

EDUCATION, INSTITUTIONAL QUALITY, AND OUTSOURCING

Yi Zhang

Jinhe Center for Economic Research, Xi'an Jiaotong University

No. 28 Xianning West Road, Xi'an, Shaanxi, 710049, China.

Email: zhangyi.econ@mail.xjtu.edu.cn.

Tel: +86 29 8266 7849. Fax: +86 29 8266 7879.

Acknowledgment:

This work was supported by the National Social Science Foundation of China (No.13XJY001).

Abstract:

From the cultural perspective of institutions, this paper proposes a new methodology to test the causal effect of education on institutional quality by analyzing how education affects outsourcing, which to a large extent depends on institutions. Based on a panel dataset covering 90 developing economies over 35 years (1980 to 2014), we find that primary education and secondary education have different effects on the quality of institutions. The results show that institutional quality increases with primary schooling, while secondary schooling has little marginal contribution on improving institutional quality. Moreover, the positive effect of primary schooling on institutional quality is more predominant when a country is at its earlier stage of development. The relationship between education and institutional quality is especially clearly presented in the lower-middle income countries.

Key words: Education; Institutional quality; Social cohesion; Outsourcing

JEL-codes: O11; I25; E02; F15

1. Introduction

According to new institutional economics theory (Williamson 1975; North 1990), institutions shape social behaviors and therefore are critical for economic growth (Hall and Jones 1999; Acemoglu et al. 2002; Rodrik et al. 2002). However, there is still no general consensus on the determinants of institutional quality. In particular, economic theories of institutions focus on social efficiency needs (Demsetz 1967; North 1981); political theories pay special attention to the benefits of the powerful groups (Ertman 1997; Finer 1997; Kamen 1997); and the cultural theories suggest the importance of social beliefs and values (Weber 1958; Putnam 1993; Landes 1998). Among these streams of thinking, the cultural theories are relatively underdeveloped and insufficiently tested.

From the cultural perspective, social cohesion is the key to determine institutional quality. It is argued that good institutions are more likely to be found in a society in which the vast majority of citizens shares a commitment to retain social order and respects the law, one another's human rights and values (Putnam 1993; Knack and Keefer 1997; La Porta et al. 1999). Moreover, social values and beliefs may influence the performance of the government (Easterly et al. 2005) and the level of democracy (Glaeser et al. 2006).

One of the most important variables that are closely related to social cohesion is education. Nevertheless, there are rival arguments about how education affects social cohesion and institutional quality. Some believe that institutional quality increases with education due to a positive relationship between education and social cohesion (Heyneman 2000; Easterly et al. 2005). Others argue that education may negatively affect social cohesion and thereby lower institutional quality (Guiso et al. 2004 and 2005). Thus, more empirical evidence is needed to better illustrate the effect of education on institutional quality.

One way of doing such test is to measure institutional quality directly, and then to regress education on institutional quality. For example, the variables which are often used to measure social cohesion include “trusts” (Putnam 1993; Knack and Keefer 1997; La Porta et al. 1997) and religious and ethnic heterogeneity (Landes 1998; La Porta et al. 1999). From the political view of point, economists view democracy as a proper proxy for institutional quality (Acemoglu et al. 2002). However, such method has several disadvantages. First, as there are no well-developed models on the determinants of institutions, misspecification and the omitted variables may lead to biased and inconsistent estimation results. Second, endogeneity issues related to reverse causality make it difficult to identify the causal relations. For example, countries with better institutions tend to put more resources into education. Third, it is still not clear whether democracy and government performance can appropriately represent institutional quality. Finally, variables like trust and ethnic heterogeneity usually lack variations over time, which to a large extent limits their explanatory power.

This study employs an alternative strategy, the methodology in Rajan and Zingales (1998) and Rajan and Subramanian (2007), to test the impact of education on institutional quality. The idea is as follows. We first identify an economic variable which depends on institutional quality. To see the effect of education on institutional quality, we check whether this economic variable performs differentially in countries with different levels of education. The economic variable regarded as institutional quality dependent in this study is outsourcing which involves large amounts of relationship-specific investments. Helpman and Grossman (2002) point out that contract enforcement and property rights protection are critical for the success of outsourcing activities and that institutional quality has a positive impact on outsourcing. Therefore, finding the influence of education on outsourcing can shed some lights on the relationship between education and institutional quality. To better capture the linkage between education and institutional quality through outsourcing, we control for other possible channels through which education affects outsourcing.

