# Undervaluation, Institutions, and Development [1]

*Guangjun Qu*      *Kevin Sylwester* [2]

March 2010

**Abstract**: Rodrik (2008) claims that weak institutions hurt the development of the tradable sector more than that of the nontradable sector and that undervaluation can foster growth by diminishing the distortion created by weak institutions between the two sectors. Using the International Country Risk Guide (ICRG) dataset on four components of institutional quality, we consider the effects of investment profile, law and order, corruption, and bureaucratic quality upon the relative development of the tradable sector to the nontradable sector, which is measured by the ratio of industry value added to services valued added. On the basis of comparison of the two sectors, the panel evidence of 131 countries indicates that none of the four components mentioned above is positively associated with the relative development of the tradable sector to the nontradable sector. That is, the tradable sector does not suffer disproportionately (compared to the nontradable sector) from institutional weaknesses. Our results cast skepticism upon one of Rodrik's explanations on the growth-promoting effects of real undervaluation because the existence of such a distortion is not supported empirically.

*JEL Classification*: F41; F43; O14; O17
*Keywords*: Undervaluation; Institutions; Tradables; Nontradables.

## 1. Introduction

Since the 1960s, several Southeast Asian countries have persistently undervalued their currencies and these economies have experienced rapid economic growth for thirty years. In contrast, during the same period, many Latin American and African countries have suffered from severe balance of payment crises due to exchange rate overvaluation.

1

Rodrik (2008) reports that the undervalued degree of real exchange rates is positively correlated with GDP growth rates. [3]

Rodrik also presents two theoretical explanations behind the growth-promoting effects of real undervaluation, the first focusing on institutional weaknesses and the second on product-market failures.[4,5] Our purpose in this paper is to present more empirical evidence on his first explanation. As argued by Rodrik, the development of the tradable sector depends heavily upon institutional environments. Therefore, the tradable sector in developing countries suffers disproportionately (compared to the nontradable sector) from institutional weaknesses, such as contract incompleteness. That is, weak institutions impose a higher "tax" on tradables, especially modern tradables whose production is assumed to be more demanding of institutional quality. He then claims that real undervaluation can mitigate this distortion by increasing the profitability of tradables.

Unfortunately, relevant empirical evidence is not sufficiently presented in the literature. For example, all the empirical studies Rodrik cites to support his claim focus only on the effect of weak institutions upon the development of trade or the tradable sector. In other words, there is no real comparison between the tradable and

---

[3] Among many different definitions of the real exchange rate (RER), the one used in this paper is the domestic relative price of tradable goods ($P_T$) to nontradable goods ($P_N$). Mathematically,

$$RER = P_T / P_N \ .$$

By showing resource allocation across the tradable and nontradable sectors, this definition provides a link between behaviors of RER and relative development of the tradable sector to the nontradable sector. See Dornbusch (1980), Frenkel and Mussa (1985), Edwards (1989) among others. Here "tradable" refers to a good or service that can be sold in another location distant from where it was produced, such as most manufactured products, and "nontradable" refers to a good or service that is not tradable, such as a service provided locally.

[4] More details are discussed in Section 2 where the relevant literature is reviewed.

[5] When we mention "real undervaluations", we follow the definition of undervaluation introduced by Edwards (1989): "*If the actual real exchange rate is below the equilibrium RER value, we say that there is real overvaluation. If, on the other hand, the actual RER exceeds the equilibrium RER, we say that there is real undervaluation.*" Accordingly, an increase in RER above its equilibrium level, i.e. real undervaluation, causes the production of tradables to become more profitable and induces more productive resources to shift from the nontradable sector toward the tradable sector.

2

nontradable sectors, given the fact that the effect of weak institutions upon nontradables is neglected.

Using the ICRG database on four components of institutional quality, we consider the effects of investment profile, law and order, corruption, and bureaucratic quality upon relative development of the tradable sector to the nontradable sector, which is measured by the ratio of industry value added to services valued added. On the basis of comparison of the two sectors, the panel evidence of 131 countries indicates that none of the four components mentioned above has a positive and statistically significant influence on the relative development of the tradable sector to the nontradable sector. That is, the tradable sector does not suffer disproportionately (compared to the nontradable sector) from institutional weaknesses. The results are robust when using an alternative dataset of institutional quality, the Worldwide Governance Indicators (WGI), and investigating three sectors (agriculture, industry, and services) separately. The results are also robust for the sample of either all countries or only less-developed countries.

Our results cast skepticism upon one of Rodrik's explanations that undervaluation can foster growth by diminishing the distortion created by weak institutions between the two sectors because the existence of such a distortion is not supported by the empirical evidence presented below. Nevertheless, this does not automatically mean that real undervaluation has no growth-enhancing impact since there are at least three other competing explanations in the literature about different channels through which real undervaluation may affect growth.[6] Therefore, the panel evidence presented in this paper only suggests that we should pay more attention to other explanations on how real undervaluation spurs growth.

---

[6] More details about the other three explanations are discussed in Section 2

The remaining part of this paper is organized as follows. Section 2 presents greater background on the explanations as to how undervaluation increases growth, focusing on the institutional explanation. Section 3 develops our empirical methodology and describes the data. The experiences from some developing economies are studied in Section 4. Section 5 shows results of econometric tests and section 6 concludes.

## 2. Theoretical Framework

Many studies have considered how real overvaluation or undervaluation affects long run economic development.[7] Most recently, Rodrik (2008) and Gala (2008) focus on real undervaluations and its growth-promoting effects. Taken together, results from these studies suggest that large overvaluation has an adverse effect on economic development whereas real undervaluation is able to foster growth.

Compared to the abundant empirical evidence, however, few studies consider formal theories of how real exchange rates could affect long-run growth. As Eichengreen (2007) points out, relevant theoretical discussion is necessary since the real exchange rate is just a relative price of tradables to nontradables and it is not under the direct control of the authorities. Although relevant theoretical models and explanations are fairly scarce, four explanations have recently been put forward:[8]

(a) Institutional weaknesses. According to Rodrik's argument, the tradable sector is "special" because it suffers disproportionately (compared to the nontradable one) from weak institutions and inabilities to completely specify contracts that characterize low-income environments. An increase in the relative price of tradables due to real undervaluation enhances the relative profitability of the tradables sector to the

---

[7] See Dollar (1992), Sachs and Warner (1995), and Easterly (2001) among others.
[8] See Rodrik (2008) and Gala (2008).

nontradable sector and, hence, acts as a second-best mechanism to (partially) alleviate the relevant distortion thereby spurring growth.

(b) Product-market failures. According to Rodrik's argument, the tradable sector also suffers from market failures (information and coordination externalities) that block structural transformation and economic diversification. Real undervaluation can again be a second-best mechanism and mitigate this distortion.

(c) Capital accumulation. According to Gala, competitive exchange rates would avoid savings displacement and contribute to capital accumulation by stimulating investment.

(d) Technological upgrading. According to Gala, competitive exchange rates would encourage the development of the non-traditional tradable sector, helping countries go through structural change and climb up the technological ladder.

As mentioned in the introduction, this paper focuses on the first explanation, institutional weaknesses. To the best of our knowledge, Rodrik's study is the only one incorporating the role of institutions into the discussion on the relationship between real undervaluation and growth. Briefly speaking, there are two theoretical claims about the role of institutions in his paper. The first one is that weak institutions "tax" the tradable sector more than the nontradable sector. The second is that undervaluation is able to induce more productive resources in the tradable sector so that the distortion of resource allocation between the two sectors caused by weak institutions can be mitigated. Note that the first claim serves as the premise of the second one, that is, the claim that undervaluation can mitigate the distortion created by weak institutions and enhance growth holds since such a distortion exists. If the existence of the distortion cannot be documented by empirical evidence, then the second claim is not applicable. This is the reason why a variety of empirical tests are conducted in this paper so as to

show clearly whether the distortion exists or not. In what follows, Rodrik's first theoretical claim, his empirical evidence, and inconsistencies between them are presented in detail.

According to the early development of new institutional economics, weak institutions in developing countries create low private appropriability of returns to investment through various mechanisms: contractual incompleteness, hold-up problems, corruption, lack of property rights, and poor contract enforcement. [9] Considering that production systems in tradables place greater premium on contractibility and reliable third-party enforcement than ones in nontradables, Rodrik claims that the problems caused by weak institutions are more severe in tradables than in nontradables. That is, those institutional and contracting shortcomings impose a higher "tax" on the tradable sector than on the nontradable sector.

Rodrik cites three groups of empirical studies to support his theoretical explanation:

"*—Across countries, lower quality of institutions (as measured by indices of the rule of law, contract enforcement, or control of corruption) is associated with lower ratios of trade to GDP ("openness").[10]*

*—Across different categories of tradable goods, more "institution-intensive" tradables are prone to larger effects.[11]*

*—Institutional weakness interacts with the contract intensity of goods to play a role in determining comparative advantage.[12]*"

---

[9] See, for example, North (1990) and Acemoglu *et al* (2001).

