INTERNATIONAL CENTRE FOR ECONOMIC RESEARCH

ICER

WORKING PAPER SERIES

Stefan Voigt

THE ECONOMIC EFFECTS OF COMPETITION POLICY
CROSS – COUNTRY EVIDENCE USING FOUR NEW INDICATORS

Working Paper No. 20/2006

The Economic Effects of Competition Policy – Cross-Country Evidence Using Four New Indicators

Stefan Voigt, University of Kassel and ICER, Torino*

Abstract:

This paper introduces a number of indicators on various aspects of competition laws and competition agencies in order to make competition policies comparable. It contains an indicator concerned with the objectives and the instruments of competition laws, a second indicator evaluating to what degree an economic – as opposed to a legal – approach to competition policy has been chosen. Based on the assumption that it is not the content of the law alone but also the structures erected in order to implement the law, it further presents an indicator reflecting the formal independence of competition agencies and a fourth one reflecting their factual independence. These four indicators are used to estimate the effects of competition policies on economic growth. It turns out that all four variables contribute to explaining differences in total factor productivity. Yet, their impact is not particularly robust to the inclusion of indicators for the general quality of institutions.

Key words: Competition and Growth, Competition Policy, Independence of Competition Agencies, Delegation of Competence.

JEL classification: D40, H11, K21, L16, L40, O57.

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* Prof. Dr. Stefan Voigt, Economic Policy, Economics Department, University of Kassel, Nora-Platiel-Str. 4-6, D-34109 Kassel, Germany. Telephone: +49-561-804 3089, Telefax: +49-561-804 2818, e-mail: voigt@wirtschaft.uni-kassel.de. The author thanks Tobias Göthel and Lorenz Blume for excellent research assistance and Anne van Aaken, Claes Bengstson, Lorenz Blume, Michael Ebeling, Justina Fischer, Viet Quoc Nguyen, Janina Satzer, André Schmidt, Jan Wagner, and Dean Williamson for constructive critique. The study would not have been possible without the support of all the competition agencies that provided detailed information. The names of the respective persons are named at the end of the paper. The study greatly profited from the hospitality of both ICER, Torino and the Research School of Social Sciences at the Australian National University in Canberra.

Competition Policies Matter – At least at the Margin: Cross-Country Evidence Using Four New Indicators

1 Introduction

Competition is of overwhelming importance for the functioning of market economies – or so the conventional wisdom goes. In countless textbooks, competition is ascribed many important functions such as securing that supply conforms to consumer preferences, producing allocative efficiency, setting incentives for the development of new products and production methods, i.e. dynamic efficiency, ensuring that behavior is adopted to changed circumstances, and also to constrain the power of single firms. The next slice of the conventional wisdom reads somewhat like this: the beneficial functioning of competition is not secured spontaneously but must be supported by state action, such as competition laws and competition agencies.

Given this conventional wisdom, it is surprising how little we really know about the effects of competition policies. Are competition agencies conducive to higher rates of economic growth? Does it make any difference whether they are independent from government? Does this hold independently of the contents of the competition laws?

There have been very few studies on these issues. If they exist at all, they are based on subjective indicators to assess a country's competition policies. Yet, such subjective indicators have serious drawbacks: The scores attributed to the countries depend on the expectations one has with regard to them. Local businesspeople might not be familiar with the policies of other countries and might have difficulties in comparing policies. We therefore introduce four objective competition policy indicators here that deal with (i) the substantive content of competition laws, (ii) the degree to which they incorporate an economic approach, (iii) the formal independence of the competition agencies that are to implement the competition laws, and (iv) the factual independence of the competition agencies. Earlier research on the independence of the judiciary (Feld and Voigt 2003, 2004) has shown that formal and factual independence are not necessarily highly correlated and that they can have very different effects. This is why we strictly distinguish between these two aspects.

The dataset on which the four indicators are based also allows us to compare competition laws systematically and, in particular, to identify recent trends in competition policy. Today, some 90 states have competition laws. Out of these, our dataset covers 57. The four indicators further enable us to answer the question

whether competition policies in a narrow sense are a good proxy for government policies towards competition more widely conceived. If competition policies in the narrow sense are to safeguard competition, they should be correlated with the absence of barriers to (international) trade, of barriers to open new firms, of bureaucratic impediments in the management of firms etc. Comparing these various policies that all deal with competition in a broad sense allows us to deal with the question whether competition laws in the narrow sense protect competition or rather competitors. It also allows us to make some statements concerning the compatibility of various government policies. The four indicators finally enable us to ascertain the effects of competition laws. Bluntly stated: can one show that competition legislation is conducive to economic growth? Even more bluntly stated: does it make any difference if countries have competition laws?

Based on the four new indicators, we find that generally, competition policies and other policies seem to re-enforce each other. However, the existence of a competition policy is positively correlated with the existence of an industrial policy. Based on a sample of up to almost one hundred countries, an econometric model is estimated that explains differences in total factor productivity by the four new competition indicators and standard controls. All four indicators contribute to explaining differences in total factor productivity. Some 30 aspects of competition laws and policies are explicitly analyzed. Among them, the number of years that a competition law has existed, the focus of the competition agency exclusively on competition, the impossibility to re-appoint the highest competition officer, and the development of the budget of the competition agency in real terms appear to be the single most important ones. Yet, the four indicators are not robust to the inclusion of indicators that proxy for the quality of institutions in a very general sense.

The rest of the paper is organized as follows: some competing views concerning possible relationships between competition and growth will be dealt with in section two. They include an overview over the existing empirical studies. Section three compares competition laws as well as formal and factual independence of competition agencies. Section four deals with the question whether competition laws in a narrow sense are a good proxy for government policies toward competition in a more general way. In the fifth section, our estimation approach is described and some estimates are carried out. Section six concludes.

2 Does More Competition Lead to Higher Growth? An Overview of Competing Views

Economists still quarrel about the effects of the intensity of competition for innovation as well as for growth. Schumpeter (1942) famously claimed that monopolistic firms are more innovative because they face looser financial restrictions and because they will be able to cash in on their innovations more sweepingly than smaller firms with small or even negligible market shares. Schumpeter thus argued that monopolistic market structures would lead to higher rates of innovation (and subsequently growth) and hence introduced a tradeoff between static and dynamic efficiency. This argument has been picked up in some growth models recently (e.g. Aghion and Howitt 1992 or Aghion, Bloom, Blundell, Griffith and Howitt 2005). The theoretical argument is still contested and the empirical evidence highly ambiguous (Cohen/Levin 1989 and Rey 1997 are overviews). Yet, the Schumpeter hypothesis has had important policy implications as it has been used to justify the creation of national champions.

Given that there is no consensus on the relationship between the intensity of competition and growth, it is not surprising that there is no consensus on adequate competition policies: if the optimal intensity of competition is unclear, then the market structure that competition policy should strive to bring about is just as unclear. Yet, some 90 states have passed general competition laws which could have effects on the ensuing market structures by prohibiting mergers, cartels etc. Since theory does not provide an unequivocal signpost, we propose to let the data speak, i.e. to ask whether competition policy has any discernible effect on economic growth.

Konings et al. (2001) have asked whether differences in mark-ups between Belgium and the Netherlands can be explained by differences in the respective competition policies. As expected, mark-ups are higher in the Netherlands because a strict competition law was introduced only after the analyzed period. Yet, the introduction of a new competition law in Belgium did not have any effect on the mark-ups there. The effects of competition policies seem thus limited. Whereas the Konings et al. (2001) study focuses on very detailed data from the manufacturing sectors in two countries, we are here interested in a cross-country study and will thus apply a coarser brush.

Dutz and Hayri (1999) have produced a cross-country study and have found that the perceived effectiveness of a country's competition policy is a variable that helps to explain differences in economic growth beyond the variables conventionally used in models of economic growth. This is an interesting insight.

Yet, it is based on subjective evaluations of surveyed businesspeople and subjective indicators have serious drawbacks: The scores attributed to the countries depend on the expectations one has with regard to them. Local businesspeople might not be familiar with the policies of other countries and might have difficulties in comparing policies. To answer the question whether antimonopoly policy is effective in a country can also be heavily influenced by the effectiveness of other policy areas such as trade, regulation, privatization and so forth. Answers would thus reflect the effectiveness of a mix of policies rather than antitrust policy narrowly conceived.

Dutz and Hayri (1999) use competition policy variables such as the legal and regulatory framework encouraging competition as a proxy for the intensity of competition. The legal framework as such, can, however, only provide the preconditions for intensive competition and not intensive competition itself. We thus keep the two meticulously apart.

Dutz and Vagliasindi (2000) assess the effectiveness of competition policy implementation in 18 transition countries. Effectiveness is measured in three categories, namely (i) enforcement, (ii) competition advocacy, and (iii) institutional effectiveness. The authors find a "robust positive relationship between effective competition policy implementation and expansion of more efficient private firms." Their paper thus contains an attempt to get away from subjective perceptions of competition and towards measuring competition policies with an emphasis on policy implementation. The drawback is the low number of countries for which data are available.

Representatives of public choice theory have argued that competition laws often serve to protect competitors rather than competition. The mere existence of a general competition law is thus not sufficient to assume that competition-enhancing policies will be implemented. If this possibility is taken seriously, two consequences for empirical research follow: (1) Aims, instruments, implementation mechanisms etc. need to be analyzed in detail, in particular with their likely impacts on competition. The "competition friendliness" of competition laws should thus not be taken for granted but be explicitly inquired into. (2) The "competition friendliness" of other policy areas should be explicitly taken into account. One crucial precondition for intensive competition to emerge is that market entry is not prohibitively costly. One important determinant of the costs of entry is government behavior: potentially relevant variables include out of pocket costs to get the necessary permits, but also costs in terms of time needed to receive them. These costs are often prohibitive, if supply of some goods is

confined to a limited number of companies, if imports are subject to tight caps etc. The ease of entry into a market is also determined by governments' willingness to let inefficient firms go bust. If politicians try to save even very uncompetitive large firms, this will prevent allocative efficiency from materializing which, in turn, will lead to lower growth rates.

Besides the goals and instruments of competition laws, i.e. their material content, another aspect of potential importance is the way they are supposed to be implemented. Over the last couple of years, an entire cottage industry dealing with independent government agencies and their effects has evolved. This literature posits that the representatives of independent agencies have the advantage of not having to strive for general popularity because they do not need to get reelected by the citizen voters. This enables them to carry out decisions that are unpopular in the short run but may enhance efficiency – and the prospect for economic growth - in the long run. They can thus be a way to ease the problem of time inconsistency (Kydland and Prescott 1977). The literature on independent central banks is most prominent here: it has been shown that the independence of central banks does indeed lead to lower inflation, at least in the member states of the OECD (Berger et al. 2001 as well as Hayo and Hefeker 2002 are two surveys).

Mergers can promise to be efficiency-enhancing but they can still be highly unpopular due to substantial job cuts. More generally, governments are often tempted to make industrial policy by actively manipulating the structure of certain markets etc. The competence over competition policy instruments frequently enables governments to carry out such policies. If, however, the competition laws of a country unequivocally and exclusively name the maintenance of an adequate framework for competition as the goal to be achieved and hands the authority to realize this goal to an independent agency, then competition policy should be more focused and more effective. Based on this approach, specific attention will thus be on the independence of competition agencies. The creation of formally independent competition agencies does, however, not abolish the temptation for politicians to tinker with their independence should this promise higher payoffs. This is why the factual independence of competition agencies will be ascertained and used as a different explanatory variable for the success of competitive policies.

In summarizing, it can be said that the literature is quite heterogeneous and no consensus on the effects of the intensity of competition for growth is in sight. This is also true for the effects of competition policies on both the intensity of competition and on growth. A shaky theoretical foundation does, however, not

preclude the possibility of having a look at the data. In this paper, we propose to analyze the effects of competition laws. Does it make a difference whether a country has a competition law at all or does it not? Does the specific contents of the competition law make a difference or not? Does it make a difference whether the competition agency is independent from other political decision-makers or not? These are questions that can be answered even without a generally agreed upon theoretical basis informing one on the transmission mechanisms through which competition is supposed to influence growth.

3 Taking Stock: A Comparison of Competition Laws

3.0 Introductory Remarks

We define a competition authority as any non-judicial authority which is the primary responsible body of the country for the enforcement of competition law and other activities in the competition policy area (note that this definition is almost identical to the one used in OECD 2003). Competition laws are any laws that deal with competition in a general, i.e. non-sector specific, sense. They include merger laws, antitrust laws and the like. The next question would then be: how exactly do they matter? We propose to distinguish two aspects in the analysis of competition laws namely (i) their contents, and (ii) the organizational structure that is supposed to implement the laws.

