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ROLE OF GENDER GAP IN ECONOMIC GROWTH: ANALYSIS ON DEVELOPING COUNTRIES VERSUS OECD COUNTRIES

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ABSTRACT: *This study investigates the effects of the gender gap on economic growth by using a composite gender gap index from the World Economic Forum. The index captures the multidimensional aspect of the gender gap, which includes gaps in opportunities and outcomes. Previous studies on the effect of gender inequality on economic growth have focused on the unidirectional aspect of inequality, such as gender–wage inequality. The differential effect of the gender gap is established by comparing three different samples, namely, member countries of the Organization for Economic Co-operation and Development, developing countries, and a combination of South and Southeast Asian countries. According to panel data estimations, policies that promote equity boost the economic growth of developing countries, including those in South and Southeast Asia. The role of export growth in economic growth is also analyzed. Consistent with those in literature, current results indicate that export growth exerts a significant positive effect on the economic growth of all samples.*

Key words: *Developing countries; Economic growth; Export growth; Gender gap; OECD countries; South Asia and South East Asia*

JEL Classifications: *D63, I24, F43.*

1. INTRODUCTION

The role of women in the global workplace has improved. Under this condition, the question of why men earn more than women arises. According to the recent Global Gender Gap Report of the World Economic Forum (2016), the gender gap at present is larger than that in any other year since 2008. On the average, women around the world earn half of what men earn but work longer hours. The labor force participation of women is 54% and that for men is 84%. In addition to the wage gap, a gap exists in many other aspects, such as employment, education, and political and legal representations. These gaps motivated us to study the macroeconomic consequences of such inequalities.

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Feminist scholars maintain that gender is an important macroeconomic variable and that gender relations can affect economic development and growth (Seguino 2000). However, how the gender gap affects economic growth remains unclear and is often considered a puzzle. Most previous studies were based on either income or gender wage inequality and not on any comprehensive measure of the gender gap. A stream of literature supports the view that an increase in the gender gap increases economic growth. Another research stream holds an opposite view. This study analyzes the effect of the gender gap on a country's output and growth by using a comprehensive index of the gender gap published by the World Economic Forum. The index is a composite measure based on the economic participation and opportunity, educational attainment, health and survival, and political empowerment of women. To provide conclusive policy inferences, we examined the differential effect of the gender gap on countries at various stages of development. Given the existence of the gender gap puzzle in literature, such an analysis of regions with different developmental statuses is necessary.

Many empirical studies have suggested that inequality in income or gender can increase economic growth. UN Women (2015) in their report acceded that gender inequality is capable of positively contributing to certain aspects of economic growth. Seguino (2000) found that for a set of semi-industrialized export-oriented economies, GDP growth is positively related to gender–wage inequality because gender–wage inequality can stimulate investments. Furthermore, Seguino (1997) found that gender–wage inequality (gender–wage differentials) positively affects the output and export growth of South Korea. Seguino explained that the demand for female labor increases due to the low wages paid to women. This condition leads to increased production in the manufacturing sector, which in turn boosts export growth.

By contrast, gender gap or income inequality can slow down growth through other possible channels (Alesina and Rodrik 1994[1]; Larrain and Vergarra 1998; Persson and Tabellini 1994). Particularly, Blackden and Bhanu (1999) found that gender inequality may limit the ability of women to accumulate capital and could thus hinder growth. Furthermore, Elborgh-Woytek et al. (2013) emphasized that high female labor force participation can increase growth by mitigating the effect of a shrinking workforce. Providing good opportunities for women can contribute to increased economic development in developing economies via increased school enrollment for girls. Stotsky (2006) explained that reducing gender inequality and improving the status of women may contribute to increased rates of economic growth and improved macroeconomic stability, especially in developing countries.[2] Hence, according to these studies, equal participation of males and females in the workforce is a necessary condition for inclusive growth.

Our study focused on developing countries. Rahaman and Islam (2013) emphasized that employment of women is important in developing economies, particularly those facing a labor supply constraint. In developing economies, women play an important role by contributing to the household income, adding to the supply of labor for economic activities, and empowering other women. A new report from UN Women indicates that South Asia has the world's most skewed gender–wage gap and is among the few regions where the gender labor force participation gap is both large and growing. The 2015–2016 UN Women report shows that in this era of unprecedented global wealth, millions of women are still consigned to work in low-pay poor-quality jobs, are denied even the basic levels of healthcare, and do not have access to clean water and decent sanitation.

