# Institutions and the Sectoral Organization of Production*

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**Abstract**

The impact of economic institutions on development is presently taken for granted but there is surprisingly scarce evidence on the channels through which institutions affect the organization of output. Imperfections in contractual enforcement, for example, could lead firms to adopt technologies that inefficiently minimize dependence on other sectors, thus going hand in hand with a reduction in productivity. Another channel would be the concentration of economic activity in sectors that have fewer interactions with other sectors. This paper presents empirical evidence supporting the second effect: better contractual enforcement increases the labor share of sectors that interact more with other sectors. The evidence, however, does not support the notion that deficiencies in contractual enforcement lead to the adoption of less efficient technologies.

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Keywords: Sectoral organizaton of output, institutions, contractual enforcement, input-output, complexity.

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# 1 Introduction

The impact of economic institutions on development is presently taken for granted (see e.g. Mankiw, Romer and Weil (1992), Hall and Jones (1999), Acemoglu and Robinson (2012)) but there is surprisingly scarce evidence on the channels through which institutions affect the organization of output. In this paper, we examine the implications of poor contractual enforcement for the organization of output within and across sectors.

Imperfections in contract enforcement raise the cost of interacting with others. This suggests that, in environments where such frictions are important, firms would economize on interactions with other firms or economic agents. Conditional on the production of a given good, they would have incentives to adopt more in-house production and avoid acquiring inputs and services from outside the boundaries of the firm (this would be the case provided the contracting costs internal to the firm were less severe than those associated with outside parties). Thus, the quality of contractual enforcement would determine the choice of technology, with less efficient technologies going together with poorer institutions. We label this effect the "productivity effect."

Another way in which contractual enforcement could affect the organization of output is by shifting resources toward sectors that interact less with others. This would follow from the fact that costly contractual enforcement would lower input productivity relatively more in sectors where the interaction with other sectors is important. We label this effect the "allocation effect." The change in allocation of labor across sectors could take place despite the choice of technology not suffering significant reductions in productivity: it could simply be the case that firms only produce when they can use an efficient technology and, whenever contractual imperfections impose too high a cost on a given sector, there is simply no output there. In this scenario, we would see important shifts in the way labor is allocated across sectors (better contractual enforcement raising the labor shares of more complex sectors) but with productivity not being systematically affected by enforcement quality. (Of course both effects on the organization of output could take place simultaneously.)

The idea that technology choice is influenced by the institutional environment has received some attention in the literature. In the context of a Ricardian trade model, Costinot (2009) offers microfoundations for ways in which contractual imperfections

may affect the productivity of firms and comparative advantage. In his model, better institutional quality and higher human per worker capital are complementary sources of comparative advantage. Acemoglu, Antràs and Helpman (2007) build on the ideas of Costinot to propose a tractable general equilibrium model showing that contractual imperfections (contractual incompleteness) leads to the adoption of less advanced technologies, and that the impact of contractual incompleteness is more pronounced when there is greater complementary among the intermediate inputs. They further argue (by resorting to a stylized simulation) that the frictions they consider are a quantitatively important source of productivity differences across countries. As in Costinot, they make the case that institutions are a source of comparative advantage.

On the empirical side, Nunn (2007) and Levchenko (2007) show that institutions are an important determinant of the direction of trade flows and, as such, of comparative advantage. Nunn shows that countries with good contract enforcement specialize in the production of goods for which relationship-specific investments are most important. According to his estimates, contract enforcement would explain more of the pattern of trade than physical capital and skilled labor combined. Levchenko extends a Heckscher-Ohlin model to incorporate institutional quality and shows that only the country with better institutions will produce the good where more than one input is required. He finds wide empirical support for the positive effect of institutional quality on comparative advantage.

Estimates of the sectoral impact of institutions on trade patterns are a form of addressing a part of the allocation effect, the part that corresponds to the extent to which trade impacts domestic production. Institutions improve the technology of countries where institutional quality is high and those countries become relatively larger producers of institutionally dependent goods and less so of others. Thus, more inputs are drawn to institutionally dependent sectors when institutional quality is high. It is possible that these estimates also include the productivity effect, but it is not for certain that this is so. It could be that, conditional on production, a country selects the best technology available and, thus, that countries that produce in institution-dependent sectors use the most efficient processes. Countries with a comparative disadvantage in institution-intensive goods will produce other goods and could be fully efficient in those other

sectors. Unless a direct test on productivity is carried out, the evidence provided in the papers above is not fully conclusive on this issue.

