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**Exploring the relationship between country-level ambition,
curiosity, educational expenditure and GDP per capita: An
international study**

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Abstract

The intention of this study is to contribute to the body of literature linking psychological traits to educational and macroeconomic variable by exploring the relationships between ambition and curiosity, educational expenditure and GDP per capita. We analysed economic data from the UNESCO institute for statistics (2014d) data base, and data for the Ambition scale and Curiosity and exploration inventory-II from the International Wellbeing Study (2014b). The sample used for this study consisted of 4,905 adults (79.5 % female and 20.5 % male) from 24 countries. Our findings suggest that country-level ambition and curiosity negatively predict GDP per capita. Only ambition significantly predicted educational expenditure. The differences between our results and the results in previous research show that the relationship between conative traits and macroeconomic variables is not a simple one, but the existence of some robust links between country-level personality traits and economic variables highlights the importance of further research on the area.

Keywords: curiosity, ambition, GDP per capita, educational expenditure

Introduction

Can personality traits and levels of general cognitive ability on a national level explain a significant proportion of variance in GDP? Stolarski, Zajenkowski and Meisenberg (2013) suggest that they can. Their model with intelligence and personality accounted for 70 % of the variance in GDP, whereas IQ alone accounted for 65 %. If general mental ability can explain about 65 % of variance of GDP, what personality traits constitute those remaining five percent? A body of research exists that works to explain which personality traits behave the best when capturing variability in economic variables related to capital, expenditure and growth. Our goal is to expand the body of research by exploring the relationships between public educational expenditure, GDP per capita, and country-level expressions of curiosity and ambition – two personality traits that have not been previously researched in the given context.

Economics, personality and mental ability

There are a few potential logical links between socioeconomic variables and personality traits, both on an individual and on a national level. Sometimes, however (as discovered in e.g. Stolarski et al., 2013), the traits function differently depending on whether the comparison is on an interindividual or an international level. The literature on links between macroeconomic variables and national-level personality traits is relatively scarce also because of the challenges in cross-cultural research.

From a theoretical point of view, it makes sense to expect economic payoffs from openness and conscientiousness (Costa and McCrae, 1992, in Stolarski et al., 2013), and following Lynn and Vanhanen's (2002, in Stolarski et al., 2013) hypothesis, one could expect a positive effect on GDP from intelligence and conscientiousness, as they are both related to occupational success and higher income. The relationship could also be mediated by other variables such as economic freedom and scientific achievement (see Rindermann & Thompson, 2011). The empirical support for these hypotheses is somewhat mis-matching. McCrae and Terraciano (2005) discovered a

positive correlation between GDP per capita, extraversion, openness and agreeableness. Stolarski et al. (2013) discovered that the correlation was strongest between IQ and GDP ($r = .78$) followed by extraversion ($r = .55$), agreeableness ($r = .44$) and openness ($r = .36$), and that only intelligence and extraversion were significant predictors of GDP in their regression model. On the other hand, in a study by Kirkcaldy, Furnham and Martin (1998), none of their personality traits (neuroticism, psychoticism and extraversion) were significantly related to, or significantly predicted socioeconomic variables.

Meisenberg, Maciej and Zajenkowski (2013) provide an explanation on how openness together with intelligence influences economic variables. They argue that looking at the nature of openness and intelligence, objective (IQ) and self-reported (openness) intellectual characteristics play a significant role in a country's economic functioning. Some individuals are willing to invest a significant fraction of their income into entrepreneurial activities, which requires a future orientation and openness-related traits (McCrae, 1996), such as creativity and novelty seeking. The authors argue that a combination of intelligence and openness is expected to lead to optimal economic outcomes (Meisenberg et al., 2013). In our study, we look at the role of curiosity and ambition in a similar light, as something that may relate to public educational expenditure as a long-term effort to influence a country's economic standing.

Curiosity

Kashdan et al. (2009) define curiosity as something that captures people's propensity to stretch their capabilities. They further on define the concept as recognizing, embracing, and seeking out knowledge and new experiences. The functions of curiosity include being interested in new things and possessing an open and receptive attitude toward the target of attention (Bishop et al., 2004). Silvia (2006, as cited in Kashdan et al., 2009) argues that curious people devote more attention to an activity, engage in deeper levels of information processing, remember information better and tend to persist on tasks until meeting the set goals. The functions of curiosity thus include better learning, exploring and immersing oneself in an activity

(Loewenstein, 1994), and it is suspected to play a role in the development of traits such as intelligence and wisdom (Kashdan et al., 2009).

