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Bank Concentration and Gender Inclusive Education in Developing Countries

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Abstract

Purpose – The primary objective of this study is to assess the incidence of bank concentration on female education in developing countries.

Design/methodology/approach – The focus of the study is on 80 countries for the period 2000 to 2020 and the empirical evidence is based on fixed effects and 2SLS regressions. Bank concentration is measured in terms of total assets owned by the three largest banks as well as the total assets owned by the five largest banks. Female education is proxied from four main perspectives, notably: (i) female enrolment in primary education; (ii) female enrolment in secondary education; (iii) female government spending on primary education and (iv) female government spending on secondary education.

Findings – It is apparent from the findings that bank concentration (in terms of the total assets held by the three largest banks) reduces gender inclusive education and female government spending on education. Moreover, bank concentration (in terms of the total assets held by the five largest banks) also reduces gender inclusive education. Policy implications are discussed.

Originality/value – The study complements the extant literature by assessing the nexus between bank concentration and inclusive education in developing countries.

Keywords: Bank concentration; female education; developing countries; fixed effects; 2SLS

1.Introduction

The research question this study seeks to answer is the following: does bank concentration affect inclusive gender education? The focus of the present study on the linkage between bank concentration and female education is motivated by three main factors in the relevant scholarly and empirical literature on the subject, notably: (i) the sparse contemporary literature on the effects of bank concentration; (ii) the importance of promoting the female gender in the light of sustainable development goals (SDGs) of the United Nations and (iii) gaps in the attendant literature on the subject. The highlighted underpinnings are expanded in what follows in the same chronology as highlighted.

First, as concerns the sparse literature on banking concentration, the phenomenon, which is defined as the dominance of a few large financial institutions, is a common phenomenon in developing nations (Asongu et al., 2025). Banking concentration has been shown in studies to have negative effects on health performance (Kayo et al., 2025), women's entrepreneurship (Zogo et al, 2025), women's economic empowerment (Asongu & Kayo, 2025), women's political empowerment (Asongu et al., 2025), financial inclusion (Avom et al., 2021; Munacinga & Segun, 2025), economic growth (Chinoda & Mashamba, 2021), access to credit (Moyo & Sibindi, 2022), a nation's financial development and income level (Bara et al., 2017). However, research on the impact of banking concentration on gender inclusive education is sparse, if not inexistent to the best of my/our knowledge.

Second, with regard to the importance of gender inclusive education in SDGs, with respect to Asongu and Odhiambo (2021), many of the 17 SDGs are based on inclusive education because, in the absence of inclusive education, the negative response of extreme poverty to economic growth diminishes when inequality levels are high, limiting the fulfillment of other objectives (McGeown, 2017; Opoku et al., 2022; Asongu & Eita, 2023). Furthermore, the narrative suggests that inclusive education fosters innovation, skills, entrepreneurship, and self-esteem, all of which are vital in employment chances. As a result, by evaluating the role of banking concentration in inclusive education, the problem statement underlying this research specifically articulates SDG 5 ("achieve gender equality and empower all women and girls") and SDG 8 ("promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all").

Third, with regards to the gaps in the relevant literature, as substantiated in Section 2.1, there are two main strands in the extant literature: (i) the effect of financial development on some macroeconomic outcomes (Anton & Nucu, 2020; Dutta & Meierrieks, 2021; El Bourainy et al., 2021; An et al., 2021; Shahbaz et al., 2021; Ajide & Ojeyinka, 2022; Mukhtarov et al., 2022; Verma et al., 2023; Gachoki, 2023; Chisadza & Biyase, 2023; Mallela et al., 2023; Jukan et al., 2024; Asongu et al., 2024) and (ii) the incidence of other macroeconomic variables on education

(Arshed et al., 2020; Head, 2020; Rotondi & Billari, 2021; Maher et al., 2022; Haleem et al., 2022). The closest study in the literature to the present research is Asongu et al. (2025).

