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Female parliamentarians and economic growth: Evidence from a large panel

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Abstract

This article investigates whether female political representation affects economic growth. Panel estimates for 119 democracies using fixed effects specifications and a system generalized method of moments approach suggest that, over recent decades, countries with higher shares of women in parliament have had faster growing economies.

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Female parliamentarians and economic growth: Evidence from a large panel

1. Introduction

Globally, less than one in five seats in national parliaments are held by women (World Bank, 2012). Increasing the number of female legislators is a key outcome of Millennium Development Goal 3 ("Promote gender equality and empower women"). This article uses data for 119 democracies for the period 1970-2009 to explore whether female representation in parliament affects the economic growth rate.

There is evidence that gender inequality in education reduces economic growth (Klasen 2002) and that female parliamentary representation reduces corruption (Dollar et al 2001, Swamy et al 2001). Economies with better-educated leaders tend to grow faster (Besley et al 2011). Women are typically recognized as better microfinance managers (Khandker 2005). However, the effect of female parliamentarians on the national economic growth rate is yet to be examined.

We present estimates using both the fixed-effects estimator and the system Generalized Method of Moments (GMM) estimator of Arellano and Bover (1995) and Blundell and Bond (1998). System GMM allows consistent estimation of the causal effect of female parliamentary representation on economic growth in the presence of endogenous explanatory variables.

2. Approach

The following growth model is estimated:

$$100(Y_{i,t} - Y_{i,t-1}) = \beta_1 Y_{i,t-1} + \beta_2 W_{i,t} + \boldsymbol{X}'_{i,t}\boldsymbol{\beta} + \beta_i + \beta_t + \varepsilon_{i,t} \quad (1)$$

where Y is the logarithm of real Gross Domestic Product (GDP) per capita in country i in year t, W is the proportion of women in parliament, $\boldsymbol{X}$ includes additional determinants of economic growth, β_i and β_t are country and year fixed effects, and ε is a residual. $E(\varepsilon_{i,t}) = 0$ for all i and t. The dependent variable is multiplied by 100 to reduce coefficient decimal places. β_i allows us to control for country-specific factors which may affect both parliamentary representation and the economy.

For robustness purposes, we present results using GDP data from both the Penn World Table (Heston et al 2011) and the World Bank (2012). The share of parliamentarians who are female is obtained from Paxton et al (2008) and the World Bank (2012), and is for the lower house of bicameral parliaments (and the sole house of unicameral parliaments). $\boldsymbol{X}$ includes standard growth determinants: the primary school enrolment rate, trade and investment (both as shares of GDP), and the population growth rate. We also present estimates that control for the ratio of the female and male primary school enrolment rates. Data for controls are from Heston et al (2011) and the World Bank (2012). Countries are only included in estimations if they are classed by Cheibub et al (2010) as democracies at the start of period t. Our (unbalanced) estimation sample is as large as data allow.

Equation (1) is initially estimated with a fixed effects estimator on annual data. Yet the inclusion of lagged log GDP per capita means that we should be concerned that these estimates are not consistent. We employ system GMM to address the endogeneity of lagged log GDP per capita and the potential endogeneity of the other explanatory variables, including W. System GMM involves joint estimation in levels and differences, employing differences as instruments in the levels equation and lagged levels as instruments in the differences equation. This estimator removes country fixed effects and is suited to relatively short panels. Accordingly, we use 13 three-year averages for the system GMM estimations, utilizing periods from 1970-1972 to 2006-2008.

Our system GMM estimations consider all variables other than population growth and the year dummies to be endogenous.[1] Following Roodman (2009b), we restrict the instruments to one lag and use a collapsed instrument matrix to reduce instrument proliferation. We use two-step estimation with the Windmeijer (2005) small sample robust correction to avoid downwardly-biased standard errors.