Authors of the Curiosity and exploration inventory-II (Kashdan et al., 2009) propose that one central facet of curiosity is exploration or *stretching*, which can be defined as actively seeking opportunities for new information and experiences. As the second facet of curiosity they propose *embracing*, or as they explain it, the willingness to embrace the novel, uncertain, and unpredictable nature of everyday life (Kashdan et al., 2009).

Ambition

Ambition is often mentioned in social science research, but studied surprisingly infrequently. The construct is often defined in either of the two following ways, which in our opinion are certainly not mutually exclusive:

- 1) In terms of goals or plans for accomplishments, where ambition is often mentioned as a source of individual differences in goals (Locke & Latham, 2002; Mento et al., 1992).
- 2) As a trait that tends to overlap with other constructs, such as conscientiousness (Schwyhart & Smith, 1972).

Judge and Kammeyer-Mueller (2012) define the concept as “the persistent and generalized striving for success, attainment, and accomplishment.” (Judge & Kammeyer-Mueller, 2012, p. 759). They propose a model of ambition, in which ambition is placed as a middle level trait, which means, that it serves “as the interface where traits and contexts come to manifest themselves in the environment” (Judge & Kammeyer-Mueller, 2012, p. 762). According to the authors, ambition is stable and consistent over time and across situations, but tends to be more contextualized. The authors argue that ambition arises from individual differences in psychological traits such as conscientiousness, extraversion and neuroticism, the individual’s general mental ability, and his or her socioeconomic background. Ambition itself has implications in predicting an individual’s level of income and occupation prestige. The authors also state, that “ambition has stronger effects on career and life success than

do distal personality traits, ability and socioeconomic status” (Judge & Kammeyer-Mueller, 2012, p. 770).

Education and educational expenditure

Education can be considered a factor that may lie in the intersection of personality traits, general mental ability and national wealth and well-being. Robert (1991, in Olaniyan & Okemakinde, 2008) developed a human capital model which displays the effects of education and human capital creation on the differences in labour productivity and in technological development all around the globe. There are several ways of viewing the expansion of education-accelerated economic growth and development. Education can be considered an investment in human capital – educate part of the community and the whole of it benefits. There are also benefits for the individual, as investment provides returns in the form of individual economic success and achievement. Investing in human capital is also critical for innovations, research and development activities. Education can be seen as an intentional effort to increase the resources needed for creating new ideas and thus, any increase in education should directly accelerate technological progress (Olaniyan & Okemakinde, 2008).

The belief that education is an engine of growth rests on the quality and quantity of education in the given country. Olaniyan and Okemakinde (2008) argue that education is both an economic consumer and capital good because of the utility it offers to a consumer, and because it also serves as an input into production of other goods and services. And so education creates improved citizens and helps upgrade the general standard of living in a society. This increasing faith in education as an agent of change in many developing countries has led to a heavy investment in it. If we consider that formal education is highly instrumental and even necessary to improve the production capacity of a population, we can see a basic justification for large public expenditure on education both in developing and developed countries (Fagerling & Saha, 1997; in Olaniyan & Okemakinde, 2008). Perhaps due to this reason, improvement in education is a very significant explanatory variable for East Asian economic growth (Robert, 1991; in Olaniyan & Okemakinde, 2008). Countries

such as Hong Kong, Korea, Singapore and Taiwan have achieved unprecedented rates of economic growth while making large investments in education (Olaniyan & Okemakinde, 2008). Olaniyan and Okemakinde (2008) conclude that education plays a significant role in the economy of a nation. Educational expenditures constitute a form of investment, which results in greater output for society and enhanced earnings for the individual.

Summary of introduction

As a summary - according to a body of earlier literature, conative and cognitive traits can relate to the educational variables and different factors of well-being of nations. The intention of our study is to contribute to this body of literature by exploring the relationships between country-level ambition and curiosity, educational expenditure and GDP per capita. We hypothesize that curiosity could relate to GDP per capita and educational expenditure through its role in behaviour as something that facilitates learning, exploration and immersion in activity (Loewenstein, 1994). We suspect that there could be a relationship between curiosity and educational expenditure, as governments who place more value on education would be more likely to promote manifestations of curiosity and exploration in their citizens. We also suspect a positive relationship between ambition, GDP per capita and educational expenditure, as ambition is a trait with strong effects on career and life success even beyond those of more distal personality traits, ability and socioeconomic status (Judge & Kammeyer-Mueller, 2012).

