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Does women's empowerment improve women's education? A cross-sectional study of 27 transitional post-communist countries

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Abstract
The paper examines the correlation between patriarchal attitudes, women's asset ownership, participation in household decision-making and women's educational attainment across 27 post-communist countries. It hypothesizes that patriarchal attitudes hinder women's educational achievements while women's asset ownership and participation in household decision-making facilitate them. Utilizing regression analysis, marginal effects, post-regression simulation, the study tests and confirms these hypotheses. Results show that for every unit increase in women's asset ownership and participation in decision-making, the odds of achieving higher educational attainment increase by approximately 35.7% and 16.5%, respectively. Conversely, a unit increase in patriarchal attitudes decreases these odds by 15.8%. The findings underscore the importance of state and civil society commitment to addressing gender disparities in education.

Keywords: women empowerment, patriarchy, women education, transition countries

Introduction

In international law and politics, the right to education has been recognized as a "multiplier right," allowing right-holders to exercise a wide variety of human rights when fully realized (Wodon et al., 2018). The Education 2030 declaration demonstrates a commitment to ensure that all people have equitable access to high-quality education and lifelong learning (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2015). The Sustainable Development Goal (SDG) 4.5, as well as the 2030 Sustainable Development Plan, emphasize and strengthen the clear link between gender equality and education (Engida, 2021). The international focus on girls' education recognizes its catalytic role in promoting substantive equality between men and women, as well as a means to improve global health and reach positive economic, political, cultural, and social development

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outcomes (Tomaševski, 2003). Despite mounting evidence of the value and effect of educating girls, a significant portion of our society takes little to no action to improve women's education. More than 63 million girls are out of school worldwide, with 47% of them never expected to return, compared to 35% of boys (UNESCO, 2016). Two-thirds of the world's illiterate adult population are women. Despite significant increases in women's education worldwide between 1960 and 2010, most nations still have a gender gap in educational achievement (Engida, 2021). Furthermore, the gender gap narrowed in 94 countries during that period, but it expanded in 32 others.

The well-known predictors of women's education that are identified in the previous literature include age, family income, employment and marital statuses, rural residency, and the number of children (Malisauskaite, 2015; Tovar García, 2014; Whitsel, 2009).

Against this background, the research objective of this paper is to examine the influence of women empowerment on women's education in 27 post-communist countries of Eastern Europe, Caucasus, and Central Asia. Women empowerment can be defined as the degree of women's participation in household decision-making, attitudes toward women's roles, and women's asset ownership (Aktakke et al., 2020; Barrett et al., 2012; Davis & Williamson, 2019; Habibov et al., 2017). Women's empowerment has been associated with a number of positive outcomes. Thus, the higher degree of women's participation in household decision-making is associated with a higher likelihood of prenatal, natal, and post-natal healthcare utilization (Auchynnikava & Habibov, 2021; Darteh et al., 2019). It is also associated with higher chances to conduct HIV and cervical cancer testing (Thapa et al., 2018; Viens et al., 2016). In turn, negative attitudes to gender equality, such as an agreement with the view that "When jobs are scarce, men should have more right to a job then women" are found to negatively impact the probability of women's employment and positively influence a gap in gender salaries and wages (Fortin, 2005). Likewise, there is a strong correlation between anti-egalitarian views of women's role and the proportion of women policy-makers in a country (Kenny & Patel, 2017). Finally, women's asset ownership is the precursor of child-friendly and health-friendly spending in households (Deere & Twyman, 2012; Doss, 2006; Quisumbing & Maluccio, 2000).

Surprisingly, there is a lack of studies about the influence of women empowerment on women's education overall and, in particular, in post-communist countries. However, post-communist countries represent a very interesting case for studying the impact of women's empowerment on educational outcomes since are expected to display lower women's education and empowerment levels for three main reasons.

On the one hand, post-communist countries were and still are more collectivistic than Western developed democracies and many developing countries (Alesina & Giuliano, 2013). Collectivistic societies tend to be more hierarchical since the development of accepted authority structures facilitates the coordination of

collective behavior. As these hierarchies are often patriarchal in nature, a society that emphasizes the family, tribe, nation, or church will tend to subordinate women and generate greater acceptance of gender inequality (Davis & Williamson, 2019). Living in collectivistic societies predicts traditional attitudes toward women (Alesina & Giuliano, 2013; Seguino, 2007; 2011; 2016). Moreover, the transition to post-communism was accompanied by the significant revival of old patriarchal cultural traditions and religious customs concerning women's roles and norms, and the rise of a cult of motherhood and domesticity (Tohidi, 2004; Chernyak, 2016). The superior position of men and the patriarchal structure of family and society were further reinforced by religion which re-emerged after the collapse of the Soviet Union (Chernyak & Barrett, 2011; Haarr, 2007).