Based on a panel dataset covering 90 developing countries from 1980 to 2014, we find that countries that have higher levels of primary schooling have more outsourcing which is sensitive to institutional quality. Such relation is more predominant in the lower-middle income countries where outsourcing is more dependent on institutional quality compared to the low and high income countries. We also find that the positive impact of primary schooling on institutional quality is larger in the earlier stage of development of a country. In addition, the results show that there is no significant causal effect of secondary schooling on institutional quality.

The innovations of this paper lie in two aspects. First, other than from the popular political view of institutions, we focus on the less developed cultural angle and try to combine these two within one framework. By discussing the relations among education, social cohesion, and institutional quality, this paper is an extension of Easterly et al. (2005). Second, we employ a new methodology to test the effect of education on institutional quality. The main advantage of this method is that not directly measuring institutional quality, which consists of a complex set of dimensions and is rather persistent over time, problems related to model misspecification and insufficient variations are largely diminished. In addition, by controlling for country fixed effects and dynamic factors with panel data, the problem of endogeneity is alleviated, which helps to establish a causal relationship between education and institutional quality.

The rest of this paper is organized as follows. Section 2 provides the related literature and theories. Section 3 shows the data and methodology. The estimation results and robustness checks are reported in section 4. Section 5 concludes.

2. Literature and theories

To show the linkage between education and institutional quality, we discuss two building blocks of the new approach. The first is theories of the educational impact on institutions. The second is the channels through which education affects outsourcing.

2.1 The effects of education on institutional quality

Education may positively affect institutional quality through the channel of social cohesion in the following ways. First, public education helps people to establish the fundamental understanding on the concept of social contracts. Social contracts can be viewed as informal regulations, which are different from the formal laws, among individuals and between individuals and the government. By telling students what should do and what should not, by public education schools enforce the social norms and rules, which are essential for building good institutions based on the cultural theories of institutions. Second, as the places where students learn and experience how to appropriately behave in the society, schools are necessary for individuals to apply social contracts into practice. Third, education makes people aware of the possible consequences of breaking social contracts, and therefore helps to improve the level of social contract enforcement. Previous studies have also shown that early education can reduce the costs of imposing good social values (Grossman 1994; Grossman and Kim 1997). Uniform schooling is able to alleviate the conflicts among different ethnic groups and to stabilize the society (Gradstein and Justman 2000, 2002). Combining with the political theories of institutions which pay attention to the powerful groups, education increases the level of democracy by raising the benefits of civic participation and the degree of monitoring (Glaeser et al. 2006). Education is also found to be able to reduce political violence (Alesina and Perotti 1996).

However, it is also possible to see a negative relationship between education and institutional quality. First, institutions may be less effectual if the educated people who are more closely related to these institutions belong to a relatively small minority. It is observed that the more-educated individuals are more likely to participate in institutions

and have more direct experiences with institutions. This implies that people with more education may have greater influence on institutions compared to the less-educated. Hence, when the more-educated individuals represent the interests of a relatively small group, there can be large negative effects on institutional quality.

More importantly, rather than the positive connection between education and social capital, many argue that higher education may worsen social cohesion. By assuming that inherited culture is important for social cohesion, Guiso et al. (2005) find that education could weaken social capital by reducing the role of the inherited cultural factors. They take the impact of education received by Catholics on their inherited cultural formation as an example. They show that the effects of culture are more concentrated among less-educated individuals, because education on Catholics after 1960 is different from their old peers. Furthermore, the marginal impact of social cohesion is higher among less-educated people than among the more-educated. Analyzing the use of the financial contracts, Guiso et al. (2004) find that social capital matters more in countries with lower education level. The underlying reason is that the less-educated investors require greater trust to make an investment than their educated peers, because they cannot fully understand the financial contracts and discriminate between legitimate investments and frauds.

2.2 Primary and secondary education

Given these competing arguments about the impact of education on institutional quality, it is especially useful to analyze the difference between primary and secondary education. Specifically, primary and secondary schooling may have different effects on social cohesion and therefore on institutional quality.

Social cohesion is mainly related to the basic understanding and practice of social contracts, such as respecting the law and other people, which can be taught in primary schools. Compared to primary schooling, on the other hand, secondary and higher education are focused more on special techniques and knowledge rather than basic behavior principles and social values. For example, Whitla (1977) finds that the four years' college education does not promote learning ability for students except the skills in their own domain. Therefore, we expect that primary education is critical to improve social cohesion, while secondary education has a trivial marginal effect on fostering social capital.