Method

Data were obtained from The International Wellbeing Study (2014b), initiated in 2009 by Jarden, McLachlan, Jose, Mackenzie, Simpson and Kashdan. The study was designed to »capture the entire picture of what it means to be healthy and most importantly, track people to understand how they change over time« (International Wellbeing Study, 2014a). In this international study, participants completed a questionnaire battery consisting of demographic questions and 17 questionnaires from the field of positive psychology. Each participant completed the questionnaire five times in three month intervals between the years 2009 and 2011. At the end of data collection, the final sample consisted of 7,616 participants.

For the purpose of our study, we extracted the data from the first assessment for two of the scales – Ambition scale (as a part of the Grit scale in the International Wellbeing Study – Study Questions, 2014c) and Curiosity and Exploration inventory-II (Kashdan et al., 2009), for countries, which met the criteria of having a sample size of more than twenty. We further on excluded countries for which data of GDP per capita and Educational expenditure were not available from online sources.

Participants

The final sample used for this study consisted of 4,905 individuals – N = 3,901 (79.5 %) female and N = 1,004 (20.5 %) male – from 24 countries. Age mean for this sample was 33.05 (*SD* = 13.37), minimum being 16.0 and maximum being 84.0 years of age. Numerous, frequency and percent by gender and information about age on a national level are reported in table 1.

Table 1.

Numerus, gender, age by countries, and reliability coefficients for central measures.

	N	Gender				Age			Cronbach's Alpha	
		Female		Male		Min	Max	M	CEI-II	AMB
		Frequency	Percent	Frequency	Percent					
Argentina	21	17	81.0	4	19.0	24	84	46.57	.88	.45
Australia*	328	270	82.3	58	17.7	-	-	-	.89	.78
Belgium	21	17	81.0	4	19.0	22	64	36.71	.83	.81
Brasil	56	39	69.6	17	30.4	19	84	36.41	.83	.54
Canada	124	106	85.5	18	14.5	18	76	38.73	.87	.64
Czech Republic*	209	163	78.0	46	22.0	-	-	-	.82	.65
Finland*	322	170	52.8	152	47.2	-	-	-	.88	.65
France	30	21	70.0	9	30.0	18	58	33.67	.86	.76
Germany	123	87	70.7	36	29.3	19	62	28.38	.86	.63
Guatemala*	33	31	93.9	2	6.1	-	-	-	.86	.75
Hungary*	743	623	83.8	120	16.2	-	-	-	.87	.68
India	44	36	81.8	8	18.2	18	57	25.23	.92	.71
Italy	27	20	74.1	7	25.9	23	56	37.11	.83	.71
Mexico	138	98	71.0	40	29.0	17	75	36.84	.82	.58
New Zealand	1558	1306	83.8	252	16.2	-	-	-	.90	.73
Norway	97	69	71.1	28	28.9	18	80	32.72	.85	.78
Philippines	106	98	92.5	8	7.5	16	54	22.23	.86	.58
Portugal	74	55	74.3	19	25.7	20	70	34.15	.88	.68
Russia*	136	108	79.4	28	20.6	-	-	-	.85	.78
Slovakia*	85	73	82.0	16	18.0	-	-	-	.88	.50
Slovenia*	161	133	82.6	28	17.4	-	-	-	.87	.71
South Africa	38	24	63.2	14	36.8	20	66	33.55	.69	.81
Spain	26	22	84.6	4	15.4	21	56	31.15	.87	.73
United Kingdom	401	315	78.6	86	21.4	16	79	33.40	.88	.77

Note. For the countries marked with * we are not reporting information about age because of suspected coding errors in the original data.

CEI-II = Curiosity and exploration inventory-II; AMB = Ambition scale.