On the other hand, post-communist countries are characterized by the collapse of comprehensive social and health services inherited from communist times that forced women to stay at home to provide care for dependent members within their families, namely, the disabled, the sick and the elderly (Habibov, 2010a). In addition, in many countries of the former Soviet Union, women living in mountain, rural, or remote areas must take responsibility for obtaining water and wood for their families (Habibov, 2010b). All of these diminish women's status, increase the gender gap, and reinforce patriarchal views on women.

Finally, there is evidence of the existing gender gap in access to education in post-communist countries (Habibov, 2015). Similarly, the gender pay gap and access to employment increases during the transition in many, although not all, post-communist countries (Brainerd, 2000; Newell & Reilly, 2001; Habibov et al., 2019). The recent meta-analysis study of the gender gap in post-communist countries reviewed more than 30 publications on this topic and concluded that "gender pay gaps in the region are considerable and above the levels observed in advanced economies" (Khitarishvili, 2019, p.1).

1. Theoretical perspectives and testable hypotheses

In this study, we theorized the influence of women empowerment on women's education from two interrelated perspectives, specifically, the Feminist Theory and the Resource Theory. The central focus of the Feminist Theory is on the patriarchal system in society that legitimizes male power by maintaining and reinforcing the social concept of gender as a hierarchical phenomenon (Jaggar, 1983; Mitchell, 1971; Ridgeway & Correll, 2004). Patriarchy emphasizes the male-dominance and supports gender-specific stereotypes about roles, obligations, and expectations of men and women in public and private spheres, such as political and business leadership, family life, labor market, and access to education (Chernyak, 2016; Davis & Williamson, 2019). Women experience patriarchy through sex-segregated perceptions of roles where the economic provision for families and involvement in political life is considered appropriate for relatively higher-educated males. On the

contrary, relatively lower-educated females are expected to focus on nurturing kids, taking care of elderly and disabled household members, and general home chores. As a result, the stronger patriarchal attitudes towards women's roles are, the lower the level of educational attainment women are expected to achieve. Consequently, based on the above-discussed, the current study articulates the following testable hypothesis:

H1: Patriarchal attitudes towards women are associated with a lower probability of women achieving higher levels of educational attainments.

The family, according to Resource Theory, is a structure of power relations in which the powerful rule over the less powerful and weak (Atkinson et al., 2005; Cubbins & Vannoy, 2005). Individuals use the resources at their disposal, such as wealth, income, and social position, to achieve their objectives since having access to resources or commanding their distribution confers greater power and influence. For resource-based theorists who focus on women's empowerment, imbalance in access to resources and their distributions in favor of men is expected to strengthen male domination in shaping gender-specific stereotypes about roles, obligations, and expectations for men and women in society (Choi & Ting, 2008). If man has more access to resources or more influence to command their distribution, then man dominates in enforcing gender-specific roles (Choi et al., 2014). The resources can be operationalized as ownership of wealth, estate, and income, whereas women's decision-making power can be operationalized as the degree to which women can make decisions about buying large household purchases or investing and borrowing money (Aktakke et al., 2020; Barrett et al., 2012; Habibov et al., 2017). The discussion above allows us to articulate the next two hypotheses:

H2 Higher level of women's asset ownership is associated with higher levels of educational attainments.

H3 A Higher degree of women's participation in household decision-making is associated with a higher level of educational attainments.

2. Data and method

2.1. Data

To test the above-mentioned hypotheses, the current study relies on data from the 2016 Life in Transition Survey which was designed and implemented jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank (henceforth the LITS). The survey provides unified and standardized data from 27 post-communist countries of Eastern Europe, Caucasus, and Central Asia. The LITS collects nationally representative data from each of the countries under investigation. In each country, a household was sampled for surveying through a multistage sampling procedure. Within the drawn household, an interview was

conducted with a randomly selected member of the household. The interview was conducted face-to-face by specially trained interviewers.

2.2. Outcome

The main outcome of interest is women's educational attainments. The LITS records information about educational attainments in the form of ordered ordinal variables with the following eight categories: No education = 1; Primary education = 2; Lower secondary education = 3; Upper secondary education= 4; Post-secondary education = 5; Tertiary education = 6; Bachelor's degree = 7; Master's degree or PhD = 8.