We examined three hypotheses in this study. First, we investigated whether gender gap or gender inequality[3] affects output growth and per capita output growth. Second, we examined whether the gender gap exerts a differential effect on countries in different stages of development. Lastly, we analyzed the role of export growth in economic growth. We determined the effects on countries in different stages of economic development by comparing three samples with different income levels. The three samples were member countries of the Organisation for Economic Co-operation and Development (OECD) (includes 32 countries), developing countries (includes 84 countries), and a combination of South and Southeast Asian (SA–SEA) countries (includes 11 countries). Pooled ordinary least-squares (OLS), fixed effect, random effect, and system GMM estimations were performed on data obtained from 2006–2015.

The panel data estimates robustly support the view that gender equality promotes economic growth in developing countries, including SA–SEA. Our findings are consistent with those of Elborgh-Woytek et al. (2013), Hakura et al. (2016), and Stotsky (2006). A percentage point increase in equity increases growth by over 20% in the SA–SEA sample compared with growth of around 5%–9% in the sample of developing countries. Hakura et al. (2016) obtained similar results for Sub-Saharan Africa by using a different index measure. However, they discovered a much milder effect of gender gap on growth. A percentage point reduction (lagged) in gender inequality in emerging and developing countries are associated with a 0.057 percentage point cumulative increase in growth over a five-year period. In addition, we found that export growth exerts a significant positive effect on economic growth for all samples.

The rest of the paper is organized as follows. Section 2 discusses the mainstream literature and the hypotheses. Section 3 discusses the empirical methods, samples, and data. Section 4 presents the regression results and their interpretations. Section 5 provides a summary of the findings, recommends avenues for future research, and presents policy suggestions.

2. LITERATURE AND HYPOTHESES

Studies on the relationship between economic growth and inequality are numerous and diverse. Many studies have investigated the effects of gender-specific policies. Research that followed the pioneering work of Kuznets (1955) concentrated mainly on the causal effect of economic growth on income distribution. According to Kuznets theory, the link between income inequality and economic growth follows an inverted U shape. As economic growth increases, income inequality increases initially and decreases thereafter. However, the relationship between economic growth and gender inequality remains ambiguous.

Promoting gender equality is one of the Millennium Development Goals (MDGs) of the United Nations and one of the main missions of many non-government organizations (NGOs), multilateral assistance organizations (MAO), and other bodies. The 2015–2016 UN Women Progress Report indicates that

> *…a new economic agenda, one firmly rooted in the human rights framework, and brings rights—the right of all women to a good job, with equal pay and safe working conditions; the right to an adequate pension; the right to healthcare, and water and sanitation—into economic policymaking.* (UN Women 2015, Chapter 1)

Gender inequality arises due to gaps in opportunities induced by unequal access to education, legal system, or finances (Hakura et al. 2016). Gender inequality can also arise due to gaps in outcomes, such as low female participation in employment, low wages, and reduced political power (Hakura et al. 2016). In ethical terms, reducing gender inequality promotes basic human rights. In economic terms, reduction of the gender gap, such as through improved access to education, increases the quantity and quality of female human capital (Siegel 2005). This increase, in turn, increases economic growth by enhancing productivity and bringing in positive externalities. A high level of female education leads to reduced fertility rates and population growth and exerts a positive effect on children's education and health. As a consequence, the quality of future human capital is enhanced.

Nevertheless, the gender gap remains high, particularly in developing countries, despite the efforts exerted by the government and various international organizations. Globally, only half of women participate in the labor force compared with the three quarters of men. In developing regions, up to 95% of women's employment is informal and involves jobs that are unprotected by labor laws and lacking in social protection. In South Asian countries such as India, only a third of women are in the labor force (UN Women 2015). In Bangladesh, the female wage is only two-thirds of the male wage (Rahaman and Islam 2013). Moreover, on the average, women are paid 24% less than men, and this gap is even wider for women with children. In South Asia, the gender–wage gap is 35% for women with children compared with 14% for those without children. Hakura et al. (2016) explained that gender inequality in sub-Saharan Africa remains one of the highest and is declining more gradually than that in other regions.

