The Long-Run Effects of Education Privatization on Labour Productivity

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Abstract. Education has long been regarded as an important determinant of the growth of labour productivity particularly for its nature as a major instrument for human capital investment. Many theoretical and empirical studies from the literature on development economics as well as on education influenced by the human capital theory have generally illustrated the positive association between the accumulation of knowledge and skills through educational attainment and the level of labour productivity or, in a broader term, economic growth. Over the recent decades, however, actors from the private entity have increasingly taken over the responsibility to run educational institutions to overcome prolonged budgetary pressure and enhance efficiency. This paper investigates the long-term labour productivity effects of education privatization. Calibrating the model using cross-national panel data on the private education share and labour productivity, the authors find that a higher rate of private school enrolment is positively correlated with a higher level of labour productivity in all specifications in the primary and secondary level of education. The detailed statistical analysis by national income level, however, shows that an increase in the share of enrolment in private secondary schools in low-income countries appears to have a negative impact on labour productivity unlike the case of high- and middle-income countries.

Research Contribution: This study explores the impact of education privatization beyond direct cognitive abilities of pupils or the quality of educational institutions/services and investigates empirically how it is associated with labour productivity, one of the major long-term effects of education that has been rather intuitively understood as a potential gain of education privatization.

Keywords: Education privatization · Labour productivity · Human capital · Low-fee private schools · International development

1 Introduction

Education has long been regarded as an important determinant of the growth of labour productivity particularly for its nature as a major instrument for human capital investment. Many theoretical and empirical studies from the literature on development economics as well as on education influenced by the human capital theory have generally

illustrated the positive association between the accumulation of knowledge and skills through educational attainment and the level of labour productivity or, in a broader term, economic growth. This approach has received widespread support on the international scale, and many individual states, regardless of their level of economic development, have been motivated to increase public expenditure on education at all levels. International organizations such as UNESCO, OECD, and the World Bank who serve as the arena for educational development and cooperation and economic growth have also extensively promoted such approaches to mobilize more resources from governments or donors to ensure accessibility to and quality of education.

On the other hand, another strand of literature in the field of education has shed light on recent privatization trend across the globe. Actors from the private entity such as enterprises, religious institutions, or other non-governmental bodies have increasingly taken over the responsibility to run educational institutions. Some of the most compelling reasons for education privatization, similar to the reasons for the privatization of other public goods, are prolonged budgetary pressure, increased efficiency, and better quality of services. Many developing countries in particular have faced mounting pressure to expand expenditure on education to ensure universal access since the early 1990s, under the influence of leading international education agendas such as the "Education for All." The private sector has become regarded not only as an entity to share some of the high burdens of financing for the production and delivery of education but also as who deliberately provides higher quality education in a more efficient way by operating under market principles.

All in all, a swath of cross-national studies that focus on the practical aspects of education privatization attempt to substantiate whether private schools outperform public ones across a number of domains such as learning outcome of pupils, teaching/teacher quality, and responsiveness or innovativeness of schools. Surprisingly, however, studies that examine the long-term macroeconomic effects of education privatization is scarce. The existing literature on education privatization hardly investigates its impact beyond direct cognitive abilities of pupils or the quality of educational institutions/services. Increased labour productivity, one of the major long-term effects of education as human capital theorists claim, has been rather intuitively, not empirically, understood as a potential gain of education privatization based on the logic that private school pupils show better academic performance than those in public schools. Moreover, the evidence on the comparative association between each level of private education, namely primary, secondary, and tertiary, and labour productivity growth is very thin.

Against this backdrop, the primary objectivity of this paper is to investigate the varying degrees of the long-term labour productivity effects of education privatization by education level. The authors calibrate the model using cross-national panel data on the private education share and labour productivity. The first phase of the empirical analysis focuses on the general correlation between the share of students' enrolment in private primary, secondary, and higher education institutions and GDP per hour worked per unit. It is followed by a more comprehensive empirical test that delves into whether the overall correlation remains consistent even allowing for the national income variation. The observations are divided into three groups, namely low-, middle- (including lower-middle and upper- middle), and high-income economies, according to the United Nations

classification measured by per capita gross national income. It is to examine whether the expansion of private schooling particularly in low-income economies is positively associated with higher labour productivity.