On a different but related front, Koren and Tenreyro (2007) show that developing countries have disproportionately large labor shares of output in sectors with high volatility, both idiosyncratic and global sectoral risk. Their variance decomposition indicates that more than half the differential in output volatility between the top 5% and the bottom 5% countries in terms of GDP per capita is due to differences in the sectoral allocation of output (the allocation effect). This evidence poses a big question mark on the reasons behind such apparently suboptimal allocation of labor to sectors.[1] Our results indicate that institutional quality is an important part of the answer.

The goal of this paper is to examine the impact of institutions on the organization of domestic output without confining it to the relevance of a country's openness to trade. We will do so by focussing on the decomposition of output per worker in a country as the product of the share of workers in a given sector times the labor productivity of that sector. By regressing the labor share on the product of institutional quality and an index of the complexity of institutions (together with country and sector dummies), we will be able to assess whether or not institutions disproportionately shift production toward sectors whose complexity necessarily requires greater institutional quality. This is the first attempt we are aware of of empirically isolating the impact of institutions on the allocation effect explicitly and beyond the impact of trade. Further, we will try to answer the question of whether institutional quality also affects the choice of technology by regressing the second factor, labor productivity, on the same product of institutional quality and sectoral complexity. We find that the allocation effect is present in a significant and quantitatively relevant manner. We do not find compelling evidence that institutions negatively impact productivity.

Our paper is also relate to recent work by Herrendorf and Valentinyi (2012) and Hsieh and Klenow (2009) among others. Relative to the literature, Herrendorf *et al.* propose a finer, five-sector decomposition of aggregate output to identify which sectors contribute the most to the lower total factor productivity (TFP) of developing countries. They

[1] We label this patter suboptimal because it differs from that of developed countries as documented in Koren and Tenreyro. Presumably, more developed economies face less restrictions in the choice of technology and in the sectoral allocation of output.

find that, in equipment, construction, and food the sectoral TFP differences between developing countries and the United States are much larger than in the aggregate. However, in manufactured consumption the sectoral TFP differences are about equal to the aggregate TFP differences, and in services they are much smaller. Our results on the productivity dimension are complementary to these. In particular, one of our datasets (from the United Nations) contains data on manufacturing alone and the other pertains to developed countries (Organization for Economic Cooperation and Development), where productivity differences across countries lie within a much narrower range. Our data suggest that labor productivity is not influenced by institutions in manufacturing, and this fact carries over to the economy as a whole within the subset of more developed economies.

Hsieh and Klenow (2009) find sizeable differences in the productivity of both labor and capital across firms within a given industry in both India and China, as compared to the United States. Were capital and labor reallocated to equalize marginal products to the extent observed in the United States, they estimate manufacturing TFP gains of 30%–50% in China and 40%–60% in India would materialize. As already indicated, at the aggregate sector level, our data does not find institutions to affect the productivity of labor in manufacturing. It points instead to the effects of the misallocation of labor across sectors.

# 2 Model and Estimation Procedure

## 2.1 Model

We begin with the following decomposition of value added per worker in a given country:

$$\frac{Y_c}{L_c} = \sum_{i=1}^{N} \underbrace{\frac{Y_i}{L_i}}_{\text{Labor productivity in sector } i} \underbrace{\frac{L_i}{L_c}}_{\text{Share of sector } i \text{ in total employment}} \tag{1}$$

where $c$ denotes country and $i$ is for sector. $Y_c$ is value added in country $c$ and $L_c$ the number of workers engaged in the production of $Y_c$. $Y_i$ and $L_i$ are value added and employment at the sector level, and there are $N$ sectors of activity in the economy. Equation (1) shows that output per worker can be split into a sum of a product of two factors, namely labor productivity in a given sector and that sector's share of total

employment.

We think of output in sector $i$ being generated by a production function $A_i(\mathcal{C}_c) F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_c\right)$, where $\mathcal{C}_c$ is a measure of the quality of contractual enforcement in country $c$, $A_i$ a measure of total factor productivity in sector $i$ possibly affected by the quality of contractual enforcement, $K_i$ and $L_i$ inputs of capital and labor employed in this sector and $X_j$ the amount of intermediate inputs acquired by sector $i$ from sector $j$, out of $J_i$ sectors with whom sector $i$ transacts:

$$Y_{ic} = A_i(\mathcal{C}_c) F\left(K_{ic}, L_{ic}, \sum_{j=1}^{J_i} X_j; \mathcal{C}_c\right).$$

We choose this specification to allow for the possibility that the effect of contractual enforcement, if any, affects output beyond its potential impact on TFP. We come back later to this issue.