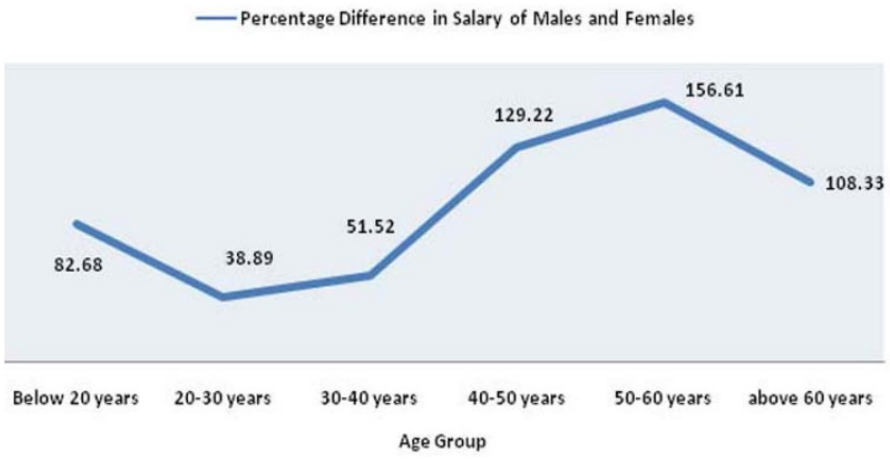
On one hand, literature indicates that the gender gap increases economic growth. On the other hand, evidence shows that the gender gap reduces growth. Many studies have discussed the macroeconomic effect of income or wage inequality. However, very few studies discussed the gender gap, especially in the context of developing countries. Many of these studies are based only on theoretical arguments. Several of them are country case studies on gender gap and inequality or gender–wage gap or focused mainly on the African region, although several cross-country studies are available. However, researchers have not paid much attention to countries in SA–SEA. We compare these regions to OECD countries and other developing countries. This study is the first to use the Global Gender Gap Index data reported by the World Economic Forum in analyzing the relations between gender gap and growth.[4] Another crucial difference between existing literature and this study is the different data period used for the analysis.

With regard to income inequality, Seguino (2000) argued that income inequality can produce political conflict, which policy makers attempt to placate with growth-inhibiting macro policies. Alesina and Rodrik (1994), Larrain and Vergara (1998), and Persson and Tabellini (1994) argued that income inequality can produce social conflicts that may retard economic growth. Furthermore, Beneria and Roldan (1987), Davis (1981), Deere (1990), and Wright (1996) discussed the effect of gendered economic opportunities. According to them, women and men on the average occupy different class positions, with women more likely to be poor, malnourished, less educated, and overworked compared with men. The UN Women (2015) explains that gender pay gaps have narrowed, and this has been in the context of declining real wages for both women and men. The gaps have narrowed only because men's wages have decreased more

dramatically than women's wages.

According to Hakura et al. (2016), in sub-Saharan Africa, gender inequality is one of the highest and is declining more gradually than that in other regions. The UN Women (2015) findings on India indicate that women perform nearly six hours of unpaid care and housework every day compared with half an hour for men. Khera (2016) found that India has high gender inequality, and despite the increasing education levels of women, female labor participation has been declining in rural and urban areas. Varkkey et al. (2012) used survey data and found that the average gender pay gap is approximately 54% for 2006 to 2011 (using survey data from a voluntary online salary survey conducted by Paycheck India; analysis was based on 16,500 online observations, out of which 13,729 were from males and 2771 were from females). Moreover, Varkkey et al. (2012) reported that the gender pay gap in India was above 70% before 2008 and had decreased to almost 40% in 2011. Furthermore, the pay gap increases with age, and it is the highest for the age group 50–60 years at 157% and the lowest for the age group 20–30 years at 38% (see Figure 1). More than 80% of the workforce in India is employed informally, and among those that are employed in the formal sector, females constitute only 19%–20%.

Figure 1: Gender pay gap in India with respect to the age of employees



Source: Varkkey et al. (2012)

Kapsos (2008) found that in Bangladesh, women earn an average of 21% less per hour than men. According to Rahaman and Islam (2013), with the acceleration of economic growth in Bangladesh (since the early 1990s), the degree of inequality has worsened over time. They indicated that the Gini coefficient has increased from 0.39 in 1991–1992 to 0.46 in 2010.

Hypotheses: This study aims to answer the question "how does the gender gap affect economic growth?" Furthermore, this study analyzes the role of the gender gap in the different stages of economic development by comparing three different groups of samples, namely, OECD countries (high income level), developing countries, and a combination of SA–SEA countries. The study also examines the role of exports in economic growth.

According to Siegel (2005), there is a widespread belief that gender gaps related to a wide range of issues hinder development (at both an intrinsic and functional level). In our analysis, the gender gap index from the World Economic Forum covers all of the missing points mentioned by Siegel (2005). The definition and methodology used for the calculation of the gender gap index are explained in detail in Section 3.