2.3. Predictors of interest

The main predictor of interest is women's empowerment. Following the precedents of previous research in post-communist and developing countries, this study focuses on summative indices of women's asset ownership, the degree of women's participation in household decision-making, and attitudes towards women's roles as the main dimensions of women empowerment (Aktakke et al., 2020; Barrett et al., 2012; Habibov et al., 2017; Davis & Williamson, 2019).

Women's Asset Ownership Index: The first set of the LITS questions, which we use in this study, captures women's asset ownership. We employ three different survey questions to measure women's ownership of four types of assets, namely, (1) land, (2) dwelling, and (3) bank account. The answers to these three questions are binomial (1= Yes; 0 = No). To develop a summary measure of women's asset ownership, we add the answers to these three questions and create the summative Women's Asset Ownership Index. The index varies from 0 if women do not own any asset to 3 if women own all three types of assets. Hence, a higher value of the index denotes a higher degree of women's asset ownership.

Women's Participation in Household Decision-Making Index: The next set of the LITS questions is aimed at capturing the degree of women's household decision-making autonomy. We use three dummies indicating if the female alone or equally with the partner or someone else in the household makes the decisions about three specific issues (1) managing day-to-day spending and paying the bills, (2) making large household purchases, and (3) savings, investments, and borrowing. The above-mentioned responses present a higher degree of women's participation in household decision-making and are coded as 1 for each of the binomial variables. The opposite responses indicate if the decisions are made mostly by a partner, mostly by someone else in the household, or mostly by someone else outside of the household, and therefore reflect a lower degree of women's participation in household decision-making and coded as 0. Such a coding of responses allows us to gauge the extent of decision-making autonomy and control that a woman alone or in collaboration with a partner could exercise in her household. By summing binomial responses to the

three above-mentioned variables, we develop the Women's Participation in Household Decision-Making Index. The index varies from 0 to 3 where a higher value of the index denotes a higher degree of women participation in household decision-making.

Patriarchal Attitudes Index: Our last set of the LITS questions gauges attitudes toward women's roles. We utilize four different survey questions to capture patriarchal and traditional attitudes regarding multiple dimensions of social life, by encompassing political and business leadership, family life, labor market, and access to education. We utilize a set of dummy variables indicating if a respondent Strongly Agree or Agree with the following four statements: (1) "Men make better political leaders than women do", (2) "A woman should do most of the household chores even if husband is not working", (3) "Cohabiting partners should be married", and (4) "It is better for everyone involved if the man earns the money and the women take care of the home and children". We also utilize a set of dummies indicating if respondents Strongly Disagree or Disagree with the following two statements (1) "Women are as competent as men to be business executives", and (2) "It is important that my daughter achieves higher education". All the above-mentioned binomial responses are recorded so that a value of 1 indicates a more patriarchal and traditional perception of the role of women in society. To develop a summary measure of attitudes towards women's roles, we add the answers to these six questions and create the summative Patriarchal Attitudes Index. A higher score on this index indicates higher levels of patriarchal attitudes. Thus, the index varies from 0 = no patriarchal attitude at all to 6 = highest degree of patriarchal attitudes.

3. Analytic approach

The analytical strategy consists of four consecutive steps. We commence with regressing outcome variable which is the educational attainment of women on the main predictors of interest which are the indices of Women's Asset Ownership, Participation in Household Decision-Making, and Patriarchal Attitudes, while controlling for the covariates and country-fixed effects in the form of country dummies. Since the outcome is ordinal and ordered, we estimate ordered logistic regression. The covariates that affect education are gleaned from the previous literature on determinants of access to education and encompass age and age-squared, family income, employment and marital statuses, rural residency, and number of children (Malisauskaite, 2015; Tovar García, 2014; Whitsel, 2009). Based on the previous literature, we expect that having more children, residing in rural areas, and being married will have a negative association with higher educational attainments while being from a higher-income family, having a job, and having a father with higher levels of educational achievements will have a positive association with higher educational attainments of respondents. The country dummies are used

to control for unobserved country characteristics, such as differences in the educational system, norms, and traditions (Habibov et al., 2021).