2 Education and Labour Productivity

Human capital theory, pioneered by Becker (1964) and Mincer (1974), has been one of the most widely accepted paradigms in the understanding of the economics of education (Carneiro, et al., 2010). In its broadest sense, human capital can be defined as "labour, managerial skills, and entrepreneurial and innovative abilities – plus such physical attributes as health and strength (Nakamura, 1981; p. 263)." Becker (1964), who initially formulated the theory, posited that resources embedded in individuals that make them more productive and get a higher rate of return in the future through monetary and psychic earnings - human capital – can be obtained mainly through education and training.

Mincer (1974) further developed the idea through the model of earnings, which shows a clear positive association between mean years of schooling and a private rate of return. The theory has become the dominant framework, although it has faced critiques for being overly simplistic and been reshaped in many respects over the last few decades. While the early literature on education and human capital focused on the variation in income across individuals, such a microeconomic underpinning has provided links for the analysis of the determinant factors of national-level growth. Operationalizing education as the school enrolment rates, completion/graduation rates, accumulated years of schooling, or public expenditure on education, a wealth of both single and cross-national studies has documented an association between education and factors related to the broader macroeconomic returns such as GDP growth (Barro, 2001), income inequality (De Gregorio and Lee 2002), and labour productivity (Bloom et al., 2003; Chansarn, 2010; Forbes et al., 2010; Nowak and Kijek, 2016).

The hypotheses regarding the impact of knowledge and skills on productivity have been examined through a series of single- and cross-country studies on the association between education and the total volume of goods and services produced (output) per unit of labour. Chansarn's (2010) regression analysis of 30 developed and developing economies from both the Eastern and the Western worlds during 1981 – 2005 reveals that the positive influences of education, represented by mean years of schooling, on the growth rates of labour productivity is statistically significant. A study of the determinants of labour productivity across 77 countries conducted by Belorgey et al. (2006), on the other hand, highlights the significance of school enrolment rates rather than mean years of schooling, arguing that the enrolment rates in primary and tertiary education have substantial impact on the productivity level with a relatively stronger coefficient for tertiary education, while the enrolment rate in secondary education does not appear to be significant due to its collinearity with tertiary education. A larger pool of single-country studies, e.g. Black and Lynch (1996) on the United States; Benos and Karagiannis (2016) on Greece; Nowak and Kijek (2016) on Poland; Arshad and Mali (2015) on Malaysia also show that higher levels of education and training are linked to higher labour productivity.

All in all, the majority of both single- and cross-country studies have provided empirical support to Becker's (1964) and Mincer's (1974) early approach on the economics

of education to the macroeconomic level. To the best of our knowledge, however, only a few studies, e.g. Black and Lynch (1996) and Belorgey et al. (2006), have included the variations of educational composition in measuring the magnitude of influence of education on labour productivity. In particular, while many studies use various proxies for educational attainment such as the enrolment rate or mean years of schooling, very few consider how different types of educational service providers, e.g. formal or informal, public or private, affect the dynamics of the association between education and labour productivity. This paper therefore attempts to fill this void by systematically analyzing whether there exists such a link between educational attainment from private institutions and the level of labour productivity. The next section illustrates the scholarly debate over the recent trend of education privatization.

3   Privatization of Education

Privatization of education has its roots in neoliberal approaches to the role of the state in education, emanating from Friedman (1955) who asserted that the introduction of free market competition particularly through voucher programmes would help improve the deteriorating quality of education in the traditional public-school system in America. According to Friedman (1955, p.124), the quality of education can be enhanced through "the rules of the game, enforcing contracts, preventing coercion, and keeping markets free," as a powerful incentive that could be potentially earned through market competition would lead schools to respond quickly to the varying demand for quality education. Chubb and Moe (1988), the strong advocates of the school choice approach, further idealized the impact of market mechanisms on education by offering a comparative analysis of the characteristics of public and private schools. Their findings suggest that private schools tend to possess the distinctive characteristics as autonomous market-driven actors that are likely to produce effectiveness while public schools are rather subordinate and abide by hierarchical systems, and that low-income families tend to be more severely affected by such bureaucratic ineffectiveness.