3. Results

Fixed effects results using annual data are in Table 1. Estimates for 1970-2009 are in columns 1 and 4, and provide no significant evidence that the female share of

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[1] We use the xtabond2 command of Roodman (2009a).

parliament affects economic growth. Results on the control variables are generally of the expected signs.

Results estimated after restricting the sample to 1993-2009, the period subsequent to the peak of the third wave of democratization (Huntington 1991), are reported in columns 2 and 5 of Table 1. We find significant positive estimates of the impact of the proportion of women on economic growth for this more recent period.

Table 2 presents system GMM results using three-year averaged data for both the full period and the more recent years. The results identify a positive effect of female parliamentary representation on economic growth, and one that is significant at the 5% level (except in column 4). The coefficients in columns 2 and 5 suggest that, holding the other variables constant, each percentage point of female parliamentary representation on average increases annual per-capita economic growth by around 0.16 percentage points. Larger estimates are obtained in columns 3 and 6 (for the period since the early 1990s).

Our Table 2 estimates fail to reject the null of the Hansen J test (Hansen 1982) that the overidentifying restrictions are valid (except for column 4). The null of the difference-in-Hansen test is also not rejected (except in column 4). We do not observe overly-high Hansen J test *p*-values, suggesting that bias from over-instrumenting has likely been avoided.[2] The Arellano and Bond (1991) tests generally identify high first-order autocorrelation and do not provide evidence of second-order autocorrelation. Altogether, the test statistics point to satisfactory system GMM specifications.[3]

We share the concern of Sung (2003) that β_2 might represent the benefit of fairer societies (in which more women enter parliament) rather than the marginal effect of women in parliament on the economy. To address this we include a key measure of gender equality – the ratio of the female and male primary school enrolment rates – in Tables 1 and 2; the estimated impact of women in parliament on economic growth

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[2] In unreported specifications using additional instrument lags and uncollapsed instruments we observe high Hansen J test *p*-values – a symptom of over-instrumenting (Roodman 2009b).
[3] The regressions in columns 1, 5 and 6 of Table 2 are the best specified as the Hansen J test values are insignificant and there is AR(1) but not AR(2) in first differences.

remains positive and significant in all cases. In unreported specifications[4], we continue to find a significant impact of female parliamentary representation on economic growth after controlling for the timing of legislative elections. We find no evidence that the gender of a country's President or Prime Minister affects economic growth.

4. Conclusion

Both fixed effects and system GMM estimations for a large sample of democracies suggest that, over recent decades, higher representation of females in parliament has led to faster economic growth. The results provide some evidence that empowering women is an important means toward economic development. Countries in the Pacific and the Middle East currently have the lowest shares of females in parliament and therefore likely have the most to gain from improving the gender balances of their parliaments. The most appropriate mechanism for increasing the representativeness of national parliaments is a contentious issue, and one for which our estimations do not shed light.

[4] Available on request.

Table 1. Fixed effects results (annual panel)

Dependent Variable: 100*(Ln GDP per capita$_t$-Ln GDP per capita$_{t-1}$)

	(1)	(2)	(3)	(4)	(5)	(6)
Data	WB	WB	WB	PWT	PWT	PWT
Years	All years	1993+	1993+	All years	1993+	1993+
Seats held by women in national parliament (%)$_t$	0.010	0.093***	0.103***	-0.022	0.067*	0.071*
	(0.026)	(0.034)	(0.035)	(0.026)	(0.038)	(0.037)
Ln GDP per capita$_{t-1}$	-7.124***	-10.091***	-10.884***	-7.488***	-12.063***	-11.909***
	(1.330)	(2.410)	(2.435)	(1.186)	(2.609)	(2.615)
School enrolment rate, primary (% gross)$_t$	0.014	0.017	0.010	-0.015	0.001	-0.014
	(0.019)	(0.024)	(0.028)	(0.020)	(0.029)	(0.029)
Trade (% of GDP)$_t$	0.031**	0.002	0.003	0.021*	-0.004	-0.003
	(0.012)	(0.017)	(0.020)	(0.012)	(0.015)	(0.016)
Investment (% of GDP)$_t$	0.128***	0.195***	0.218***	0.175***	0.249***	0.277***
	(0.037)	(0.050)	(0.052)	(0.037)	(0.046)	(0.046)
Population growth rate$_t$	-0.778**	-1.132***	-1.158***	-0.434	-0.673	-0.864**
	(0.330)	(0.374)	(0.348)	(0.410)	(0.420)	(0.421)
Ratio: Female/male primary gross school enrolment rate$_t$			0.001			-0.034
			(0.041)			(0.049)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (within)	0.25	0.32	0.34	0.21	0.26	0.29
Countries	117	115	114	119	116	115
Observations	2,373	1,436	1,395	2,414	1,443	1,402