It is conceivable to believe that women empowerment indices can be correlated to each other. Hence, a hierarchical approach to build the regression is used in which more variables are added to the model in separate steps called "blocks". This approach is used to examine if adding variables significantly improves a model's fit and to assess a moderating influence of the added variables. The model's fit is measured in several ways (Long & Freeze, 2014). We use McKelvey and Zavoina's R2 for ordered logistic regression to assess the fit of the estimated model. McKelvey and Zavoina's pseudo-R2 is the closest possible approximation of traditional R2 that is employed to assess the fit of linear regressions. The value of McKelvey and Zavoina's pseudo- R2 indicates the percentage of variation in outcome variable that is explained by all predictors in the models taken together. Hence, the higher value of McKelvey and Zavoina's pseudo-R2 denotes better explanatory power of the model. In addition, we use the Bayesian Information Criterion (BIC) and the AIC (Akaike's Information Criterion) which allows us to examine the overall fit of a model and allows the comparison of models with different sets of predictors. The reduction of BIC and AIC after the inclusion of more variables suggests an improvement in the fit of the model. How much one model is preferred over the other depends on the scale of the difference. For example, an absolute difference of more than 10 in BIC indicates very strong evidence of model improvement (Raftery, 1995).

In the second step, after the main model is estimated and discussed, we transform the odds ratios of our main model into standardized regression coefficients. Analyzing standardized regression coefficients is useful because predictors and covariates are measured with different units and different scales. Standardized coefficients employ standard deviations as their units so we can directly compare the relative importance of each standardized coefficient in the estimated model.

In the third step of our analysis, we estimate marginal effects based on the specification of our main model. The reason is that the odds ratio indicates an overall change in the likelihood of getting a higher level of education. By contrast, marginal effects show a separate probability of achieving each of the eight educational levels. For instance, we can evaluate how the propensity to receive Bachelor's and Master's degrees increases as a result of an increase in one unit of the Asset Index.

In the next step, to better elucidate the existing differences in the influence of various levels of women empowerment taken together on the educational attainments of women, we employ a simulation based on the results of regression analysis. The objective of the simulation is to estimate predicted probabilities for each type of education (e.g., no education vs. bachelor education) for women with the highest and lowest levels of empowerment. The advantage of using simulation over the odds ratios and marginal effects is that by comparing several scenarios, we

can compare probabilities as a whole set of women empowerment indices changed, not just a change in a single index (Long & Freeze, 2014). In the simulation, we compare the "average woman" scenario with two extremes, namely, a scenario for a woman with the lowest level of empowerment and a scenario for a woman with the highest level of empowerment (Habibov, 2013). The "average woman" is a woman who has the average characteristics for all independent variables that were used in regression model estimation. In other words, values of all independent variables are held at their means for the "average woman". By contrast, women with the lowest level of empowerment possess the lowest level of the assets and decision-making indices and the highest level of the patriarchy index, while all other variables are held at their means. Conversely, women with the highest level of empowerment possess the highest level of the assets and decision-making indices and the lowest level of the patriarchy index, while all other variables are held at their means.

In the last step, we conducted a robustness analysis to find out if the posted hypotheses can be confirmed for Eastern Europe (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia), Central Europe (Albania, Bosnia, Bulgaria, Croatia, FYR Macedonia, Romania, and Serbia) and the former Soviet Union (Armenia; Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine, Uzbekistan). Mongolia was not officially part of the Soviet Union but its educational system and economic and political development is close to the countries of the former Soviet Union, so it is included in the group of former Soviet countries.

All estimations are conducted with the Stata 16 software package. Significance in all models and discussion is reported at conventional levels: * = $p < 0.05$, ** = $p < 0.01$, and *** = $p < 0.001$. Descriptive statistics for all variables can be found in Table 1.

Table 1. Descriptive table

Variables	Description	Mean	Std. Dev	Min	Max
Outcomes					
Education	The highest level of education completed by a woman. No education = 1; Primary education = 2; Lower secondary education = 3; Upper secondary education= 4; Post-secondary education = 5; Tertiary education = 6; Bachelor's degree = 7; Master's degree or PhD = 8.	4.466	1.604	1	8