For the period 2004 to 2020, Asongu et al. (2025) looked at how bank concentration affected women's political empowerment in 80 developing countries. The assets held by the three biggest commercial banks as a percentage of all commercial bank assets in a nation is known as banking concentration, or BC. The political empowerment index, which consists of three indices (i.e., the women's civil liberties index, the women's civil society index, and the women's political participation index), is one of many indices used to quantify political empowerment. The Fixed Effects (FE) and Ordinary Least Squares (OLS) approaches serve as the foundation for the empirical analysis. It is concluded that banking concentration lowers women's political influence.

The present study departs from Asongu et al. (2025) by assessing the incidence of bank concentration on female education in developing countries. The research is framed on 80 nations using data from 2000 to 2020 while the 2SLS and fixed effects regressions provide the empirical basis for the findings. It is apparent from the findings that bank concentration (in terms of the total assets held by the three largest banks) reduces gender inclusive education and female government spending on education. Moreover, bank concentration (in terms of the total assets held by the five largest banks) also reduces gender inclusive education. Hence, in terms research objectives, methodology, periodicity and findings, the present research is distinct from Asongu et al. (2025).

The remainder of the study is organized as follows. Section 2 discusses the empirical literature, the intuition, theoretical underpinnings and testable hypothesis while the data and methodology are presented in Section 3. Section 4 provides the empirical findings. The study concludes in Section 5 with implications and future research directions.

2. Empirical literature, intuition, theoretical underpinnings and testable hypothesis

2.1 Empirical literature

There are two main strands: (i) the effect of financial development on some macroeconomic outcomes and (ii) the incidence of other macroeconomic variables on education. The two strands are discussed in the same chronology as follows.

First, with respect to the primary strand on the incidence of financial development on macroeconomic outcomes, in many studies so far in the literature, the concept of financial development or financial sector evolution is one that has attracted the interest of many researchers in view of explaining, understanding and analyzing the concept, even as a key factor in various phenomena and activities. Following the studies conducted by Dutta and Meierrieks (2021), it is stated that financial development has a positive impact on entrepreneurial activity by meeting the demand for accessible, affordable and extensive credit of entrepreneurs, as well as the demand for efficient and profitable risk and information management of investors. In line with Ajide and Ojeyinka (2022), it is argued that financial development does not directly promote entrepreneurship. Their results indicate that financial development raises the degree of entrepreneurship at certain thresholds of institutional quality and business regulation. Financial development's propensity to raise the degree of entrepreneurship is associated with good institutional quality and advantageous business regulations up to a certain point.

Following An et al. (2021), in low- and middle-income nations, financial development in terms of financial depth and intermediation slows the rise of per capita income. Nonetheless, they boost growth in both high-income nations and the sample of SSA nations as a whole. In the same vein, Verma et al. (2023) found that financial development accelerates growth. Consistent with Anton and Nucu (2020), all three aspects of financial development (banking sector, bond market, and capital market) are shown to have a beneficial impact on renewable energy consumption. In their research, Shahbaz et al. (2021) demonstrates that developments in financial markets increase the demand for renewable energy by generating increasing demand for environmentally friendly energy sources.

In their research, Mukhtarov et al. (2022) also show that financial development positively and statistically significantly affects the use of renewable energy. Their findings indicate that the consumption of renewable energy rises by 0.21% for every 1% increase in financial development. Building on El Bourainy et al. (2021), an increase in financial inclusion is a means of decreasing inflation in developing countries. With respect to Gachoki (2023), financial development has a significant negative long-term effect on inflation, while in the short term, it has no significant impact. Jukan et al. (2024) conclude that countries with higher financial

inclusion are more resilient to inflation. Thus, a high level of financial development would be required for the level of inflation encountered to be low.

Consistent with Chisadza and Biyase (2023), financial development has been shown to reduce disparities in developing and least developed countries, which is not statistically significant in developed countries. However, by dividing the financial development index into different components (financial institutions and financial markets), it is apparent that the development of the banking sector within the remit of financial institutions has consequences in the reduction of income inequalities in emerging and least developed countries, while the development of the stock market under in the context of financial markets increases inequalities in least developed countries. For their part, Mallela et al. (2023) explain that financial development substituted for remittances reduces income inequalities.