3. EMPIRICAL METHODS, SAMPLES, AND DATA SOURCES

3.1. Methodology and data

This study used three panel data estimation methods, namely, pooled OLS estimation, panel estimation (fixed effects, random effects, and Hausman test), and GMM estimation, to test the hypotheses.

The panel approach, which was used by Islam (1995), deals with the omitted variable bias of the OLS method. However, this approach is not free of the possible endogeneity problem. Thus, the system GMM estimation from Arellano and Bover (1995) and Blundell and Bond (1998) were applied to correct this potential problem. To evaluate the GMM estimation model specifications, we used two criteria: the Hansen over-identification test and the test for second-order serial correlation (AR2) of the residuals in the first differenced equation. The AR2 test also provides additional checks on the specifications of the model and on the legitimacy of the instrumental variables in the differenced equation.

In the regression, we used the standard growth model specifications that consist of typical control variables (X_{it}), a set of the interest variables (Z_{it}), and other control variables (O_{it}) as follows:[55]

The economic model given in equation (1) is based on Cobb-Douglas production function.

Y_{it}, is a function of multifactor productivity,

A_{it}, the capital stock,

K_{it}, and the labour force,

L_{it}. Capital and labour have exponents á and â, although these parameters are not defined.

$$Y_{it} = function\left(A_{it}\ K_{it}^{\alpha}, L_{it}^{\beta}\right) + e_{it}$$

$$Y_{it} = function\left(X_{it}, Z_{it}, O_{it}\right) + e_{it} \quad (1)$$

X_{it} is a vector of control variables in a standard growth equation, which comprises of physical capital or investment, population growth rate, and basic human capital (primary and secondary school enrollment) of country i at period t. Let y_{it} denote the GDP growth rate in country *i* in year *t*, $popgrowth_{it}$ be the population growth, $H\_capital_{it}$ be the school enrollment (human capital), and P_cap_{it} be the gross capital formation in country *i* in year *t*. The gender gap variable $(GGGI_{it})$ is the key variable of interest. First, the test was performed

using the gender gap variable and the other control variables. Second, we add the export growth rate (Exp_growth_{it}) for a robustness check. Ramanayake and Lee (2015) have established the significant effect of export growth on economic growth. Therefore, in this study, we also include export growth. However our samples are different and covers different periods (2009–2015)[6] compared to Ramanayake and Lee (2015). For an additional robustness check, we tested our hypotheses by using GDP per capita growth rate as y_{it}. Therefore, we obtained the following simple growth equation.

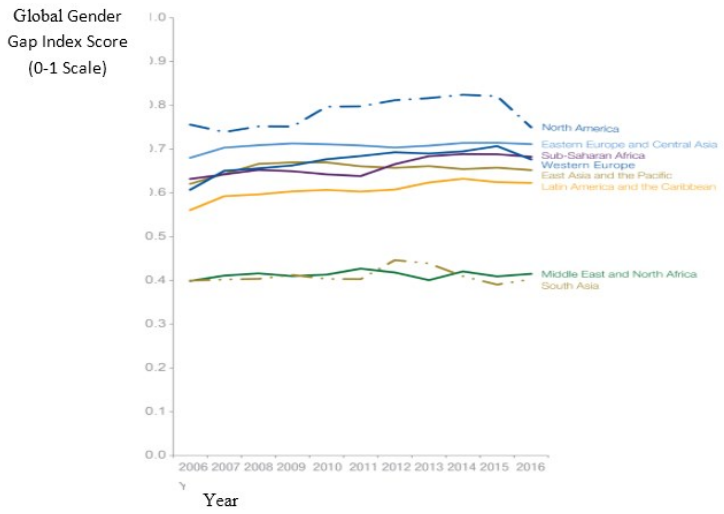
$$y_{it} = \alpha_1 + \beta_1 popgrowth_{it} + \beta_2 H\_capital_{it} + \beta_3 P\_capital_{it} + \beta_5 (GGGI_{it} + Exp\_growth_{it}) + e_{it} \quad (2)$$

In the regression, β_5 represent the coefficient of the two variables of interest. Our main variable of interest is Global Gender Gap index ($GGGI_{it}$). An additional variable capturing economic integration, exports growth (Exp_growth_{it}), is added at a later step as the second key variable of interest along with GGGI. Therefore, first we only tested our main concern variable ($GGGI_{it}$), and then we tested together ($GGGI_{it} + Exp\_growth_{it}$) as a pair or a group.