In line with the literature (see references above), we postulate that lower quality of contract enforcement is harmful for production processes that have many interactions with other parties. If, say, a company has to hire many workers, acquires many inputs from other sectors (and thus from outside sources) and engages a variety of different types of capital, it becomes heavily dependent on these transactions and, as such, on the quality of contractual enforcement to make them happen (and to provide incentives to its business parties toward good outcomes). By comparison, a good that can be produced using only a few intermediate inputs and which does not require specific capital nor engaging many laborers will be much more insulated from variations in the quality of contractual enforcement. We conclude from here that good contractual enforcement is especially beneficial for sectors that rely heavily on interactions with others.

More formally, we assume that, for two values of contractual quality $\mathcal{C}_1$ and $\mathcal{C}_2$, with $\mathcal{C}_2 > \mathcal{C}_1$,

$$A_i(\mathcal{C}_2) F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_2\right) > A_i(\mathcal{C}_1) F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_1\right), \tag{2}$$

$$A_i(\mathcal{C}_2) \frac{\partial F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_2\right)}{\partial K_i} > A_i(\mathcal{C}_1) \frac{\partial F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_1\right)}{\partial K_i}, \tag{3}$$

$$A_i(\mathcal{C}_2) \frac{\partial F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_2\right)}{\partial L_i} > A_i(\mathcal{C}_1) \frac{\partial F\left(K_i, L_i, \sum_{j=1}^{J_i} X_j; \mathcal{C}_1\right)}{\partial L_i}. \tag{4}$$

Equation (2) says that better contractual enforcement will raise output, while equations (3) and (4) indicate that this effect will carry over to the marginal products of labor and capital.

Consider now the effects of reducing contractual quality from $\mathcal{C}_2$ to $\mathcal{C}_1$ in a given country for exogenous reasons that remain otherwise orthogonal to the functioning of the economy. Firms operating competitively equate the marginal product of inputs to their opportunity costs, respectively wages and the interest rate. Because of the standard assumption that the marginal product of inputs is decreasing in the amount of that input, at constant input prices (i.e. not changing with institutions), it follows that sectors where the reduction in productivity due to contracting quality is the greatest would suffer the greatest reduction in their optimally chosen input levels. If there is no international factor mobility (closed economy), then full employment of all inputs would require wages and interest rates to decline. If there is factor mobility and country 1 is a small open economy, then factors would migrate. Either way, there would be a shift in input usage toward industries where the productivity effects of lower contractual quality were felt the least and away from those production processes that are contract intensive.

In terms of the decomposition of sectoral output in (1), we would expect to see lower enforcement quality negatively affect the productivity term. This is the productivity effect. Further, the reallocation of inputs (labor in particular) toward sectors whose productivity is less institution sensitive would raise the labor shares of those sectors. This is the allocation effect. This would mean that an economy with poor institutions could look rather different from an economy with good enforcement quality at the level of sectoral composition. An interesting possibility is that these effects take place in an extreme form: in the presence of fixed costs or other nonconvexities, it could be that firms suffering a reduction in productivity would simply stop producing in those sectors. What we would then observe would be a large shift in labor shares toward institution-independent sectors but without productivity losses. Of course this would still be a manifestation of the productivity effect: it is precisely because of the reduction in productivity that labor is reallocated across sectors. But firms minimize out their losses and so avoid producing in sectors in which they are no longer efficient, causing the productivity reduction not to show.

## 2.2 Estimation Procedure

From the previous discussion, we set out to estimate the following equations:

$$\frac{L_{ic}}{L_c} = \alpha_1 + \beta_1 \text{enforcement}_c.\text{complexity}_{i,US} + \mu_{1i} + \mu_{1c} + \varepsilon_{1ic}, \tag{5}$$

$$\frac{Y_{ic}}{L_{ic}} = \alpha_2 + \beta_2 \text{enforcement}_c.\text{complexity}_{i,US} + \mu_{2i} + \mu_{2c} + \varepsilon_{2ic}. \tag{6}$$

with $i$ denoting sector and $c$ country. The interaction terms on the right-hand side cross measures of the quality of contract enforcement with measures of sector complexity as measured by US sectoral allocations. The terms $\mu_{1i}$ and $\mu_{1c}$ are sector and country dummies, and similarly for equation (6). This regression format was first made popular in the work of Rajan and Zingales (1998). In the present framework, it captures the notion that contractual enforcement is relatively more beneficial for sectors which have more complex productive structures.