Moreover, the effect of education on institutional quality may vary with the income level of a country. As a country tends to have higher education level and better institutions when it becomes richer, income is likely to be positively correlated with both education and institutional quality. Hence, there are two types of diminishing returns as a country's income grows. First, the potential for the further improvement in institutional quality is limited in countries that already have good institutions. It implies that education may contribute more to enhance institutional quality in relatively less developed countries. Second, the marginal returns to social cohesion of improving education may be diminishing. It is expected that social capital increases more with education in countries that have fewer educated citizens. In addition, when a country already has a large number of educated individuals, further improvement in education raises the possibility of getting two negative results. One comes from the weakened

cultural factors because of the possibly inconsistent education in different periods. The other is that more educated individuals are more likely to participate and exert their influence on institutions. Thus, we suggest that the positive effect of education on institutional quality decreases with the income level.

2.3 Impact of education on outsourcing

Education may affect outsourcing through two possible channels, institutional quality and the wage rates. First, as the key point of this study, education affects institutional quality, which is closely related to outsourcing. Offshore outsourcing often requires relationship-specific investments made by the input providers in the developing countries to produce the customized inputs for the final good producers in the developed economies. Based on Helpman and Grossman (2002), firms that produce intermediate inputs in the developing countries tend to under-invest because of a hold-up problem. Since the revenues to the firms greatly depend on the rule of law, low contract enforcement may lead to too little outsourcing given the levels of wage rates and technological development. Higher institutional quality means better contract environment and better property rights protection. This reduces the opportunistic behavior by providing better protection for the trade parties.

However, the effect of institutional quality on outsourcing may differ in countries with different income levels. Specifically, outsourcing is attracted to the low income countries to take advantage of their low labor costs. In these countries, other factors like institutional quality may not be vital for outsourcing. On the contrary, other than seek for the low labor costs, outsourcing firms choose their partners in the middle income countries for alternative reasons such as high product quality, good infrastructure, and high institutional quality. In these countries, institutional quality plays an important role in attracting outsourcing. Nevertheless, it is expected that such positive effect of institutional quality on outsourcing may diminish as income rises.

Second, higher education leads to higher wage rates, which have mixed effects on outsourcing. Different theoretical schools provide interpretations for the positive relationship between education and wage rates. The traditional human capital theories focus on the change of cognitive abilities of workers with the change of education. Becker (1964) establishes a link between education and personal income. He shows that a greater capacity for reasoning, for self-expression and evaluation, and for literacy and numeracy, which is brought about by higher education, is essential for a worker to get more returns. Bowles (1971) and Gintis (1971) argue that it is the changes in the non-cognitive domain which cause the change in earnings. They believe that there is a correspondence between the values and behavior implanted by schools and the requirements of employers.

There are two opposite effects of wage rates on outsourcing. On the one hand, higher wages represent higher productivity, which results in higher product quality and more outsourcing. On the other hand, higher wages increase the labor costs and discourage outsourcing. We expect that outsourcing increases with wages in the middle income countries, because outsourcing firms go to these countries for their high productivity and product quality.

Given these two channels through which education affects outsourcing, it is necessary to control for the wages-associated relationship between education and outsourcing, so as to better capture the effect of education on institutional quality. In practice, we add the wage rates variable into regressions. We suggest that by keeping wage rates unchanged, the estimates of education on outsourcing can reveal the effect of education on institutional quality.

3. Data and methodology

The dataset used in this paper covers 90 developing countries over 35 years (from 1980 to 2014). The dependent variable is an outsourcing index (*OUTS*) calculated following Roelfsema and Zhang (2011). Based on the exports statistics and two indexes of industrial institutional dependency, the outsourcing index is defined as:

$$OUTS_{it} = \frac{\sum_j (CII_j / HII_j) \times Balassa_{ijt}}{\sum_j Balassa_{ijt}}. \quad (1)$$

As illustrated in Nunn (2007), CII_j is a contract intensity indicator that measures the degree of relationship-specificity in a manufacturing sector.¹ In line with theory, firms in sectors with more relationship-specific investments tend to use outsourcing or in-house production rather than trade in the open market. Furthermore, we assume that firms prefer outsourcing to vertical integration if the final product involves many intermediate inputs. The Herfindahl index of intermediate input use (HII_j) is used to measure the concentration of inputs by industry.² Therefore, the term CII_j/HII_j shows the probability of outsourcing at the sector level. It implies that firms are more likely to outsource in sectors with higher CII and lower HII (more complex). These indexes are calculated for the 3-digit ISIC sectors based on the input-output tables in 20 developed countries.³ To show the relative export performance, we then construct a normalized Balassa index (*Balassa*) by sector for 90 developing economies over years.⁴ Export data are taken from United Nations Conference on Trade and Development (UNCTAD) Handbook of Statistics 2015. Hence, the outsourcing index indicates that a developing economy sees larger volumes of outsourcing trade if it has better export performance in the ‘outsourcing-more-likely’ sectors.