[10] See Anderson and Mercouiller (2002), Rodrik, Subramanian, and Trebbi (2004), Rigobon and Rodrik (2005), Méon and Sekkat (2006), Berkowitz, Moenius, and Pistor (2006), and Ranjan and Lee (2004).

[11] Méon and Sekkat (2006) find that the relationship they identify holds for manufactured exports but not for nonmanufactured exports. Moreover, Ranjan and Lee (2004) find that the effect is stronger for differentiated goods than for homogeneous goods.

However, there are some inconsistencies between Rodrik's theoretical claim and his empirical evidence. The first group of empirical studies mentioned above deals with the relationship between institutions and the trade share. Even though such a relationship is indeed positive, it does not automatically mean that the same relationship holds throughout the whole tradable sector. For many countries, in particular developing ones, the goods and services transacted across countries are only a small part of tradables as most tradables are produced and consumed within local markets. Therefore, the discussion in these studies actually has been limited to the correlation between institutional quality and one part of tradables. To say the least, even if the same relationship holds throughout the whole tradable sector, it cannot be taken as the suggestive evidence for Rodrik's theory alleging that weak institutions impose a higher "tax" on tradables than on nontradables. The reason is that relevant empirical evidence should be involved in a comparison between the effect of weak institutions on tradables and the one on nontradables. But all studies in the first group do not draw any conclusion about nontradables. Similarly, in the second and third group, the studies also focus on trade or tradables and provide no comparison between the two sectors.[13] Thus, these empirical studies fail to provide sufficient support to Rodrik's first claim because they only correspond to his theory loosely. In the next section, the ratio of industry value added to services valued added will be introduced as a measure of relative development of the tradable sector to the nontradable sector and the differing influence of weak institutions between the two sectors will be tested.

---

[12] See Levchenko (2004), Berkowitz, Moenius, and Pistor (2006), and Nunn (2007). Generally, they find that countries with poor institutions have comparative disadvantage in products that are more institutions-intensive, more complex, or more relationship-intensive.

[13] For example, in the second group, Méon and Sekkat (2006) find that exports of manufactured goods are positively affected by institutional quality but neither total exports nor non-manufactured exports. In the third group, Nunn (2007) finds that countries with poor institutions have comparative advantage in institution-intensive products.

## 3. Methodology and Data

To further examine Rodrik's claim that weak institutions impose a higher "tax" on tradables than on nontradables, the following regression is estimated.

$$\ln(TN_{it}) = \alpha + \beta IQ_{it} + \gamma X_{it} + f_t + \varepsilon_{it}$$

where $TN_{it}$ is the size of tradables divided by the size of nontradables in country $i$ for year $t$. $IQ_{it}$ are indices of institutional quality of country $i$ for year t. $X_{it}$ is a set of control variables, including lagged values of the natural log of real per capita GDP and country $i$'s trade share.[14] $f_t$ is the fixed effects for time period, which controls for impacts of time-variant global shocks on $TN_{it}$. The key coefficient in equation [1] is $\beta$. According to Rodrik's theory, $\beta$ is expected to be positive and statistically significant, especially for the sample of developing countries, since the worse the institutional quality ($IQ_{it}$), the higher "tax" imposed on tradables than on nontradables, and, hence, the smaller the relative size of tradables to nontradables ($TN_{it}$).

In practice, we use industry value added (% in GDP) and services value added (% in GDP) to approximate the size of the tradable and nontradable sector, respectively. $TN_{it}$ then equals industry value added (% in GDP) divided by services value added (% in GDP). Relevant data are from the World Development Indicators (WDI), 2008.

An obvious concern about the usage of the ratio of industrial sector production to service sector production as a proxy of $TN_{it}$ is that it does not include the agricultural sector directly. One reason for this omission is that agricultural goods, especially the ones in developing countries, can be considered as either tradables or nontradables depending upon whether they are produced for local or global markets and so omitting agricultural goods makes $TN_{it}$ more comparable across countries. Moreover, although

---

[14] In order to capture the nonlinear relationship between $TN_{it}$ and the income level, one of my empirical specification also contains the quadratic term of the natural log of real per capita GDP as an explanatory variable. Data on the control variables are obtained from World Development Indicators (WDI).

some agricultural goods are actually tradable, Rodrik stresses production of the industrial sector in particular when he mentions "tradables".[15] The reason is that only the modern industrial sector is commonly considered as the engine of growth in the literature. The exclusion of the agricultural sector thus makes our empirical outcomes more consistent with Rodrik's theory and other growth literature. Nevertheless, movements of resources into or out of agriculture would affect $TN_{it}$ and so should be kept in mind when interpreting findings.[16] Moreover, as a response of concerns about ignoring the agricultural sector in the construction of $TN_{it}$, one of the robustness checks presented in Section 5 considers the effects of weak institutions on each of the three sectors (agriculture, industry, and services) separately.

$TN_{it}$ is preferable to the share of industry in GDP when the comparison between two sectors matters.[17] A simple numerical example illustrates the difference that the two measures can make. Country A's industry value added (% in GDP) rises by 10% and its services value added (% in GDP) rises by 20% when its institutional environment improves.[18] Suppose that all other factors affecting the shares of industry and services in GDP stay the same. Now, in this specific case, the improvement of weak institutions induces more productive resources to move into the services sector and thereby drives it to grow faster, which means that this is a counterexample of Rodrik's theory where weak institutions actually discourage development of services more than that of industry. In

---

[15] The words he uses for industrial goods and services are "modern tradables".

[16] For example, if one considers agricultural goods as tradables and the coefficient on institutional quality is positive in the regression without inclusion of agricultural goods in the numerator of $TN_{it}$, she may doubt that the coefficient will be still positive after adding agriculture to the numerator of $TN_{it}$ since a sharp decline in the share of agriculture is often observed when an economy takes off. Such a decline will decrease $TN_{it}$ and, possibly, lead to a negative coefficient on institutional quality. However, for the same reason, if the coefficient is negative in the regression without inclusion of agricultural goods in the numerator of $TN_{it}$, adding it back to the numerator would make the results even stronger.

[17] See, for example, Rodrik (2008). When discussing the size of the tradable sector as the operative channel through which undervaluation fosters growth, Rodrik employs the share of industry in GDP as the dependent variable.

[18] Of course, this results from a 30% decrease in agriculture value added (% in GDP).

other words, weak institutions impose a higher "tax" on services, the proxy of the nontradable sector, than on industry, the proxy of the tradable sector. However, if one regresses the share of industry in GDP on indices of institutional quality, the coefficient will be positive as both variables increase over time. The regression result, then, becomes supportive of Rodrik's explanation. The same contradiction will not occur when using $TN_{it}$ as the dependent variable. The coefficient on institutional quality will be negative as $TN_{it}$ declines during the improvement of weak institutions. In the next section where the case study of developing countries is presented, we will find that the numerical example discussed above is not an extreme one. Along with the improvement of weak institutions, the services sector in many developing economies either grows faster than the industrial sector or evolves in a similar pattern to the one of the industrial sector.

The main results of this article are derived using data on institutional quality coming from the International Country Risk Guide (ICRG). It was developed by the PRS Group mainly for commercial purposes. Given the fact that "institution" is a multifaceted concept, the current debate over the role of institutions in the relationship between real undervaluation and growth remains fairly vague on what is meant by "institutions". The ICRG dataset offers a wide choice of indicators and allows us to examine the extent to which various dimensions of the institutional framework have an impact on relative development of the tradable sector to the nontradable sector.[19]

For the purpose of this paper, we only consider four of twelve ICRG institutional components. The four components and their exact meaning defined by the PRS are

---

[19] Specifically, the part of the ICRG involved in this paper is the Political Risk Components (The PRS Group also calls it Table 3B or the Researcher Dataset). There are twelve components used to assess the political risk of a country: government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability, and bureaucracy quality.

presented in Table 1. Strictly speaking, Investment Profile, Law and Order, and Corruption approximate most closely to Rodrik's definition of weak institutions. But Bureaucratic Quality is still included since it measures changes in public policy and interruptions in government services which are supposed to be important for decisions of investment and employment between two sectors.[20]

The ICRG dataset is much different from the datasets prevalently used by other researchers in this field, such as the Worldwide Governance Indicators (WGI) constructed by the World Bank. For one, the ICRG dataset dates back to 1984 for most countries. More importantly, the ICRG separates Investment Profile from Law and Order and focuses the former on economic factors affecting firms' investment decisions, such as contract viability, profits repatriation and payment delays. Unlike the ICRG, the WGI incorporates quality of contract enforcement into its measure named "Rule of Law". There is no doubt that contract viability or payment delays is a subcomponent reflecting the quality of legal systems, but Rule of Law in the WGI also involves other information of legal and social factors, such as the likelihood of crime and violence.[21] Therefore, the ICRG data is mainly employed in this paper so as to pay more attention to Investment Profile characterizing contractual environments while excluding other legal and social factors. But the WGI data are also employed in one of our robustness checks just in case that our results are sensitive to the selection of datasets.[22]

---

[20] For Investment Profile, a score of 12 points equates to very low risk (high quality of institutions) and a score of 0 points to very high risk (low quality of institutions). For Law and Order and Corruption, their rating ranges from 0 to 6, with 6 representing very low risk. For Bureaucratic Quality, its rating ranges from 0 to 4, with 4 representing very low risk. Thereby, it is worth noting that values of different components are not comparable since they have different scales of maximum points.