Second, as concerns the secondary strand on the effect of the incidence of macroeconomic variables on education, some authors have also examined various elements in order to explain the level of education. For example, the research of Arshed et al. (2020) demonstrates that income inequality leads to educational inequality, preventing individuals from accessing higher education. It is argued by Maher et al. (2022) that inflation is fundamental in explaining per student education expenditure in Egypt. In other words, the increase of inflation has a deleterious effect on education expenditure.

In line with Head (2020), technological advances have the effect of increasing the demands placed on parents to engage in education, thereby reinforcing broader norms of intensification and professionalization of parenting. Haleem et al. (2022) have examined the role of digital technology in education and have demonstrated that this technology has a powerful effect on the education system. Furthermore, the authors posit that the applications of digital technologies in the sector of education has been institutionalized in the era of the COVID-19 pandemic.

It is highlighted by Rotondi and Billari (2021) that the use of mobile money improves children's likelihood of attending school. Looking at their findings, equitable availability of mobile money could provide access to education for a thousand children. Accordingly, mobile money lowers transaction costs and makes it easier to receive remittances, mitigating the relevance of coping techniques that are not favorable to the development of children, such as trading the ability of children to school to their ability to work early in life. In light of the extant literature, sparse research on the explanatory factors that can elicit education, especially as it pertains to the influence of banking concentration, is noteworthy. The present study thus contributes to the literature as one of the first recent studies addressing the direct link between banking concentration and education within the remit of gender inclusive education. The intuition for the nexus and corresponding testable hypothesis are discussed in what follows.

2.2 Intuition, theoretical underpinnings and testable hypothesis

To begin, banking concentration can limit families' access to loans (Moyo & Sibindi, 2022). In the light of Lochner and Narange (2012), limited access to finance may cause some people to drop out of education, particularly those from lower socioeconomic backgrounds and such is accompanied by unfavorable socio-economic externalities (Von dem et al., 2006). They discovered that credit limits had a major impact on people's educational decisions. In addition, tougher financing limits tend to discourage people from investing in education. This reduces school enrollment rates. Furthermore, Bound et al. (2010) argue that people with limited access to financing are more likely to drop out of education.

In terms of theoretical underpinnings, building on the extant empirical literature and corresponding intuition, the nexus between banking concentration and gender inclusive education can be theoretically consolidated with the intensive and extensive margin theories, in accordance with extant contemporary literature focusing on the nexus between financial inclusion and income inequality (Tchamyou et al., 2019), productivity (Asongu, 2020) and energy poverty (Asongu et al., 2024). According to the underlying theoretical underpinnings, the intensive margin theory is when financial access is increased to existing bank customers and by extension, such better access to finance can be used to improve inclusive gender education opportunities. In the same vein, the extensive margin theory applies when financial access is provided to new bank customers who did not previously own bank accounts, thus providing them with financial opportunities with which to fund the education of their children, including females.

In view of the above, it can be posited that banking concentration (which is a proxy of limited financial access) negatively affects education.

Hypothesis 1: bank concentration reduces inclusive gender education

A negative link between bank concentration and gender inclusive education is thus postulated. There are various intuitive arguments and theoretical underpinnings supporting the underlying hypothesis that have been discussed. Whether the attendant hypothesis withstands empirical validity is an object of empirical scrutiny, which is the main focus of the section that follows.

3. Data and methodology

3.1 Data and measurements

We use an unbalanced panel of 80 developing nations from 2000 to 2020 as our primary sample for the analysis. The availability of data on the variables of interest determines the study duration and sample size. In this study, women's education is measured using female primary and secondary school enrolment rates based on the World Bank's Development Indicator (WDI, 2021).

For the measure of banking concentration, we follow Asongu et al. (2025) and capture it through the total assets held by a country's three largest banks (C3). These data come from the Global Financial Development Database (GFDD, 2020). Control variables are involved into the analysis to account for other features affecting women's education, as suggested by the literature. These include: foreign direct investment, urbanization, democracy, electricity, corruption, trade openness and inflation.