To measure education and distinguish different effects of education, we use two educational variables, total enrollment in primary/secondary education as a percentage

¹ As in Nunn (2007), we define the contract intensity indicator as $CII_j = \sum_h \theta_{hj} R_h$, where θ_{hj} is the value of the intermediate input h used to produce one unit of the final good in industry j and R_h is the proportion of input h that is neither sold on an organized exchange nor reference priced. CII is larger in sectors with more relationship-specific investments.

² The Herfindahl index is defined as the sum of the squares of intermediate input shares for producing one unit of the final good. This index has a smaller value when more intermediate inputs are used in an industry.

³ It is assumed that final goods are mainly produced by firms in developed countries. The selected developed countries include Australia, Austria, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, New Zealand, Portugal, Spain, Switzerland, UK, and USA. Export data taken from UNCTAD are converted from the 3-digit SITC Rev.3 system into the 3-digit ISIC Rev. 2 system.

⁴ We construct a normalized Balassa index: $Balassa_{ij} = (X_{ij}/X_{wj}) / [(1/J) \sum_j X_{ij}/X_{wj}]$, where X_{ij} is exports by country i (w = world) of good j (J the total number of sectors considered).

of the population of official primary/secondary education age (*PRIM* and *SECOND*) (World Bank Development Indicators).⁵ Considering the fact that social capital cannot be formed instantly by improving education and the effects of education may take some time to transfer, we lag the educational variables by five years.⁶ We also use the average schooling years of people above 25 years old (*ASY25*) (Barro and Lee dataset), the ratio of primary and secondary students in total population (*TOTAL*), and the ratio of education expenditure in total government expenditure (*EDUCEXPEN*) (World Bank Development Indicators) for robustness check.

Accounting for the potential long-run partnership between a domestic producer and a foreign buyer, we add the lagged dependent variable as the explanatory variable. We use gross domestic product per capita (*GDPPC*) (World Bank Development Indicators) to measure the wage rates. We include the ratio of total trade to gross domestic product (*OPENNESS*) (World Bank Development Indicators) to reflect the free trade policy. These variables are lagged by one year to reduce endogeneity. In addition, the road density and airport density are selected to capture the quality of infrastructure (World Bank Development Indicators). We employ logarithm transformation for the non-ratio variables so as to reduce heteroskedasticity and obtain standardized estimation coefficients. We further control for year dummies and country-specific effects in all models. Table 1 provides data description.

[Refer Table 1 about here]

Based on these data, we first report the results of using the fixed effects models. Though Nickell (1981) shows that the fixed effects estimation may yield biased and inconsistent results for the model including the lagged dependent variable, we argue that this bias, which is of order $1/T$, is rather small in our sample with the time dimension T as 35 years. Judsen and Owen (1999) also show that “Nickell bias” is negligible when T is 30. We further employ Anderson and Hsiao (1981) dynamic panel IV estimation⁷ for robustness. The results support the use of the fixed effects estimation models.

To show the non-linear impact of education, we create an interaction term of education and wage rates (*EDUCGDPPC*). We also construct interactions between educational variables and the income group dummies⁸, so as to specify different effects of education on institutional quality in countries with different income levels. To further test whether education contributes to explaining institutional quality, we add a political institutional variable, which is an ICRG⁹ indicator of quality of government (the

⁵ These ratios may exceed 1 due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition.

⁶ We try different lags of educational variables and the results are robust to different specifications.

⁷ This method takes the first-differencing to get rid of the fixed effects. Because the new error term after the first-differencing $\varepsilon_{it} - \varepsilon_{it-1}$ is correlated with the lagged dependent variable $y_{it-1} - y_{it-2}$, the lagged level terms to instrument the first-differenced endogenous variables. The IV estimates are derived based on the condition: y_{it-s} is not correlated with $\varepsilon_{it} - \varepsilon_{it-1}$, $s \geq 2$.

⁸ Income groups are divided according to 2014 GNI (gross national income) per capita, provided by the World Bank. The groups are: low income, \$1,045 or less; lower-middle income, \$1,046 to \$4,125; upper-middle income, \$4,126 to \$12,735; high income, \$12,736 or more. We use the low income group as the base category. *LMIDDLE* equals one if the country is in the lower-middle income group, zero otherwise; *HIGH* equals one if the country is in the upper-middle or high income group, zero otherwise.