The data were annual average data covering the period of 2006–2015. We considered 84 developing countries, 32 OECD countries (high income), and 11 countries from SA–SEA. Except for the global gender gap index (GGGI) data, all other variables were from the World Bank–World Development Indicator's online database. A detailed explanation of the definitions of the variables and data sources is presented in Appendix-Table 2. The GGGI variable is defined below.

GGGI (Global Gender Gap Index): GGGI was introduced by the World Economic Forum in 2006 as a framework for determining the magnitude of gender-based disparities and tracking their progress. Three basic concepts underlie GGGI. First, the index focuses on measuring gaps rather than levels. Second, it captures gaps in the outcome variables rather than gaps in the input variables. Third, it ranks countries according to gender equality rather than women's empowerment. GGGI is independent of the countries' levels of development. In other words, this index was constructed to rank countries based on their gender gaps and not on their development level. In addition, it examines the gap between men and women by using the four fundamental categories (sub-indexes) of Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment (Appendix-Table 1). The GGGI rank is from 0 to 1, where 0 means 100% inequality and 1 means 100% equality. Considering the GGGI rank in 2015, in the overall index, no country in the world has fully closed the gender gap; however, four out of the five Nordic countries and Ireland have closed more than 80% of this gap. Yemen, the lowest ranking country, has closed over 48% of the gender gap. Figure 2 shows the progress in closing the global gender gap across regions. Among the regions, North America is the highest and South Asia is the lowest in terms of closing the gender gap. According to the GGGI rank in 2016, the global leaders are Iceland, Finland, Norway, Sweden, Rwanda, Ireland, Philippines, Slovenia, New Zealand, and Nicaragua. The Global Gender Gap Report of 2015 provides additional details on the index.

Figure 2: Progress in closing the global gender gap across regions



Source: Global Gender Gap Index 2016, World Economic Forum

4. EMPIRICAL RESULTS AND INTERPRETATIONS

4.1 Pooled OLS, RE, and system-GMM estimations

To answer the main research question of how the gender gap affects economic growth and its differential effects on countries in different stages of development, we performed pooled OLS, fixed effect, random effect, and system GMM estimations with GDP growth rate as the dependent variable. A robustness check was performed by changing the dependent variable into GDP per capita growth rate. Robustness was only confirmed when the variables were significant in all three estimation methods or at least in both OLS and GMM methods. Prior to the robustness check, we checked the correlation coefficients among all the variables. Given that the variables are not highly correlated, we continued using our model. The descriptive statistics are presented in Table 1.

Table 1: Descriptive statistics

	OECD					Developing					SA & SEA				
Variables	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
GDP growth	300	1.73	3.43	−14.72	11.90	774	4.80	4.01	−17.67	34.50	100	5.48	2.92	−5.51	20.65
GDP per capita growth	300	1.09	3.36	−14.56	12.93	774	3.23	3.86	−18.87	33.03	100	4.09	2.62	−4.99	16.31
Population growth	300	0.63	0.79	−2.08	2.89	789	1.49	1.13	−3.34	4.69	100	1.33	0.72	−0.55	4.69
Human capital (gross school enrollment, primary, and secondary)	236	1.00	0.02	0.90	1.08	487	0.98	0.07	0.64	1.17	51	0.98	0.09	0.78	1.09
Physical capital (gross capital formation as % of GDP)	298	22.54	4.58	9.83	41.65	717	25.51	8.66	1.57	58.83	87	28.46	6.54	14.12	39.58
Gender gap	300	0.72	0.06	0.58	0.88	764	0.67	0.52	0.45	0.79	98	0.65	0.05	0.54	0.75
Export growth	297	3.91	7.02	−24.20	24.83	675	6.04	13.03	−37.67	92.70	87	5.53	8.47	−15.00	29.34