Following the previous discussion, we think of contracting costs to be positively related to the intensity of exchanges that a sector has to carry out with other sectors. We label this variable "complexity." In line with the literature (see e.g. Blanchard and Kremer (1997), Levchenko (2007), Nunn (2007)), we resort to the Input-Output matrix of the United States to measure the degree of concentration of exchanges carried out by each sector. The Herfindahl index is calculated for each sector as follows. First, the column data is transformed into shares (the initial column magnitude is divided by the sum of that column's total). The Herfindahl index is computed out of these shares for each column, giving a sectoral measure of concentration. The larger the concentration, the least the interaction with other sectors (the Herfindahl index takes the maximum value of unity in the case that a sector's inputs all come from a single sector). In order to correctly measure complexity, we need its reciprocal and so use 1/Herfindahl as our measure of complexity. As in Rajan and Zingales, we use a measure of complexity from the United States (US) for all countries. The idea is that the productive structure of that country would face the least contracting constraints of all, thus reflecting a kind of "ideal" measure of sectoral complexity.

From the model presented in section 2.1, we expect $\beta_1$ to be positive and significant reflecting the allocation effect of contracting quality. To the extent that the productivity

effect does not take place in an extreme form, estimates of $\beta_2$ should be positive and significant. Insignificant estimates of $\beta_2$ would mean that firms opt for dropping production when they face contract-induced productivity losses, in fact an extreme manifestation of the productivity effect.

# 3 Data and Estimation

## 3.1 Data

**Industrial Statistics** We use two main datasets regarding employment and productivity measures. One is INDSTAT4 2011, the Industrial Statistics Database 2011 (3- and 4-digit level of ISIC code) from the United Nations Industrial Development Organization (henceforth referred to as the UNIDO dataset). The other is the Organization for Economic Cooperation and Development STAN database for Structural Analysis (henceforth STAN dataset). We collect sectoral employment and productivity measures (based on value added) from both sources. UNIDO contains only data on manufacturing sectors whereas STAN has a more general sectoral coverage.[2] We find this diversity useful in interpreting the results.

**Complexity** The measure of complexity comes from the Input-Output US matrix provided in the STAN database and thus the Herfindahl measure computed is also used with the UNIDO dataset. Input-Output data for the US in STAN is only available for the years 1995, 2000 and 2005. For this reason, we can only compute the interaction term for these three years.

**Governance Indicators** Our preferred measure of the quality of contractual enforcement is the "Rule of Law" indicator from the Worldwide Governance Indicators (2011) provided by the World Bank. The earliest datapoint for this indicator is 1996 and, as a result, we construct the product of the 1995 complexity measure times the 1996 rule of law. The variables used in the interaction terms for the other years (2000 and 2005) are each measure in the corresponding years.[3] We report also results using the

[2] STAN also focuses more on developed economies.

[3] E.g. "rule of law" measured in 2000 times "1/Herfindahl" measured in 2000.

other five governance indicators provided by the same source ("voice and accountability," "political stability," "government effectiveness," "regulatory quality," and "control of corruption"). The results are reassuringly similar across indicators.

## 3.2 Results

All results are presented in tables placed at the end of the paper. Tables labeled "A" were computed using the UNIDO dataset whereas those labeled "B" come from STAN data.

**Allocation Effect** Table 1 presents our estimates of equation (5) (only the estimates of $\beta_1$ are shown). The effect of contractual quality does appear to affect positively the labor share of more complex sectors. Estimates of $\beta_1$ are always positive and generally very significant irrespective of the dataset used (estimates are always significant at the 5% level and they are usually significant at the 1% level). The effect of contractual imperfections and complexity are higher when measured in the UNIDO dataset relative to STAN but still very similar. This could be because contractual imperfections are more important in manufacturing relative to the economy as a whole or the consequence of the STAN sample including only developed economies.