Our aim is to synthesize various variables into meaningful indicators. Four such indicators are introduced here, one reflecting the basis and the contents of the various competition laws, a second one reflecting the degree to which competition laws rely on economic reasoning, a third one reflecting the formal degree of independence of the competition agency, and a fourth one reflecting its factual independence. Each of the variables used for the construction of the four indicators can take on values between 0 and 1 where greater values indicate a higher degree of competition mindedness or independence. The sum of the coded variables is divided by the number of variables for which data was available. The indicators can thus take on any value between 0 and 1.[1]

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[1] This means that equal weight is attached to all variables. It can, of course, be argued that they should be weighted according to their importance. This presupposes, however, that there is a theory according to which weights could be attached. Such a theory is not available at present. One could also think of attaching weights *ex post*, for example by using factor analysis, such that the explanatory fit is maximized. Indeed any weighting is more or less arbitrary without the existence of

Before describing the various variables as well as carrying out a comparison of the 57 competition laws included in our analysis, one word concerning the underlying dataset is in order: A questionnaire and an accompanying letter explaining the purpose of the research project were sent to all known competition agencies via traditional mail.[2] Approximately two months later, all agencies that had not responded to the first letter received the questionnaire again. Another three months later, the agencies that had not responded to the first two letters were contacted via e-mail with the same request. The questionnaire was designed such that the representatives of competition agencies would not have to make personal evaluations of the situation in their country, but simply to give information on the legal and factual situation of their agency. It is conjectured that they had little incentives not to fill in the questionnaire truthfully. The overall response rate of 63% is not bad for the chosen approach.[3] The questionnaire is reproduced as appendix 1 here. Please note that the coding of the variables was not contained in the version of the questionnaire sent to the competition agencies.

The estimations themselves are based on more than 57 countries. Since our basic question is whether the existence of competition laws makes any perceptible difference at all, 37 additional countries that are known not to have a competition law were included into the regressions. The description of the results that follows is, however, constrained to the 57 countries from which more detailed information concerning competition law and practice are available. We now proceed to present the motivation as well as the construction of the four indicators and begin with the indicator focusing on the basis of competition laws. If variables carry numbers in the following text, these numbers refer to the numbers in the questionnaire which is reprinted as appendix 1 here.

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a proper theory for construction of the indexes. This also holds with respect to factors extracted from the set of single variables. In the latter case, only statistical criteria are relevant in the construction of the index and it is up to the analyst to interpret the factors obtained. We leave a further discussion of different weights to future analysis and concentrate on the simplest method of computing the indexes by taking an (unweighted) average of the variables.

2 Concretely, all agencies that are members of the International Competition Network as well as those participating in the Intergovernmental Group of Experts on Competition Law and Policy within the framework of UNCTAD were asked to complete the questionnaire. The competition policy of the EU is included in this analysis as the EU replied to our questionnaire.

3 For a number of countries we did not receive completed questionnaires from their competition agencies but were able to make some competition lawyers complete them for us. These countries are: China, Colombia, France, Israel, Peru, and South Africa.

3.1 Indicator #1: The Basis of Competition Laws

Policy areas that are attached a high degree of importance are often mentioned in the constitution of a country. The first variable thus asked whether the Constitution names competition as a goal to be achieved. In one third of the countries analyzed, this was the case, most of them in Latin America or in Central and Eastern Europe. Among the competition agencies from OECD-memberstates that replied, competition is mentioned as a constitutional goal only in Italy, Portugal and Switzerland.[4] Interestingly, there are a number of countries that name competition as a goal in the constitution but that do not have a general competition law and a competition agency (which is the case in the Dominican Republic, El Salvador and the Philippines).

The second variable asked whether there was a specific law that had the purpose of safeguarding and promoting competition. In all 57 jurisdictions considered, this is indeed the case.

The introduction of a competition policy can be interpreted as a government promise to act in certain ways (and not to act in others) with regard to a specific policy area, namely competition. Whether the passing of a competition law will be interpreted as cheap talk or as a credible commitment by market participants depends on a number of determinants, some of which will be dealt with explicitly later (e.g. whether the competence to implement the government promise is delegated to an independent agency or not). Here, we want to deal with just one possible determinant of the credibility ascribed to government, namely the time that has passed since the first competition law was inaugurated. Over the last couple of decades, more and more countries have passed competition laws. Some of them were passed under the gentle pressure of foreign organizations. It can thus not be excluded that performance of these laws is less satisfactory as they might be perceived as “forced” upon a country externally.

HERE: Graph # 1

The U.S. (1890), Canada (1899) and Australia (1906) have the oldest competition laws. The policy promises contained in these laws are assumed to be more credible than those contained in laws that were passed just a few years ago.

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[4] Some descriptive statistics concerning the individual variables have been added to the questionnaire; these can also be found in appendix 1.

What is striking is that more than half of all countries considered here passed their competition laws only during the last 15 years. On the one hand, this is a consequence of the changes in Central and Eastern Europe, on the other, it can also be interpreted as a sign for the importance that is now being attached to competition on a global scale.

With regard to the contents of competition laws, we assume that safeguarding and promoting competition is their stated purpose. But often, competition laws contain other purposes, such as furthering technological progress, improving international competitiveness, securing the survival of small and medium enterprises, and regional development concerns. Any additional purpose on top of securing competition leads to the necessity of making tradeoffs. Tradeoffs are hypothesized to reduce the degree to which competition is protected by the law. If competition is indeed conducive to growth, one should expect a negative correlation between the number of goals other than competition named in the law, and per capita income growth. If competition was the only goal in the competition law of a country, the country was coded a 1. For every other goal named, 0.125 was subtracted from 1 (but the score could never turn negative). Tunisia, the Philippines (both 11), Morocco (9), Malta, South Africa (both 8) and Zimbabwe (8) were the countries whose competition laws named the highest number of other goals. On average, three and a half other goals besides competition were named.

The lacking consensus in competition theory also holds for the kinds of practices that are deemed to be anti-competitive. We have decided to ask for seven such practices, namely (i) cartels, (ii) abuse of dominant position, (iii) control of mergers, (iv) predatory pricing, (v) price discrimination, (vi) exclusive dealing, and (vii) interlocking directorates.[5] An eighth possibility was an open option that included all relevant practices that had not been included in the explicitly named options. Coding followed a very simple scheme: the higher the number of practices that were dealt with in the law, the better; every practice dealt with earned the country 0.125 points. Bulgaria and Italy only deal with three of these practices, and eight countries (Brazil, Hungary, Indonesia, Kazakhstan, Malta, Spain, Tanzania and Thailand) scored the maximum score, indicating that their competition laws deal with eight practices often considered to be in conflict with

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5 (iv), (v), and (vi) can all be part of abuse of a dominant position; they are named separately here in order to be able to ascertain the ways that abuse of dominant positions is dealt with in various jurisdictions.

beneficial competition. On average, a little more than six such practices were named in the competition laws here under consideration.[6]

These four variables are synthesized into the first indicator that is to proxy for the bases of competition law here according to the procedure described above.

3.2 Indicator #2: Economic Approach

The first aspect explicitly recognized in the second new indicator deals with a contentious issue, namely the most adequate legal techniques to deal with anti-competitive behavior. *Per se* rules, prohibiting certain kinds of behavior deemed to be anti-competitive independently from the concrete effects this behavior is expected to provoke in a specific situation, have been confronted with the rule of reason under which the probable effects of a particular case are evaluated. The reduction of uncertainty is an important function of institutional arrangements. This holds also true for competition rules. *Per se* rules are supposedly better suited to reduce uncertainty than the rule of reason as with that arrangement, some competition officers, judges or other actors have to make decisions based on the specific merits of the case. This presupposes that the necessary competence to make such evaluations be readily available. It has been argued that any such presupposition would be a pretence of knowledge (Hayek 1978) and that competition policy should thus exclusively rely on *per se* rules.

Williamson praises the merits of the rule of reason which he calls „flexible legal process“ (1996, 283): “Rather than assert false certitude, the legal process approach urges that complicated issues of economic organization that are poorly understood be accorded respect. The object is to move toward a progressively more informed disposition of the issues as the relevant theory is refined and implemented …” It is precisely the recognition of the fact that we only dispose of incomplete and uncertain knowledge that leads Williamson to plead in favor of the rule of reason. Rather than discussing the pros and cons of these two positions further, we propose to test whether the techniques adopted to deal with various

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6 The coding of this variable is, of course, debatable: first, it can be argued that only some of the practices are in conflict with competition but not others (as, e.g., price discrimination or interlocking directorates). Second, it could be argued that the implied linear relationship between the number of practices dealt with and the effects on the degree of competition observed in a country was not linear but that some practices were more important than others, that there might be some minimum threshold, that the number was subject to decreasing (or increasing) marginal returns etc.

kinds of anti-competitive behavior have any significant effect on our variables of interest. The two techniques mentioned can be interpreted as the two ends of a continuous variable; an example for a legal technique between the two extremes are *per se* prohibitions with an enumeration of exceptions (as, e.g., found in the German Act on Competition Restraints that is based on a *per se* prohibition of cartels, but names an extended list of exceptions).

Hence, the coding of this variable is quite difficult. On the other hand, the two conjectures are exactly opposite to each other, which means that the sign of the estimated coefficient will be of particular interest. Coding is based on the assumption that the more economic approach is right, hence *per se* prohibitions (but also per se permissions) were coded 0, whereas the rule of reason was coded 1 and exceptions as the intermediate case 0.5. The value of the variable was normalized for the number of practices that competition laws deal with. Turkey follows the *per se* approach closest with six kinds of behavior regulated according to it. On the other side of the coin are Argentina, Brazil and Uzbekistan where seven kinds of behavior are dealt with drawing on the rule of reason. These are the absolute numbers. Since not all practices mentioned are dealt with in all countries, it might be more meaningful to have a look at the normalized scores: in the Philippines (0.0), Poland (0.08), Armenia (0.12) and Turkey (0.14), the economic approach has made the least headway. Five countries entirely rely on the rule of reason (and thus receive a 1.0): These are Argentina, Brazil, Canada, Switzerland and Uzbekistan.[7]

The second aspect recognized in the economic approach indicator counts the number of instruments that have been discussed (and promoted) by economists only in recent years, which are part of the currently valid competition law. The instruments asked for are (i) collective dominance, (ii) conglomerate effects, (iii) leniency programs, and (iv) the effects doctrine (variable 7 in the questionnaire). If one (or more) of these instruments is part of the current competition law, this can be interpreted as a sign for the willingness of the actors to keep up with recent developments. It can also be interpreted as following a "more economic approach" (as opposed to a "more legalistic approach"). The "effects doctrine" is somewhat apart from the other three instruments and it could be conjectured that reliance on it reflects factual economic strength rather than following an economic approach (the partial correlation coefficient between following the effects doctrine

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7 Five other jurisdictions have found the perfect middle course, at least scorewise: Bulgaria, the EC, Germany, Lithuania and Taiwan all have a coding of 0.5.

and the absolute size of the GDP in 2000 is, however, only a rather modest .295). Use of any of the first three instruments was coded 0.33, i.e. countries relying on all three instruments scored 1. 12 countries had installed all three instruments, whereas 12 countries used none of them. With the exception of South Africa, all of these twelve countries' competition laws were only passed in 1991 or later.

The third variable follows a similar logic as the one just dealt with but is constrained to how mergers are handled. In the European Union, the criterion used to decide whether a merger is compatible with the Common Market was recently changed from the so-called "dominance criterion" hitherto used to the "substantial impediment to effective competition criterion" that has been used in the U.S. and in a number of other jurisdictions. "Dominance" and "substantial lessening of competition" were thus meant as alternatives. Yet, the representatives of 21 competition agencies declared that in their country, both criteria were used (Brazil and Colombia are the only countries that have a merger policy but do not rely on either of them). The use of remedies in merger policy indicates, again, a case-by-case approach as opposed to a more rigid *per se* approach. The same holds true with regard to efficiencies where the competition agency has the competence to evaluate whether an otherwise problematic merger can be consummated because representatives of the agency expect important efficiencies to emerge as a consequence of the merger.