According to Ghosh (2019), foreign investors, who are the source of foreign direct investment (FDI), are more likely to favor locations with low gender disparities in education (FDI). In addition, foreign companies can invest in school construction, teacher training, and the supply of educational materials. This can improve girls' access to education and the quality of the teaching they receive. Urbanization also offers greater social, economic and political opportunities for women. The same opportunities are offered to women in rural areas to give them greater access to education (Abdullah et al., 2021). Accordingly, cities often offer a wider range of learning opportunities, including vocational education programs and continuing education courses. Democratic regimes are more likely to guarantee girls' and women's access to education, by enacting laws and implementing policies that combat discrimination and promote equal opportunities (Brown, 2004). According to Hao et al. (2018), Corruption diverts financial resources that should be allocated to education into private pockets, resulting in a shortage of funds for school construction, teacher training, and the provision of educational materials. Access to electricity is also important as it enables the use of fans and air conditioners, which can improve the comfort of students and teachers in the classroom, especially in hot climates. It also enables the use of computers, projectors and other teaching tools to make learning more interactive and stimulating (Winther et al., 2017). Trade openness can stimulate economic growth and create new employment opportunities for women, which can enable them to generate income and invest in their education and that of their children (Wamboye & Seguino, 2015). Inflation leads to higher prices for school supplies, transport costs and other education-related expenses, which can make access to education more difficult, especially for low-income families (Levine, 2023).

The list of sampled countries is disclosed in Panel A of Appendix Table A1 while definitions and sources of variables are provided in Panel B of Appendix Table A1. The corresponding summary statistics and correlation matrix are provided in Appendix Table A2 and Appendix Table A3, respectively.

3.2 The empirical model

The empirical model chosen to estimate the effect of bank concentration on women's education in developing countries is a modified version of the model by Asongu et al. (2025). It is specified as follows in Equation (1):

$$WED_{it} = \alpha + \beta_1 BC_{it} + \beta_2 X_{it} + \mu_i + \nu_t + \varepsilon_{it} \qquad (1)$$

Or WED_{it} represents women education, BC_{it} is bank concentration, X_{it} is the vector of control variables, μ_i is the country fixed effect, ν_t is the time of fixed effects and ε_{it} is the error term. The model with control variables is as follows in Equation (2):

$$WED_{it} = \alpha + \beta_1 BC_{it} + \beta_2 Elec_{it} + \beta_3 Ubar_{it} + \beta_4 FDI_{it} + \beta_5 Corup_{it} + \beta_6 Inf_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad \textbf{(2)}$$

To account for national fixed effects, we estimate the model using panel data. In fact, we account for variables that may concurrently influence the behavior of country-specific monetary policies across time by adjusting for country fixed effects. Consequently, country fixed effects allow the study to control for country-specific factors that could influence women's education, such as a country's landlocked position. In the literature, two methods are generally used to estimate panel data in practice (Asongu & Odhiambo, 2019; Kayo et al., 2025). There is the random effects model, which assumes that there is no correlation between country fixed effects and explanatory variables, and the fixed effects model, which assumes that there is a correlation between country fixed effects and explanatory variables. The Hausman specification test determines which of these two models to use. Since the probability value for Chi2 is less than 1%, we decide to use the fixed-effects model[1].

However, the model might have an endogeneity issue, which could be caused by measurement errors, which are prevalent in research done in developing nations. This issue is not addressed by the fixed-effects model, so additional endogeneity factors are considered to guarantee the validity of our findings. The specifications are modified for measurement errors and the variable omission bias aspects of endogeneity, respectively, and take into consideration a wide range of variables that impact women's education in the conditioning information set. Furthermore, the Variance Inflation Factor (VIF) test was conducted and the VIF has a mean value of 1.6 which is lower than the 3 threshold used to assess evidence of multicollinearity (Bidiasse et al., 2025). Due to wordcount constraints, the results of the VIF test are available upon request.

[1] Owing to wordcount constraints, the results of the Hausman test are available upon request.