[21] See Kaufmann *et al* (2009).

[22] Three out of six indicators of the WGI are chosen for robustness checks as they are more or less relevant to Rodrik's definition of weak institutions. They are Rule of Law, Control of Corruption, and Regulatory Quality. See Kaufmann *et al* (2009) for definitions of those indicators.

**Table 1: Four Components of Institutional Quality Used in This Paper**

| Component | Risk Rating (max.) | Definition & Subcomponents |
|---|---|---|
| Investment Profile | 12 | An assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays. |
| Law and Order | 6 | Law and Order are assessed separately. The Law subcomponent is an assessment of the strength and impartiality of the legal system, while the Order subcomponent is an assessment of popular observance of the law. |
| Corruption | 6 | An assessment of corruption within the political system. Such corruption is a threat to foreign investment for several reasons: it distorts the economic and financial environment; it reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability; and, last but not least, introduces an inherent instability into the political process. |
| Bureaucratic Quality | 4 | An assessment of both the institutional strength and quality of the bureaucracy. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. |

Source: *A Business Guide to Political Risk for International Decisions*, the PRS Group, 2009.

## 4. Case Studies of Selected Developing Countries

In the introduction of Rodrik (2008), to reveal the correlation between real undervaluation and economic growth, the experience of seven developing economies during 1950-2004 is exhibited graphically. They are China, India, South Korean, Taiwan, Uganda, Tanzania, and Mexico. Here we conduct case studies for the same economies, except for South Korea and Taiwan which have not been considered as developing economies since 1984 when the data on institutional quality from the ICRG starts. In what follows, the evolution of institutional quality and structure of output is depicted to show whether and how changes in institutional quality affect industry and services discriminatively. Primary attention is paid to the periods where the four components of

institutional quality move in the same direction as, if they do not, their influences on tradables and nontradables may offset with each other and no unambiguous conclusion can be drawn. In addition, note that Investment Profile seems to be more volatile than the other three components for all selected economies. Although this is partially because the scale of its rating is wider, ranging from 0 to 12, the fact also highlights the importance of its separation from Law and Order mentioned in the last section. The volatility of economic factors is probably a critical characteristic distinct from other legal and social factors.

During 1991-1993, all components of institutional quality in China either improved or stayed the same: the ratings of three out of four components increased and only Bureaucratic Quality was unchanged. During the same period, the share of industry in GDP rose by 5 percentage points but the one of services rose by 1 percentage point. For India, another rapidly growing economy in Asia, the entire institutional environment ameliorated during 1991-1994 given that the ratings of three out of four components rose and only Bureaucratic Quality was unchanged. But its structure of output has been relatively stable over the same period, with a 1-percentage-point increase in industry share and an unaltered services share.

In Uganda, two out of four components had increasing ratings and the other two had constant ones during 1992-1995, implying that weak institutions obviously improved. Its industry share rose by 1 percentage point and its services share did not change. As another African example, the ratings of two out of four institutional indicators rose in Tanzania during 1990-1992 while the other two kept constant. Its industry share decreased by 2 percentage point and its service share was unaltered in these three years.

Mexico had increasing ratings of two out of four indicators and unchanged ones of the other two during 1987-1990. Strikingly, its industry share declined by 10 percentage points and its services share climbed by 12 percentage points over those four years.

**Figure 1: Institutional Quality and Relative Development of the Tradable Sector to the Nontradable Sector in Selected Developing Countries**



China: Institutional Quality and Structure of Output



India: Institutional Quality and Structure of Output

**Figure 1: Institutional Quality and Relative Development of the Tradable Sector to the Nontradable Sector in Selected Developing Countries (Cont'd)**



Uganda: Institutional Quality and Structure of Output



Tanzania: Institutional Quality and Structure of Output

**Figure 1: Institutional Quality and Relative Development of the Tradable Sector to the Nontradable Sector in Selected Developing Countries (Cont'd)**