Whether the "economic approach" – with its reliance on insights based on game theory and its emphasis on incentives – or the "legal approach" – with its possibly positive effects on the predictability of competition policy – is more conducive to growth is open to speculation. In order to reduce speculation, we have created the second indicator that reflects the degree to which a country follows an "economic approach".[8]

3.3 The Structure of Competition Agencies

We now turn to the organizational structure of the competition agencies that are supposed to implement the competition laws. As spelled out above, particular emphasis is put on the independence of the agencies. Formal and factual independence do no necessarily coincide. This is why two separate indicators are

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8 One could assume that introduction of a more economic approach could be a function of per capita income. The partial correlation between our ECONAPP variable and per capita gdp in 2000 is, however, only a modest .299.

developed, one for the *de jure* and one for the *de facto* independence of competition agencies.

For the purposes of this paper, an independent competition agency is one that investigates anticompetitive behavior as specified in the competition law without interference from members of the executive. Independence further implies that the decisions of the competition agency will be carried out even if they are not in the interest of the executive. It also implies that competition officers – apart from their decisions being implemented – do not have to anticipate negative consequences as the result of their decisions, such as (a) being expelled, (b) being paid less, or (c) being made less influential.

3.3.1 Indicator #3: The *de jure* independence of competition agencies

The first issue in ascertaining the independence of the competition agency is thus to inquire whether the agency finds itself under the direct supervision of the government or not (variable 9). 40 out of 57 agencies are not subject to the direct supervision of the executive. The second variable here considered deals with the issue whether the sole task of the agency is to safeguard competition ("1") or whether it has to pursue other goals ("0"). 32 out of the 57 agencies are restricted to safeguarding and promoting competition (variable 10). The following variable (variable 11) is based on the assumption that the more competences are formally attributed to the competition agency, the better it should be able to fulfill its tasks. 20 out of the 55 agencies for which we have information have all five competences named in that variable at their disposition. Given that the court system is sufficiently independent, the possibility to take a case decided by the competition agency to court supposedly increases the incentives of the competition agency to apply the competition law as closely as possible. This is why countries in which courts have the power to inquire into both the procedural as well as the substantive aspects of a competition agency decision received a score of 1, countries in which courts were restricted to the review of procedural analysis were scored .5 and countries in which the courts did not play any role were simply coded 0. Out of the 57 countries analyzed, there was none in which the courts do not play any role (7 countries were coded .5, 47 the full score).

The appointment procedure of the leading members of the competition agency is another variable of interest. For lack of a generally accepted generic term for the head of competition agencies, we propose to call them competition officers in the introduction to this variable. It is hypothesized that appointment through one important member of the executive (e.g., the minister of economics) is less

conducive to independence than appointment procedures that provide for the participation of representatives of more than one government branch. More than two third of all competition laws (40 out of 57) preview appointment of the competition officer solely through the executive.

It is further conjectured that the legal term length of the competition officer is another important variable for the independence of the agency. We assume that they are most independent if they are appointed for life (or up to a mandatory retirement age) and cannot be removed from office, save by legal procedure. Average tenure over all countries in which term limits apply is 4.79 years. There are seven countries in which tenure is at least 12 years, but also six with less than four (Brazil, Greece, Peru, Taiwan, Thailand and Zambia). Competition officers are further assumed to be less independent if terms are renewable because they have an incentive to please those who can reappoint them. In 47 out of 57 competition laws, reappointment is, however, possible. The gist of variable 16 appears straightforward: the more difficult it is for government to get rid off the competition officer, the more independent can the agency assumed to be. 7 competition laws preview a judicial procedure, but in 37 countries, competition officers can be kicked out of office following a decision either of parliament or the executive.

Further, if the members of one of the other government branches enjoy discretion in determining the salaries of the competition officers, this raises incentives to take the preferences of these members explicitly into account. In contrast, general rules that their salaries cannot be reduced increase, in turn, the independence of the competition agency. Eleven competition laws prevent income reductions, whereas 41 do not.

If the allocation of cases to the various members of the competition agency is at the discretion of the competition officer, his influence on the outcomes of cases is potentially important because he could allocate cases to those who he expects to prepare decisions that are in line with his own prejudices. We expect independence to be larger if there is a general rule according to which cases are allocated within the competition agency (17 competition laws know a general allocation rule, 35 do not).

The competition agency will be less independent if members of the executive have the formal power to give instructions. Quite generally, two kinds of instructions can be distinguished: those referring to specific cases and those issuing general guidelines. Specific instructions are assumed to mean less independence than general guidelines (which is why the specific instructions are

coded 0, whereas general guidelines are coded 1). In 8 countries, specific instructions are possible, in 13 countries, general guidelines can be issued and in 23 countries, no instructions are legally possible at all. If the executive has the power to override decisions made by the competition agency, this will lead to a dependent, rather than an independent competition agency. In 9 countries, the competition office can be overridden by the executive, and in 44, it cannot.

If the competition agency has to publish its decisions, and especially their economic rationale, these decisions can be scrutinized by others and the reasoning can become subject to public debate. This can be interpreted as making it more difficult for representatives of the other government branches to have irrelevant considerations influence their decisions. In 38 countries, the competition agency has to publish the economic rationale underlying its decisions, whereas in 18 countries, it has not to.

We have described a total of 13 different variables that cover different aspects of the formal independence of competition agencies. These are synthesized into our third new indicator that deals with the formal independence of competition agencies. The three top scorers here are South Africa (0.769) Spain and Colombia (both .692), the three bottom scorers China(.0238), Belgium (.331) and Malta (.333) The average score is .506.[9]

3.3.2 Indicator #4: The *de facto* independence of competition agencies

The variables presented in the last subsection all focused on the independence of competition agencies as provided for by law. But it is well-known that *de jure* independence is often not implemented, at least not entirely. In order to ascertain the factually realized levels of the independence of competition agencies, some other criteria are thus taken into consideration. A crucial aspect of the *de facto* independence is the effective average term length of the chief competition officer.[10] If the actual term length and the one to be expected on the basis of the legal foundations deviate, the competition agency is assumed to be less independent than provided for in the books. Removing a competition officer before the end of term is a serious breach of independence. Whenever that has occurred at least once, the competition agency is assumed to be little independent. The countries with the lowest average tenure of competition officers are

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9 Variables 22 and 23 were not integrated into any indicator.

10 This variable is closely reminiscent of the turnover rate calculated for central bank governors and used as a proxy for their *de facto* independence.

Kazakhstan, Slovakia, Uzbekistan and Venezuela; average tenure in these countries is below two years.

The importance of an adequate income was already discussed with regard to the *de jure* indicator. With regard to the *de facto* situation, we were interested to learn whether the incomes of competition officers have at least remained constant in real terms since 1990.[11] 36 competition agencies claimed that real income had remained at least constant whereas 12 said that this was not the case. But the efficacy of competition agencies does not only depend on the income level of competition officers but also on the number of staff employed, the size of the library, the availability of modern computer equipment etc. We have tried to take this aspect into account by asking for the development of the competition agency's budget as an organization. 31 competition agencies declared that their budget had remained at least constant since 1990, whereas this was not the case in 17 countries.

If members of the executive give instructions to representatives of the competition agency, this is interpreted as a sign that they are not independent. The same holds if decisions by the competition agencies are overridden by the executive. We were interested in the number of times that this had happened between 1990 and 2000. This rather long period was chosen to reduce the possibility that any short-term events would be driving the result. The rather high mean values for both aspects (0.978 and 0.924 respectively) show that instructions seem to be the rare exception to the rule.

In the first indicator, goals other than competition that were named in the currently valid competition laws had a negative impact on the actual score, the underlying assumption being that other goals made tradeoffs necessary and deflected attention from competition. With regard to the indicator described here (i.e. the one on factual independence), the potential role of courts in citing goals other than competition - although they are not explicitly spelled out in the competition law - is taken into consideration. If this happens, this can be interpreted as pressure on the competition agency produced by the judiciary which indicates a low level of *de facto* independence. The average score of .925 indicates that this does not occur with great frequency.

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11 Answering this question should have been difficult in many cases, since many competition agencies were created only after 1990, but the response rate to this question was not significantly lower than to the other questions.

Altogether, this indicator thus consists of nine variables. The average score is .756 with a minimum of .23 and a maximum of 1.0. In line with expectations, the variation is larger than with regard to the third indicator. Data availability is a particular problem with regard to this indicator: many competition agencies were only created post 1990 and could thus not meaningfully respond to some of the questions. In order to secure a minimum level of comparability, only countries for which information on at least three of these variables were available are included in the analysis.

3.4 Partial Correlations Among Indicators

In order to get a feel for the results, it might be useful to have a look at the correlations the indicators display (i) amongst each other and (ii) with other indicators previously used to proxy for competition policies. A look at the correlation matrix reveals that the correlations between the four indicators are rather high although they are far from perfectly correlated. This could simply reflect the fact that the indicators are to proxy for different concepts. The correlation matrix also contains correlation coefficients with two subjective indicators of competition. One is from the Global Competitiveness Report, which is published annually by the World Economic Forum. It is produced on the basis of a survey with top business executives from 80 countries who are asked to rank their own country with regard to the statement "Antimonopoly policy in your country is 1 = lax and not effective at promoting competition, 7 = effective and promotes competition". The other subjective indicator is taken out of the World Competitiveness Yearbook, which is produced on an annual basis by the Lausanne-based International Institute for Management Development (IMD). Here, business people were asked: "Do anti-trust laws prevent unfair competition in your country"?

Table 2: Correlation Matrix

	Basis	EconApp	*De jure* Independence	*De facto* independence	GCR
Basis	1				
EconApp	0,699	1			
De jure Ind.	0,730	0,818	1		
De facto independence	0,710	0,873	0,915	1	
GCR	0,363	0,494	0,560	0,625	1
WCY	0,010	0,130	0,230	0,266	0,818

Four observations appear noteworthy: First of all, it is noteworthy that the two variables are highly correlated (partial correlation = .818). Second, the correlation coefficient with our four indicators is substantially lower. This can mean that the "competition friendliness" of a competition agency cannot be convincingly grasped by focusing on the legal basis and the factual behavior as we have tried to do. But it could also be another proof for the precariousness of subjective indicators: if an economy displays a good overall performance then the country's competition policy must be effective - or so the businesspeople surveyed might think. If this is the reasoning behind their answers, we are confronted with a huge endogeneity problem. Third, the correlation of the competition indicators here introduced with the indicator provided by the Global Competitiveness Report is in general clearly higher than that with the one provided by the World Competitiveness Yearbook. Fourth, among the four indicators introduced here, the partial correlation between the indicator representing the *de facto* independence of competition and the two subjective indicators is the highest. Businesspeople might, hence, form their opinions on the observed behavior of competition agencies, rather than on the law as written in the books.

The first look at the data does not allow us to draw any firm conclusions yet, but the rather low partial correlations between the various indicators could be of some concern. Before using some econometrics in section five in order to analyze the effects of competition policies on economic variables, we turn to deal with the question whether competition policy narrowly conceived is a good predictor for competition policy more broadly delineated.

4 Are Competition Policies a Good Predictor for Attitudes Toward Competition More Broadly Delineated?

If competition policies in the narrow sense are to safeguard competition, they should be correlated with the absence of barriers to (international) trade, of barriers to open new firms, of bureaucratic impediments in the management of firms etc. It has been argued that the introduction of competition laws can be interpreted as a government promise to avoid more intrusive forms of government intervention into the markets (Green 1987). The credibility of such a promise will, however, be low if policies in other areas are not in line with it. Such policies cannot only be expected to be a direct hindrance to growth, but also to make government promises in other areas (such as competition) less credible and hence constitute an indirect hindrance to growth. In this section, we set out to ask whether the existence of competition laws and their implementation by

(independent) competition agencies is indeed in line with other pro-competitive government policies.

A straightforward way in which government can enable competition is to refrain from making entry costly or even impossible. We distinguish between two aspects of state-mandated entry barriers here, namely foreign and domestic ones. If foreign firms can easily offer their products on the domestic market, a high level of competition should result. Openness and competition policy in the narrow sense should thus go hand in hand. A first indicator for openness towards international competition is the sum of exports plus imports as a share of GDP, capturing the volume of trade. A second indicator is to capture trade policies by the ratio between the actual size of the trade sector and the size expected according to economic theory. This is calculated on the basis of gravitation models and takes the size of a country's population, its geographical position etc. into account. A third indicator has been introduced by Sachs and Warner (1995) which is a dummy variable calculated on the basis of five different criteria. *Ex ante*, it is unclear what the best indicator for the possibility of foreign competition is. It is noteworthy how small the partial correlation coefficients between the various indicators for openness are: that between the weighted trade and years open is only 0.09.