The magnitude of the effects is not trivial either. We provide a "back-of-the-envelope" calculation to gauge the magnitude of the effects using numbers from the 1995 estimates. If we vary the rule of law by one standard deviation and compare the effects of this change on the least complex and most complex sectors, we get an increase in labor share allocations of 0.5 and 3.14 percentage points. These are not trivial effects considering that the average labor share in the 1995 UNIDO sample is 4.8%. In the STAN database, the standard deviation of contract enforcement quality is lower (recall that the sample focusses on developed countries). The same illustrative experiment yields a change of 0.17 and 1.12 percentage points when comparing the least and the most complex sectors. The average of labor shares in the STAN 1995 database is 2.95%.

We also estimate the effect of all other governance indicators interacted with the reciprocal of the Herfindahl index on sectoral labor shares. Results are presented in Table 2. Coefficients are rather similar across governance indicators across datasets.

Because this pattern was repeated, we omit results for other years.

In order to control for endogeneity issues, we run two additional regressions for each year. Using 1995 as an example, we forward the left-hand side one and two years and regress it in each case on the 1995 interaction term (together with sector and country dummies). With this we aim to assess whether the presence of a shock common to the labor share and law enforcement variables is biasing the estimates. We then proceed similarly for the 2000 and 2005 observations. Results to this sensitivity analysis are presented in Tables 3A and 3B. (Only results for 1995 through 1997 are reported because they pattern is similar for all years.) The coefficients of the lead years are generally very similar to those of the coincident year (i.e. the estimate of $\beta_1$ when labor shares are measured in 1997 and regressed on the 1995 interaction term is similar to the case when the labor share of 1995 is regressed on the 1995 interaction) and mostly retain their significance.

We read the evidence as strongly supporting the allocation effect.

**Productivity Effect** Tables 4A and 4B present the estimates of equation (6). In general, estimates of $\beta_2$ are not significant. The only significant estimate occurs for the year 2000 using the UNIDO dataset and is negative. All other estimates are generally negative and lacking statistical significance. This pattern is repeated when the analysis considers other governance indicators (Tables 5A and 5B) and is further reinforced when sensitivity analysis similar to what was described above is performed. (See tables 6A and 6B).

We read the evidence as a possible extreme manifestation of the detrimental effects of poor contractual enforcement on productivity: firms simply do not produce if poor contracting significantly reduces their productivity.

# 4 Conclusion

This paper presented compelling evidence that the quality of contractual enforcement is an important determinant of the sectoral composition of output. It was found that the labor share of sectors that are more complex in their interaction with other sectors of the economy and thus considered contract dependent is affected relatively more by

the quality of contractual enforcement. We did not find evidence to likewise support the notion that the labor productivity of more complex sectors is boosted by good enforcement quality relatively more than less complex ones.

Results thus suggest that institutions shape the way labor is allocated across sectors in important ways (and possibly other inputs as well). The data we examined supports the view that the allocation effect is the way in which institutions affect aggregate productivity, though this could well be an extreme manifestation of the productivity losses imposed by poor contracting institutions on firms.

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# 5 Tables

Table 1A – UNIDO data
Dependent Variable is Labor Share – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 | 2000 | 2005 |
| herfindahl95ruleoflaw96 | 0.19749*** | | |
| | (0.051) | | |
| herfindahl00ruleoflaw00 | | 0.16458** | |
| | | (0.054) | |
| herfindahl05ruleoflaw05 | | | 0.11634** |
| | | | (0.045) |
| Constant | 15.83273*** | 15.96359*** | 16.46641*** |
| | (1.423) | (1.850) | (1.627) |
| Observations | 990 | 1,360 | 1,566 |
| Adjusted R-squared | 0.462 | 0.392 | 0.377 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 1B – STAN data
Dependent Variable is Labor Share – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 | 2000 | 2005 |
| herfindahl95ruleoflaw96 | 0.15633*** | | |
| | (0.032) | | |
| herfindahl00ruleoflaw00 | | 0.08475** | |
| | | (0.029) | |
| herfindahl05ruleoflaw05 | | | 0.07030* |
| | | | (0.027) |
| Constant | 5.43104*** | 4.86375*** | 4.18875*** |
| | (0.518) | (0.526) | (0.485) |
| Observations | 887 | 844 | 887 |
| Adjusted R-squared | 0.824 | 0.833 | 0.853 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 2A – UNIDO data
Dependent Variable is Labor Share – All Institutions 1995