Mexico: Institutional Quality and Structure of Output
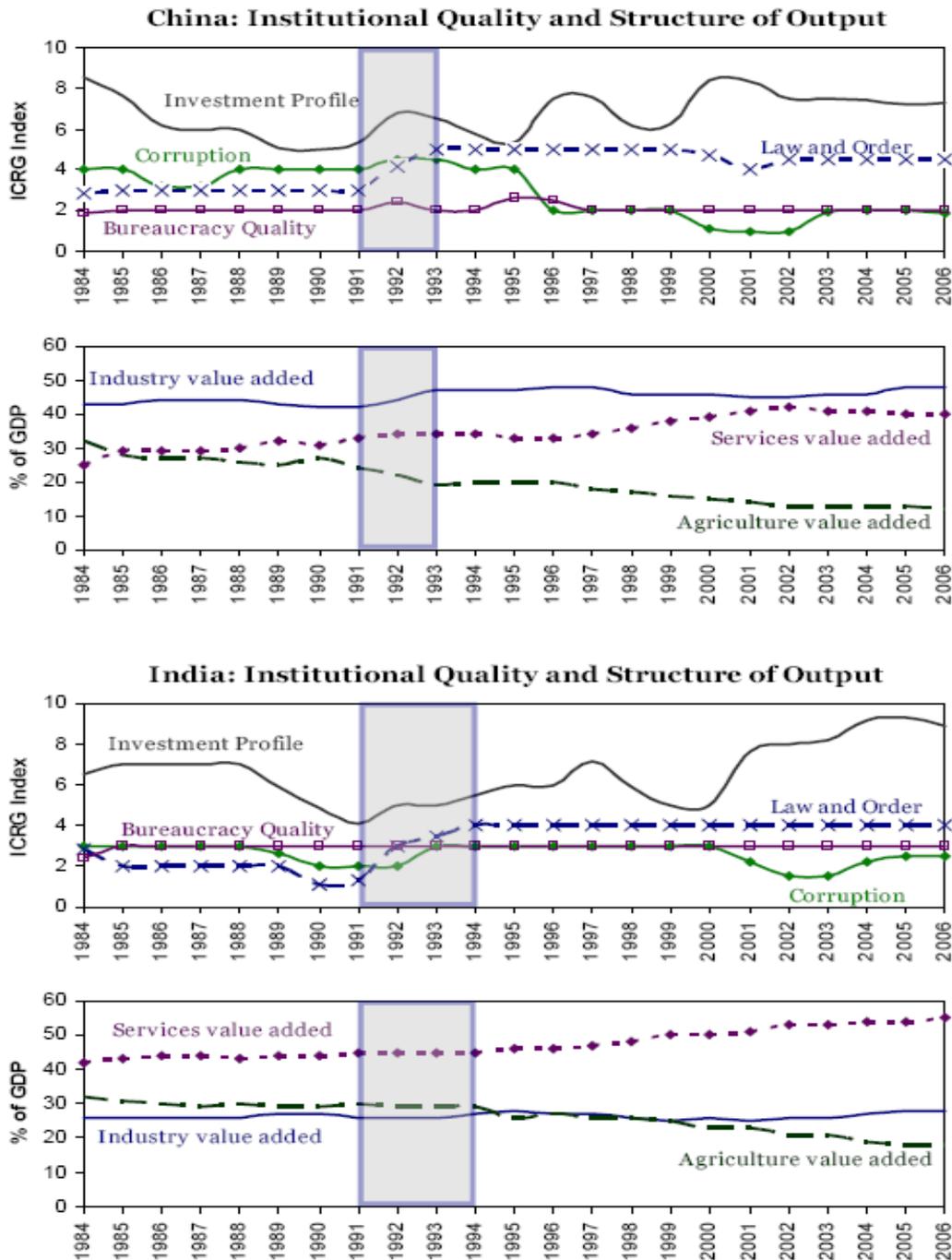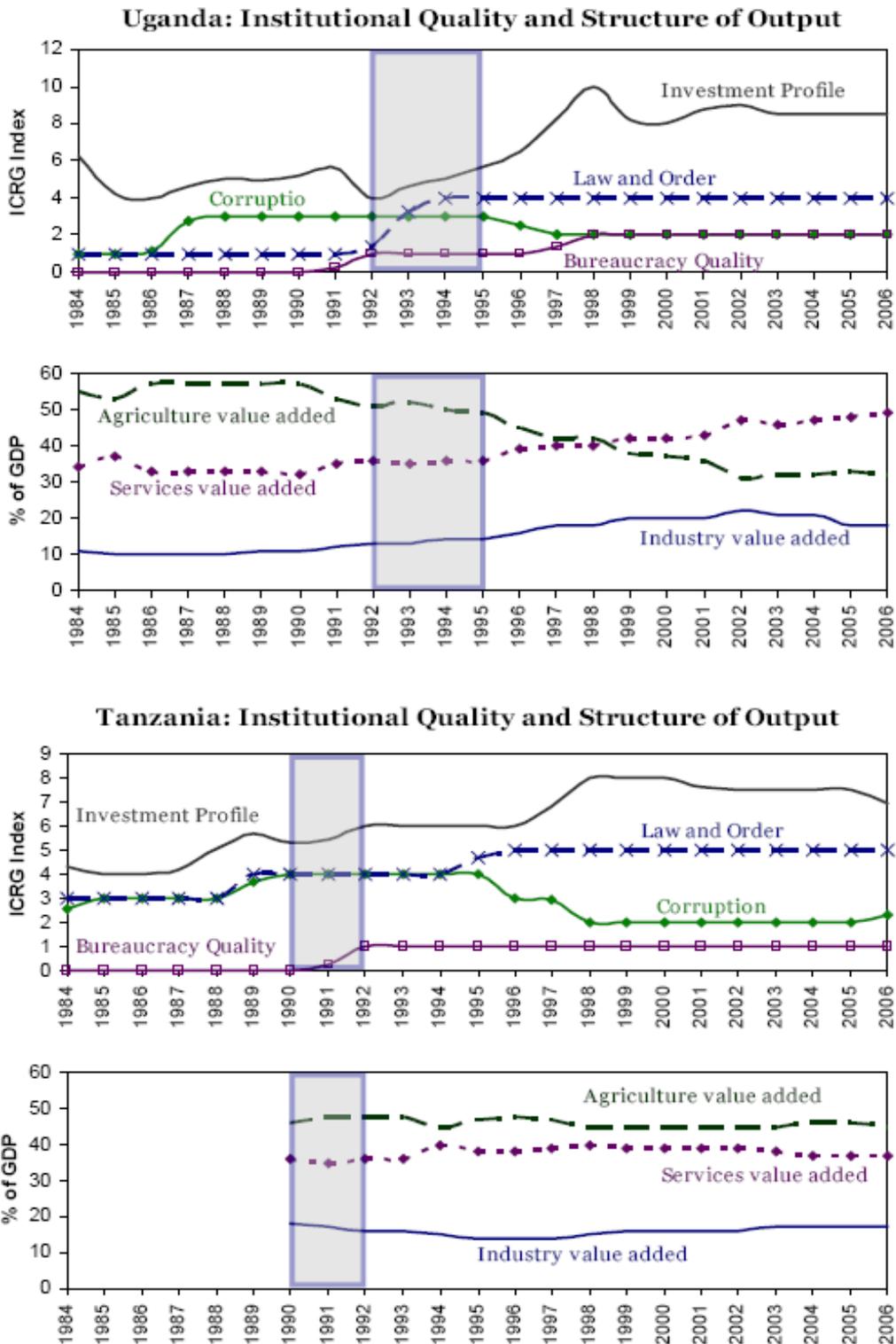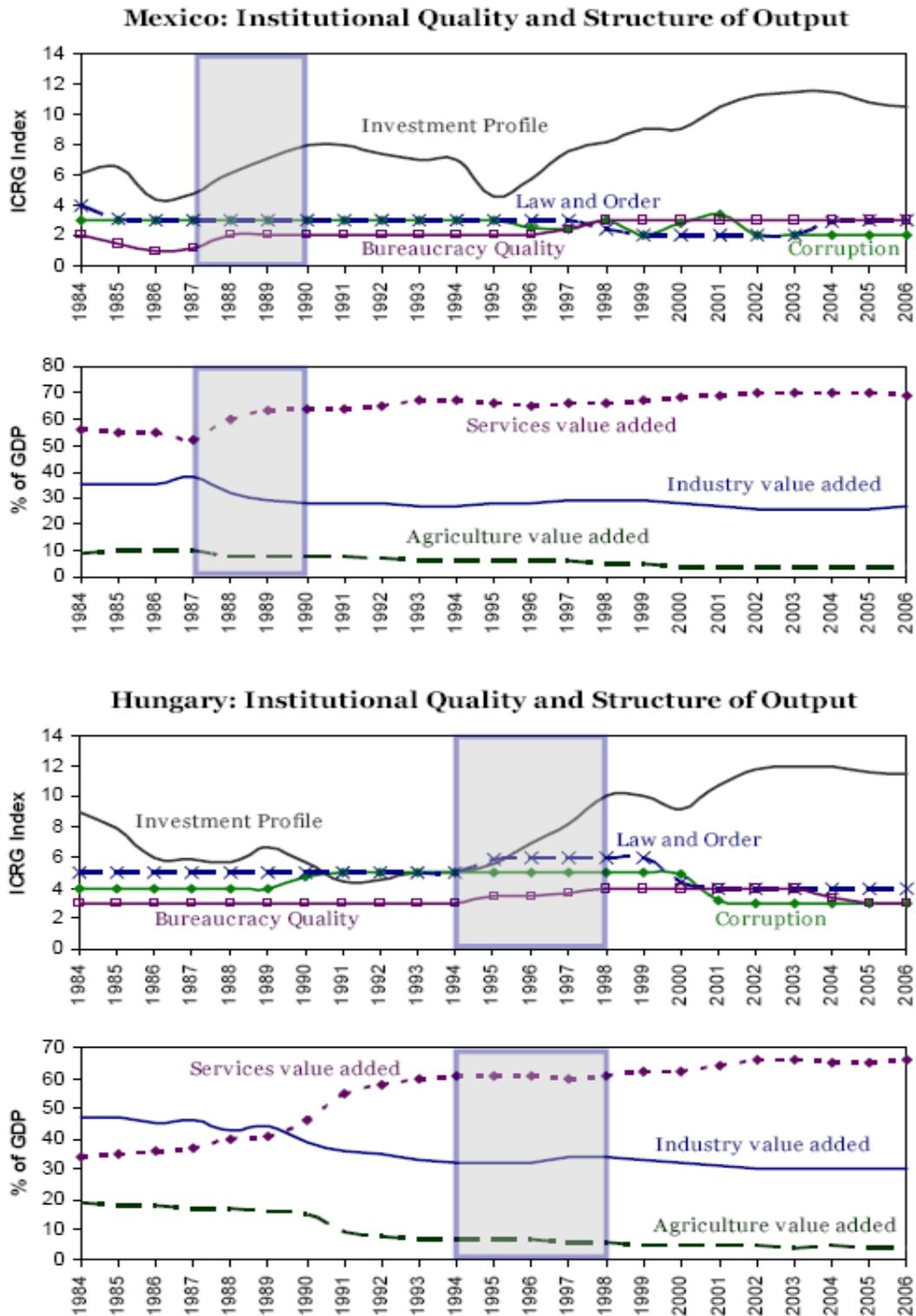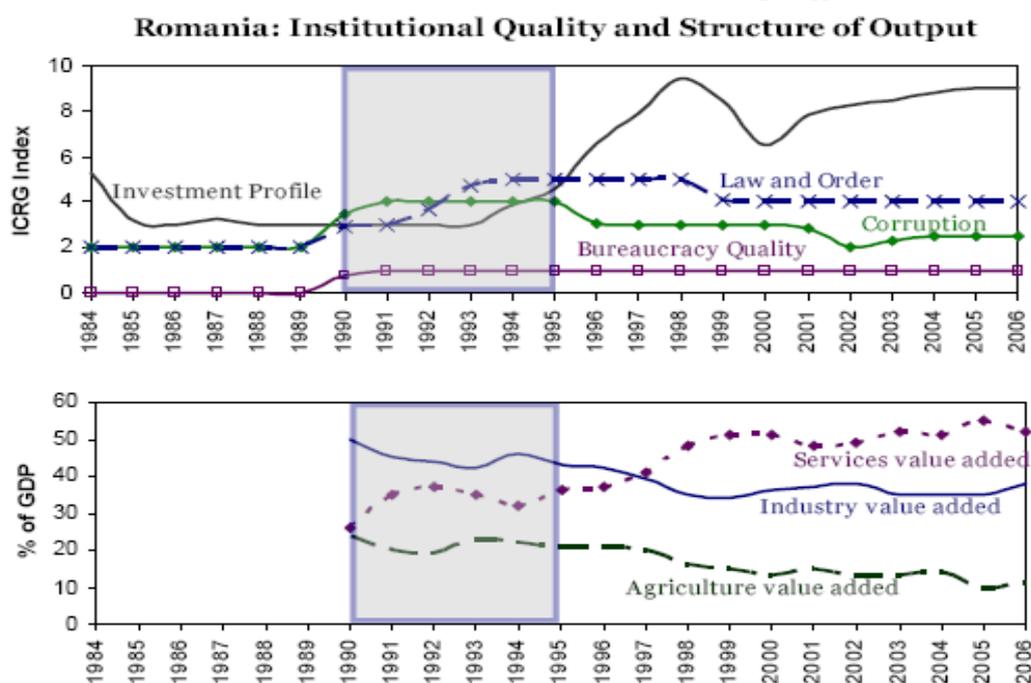


Hungary: Institutional Quality and Structure of Output

**Figure 1: Institutional Quality and Relative Development of the Tradable Sector to the Nontradable Sector in Selected Developing Countries (Cont'd)**



Romania: Institutional Quality and Structure of Output

The experiences from two Eastern European economies, Hungary and Romania, are also presented here. The reason is that these economies experienced fundamental changes in their institutional environments since the early 1990s which enable us to examine movements of their structure of output before and after such institutional changes. Hungary and Romania are selected out of other eastern European economies due to availability of relevant data since the 1990s. Except for corruption staying constant, the ratings of three out of four components rose in Hungary during 1994-1998. Meantime, its industry share rose by 2 percentage points but its services share was the same. To the contrary, what happened in Romania during 1990-1995 was that its industry share decreased by 7 percentage points but its services share increased by 10 percentage points while all the four indicators of institutional quality improved.