Strong negative correlations between the competition and the openness indicators could mean that in the absence of competition laws, legislators use trade policy as a substitute for competition policy: Small states might not have the means to set up a competition authority of their own and might want to secure competitive pressure on domestic firms by opening up their home markets. Strong positive correlations would indicate that these two policies are used in a complimentary fashion. Unfortunately, the data do not offer any clear-cut information: the signs for the correlation coefficients with the openness as well as the weighted trade variable change but never reach any traditional level of significance. Relying on the years open indicator would, however, lead us to conclude that the two policies are used in a complimentary fashion.

Table 3: Correlation Between Competition and other Indicators

	Basis	Econ App	De jure Indep.	De facto Indep.	GCR	WCY
Openness	-0,134	-0,124	-0,126	-0,097	0,056	0,128
Weighted Trade	-0,061	-0,068	-0,015	0,014	0,064	-0,215
Years Open	0,359	0,388	0,331	0,358	0,492	0,551
Starting	-0,487	-0,491	-0,516	-0,526	-0,509	-0,368

Business						
Hiring & Firing	0,055	-0,104	-0,074	-0,117	-0,426	-0,430
Price Controls	0,251	0,073	0,247	0,160	0,453	0,662
Industrial Policy	-0,266	-0,707	-0,485	-0,651	-0,414	-0,282
Government Effectiveness	0,484	0,605	0,548	0,604	0,845	0,796
Regulatory Quality	0,594	0,645	0,623	0,636	0,786	0,792

We now turn to the possible connection between competition laws and domestic barriers to entry mandated by the state. De Soto (1990) pointed to the importance of regulatory procedures as an impediment for many entrepreneurs to become legal. Governments that have an interest in strong competition should thus aim at making domestic entry easy. Based on the ideas of de Soto, the World Bank publishes the "Doing Business" survey which contains (i) the number of procedures, (ii) the official time, and (iii) the official cost that a start-up has to incur before it can operate legally. In order to insure maximum comparability across countries we use the cost expressed as a percentage of income per capita here (World Bank 2004). Higher indicator values mean higher costs. If competition policies and domestic entry policies go hand in hand, we should thus indicate negative correlation coefficients. This is indeed the case.

Barriers to exit can prevent a (potential) competitor from entering a market in the first place. They can thus constitute barriers to entry. Not all of these are determined by technology (the sunk cost argument), some are the effect of regulation. Strict rules on hiring and firing labor are a case in point. The Doing Business Survey also contains an employment laws indicator that is composed of (i) the flexibility of hiring, (ii) the conditions of employment and (iii) the flexibility of firing. If hiring and firing legislation was pro-competitive, then we would get negative correlations because the employment index takes values between 0 and 100, with higher values indicating more rigid regulation. Our four indicators are basically uncorrelated with this indicator. It is, however, worth mentioning that the two subjective competition indicators do have the expected sign. Based on our indicators, no conclusion regarding the compatibility of the two policy areas is possible. Based on the two subjective indicators, it seems as if policies were largely in line with each other.

Historically, governments have often sought to control a number of prices for various reasons. Yet, if prices cannot properly reflect changes in market conditions, they will partially lose informative value which will lead to losses in allocative efficiency. "Competition friendly" governments should thus largely

abstain from price controls. The variable “price controls” is taken from the World Competitiveness Yearbook (2001) and the exact wording is “Government price controls (do not) affect pricing of products in most industries.” Higher scores indicate less price controls, hence the correlations should be positive. Correlations are indeed positive, the subjective indicators again more significantly so than the objective ones introduced in this paper.

Industrial policy is often at odds with a policy in favor of competition. Whereas competition policy trusts in the incentives of the market actors as well as the invisible hand of the market itself, industrial policy is often based on the assumption that due to some market failures, the government could increase welfare by heavily influencing the structure of the market. A sincere competition policy should thus be connected with a low level of industrial policy. In order to test such a presupposition, one would need a measure for industrial policy. To the best of our knowledge, such a measure has not been constructed. We therefore propose to test whether our competition policy variables are correlated with the amount of subsidies as a fraction of Gross Domestic Product. This variable is taken from the Economic Freedom Index and subsidies are not expressed in percent of GDP but in a score ranging from 1 (worst) to 10 (best). If countries scoring well in competition policy spend little on industrial policy, a positive correlation should hence result. This is, however, not the case. There are significant negative correlations indicating that high levels of competition policy are often combined with high levels of industrial policy.

Finally, we are interested in the correlation between our competition indicators and the quality of institutions in general. Kaufman et al. (2003) contains two interesting indicators, one measuring “government effectiveness” which includes the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government’s commitment to policies. The second indicator is called “regulatory quality” and includes measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development. As expected, the correlation between these two variables and our four competition indicators are quite high albeit not as high as with the subjective competition indicators.

All in all, the existence of competition policies is correlated with good institutions more generally; if a competition policy exists, domestic as well as foreign entry barriers tend to be lower than if there is no competition policy. However, the

existence of a competition policy is strongly correlated with the existence of industrial policy. Whether competition policies more narrowly conceived have any measurable effects on economic variables will be analyzed in the next section.

5 On the Effects of Competition Policies on Economic Growth – Estimation Approach and Discussion of Results

5.1 The Empirical Strategy

The estimation approach is based on the assumption that differences in productivity can be attributed to differences in the quality of institutions. Good institutions are supposed to be productivity-enhancing. The hypothesis is that good competition institutions lead to higher (total factor) productivity. The model to be estimated is

$$TFP_i = \alpha + \beta COMP_i + \chi Z_i + \varepsilon_i \qquad (1)$$

Estimating the effects that competition policies have on total factor productivity is using a very coarse brush. Yet, other more fine-grained indicators such as mark ups on prices or intensity of competition have two huge disadvantages: they would have to be used over all sectors of an economy and the resulting averages would be almost meaningless. Secondly, these indicators are not available for a large number of countries. In recent years, the crucial role of institutions for total factor productivity has come to the fore (see, e.g., Hall and Jones 1999).

Following Hall and Jones (1999), we calculate productivity as the residual of a Cobb-Douglas production function.[12] Hall and Jones provide data for 1988, we recalculated them for the year 2000. Instead of the output per worker for 1988 the output per worker for the year 2000 was taken from the Penn World Tables 6.1 by Heston et al. (2002). The physical capital stock was calculated as an arithmetic mean of the capital stock calculated by Hall and Jones for 1988 and the aggregate investment in the period 1990-2000 again taken from Heston et al. (2002). An assumed depreciation rate of 6 percent for the capital stock means that the value of the 1988 capital stock has nearly lost half its value by the year 2000. Missing data for the 1988 capital stock in countries like Croatia, Ukraine, Slovakia were

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12 Hall and Jones (1999) assume a production function $Y_i=K_i^{\alpha}(A_iH_i)^{1-\alpha}$ with Y_i=Output per worker in country i (taken from the Penn World Tables), K_i=stock of physical capital in country i, H_i=amount of human capital-augmented labor used in production in country i and A_i=labor-augmenting measure of productivity in country i. After rearranging the equation, A_i as the residual is calculated assuming α to be $1/3$.

imputed by taking the data of the "mother countries" USSR, Yugoslavia and CSSR. The human capital variable is based on the average number of years that citizens above the age of 15 of the respective country spent in schools. It is assumed that school attendance is subject to decreasing marginal returns. Accordingly, the first years spent in school are supposed to lead to higher marginal returns than the last years spent there. Like Hall and Jones (1999), we assume a rate of return of 13.4 percent for the first four years of education, of 10.1 percent for the next four years and of 6.8 percent for education beyond the eighth year. The data for the years of schooling were taken from www.worldbank.org/data. Missing data were imputed by augmenting the data in Hall and Jones for 1985 (originally provided by Barro and Lee 1993) with the average growth rate in schooling between 1985 and 2000.

It might be argued that drawing on total factor productivity as the dependent variable would be premature as many competition laws have only been passed during the 1990s and it seems unlikely that they should have an important effect on the level of total factor productivity, rather than on its changes. On the other hand, total factor productivity for the year 2000 occurred more unequivocally after the establishment of competition laws than the growth rates currently available. Additionally, there is a serious endogeneity problem: it might be the case that competition laws are primarily enacted by countries with a high level of total factor productivity – and not vice versa.[13]

Most cross-country growth equations take investment, schooling and initial GDP per capita explicitly into account before augmenting the model with the variable of interest. In estimating the influence of the various competition indicators on the productivity residual, we refrain from estimating a baseline model as the influence of the physical capital stock as well as human capital on the variation in output per worker is already captured by decomposing output per worker into its basic determinants. It is thus plausible to assume that differences in institutions are the primary and fundamental determinant of differences in productivity.[14] In this

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13 Additionally, there might be some selection bias as we did not receive questionnaires from all countries known to have competition policies. In order to check how serious it was, a table containing the descriptive statistics of the missing countries as well as the entire sample was constructed (it can be found in the appendix). Generally speaking, the analyzed sample does not suffer from a serious selection bias.

14 This is in analogy to the Hall and Jones hypothesis according to which social infrastructure is the primary and fundamental determinant of total factor productivity.

approach it is, of course, crucial to control for the possible influence of other institutional arrangements via the Z-vector.

We propose to include a number of standard economic variables (that result out of various policies which are, in turn, based on various institutions) as well as some political variables. A third group of variables controls for influences that are more truly exogenous such as the legal origin of a country and its fractionalization in terms of ethnicity and language. The more standard variables include (i) average government consumption in percent of GDP between 1990 and 2000, (ii) openness measured by the sum of exports and imports in percent of GDP, (iii) average population growth between 1980 and 1998, and (iv) the average inflation rate, all from the PWT 6.0 data set. In traditional growth theory, the so-called Solow Residual was attributed to "technical progress" which should hence also be controlled for. R&D expenditures have been found to have a positive effect on total factor productivity (Nickell 1996, 729) which is why we control for them. Since data on (v) the number of patents granted by the U.S. Department of Commerce is available for more countries, we decided to rely on the output of R&D, rather than on its input.

We assume that institutional differences are the driving forces behind the variation in the Solow residuals. This is why we also control for a number of institutional variables such as (vi) the degree of political rights as provided by Freedom House which is often used as a proxy for democracy. We further control for (vii) the degree of civil liberties as provided by Freedom House. (viii) With regard to institutional quality, government effectiveness (taken from Kaufman et al. 2003) is included to find out whether the impact of competition policy still holds if a variable is included that focuses on institutional quality in a very broad sense and that may, hence, partly incorporate the quality of competition institutions as one of its components.

Turning to the variables that are exogenous even in the long term, we control for (ix) the legal origin of countries as well as for their (x) ethno-linguistic fractionalization. As has also become standard practice, a (xi) latitude variable is used that controls for a number of geographic aspects. Additionally, we introduce a dummy in order to control for EU-membership.[15] All EU members do not only have their own competition policies but are also subject to the competition policy

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15 The EU itself will, however, not be counted as a country of its own in the estimates below. Malta, for whose competition policy we also have detailed information is not included because we lack detailed growth information as the country is not included in the Summers et al. (2001) dataset.

made in Brussels. In order to control for possible effects of this two leveled competition policy, a dummy is hence introduced.

A potential problem with estimating the effects of competition policies on the average growth over the period from 1990 to 2000 is that the majority of competition laws were only passed after 1990. It almost suggests itself to constrain the estimations to those countries that have had a competition agency for at least 10 or 15 years, but this would considerably reduce the number of observations. A particular problem is that at least until the last decade, the introduction of competition laws seemed to be systematically correlated with per capita income. This means that the causation could run from income to competition laws – and not the other way round. This constitutes a serious endogeneity problem.[16] This the reason for not relying exclusively on OLS but also on TSLS. For all four competition policy indicators, the same three instruments were used. They are (i) the distance of a country from the equator, (ii) whether a country has a common law legal origin, and (iii) the degree of ethnolinguistic fractionalization. Inference is based on t-statistics computed on the basis of White heteroscedasticity consistent standard errors.

5.2 The Estimation Results

Tables 1a and 1b contain the regression results when standard economic variables are controlled for. All standard variables, except population growth, have the expected sign. Except population growth, all are significant at least at the ten percent level. This also holds for the EU-Dummy. In table 1b, population growth is dropped and inflation is introduced instead. It also has the expected sign and is highly significant. How do the newly introduced indicators do? Based on the OLS-estimates which are presented in the first four columns of both tables, a rather clear picture emerges: *De facto* independence seems to be most significant for explaining variation in total factor productivity whereas the economic approach misses conventional levels of significance.[17] Both the formal basis of

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16 If, in addition to this observation, the catch-up hypothesis is correct and poorer countries hence experience higher growth rates than richer ones, this constitutes a systematic bias against competition laws to have any positive effect on economic growth. In the extreme, countries with competition policies should experience less growth than countries without competition policies.