⁹ This indicator is built on “corruption, law and order, and bureaucracy quality”. Its value varies from 0 to 1. Because of data availability, we impute data from 1980 to 1983 with the values in 1984.

International Country Risk Guide of the PRS Group). It is supposed that if governance can fully represent institutional quality, educational variables may lose significance after controlling for this political variable (holding wage rates constant). Finally, we run several robustness checks.

4. Results

Table 2 shows the fixed effects estimation results. In Columns (1) and (2), if the enrollment ratio in primary school five years ago rises by 1 percent, the outsourcing index goes up by 0.765 percent and 0.372 percent in static and dynamic settings, respectively. Considering that outsourcing is to a large extent institutional dependent, these findings support a positive impact of primary education on institutional quality. We report the Anderson and Hsiao (1981) dynamic panel IV estimation results in Column (3). We use the lagged two and three year dependent variable to instrument the first-differenced lagged one year dependent variable. The similar estimates of the lagged dependent variable suggest that the fixed effects estimation is reliable. In Columns (4) and (5), we find that the enrollment ratio in secondary school has no causal impact on outsourcing. The insignificant estimates are consistent with the theoretical predication that secondary schooling makes trivial contribution to improve social cohesion and therefore has no effect on institutional quality. The lagged dependent variable is significantly positive, which suggests the importance of the duration of partnership in reducing transaction costs in relationship-specific contracts. The variable on wage rates (GDP per capita) has a significantly positive effect on outsourcing. It implies that the positive effect of increased productivity may overwhelm the negative effect of increased labor costs on outsourcing. In addition, openness is important for a country to attract more outsourcing.

[Refer Table 2 about here]

Table 3 shows the estimation results for the non-linear models. In Column (1), we add a quadratic term of primary schooling. We find a significantly positive level variable and an insignificant quadratic variable, which indicates that overall institutional quality increases with the enrollment ratio in primary school. In Column (2), an interaction between education and wages is added and found to be significantly negative. This suggests that primary education has a positive impact on institutional quality in countries with relatively low wage rates, while such positive effect decreases when wage rates rise. Such finding is consistent with our theoretical expectation that the positive effect of education is larger in the earlier stage of development of a country.

Column (3) reports the results of the income-grouped models. By including the interactions between primary education and income group dummies, we find that the enrollment ratio in primary school mainly affects outsourcing in the lower-middle income countries, while it is insignificant for attracting outsourcing in the low income, upper-middle income, and high income countries. For the upper-middle and high income countries, they usually already have relatively high enrollment ratio in primary school. Therefore, in these relatively developed countries, further improvement in primary education plays rather limited role in improving social cohesion and upgrading institutional quality. For the low income countries, they attract outsourcing mainly because of their low labor costs. Since institutional quality is not the key to determine

outsourcing in these countries, it is hard to identify the link between education and institutional quality. Compared with the low income countries, the lower-middle income countries have relatively skilled workers and attract the high value-added type of outsourcing which depends on institutional quality, such as contract enforcement and intellectual property. Therefore, in this group of countries, we find evidence for a significant causal impact of education on outsourcing through its effect on institutional quality.

We then test the cultural and political theories of institution within one model by adding a political institutional variable, which is the ICRG government quality indicator in Column (4). The results show that the significantly positive effect of primary schooling holds even after we account for the political institutional variable. This finding implies that taking education into account adds more information to understand the factors affecting institutions. It suggests the importance of analyzing the determinants of institutional quality from the cultural perspective. In addition, the estimates of the political institutional variable *ICRG* are similar in Column (4) with education and in Column (5) without education. The insignificant effects of the political institutional variable in the low and high income countries further support the findings in Column (3). In Columns (6) to (8), the results show that the enrollment ratio in secondary school presents no non-linear effects on institutional quality.

[Table 3 about here]

Table 4 provides the results of the robustness checks of different income groups and different periods. In the lower-middle income countries, the increase of outsourcing is larger (0.488 percent) than that in all the developing countries (0.372 percent), if the enrollment ratio in primary school (five years ago) increases by one percent. The significant effect of primary education holds in periods from the late 80's up to now, when outsourcing became an important form of the international economics.

[Table 4 about here]

Finally, Table 5 shows the results of applying alternative educational variables, namely the average schooling years above 25, the ratio of primary and secondary students in total population, and the ratio of education expenditure in total government expenditure. All these educational variables are insignificant, which may be caused by the mixed effects of primary and secondary (and higher) education.