Taken together, if other factors are assumed to be constant during the sample periods discussed above, the experiences from China and Hungary offer favorable evidence to Rodrik's theory since the improvement of weak institutions coincided with relative growth of the tradable sector (industry) to the nontradable sector (services). However, what happened in Mexico and Romania is completely contradictory to Rodrik's theory.[23] Although it is too premature to draw any conclusion based upon these figures as other factors affecting the structure of output are not controlled, the information conveyed by these figures suggests that experiences of developing economies are not always consistent with what Rodrik's theory predicts. Therefore, empirical results of the panel regressions are reported in the next section so as to examine further Rodrik's theory.

## 5. Empirical Results

### 5.1 The Baseline Panel Evidence

The baseline regressions are of the forms:

$$\ln(TN_{it}) = \alpha + \beta IQ_{it} + \gamma \ln\left(lagged\ income_{it}\right) + \varphi \ln\left(trade\ share_{it}\right) + f_t + \varepsilon_{it} \qquad [1]$$

$$\ln(TN_{it}) = \alpha + \beta IQ_{it} + \gamma \ln\left(lagged\ income_{it}\right) + \delta \ln\left(lagged\ income_{it}\right)^2 + \varphi \ln\left(trade\ share_{it}\right) + f_t + \varepsilon_{it}$$
$$[2]$$

Both econometric specifications apply first to the sample of all countries and then apply to developing countries.[24] Due to the availability of data from the WDI and the ICRG, our sample ranges from 1984 to 2006, including observations for 131 countries. We include one component of institutional quality in the regression at a time. The main results are reported in Table 2. What is reported in panel A of Table 2 are complete

---

[23] What happened in India, Uganda, and Tanzania is relatively neutral since the difference in changes between the two sectors is equal to or less than 2 percentage points when institutional quality improved.

[24] Developing countries are defined as those with per capita income of less than $6,000.

results of coefficient estimates of both the institutional variable and control variables from regressions [1] and [2]. Panel B reports the results of coefficient estimates when replacing Investment Profile by the ICRG indices measuring other aspects of institutional quality, i.e. Law and Order, Corruption, and Bureaucratic Quality. To save space, the coefficients on other control variables are not reported in panel B but available upon request.

For the sample of all countries, the coefficients on Investment Profile in regressions [1] and [2] are -0.032 and -0.028 and statistically significant at the 1-percent level, respectively. It means that the weaker the institutions (lower ratings), the greater the size of the tradable sector (industry share in GDP) relative to that of the nontradable sector (services share in GDP). That is, weak institutions seem to impose a *lower*, instead of higher as Rodrik claims, "tax" on the production of tradables relative to that of nontradables. These coefficients are still negative and statistically significant after excluding rich countries. According to Rodrik's theory, the relative size of industry value added to services value added in developing countries are supposed to be more sensitive to changes in institutional quality than that in developed countries where institutional environments are much better. Thus, the values of the coefficients on institutional quality estimated from the sample of developing countries should be greater than those from the full sample. The panel evidence, however, suggests that the relative size of the tradable sector to the nontradable sector falls similarly (around 0.030) when the rating of Investment Profile rises by 1 point.

The coefficient on lagged income is positive but statistically insignificant in regression [1] for the sample of all countries, but it becomes significant at the 1-percent level when adding the quadratic term of lagged income. The negative sign of the coefficient on the squared lagged income implies that there is an inverted U-shape

relationship between relative sizes of tradables to nontradables and income levels, which is commonly acknowledged by the literature. The coefficient on trade share is positive and statistically significant, saying that openness to trade raises the relative size

**Table 2: Panel Regressions of Relative Development of Tradables to Nontradables on Institutional Quality [1]**

| Independent variables | All countries [2] | | Developing countries [3] | |
|---|---|---|---|---|
| | [1] | [2] | [1] | [2] |
| **Panel A [4]** | | | | |
| Investment profile | -0.032*** | -0.028*** | -0.030*** | -0.032*** |
| | (-6.25) | (-5.36) | (-3.53) | (-3.79) |
| ln lagged income | 0.002 | 0.515*** | 0.074*** | 1.41*** |
| | (0.246) | (5.18) | (3.66) | (3.48) |
| (ln lagged income)$^2$ | | -0.030*** | | -0.089*** |
| | | (-5.18) | | (-3.30) |
| ln trade share | 0.137*** | 0.136*** | 0.208*** | 0.204*** |
| | (8.77) | (8.77) | (7.49) | (7.38) |
| **Panel B [5]** | | | | |
| Law and order | -0.044*** | -0.034*** | -0.025** | -0.028** |
| | (-5.91) | (-4.41) | (-2.03) | (-2.25) |
| Corruption | -0.080*** | -0.073*** | -0.020 | -0.020 |
| | (-10.63) | (-9.36) | (-1.37) | (-1.36) |
| Bureaucratic quality | -0.099*** | -0.091*** | -0.050*** | -0.057*** |
| | (-9.85) | (-8.96) | (-3.15) | (-3.58) |
| No. of observations | 2539 | 2539 | 1243 | 1243 |

Note: [1] The dependent variable is the ratio of industry value added (% in GDP) to services value added (% in GDP). Observations are annual, ranging from 1984 to 2006. All regressions include time fixed effects. Robust *t* statistics are in parentheses. Asterisks indicate statistical significance at the * 10 percent, ** 5 percent, *** 1 percent level.
[2] The sample of all countries contains 131 developed and developing economies. Both the regressions [1] and [2] have been run based on this sample.
[3] The subsample of developing countries contains 70 developing economies with real GDP per capita less than $6000. Both the regressions [1] and [2] have been run based on this subsample.
[4] What is reported in panel A is the complete results when using the ICRG index of investment profile to measure one aspect of institutional quality.
[5] What is reported in panel B is the results when replacing investment profile by the indices measuring other aspects of institutional quality, i.e. law and order, corruption, and bureaucratic quality. We regress on one institutional variable at a time, instead of inclusion of all four variables in the regression. Therefore, this table reports coefficient estimates from 16 different regressions. To save space, the coefficients of the control variables are not reported in panel B but available upon request. All of these coefficients have the same signs as reported in panel A and are statistically significant at 1 percent, except the one of ln lagged income in the regression [1] on law and order which is positive but statistically insignificant.

of the tradable sector to the nontradable sector. This is consistent with Dodzin and Vamvakidis (2004), which presents some cross-country evidence suggesting that trade liberalization could lead to industrialization in developing countries.[25]

In panel B of Table 2, all coefficients on Law and Order, Corruption, and Bureaucratic Quality are negative and statistically significant at the 1-percent level, showing consistently that Rodrik's theory is not supported by the ICRG data. Contrasting with developed countries, institutional environments in developing countries have smaller impact upon relative size of tradables to nontradables since the absolute values of coefficient estimates become smaller for those countries. This contradicts Rodrik's claim as well.[26]

### 5.2 Robustness: 5-year lagged values of institutional variables as independent variables

Considering that institutional changes might have persistent influences upon allocation of productive resources, we replace current values of institutional variables by their 5-year lagged values and the results are reported in Table 3. We find that the coefficients of institutional variables are still negative and statistically significant at the 1-percent level, which means that no supporting evidence for Rodrik's theoretical claim occurs, even in a relatively long period. But, compared to those coefficients in Table 2, the ones in Table 3 decline more or less, except for the ones on Bureaucratic Quality. For instance, the coefficient on Investment Profile in regression [2] for the sample of all countries is -0.028 in Table 2, but the same coefficient turns out to be -0.031 in Table 3. Such a decline becomes even more remarkable if we focus on the subsample of

---

[25] Many empirical studies have also found that openness to trade leads to faster growth. See Dollar (1992), Edwards (1992, 1998), Sachs and Warner (1995), Greenaway et al. (1998), and Frankel and Romer (1999).