Table 2: Gender gap on growth: samples of OECD, developing, and SA–SEA

	OECD						Developing						SA & SEA					
GDP growth	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM
Population growth	.96*** (3.50)	.84*** (2.72)	.95*** (3.37)	1.16*** (5.93)	.88*** (3.53	1.17*** (4.42)	.79*** (4.83)	.71*** (3.65)	.74** (4.09)	.61*** (4.00)	.54*** (2.93)	.59*** (3.55)	2.47*** (3.03)	2.40*** (2.79)	2.47*** (5.25)	2.02** (2.44)	2.02** (2.44)	2.02*** (4.52)
Human capital (school enrollment, primary, and secondary)	-4.01 (-0.38)	-5.86 (-0.49)	-4.24 (-0.40)	-8.58 (-1.13)	-10.00 (-1.05)	-9.78 (-1.09)	-8.63*** (-2.68)	-8.35** (-2.26)	-9.37** (-2.52)	-8.31*** (-2.68)	-9.19** (-2.51)	-9.91** (-2.56)	-0.78 (-0.14)	-1.25 (-0.21)	-0.78 (-0.13)	-3.59 (-0.64)	-3.59 (-0.64)	-3.59 (-0.60)
Physical capital	0.35*** (7.62)	0.39*** (7.91)	0.34*** (6.56)	0.25*** (7.48)	0.32*** (8.31)	0.24*** (5.34)	0.12*** (5.84)	0.12*** (5.12)	0.14** (4.28)	0.11*** (5.97)	0.12*** (5.75)	0.14*** (4.90)	0.15*** (3.11)	0.15*** (2.98)	0.15*** (3.19)	0.15*** (3.30)	0.15*** (3.30)	0.15*** (3.80)
Gender gap	**-8.35** (-2.05)**	**-7.92* (-1.66)**	**-8.49** (-2.26)**	**-2.30 (-0.78)**	**-1.57 (-0.39)**	**-2.21 (-0.84)**	**8.98** (2.20)**	**5.73 (1.22)**	**8.36** (1.97)**	**7.81** (2.06)**	**6.36 (1.44)**	**8.93** (2.41)**	**23.30*** (2.69)**	**23.00** (2.52)**	**23.30*** (4.16)**	**20.58** (2.41)**	**20.58** (2.41)**	**20.58*** (4.00)**
Export growth				0.31*** (14.78)	0.30*** (15.34)	0.31*** (12.26)				0.11*** (9.81)	0.11*** (9.87)	0.11*** (3.66)				0.06* (1.94)	0.06* (1.94)	0.06*** (2.66)
Constant	3.00 (0.31)	3.64 (0.33)	3.59 (0.38)	4.10 (0.58)		5.39 (0.63)	3.16 (1.00)	5.21 (1.41)	3.89 (1.08)	3.23 (1.11)	4.92 (1.41)	3.57 (1.00)	-15.91** (-2.50)	-15.19** (-2.28)	-15.91*** (-3.84)	-11.39* (-1.72)	-11.39* (-1.72)	-11.39*** (-2.68)
R^2	0.26	0.26		0.62	0.61		0.12	0.12		0.29	0.28		0.36	0.36		0.41	0.41	
AR2			0.002			0.075			0.038			0.230			0.757			0.694
Hausman test					**40.51**			**21.68**			**18.17**			**5.45**			**6.70**	
Hansen & Sargan test			0.034			0.026			0.003			0.018			0.571			0.631
Observations	236	236	236	236	236	236			445	428	428	428	51	51	51	51	51	51

Note: The dependent variable is GDP growth rate, with five years average from 2006-2015. Figures in brackets represent t and z ratios. *** means significant at 99%, ** means significant at 95%, and * means significant at 90%.

Table 3: Robustness check: gender gap on growth: samples of OECD, developing, and SA–SEA