[Table 5 about here]

5. Conclusions

Based on panel data of 90 developing countries over 35 years (1980 to 2014), this paper empirically investigates the relationship between education and institutional quality by analyzing how education affects the institutional dependent outsourcing. The estimation results show that primary education has a positive effect on institutional quality, especially in the lower-middle income countries. Moreover, the positive effect of education is more predominant when a country is relatively underdeveloped. We also find that there is no causal link between secondary education and institutions.

Focusing on the cultural theories of institutions, we propose a new methodology to test the effect of education on institutional quality. Doing so helps to increase variations over time, reduce measurement errors, and alleviate endogeneity due to reversal causality and the omitted variables. However, since we show that institutional quality has little effect on outsourcing in the low income countries, the method of looking through the third related variable “outsourcing” in turn shows no clear relationship between education and institutions in these countries. We acknowledge that with more completed data and well-developed models in the future, it is promising to obtain more fruitful findings by directly regressing education on institutional quality.

Reference

- Acemoglu, D., S. Johnson, and J. A. Robinson. 2002. Reversal of Fortunes: Geography and Institutions in the Making of the Modern World Income Distribution. *Quarterly Journal of Economics*, 117, pp. 1231-1294.
- Alesina, A. and R. Perotti. 1996. Income Distribution, Political Instability, and Investment. *European Economic Review*, 40, pp. 1203-1228.
- Anderson, T. W. and C. Hsiao. 1981. Estimation of Dynamic Models with Error Components. *Journal of the American Statistical Association*, 76, pp. 598-606.
- Barro, R. and J. W. Lee. 2001. International Data on Educational Attainment: Updates and Implications. *Oxford Economic Papers*, 53, pp. 541-563.
- Becker, G. 1964. Human Capital. New York: National Bureau of Economic Research.
- Bowles, S. 1971. Unequal Education and the Reproduction of the Social Division of Labor. *Review of Radical Political Economy*, 3, pp. 1-30.
- Demsetz, H. 1967. Toward a Theory of Property Rights. *American Economic Review*, 57, pp. 347-359
- Easterly, W., J. Ritzen, and M. Woolcock. 2005. Social Cohesion, Institutions, and Growth. Mimeo, World Bank.
- Ertman, T. 1997. Birth of the Leviathan. Cambridge: Cambridge University Press.
- Finer, S. 1997. The History of Government, Vol. I-III. Cambridge: Cambridge University Press.
- Gintis, H. 1971. Education, Technology and the Characteristics of Worker Productivity. *American Economic Review*, 61, pp. 266-279.
- Glaeser, E. L., G. Ponzetto, and A. Shleifer. 2006. Why does Democracy Need Education. NBER working paper No. 12128.
- Gradstein, M. and M. Justman. 2000. Human Capital, Social Capital, and Public Schooling. *European Economic Review*, 44, pp. 879-890.
- Gradstein, M. and M. Justman. 2002. Education, Social Cohesion, and Economic Growth. *American Economic Review*, 92: 4, pp. 1192-1204.
- Grossman, H. I. 1994. Production, Appropriation, and Land Reform. *American Economic Review*, 84: 3, pp. 705-712.
- Grossman, H. I. and M. Kim. 1997. Human Capital and Predation: A Positive Theory of Education Policy. Mimeo, Brown University.
- Guiso, L., P. Sapienza, and L. Zingales. 2004. The Role of Social Capital in Financial Development. *American Economic Review*, 94: 3, pp. 526-566.
- Guiso, L., P. Sapienza, and L. Zingales. 2005. Does Culture Affect Economic Outcomes? Manuscript, Northwestern University.
- Hall, R. E. and C. I. Jones. 1999. Why do Some Countries Produce so Much More Output per Worker than Others. *Quarterly Journal of Economics*, 114, pp. 83-116.
- Helpman E. and G. M. Grossman. 2002. Integration versus outsourcing in industry equilibrium. *Quarterly Journal of Economics*, 117:1, pp. 85-120.