Measures

Curiosity and exploration. In The International Wellbeing study curiosity was measured by Curiosity and exploration inventory-II (CEI-II) developed by Kashdan et al. (2009). The inventory consists of ten items describing attitudes and behavior (e.g. “*Everywhere I go, I am out looking for new things or experiences.*”), which are divided on two subscales (Stretching and Embracing), each capturing five of the items. Participants respond to items on a five point Likert-type scale (from 1 – “very slightly or not at all” to 5 – “extremely”). Authors report internal reliability coefficients for the

whole scale ranging from .83 to .86 (Cronbach's alpha), and so estimate the internal reliability being adequate. In our study, for the sake of simplification and some difficulties in differential interpretation of the two different subscales in a very large context, we decided to use only the total score for the scale. Its internal reliability coefficient (Cronbach's alpha) across the entire pool of all participants was sufficient (.87).

Ambition. Ambition was measured as a part of Grit scale in The International Wellbeing Study questionnaire battery (2014c). The scale consists of five items (e.g. *"I aim to be the best in the world at what I do."*), which are answered on five point Likert-type scale (from 1 – "not at all like me" to 5 – "very much like me"). In our sample, the internal reliability coefficient for the items was .70 (Cronbach's alpha). We cannot report reliability information from the scale's original authors due to lack of information about validation of this scale.

Macroeconomic measures. Following our hypotheses, we extracted information about GDP per capita (in US\$) and Public expenditure on education as a proportion of total government expenditure from the UNESCO Institute for statistics (2014d) data base. From now on we will refer to these measures as to GDP per capita and educational expenditure. We obtained information on these measures for every country in our sample for the five year period during which that data was collected (from 2008 to 2012) and averaged them for the purpose of analysis.

Procedure

After formulating initial research questions, we obtained authorization for data use from the authors of The International Wellbeing Study. Following that, we selected the countries for the sample, influenced by macroeconomic data availability for each country. After the country selection, we performed our analyses.

Results

Descriptive statistics of ambition and curiosity across all individual participants are reported in table 2. Table 3 contains a report of descriptive statistics for the same two variables after averaging them over countries, as well as our macroeconomic variables.

Table 2.

Mean, standard deviation, minimum, maximum, skewness, kurtosis, and test of normality on individual level (all countries included).

	<i>M</i>	<i>SD</i>	Min	Max	Skewness	Kurtosis	Kolmogorov-Smirnov* <i>Statistic</i>
Ambition	3.35	0.83	1.00	5.00	-.231	-.441	.072
Curiosity	32.15	7.76	10.00	50.00	-.197	-.324	.051

Notes. *Lilliefors Significance Correction

Table 3.

Descriptive statistics for ambition and curiosity across the participant pool and for the macroeconomical variables.

	<i>M</i>	<i>SD</i>	Min	Max	Skewness	Kurtosis	Kolmogorov-Smirnov* <i>Statistic</i>
Ambition	2.91	0.20	2.93	3.79	.050	.067	.112
Curiosity	33.13	1.32	30.64	36.50	.379	.434	.176
Educational expenditure	12.75	2.92	9.22	19.28	.874	-.504	.196
GDP per capita	26202.13	13874.30	3254.06	58225.51	.006	.131	.120

Notes. *Lilliefors Significance Correction. *M* = arithmetic mean, *SD* = standard deviation, *Min* = minimum, *Max* = maximum.

In order to explore the relationships between the central variables of this study, we performed a preliminary correlational analysis. Correlations between all of the included variables are reported in table 4. Only the educational expenditure variable appeared to be normally distributed on the international level, so we computed Spearman's correlational coefficients.

Table 4.

Spearman's correlational coefficient for central study variables.

	1.	2.	3.	4.

1. Ambition	-			
2. Curiosity	,579**	-		
3. Educational expenditure	,502*	,034	-	
4. GDP per capita	-,493*	-,375	-,126	-

Notes. * $p < .05$ (two-tailed), ** $p < 0.01$ (two-tailed).

Initially, we suspected a significant relationship between curiosity and both macroeconomic variables. However, a significant positive relationship was discovered only between ambition and the macroeconomic variables. The results display some relevance of our hypotheses, with a plenty of room for reflecting on the direction of the results and discussion regarding the lack of statistical power of our methods. Ambition was discovered to have a significant positive correlation with educational expenditure ($r_s = .50$, $p < .05$), and the correlation between ambition and GDP per capita also appeared significant, although negative ($r_s = -.49$, $p < .05$). Correlations between curiosity and macroeconomic factors did not prove to be significant, although the relationship between curiosity and GDP per capita was close to reaching significance ($r_s = -.375$, $p = .078$). The relationship between both psychometric variables was quite strong ($r_s = .579$, $p < .01$), which could be either due to a connection between the underlying traits, or due to systematic factors related to the assessment procedure.