	OECD						Developing						SA & SEA					
GDP per capita growth	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM	OLS	RE	GMM
Population growth	-.06	-.17	-.07	.14	-.13	.15***	-.27*	-.34*	-.328	-.44 ***	-.51***	-.46***	1.42**	1.35	1.42***	0.97	0.97	0.97**
	(-0.23)	(-0.57)	(-0.26)	(0.73)	(-0.54)	(0.55)	(-1.69)	(-1.80)	(-1.85)	(2.93)	(-2.78)	(-2.88)	(1.56)	(1.59)	(3.03)	(1.18)	(1.18)	(2.18)
Human capital (school enrollment, primary, and secondary)	-4.01	-5.88	-4.27	-8.56	-10.06	-9.78	-8.47***	-8.20**	-9.19**	-8.14***	-8.95**	-9.71**	-0.82	-1.28	-0.82	-3.60	-3.60	-3.60
	(-0.38)	(-0.49)	(-0.40)	(-1.13)	(-1.06)	(-1.09)	(-2.68)	(-2.27)	(-2.52)	(-2.66)	(-2.50)	(-2.55)	(-0.15)	(-0.22)	(-0.13)	(-0.65)	(-0.65)	(-0.61)
Physical capital	0.35***	0.39***	0.34***	0.25***	0.32***	0.25***	0.12***	0.12***	0.13***	0.11***	0.12***	0.13***	0.14***	0.14***	0.14***	0.15***	0.15***	0.15***
	(7.64)	(7.92)	(6.52)	(7.49)	(8.33)	(5.32)	(5.78)	(5.09)	(4.33)	(5.88)	(5.67)	(4.99)	(3.11)	(2.97)	(3.19)	(3.29)	(3.29)	(3.80)
Gender gap	**-8.25****	**-7.82***	**-8.39****	**-2.22**	**-1.47**	**-2.14****	**8.87****	**5.88**	**8.23****	**7.72****	**6.39**	**8.79****	**23.12*****	**22.83****	**23.12*****	**20.45****	**20.42****	**20.42*****
	(-2.03)	**(-1.64)**	**(-2.24)**	**(-0.75)**	**(-0.36)**	**(-0.81)**	**(2.21)**	**(1.28)**	**(1.98)**	**(2.07)**	**(1.47)**	**(2.41)**	**(2.70)**	**(2.53)**	**(4.15)**	**(2.42)**	**(2.42)**	**(3.98)**
Export growth				0.31***	0.30***	0.31***				0.11***	0.11***	0.10***				0.06*	0.06*	0.06***
				(14.73)	(15.29)	(12.07)				(9.72)	(9.77)	(3.66)				(1.94)	(1.94)	(2.63)
Constant			3.54				3.20	5.07	3.93	3.26	4.81	3.60	-15.69**	-14.99**	-15.69***	-11.21*	-11.21*	-11.21***
			(0.37)				(1.03)	(1.40)	(1.11)	(1.13)	(1.40)	(1.03)	(-2.49)	(-2.27)	(-3.82)	(-1.71)	(-1.71)	(-2.65)
R^2	0.23	0.23		0.60	0.60		0.08	0.08		0.24	0.24		0.40	0.40		0.45	0.45	
AR2						0.072			0.040			0.220			0.747			0.686
Hausman test		38.30			40.64			20.86			17.17			5.41			6.52	
Hansen & Sargan Test			0.034			0.026			0.003			0.017			0.580			0.639
Observations	236	236	236	236	236	236	445	445	445	428	428	428	51	51	51	51	51	51

Note: The dependent variable is GDP per capita growth rate, with five years average from 2006-2015. Figures in brackets represent t and z ratios. *** means significant at 99%, ** means significant at 95%, and * means significant at 90%.

Table 2 shows the results with GDP growth as the dependent variable for OECD, developing, and SA–SEA country groups. Table 3 shows the results with GDP per capita as the dependent variable. First, we tested only the gender gap variable with other control variables. Second, we included the export growth rate. The results of OLS, RE, and GMM estimations are generally robust. The results indicate that an increase in the gender gap index (equivalently, an increase in equity) exerts a significant positive effect on the economic growth of the sample of developing and SA–SEA countries. The results also show that a decrease in gender gap (as captured by the increase in GGGI) promotes growth among low-income countries. This finding implies that implementation of policies to reduce the gender gap in developing countries helps achieve increased growth. Our finding is consistent with the results of Elborgh-Woytek et al. (2013), Hakura et al. (2016)[7], and Stotsky (2006). The SA–SEA sample shows similar results as those of developing countries. The coefficients for the GGGI variables are greater than the coefficients for the SA–SEA sample vis-à-vis the sample of developing countries. As a result, an increase in the gender gap index (increasing equity) is associated with higher cumulative growth in the SA–SEA sample than in the group of developing countries as a whole. A percentage point increase in GGGI increases growth by over 20% in the SA–SEA sample vis-à-vis an increase in the growth of around 5%–9% in the sample of the developing countries. When we compared our results with those of existing literature, we found that they are in agreement. Hakura et al. (2016) indicated that a single percentage point reduction in gender inequality (lagged) in emerging and developing countries is associated with a 0.057 percentage point cumulative increase in growth over a five-year period; for all countries, the percentage is 0.031%.

The estimation results also indicate that an increase in the gender gap index negatively affects the growth of OECD countries. The results become insignificant when export growth is added in the estimation. This finding indicates that an increase in gender equality may impede growth in OECD countries significantly or insignificantly. Most developed countries have capital- and technology-intensive industries and are usually characterized by a high level of innovation. Therefore, the gender gap is not an important variable for economic growth. Rich countries already have high gender equality levels (according to GGGI data, all rich countries are close to 1). Further improvement from that position does not yield much in terms of growth.