- Heyneman, S. P. 2000. From the Party/State to Multi-ethnic Democracy: Education and Social Cohesion in Europe and Central Asia. *Educational Evaluation and Policy Analysis*, 22, pp. 173-191.
- Judsen, R. and A. Owen. 1999. Estimating Dynamic Panel Data Models: A Guide for Macroeconomics. *Economic Letters*, 65, pp.9-15.
- Kamen, H. 1997. The Spanish Inquisition. New Haven: Yale University Press.
- Knack, S. and P. Keefer. 1997. Does Social Capital Have an Economic Payoff? A Cross-country Investigation. *Quarterly Journal of Economics*, 112, pp. 1251-1288.
- Landes, D. 1998. The Wealth and Poverty of Nations. New York: W. W. Norton.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1997. Trust in Large Organizations. *American Economic Review*, 87, 333-338.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1999. The Quality of Government. *Journal of Law, Economics and Organization*, 15, pp.222-279.
- Nickell, S. 1981. Biases in dynamic Models with Fixed Effects. *Econometrica*, 49, pp. 1417-1426.
- North, D. 1981. Growth and Structural Change. New York: W. W. Norton.
- North, D. 1990. Institutions, Institutional Change and Economic Performance. Cambridge: Cambridge University Press.
- Nunn, N. 2007. Relationship-specificity, incomplete contracts, and the pattern of trade. *Quarterly Journal of Economics*, 122, pp. 569-600.
- Putnam, R. 1993. Making Democracy Work: Civic Traditions in Modern Italy. Princeton: Princeton University Press.
- Rajan, R. and A. Subramanian. 2007. Does Aid Affect Governance? *American Economic Review*, 97, pp. 322-327.
- Rajan, R. and L. Zingales. 1998. Financial Dependence and Growth. *American Economic Review*, 88, pp. 559-586.
- Rodrik, D., A. Subramanian, and F. Trebbi. 2002. Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development. IMF Working Paper, 02/189, Washington.
- Roelfsema, H. and Y. Zhang. 2012. The Causal Effect of Institutional Quality on Outsourcing. *Journal of International Trade & Economic Development*, 21, pp. 895-920.
- Weber, M. 1958. The Protestant Ethic and the Spirit of Capitalism. New York: Charles Scribner's Sons.
- Whitla, D. 1977. Value added: Measuring the Outcomes of Undergraduate Education. A Study Conducted by the Office of Instructional Research and Evaluation, Harvard University.
- Williamson, O. E. 1975. Markets and Hierarchies: Analysis and Antitrust Implications. New York: Free Press.

Table 1: Summary and correlation

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>OUTS (ln)</i>	2544	0.9825	0.4576	-0.6162	1.8536
<i>PRIM</i>	2838	0.8700	0.2465	0.1582	2.1129
<i>SECOND</i>	2301	0.5212	0.2905	0.0248	1.2032
<i>GDPPC (ln)</i>	2969	7.2603	1.3335	4.1714	11.4797
<i>OPENNESS(ln)</i>	2850	4.2032	0.6344	-1.1751	6.0859
<i>ROAD (ln)</i>	2345	1.0262	0.7039	-1.1085	3.0161
<i>AIRPORT (ln)</i>	2616	3.2596	2.1601	-2.3026	8.9994
<i>ASY25</i>	2835	5.0847	2.4542	0.3800	11.5900
<i>TOTAL</i>	2296	0.1156	0.0615	0.0351	0.3501
<i>EDUCEXPEN</i>	1359	0.0429	0.0236	0	0.4433
<i>ICRG (ln)</i>	2345	-0.7853	0.4925	-3.1780	-0.0562

Variable	1	2	3	4	5	6
<i>PRIM</i>	1.0000					
<i>SECOND</i>	0.4408	1.0000				
<i>GDPPC (ln)</i>	0.3745	0.5848	1.0000			
<i>OPENNESS(ln)</i>	0.1024	0.2490	0.2931	1.0000		
<i>ROAD (ln)</i>	0.1101	0.1790	0.2215	-0.2699	1.0000	
<i>AIRPORT (ln)</i>	0.1810	0.4180	0.3980	-0.0098	0.5264	1.0000

Table 2: Basic estimation results

Dependent variable: Outsourcing index $OUTS$ (\ln)

Variable	Primary education			Secondary education	
	(1) FE	(2) FE Dynamic	(3) IV	(4) FE	(5) FE Dynamic
$OUTS_{t-1} (\ln)$		0.627*** (0.049)	0.713** (0.341)		0.619*** (0.056)
$EDUCATION$	0.765** (0.383)	0.372*** (0.107)	0.263* (0.142)	0.127 (0.186)	-0.019 (0.137)
$GDPPC (\ln)$	0.052*** (0.023)	0.019 (0.012)	-0.001 (0.019)	0.042*** (0.013)	0.027 (0.019)
$OPENNESS (\ln)$	0.156*** (0.037)	0.054*** (0.022)	0.051 (0.044)	0.071*** (0.033)	0.052*** (0.023)
No. of obs.	2302	2285	2068	2095	2158

Note: Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions control for year dummies. Insignificant control variables not reported include road and airport density. In Anderson and Hsiao dynamic panel IV estimation, there is no second-order autocorrelation. F-value in the first stage regression is 18.68. We use the lagged two and three year dependent variable to instrument the first-differenced $OUTS_{t-1}$.