17 The introduction of quadratic terms somewhat changes these results. They do not reach conventional levels of significance, except for the second indicator, i.e. the economic approach. Here, the quadratic term has a negative sign and it is significant around the one percent level (for

competition law and *de jure* independence always reach at least the ten percent significance level. How about economic significance? The coefficient of the *de facto* indicator is roughly 0.235, its standard deviation 0.399 (the descriptive statistics for the four new indicator are documented as part of appendix 2). As the total factor productivity of the U.S. has been standardized to one, that means that a one standard deviation improvement in the *de facto* independence of competition agencies lets a country catch up some 9.38 percentage points to the U.S.. As the standard deviation of the other indicators is lower (0.247 for the basis of competition legislation indicator, and 0.266 for the de jure independence of competition agencies), a one standard-deviation improvement would translate into a reduction of the total factor productivity-gap to the U.S. of some 6.18 (6.65) points.

The estimates based on the instrumental variable technique are depicted in columns 5 through 8 of tables 1a and 1b. Instrumenting the competition variables does not make them insignificant. Hence, endogeneity is not an unsurmountable problem in this case.

Table 2 asks whether the productivity-enhancing effect of competition laws and agencies survives if the four new indicators are tested in conjunction with other variables proxying for the quality of institutions. The first four columns show that Political Rights as delineated by Freedom House do not seem to contribute significantly to the Solow residual (indeed, the coefficients even have the "wrong" sign). Civil Liberties, in turn, have the expected sign and are significantly correlated with higher productivity in three out of four cases. The "rank order" of the four indicators that emerged when they were estimated in conjunction with economic variable seems to be confirmed here: the coefficients as well as the significance levels are fairly similar to the results displayed in table 1.[18] The picture totally changes as soon as Government Effectiveness is taken into account. None of the other institutional variables survives its inclusion. On the one hand, this should definitely make us wonder about the robustness of the competition indicators. On the other, the variable "Government Effectiveness" is a very, very broad variable. Moreover, it is unclear what exactly has entered into its construction, so one should probably not over-evaluate these results either.

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column 2) and clearly better (for column 6). Hence, "too much" economic reasoning can be bad for you.

18 Interestingly, the "quadratic effect" can also be observed with regard to the institutional variables: the square of the economic approach gets a negative coefficient which is significant on the two percent level (column 2) and the five percent level (column 6).

Table 3 presents the four new indicators in conjunction with some more truly exogenous variables such as latitude or a common law dummy. Again, the variable proxying for the economic approach is the least significant among the four new variables.[19] The geographical variable "latitude" is highly significant in conjunction with all four new indicators, whereas "ethnic fractionalization" barely misses the ten percent significance level in all four equations. Columns 5 through 8 deal more specifically with the question whether the legal origin is relevant for explaining the calculated variation of the residuals. The Scandinavian legal origin serves as a benchmark in this case. It turns out that only socialist legal origin countries do significantly worse than countries with a Scandinavian legal origin across all four equations.

Although the four indicators are not robust to the inclusion of variables that cover the general quality of institutions, it might very well be the case that some of the single components that the indicators are made up of survive individually. It turns out that the number of years that a competition policy based on an explicit competition law has been in existence, the focus of the competition agency exclusively on competition, the impossibility to re-appoint the highest competition officer, and the development of the budget of the competition agency in real terms are the single most important variables. For policy makers, this is mixed news: the age of the competition law can obviously not be manipulated. On the other hand, the responsibility of the competition agency can very well be confined to competition and it is possible to increase the independence of competition agencies by excluding the possibility that the director of the competition agency can be re-appointed.

6 Conclusion and Outlook

We have introduced four new indicators to measure various aspects of competition law and competition policy. More precisely, the indicators cover (1) the formal basis of the competition legislation, (2) the degree to which it is based on an economic approach, (3) the formal independence of competition agencies, and (4) their factual independence. It was shown that competition policies when represented by these four indicators seem by and large compatible with other policy areas such as trade policy. Further, it was asked whether the four competition indicators help to explain differences in total factor productivity. It

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[19] As before, the quadratic term of the four indicators was only significant for the economic approach. Here, it enters with a negative sign and is significantly at the 1 percent level.

was shown that controlling for standard economic variables as well as institutional and more truly exogenous ones, the four indicators did seem to have an effect on total factor productivity. This vanishes, however, as soon as indicators are used that represent the quality of institutions very broadly conceived.

This suggests the policy implication that the general quality of institutions is of primary interest and not necessarily the existence, age, content, and independence of competition laws and agencies. But this might be premature. First, it might very well be the case that introducing a competition law helps to improve the general quality of institutions in the long run. Secondly, it might simply be too early for any final verdicts on the effects of competition policy. After all, more than half of all existing competition agencies were created after 1990.

A number of possible next steps for future research come to mind: first, it appears interesting to inquire more precisely into the transmission channels via which competition policies could have an impact on economic growth. It would, e.g., be interesting to see whether differences in market structures and price-cost margins can be explained by drawing on our competition indicators. A second logical next step is to endogenize the choice of competition policies. With regard to explaining the choice, a number of questions come to mind: is the first-time enactment of competition laws correlated with a certain minimum level of development, e.g. measured in income? If that is the case, competition laws will only be passed if the general institutional quality of a country is sufficiently good, otherwise, income levels would not have attained certain levels. This would, then, imply that competition laws are not a necessary condition for reaching fairly high income levels in the first place. Or is it closely correlated with very uneven firm-size? If there are no trusts that can be busted, politicians will not be able to cash in on the promise to trust-busting. Or are certain political regimes more likely to pass competition laws than others? Regimes in which politicians are also owners of the most important firms in a country might lack incentives to pass competition laws.

A hundred years ago, only Canada and the U.S. had competition laws. Today, some 90 countries have such laws. It would be interesting to analyze whether there are certain patterns in the diffusion of competition laws: does yardstick competition take place also with regard to competition laws? Are the various approaches that are reflected in the various competition laws correlated with legal families or does the diffusion process rather work via geographical spreading of the laws?

A distinction between *de jure* and *de facto* independence of competition agency was introduced. It is, of course, tempting to inquire whether there are variables

that could explain the deviation between the two. Elsewhere (Hayo and Voigt 2005), it has been argued that the difference between *de jure* and *de facto* central bank independence can be explained with the different degree to which countries are able to make credible commitments. It has further been shown that this capacity is partially determined by the amount of factual judicial independence observed in a country. The degree of *de facto* Judicial Independence is interpreted as a proxy for the degree to which the rule of law is realized in a given country, i.e., for the degree to which government officials are constrained by rules. A similar reasoning could also be applied to competition agencies and the degree to which they have been able to maintain their independence from government.

Acknowledgments: The following persons helped tremendously with this project by completing the questionnaire or otherwise: Dr. Zef Preci (Albania); Ismael Malis and Marina Bidart (Argentina); Karine Poladyan (Republic of Armenia); Brian Cassiday (Australian); Rainer Kaltenbrunner (Austria); Ingrid De Mey and Patrick de Wolf (Belgium); Eduardo Freitas Alvim (Brazil); Elena Kamilarova (Bulgaria); Peter Sagar (Canada); Tang Jie and Jian Qiu (partner of Coudert Brothers LLP, based in its Beijing office) (China); Gabriel Ibarra (Colombia); Claudio Donato (Costa Rica); Olgica Spevec (Croatia); xxx (Cyprus); Arthur Braun (Czech Republic); Torben Thoro Petersen (Denmark); Katrin Tasa (Estonia); Mette Janum (European Commission); Matti Purasjoki (Finland); Dominique Brault / Herbert Smith (France); Andreas Bardong (Germany); Helen Papaconstantinou (Greece); Gergely Polony (Hungary); Murman Budijanto (Republic of Indonesia); Linda NiChualladh (Ireland); Eytan Epstein and Ziv Abramovich (Israel); Silvio Schinaia (Italy); Barbara Lee (Jamaica); Tsoyoshi Takahashi and Tetsuji Yokote (Japan), Alma Zhuspekova (Republic of Kazakhstan); Peteris Vilks and Dana Sosnovska (Latvia); Aurimas Jankauskas (Lithuania); Silvio Meli (Malta); Erika Arguello Cervera (Mexico); Ali Kufali (Marocco); E.R.H. Jutten and Pim de Wild (Netherlands); Gail Marshall and Jessica White (New Zealand); Bruno Hug de Belmont (Paraguay); Teresa Tovar (Peru); xxx (Philippines); Michael Jasiorkowski (Poland); Isabel Ivaz (Portugal); Mouhamadou Diawara (Senegal); xxx (Slovak Republic); Mirjam Mocnik (Slovenia); Gonzalo Sanz Pérez (Spain); Rolf Dähler (Switzerland); Natalia Lopes (South Africa); Julia Huang (Taiwan); Godfrey Mkocha (Tanzania); Siripol Yodmuangcharoen (Thailand); Adel ben Hsann (Tunesia); xxx (Turkey); Terry Butzer (United Kingdom); Makan Delrahim (U.S. Department of Justice); Adham Kuchkarov (Uzbekistan); María Antonieta Magaldi (Venezuela); George K Lipimile (Zambia); Gladmore Mamhare (Zimbabwe).

References

Aghion, Ph., N. Bloom, R. Blundell, R. Griffith, P. Howitt (2005); Competition and Innovation: An Inverted U Relationship, *Quarterly Journal of Economics* 120(2):701-28.

Aghion, Ph. And P. Howitt (1992); A Model of Growth through Creative Destruction, Econometrica 60(2): 323-51.

Berger, H., J. de Haan and S. Eijffinger (2001); Central Bank Independence: An Update of Theory and Evidence, Journal of Economic Surveys 15:3-40.

Cohen, W. and R. Levin (1989); Empirical Studies of Innovation and Market Structure, in: R. Schmalensee and R. Willig (eds.): Handbook of Industrial Organization, Amsterdam et al.: North Holland, Volum II, pp. 1060-1107.

Department of Commerce (2005); Patent Counts by Country/State and Year, Utility Patents, January 1, 1963 – December 31, 2004; downloadable from: http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.pdf.

Dutz, M.A and A Hayri (1999); Does more intensive competition lead to higher growth? CEPR Discussion Paper No. 2249.

Dutz, M. A. and M. Vagliasindi (2000); Competition policy implementation in transition economies: An empirical assessment, *European Economic Review* 44(4-6):762-72.

Feld, L. und S. Voigt (2003); Economic Growth and Judicial Independence: Cross Country Evidence Using a New Set of Indicators, *European Journal of Political Economy* 19(3):497-527.

Feld, L. and S. Voigt (2004); "Making Judges Independent - Some Proposals Regarding the Judiciary". CESifo Working Paper Series No. 1260. http://ssrn.com/abstract=597721

Green, C. (1987); Industrial Organization Paradigms, Empirical Evidence and the Economic Case for Competition Policy, Canadian Journal of Economics, 20(3):482-505.

Hall, R. E. and C.I. Jones (1999); Why do some Countries Produce so much more Output per Worker than others? *The Quarterly Journal of Economics* , February: 83-116.

Hayek, F. (1978); The Pretence of Knowledge in: Hayek, F.: *New Studies in Philosophy, Politics, Economics and the History of Ideas*, Chicago: University of Chicago Press, 23-34.

Hayo, B. und C. Hefeker (2002), Do We Really Need Central Bank Independence? A Critical Re-examination, European Journal of Political Economy.

Kaufman, D., A. Kraay, M. Mastruzzi (2003); Governance Matters III: Governance Indicators for 1996 – 2002, The World Bank.

Konings, J., P. van Cayseele, F. Warzynski (2001); The dynamics of industrial mark-ups in two small open economies: does national competition policy matter? *International Journal of Industrial Organization* 19:841-59.

Nickell, St. (1996); Competition and Corporate Performance, Journal of Political Economy 104(4):724-46.

OECD (2003); Optimal Design of a Competition Agency – Note by the Secretariat. (CCNM/GF/COMP(2003)2).

Rey, P. (1997); Competition policy and economic development, mimeo, September 1997.

Sachs, J. and A. Warner (1995); Economic reform and the process of global integration. Brookings Papers on Economic Activity 1, 1-118.