| VARIABLES | (1) rule law | (2) voice | (3) polstab | (4) gov effect | (5) reg quality | (6) contr corrpt |
|---|---|---|---|---|---|---|
| herfindahl95ruleoflaw96 | 0.1975*** | | | | | |
| | (0.051) | | | | | |
| herfindahl95voiceaccount96 | | 0.2063*** | | | | |
| | | (0.054) | | | | |
| herfindahl95polstab96 | | | 0.1937*** | | | |
| | | | (0.054) | | | |
| herfindahl95geffect96 | | | | 0.1974*** | | |
| | | | | (0.049) | | |
| herfindahl95regqual96 | | | | | 0.2348*** | |
| | | | | | (0.054) | |
| herfindahl95contcorrupt96 | | | | | | 0.1503*** |
| | | | | | | (0.045) |
| Constant | 15.8327*** | 16.6356*** | 16.1988*** | 15.6110*** | 19.7055*** | 15.0406*** |
| | (1.423) | (1.470) | (1.491) | (1.387) | (1.423) | (1.369) |
| Observations | 990 | 1,008 | 990 | 990 | 990 | 990 |
| Adjusted R-squared | 0.462 | 0.460 | 0.461 | 0.463 | 0.465 | 0.460 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 2B – STAN data
Dependent Variable is Labor Share – All Institutions 1995

| VARIABLES | (1) rulelaw | (2) voice | (3) polstab | (4) goveffect | (5) regquality | (6) contrcorrpt |
|---|---|---|---|---|---|---|
| herfindahl95ruleoflaw96 | 0.1563*** | | | | | |
| | (0.032) | | | | | |
| herfindahl95voiceaccount96 | | 0.2375*** | | | | |
| | | (0.050) | | | | |
| herfindahl95polstab96 | | | 0.1381** | | | |
| | | | (0.047) | | | |
| herfindahl95geffect96 | | | | 0.1414*** | | |
| | | | | (0.027) | | |
| herfindahl95regqual96 | | | | | 0.1459*** | |
| | | | | | (0.033) | |
| herfindahl95contcorrupt96 | | | | | | 0.0966*** |
| | | | | | | (0.020) |
| Constant | 5.4310*** | 5.0578*** | 5.8553*** | 5.6558*** | 5.9360*** | 5.8718*** |
| | (0.518) | (0.573) | (0.552) | (0.485) | (0.476) | (0.471) |
| Observations | 887 | 887 | 887 | 887 | 887 | 887 |
| Adjusted R-squared | 0.824 | 0.824 | 0.821 | 0.825 | 0.823 | 0.824 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 3A – UNIDO data
Dependent Variable is Labor Share – Robustness Checks

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 on 1995 | 1996 on 1995 | 1997 on 1995 |
| herfindahl95ruleoflaw96 | 0.19749*** | 0.18094*** | 0.20690*** |
| | (0.051) | (0.047) | (0.057) |
| Constant | 15.83273*** | 15.57838*** | 14.60213*** |
| | (1.423) | (1.277) | (1.569) |
| Observations | 990 | 1,116 | 1,170 |
| Adjusted R-squared | 0.462 | 0.504 | 0.429 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 3B – STAN data
Dependent Variable is Labor Share – Robustness Checks

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 on 1995 | 1996 on 1995 | 1997 on 1995 |
| herfindahl95ruleoflaw96 | 0.15633*** | 0.15682*** | 0.15602*** |
| | (0.032) | (0.032) | (0.032) |
| Constant | 5.43104*** | 5.24513*** | 5.01988*** |
| | (0.518) | (0.513) | (0.509) |
| Observations | 887 | 887 | 887 |
| Adjusted R-squared | 0.824 | 0.827 | 0.830 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 4A – UNIDO data
Dependent Variable is Productivity – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 | 2000 | 2005 |
| herfindahl95ruleoflaw96 | 305.61571 | | |
| | (558.057) | | |
| herfindahl00ruleoflaw00 | | -1,296.94828** | |
| | | (462.741) | |
| herfindahl05ruleoflaw05 | | | -1,836.36618 |
| | | | (978.255) |
| Constant | 12,980.58097 | 8,465.48905 | -25845.08629 |
| | (19,492.516) | (23,431.736) | (51,210.771) |
| Observations | 852 | 1,213 | 1,297 |
| Adjusted R-squared | 0.468 | 0.386 | 0.290 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 4B – STAN data
Dependent Variable is Productivity – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 | 2000 | 2005 |
| herfindahl95ruleoflaw96 | 3,923.08834 | | |
| | (9,242.449) | | |
| herfindahl00ruleoflaw00 | | -4,166.86260 | |
| | | (7,078.766) | |
| herfindahl05ruleoflaw05 | | | -4,394.40367 |
| | | | (4,028.783) |
| Constant | 9,487.62459 | 119157.18113 | 103177.72739 |
| | (170,291.655) | (147,253.339) | (81,281.829) |
| Observations | 689 | 698 | 732 |
| Adjusted R-squared | 0.126 | 0.136 | 0.250 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 5A – UNIDO data
Dependent Variable is Productivity – All Institutions 1995