For a better representation of our idea and results, we considered a model, which includes all of the main variables of the study (figure 1).

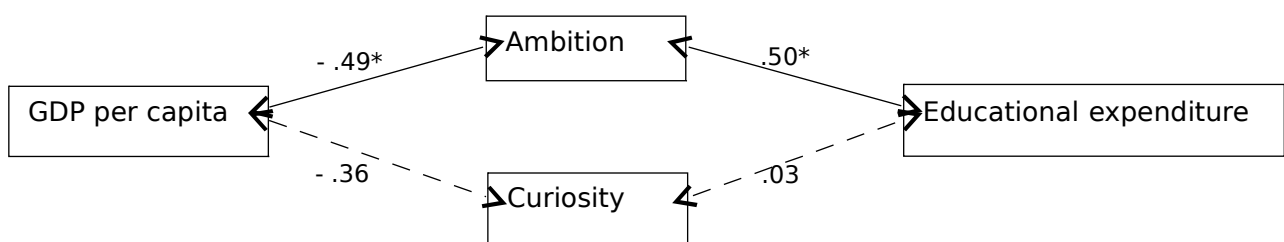


Figure 1. Hypothesized model results. Solid lines represent statistically significant relationships, while the dotted lines represent non-significant relationship. * $p < .05$, two-tailed, ** $p < .01$, two-tailed.

Regression

Even though the results from our correlational analysis suggested that the relationship between macroeconomic factors and ambition is more significant than the relationship between macroeconomic factors and curiosity, we wondered whether a regression model could better describe the relationship between our central variables. We expected GDP per capita to predict ambition and curiosity, and on the other hand we expected ambition and curiosity to predict educational expenditure.

We made three regression models. In the first two, we entered GDP per capita as a predictor of both ambition and curiosity, and in the third, we entered ambition and curiosity as predictors of educational expenditure. For all of the proposed models, assumptions of homoscedasticity and linearity were met.

In our first model, we predicted ambition from GDP per capita. The model was significant ($\beta = -.52, p < .05$) and explained 27.3% of the variance ($R^2 = .27, F(1,21) = 7.88, p < .05$). The negative beta coefficient implies a declining slope, which means that individuals in countries with a lower GDP per capita reported higher ambition.

In our second model, we predicted curiosity from GDP per capita. This model was also significant ($\beta = -.44, p < .05$), explaining 19.7% of the variance ($R^2 = .20, F(1,21) = 5.15, p < .05$). This model also has a negative slope, which means that individuals from countries with lower GDP per capita also report higher curiosity.

In the third model, we entered ambition and curiosity as predictors of educational expenditure. The model explained 29.3% of the variance ($R^2 = .29, F(2,19) = 3.95, p < .05$). We discovered that while curiosity did not significantly predict educational expenditure ($\beta = -.39, p = .11$), ambition did ($\beta = .66, p < .05$).

Our correlational analysis indicated a positive relationship between ambition and curiosity, and between ambition and educational expenditure. A negative relationship was discovered between ambition and GDP per capita, and between curiosity and GDP per capita, although the last one was not significant. In the regression models,

GDP per capita on its own was a significant predictor of both ambition and curiosity, but in a negative manner. Further on, ambition predicted educational expenditure, while curiosity did not.

Discussion

We hypothesized that curiosity could be related to GDP per capita and educational expenditure by facilitating learning, exploration and immersion in activity. We also hypothesized that a relation could exist between curiosity and educational expenditure, as governments placing more value on education would be more likely to promote behaviours related to curiosity and exploration. As ambition is a trait with strong effects on career and life success, we also expected a positive relationship between ambition, GDP per capita and educational expenditure.