Variables	**Description**	**Mean**	**Std. Dev**	**Min**	**Max**
Predictors of interest					
Women's Asset Ownership Index	As detailed in section 3.3.1	1.733	0.756	0	3
Women's Participation in Household Decision-Making Index	As detailed in section 3.3.2	2.476	0.964	0	3
Patriarchal Attitudes Index	As detailed in section 3.3.3	2.762	1.350	0	6
Covariates					
Rural	Rural = 1; 0 = otherwise				
Age	Age in years	48.560	17.441	18	95
Age2	Age squared in years	2662.2	1774.7	324	9025
Employment	Did you work during the past 12 months? Yes=1, No=0	0.6224	0.4848	0	1
Income	Deciles of monthly family total income where 1 = to the poorest 10 % of population in each country and 10 = to the wealthiest 10 % of population in each country	5.323	2.845	1	10
Father's Education	Education of women's father. No education = 1; Primary education = 2; Lower secondary education = 3; Upper secondary education= 4; Post-secondary education = 5; Tertiary education = 6; Bachelor's degree = 7; Master's degree or PhD = 8.	3.608	1.617	1	8
Married	1 = Married; 0 = otherwise				
Single	1 = Single; 0 = otherwise				
Widowed	1 = Widowed; 0 = otherwise				
Divorced	1 = Divorced; 0 = otherwise				
Separated	1 = Separated; 0 = otherwise				

Source: authors' calculations

4. Findings

4.1. Main model

Our main findings are reported in Table 2. As detailed in the Analytic approach section above, Model 1 reports the results of an ordered logistic model with only the Women Asset Index and country dummies without other women empowerment indices and the control variables. The results suggest that for one unit increase in the Women Asset Index, the odds of achieving higher levels of educational attainment by women increase by approximately 38.1 % (Odds ratio = 1.381***). Women's Participation in the Decision-Making Index is added in Model 2. The results suggest that for one unit increases in this index, the odds of achieving higher levels of educational attainment by women increase by approximately 16.7 % (Odds ratio = 1.167***). At the same time, Model 2 demonstrates that the odds for the Women Asset Index remain significant and did not decrease considerably. The patriarchal Attitudes Index is added in Model 3 and indicates that for one unit increases in this index, the odds of achieving higher levels of educational attainment by women dropped by 28.4 % (Odds ratio = 0.716***). This model also shows that the odds for the other two indices remain significant and did not decrease considerably.

Table 2. Main results

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Women Asset Index	1.381***	1.365***	1.384***	1.357***	0.094***
	(0.023)	(0.023)	(0.027)	(0.035)	(0.747)
Women Household Decision Participation Index		1.167***	1.123***	1.165***	0.055***
		(0.014)	(0.016)	(0.025)	(0.866)
Women Patriarchy Index			0.716***	0.842***	-0.095***
			(0.008)	(0.013)	(1.345)
Rural				0.678***	-0.078***
				(0.027)	(0.486)
Age				1.042***	0.288***
				(0.007)	(16.95)
Age^2				1.000***	-0.359***
				(0.000)	(1760.2)
Employment				1.143***	0.049***
				(0.058)	(0.496)
Income Quantiles				1.143***	0.158***

	Model 1	Model 2	Model 3	Model 4	Model 5
				(0.009)	(2.857)
Father's Education				1.824***	0.406***
				(0.027)	(1.634)
Number of children				0.896***	-0.044***
				(0.019)	(0.972)
Single				1.246***	0.031***
				(0.079)	(0.338)
Widowed				1.077	0.013
				(0.061)	(0.407)
Divorced				1.284***	0.033***
				(0.079)	(0.318)
Separate				1.252*	0.012*
				(0.180)	(0.125)
Country dummies included	YES	YES	YES	YES	YES
McKelvey & Zavoina R^2	0.153	0.159	0.195	0.438	
Likelihood Ratio χ^2	3933.35***	4095.95***	3889.85***	5880.09***	
Log likelihood	-42174.7	-42093.4	-31474.1	-16368.0	
AIC	84419.4	84258.81	63022.11	32831.96	
BIC	84702.26	84549.74	63310.98	33180.54	
N	23897	23897	18167	10532	10532

Note: As detailed in the text, odds ratios are reported in Models 1 to 4, while standardized regression coefficients are reported in Model 5. Standard errors are in the arentheses.
Source: authors' calculations

All control variables are added in Model 4. This is our main model. After adding all controls, for one unit increase in the Women Asset and Women's Participation in Decision-Making indices, the odds of achieving higher levels of educational attainment by women increase by approximately 35.7 % and 16.5 % (Odds ratios are 1.357*** and 1.165***). In comparison, it indicates that for one unit increases in the Patriarchal Attitudes Index, the odds of achieving higher levels of educational attainment by women dropped by 15.8 % (Odds ratio = 0.842***). Thus, the results of the main model demonstrate support for all three above-posted hypotheses.