Table 3: Fixed effects results on the non-linear effects
 Dependent variable: Outsourcing index *OUTS* (*ln*)

Variable	Primary education				Secondary education			
	(1) With Quadratic	(2) With GDPPC	(3) Income group	(4) With ICRG	(5) Only ICRG	(6) With Quadratic	(7) With GDPPC	(8) Income group
<i>OUTS</i> _{<i>t-1</i>} (<i>ln</i>)	0.618*** (0.078)	0.621*** (0.069)	0.627*** (0.052)	0.613*** (0.063)	0.639*** (0.054)	0.658*** (0.049)	0.651*** (0.062)	0.648*** (0.052)
<i>EDUC</i>	1.293** (0.654)	4.535** (2.326)	-0.513 (0.486)	0.366** (0.104)		-0.054 (0.429)	1.533 (1.149)	-0.073 (0.188)
<i>EDUC</i> ²	-1.073 (7.945)					0.325 (0.821)		
<i>EDUCGDPPC</i>		-0.586* (0.356)					-0.275 (0.395)	
<i>EDUCLMIDDLE</i>			1.124** (0.532)					-0.019 (0.253)
<i>EDUCHIGH</i>			0.186 (0.656)					0.292 (0.198)
<i>GDPPC</i> (<i>ln</i>)	0.039 (0.059)	0.061 (0.052)	0.021 (0.018)	0.011 (0.017)	-0.029 (0.026)	0.048 (0.318)	0.068 (0.052)	0.009 (0.023)
<i>OPENNESS</i> (<i>ln</i>)	0.059*** (0.024)	0.052*** (0.027)	0.068*** (0.031)	0.055*** (0.018)	0.063*** (0.033)	0.071*** (0.034)	0.067*** (0.027)	0.065*** (0.027)
<i>ICRG</i> (<i>ln</i>)				-0.027 (0.024)	-0.029 (0.021)			
<i>ICRGLMIDDLE</i>				0.035* (0.017)	0.057*** (0.026)			
<i>ICRGHIGH</i>				-0.049 (0.038)	0.034 (0.029)			
No. of obs.	2285	2285	2285	2123	2164	2158	2158	2158
F-test	Education: P = 0.06	Education: P = 0.05	Lmiddle: P = 0.02 High income: P = 0.38	ICRG: Lmiddle: 0.05 High: 0.42	ICRG: Lmiddle: 0.06 High: 0.47	Education: P = 0.63	Education: P = 0.31	Lmiddle: P = 0.25 High income: P = 0.36

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. All regressions control for year dummies. Insignificant control variables not reported include road and airport density.

Table 4: Sub-sample fixed effects results for primary education
 Dependent variable: Outsourcing index $OUTS$ (\ln)

Variable	(1) Low	(2) Upper/ high	(3) Lower-middle		
			80-14	85-14	90-14
$OUTS_{t-1} (\ln)$	0.662*** (0.092)	0.457*** (0.128)	0.693*** (0.042)	0.672*** (0.051)	0.663*** (0.049)
$PRIM$	-0.381 (0.922)	-0.226 (0.452)	0.488** (0.232)	0.491** (0.212)	0.470** (0.225)
$GDPPC (\ln)$	-0.051** (0.034)	0.031 (0.057)	0.024 (0.026)	0.102** (0.043)	0.006 (0.057)
$OPENNESS (\ln)$	0.058 (0.042)	0.064 (0.040)	0.067*** (0.025)	0.118** (0.053)	0.084 (0.059)
No. of obs.	780	573	932	830	707

Note: Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions control for year dummies. Insignificant control variables not reported include road and airport density.

Table 5: Fixed effects results with alternative educational variables
 Dependent variable: Outsourcing index *OUTS* (*ln*)

Variable	<i>ASY25</i>	<i>TOTAL</i>	<i>EDUCEXPEN</i>
<i>OUTS</i> _{<i>t-1</i>} (<i>ln</i>)	0.673*** (0.052)	0.631*** (0.057)	0.688*** (0.044)
<i>EDUCATION</i>	-0.025 (0.016)	0.039 (0.134)	0.016 (0.014)
<i>GDPPC</i> (<i>ln</i>)	-0.018 (0.015)	0.027 (0.017)	-0.018 (0.013)
<i>OPENNESS</i> (<i>ln</i>)	0.024 (0.017)	0.065*** (0.021)	0.061*** (0.029)
No. of obs.	2718	2168	1342

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. All regressions control for year dummies. Insignificant control variables not reported include road and airport density.