4. Empirical results and discussion

4.1 Basic results

It is important to recall that the research question this study seeks to answer is the following: does bank concentration affect inclusive gender education? The corresponding testable hypothesis is that bank concentration reduces inclusive gender education. Table 1 summarizes the baseline results estimated using the fixed-effects model. It presents the empirical results of the model that is multivariate, estimating the impact of bank concentration on women's education with the control variables. In line with our testable hypothesis, it is apparent in general that the coefficient associated with women's education is negative and statistically significant at the 1% level, suggesting that bank concentration reduces women's schooling rate. Indeed, banking concentration can reduce competition, leading to an increase in interest rates and a reduction in the supply of credit (Abuka et al., 2019). This reduction will have a negative effect on women's education. Low-income populations and women may not have access to bank credit, and therefore would not be able to invest in their own education and that of their children.

The effects of certain control variables are also noted. Accordingly, there is a positive effect of foreign direct investment on women's education. This result can be explained by the fact that foreign companies can invest in school construction, teacher training, and the supply of teaching materials. This can improve girls' access to education and the quality of the education they receive (Ghosh, 2019). The negative effect of inflation is also worth noting. According to Levine (2023), inflation leads to higher prices for school supplies, transportation costs and other education-related expenses, which can make access to education more difficult.

"Insert Table 1 here"

4.2 Robustness checks

To assess the robustness of the primary findings, sensitivity analyzes is performed along several considerations: (i) usage of more control variables and (ii) alternative measurements of key variables, namely women education and banking concentration; (iii) alternative estimation strategies. Overall, in all robustness checks we find that specification results are broadly consistent with those in Table 1.

4.2.1 Robustness to additional control variables

Thus far, the research has demonstrated a statistically significant and adverse correlation between women's education and banking concentration. However, it is impossible to completely rule out the possibility that this negative association is partly caused by unobserved

national characteristics. In order to reduce this risk and guarantee the accuracy of our estimations, we account for other factors like democracy and trade openness that can have an impact on women's education. Table 2 presents the outcomes of this exercise. It is clear that banking concentration (C3) has a negative and significant impact on women's education even after adding these extra control variables to our model. Consequently, our findings hold up well when more factors are included.

"Insert Table 2 here"

4.2.2 Robustness to alternative measures of women education

We estimate our model using an alternative measure of women education. We use female government spending on education as an alternative measure of women education. The results reported in Columns 1 and 2 of Table 3 show that bank concentration has a negative and significant effect on female government spending on education.

"Insert Table 3 here"

4.2.3 Robustness to alternative measures of banking concentration

We further estimate the model by employing an alternative measure of banking concentration. We use the total assets held by the five largest banks in a country (C5) as an alternative measure of banking concentration. The results reported in Columns 1 and 2 of Table 4 show that bank concentration (C5) has a negative and significant effect on female education.

"Insert Table 4 here"

4.2.4 Robustness to alternative estimation strategies

It would be interesting to examine the validity of these earlier findings using a different approach. As a result, we employ the two-stage instrumental variable approach (IV-2SLS) to extend our robustness assessments. The primary problem of the instrumental variable method has been noted in the literature as the pursuit of a fully exogenous instrument. The tool must only have an impact on bank concentration in order to meet exogeneity requirements for women's education (Baum et al., 2012). Considering the challenge of locating a completely exogenous instrument, we consult recent research and employ the instrumental variable estimate method suggested by Lewbel (2012).

The Lewbel (2012) 2SLS technique is essential for determining structural parameters in regression models with endogenous or weakly exogenous regressors when conventional identification information is unavailable. Furthermore, Lewbel (2012) employs instruments developed

internally based on a heteroskedastic covariance constraint to demonstrate causation, negating the need for any exclusion conditions to be met. The internal instruments are constructed by multiplying each external variable by the residuals from the auxiliary equation in mean-centered form. Table 5 provides a summary of the estimation results. The coefficient linked to women's education is statistically significant and negative, which is consistent with the fixed effects findings.

"Insert Table 5 here"

The findings are in line with the theoretical framework, especially when it comes to bank concentration as a proxy for market power's negative effects on gender inclusion, as noted by Asongu et al. (2025). Thus, the results are consistent with the foundations of the purpose of financial inclusion (Ozili, 2020; Nchofoung et al., 2024). Furthermore, the findings are consistent with the perspective that reducing market power, especially through information sharing offices can promote gender inclusion, supporting the theory that they can reduce asymmetric information (Bennardo et al., 2015; Karapetyan & Stacescu, 2014; Boateng et al., 2018).