[26] Once again, note that the coefficients of different institutional variables are not comparable as the ratings of those variables are constructed on the basis of different scales.

developing economies. For estimates based on data of those countries, the same coefficient mentioned above is -0.032 in Table 2 but -0.056 in Table 3. If we are allowed to ignore Bureaucratic Quality temporarily because of its lesser relevance to what Rodrik

**Table 3: Panel Regressions of Relative Development of Tradables to Nontradables on Institutional Quality: 5-year Lagged Values of Institutional Variables as Independent Variables [1]**

| Independent variables | All countries [2] | | Developing countries [3] | |
|---|---|---|---|---|
| | [1] | [2] | [1] | [2] |
| **Panel A [4]** | | | | |
| Investment profile | -0.034*** | -0.031*** | -0.051*** | -0.056*** |
| (5-year lagged values) | (-5.59) | (-5.09) | (-5.13) | (-5.65) |
| | | | | |
| ln lagged income | -0.011 | 0.472*** | 0.062*** | 1.80*** |
| | (-1.21) | (4.23) | (2.64) | (3.92) |
| | | | | |
| (ln lagged income)$^2$ | | -0.028*** | | -0.115*** |
| | | (-4.35) | | (-3.81) |
| | | | | |
| ln trade share | 0.158*** | 0.160*** | 0.272*** | 0.269*** |
| | (8.58) | (8.74) | (8.03) | (7.99) |
| **Panel B [5]** | | | | |
| Law and order | -0.063*** | -0.056*** | -0.070*** | -0.077*** |
| (5-year lagged values) | (-7.45) | (-6.40) | (-4.63) | (-5.06) |
| | | | | |
| Corruption | -0.094*** | -0.089*** | -0.058*** | -0.064*** |
| (5-year lagged values) | (-11.17) | (-10.33) | (-3.63) | (-4.03) |
| | | | | |
| Bureaucratic quality | -0.081*** | -0.073*** | -0.044** | -0.052*** |
| (5-year lagged values) | (-7.28) | (-6.44) | (-2.46) | (-2.91) |
| | | | | |
| No. of observations | 1958 | 1958 | 942 | 942 |

Note: [1] The dependent variable is the ratio of industry value added (% in GDP) to services value added (% in GDP). Although observations are still annual, they range from 1989 to 2006 as we use 5-year lagged values of institutional variables. All regressions include time fixed effects. Robust *t* statistics are in parentheses. Asterisks indicate statistical significance at the * 10 percent, ** 5 percent, *** 1 percent level.
[2] The sample of all countries contains 131 developed and developing economies. Both the regressions [1] and [2] have been run based on this sample.
[3] The subsample of developing countries contains 70 developing economies with real GDP per capita less than $6000. Both the regressions [1] and [2] have been run based on this subsample.
[4] What is reported in panel A is the complete results when using the ICRG index of investment profile to measure one aspect of institutional quality.
[5] What is reported in panel B is the results when replacing investment profile by the indices measuring other aspects of institutional quality, i.e. law and order, corruption, and bureaucratic quality. We regress on one institutional variable at a time, instead of inclusion of all four variables in the regression. Therefore, this table reports coefficient estimates from 16 different regressions. To save space, the coefficients of other control variables are not reported in panel B but available upon request. Generally, they have the same signs and similar significance levels as reported in panel A.

defines "weak institutions", there are two findings. First, changes in institutional environments have stronger effects in a relatively long period upon relative development of the tradable sector to the nontradable sector than they do in the short run. Second, although, in the short run, relative size of tradables to nontradables in developing countries is less sensitive to changes in institutional environments than the one in developed countries, it is more sensitive in a relatively long period. That is, weak institutions impede the development of the services sector and their negative impact becomes even stronger in the long run.

### 5.3 Robustness: development of three sectors as dependent variables

As addressed in Section 3, not only changes in sizes of industry and services but changes in sizes of agriculture will affect the ratio of industrial sector production to service sector production, the proxy of $TN_{it}$. In fact, the experiences from the developing countries which successfully caught up with their rich counterparts reveal that the process of industrialization occurs when the agricultural sector shrank rapidly. To further demonstrate the discriminative effects of weak institutions on three sectors of an economy, we replace the ratio of industry value added to services value added with agriculture share in GDP, industry share in GDP, and services share in GDP, respectively. The results are reported in Table 4.

Investment Profile, Corruption and Bureaucratic Quality have a negative and statistically significant influence on agriculture share in GDP, for both all countries and developing ones. Despite the positive coefficients on Law and Order, they are not statistically significant, even at the 10-percent level. In most cases, all four components of institutional quality have a negative and statistically significant impact on industry share in GDP. There are two exceptions: one occurs for the coefficient on Investment Profile based on the subsample of developing countries, which is still negative but not

# Table 4: Panel Regressions of Development of Three Sectors on Institutional Quality [1]

| Independent variables | All countries [2] | | | Developing countries [3] | | |
|---|---|---|---|---|---|---|
| | Agriculture Share in GDP | Industry Share in GDP | Services Share in GDP | Agriculture Share in GDP | Industry Share in GDP | Services Share in GDP |
| **Panel A** [4] | | | | | | |
| Investment profile | -0.420*** | -0.506*** | 0.883*** | -0.630*** | -0.284 | 0.817*** |
| | (-5.67) | (-4.09) | (7.12) | (-4.42) | (-1.62) | (4.63) |
| | | | | | | |
| ln lagged income | -55.10*** | 36.63*** | 18.15*** | -57.78*** | 44.01*** | 12.76 |
| | (-38.86) | (15.43) | (7.63) | (-8.52) | (5.26) | (1.52) |
| | | | | | | |
| (ln lagged income)[2] | 2.61*** | -1.91*** | -0.674*** | 2.83*** | -2.42*** | -0.339 |
| | (31.56) | (-13.83) | (-4.86) | (6.32) | (-4.39) | (-0.613) |
| | | | | | | |
| ln trade share | -1.38*** | 3.03*** | -1.46*** | -3.09*** | 4.64*** | -1.24** |
| | (-6.21) | (8.17) | (-3.93) | (-6.66) | (8.13) | (-2.17) |
| **Panel B** [5] | | | | | | |
| Law and order | 0.126 | -0.872*** | 0.752*** | 0.114 | -0.559*** | 0.509** |
| | (1.15) | (-4.79) | (4.09) | (0.545) | (-2.18) | (1.97) |
| | | | | | | |
| Corruption | -0.21* | -2.01*** | 2.12*** | -0.872*** | 0.178 | 1.20*** |
| | (-1.91) | (-10.90) | (11.53) | (-3.61) | (-0.595) | (4.00) |
| | | | | | | |
| Bureaucratic quality | -0.549*** | -1.92*** | 2.60*** | -0.717*** | -0.463 | 1.36*** |
| | (-3.72) | (-7.92) | (10.53) | (-2.70) | ((-1.42) | (4.17) |
| | | | | | | |
| No. of observations | 2546 | 2546 | 2546 | 1243 | 1243 | 1243 |

Note: [1] The dependent variables are agriculture value added (% in GDP), industry value added (% in GDP), and services value added (% in GDP), respectively. Observations are annual, ranging from 1984 to 2006. All regressions include time fixed effects. Robust *t* statistics are in parentheses. Asterisks indicate statistical significance at the * 10 percent, ** 5 percent, *** 1 percent level.
[2] The sample of all countries contains 131 developed and developing economies. To save the space, although both the regressions [1] and [2] have been run based on this sample, only estimates from the regression [2] are reported on this table.
[3] The subsample of developing countries contains 70 developing economies with real GDP per capita less than $6000. To save the space, although both the regressions [1] and [2] have been run based on this sample, only estimates from the regression [2] are reported on this table.
[4] What are reported in panel A is the complete results when using the ICRG index of investment profile to measure one aspect of institutional quality.
[5] What are reported in panel B is the results when replacing investment profile by the indices measuring other aspects of institutional quality, i.e. law and order, corruption, and bureaucratic quality. We regress on one institutional variable at a time, instead of inclusion of all four variables in the regression. Therefore, this table reports coefficient estimates from 24 different regressions. To save the space, the coefficients of other control variables are not reported in panel B but available upon request. Generally, they have the same signs and similar significance levels as reported in panel A.

statistically significant; the other is the coefficient on Corruption based on the same subsample, which is positive and statistically insignificant. Not surprisingly, all institutional variables are negatively associated with services share in GDP and all their coefficients are statistically significant at 1-percent level. In other words, the poorer the institutional environments, the smaller the services share in GDP. To sum up, even though agricultural products are considered as tradables, the panel evidence still suggests that weak institutions impose a *lower*, instead of higher as Rodrik claims, "tax" on the tradable sector (agriculture and industry) than on the nontradable sector (services).

### 5.4 Robustness: Five-year Period and the WGI Dataset

Following Rodrik's methodology, we take five-year averages of all annual observations and then run the regressions based on the same specifications reported in Table 2. The new results are reported in Table 5. For the sample of all countries, the coefficients of institutional variables are negative and statistically significant, which is consistent with my previous findings. These coefficients become statistically insignificant when using the subsample of developing countries.