Notes: WB: World Bank (2012). PWT: Penn World Table. Years in full sample: 1970-2009. Robust standard errors are in parentheses. The R-squared includes the explanatory power of the year dummies. ***, ***, *: Significant at the 1, 5 and 10% levels.

Table 2. System GMM results (three-year panel)

Dependent Variable: 100*(Ln GDP per capita$_t$-Ln GDP per capita$_{t-1}$)						
Data	WB	WB	WB	PWT	PWT	PWT
Years	All years	All years	1993+	All years	All years	1993+
	(1)	(2)	(3)	(4)	(5)	(6)
Seats held by women in national parliament (%)$_t$	0.589**	0.518**	0.724**	0.468	0.485**	0.658**
	(0.281)	(0.243)	(0.348)	(0.307)	(0.237)	(0.308)
Ln GDP per capita$_{t-1}$	-4.297	-3.371	-3.677	-5.465	-1.582	-1.440
	(3.588)	(2.877)	(3.806)	(3.593)	(2.827)	(3.530)
School enrolment rate, primary (% gross)$_t$	0.204	0.603**	0.485	1.048	0.456	0.390
	(1.358)	(0.248)	(0.331)	(0.673)	(0.323)	(0.354)
Trade (% of GDP)$_t$	-0.043	-0.013	0.002	0.017	-0.035	0.003
	(0.119)	(0.085)	(0.119)	(0.148)	(0.105)	(0.116)
Investment (% of GDP)$_t$	1.708***	1.543***	1.850***	1.291***	1.183***	1.234***
	(0.346)	(0.331)	(0.463)	(0.430)	(0.337)	(0.451)
Population growth rate$_t$	-1.162*	-1.321***	-1.375**	-0.966*	-0.847*	-1.034*
	(0.615)	(0.408)	(0.594)	(0.560)	(0.436)	(0.575)
Ratio: Female/male primary gross school enrolment rate$_t$		-0.620	-0.696		-0.602	-0.850
		(0.675)	(0.824)		(0.490)	(0.661)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hansen J test *p*-value	0.16	0.48	0.39	0.07	0.24	0.39
Arellano-Bond test: first-order autocorrelation	0.03	0.21	0.61	0.01	0.00	0.01
Arellano-Bond test: second-order autocorrelation	0.53	0.60	0.45	0.78	0.24	0.65
Instruments	24	26	20	24	26	20
Countries	105	104	103	106	105	104
Observations	641	582	395	653	592	397

Notes: WB: World Bank. PWT: Penn World Table. Robust standard errors are in parentheses. Explanatory variables other than population growth and the year dummies are treated as endogenous. Estimation is two-step and uses the Windmeijer (2005) correction. A collapsed matrix of first-lag instruments is used. The Arellano-Bond tests are for the difference equations. Growth variables represent growth over a three-year period. With the exception of lagged ln GDP per capita, the other variables are three-year averages. The "1993+" sample uses three-year intervals from 1991-1993 to 2006-2008. ***, ***, *: Significant at the 1, 5 and 10% levels.

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