5.Concluding implications and future research directions

The primary objective of this study is to assess the incidence of bank concentration on female education in developing countries. The focus of the study is on 80 countries for the period 2000 to 2020 and the empirical evidence is based on fixed effects and Lewbel (2012) 2SLS. Bank concentration is measured in terms of total assets owned by the three largest banks as well as the total assets owned by the five largest banks. Female education is proxied from four main perspectives, notably: (i) female enrolment in primary education; (ii) female enrolment in secondary education; (iii) female government spending on primary education and (iv) female government spending on secondary education. It is apparent from the findings that bank concentration (in terms of the total assets held by the three largest banks in countries) reduces gender inclusive education and government spending on education. Moreover, bank concentration (in terms of the total assets held by the five largest banks in countries) reduces gender inclusive education. The two main policy implications are discussed in what follows.

The first main policy implication is drawn from the finding that bank concentration (in terms of the total assets held by the three largest banks) reduces gender inclusive education and female government spending on education. The corresponding implication is that bank concentration reduces spending on education because such spending does not benefit women in terms of improving their opportunities for education. This could be due to corruption, mismanagement of funds or poor allocation of funds for gender inclusive education. It follows that increasing government spending on education should be more targeted toward promoting female education through, *inter alia*, more tailored allocation on projects designed to improve female education and less corruption in the implementation of projects related to the funding of education.

The second main policy implication builds on the finding that bank concentration, a proxy of banking competition reduces gender inclusive education. The attendant implication is that increasing competition in the banking sector boosts gender inclusive education. In order to assist the shift from confiscatory concentration to distributive bank concentration that is advantageous to all parties involved, governments in the sampled nations should lower entry barriers for prospective banks in order to boost competition in the banking sector. Therefore, competition is likely to mitigate market power within the banking sector in order to ultimately boost access to finance (Boateng et al., 2018), which, according to previous research, has externalities in terms of women's educational empowerment because bank concentration is a measurement for market power(Asongu & Biekpe, 2018).

This study evidently leaves space for future research especially as it pertains to understanding how the assessed linkages affect other sustainable development goals (SDGs) of the United Nations. Accordingly, while the present study has focused on the fifth SDG which is oriented

towards to the promotion of the female gender, other SDGs of the United Nations can be considered in future studies in order to improve insights into the nexuses that are examined. Moreover, engaging country-specific studies with the relevant estimated and robust strategies will engender more targeted policy implications. Furthermore, while the motivation for the use of the considered estimation techniques is provided in the data section, other robust estimation techniques that address more concerns of endogeneity and the concern of cross-sectional dependence should be considered in future studies.

Table 1: Banking concentration and women education (fixed effects model)

	(1)	(2)
Variables	**Enrolment in primary education, female**	**Enrolment in secondary education, female**
C3	**-10.30*** **	**-6.814*** **
	(2.189)	**(1.844)**
Electricity	2.376***	0.0377**
	(1.689)	(1.722)
Urbanization	-4.74	-2.03
	(1.38)	(1.54)
FDI	6.86***	9.71***
	(9.927)	(8.067)
Inflation	-3.098**	-4.976*
	(4.948)	(4.573)
Corruption	-4.55	-2.55
	(1.460)	(1.88)
Constant	1.113***	5.401***
	(1.104)	(1.009)
Observations	1101	1117
R-squared	0.437	0.393
Number countries	78	79
Fisher	185***	16.14***

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 C3 :The total assets held by the three largest banks in countries. FDI : foreign direct Investments