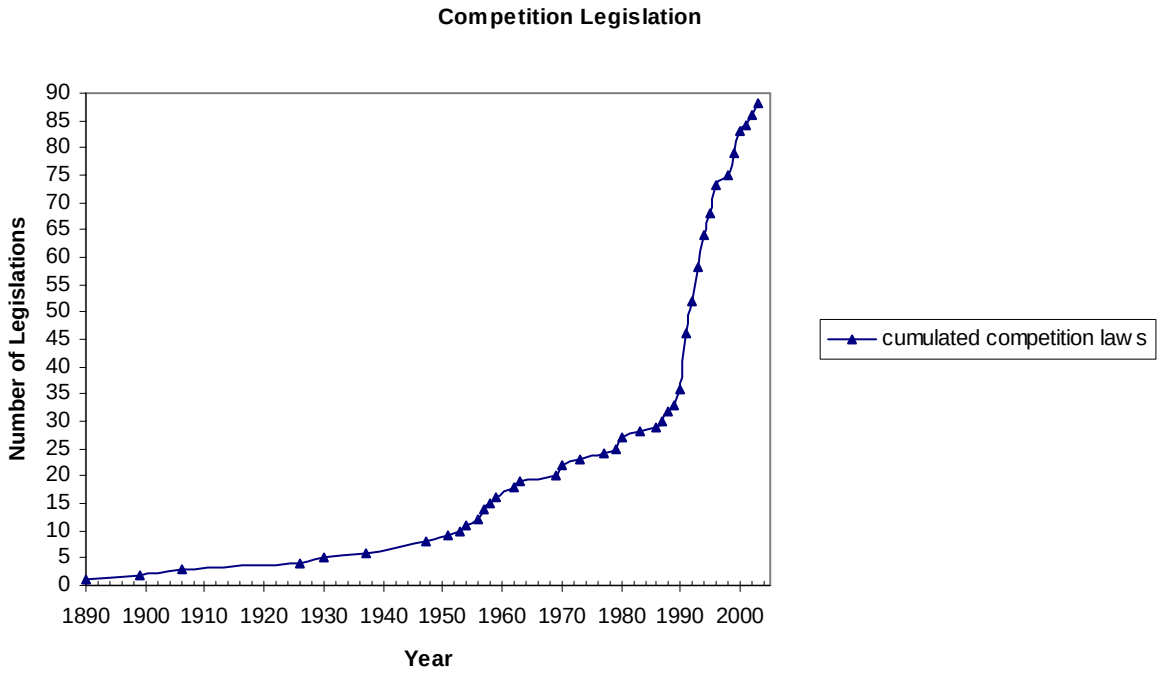
Schumpeter, J. (1942); Capitalism, Socialism, Democracy, New York: Harper.

Soto, H. de (1990), The Other Path - The Invisible Revolution in the Third World, New York.

Williamson, Oliver E (1996), The Mechanism of Governance, New York.

World Bank (2004); *Doing Business*, Washington, D.C..

World Competitiveness Yearbook (2001), IMD: Geneva.


Competition Legislation
Number of Legislations
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Year
cumulated competition laws

On the Economic Effects of Competition Laws and Competition Authorities

QUESTIONNAIRE[20]

Please return to:

Prof. Dr. Stefan Voigt
Economic Policy
University of Kassel
Nora-Platiel-Str. 4-6
D-34109 Kassel

Country for which information is provided:

_____

In order to avoid ambiguities, please tick either „yes“ or „no“ and do not leave blanks where both answers are offered as options.

The substantive basis of competition policy

(1) Does the Constitution name competition as a goal to be achieved? (1) YES (0) NO
(If yes, the relevant paragraph is _____).

Descr. Stats: mean, median, min, max, sd, obs.: 0.245, 0.0, 0.0, 1.0, 0.432, 98.

(2) Is there a specific law that has the purpose of safeguarding and promoting competition? (1) YES (0) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.649, 1.0, 0.0, 1.0, 0.479, 131.

(3) If yes: in what year was the first such law passed in your country?____1889___

Descr. Stats: mean, median, min, max, sd., obs: 1981, 1991, 1890, 2003, 23.677, 88.

[20] Please note that neither the coding scheme nor the descriptive statistics were contained in the version of the questionnaire sent to the competition authorities.

(4) Are there other goals – beyond competition – that are mentioned in the currently valid competition laws? NO (1);

YES, these are: (a) consumer protection ( ),
(b) technological progress ( ),
(c) enhanced efficiency ( ),
(d) international competitiveness ( ),
(e) export success ( ),
(f) small and medium enterprises ( ),
(g) business cycle stabilization ( ),
(h) employment concerns ( ),
(i) regional development concerns ( ),
(j) security of supply ( ),
(k) other _____( ).

Coding: y= 1 - 0,125x; x=number of crosses from a through k; y ≥ 0.

Descr. Stats: mean, median, min, max, sd., obs.: 0.344, 0.125, 0.0, 1.0, 0.385, 98.

(5) Do the currently valid competition laws provide measures against

(a) cartels ( ) YES ( ) NO,
(b) abuse of dominant position ( ) YES ( ) NO,
(c) control of mergers ( ) YES ( ) NO,
(d) predatory pricing ( ) YES ( ) NO,
(e) price discrimination ( ) YES ( ) NO,
(f) exclusive dealing ( ) YES ( ) NO,
(g) interlocking directorates ( ) YES ( ) NO,
(h) other _____( ).

Coding: y= 0,125x; x=number of crosses from a through

Descr. Stats: mean, median, min, max, sd., obs.: 0.458, 0.625, 0.0, 1.0, 0.406, 98.

(6) There are different techniques of dealing with various kinds of behavior that are deemed to be anti-competitive. *Per se* rules declare behavior to be compatible /incompatible with the law independently from the concrete effects to be expected in a particular situation. Under the rule of reason, in comparison, the probable effects of a particular case are evaluated. A third technique is to rely on *per se* rules, but to specify a number of exceptional circumstances, under which the general prohibition is not to be applied. Although this distinction is not razor-sharp, we would ask you to fill in one (or more) of the corresponding options.

(PLEASE TICK THE MOST SUITABLE OPTION FOR EVERY KIND OF ACTION)

Behavior:	*Per se* Prohibition a	*Per se* Permission b	Rule of Reason c	*Per se* Prohibition with Exceptions d	Exceptions are: E
Cartels					
Abuse of dominant position					
Mergers					

Predatory Pricing					
Price discrimination					
Exclusive dealing					
Interlocking directorates					
Sums					

Descr. Stats: mean, median, min, max, sd: 0.267, 0.143, 0.0, 1.0, 0.317, 97.

(7) Over the last couple of years, a number of concepts have gained some prominence in competition circles. Does the currently valid competition law provide for

(a) collective dominance ( ) YES ( ) NO (if yes, since _____),

(b) conglomerate effects ( ) YES ( ) NO (if yes, since _____),

(c) leniency programs ( ) YES ( ) NO (if yes, since _____),

(d) the effects doctrine ( ) YES ( ) NO (if yes, since _____).

Produce four columns; if answer is YES then simply code the year; ergo: if no year, the answer must have been NO

Descr. Stats: mean, median, min, max, sd., obs.:

(8) With regard to mergers, various policy instruments can be used. Please indicate which of the following instruments are provided for under the currently valid competition law in your country

(a) dominance ( ) YES ( ) NO (if yes, since _____),

(b) substantial lessening of competition ( ) YES ( ) NO (if yes, since _____),

(c) remedies ( ) YES ( ) NO (if yes, since _____),

(d) efficiencies ( ) YES ( ) NO (if yes, since _____).

Produce four columns; if answer is YES then simply code the year; ergo: if no year, the answer must have been NOImplementing Competition Legislation

Descr. Stats: mean, median, min, max, sd:

(9) How are the currently valid competition laws to be implemented?

(a) by an office under the direct supervision of the executive (e.g. the minister of finance or economy) (0),

(b) by an office not under the direct supervision of the executive (1),

(c) other, namely _____(?).

Descr. Stats: mean, median, min, max, sd., obs.: 0.435, 0.0, 0.0, 1.0, 0.496, 93.

(10) If there is an office responsible for the implementation of the competition laws, are its tasks restricted to the safeguarding and promotion of competition (1),

or is it obliged to strive for the attainment of other goals (0), (such as those mentioned in question 4)

Descr. Stats: mean, median, min, max, sd., obs.: 0.348, 0.0, 0.0, 1.0, 0.479, 92.

(11) Does the Competition Office have competence with regard to

(a) investigating anti-competitive behavior ( ),

(b) negotiating possible remedies ( ),

(c) deciding on the consequences of anti-competitive behavior ( ),

(d) intervene in the proceedings of sector-specific regulatory agencies (such as those regulating utilities or natural monopolies)? ( ),

(e) anti-competitive behavior by state-owned enterprises? ( ).

Produce six columns (five for a-e plus one for the sum); if answer is YES then code "0,2" the sixth column contains the sum a-e.

Descr. Stats: mean, median, min, max, sd: 0.49, 0.6, 0.0, 1.0, 0.422, 91.

(12) Affected parties can challenge the decisions of the Competition Office

(a) in court (please specify which court _____)( ),

(aa) the court is restricted to procedural issues (0,5),

(bb) the court has the power to inquire into procedural as well as substantive issues (1),

(b) by turning to the executive (please specify who _____) (0).

Descr. Stats: mean, median, min, max, sd., obs.: 0.545, 0.75, 0.0, 1.0, 0.477, 88.

(13) How is the head of the competition office (called "competition officer" here) nominated/appointed/elected? (PLEASE TICK ONLY THE MOST APPROPRIATE LETTER)

(a) Competition officers are nominated and appointed by one or more members of the executive; ( ),

(b) Competition officers are nominated by one or more members of the Executive and are elected by parliament (or a committee thereof); ( ),

(c) Competition officers are nominated by one or more members of the executive and are elected by the judiciary; ( ),

(d) Competition officers are nominated and elected by parliament (or a committee thereof); ( ),

(e) Competition officers are nominated by parliament (or a committee thereof) and are appointed by one or more members of the executive; ( ),

(f) Competition officers are nominated by parliament (or a committee thereof) and are elected by the judiciary; ( ),

(g) Competition officers are nominated and elected by the judiciary; ( ),

(h) Competition officers are nominated by the judiciary and are appointed by one or more members of the executive; ( ),

(i) Competition officers are nominated by the judiciary and are elected by parliament (or a committee thereof); ( ),

(j) Competition officers are nominated by the judiciary, the legislature, or the executive and are elected by actors not representing any government branch (academics, the public at large). ( ),

(k) Competition officers are elected by still another procedure, namely_____ _____( ).

		Competence to **elect/appoint** "competition officer"		
		Executive	Legislature	Judiciary
Competence to **nominate** "competition officer"	Executive	0 ("a")	1/3 ("b)	2/3 ("c")
	Legislature	1/3 ("e")	0 ("d")	2/3 ("f")
	Judiciary	2/3 ("h")	2/3 ("i")	1 ("g")

Additional coding notes: nomination by PM AND appointment by PRES in non-pres. Systems = 1/6; 2 different chambers = 1/3; PM AND two different houses = ½; trade and professional associations = 0.

Descr. Stats: mean, median, min, max, sd., obs.: 0.086, 0.0, 0.0, 1.0, 0.203, 92.

(14) What is the legal term length of the Competition officer?

NUMBER OF YEARS_____

Term of office(too)	*coding*
≥ 12 years	*1,0*
10 ≤ too < 12	*0,8*
8 ≤ too < 10	*0,6*
6 ≤ too < 8	*0,4*
4 ≤ too < 6	*0,2*
4 > too	*0,0*

Descr. Stats: mean, median, min, max, sd: 0.2, 0.2, 0.0, 1.0, 0.291, 89.

(15) Can Competition officers be reelected? (0) YES (1) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.012, 0.0, 0.0, 1.0, 0.109, 84.

(16) How can Competition officers be removed from office?

(a) only by judicial procedure; (1) YES ( ) NO,

(b) by decision of one or more members of the executive; (0) YES ( ) NO,

(c) by decision of parliament (or a committee thereof); (0) YES ( ) NO,

(d) by joint decision of one or more members of the executive and of parliament (or a committee thereof). (1/2) YES ( ) NO,

(e) other, namely _____(?) YES ( ) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.113, 0.0, 0.0, 1.0, 0.296, 85.

(17) Is there a measure preventing income reductions of Competition officers in real terms? (1) YES (0) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.125, 0.0, 0.0, 1.0, 0.333, 88.

(18) Is there a general rule allocating the responsibility concerning incoming cases to specific members of the Competition office? (1) YES (0) NO,

(or does the Competition Officer have discretion on the allocation of cases?) (0) YES (1) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.193, 0.0, 0.0, 1.0, 0.397, 88.