Since Friedman (1955), scholars have had a starkly different take on the issues around education privatization. A wealth of research has provided polarized empirical evidences around the benefits of private-sector engagement in education with regard to various aspects including financial stability, parental satisfaction, the quality of curriculum and school facilities, and learning outcome. Many authors have supported market principles introduced in the education sector with theoretical and empirical bases (e.g. Levin, 2000; Lubienski, 2009). The most commonly held argument for education privatization, among others, is its enhanced efficiency and effectiveness throughout the production, delivery, and management of educational services. Some scholars find that competition among private education providers leads schools to be more responsive to the demands of the educational market or individual consumers' (pupils' or parents') preference (Pedró et al., 2015) while securing profits, thus making schools not only use resources efficiently but utilize incentive schemes on teachers (Aslam and Kingdon, 2011; Kremer and Muralidharan, 2008).

On a different note, some advocates of education privatization argue that, in addition to higher efficiency and educational outcome, markets could also enhance accessibility

to education particularly for the marginalized. Many developing countries have recently seen the growth of so-called low-fee private schools (LFPS) for the delivery of basic education to those who cannot afford public school fees. The typical business model of LFPS is based on "low input costs to keep prices affordable for low- income families and competes with government-owned or supported schools by being closer to home and having longer opening hours (Pedró et al., 2015; p.6). It certainly is a growing phenomenon in many low-income countries in Sub-Saharan Africa, South Asia, and Latin America, and has provided educational opportunities for low-income families (Verger et al., 2016). When it comes to the quality of education provided by LFPSs, however, the overall evidence suggests that LFPSs often lag behind public or standard private schools. LFPSs tend to deprioritize teacher/teaching quality to keep tuition fee low, making them to hire less qualified and less trained teachers who are paid much less than the public school teachers (Andrabi et al., 2008; Riep, 2014). Many LFPSs also often more intensely use physical resources by, for example, increasing teacher-pupil ratios or reusing teaching materials (Verger et al., 2016). Moreover, overall strength of empirical evidence for the claim that private schools including LFPSs geographically reach the poor is also weak (Andrabi et al., 2008; Pal, 2010; Woodhead et al., 2013).

The rigorous review of the impact of education privatization suggests that its empirical evidence base is rather unsettled. Moreover, when it comes to the mid- to long-term effect of education privatization on either individuals or the economy, empirical issues remain even largely unexplored despite the its critical policy implications, except for some exceptions such as those uncovering the association between attending private schools and labour force participation or wages (e.g. Asadullah, 2009; Brown and Belfield, 2001; Bedi and Garg, 2000). Considering that little is known on the long-run effectiveness of education privatization in enhancing other macroeconomic values than employment and wage, this paper is expected to contribute to filling the research gap by estimating the labour productivity effect of private schooling.

4 Model Specification

The rationale of this study is to examine the impact of the privatization of education on labour productivity, controlling for a set of factors closely related to the productivity growth such as technology investment, health expenditure, and the Internet usage. The hypotheses are tested using data sources mainly from the World Bank and OECD. The datasets from the World Bank consist of private primary education and private secondary education enrolment ratio, researchers in R&D (per million people), health expenditure, the percentage of individuals using the Internet, labour force participation rate, and gross fixed capital formation. In total they cover 266 observations between 1960-2020. The percentageof private tertiary education enrolment and the rates of labour productivity (GDP per hour worked) have been taken from the OECD, both of which cover a total of 277 observations including individual countries and regions between 2010-2021. Because of the differences in time dimension across the data sources and the missing values of some countries, it can be condensed as an unbalanced dataset.

This study uses an unbalanced panel regression to investigate the consecutive periods, for which data on all explanatory and control variables are obtained in the different

specifications. The simple Cobb- Douglas production function is applied to measure the impact of private education and other explanatory variables on labour productivity. It can be transformed into a linear form for regression by taking the natural logarithm of the production function as it is shown below:

$$\log(LP_{i,t}) = \log(Labor_{i,t}) + \log(Capital_{i,t}) + \log(Primary_{i,t-a}) + \log(Secondary_{i,t-b}) + \log(Tertiary_{i,t-c}) + \log(GERD_{i,t-d}) + \log(Researcher_{i,t}) + \log(Internet_{i,t}) + \log(Health_{i,t}) + \varepsilon_{i,t}$$

The dependent variable of the statistical model is specified as LP, which is an economic indicator that has been perceived widely as a source of economic growth and improvements in competitiveness and living standards within an economy. It represents the total amount of output, which is measured in terms of real gross domestic product (GDP), produced by an hour of labour, which is measured in terms of the number of persons employed (head counts), during the given time reference period. Labour and capital are included to control for the basic inputs in the Cobb-Douglas production function. Labour is specified as the share of the working-age population aged 15 and over in total employment, while Capital denotes gross fixed capital formation.