Table 2: Robustness of the results to additional control variables

VARIABLES	(1) eq1 Enrolment in primary education, female	(2) eq2 Enrolment in secondary education, female
C3	**-10.27*** **	**-7.260*** **
	(2.356)	**(2.023)**
Electricity	3.716*	0.560***
	(1.944)	(2.212)
Urbanization	-5.413***	-2.46**
	(1.169)	(1.102)
FDI	3.23***	2.12**
	(1.25)	(1.398)
Inflation	-3.182	-5.123
	(4.904)	(4.635)
Corruption	-2.219	-4.260
	(1.434)	(3.165)
Democracy	1.289	8.326
	(16.08)	(14.38)
Trade openess	2.889*	1.014**
	(1.639)	(1.486)
Constant	1.224***	8.01***
	(2.118)	(2.117)
Observations	1171	1157
R-squared	0.465	0.404
Number of countries	77	75
Fisher	130 .76***	14.54***

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. C3 :The total assets held by the three largest banks in countries. FDI : foreign direct Investments

Table 3 : Estimations with alternatives measures of women education

Variables	(1) eq1 **female government spending on primary education**	(2) eq2 **female government spending on secondary education**
C3	**-0.438*** **	**-0.125*** **
	(0.0120)	**(0.00751)**
Electricity	0.0575**	0.0748***
	(0.0225)	(0.0154)
Urbanization	-0.0311	-0.0282***
	(0.0110)	(0.0103)
FDI	-0.0366	-0.251
	(0.104)	(0.406)
Inflation	0.0226	-0.0662
	(0.173)	(0.0556)
Corruption	-4.144***	-0.0748***
	(1.149)	(0.854)
Constant	48.86***	54.34***
	(8.228)	(6.116)
Observations	958	958
R-squared	0.445	0.404
Number of countries	74	74
Fisher	26.42***	21.28***

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. C3 :The total assets held by the three largest banks in countries. FDI : foreign direct Investments

Table 4 : Estimations with alternatives measures of banking concentration (C5)

Variables	(1) eq1 Enrolment in primary education, female	(2) eq2 Enrolment in secondary education, female
C5	**-0.289***** **(0.0993)**	**-0.195**** **(0.0777)**
Electricity	0.135* (0.0671)	0.124** (0.0525)
Urbanization	0.245 (0.741)	0.339 (0.580)
FDI	0.0309 (0.123)	0.00277 (0.0960)
Inflation	-0.00569 (0.212)	0.129 (0.166)
Corruption	-4.530*** (1.268)	-3.095*** (0.992)
Constant	36.49*** (10.74)	48.44*** (8.405)
Observations	950	950
R-squared	0.373	0.368
Number of countries	72	72
Fisher	20.15***	15.07***

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. C5 :The total assets held by the five largest banks in countries. FDI : foreign direct Investments

Table 5 : Results with Lewbel's estimator

Variables	(1) eq1 **Enrolment in primary education, female**	(2) eq2 **Enrolment in secondary education, female**
C3	**-0.1453*** **	**-0.1364*** **
	(0.0499)	**(0.0501)**
Electricity	0.0775*	0.0311**
	(0.0498)	(0.0513)
Urbanization	1.133	-0.346
	(0.631)	(0.561)
FDI	0.0331***	0.0311***
	(0.00880)	(0.0110)
Inflation	-0.0489***	-0.0575**
	(0.0150)	(0.0225)
Corruption	-0.0267	-0.0582
	(0.0195)	(0.0296)
Constant	79.019***	76.304***
	(10.74)	(8.405)
Observations	1150	1150
R-squared	0.182	0.182
Number of countries	77	77
Hansen J test	0.18	0.18
Underidentification test	111.78	111.78
Underidentification (p-value)	0.00	0.00
Weak identification test	37.54	37.54

Note : Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. C3 :The total assets held by the three largest banks in countries. FDI : foreign direct Investments. The Kleibergen- Paap rk LM and Cragg-Donald Wald F statistics are reported as the model is exactly identified.