(19) Do members of the executive have the power to give instructions to the competition office

(a) with regard to specific cases (0) YES ( ) NO,

(b) by issuing general guidelines (0,5) YES ( ) NO,

(c) not at all? (1) YES ( ) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.369, 0.0, 0.0, 1.0, 0.441, 80.

(20) Do members of the executive have the power to override decisions made by the competition office? (0) YES (1) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.494, 0.0, 0.0, 1.0, 0.503, 89.

(21) Does the competition office have to publish the economic rationale underlying its decisions? (1) YES (0) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.413, 0.0, 0.0, 1.0, 0.495, 92.

(22) If there is an office responsible for the implementation of the competition laws, is there more than one such office (as the Federal Trade Commission and the Antitrust Division of the Department of Justice in the U.S.) ( ) YES ( ) NO.

OFFEN

(23) Does the competition office have the competence to initiate proceedings by itself (1)?

Or does it depend on others to kick of proceedings ( )?

These are (a) the executive ( ) YES ( ) NO,

(b) the legislature ( ) YES ( ) NO,

(c) the judiciary ( ) YES ( ) NO,

(d) consumers ( ) YES ( ) NO,

(e) competitors ( ) YES ( ) NO,

(f) others, namely _____ ( ) YES ( ) NO.

six columns, each yes gets a "0,16"; a seventh column contains the sum of a-e.

Descr. Stats: mean, median, min, max, sd., obs.: 0.455, 0.52, -0.96, 1.0, 0.512, 92.

(24) What has been the effective average term length of Competition officers since the respective legal foundations have been passed? IN NUMBER OF YEARS_____

For coding, the number of years was multiplied by 0.05.

Descr. Stats: mean, median, min, max, sd., obs.: 0.144, 0.108, 0.0, 0.75, 0.168, 80.

(a) does it deviate from the average term length to be expected by the legal foundations? (0) YES (1) NO,

Descr. Stats: mean, median, min, max, sd., obs.: 0.413, 0.0, 0.0, 1.0, 0.496, 75.

(b) How many Competition officers have been removed from office before end of term? NUMBER_____

For coding, any positive number led to a zero-coding.

Descr. Stats: mean, median, min, max, sd., obs.: 0.468, 0.0, 0.0, 1.0, 0.502, 79.

(25) Has the income of Competition officers remained at least constant in real terms since 1990? (1) YES (0) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.429, 0.0, 0.0, 1.0, 0.498, 84.

(26) Has the budget of the competition office remained at least constant in real terms since 1990? (1) YES (0) NO.

Descr. Stats: mean, median, min, max, sd., obs.: 0.369, 0.0, 0.0, 1.0, 0.485, 84.

(27) Between 1990 and 2000, how many times have members of the executive given instructions to the competition office

(a) with regard to specific cases; number of times_____

Descr. Stats: mean, median, min, max, sd., obs.: 0.496, 0.8, 0.0, 1.0, 0.495, 73.

(b) by issuing general guidelines; number of times_____.

Please type in numbers as provided!

Descr. Stats: mean, median, min, max, sd., obs.: 0,468, 0.2, 0.0, 1.0, 0.488, 73.

(28) Between 1990 and 2000, how many times have members of the executive overridden decisions made by the competition office?_____times.

Please type in number as provided:

The answers were coded using the following table:

Number of changes	*Coding*
0	*1,0*

1-2	*0,8*
3-4	*0,6*
5-6	*0,4*
7-8	*0,2*
more	*0,0*

Descr. Stats: mean, median, min, max, sd., obs.: 0.5, 0.8, 0.0, 1.0, 0.492, 74.

(29) Have interested parties successfully referred to any of the goals spelled out in question four above in order to challenge decisions of the competition office in court *although they are not explicitly spelled out in competition law*? NO (1);

YES, namely:
(a) consumer protection ( ),
(b) technological progress ( ),
(c) enhanced efficiency ( ),
(d) international competitiveness ( ),
(e) export success ( ),
(f) small and medium enterprises ( ),
(g) business cycle stabilization ( ),
(h) employment concerns ( ),
(i) regional development concerns ( ),
(j) security of supply ( ),
(k) other _____( ).

Name all letters; then do y= 1 - 0,125x; x=number of crosses from a through k.

Descr. Stats: mean, median, min, max, sd:

(30) Assume a fairly complex merger case to be notified in your country.
From notification until the final decision of the highest court,
(a) how many months will pass on average _____

Please type in number as provided:

(b) how many months will pass if everything that can possibly go wrong goes wrong _____.

Please type in number as provided:

Descr. Stats: mean, median, min, max, sd:

General comments (please feel free to make any comment):

Appendix 2:

The Country Results for the 6 Indicators

Country	Formal Basis	Econ-app	De jure Ind.	De facto Ind.
Albania	**0,318**	0,791	**0,410**	
Angola	0,000	0	0,000	0,000
Argentina	**0,612**	0,666	**0,362**	**0,450**
Armenia	**0,595**	0,187	**0,500**	**0,230**
Australia	**0,620**	0,388	**0,592**	**0,872**
Austria	**0,322**	0,595	**0,523**	
Bangladesh	0,000	0	0,000	0,000
Belgium	**0,288**	0,75	**0,331**	**0,800**
Belize	0,000	0	0,000	0,000
Benin	0,000	0	0,000	0,000
Bolivia	0,000	0	0,000	0,000
Brazil	**0,664**	0,5	**0,581**	**0,903**
Bulgaria	**0,559**	0,583	**0,400**	**0,694**
Canada	**0,474**	0,666	**0,554**	**0,798**
Central African Republic	0,000	0	0,000	0,000
Chad	0,000	0	0,000	0,000
China	**0,115**	0,375	**0,238**	
Colombia		0,761	**0,692**	**0,642**
Congo, rep.	0,000	0	0,000	0,000
CostaRica	**0,360**	0,472	**0,542**	**0,814**
Croatia	**0,526**	0,694	**0,400**	**0,594**
Cuba	0,000	0	0,000	0,000
Cyprus	**0,086**	0,731	**0,350**	**0,819**
Czech Republic	**0,371**	0,916	**0,477**	**0,922**
Denmark	**0,404**	0,902	**0,508**	**0,944**
Dominican Republic	**0,333**	Na		
Ecuador	0,000	0	0,000	0,000
Egypt, arab rep.	0,000	0	0,000	0,000
ElSalvador	**0,333**	Na		
Estonia	**0,365**	0,233	**0,650**	**0,500**
Fiji	0,000	0	0,000	0,000
Finland	**0,343**	0,904	**0,650**	**0,969**
France	**0,313**	0,739	**0,564**	**0,663**
Gabon	0,000	0	0,000	0,000
Germany	**0,471**	0,7	**0,625**	**0,967**
Ghana	0,000	0	0,000	0,000
Greece	**0,287**	0,583	**0,55**	**0,421**
Guatemala	**0,333**	Na		
Guinea	0,000	0	0,000	0,000
Guyana	0,000	0	0,000	0,000
Haiti	0,000	0	0,000	0,000
Honduras	0,000	0	0,000	0,000
Hungary	**0,499**	0,972	**0,630**	**0,802**
Indonesia	**0,181**	0,785	**0,548**	**0,708**
Iran, islamic rep.	0,000	0	0,000	0,000
Ireland	**0,371**	0,638	**0,585**	**0,893**
Israel	**0,173**	0,85	**0,500**	**0,953**
Italy	**0,708**	0,611	**0,644**	**0,911**
Jamaica	**0,240**	0,142	**0,607**	**0,772**
Japan	**0,375**	0,821	**0,517**	**0,917**
Kazakhstan	**0,080**	0	**0,417**	**0,775**
Latvia	**0,243**	0,785	**0,577**	**0,636**
Lithuania	**0,702**	0,75	**0,625**	**0,781**
Madagascar	0,000	0	0,000	0,000
Malaysia	0,000	0	0,000	0,000
Mali	0,000	0	0,000	0,000
Mauritania	0,000	0	0,000	0,000
Mexico	**0,324**	0,476	**0,442**	**0,722**
Moldova	**0,333**	Na		
Morocco	**0,012**	0,809	**0,558**	**0,396**
Mozambique	0,000	0	0,000	0,000
Nepal	0,000	0	0,000	0,000
Netherlands	**0,474**	0,722	**0,417**	**1,000**
New Zealand	**0,454**	0,319	**0,485**	**0,550**
Nicaragua	0,000	0	0,000	0,000
Niger	0,000	0	0,000	0,000
Nigeria	0,000	0	0,000	0,000
Paraguay	**0,333**	Na		
Peru	**0,621**	0,642	**0,446**	**0,572**
Phillipines	**0,550**	Na	**0**	
Poland	**0,249**	0,816	**0,425**	**0,781**
Portugal	**0,561**	0,716	**0,438**	
Rwanda	0,000	0	0,000	0,000
Senegal	**0,154**	0,062	**0,636**	
Singapore	0,000	0	0,000	0,000
Slovakia	**0,663**	0,84	**0,525**	**0,678**
South Africa	**0,073**	Na	**0,769**	**0,813**
Spain	**0,453**	0,773	**0,692**	**0,933**
Switzerland	**0,664**	0,833	**0,446**	**0,939**
Syrian arab republic	0,000	0	0,000	0,000
Taiwan	**0,288**	0,25	**0,511**	**0,683**
Tajikistan	0,000	0	0,000	0,000
Tanzania	**0,238**	0,476	**0,624**	**0,867**
Thailand	**0,323**	0,214	**0,417**	
Togo	0,000	0	0,000	0,000
Tunisia	**0,038**	0,535	**0,483**	**0,806**
Turkey	**0,696**	0,357	**0,618**	**0,922**
Uganda	0,000	0	0,000	0,000
United Kingdom	**0,750**	0,833	**0,577**	**0,875**
Uzbekistan	**0,327**	0,333	**0,466**	**0,820**
Venezuela, rp	**0,577**	0,484	**0,500**	**0,638**
Vietnam	0,000	0	0,000	0,000
Yemen	0,000	0	0,000	0,000
Zambia	**0,154**	0,722	**0,460**	**0,822**
Zimbabwe	**0,023**	0,595	**0,457**	**0,714**

Descriptive Statistics for the Four New Indicators

	Formal Basis	Econ Approach	De jure Indpdce	De facto Indpdce
Mean	0.245	0.606	0.310	0.436
Median	0.239	0.667	0.417	0.550
Min	0.000	0.000	0.000	0.000
Max	0.750	0.972	0.769	1.000
Std Dev.	0.247	0.231	0.266	0.399

Comparison of Descriptive Statistics Missing Sample (Entire Sample)

	Min	Max	Mean	Median	Std.-Dev.
Solow Res	0.092 (0.051)	1.835 (1.835)	0.473 (0.459)	0.349 (0.361)	0.369 (0.330)
Staatsquote	6.294 (4.084)	49.794 (80.058)	21.144 (20.939)	21.067 (19.586)	10.021 (11.485)
Openness	22.143 (15.029)	230.821 (313.927)	76.773 (75.171)	69.801 (66.176)	39.644 (41.851)
Patents	0 (0)	6267 (287848)	415 (4501)	5,5 (6,5)	1361 (28749)
Inflation	-35.052 (-35.052)	49.422 (132.993)	-4.82 (-1.778)	-5.334 (-5.134)	13.919 (17.520)
Pol rights	1.000 (1.000)	7.000 (7.000)	3.250 (3.275)	3.000 (3.000)	2.110 (2.060)
Cvl liberties	1.000 (1.000)	6.000 (7.000)	3.313 (3.486)	3.000 (4.000)	1.554 (1.613)

List of Variables

Variable	***Description***	***Source***
Solow Residual	Calculation based on Hall and Jones (1999) as described in text; more recent data from Heston et al. (2002)	Hall and Jones (1999); Heston et al. (2002)
Average Government Consumption	Aggregate Government Expenditures of all Government tiers; Average for the period 90 -00	Heston et al. (2002)
Openness	(Exports + Imports)/ GDP	Heston et al. (2002)
Pop growth	Average population growth between 1980 and 1998	Heston et al. (2002)
Inflation	Average Inflation rate from	Heston et al. (2002)
Patents	Number of patents for invention granted by U.S. Department of Commerce distributed by country of origin; Sum of years 1993-1997	U.S. Department of Commerce (2005)
Political Rights	Measured on a scale from 1 to 7; 1 representing the highest degree of political rights; 1999.	Freedom House (1999/2000)
Civil Liberties	Measured on a scale from 1 to 7; 1 representing the highest degree of civil liberties; 1999.	Freedom House (1999/2000)
Government Effectiveness	Based on a number of survey indicators, this variable is based on responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies.	Kaufman et al. (2003)
Common Law	Dummy for Common law legal origin; Coded 1 for if legal origin is common Law, coded 0 if legal origin is any other	La Porta et. al. (1999)
Ethno-linguistic fractionalization 1960	Index of ethnolinguistic fractionalization, 1960. Measures probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group	Atlas Narodov Mira (1960)
Ethnic Fraction.	Index of ethnical fractionalization	Alesina et al. (2003)
Linguistic Fraction.	Index of linguistic fractionalization	Alesina et al. (2003)
Religious Fraction.	Index of religious fractionalization	Alesina et al. (2003)
Latitude	The absolute value of the Hall and Jones numbers; divided by 90.	Hall and Jones (1999)
Dummy EU	Dummy variable taking on a value of 1 if country is member of the EU, 0 if otherwise	