This study incorporates explanatory variables of private primary, secondary, and tertiary education enrolment rates as proxies to determine the impact of privatized education on labour productivity. Primary and Secondary are measures of private primary and private secondary education enrolment as a ratio of total number of primary and secondary school students, respectively. Tertiary measures the percentage of private university enrolment.

Different specifications of the model control for inputs for innovation or technology capability development, technology usage, and health improvement that have been widely examined in the literature as factors that affect national productivity. To evaluate the aspects of innovation as a source of economic growth, this study uses research and development (R&D) expenditure and the number of researchers, in congruence with Ishchy (2019). GERD controls for gross domestic expenditure on R&D as a ratio of GDP, while Researcher is the number of researchers in R&D as a ratio of total population. The percentage of individuals using the Internet (Internet) is considered in this study to account for the role of the information and communication technology in promoting economic development. Lastly, health expenditure (Health) is used as a proxy to determine the qualitative aspect of population health.

The second phase of the empirical examinations involves a further test on how the impact of education privatization on labour productivity varies by basic economic conditions of each state. Based on the classification by the United Nations, states have been categorized by their level of economic development as measured specifically by gross national income (GNI) per capita. Accordingly, states have been classified as high-income, middle-income (including upper middle- and lower middle- income), and low-income groups.

The traditional privatization objectives, developmental patterns, socio-economic infrastructure, or other variations in privatization practice within political or regulatory frames may differ by level of economic development, which could possibly contribute to dynamics of school choice or comparable reputation of public/private education institutions. For example, in many developed economies who are generally more equipped

with capital, private education institutions are often perceived as having higher quality curriculum, teachers and teaching materials, and it encourages competition and attracts students with higher academic performance to private schools. On the other hand, many private schools in developing countries with lower gross fixed capital formation in general are 'low-fee private schools' that are for the purpose of widening access and therefore choice for families in marginalized groups or peripheral areas. In these countries, empirical evidence on whether students attending private schools show better educational performance is extremely fragmented and often shows negative associations between private schooling and economic growth. Such evidence informs the second empirical test on the correlation between the private school enrolment and labour productivity by dividing countries into income groups.

5   Empirical Results

The regression results presented in Table 1 shows that the coefficients of ***Primary*** and ***Secondary*** are positive and statistically significant across all specifications, meaning that the high enrolment rates in private primary and secondary schools are positively associated with labour productivity. In detail, the standardized coefficients of ***Primary*** and ***Secondary*** are both positive and statistically highly significant with 99% confidence interval in Model 2 when no control variables are introduced. Once the control variable ***Capital*** is held constant, the coefficients of both variables remain positive and significant while the p-value of ***Secondary*** slightly increases. The fact that adding the control variable related to gross fixed capital formation helps us confirm that a state's net investment in acquisitions of less disposals of fixed assets cannot be an alternative explanation for the observed relationship between education privatization and labour productivity.

The standardized coefficients of ***Primary*** and ***Secondary*** are also positive and statistically significant in Model 4, 5, 7, and 8, where the employment rates, gross domestic expenditure on R&D, Internet usage, and health expenditure ratio are controlled for, respectively. The significance of the ***Primary*** variable decreases, however, once R&D personnel ratio is controlled for in Model 6. Finally, when all control variables are introduced, the coefficients of ***Primary*** and ***Secondary*** are still positive and hold high significance (see Model 1), suggesting that the enrolment rates in private primary and secondary schools are significant determinants of the variation in the level of labour productivity, or the total value that each worker creates per unit of his or her input. It shows that the result remains consistent even when a set of various control variables ranging from basic economic indicators such as capital and employment rates to the factors related to technological advancement such as GERD, R&D personnel, and Internet usage, and health expenditure, which has been traditionally discussed as one of the main factors that affect long-term labour productivity, is held constant.

