most countries, women already have a longer life expectancy than males.

Comparing tables 4 and 5, we see stronger gender effects on growth of the allocation variables than the distribution variables. All statistically significant coefficients have a positive sign for gender equality on growth (or, alternatively, a negative sign for gender inequality). So, the analysis confirms the hypothesis that more gender equality in the allocation of human resources contributes to economic growth, rather than reducing it. At the same time, some distribution variables show a negative impact on growth, but these are not statistically significant. Other distribution variables will probably show significant negative effects, but for those variables, there was insufficient data available. The analysis with the available gender variables suggests that disaggregating a gender index makes the study of gender impacts on macroeconomic variables meaningful, both empirically as well as theoretically.

Conclusions

The bi-variate regression analysis indicates that the five available gender indices for the year 2010 all have many statistically significant relationships with economic variables, and in the majority of cases with expected positive signs, indicating that more gender equality correlates with better economic performance. But almost half of the economic variables show negative relationships between economic performance and gender equality. These preliminary regression results have been interpreted, with help

of the literature, as related to exploitation, marginalization or exclusion of women through high use of women's unpaid family labour in food production, or high use of low wage women's labour in export industries. For these economic performance variables, there seems clearly a win-lose relationship with gender equality.

The multiple growth regression with panel data and country fixed effects has indicated a negative relationship between gender equality and growth as measured by one of the indices for which data was available for a period of 20 years (GEI). A disaggregated regression analysis with some underlying gender indicators has provided support for this hypothesis. Allocation gender variables for labour force participation, tertiary education and professionals all have a positive and statistically significant effect on growth. Of the distribution variables, only one appeared to be significant, namely the gendered norm that men have more rights to a job when jobs are scarce. This had, contrary to what was expected, a negative effect on growth, suggesting an efficiency loss due to patriarchal norms and old boys networks in labour markets on growth. The other gender variables showed in most cases the expected sign.

The conclusion of the chapter is that gender indices seem adequate measures for tracking and monitoring gender effects of macroeconomic trends and policies, but that for the measurement of the impact of gender on macroeconomic variables, such as growth, gender indices are a too broad measure to obtain meaningful results. Disaggregation into allocation variables and distribution variables appears to be more adequate for analysing the impact of gender (in)equality on growth. This implies that there is be no more value added for additional macro-level gender indices, but that efforts need to be invested in expanding the data for allocation and distribution gender variables, in particular in the number of countries covered.

References

Berik, Gunseli, Yana van der Meulen Rodgers, and Stephanie Seguino (eds.) (2011) *Inequality, Development, and Growth*. London: Routledge.

Blecker, Robert, and Stephanie Seguino (2002), 'Macroeconomic Effects of Reducing Gender Wage Inequality in an Export-Oriented, Semi-Industrialized Economy', *Review of Development Economics* 6 (1), pp. 103-119.

Klasen, Stephan, (1999) Does Gender Inequality Reduce Growth and Development? Evidence from Cross-Country Regressions. The World Bank, Washington D.C.

Klasen, Stephan, and Dana Schüler (2011) 'Reforming the gender-Related Development Index and the Gender Empowerment Measure: Implementing Some Specific Proposals', *Feminist Economics* 17 (1), pp. 1-30.

Kucera, David (2002) 'Core Labour Standards and Foreign Direct Investment', *International Labour Review*, 141 (1-2), pp. 31-69.

Ozler, Sule (2007) 'Export-led Industrialization and Gender Differences in Job Creation and Destruction: Micro Evidence from the Turkish Manufacturing Sector', in van Staveren et al. (eds.) *The Feminist Economics of Trade*. London: Routledge.

Schober, Thomas, and Rudolf Winter-Ebmer (2011) 'Gender Wage Inequality and Economic Growth: Is there Really a Puzzle?', *World Development* 39 (8), pp. 1476-1484.

Seguino, Stephanie (2000a) 'Accounting for Gender in Asian Economic Growth', *Feminist Economics* 6 (3), pp. 27-58.

Seguino (2000b) 'Gender Inequality and Economic Growth: A Cross-Country Analysis', *World Development*, 28 (7), pp. 1211-1230.

Seguino, Stephanie (2011) 'Gender Inequality and Economic Growth: a Reply to Schober and Winter-Ebmer', *World Development* 39 (8), pp. 1485-1489.

Van Staveren, Irene, Diane Elson, Nilufer Cagatay and Caren Grown (eds.) (2007) *The Feminist Economics of Trade*. London: Routledge.

Van Staveren, Irene, 'The Gender Bias of the Poverty Reduction Strategy Framework', *Review of International Political Economy*, 15 (2), 2008, pp. 289-313.

Van Staveren, Irene (2011)'FDI Volatility and Development', in: Peter A.G. van Bergeijk, Arjan de Haan and Rolph van der Hoeven (eds), *The Financial Crisis and Developing Countries*, Cheltenham: Edward Elgar, pp. 111-126.

Van Staveren, Irene, 'From Gender as Exogenous to Gender as Endogenous in the New Economics', in: Philip Arestis and Malcolm Sawyer (eds.). *New Economics as Mainstream Economics*. Basingstoke: Palgrave Macmillan, 2011, pp. 116-153.

Note

[1] An instrumental variable analysis, including two stage least squares, appeared not meaningful, due to the lack of an appropriate instrument for GEI. This is because GEI is an index consisting of a broad range of indicators and therefore a constructed variable. It cannot be predicted by an instrument but rather simply explained by its constitutive indicators.