As mentioned in Section 3, we also use another widely accepted dataset of institutional quality, the WGI, to reproduce the regressions in Table 2. Our purpose is to ensure that the results discussed above are obtained not because we choose a specific dataset. Here two things are worth mentioning before discussing results in Table 6. First, although the names of three WGI indicators (Rule of Law, Control of Corruption, and Regulatory Quality) seem to be close to those of the ICRG indicators (Law and Order, Corruption, and Bureaucratic Quality), they are actually somewhat different according

to the description of the two datasets.[27] As a result, the coefficients in Table 6 are not directly comparable, in terms of their magnitude, to those in Table 2. Second, dissimilar to the ICRG, the WGI applies the same scale to all its indicators, ranging from -2.5 to 2.5 with high values corresponding to better governance outcomes. That makes the coefficients in Table 6 directly comparable across indicators (rows). As shown in Table 6, no matter which component of institutional quality is used as the independent variable, the results are exactly consistent with our previous ones in Table 2, in regard to signs of the coefficients. Again, those coefficients are supposed to be positive on the basis of Rodrik's theory. What distinguishes the two tables is the coefficients on Rule of Law and Control of Corruption turn out to be even more significant in Table 6.

**Table 5: Panel Regressions of Relative Development of Tradables to Nontradables on Institutional Quality: Five-year Period [1]**

| Institutional variable used | All countries [2] | | Developing countries [3] | |
| --- | --- | --- | --- | --- |
| | [1] | [2] | [1] | [2] |
| Investment profile | -0.031** | -0.031** | -0.024 | -0.026 |
| | (-2.50) | (-2.48) | (-1.22) | (-1.33) |
| Law and order | -0.053*** | -0.055*** | -0.001 | -0.004 |
| | (-3.35) | (-3.36) | (-0.04) | (-0.16) |
| Corruption | -0.075*** | -0.078*** | 0.001 | 0.002 |
| | (-4.66) | (-4.70) | (0.04) | (0.079) |
| Bureaucracy quality | -0.095*** | -0.096*** | -0.026 | -0.033 |
| | (-4.53) | (-4.53) | (-0.85) | (-1.08) |
| No. of observations | 549 | 549 | 274 | 274 |

Note: [1] The dependent variable is the ratio of industry value added (% in GDP) to services value added (% in GDP). Observations are averages over five-year periods, ranging from 1984 to 2006. All regressions include time fixed effects. Robust *t* statistics are in parentheses. Asterisks indicate statistical significance at the * 10 percent, ** 5 percent, *** 1 percent level. We regress on one institutional variable at a time, instead of inclusion of all four variables in the regression. Therefore, this table reports coefficient estimates from 16 different regressions. To save the space, the coefficients of other control variables are not reported here but available upon request.

[2] The sample of all countries contains 131 developed and developing economies. Both the regressions [1] and [2] have been run based on this sample.

[3] The subsample of developing countries contains 70 developing economies with real GDP per capita less than $6000. Both the regressions [1] and [2] have been run based on this subsample.

---

[27] For instance, based on the user's guides of the two datasets, Regulatory Quality in the WGI measures how well government policies and regulations promotes private sector development, while Bureaucratic Quality in the ICRG only mentions the consistency of government policy and services.

**Table 6: Panel Regressions of Relative Development of Tradables to Nontradables on Institutional Quality: the WGI Dataset [1]**

| Institutional variable used [4] | All countries [2] | | Developing countries [3] | |
|---|---|---|---|---|
| | [1] | [2] | [1] | [2] |
| Rule of Law (RL) | -0.830*** | -0.956*** | -0.363*** | -0.369*** |
| | (-10.76) | (-11.50) | (-10.06) | (-10.25) |
| Control of Corruption (CC) | -0.819*** | -1.00*** | -0.365*** | -0.367*** |
| | (-11.20) | (-12.37) | (-8.90) | (-8.95) |
| Regulatory Quality (RQ) | -0.855*** | -0.908*** | -0.331*** | -0.340*** |
| | (-11.31) | (-11.61) | (-8.80) | (-9.04) |

Note: [1] The dependent variable is the ratio of industry value added (% in GDP) to services value added (% in GDP). Observations are annual, ranging from 1984 to 2006. All regressions include time fixed effects. Robust $t$ statistics are in parentheses. Asterisks indicate statistical significance at the * 10 percent, ** 5 percent, *** 1 percent level. We regress on one institutional variable at a time, instead of inclusion of all three variables in the regression. Therefore, this table reports coefficient estimates from 9 different regressions. To save the space, the coefficients of other control variables are not reported here but available upon request.
[2] The sample of all countries contains 131 developed and developing economies. Both the regressions [1] and [2] have been run based on this sample.
[3] The subsample of developing countries contains 70 developing economies with real GDP per capita less than $6000. Both the regressions [1] and [2] have been run based on this subsample.
4. The WGI measures six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. Here we only show results on the three out of six indicators according to their relevance to Rodrik's theory.

Altogether, the statistical insignificance clearly expresses that Rodrik's theory is not documented by the data of institutional quality.


## 6. Concluding Remarks

One theoretical explanation that Rodrik develops claims that undervaluation boosts economic growth by mitigating the distortion created by weak institutions between the tradable sector and the nontradable sector. Based on the comparison between the two sectors and the four dimensions of institutional quality from the ICRG, we find that investment profile, corruption, law and order, and bureaucracy quality are negatively correlated to the ratio of industry share in GDP to services share in GDP. The

negative association implies that the poorer the institutional environments, the greater the relative size of the tradable sector to the nontradable sector. Thereby, the current panel evidence does not support Rodrik's explanation. However, there are some other possibilities we should keep in mind:

First, although we find that, as the whole-sector level, weak institutions hurt services more than industry, it is still possible that, at the sub-sector level, weak institutions hurt some subsectors of industry more than the service sector as a whole. Take manufacturing as an example. As the illustrative example Rodrik uses, manufacturing firms face more complex relationships with their suppliers, customers, and government agencies than many service firms do. Therefore, weak institutions quite likely hurt manufacturing more than other industrial and service subsectors. Given the fact that manufacturing is considered as the engine of long-run growth of developing countries, real undervaluation can still be used to diminish the distortion created by weak institutions as it raises relative price of products of manufacturing firms to nontradable goods.[28]

The possibility makes much sense when taking into account recent development of literature on the curse of natural resources. Many studies document the negative relationship between natural resource abundance and institutional quality.[29] Therefore, one may argue that the negative association between institutional quality and (relative) development of the tradable sector (industry) presented in Section 5 results from inclusion of natural resource sector to the tradable sector (industry).[30] That is, once we

---

[28] See Tybout (2000) among others for the importance of manufacturing to long-run development of a country.

[29] See Leite and Weidmann (1999), Sala-i-Martin and Subramanian (2003), Mehlum et al. (2006), Fors and Olsson (2007) among others.

[30] According to the International Standard Industrial Classification of All Economic Activities (ISIC Rev.3), industry consists of mining and quarrying, manufacturing, electricity, gas and water supply , and construction. Also, "mining and quarrying" comprises mining of coal and lignite, extraction of crude petroleum and natural gas, etc. Evidently, the production of natural resource sectors is taken as a part of industry value added when collecting the data.

28

exclude natural resource production from industry value added, the corresponding coefficients will turn out to be positive, which is consistent with Rodrik's theory. However, we do not explore that direction further because of the following consideration: even though weak institutions do hurt manufacturing more than the service sector as a whole, real undervaluation will not be the second-best mechanism any more to solve such a problem, as Rodrik claims, since it raises relative prices of all tradable goods to nontradable goods but some of the relative price increases may hurt the long-run development of a country, such as an increase in prices of natural resources. [31] Obviously, subsidizing directly manufacturing firms will replace undervaluation to be the second-best mechanism. Consequently, although this possibility may help us understand the negative association between institutional quality and (relative) development of tradables, it is not promising in terms of the explanation of growth-promoting effects of real undervaluation.

Second, when investors make their decisions between tradables and nontradables, perhaps what matters more to them is not economic and legal dimensions of institutions, such as contractual incompleteness, weak contract enforcement, or lack of protection of property rights, but political dimensions of institutions, such as instability of political regimes or uncertainty of public policies. [32] As observed in many developing countries, investors can always find ways to make money even if contract enforcement and protection of property rights are weak. Political instability and policy uncertainty, however, depress investment activities fundamentally.

---

[31] An increase in prices of natural resources relative to services induces productive resources to move from services to natural resource sectors, which makes developing countries further specialize in production of primary products.

[32] As Mankiw (1995) and Persson & Tabellini (1999) suggests, instability of political regimes is measured by the frequency of regimes, revolutions, coups, or wars. According to Feng (2001), uncertainty of public policies is measured by the standard deviation of inflation, government consumption expenditure in GDP, the black market premiums on foreign exchange, domestic credit expansion, etc.