On the other hand, the coefficient of the variable ***Tertiary***, which tests the impact of private tertiary education, rather fluctuates based on which other control variables are included in the model. Its significance notably decreases once the ***Capital*** variable is introduced, and does not appear to hold a statistical significance when it comes to its impact on labour productivity. The variable ***Tertiary*** is also statistically insignificant in the complete model with all control variables included. Accordingly, we cannot reject

Table 1. The impact of education privatization on labour productivity

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
log_private-primary-student-ratio_lag12years	0.03** (0.04)	0.08*** (0.00)	0.10*** (0.00)	0.08*** (0.00)	0.09*** (0.00)	0.04 (0.14)	0.05*** (0.00)	0.09*** (0.00)
log_private-secondary-student ratio_lag6years	0.04** (0.01)	0.08*** (0.00)	0.03** (0.03)	0.08*** (0.00)	0.07*** (0.00)	0.06** (0.01)	0.05*** (0.00)	0.09*** (0.00)
log_private-university-student ratio_lag2years	-0.01 (0.13)	-0.02** (0.04)	-0.01 (0.14)	-0.02** (0.04)	-0.01 (0.50)	-0.01 (0.62)	-0.03*** (0.00)	-0.01* (0.07)
log_capital	0.13*** (0.00)		0.16*** (0.00)					
log_employment-ratio	-0.09 (0.29)			0.02 (0.79)				
log_gerd	-0.04** (0.02)				0.01 (0.40)			
log_r&dpersonnel-ratio	0.13*** (0.00)					0.10*** (0.00)		
log_internet-use-ratio	0.11*** (0.00)						0.12*** (0.00)	
Log_health-expenditure-ratio	-0.09** (0.02)							-0.09*** (0.00)
Constant	8.36*** (0.00)	10.86*** (0.00)	6.91*** (0.00)	10.87*** (0.00)	11.19*** (0.00)	11.67*** (0.00)	10.81*** (0.00)	10.65*** (0.00)
Observations	324	677	643	677	386	353	612	580
R-squared	0.478	0.000	0.184	0.000	0.027	0.4804	0.2803	0.0093

*p < 0.1; **p < 0.05; ***p < 0.01.

the null hypothesis that student's high enrolment in private tertiary education institutions does not affect long-term national labour productivity. The plausible explanation to the lack of significance of the ***Tertiary*** variable might be that this cross-sectional panel regression does not effectively capture the implicit changes in public perception and the reputation of public/private tertiary institutions in each state and their impact on school choices over time. The impact of such internal variations may be more dynamic than in primary or secondary education as tertiary education is generally not part of government's free compulsory services, which therefore makes sectoral variations including tuition fee, students' socio-economic status, direct impact on individual's future job, comparable reputation, or public perception necessary to be more comprehensively considered to examine the factors influencing private schools' relative advantage.

In the second phase of the empirical analysis, the impact of education privatization on labour productivity differed by national income level is tested. The regression is divided into three groups of countries, namely low-, middle-, and high income, making the total number of observations smaller than the first regression model. Some control

Table 2. The impact of education privatization on labour productivity, by income level

Variable	High Income Countries	Middle Income Countries	Low Income Countries
log_private-primary-student-ratio_lag12years	0.074*** (0.00)	0.095*** (0.00)	0.074*** (0.00)
log_private-secondary-student ratio_lag6years	0.030** (0.01)	0.062** (0.01)	-0.058** (0.01)
log_private-university-student ratio_lag2years	-0.018*** (0.00)	0.012 (0.57)	0.005 (0.89)
log_capital	0.111*** (0.00)	0.159*** (0.00)	0.132*** (0.00)
log_employment-ratio	0.429*** (0.00)	-0.668*** (0.00)	-2.644*** (0.00)
log_health-expenditure-ratio	-0.076** (0.02)	0.008 (0.88)	0.046 (0.41)
Constant	8.962*** (0.00)	6.578*** (0.00)	4.885*** (0.00)
Observations	264	245	45
R-squared	0.137	0.117	0.713

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

variables used for the first statistical test, including R&D expenditure, R&D personnel, and internet use, now cover a much shorter period. Thus, they will be dropped from the second regression to confirm the sufficiency of observations.