| VARIABLES | (1) rule law | (2) voice | (3) polstab | (4) gov effect | (5) reg quality | (6) contr corrpt |
|---|---|---|---|---|---|---|
| herfindahl95ruleoflaw96 | 305.6157 | | | | | |
| | (558.057) | | | | | |
| herfindahl95voiceaccount96 | | 812.1301 | | | | |
| | | (596.100) | | | | |
| herfindahl95polstab96 | | | 1,049.8682 | | | |
| | | | (602.212) | | | |
| herfindahl95geffect96 | | | | 130.5533 | | |
| | | | | (536.972) | | |
| herfindahl95regqual96 | | | | | -197.8106 | |
| | | | | | (590.492) | |
| herfindahl95contcorrupt96 | | | | | | 472.6028 |
| | | | | | | (479.711) |
| Constant | 12,980.5810 | 51,378.4502* | 8,583.1475 | 13,857.5831 | 15,901.6056 | 11,573.2173 |
| | (19,492.516) | (22,087.866) | (19,483.602) | (19,644.981) | (19,417.501) | (19,463.453) |
| Observations | 852 | 861 | 852 | 852 | 852 | 852 |
| Adjusted R-squared | 0.468 | 0.470 | 0.470 | 0.468 | 0.468 | 0.469 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 5B – STAN data
Dependent Variable is Productivity – All Institutions 1995

| ARIABLES | (1)<br>rule law | (2)<br>voice | (3)<br>polstab | (4)<br>gov effect | (5)<br>reg quality | (6)<br>contr corrpt |
|---|---|---|---|---|---|---|
| erfindahl95ruleoflaw96 | 3,923.0883 | | | | | |
| | (9,242.449) | | | | | |
| erfindahl95voiceaccount96 | | 6,141.9938 | | | | |
| | | (14,172.250) | | | | |
| erfindahl95polstab96 | | | 11,606.4838 | | | |
| | | | (13,283.235) | | | |
| erfindahl95geffect96 | | | | 5,245.9426 | | |
| | | | | (7,975.217) | | |
| erfindahl95regqual96 | | | | | 5,248.3851 | |
| | | | | | (9,680.730) | |
| erfindahl95contcorrupt96 | | | | | | 4,125.6006 |
| | | | | | | (5,626.497) |
| onstant | 9,487.6246 | -553.7102 | -43,967.4867 | 496.0792 | 13,486.9747 | 1,869.9703 |
| | (170,291.655) | (182,506.388) | (178,456.174) | (161,236.115) | (157,597.806) | (157,293.791) |
| bservations | 689 | 689 | 689 | 689 | 689 | 689 |
| djusted R-squared | 0.126 | 0.126 | 0.127 | 0.127 | 0.127 | 0.127 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 6A – UNIDO data
Dependent Variable is Productivity – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 on 1995 | 1996 on 1995 | 1997 on 1995 |
| herfindahl95ruleoflaw96 | 305.61571 | 249.16868 | -250.16816 |
| | (558.057) | (608.085) | (601.421) |
| Constant | 12,980.58097 | -1,217.38357 | 50,683.33336* |
| | (19,492.516) | (30,409.023) | (24,648.253) |
| Observations | 852 | 982 | 1,052 |
| Adjusted R-squared | 0.468 | 0.417 | 0.394 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 6B – STAN data
Dependent Variable is Productivity – All Years

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | 1995 on 1995 | 1996 on 1995 | 1997 on 1995 |
| herfindahl95ruleoflaw96 | 3,923.08834 | 3,025.42483 | 4,408.77685 |
| | (9,242.449) | (8,056.389) | (8,628.622) |
| Constant | 9,487.62459 | 21,062.30040 | 12,351.98321 |
| | (170,291.655) | (148,435.136) | (160,958.721) |
| Observations | 689 | 693 | 724 |
| Adjusted R-squared | 0.126 | 0.138 | 0.123 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05