We discovered a large, positive relationship between ambition and curiosity, which could imply that those with a tendency towards exploratory and curious approaches in their interaction with the world also tend to be motivated by setting challenging goals for themselves and reaching for excellence. In a way, a certain level of ambition could be considered a prerequisite for true exploration – or the opposite – as in a way, a certain level of motivation can be assumed to be a necessary factor for engaging in behaviours related to curiosity and exploration. Similarly, it would make sense to assume that ambition and curiosity would both be related to similar other traits and characteristics, such as intrinsic motivation or a mastery orientation. It should also be noted, however, that the height of the correlation may be inflated due to the characteristics of the data, and some of the shared variance is certainly also due to autocorrelation and the assessment methodology.

Unexpectedly to our hypotheses, we also discovered a significant negative relationship between GDP per capita and ambition and curiosity. The effect was rather large – when predicting ambition from GDP per capita, our model explained 27.3 % of variance, and when predicting curiosity, it explained 19.7 %. There are a few ways we could try to explain the results, even though they are clearly opposite to the effects we were expecting based on what was perhaps an uncritically set one-tailed hypothesis. Namely, the different levels of reported ambition and curiosity

could be due to the fact that people in countries with lower GDP per capita could have developed different strategies for coping with everyday life. That way, a higher level of reported curiosity or ambition might not indicate a higher trait expression, but simply point towards a different type of manifestation of the given trait, given the dominant environmental demands. Similarly, the results could indicate a higher level of behavioural manifestation rather than trait expression in such countries because of other factors – e.g. that in poorer and so less cognitively stimulating environments, people would have to actively engage with their environments to seek entertainment. The result could also be an outcome of having differential targets of comparison in different cultures and due to differential metric characteristics and validity of the scale for different cultures, environments and languages.

For the regression model predicting educational expenditure, we discovered that the contributions were mostly from ambition, as curiosity appeared as a non-significant predictor in the model. The results indicate that ambition does play a contributing a role in predicting public educational expenditure, consistent with Judge and Kammeyer-Mueller's (2012) finding that ambition manifests itself in human capital investments. We hold some reservations in making a clear interpretation when it comes to the direction of the effect, as it would be just as likely that educational expenditure would predict ambition on a country level. The significance of the model generally implies that countries with higher public educational expenditure also have more ambitious but not necessarily more curious citizens. The lack of effect for curiosity could imply that compared to ambition, it is not significantly related to decisions made about allocation of public resources to education. It would be interesting to see how countries with different school systems – e.g. those with an implicit focus on intrinsic motivation and curiosity versus those that have no such cultural emphasis – might contribute differently to the model.

There are a few features of our data that influence the reliability and effect size of our results due to loss of statistical power in the tests. Namely, we used very simple, non-hierarchical statistical analyses. The sample sizes were small for quite a few countries, and different countries consisted of inconsistent sample qualities due to

different sampling approaches and methodology employed by different researchers. Since we borrowed the data set from the International Wellbeing Study, there are also likely quite a few unknown variables that may influence the results without us knowing about their confounding effects. Finally, a plenty of noise is introduced to the data by how the inventories function differently across different cultures.

Additionally, several shortcomings of our findings should be discussed in the light of robustness of our economic indicators. For instance, where our variable of public educational expenditure only focused on the volume of spending in the respective countries, several authors (e.g. Bray, 2002; Wößmann, 2000) have discovered that student performance and economic outcomes of educational expenditure depend on the allocation and efficiency of use of the expenditure rather than on its volume. In countries where curiosity and ambition are higher, educational finances might be used more efficiently or distributed more adequately, which might relate to things such as student performance and long term economic outcomes without directly correlating with the volume of the educational expenditure. Put shortly and simply, it could be that ambition and curiosity relate to efficient and productive allocation of financial resources meant for education, rather than to the amount the government is willing to spend. Thus, countries with a smaller proportion of government budget meant for financing education could simply use the resources more efficiently, or have other sources for finances.

In different regions, substantial variations exist in the volume of public expenditure in education. Bray (2002) looked at differences in public educational expenditure in the Pacific and Asian region, and discovered that the total budget ranged from 7.4 % in Vietnam to 23.1 % in the Kyrgyz Republic. Education was commonly the largest item in government budgets, and in all countries, education was seen as a major investment for economic and social goals. In some countries, lower public spending is compensated for by private educational expenditures. In other – especially developing countries – such compensation is not always available. One of the major shortcomings of our study is that we did not look into private funding of education. A possible work-around for this could have been to use Hansson and Henrekson's

(1994) approach, where they looked at the effects of governmental expenditure on the *private* sector.

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