The statistical results illustrated in Table 2 present the positive effects of private primary and private secondary education on labor productivity in high- and middle-income economies, all of which are statistically significant. However, the share of enrolment in private secondary education institutions is rather negatively associated with the labour productivity growth in the low-income economies. The fact that the coefficients of private secondary education exhibit the most dynamic variation by income level is particularly significant as the secondary level of education is where the curriculum and degree are more directly connected to skills, future employment and income the primary education and is, in particular, where vocational education and training generally begin. The result therefore confirms that the widespread expectations for higher quality educational resources and services offered by private schools, their attraction of high-performing students, and the consequent long-term impacts on labour productivity is only supported for the case of economically wealthy economies. On the other hand, the result for low-income economies where private secondary education is rather negatively associated with labor productivity growth suggests that a wealth of case studies neatly addressing the issue of lower quality education provided by privately-run institutions are valid in examining not only its short- to mid- term or microeconomic-level impact on individuals' educational performance, employment, and income, but long-term labour

effects at a more macroeconomic scale. In addition, the coefficients of private primary and secondary education in middle-income economies are greater than in high-income economies. As the ratio of students in private schools in the high-income economies are higher than that of the middle-income ones, the decreasing return to scale of labors could make their coefficients less than others.

Unlike primary and secondary education, the coefficients of tertiary education privatization are not being both positive and statistically significant at the same time in any specifications. In high-income economies, a higher share of private tertiary institution enrolment is rather negatively associated with labour productivity while it appears to have statistically insignificant impact in the case of middle- and low-income economies. It is plausible to some extent to attribute the negative association between private tertiary education and labour productivity in high-income economies to some legitimacy issues that many European private tertiary institutions face with (Kwiek, 2020; Levy 2014). Unlike some developed economies such as the United States where private universities hold prestigious elite status, high international university ranking and prestige of an institution are correlated with advanced research capacity and norms that have been formed primarily within the public system in most European countries, and private institutions are still often deviated from such firmly established perspective (Kwiek, 2020).

It is also reasonable to assume that the lack of significance of the private tertiary education variable in the cases of low- and middle-income economies may be due to the fact that this empirical test does not capture internal variations of demand-absorbing type private higher education institutions. Private higher education institutions can be conceptually categorized into religious, elite, and demand-absorbing types (Levy, 1992). Among these, the demand-absorbing type schools are non-elite in nature as they emerge as a response to a growing public demand for higher education, and they are prevalent in economically less developed economies in general. A series of recent empirical studies, however, have shown a great deal of internal variation within this type of private institutions, which makes it difficult to be analyzed as one single conceptual framework.

All in all, the findings highlight that increases in the share of private school enrolment particularly at the lower level of education are strongly associated with growth in labour productivity. The positive association is more obvious in mid- and high-income economies while private education rather seems to decrease labour productivity in low-income economies presumably due, in part, to the proliferation of low-fee private schools at primary and secondary level in economically or geographically disadvantaged communities.

6 Conclusion

The introduction of free-market principles into the education sector has become ubiquitous over the last few decades regardless of varying political and economic background. The hardening of budget constraints and increasing demand for higher quality education have particularly encouraged governments and administrations of many developing countries to transfer considerable responsibilities and functions of education service to the private entity. Building on a volume of empirical studies on short-term effects of education privatization such as the gap in teaching quality or academic performance

between public and private education institutions, this study made an attempt to examine the long-term macroeconomic impact of education privatization on a state's labour productivity. As the over regression result suggests, a higher rate of private school enrolment is positively correlated with a higher level of labour productivity in all specifications in the primary and secondary level of education. The more detailed statistical analysis by national income level, however, shows that an increase in the share of enrolment in private secondary schools in low-income countries appears to have a negative impact on labour productivity unlike the case of high- and middle-income countries. Such results allow us to confirm that, as a wealth of previous research has provided polarized empirical evidences around the short-term benefits of private-sector engagement in education, the increasing engagement of private actors in producing and delivering education services does not necessarily create more socioeconomic benefits. A conclusion is the last part of something, its end or result. When you write a paper, you always end by summing up your arguments and drawing a *conclusion* about what you've been writing about.

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