As observed, BIC and AIC measures plummeted considerably in Model 4, as compared with Model 1. Thus, BIC dropped from 84702 in Model 1 to 33180 in Model

4. Likewise, AIC declined from 84419 in Model 1 to 32832 in Model 4. Such results provide very strong evidence for adding the variables in our main Model 4. Similarly, adding more variables into Models 1 to 4 does not make main predictors of interest non-significant or considerably reduce their association with the outcome variable.

McKelvey & Zavoina's pseudo-R2 also grew from Model 1 to Model 4 providing support for adding more variables into the models. It increased from 0.153 in Model 1 to 0.438 in Model 4. Such results indicate that our main Model 4 explains about 50% of the variation in the outcome variable. Moreover, the significant value of the Likelihood Ratio (LR) Chi-Square test rejects the hypothesis that all coefficients in a given model are equal to zero. In other words, significant results of the LR test suggest that coefficients in the model are different from each other in a strict statistical sense. It should be highlighted that the LR test is significant in all estimated models.

In terms of control variables, all their effects are in the expected direction. Residing in rural areas and having more children reduces the likelihood of achieving higher levels of educational attainments. Conversely, living in wealthier families and having a father with higher levels of education are associated with an increased likelihood of achieving higher levels of educational attainments. Age has positive effects on education, while age-squared has a negative minuscule effect which suggests that as people get older the effect of age on educational attainments weakens and other variables become more important in shaping educational attainments.

4.2. Standardized coefficients

The results of main Model 4 are converted into standardized coefficients and reported in Model 5. The results suggest that for every standard deviation increase in the Women Asset Index, a woman's propensity to achieve higher levels of educational attainments decreases by 0.094 standard deviations. In comparison, for every standard deviation increase in women's decision-making participation, a woman's propensity to achieve higher levels of educational attainments decreases by 0.055 standard deviations. At the same time, a woman's propensity to achieve higher levels of educational attainments declines by 0.095 standard deviations for every standard deviation increase in patriarchal attitudes. Hence, the influence of women's assets appears to be the highest in magnitude among all measures of women's empowerment, followed by patriarchal attitudes and women's decision-making participation.

Importantly, analysis of standardized coefficients suggests that the influence of women empowerment should not be underestimated since the magnitude of their effect is close to those of well-known precursors of women's education in the estimated model such as living in rural areas, having more children, and having higher income. Indeed, the standardized coefficient for patriarchal attitudes is larger than one for living in rural areas. Equally, the standardized coefficient for women's

decision-making participation is similar in size to one for having more children, while the influence of women's assets is close to one of income.

4.3. Marginal effects

Odds ratios from our main Model 4 are transformed into marginal effects and reported in Table 3.

Table 3. Marginal effects

Education	**No education**	**Primary education**	**Lower secondary education**	**Upper secondary education**
Women Asset Index	-0.001***	-0.006***	-0.012***	-0.020***
	(0.0002)	(0.0010)	(0.0021)	(0.0034)
Women Household Decision Participation Index	-0.001*** (0.0002)	-0.004*** (0.0008)	-0.008*** (0.0016)	-0.014*** (0.0027)
Women Patriarchy Index	0.001***	0.004***	0.009***	0.015***
	(0.0002)	(0.0007)	(0.0013)	(0.0022)

Education	**Post-secondary education**	**Tertiary education**	**Bachelor's degree or more**	**Master's degree or PhD**
Women Asset Index	0.003***	0.014***	0.014***	0.009***
	(0.0005)	(0.0023)	(0.0023)	(0.0015)
Women Household Decision Participation Index	0.002*** (0.0004)	0.010*** (0.0018)	0.010 *** (0.0019)	0.006*** (0.0012)
Women Patriarchy Index	-0.002***	-0.010***	-0.010***	-0.007***
	(0.0004)	(0.0015)	(0.0016)	(0.0010)

Note: Marginal effects are based on the main Model 4. Standard errors are in the parentheses.
Source: authors' calculations

To conserve space, we report marginal effects only for the main predictors of interest, while full results are available upon request. As observed, the Asset Index increases the probability of women achieving post-secondary and tertiary education as well as receiving Bachelor's, Master's, and Ph.D.'s degrees. More specifically, one

unit increase in the Asset Index is associated with a 1.4 percentage point increase in the probability of obtaining a Bachelor's degree and with a 1.4 and 0.9 percentage point increase in the probability of obtaining tertiary education and a Master's degree.