In line with the finding of Ramanayake and Lee (2015), the export growth variable is positively significant for all OECD, developing, and SA–SEA samples. Additionally, population growth exerts a significant positive effect on the GDP growth of all the samples. However, its effect on GDP per capita is ambiguous. Other studies also obtained ambiguous results on the effect of population growth on economic growth (Lee and Kim 2009; Ramanayake and Lee 2015). Physical capital exerts a significant positive effect on GDP growth and GDP per capita growth for all the samples as predicted by the growth models. However, the results for school enrollment are ambiguous. For the developing country sample, school enrollment exerts a significant negative effect on growth. For the SA–SEA sample and the sample of OECD countries, however, human capital has an insignificant effect on output growth and per capita output growth. Several other empirical studies have found similar negative or inconclusive effects on school enrollment or human capital in growth models (Borensztein et al. 1998[8]). It could be explained by the following reasons. Some researchers (Bils and Klenow, 2000) believe

that the reverse causality is stronger where growth affects human capital rather than human capital affecting growth. Additionally, school enrollment is considered to be a poor proxy for human capital.

4.2 Robustness Checks: We have performed various robustness checks in the paper (see Table 3). The main results remain unchanged. First, the test was performed on GDP growth rate using the key variable of interest (the gender gap variable) and the other standard control variables. Second, we added the export growth rate in the equation. For additional robustness check, we tested the same hypotheses, using GDP per capita growth rate instead of GDP growth rate. Our main results remain unchanged to the use of these alternative assumptions. Moreover, we have found similar results for the same samples using Panel VAR estimation (Ghosh and Ramanayake, 2018).

5. CONCLUSIONS AND POLICY SUGGESTIONS

In this study, we determined how the gender gap affects economic growth and output, with focus on developing and SA–SEA countries. Furthermore, we established the differential role of the gender gap in countries characterized by different stages of economic development. We performed various panel data analyses, including OLS, panel (fixed effects, random effects, and Hausman test), and system GMM estimations. Our findings, which are consistent with those of Elborgh-Woytek et al. (2013), Hakura et al. (2016), and Stotsky (2006), support the view that reducing income and gender inequality can deliver significant sustained growth dividends, particularly for low-income countries. Policies that promote gender equality in terms of equal wages, education, employment, and political and legal representations will boost the economic growth of developing countries. However, the effect of such policies on OECD countries is unclear. Furthermore, consistent with those of literature, our results emphasize that export growth exerts a significant positive effect on the economic growth of all samples.

Notes

1. The Gini coefficient has a consistently negative effect on standard neoclassical growth regressions (Alesina and Rodrik 1994).
2. “Equality of opportunity in labor and financial markets is critical to enabling women to take full advantage of improved macroeconomic conditions” Stotsky (2006 : P.1).
3. In this study, we assume that gender inequality equals gender gap. Gender equality means the absence of gender gap, and all men and women are treated and paid equally.
4. Most of existing studies used the UN gender inequality index (GII) to measure gender gap or gender inequity in panel estimations. In the Solow (1956) model, it is true that physical capital does not determine the long-run growth rate of the economy, but, it can affect the output growth in the short run. Based on Ramanayake and Lee 2015; Lee et al. 2013 and Kim et al. 2012, we add capital investment and human capital as a determinant of growth. Our results show significant contribution of physical capital in explaining both output growth and output per capita growth in all samples justifying its role as one of the control variables. Human capital show significant contribution for the developing country sample. Similarly, following the above cited literature, population growth rate is added as one of the other control variables. In our results, it plays a significant role in explaining output growth but not output per capita growth. However, it is still necessary to add population growth rate as one of the control variables as it can also have an impact on per capita GDP through its indirect links like greater R&D activities etc.

6. Ramanayake and Lee (2015) used data from 1980–2009, and the sample set was developing vs. developed.
7. Nevertheless, the sample period and sample size are comparable. Hakura et al. (2016) used a sample of 115 countries, and the data period was 1995–2014. Only system-GMM estimations were used. Furthermore, the gender inequality index used is different in both studies. We used the GGGI from the World Economic Forum, whereas Hakura et al. (2016) used the gender inequality index from the United Nation's Gender Inequality Index (GII).
8. Borensztein et al.'s (1998) study was based on panel data for two decades (1970–79 and 1980–89). Seemingly unrelated regression (SUR) was used for estimations in a sample of 69 developing countries.

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