Table 1a:

OLS-Regressions of Solow Residuals (2000) on Competition Indicators and Economic Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.240(*) (1.936)				0.492* (2.106)			
Economic Approach		0.128 (1.217)				0.630* (2.516)		
De jure Indepen-dence			0.223(*) (1.680)				0.616* (2.456)	
De facto Independence				0.234* (2.384)				0.342* (2.532)
Gov.consumption	-0.014** (3.198)	-0.014** (3.012)	-0.013** (2.986)	-0.013** (2.886)	-0.010* (2.230)	-0.010** (2.732)	-0.009* (2.292)	-0.010* (2.413)
Openness	0.000(*) (1.666)	-0.001(*) (1.929)	0.001(*) (1.786)	-0.001(*) (1.990)	0.002** (3.681)	0.002** (3.778)	0.002** (3.828)	0.002** (3.857)
Popgrowth	2.751 (0.909)	0.739 (0.231)	1.693 (0.512)	2.092 (0.634)	0.050* (2.456)	0.049* (2.599)	0.051* (2.590)	0.051* (2.606)
Patents	1.54^{E}-06** (5.210)	1.71^{E}-06** (5.301)	1.77E-06** (5.873)	1.82E-06** (5.251)	1.66E-06** (6.092)	1.54E-06** (5.919)	1.61E-06** (5.964)	1.61E-06** (5.970)
EU-Dummy	0.247** (2.864)	0.214* (2.266)	0.231* (2.547)	0.154(*) (1.726)	0.302** (4.187)	0.274** (3.443)	0.277** (3.572)	0.272** (3.430)
Constant	0.526	0.559	0.508	0.470	0.346	0.161	0.257	0.307
Technique	OLS	OLS	OLS	OLS	TSLS	TSLS	TSLS	TSLS
$\overline{R}^2$	0.433	0.439	0.433	0.433	0.631	0.638	0.637	0.638
SER	0.241	0.243	0.244	0.240	0.211	0.209	0.209	0.209
F-Stat	11.427**	10.788**	10.785**	9.913**	20.07**	20.67**	20.63**	20.68**
J.-B.	3.215	2.154	3.532	2.255	2.585	2.068	2.261	2.047
N	83	76	78	71	68	68	68	68

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.

Table 1b:

OLS-Regressions of Solow Residuals (2000) on Competition Indicators and Economic Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.257* (2.321)				0.359 (1.220)			
Economic Approach		0.158 (1.573)				0.469(*) (1.856)		
De jure Indepen-dence			0.276* (2.273)				0.438 (1.586)	
De facto Independence				0.235** (2.785)				0.240(*) (1.687)
Gov.consumption	-0.012** (3.072)	-0.011** (2.980)	-0.010** (2.841)	-0.010** (2.811)	-0.012* (2.397)	-0.013** (3.090)	-0.012* (2.616)	-0.012** (2.781)
Openness	0.001(*) (1.920)	-0.001* (2.483)	0.001* (2.311)	-0.001* (2.399)	0.002* (3.208)	0.002** (3.294)	0.002** (3.312)	0.002** (3.317)
Patents	1.52E-06** (5.897)	1.80E-06** (6.551)	1.85E-06** (7.479)	1.88E-06** (6.395)	1.71E-06** (5.703)	1.58E-06** (5.354)	1.66E-06** (5.656)	1.65E-06** (5.615)
Inflation	-0.004** (2.864)	-0.004** (3.312)	-0.004** (3.294)	-0.004** (2.967)	-0.001 (0.186)	-0.001 (0.378)	-0.000 (0.049)	0.000 (0.066)
EU-Dummy	0.247** (3.563)	0.240** (2.992)	0.247** (3.250)	0.175* (2.223)	0.330** (4.088)	0.316** (3.923)	0.317** (3.901)	0.316 (3.875)
Constant	0.512	0.487	0.439	0.437	0.446	0.316	0.391	0.431
Technique	OLS	OLS	OLS	OLS	TSLS	TSLS	TSLS	TSLS
$\overline{R}^2$	0.479	0.496	0.499	0.495	0.586	0.594	0.591	0.591
SER	0.230	0.231	0.229	0.226	0.223	0.221	0.222	0.222
F-Stat	13.577**	13.290**	13.778**	12.439**	16.830**	17.36**	17.121**	17.165*
J.-B.	3.009	2.087	3.211	2.380	2.312	2.164	2.183	2.125
N	83	76	78	71	68	68	68	68

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.

Table 2a:

OLS-Regressions of Solow Residuals (2000) on Competition Law Indicators and Institutional Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.246* (2.138)				0.180 (0.696)			
Economic Approach		0.158(*) (1.672)				0.158 (0.506)		
De jure Independence			0.203* (1.792)				0.198 (0.656)	
De facto Independence				0.228** (2.645)				0.095 (0.570)
Political Rights	0.029 (0.972)	0.024 (0.734)	0.025 (0.796)	0.004 (0.130)	-0.026 (0.788)	-0.028 (0.856)	-0.027 (0.830)	-0.027 (0.838)
Civil Liberties	-0.088* (2.240)	-0.084(*) (1.948)	-0.085* (2.020)	-0.050 (1.137)	-0.048 (1.040)	-0.047 (0.982)	-0.046 (0.971)	0.047 (0.983)
EU-Dummy	0.217* (2.616)	0.195* (2.156)	0.214* (2.498)	0.147 (1.647)	0.401** (4.749)	0.406** (4.656)	0.399** (4.556)	0.402** (4.544
Constant	0.585	0.593	0.581	0.510	0.653	0.621	0.629	0.654
Technique	OLS	OLS	OLS	OLS	TSLS	TSLS	TSLS	TSLS
$\overline{R}^2$	0.340	0.344	0.346	0.322	0.479	0.477	0.479	0.478
SER	0.260	0.263	0.261	0.265	0.251	0.251	0.251	0.251
F-Stat.	13.260**	12.512**	12.926**	10.866**	17.771**	17.672**	17.75**	17.703**
J.-B.	2.75	2.997	2.372	3.086	16.214**	15.157**	16.208**	15.641**
N	96	89	91	84	74	74	74	74

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.

Table 2b:

OLS-Regressions of Solow Residuals (2000) on Competition Law Indicators and Institutional Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.105 (0.983)				0.143 (0.592)			
Economic Approach		0.004 (0.052)				-0.254 (0.892)		
De jure Independence			0.037 (0.403)				0.017 (0.059)	
De facto Independence				0.076 (1.115)				-0.023 (0.155)
Civil Liberties	0.000 (0.008)	0.005 (0.272)	0.006 (0.315)	0.0178 (0.897)	-0.006 (0.189)	-0.022 (0.811)	-0.012 (0.417)	-0.015 (0.519)
Government Effectiveness	0.212** (6.995)	0.233** (7.939)	0.231** (7.896)	0.236** (8.052)	0.166** (5.027)	0.175** (5.404)	0.167** (4.990)	0.168** (5.058)
EU-Dummy	0.045 (0.585)	0.063 (0.785)	0.058 (0.760)	0.010 (0.129)	0.257** (3.117)	0.304** (3.944)	0.275** (3.388)	0.283** (3.518)
Constant	0.426	0.414	0.403	0.356	0.444	0.661	0.495	0.520
Technique	OLS	OLS	OLS	OLS	TSLS	TSLS	TSLS	TSLS
$\overline{R}^2$	0.550	0.587	0.587	0.588	0.584	0.586	0.583	0.583
SER	0.214	0.209	0.208	0.205	0.224	0.224	0.224	0.224
F-Stat.	30.054**	32.330**	32.966**	30.585**	26.669**	26.842**	26.479**	26.488**
J.-B.	4.425	4.395	4.250	5.557(*)	18.021**	13.449**	15.603**	14.936**
N	96	89	91	84	74	74	74	74

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.

Table 3:

OLS-Regressions of Solow Residuals (2000) on Competition Indicators and Legal Origin Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.347** (3.005)				0.533** (4.509)			
Economic Approach		0.070 (0.698)				0.435** (4.279)		
De jure Indepen-dence			0.208(*) (1.798)				0.510** (3.892)	
De facto Independence				0.130 (1.370)				0.393** (4.240)
Latitude	0.614* (2.500)	0.802** (3.180)	0.744** (3.081)	0.778** (2.957)				
Ethnic Fractionalization	-0.157 (1.538)	-0.169 (1.418)	-0.156 (1.503)	-0.157 (1.403)				
EU-Dummy	0.172* (1.735)	0.151 (1.502)	0.150 (1.520)	0.087 (0.824)				
Government Consumption					-0.007(*) (1.766)	-0.006 (1.566)	-0.007 (1.654)	-0.005 (1.447)
Inflation					-0.000 (0.217)	-6.54E-05 (0.065)	-0.001 (0.528)	-0.000 (0.208)
Common Law Legal Origin	0.112(*) (1.830)	0.101 (1.582)	0.101 (1.574)	0.096 (1.424)	-0.125(*) (1.665)	0.0202 (0.219)	-0.084 (0.915)	-0.022 (0.245)
French Legal Origin					-0.167** (2.658)	0.007 (0.083)	-0.092 (1.133)	-0.030 (0.398)
German Legal Origin					-0.095 (1.013)	0.042 (0.391)	-0.039* (0.413)	-0.023* (0.307)
Socialist Legal Origin					-0.411** (5.933)	-0.247** (3.175)	-0.310** (4.006)	-0.259** (3.731)
Constant	0.267	0.274	0.247	0.262	0.681	0.479	0.577	0.492
$\overline{R}^2$	0.504	0.489	0.509	0.477	0.347	0.363	0.332	0.376
SER	0.233	0.242	0.236	0.240	0.260	0.261	0.266	0.254
J.-B.	0.940	0.932	1.432	1.662	3.317	1.209	1.366	0.904
N	79	73	75	69	94	87	89	82

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.

Table 5:

OLS-Regressions of Solow Residuals (2000) on Competition Indicators and Very Broad Institutional Controls

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***
Formal Basis of Comp. Law	0.149 (1.434)	0.112 (0.903)						
Economic Basis of Comp. Law (ECONAPP)			0.057 (0.704)	0.156(*) (1.666)				
De jure Indepen-dence					0.100 (1.003)	0.162 (1.350)		
De facto Independence							0.079 (1.091)	0.160(*) (1.911)
Government Effectiveness	0.208** (7.999)		0.227** (8.110)		0.227** (8.439)		0.215** (7.642)	
Economic Freedom (Heritage)		-0.236** (5.688)		-0.223** (5.440)		-0.230** (5.490)		-0.203** (4.782)
Inflation	-0.003* (2.283)	-0.003* (2.209)	-0.003* (2.439)	-0.003* (2.433)	-0.003* (2.568)	-0.003* (2.419)	-0.003* (2.622)	-0.003* (2.478)
Government Consumption	-0.003 (1.314)	-0.004 (1.553)	-0.002 (0.925)	-0.003 (1.197)	-0.002 (0.786)	-0.003 (1.206)	-0.002 (0.836)	-0.003 (1.161)
Constant	0.481	1.259	0.466	1.179	0.449	1.202	0.456	1.104
$\overline{R}^2$	0.584	.473	0.619	0.492	0.619	0.479	0.623	0.485
SER	0.207	0.233	0.201	0.232	0.200	0.234	0.196	0.229
J.-B.	5.406(*)	3.312	5.681(*)	2.432	5.243(*)	2.737	5.480(*)	1.588
N	95	94	88	87	90	89	83	82

The table contains ß regression coefficients, the numbers in parentheses are the absolute values of the estimated t-stats, based on the White heteroscedasticity-consistent standard errors. '**', '*' or (*) indicates that the parameter is significantly different from zero on the 1, 5 or 10 percent level; SER is the standard error of the regression and J. – B. the value of the Jarque-Bera-test on normality of the residuals.