

Economic Freedom in Terms of Kinds of Government Actions: An Empirical Investigation

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Abstract

This paper evaluates the Economic Freedom of the World Index on the basis of the Hayekian concept of freedom (Hayek 1960), more precisely on that of its conceptualization in terms of the character of government actions developed in Kapás and Czeglédi (2007a). As a result of a detailed criticism, the components of the EFW index are regrouped in freedom-related, policy and other categories. Although the EFW index is not considered a good measure of economic freedom, its components and the index itself are used in empirical investigations. In these examinations the aim is to show that using the freedom-related components of the EFW index (which is more in line with authors' concept of economic freedom) instead of the index itself may lead to even more plausible propositions than those provided by the EFW index. The results provide support for this argument.

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1. Introduction

During the past decade the concept of economic freedom, after being for a relatively long period a subject of little interest among economists, has attracted more attention. This is due to the emergence of indexes ranking countries according to a scale running from the least free to the freest. Now there exist two widely accepted indexes of economic freedom: the one developed by the Fraser Institute (Economic Freedom of the World Index, EFW index), and another constructed by the Heritage Foundation jointly with the Wall Street Journal (Index of Economic Freedom). These two indexes are quite similar in terms of what they consider as a plus and as a minus when measuring economic freedom.¹

Since the construction of these indexes researchers have been using them quite extensively in examining the effects economic freedom has on economic performance and on various measures of human welfare. So far a significant number of econometric papers have been accumulated. In another paper (Kapás and Czeglédi 2007b) we reviewed this literature and argued that this body of literature – by focusing on empirical examinations – completely neglects the discussion of what is precisely understood by economic freedom, the index of which they use so extensively. However, we think that the major problem is not that that this body of the literature is not based on a coherent theory of economic freedom, but that the concept of the researchers who came up with the index (Gwartney et al. 1996, Gwartney and Lawson 2003) is formulated in such a way as to serve first of all the purpose of measuring economic freedom.

These scholars define economic freedom as follows (Gwartney et al. 2001:4): “Individuals have economic freedom when the following conditions exist: (1) their property acquired without use of force, fraud or theft is protected from physical invasions of others; and (2) they are free to use, exchange, or give their property to another as long as their actions do not violate the identical rights of others.” Here the emphasis is on secure property rights, exclusively. However, elsewhere they broaden the concept (Gwartney and Lawson 2007:3): “The cornerstones of economic freedom are personal choice, voluntary exchange, freedom to

¹ The Fraser’s index includes five main areas, namely the extent of government intervention, the security of property rights and the rule of law, the stability of the monetary system, the burdens of international trade, and the extent of regulation on different markets. By breaking down each area into several components and subcomponents, it aggregates 38 separate categories of data (Gwartney and Lawson 2006:10, see Appendix A for the detailed description of the index). (The reason why we do not rely on the most recent EFW index will be explained in Section 3.) The Heritage’s index explicitly considers economic freedom as a composite concept encompassing various kinds of economic freedom (Kane, Holmes and O’Grady 2007). These are as follows: business freedom, trade freedom, monetary freedom, freedom from government, fiscal freedom, property rights, investment freedom, financial freedom, freedom from corruption, labor freedom.

compete, and security of privately owned property.” However, we believe that economic freedom is a concept in its own right, and as a result it cannot be conceptualized by simply adding various “good” things. Such a list can never be a theoretical concept.²

Accordingly, as opposed to the common criticism of the EFW index in the literature³, we will criticize it on conceptual grounds. Because of space limits, in this paper we will not develop an alternative means for the measurement of economic freedom; instead, by using the EFW index and its various components in our empirical investigations our aim is to highlight its weakness, and through it, to provide some first-hand evidence for our argumentation concerning how we propose to conceptualize economic freedom.

The paper is organized as follows. In Section 2 we will briefly summarize our concept of economic freedom based on Hayek (1960) and our categorization of government actions, which gives us some guidance about which government actions hurt and which do not hurt economic freedom. In Section 3 we will evaluate the EFW index from the viewpoint of our understanding of economic freedom. In Section 4 we will present some empirical findings. Section 5 concludes.

2. The concept of economic freedom and government actions

Our concept of economic freedom developed elsewhere (Kapás and Czeglédi 2007a) is based on Hayek (1960). Here our starting point is the view that, since state is inevitable (Holcombe 2004, Benson 1999, Olson 1993, 2000)⁴, economic freedom should be interpreted under the existence of a state (government). Bearing in mind that state has a monopoly over coercion, and accordingly remains the primary threat to freedom, the crucial concept for making sense of freedom is coercion.

Clearly, freedom does not mean a total absence of coercion but the question is what kind of coercion we tolerate. History shows that institutionalized coercion by private (nongovernmental) parties is almost never tolerated, but we tolerate governmental coercion (Klein 2007). Why do we tolerate infringements of property and liberty rights by the

² Of course, when trying to measure economic freedom, we may draw up a list of its constituting parts as a proxy for measurement. But proxies are different from concepts.

³ The most common critiques refer to the weighting system the indexes use, what items should be included and how various policy issues should be handled (e.g., Macleod 2005, Karlsson 2005). While our concept of economic freedom, which we will explore below, by its nature excludes some of these problems, we have to admit that the weighting problem still remains. The reason why we will not deal with that is the fact that this is a second order problem. That is, it emerges only after the establishment of a conceptually well founded measure of economic freedom. Here we do not want to confuse these two separate problems.