Appendices

Table A1: List of countries in the study

Panel A: List of countries in the study			
Afghanistan	China	Kuwait	Qatar
Albania	Costa Rica	Lesotho	Romania
Angola	Colombia	Mauritania	Rwanda
Algeria	Djibouti	Madagascar	Senegal
Armenia	Egypt	Mexico	Serbia
Argentina	Estonia	Mongolia	Seychelles
Bangladesh	Eswatini	Montenegro	South-Africa
Barhain	Ethiopia	Moldova	Tajikistan
Benin	Ecuador	Morocco	Tanzania
Belize	Ghana	Mozambique	Thaïland
Botswana	Guatemala	Nepal	Turkey
Bolivie	Georgia	Nicaragua	Tunisia
Bukina Faso	Indonesia	Niger	Togo
Burundi	India	Nigeria	Uganda
Brazil	Iran	Oman	Ukraine
Cambodia	Iraq	Panama	Vietnam
Cape Verde	Ivory Coast	Paraguay	Uruguay
Cameroon	Jamaica	Pakistan	Venezuela
Chad	Kazakhstan	Peru	Zambia
Chile	Kenya	Philippines	Zimbabwe
Panel B : Definition of variables			
Variables	**Definitions**		**Data sources**
Bank concentration (C3)	the total assets held by a country's three largest banks.		GFDD (2020)
Bank concentration (C5)	the total assets held by a country's five largest banks.		GFDD (2020)
Women's education	- Enrolment in primary education, female -Enrolment in secondary education, female - female government spending on primary education - female government spending on secondary education		UNESCO (2019)
Democracy	Measured by the democracy index. It provides an indication of the constraints on the executive.		Polity IV (2020)
Electricity	Measured by access to electricity for a given population		WDI (2021)
Corruption	Measured by the level of corruption.		ICRG (2020)
Urbanisation	Measured by the proportion of the total population living in urban areas compared to the rural population.		WDI (2021)
Trade openness	Measured by the sum of exports and imports of goods and services in relation to GDP.		WDI (2021)
Inflation	Measured by the level of inflation in an economy.		WDI (2021)
FDI	Measured by net inflows and outflows		WDI (2021)

Table A2: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Enrolment in primary education, female	1146	2496.52	8329.374	.099	63015.11
Enrolment in secondary education, female	1357	2856.167	8699.603	.09	74526.86
female government spending on primary education	1654	75.529	9.197	25.936	100
female government spending on secondary education	1659	79.451	6.312	42.014	100
C3	1369	68.634	20.484	17.047	100
C5	1119	79.829	16.608	31.855	100
Democracy	1375	7.831	2.708	1	12
Electricity	1460	71.216	33.351	1.252	100
Urbanization	1460	2.647	1.955	-2.869	19.612
FDI	1439	3.874	5.014	-37.173	57.877
Inflation	1436	6.996	8.605	-25.958	86.826
Trade openness	1382	74.265	38.115	20.723	347.997
Corruption	1455	-.436	.671	-1.672	1.718

Note: C5 :The total assets held by the five largest banks in countries. C3: The total assets held by the three largest banks in countries. FDI : foreign direct Investments.

Table A3 : Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Enrolment in primary education, female	1.000												
(2) Enrolment in secondary education, female	0.995	1.000											
(3) female government spending on primary education	-0.403	-0.427	1.000										
(4) female government spending on secondary education	-0.276	-0.279	0.925	1.000									
(5) C3	-0.082	-0.096	0.727	0.644	1.000								
(6) C5	-0.076	-0.070	0.685	0.650	0.947	1.000							
(7) Democracy	-0.012	0.000	-0.746	-0.677	-0.757	-0.692	1.000						
(8) Electricity	0.216	0.209	0.701	0.689	0.886	0.900	-0.831	1.000					
(9) Urbanization	0.184	0.139	0.296	0.262	0.146	0.204	-0.258	0.335	1.000				
(10) FDI	0.433	0.398	-0.043	-0.112	0.195	0.003	-0.271	0.203	0.161	1.000			
(11) Inflation	-0.084	-0.061	-0.123	0.012	-0.204	-0.238	0.253	-0.248	-0.431	0.083	1.000		
(12) Trade openness	-0.013	-0.048	0.679	0.486	0.858	0.731	-0.824	0.804	0.135	0.392	-0.242	1.000	
(13) Corruption1	-0.280	-0.265	0.264	0.081	0.528	0.528	-0.487	0.387	-0.047	0.117	-0.369	0.616	1.000

Note: C5 :The total assets held by the five largest banks in countries . C3: The total assets held by the three largest banks in countries. FDI: foreign direct Investments

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