The increase in Women's Participation in Decision-Making Index is also associated with improved chances to receive post-secondary, tertiary, Bachelor, Master, and Ph.D. levels education. Conversely, the increase in the Patriarchal Attitudes Index reduces the propensity of receiving post-secondary, tertiary, Bachelor's, Master's, and Ph.D.s. levels of education. Hence, the analysis of marginal effect provides further support to all three above-posted hypotheses.

4.4. Simulation

The results of predicted probabilities in women empowerment on educational attainment are reported in the first part of Table 4. The results expose considerable differences between different "types of women" depending on their empowerment level. For instance, the probability of achieving tertiary education is 12.4% for an "average woman".

Table 4. Results of simulation

Types	**No education**	**Primary education**	**Lower secondary education**	**Upper secondary education**
Average women: all predictors are held at their means	0.002	0.037	0.092	0.423
Women with the lowest level of empowerment	0.009	0.146	0.252	0.443
Women with the highest level of empowerment	0.001	0.016	0.042	0.281

Types	**Post-secondary education**	**Tertiary education**	**Bachelor's degree or more**	**Master's degree or PhD**
Average women: all predictors are held at their means	0.225	0.124	0.075	0.022
Women with the lowest level of empowerment	0.091	0.035	0.018	0.005

Women with the highest level of empowerment	0.254	0.200	0.155	0.052

Source: authors' calculations

In contradistinction, the probability of achieving tertiary education for a woman with the lowest level of empowerment dropped to only 3.5%. However, the same probability grew to 20% for a woman with the highest level of empowerment. The rest of the predicted probabilities can be interpreted in a similar manner. What is important, however, is that all predicted probabilities suggest that women with the highest level of empowerment have considerably higher chances of obtaining higher levels of educational attainment as compared with "average women" and women with the lowest levels of empowerment.

4.5. Robustness analysis

The main Model 4 is re-estimated by regions with the results reported in Table 5. As shown in Models 6 to 8, all predictors of interest are significant and have expected directions in all regions under investigation. The results provide additional support for all three posted hypotheses. At the same time, there is a variation in the size of the effect. Having more assets appears to have a stronger effect on education in Central Europe followed by Eastern Europe and the former Soviet Union. The significant results of the Likelihood Ratio test in Model 9 suggest that the regional differences in the effect of the Asset Index are significant in the strict statistical sense.

Table 5. Robustness analysis

	Model 6 (Eastern Europe)	**Model 7 (Central Europe)**	**Model 8 (former Soviet Union)**	**Model 9 (LR test to compare coefficient across models)**
Women's Asset Ownership Index	1.452***	1.579***	1.246***	$\chi 2$ (2)=14.68***
	(0.074)	(0.093)	(0.046)	
Women's Participation in Household Decision-Making Index	1.227***	1.132**	1.164***	$\chi 2$ (2)=0.96
	(0.056)	(0.053)	(0.034)	
Patriarchal Attitudes Index	0.902***	0.813***	0.850***	$\chi 2$ (2)=9.16**
	(0.026)	(0.024)	(0.020)	

Control variables included	YES	YES	YES
Country dummies included	YES	YES	YES
McKelvey & Zavoina's R2	0.453	0.488	0.369
Log likelihood	-4446	-3547	-7601
LR test $\chi 2$	1711***	1567***	2186***
N	2893	2446	5019

Source: authors' calculations

On the contrary, the Women's Participation in Decision-Making Index has the strongest effect in Eastern Europe followed by the other two regions. However, the non-significant result of the Likelihood Ratio test indicates that this difference is not statistically significant. Finally, patriarchy has the strongest effect in Central Europe, followed by the former Soviet Union and Central Europe. The regional differences in effect of patriarchy are statistically significant as shown by significant results of the Likelihood Ratio test.

5. Discussion

In this paper, we examine the influence of women's empowerment on women's education. Our theoretical argument is grounded on the perspectives of the Feminist Theory and the Resource Theory. Based on these perspectives, we hypothesize that patriarchal attitudes towards women are associated with a lower probability of women achieving higher levels of educational attainments. We also hypothesize that higher levels of women's asset ownership and women's participation in household decision-making are associated with higher levels of educational attainments. To empirically test the above-described hypotheses, we focus on a diverse set of 27 post-communist countries of Central Europe, Eastern Europe, and the former Soviet Union. We constructed the measures of patriarchal attitude towards women, women's asset ownership, and women's participation in household decision-making and utilized multiple statistical techniques to assess their influence on the probability of achieving higher educational attainments by women vis-à-vis other well-known predictors of women's education.