Intuitively, as Feng (2001) argues, political instability and policy uncertainty decrease savings and increase consumption since the expected return of savings falls with a rise in uncertainty of the future. That means that the supply of loanable funds declines. Meanwhile, political instability and policy uncertainty tend to compel investors to delay their investment until the instability or uncertainty becomes clear. Thus, the demand for loanable funds falls as well. Both decreases in the supply and the demand eventually lead to the contraction of (private) investment. Considering that the tradable sector (industry) is more capital-intensive than the nontradable sector (services) is, political instability and policy uncertainty are likely to hurt the former more than the latter by their impacts on (private) investment.[33] Furthermore, even though the level of aggregate investment is unchanged, political instability and policy uncertainty may cause investors to prefer the service sector to the industrial sector because the former brings them quicker returns without long-term commitments.[34] All in all, the quality of political institutions and public policies is likely to be positively correlated to the development of tradables relative to that of nontradables.[35] Suppose that this argument is supported by empirical evidence and political dimensions of institutions dominant economic and legal ones in terms of their influences on tradables and nontradables, we could still say that overall institutions impose a *higher* "tax" on tradables than on nontradables, as Rodrik claims. Apparently, this idea goes beyond the scope of this paper and is worth exploring further in the future.

---

[33] There are some empirical studies in this field. Simply speaking, the more stable the political regime of a country (or the more consistent the public policy of a country), the higher the level of (private) investment. See, for example, Rodrik (1991), Brunetti & Weder (1998), Zak (2000), Feng (2001), among others.

[34] For example, Root (1996) states that, under condition of political instability, short-term investment with quick returns that could easily exported were preferred to long-term commitments that could be held hostage when government changed.

[35] Here we assume that a higher score indicates a better quality of political institutions and public policies, as the ICRG and the WGI do.

Nevertheless, even though future studies eliminate the two possibilities above, undervaluation could still facilitate growth by mitigating the distortion created by market failure which is prevalent in the product markets of developing economies, as Rodrik argues in the same paper. This argument is worth exploring when relevant data is available so as to further examine the mechanism through which movements of real exchange rates affect long-run economic development. Furthermore, other studies show that undervaluation may help poor countries accumulate capital and upgrade technology though relevant empirical studies are scarce.[36] Hence, the panel evidence presented in this paper suggests that we should pay more attention to other explanations on how real undervaluation spurs growth.

The negative association mentioned above also suggests that weak institutions impose a *higher* "tax" on nontradables than tradables, which probably points out another direction for future research. What insight is contract theory able to provide to explain why it is the nontradable sector which suffers disproportionately (compared to the tradable sector) from institutional weaknesses? Or what else could be possible theoretical explanations about the discriminative influence of weak institutions between the two sectors? The exploration of these questions may help us better understand potential influence of industry policies and may offer more insights to policymakers in developing economies.

---

[36] Gala (2008).

# References

Acemoglu, Daron, S. Johnson, Y. Thaicharoen and J. Robinson (2002), "Institutional Causes, Macroeconomic Symptoms: Volatility, Crisis and Growth", NBER Working Paper 9124.

Anderson, James, and Douglas Mercouiller (2002), .Trade, Insecurity and Home Bias, *Review of Economics and Statistics*, 84 (2), 345-352

Berkowitz, Daniel, Johannes Moenius, and Katharina Pistor (2006), "Trade, Law, and Product Complexity," *Review of Economics and Statistics*, 88(2), 363-373.

Brunetti, A. and B. Weder (1998), "Investment and Institutional Uncertainty, A Comparative Study of Different Uncertainty Measures." *Weltwirtschaftliches Archiv* 134:513-533.

Diaz-Alejandro, Carlos (1965), "*Exchange Rate Devaluation in a Semi-Industrialized Country*", the MIT Press.

Dodzin, Sergei and Athanasios Vamvakidis (2004), "Trade and Industrialization in Developing Economies." *Journal of Development Economics*, 75, 319-328.

Dollar, David (1992), "Outward-oriented developing countries really do grow more rapidly: Evidence from 95 LDCs, 1976-1985", *Economic Development and Cultural Change* 40 (3), 523-544.

Dornbusch, Rudiger (1984), *Open Economy Macroeconomics*, Harper & Row.

Easterly, William (2001), "The lost decades: developing countries' stagnation in spite of policy reform 1980-1998", *Journal of Economic Growth* 6 (2), 135-157.

Edwards, Sebastian (1986), "Are Devaluations Contractionary?", *Review of Economics and Statistics*, 501- 508.

Edwards, Sebastian (1989), "*Real Exchange Rates, Devaluation, and Adjustment: Exchange Rate Policy in Developing Countries*", the MIT Press.

Edwards, Sebastian (1992), "Trade Orientation, Distortions and Growth in Developing Countries," *Journal of Development Economics*, 39, 31-57.

Edwards, Sebastian (1998), "Openness, Productivity and Growth: What Do We Really Know?" *Economic Journal*, 108, 383-398.

Eichengreen, Barry (2007), "The real exchange rate and economic growth", http://www.econ.berkeley.edu/~eichengr/real_exchange_rate.pdf

Feng, Yi (2001), "Political Freedom, Political Instability, and Policy Uncertainty: A Study of Political Institutions and Private Investment in Developing Countries." *International Studies Quarterly*, 45(2), 271-294.

Fors, Heather C. and Ola Olsson (2007), "Endogenous Institutional Change After Independence." *European Economic Review*, 51, 1896-1921.

Frankel, J.A. and David Romer (1999), "Does Trade Cause Growth?" *American Economic Review*, 89, 379-399.

Frenkel, Jacob and Michael Mussa, "Asset Markets, Exchange Rates and the Balance of Payments," in R. Jones and P. Kenen (eds.), Handbook of International Economics, Vol. II, North Holland, 1985.

Gala, Paulo (2008), "Real exchange rate levels and economic development: theoretical analysis and econometric evidence", *Cambridge Journal of Economics* 32, 273-288.

Galindo, Arturo, Alejandro Izquierdo and Jose Montero (2007), "Real Exchange Rates, Dollarization and Industrial Employment in Latin America", *Emerging Markets Review*, 8(4), 284-298.

Greenaway, D., W. Morgan, and P. Wright (1998), "Trade Reform, Adjustment and Growth: What Does the Evidence Tell Us?" *The Economic Journal*, 108, 1547-1561.

Heston, Alan, R. Summers, and B. Aten (2006), *Penn World Tables Version 6.2*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, http://pwt.econ.upenn.edu/php_site/pwt_index.php

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi (2009). "Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996–2008." World Bank Policy Research Working Paper 4978. Washington: World Bank.

Krugman, Paul and Lance Taylor (1978), "Contractionary Effects of Devaluations", *Journal of International Economics*, 445-456.

Leite, C. and J. Weidmann (1999), "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth." *IMF Working Papers* 99/85.

Levchenko, Andrei (2004), "Institutional Quality and International Trade", *IMF Working Paper* WP/04/231.

Mankiw, Gregory (1995), "The Growth of Nations." *Brookings Papers on Economic Activity*, 1, 275-310.

Mehlum, Halvor, Karl Moene and Ragnar Torvik (2006), "Institutions And The Resource Curse." *The Economic Journal*, 116, 1-20.

Méon, Pierre-Guillaume, and Khalid Sekkat (2006), "Institutional Quality and Trade: Which institutions? Which trade?," Working Papers DULBEA 06-06.RS, Université libre de Bruxelles, Department of Applied Economics (DULBEA).

North, Douglas (1990), *Institutions, Institutional Change and Economic Performance*, New York, Cambridge University Press.

Persson, T. and G. Tabellini (1999), "Political Economics and Macroeconomic Policy." In Taylor and Roubini (Eds.), *Handbook of Macroeconomics*, North-Holland, Amsterdam.

Rodrik, Dani (1991), "Uncertainty and Private Investment in Developing Countries." *Journal of Development Economics*, 36, 229-242.

Rodrik, Dani (2008), "The real exchange rate and economic growth", *Brookings Papers on Economic Activity*, fall 2008, 365-412.

Rodrik, Dani, Arvind Subramanian, and Francesco Trebbi (2004), "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development," *Journal of Economic Growth*, 9(2), 131-165.

Rodrik, Dani, and Roberto Rigobon (2005), "Rule of Law, Democracy, Openness and Income: Estimating the Interrelationships." *Economics of Transition*, 13(3), 533-564.

Root, H. L. (1996), *Small Countries, Big Lessons: Governance, and the Rise of East Asia*. New York: Oxford University Press.

Sachs, Jeffrey and A. Warner (1995) "Economic reform and the process of global integration", *Brookings Papers on Economic Activity* 1, 1-95.

Sala-i-Martin, X. and A. Subramanian (2003), "Addressing The Natural Resource Curse: An Illustration From Nigeria." *NBER Working Papers*, 9804.

Tybout, James (2000), "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?", *Journal of Economic Literature*, Vol. XXXVIII, 11-44.

World Bank (2008), World Development Indicators, CD-ROM, Washington DC.

Zak, P. J. (2000) "Socio-Political Instability and the Problem of Development." In *Governing for Prosperity*, edited by B. Bueno de Mesquita and H. Root, pp. 153-171. New Haven, CT: Yale University Press.