Our results confirmed all three posted hypotheses. Our main Model 4 suggests that an increase in women's assets is associated with the odds of achieving higher levels of educational attainment by women increased by 35.7% (Odds ratio = 1.357). Similarly, an increase in women's participation in decision-making is associated with the odds of achieving higher levels of educational attainment by women increased by 16.5% (Odds ratio = 1.165). In contrast, an increase in patriarchal

attitudes is associated with the odds of achieving higher levels of educational attainment by women dropped by 15.8% (Odds ratio = 0.842). The standardized coefficient analysis suggests the influence of women's assets appears to be the highest in magnitude among all measures of women's empowerment, followed by patriarchal attitudes and women's decision-making participation. Moreover, our results indicate that the magnitude of the influence of women's empowerment on educational attainments is at par with the influence of well-established predictors of women's education, such as residing in rural areas, having more children, and receiving higher income. Marginal effects analysis revealed that having more assets and more say in decision-making increases the probability of attaining post-secondary education, especially at Bachelor, Master, and Ph.D. levels. On the contrary, patriarchal attitudes reduce the probability of attaining post-secondary education including Bachelor, Master, and Ph.D. levels. Results of the simulation further indicate that women with the highest level of empowerment have a higher propensity to receive higher levels of education as compared with women with lower levels of empowerment. For instance, women with higher levels of empowerment have about a 14% probability of attaining a Bachelor's education as compared with about a 5% probability for women with the average level of empowerment. Finally, robustness analysis suggests that a significant influence of empowerment on education can be found in all regions under investigation.

This is one of the first studies that demonstrate that women's empowerment is an important determinant of women's education. Our findings suggest that studies on the determinants of women's educational attainments are likely to be biased unless the indicators of women's empowerment are explicitly controlled for. At the same time, our findings contribute to the extant literature on the influence of women empowerment on intimate partner violence, health outcomes (Thapa et al., 2018; Viens et al., 2016), and women's employment and a gap in gender salary and wages (Fortin, 2005).

Our results suggest that issues of women's asset ownership, women's participation in household decision-making, and patriarchal attitudes towards women should be at the top of the educational development agenda. This is especially important for post-communist countries where gender differences in educational access are significant (Habibov, 2015) and where the gender pay gap and access to employment widen throughout the transition period (Brainerd, 2000; Newell & Reilly, 2001; Habibov et al., 2019; Khitarishvili, 2019). However, a recent study by Aktakke et al. (2020) found that disparities in women's empowerment are not due to legislative or regulatory differences. Rather, women's empowerment is more likely to be influenced by informal conventions, attitudes, and expectations.

Conclusions

This paper focuses on the influence of women's empowerment on the educational attainment of women. The findings demonstrate that an increase in women's empowerment is linked with higher educational attainments. The issue of lack of women's empowerment must be urgently addressed to advance meaningful gender equality in access to education. This, in turn, requires serious commitment from the states and civil society institutions.

Hence, we argue that women's empowerment in these countries should be addressed through economic and political commitments. Government participation and partnership with women's organizations, human rights groups, and civil society institutions as well as financial and in-kind support for organizations and agencies working on advancing women's issues, should all be part of this commitment. To raise public awareness about the lack of women's empowerment and its consequences for women and the whole society, it is vital to openly debate factors hampering women's empowerment by actively engaging media organizations and educational institutions such as schools and universities.

Future studies on the topic may proceed in three main ways. First, they should focus on proving causality. Our study is based on a cross-sectional design and therefore cannot establish causality. Future studies are to employ designs that allow for establishing causal relationships, for instance, experimental or longitudinal designs. Second, they may wish to control for some covariates which are not readily available in our survey. Since we employ secondary analysis of the existing data, we cannot control for several factors which may potentially influence educational attainment, such as accessibility of education, for instance, time and distance to reach educational institutions as well as affordability of education, for example, official and unofficial out of pocket expenditures on education. Finally, more attention should be paid to the detailed investigation of regional variations in the link between various empowerment indicators and educational attainments. For instance, our results demonstrate that patriarchal attitudes are significantly more important for Eastern Europe than for Central Europe and the former Soviet Union, while women's assets are significantly more important for Central Europe than for Eastern Europe and the former Soviet Union. Such variation warrants future investigation.

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