⁴ For a critique see Leeson and Stringham (2005).

government? The answer is that coercive power of the state is useful when it protects our lives and property from outside (private) coercion.⁵ However, not all means are appropriate in order to assure the greatest possible freedom, the only acceptable means is enforcing general abstract rules known beforehand.⁶ “Freedom demands no more than that coercion and violence, fraud and deception, be prevented, except for the use of coercion by the government for the sole purpose of enforcing known rules intended to secure the best conditions under which the individual may give his activities a coherent, rational pattern” (Hayek 1960:144).

To sum up, not all kinds of coercive governmental actions are to be condemned, instead it is in our interest to tolerate some kinds of coercion. Accordingly, the major question is in which field(s) government monopoly over coercion is allowed and what kinds of governmental actions are not harmful to (economic) freedom. This implies that economic freedom relates to the character, rather than the size of government actions, which relates in its turn to the issue of efficiency, and these two do not necessarily overlap. This implies that, as opposed to what is suggested in a large part of the literature, the concept of “limited government” should not refer to the size of the government *per se*, but rather, to in what fields the state exercises its coercive power.⁷

Thus we proposed elsewhere (Kapás and Czeglédi 2007a) to conceptualize economic freedom in terms of the character of government actions. We distinguished, on the one hand, between coercive and non-coercive governmental actions, and on the other hand, between two kinds of coercive activities, those that are compatible with economic freedom (freedom-compatible coercive activities) and those that are not (freedom-non-compatible coercive activities). Based on what was said above, it is clear that only coercive activities concern economic freedom.

Non-coercive government activities, referred to as services by Hayek (1960, 1973), by definition, do not concern economic freedom, while they influence the size of the government. These include on the one hand those government actions that by providing the means for a better execution of individuals’ plans are necessary for a favorable institutional

⁵ As Hayek (1960) argued, a paradox is that the only means whereby the state can prevent the coercion of one individual by another is the very threat of coercion, i.e., the only way to prevent one coercion is by the threat of another one.

⁶ Friedman (1962:15) also supports this view: “...government is essential both as a forum for determining the ‘rules of the game’ and as an umpire to interpret and enforce the rules decided upon”.

⁷ It is worth noting that this serious confusion of two economic criteria, namely economic freedom and efficiency in the literature (among others Carlsson and Lundström 2002, Dawson 1998, 2003, De Haan and Siemann 1998, De Haan and Sturm 2000, Grubel 1998, Gwartney et al. 2004, 2006, Scully 2002, for an overview of the literature see Doucouliagos and Ulubasoglu 2006) is the result of a lack of a coherent understanding of the way economic freedom affects growth.

framework for individuals' free acts (e.g., various official governmental statistics and information, national security), and on the other hand there are those where the government is only one of the (many) providers of goods and services. Of course, nothing guarantees that government provides these services in an efficient way, but as mentioned above, arguing against the government on the grounds of efficiency, which is a criterion in its own right, is different from arguing against it on the grounds of economic freedom.

As regards the coercive activities of a state, we proposed to differentiate between freedom-compatible and freedom-non-compatible coercive activities. The former, being predictable, are compatible with the functioning of the market because they allow individuals to make plans and realize them on the market. The essential thing is that these government activities can be accounted for. These include, on the one hand, those activities that are necessary implications of the monopoly over coercion (enforcement of contracts and property rights, etc.), and on the other hand, those that encompass general rules and regulations laid down beforehand conforming to the rule of law (e.g., laws, work safety and health regulation, etc.).

Freedom-non-compatible government actions include three kinds of actions. The first is controls such as price, quantity and wage control. Clearly, these coercive activities of the government represent the kind of infringement of the individual's private sphere which is an obstacle to individuals freely contracting with each others. So do, besides these regulations, all kinds of government monopolies for those goods and services which could be otherwise provided on a competitive basis. The third type of freedom-non-compatible coercive activities is government subsidies to particular firms (private or state) and various transfers which arbitrarily differentiate between agents. Transfers and subsidies should be seen as coercive actions because those who get particular subsidies are forced to behave not according to their plans but according to the government's will.

On the basis of the above categorization schema of governmental actions, the extent of economic freedom can be reduced from two sides: (1) by the deviation from an *ideal* of the rule of law (freedom-compatible government activities), and (2) by freedom-non-compatible government activities.

3. A critique of the EFW index

In what follows in the context of the above framework for an understanding of government actions we will summarize the most important critiques we level against the EFW index. As

will be clear, this index is not in harmony with our concept of economic freedom; rather, it embodies some contradictions between our theoretical notion and what is measured.⁸

First of all, as we made clear in our framework economic freedom is crystallized in various institutions. In this light, we find it problematic that the EFW index contains economic policy variables, too. From our theoretical viewpoint the EFW index is more specific than we would need in order to measure economic freedom, because it measures the content of economic policy, too, and only that of particular institutions. This objection against policy variables in the index comes from our theoretical framework; however, we think one can have objections in principle as well: it is not obvious that mixing economic policy variables with more stable, institutional variables makes sense at all.⁹

In addition, incorporating economic policy variables into the index seems to suggest us that “good” policy is seen as a synonym for rule-following. Of course, it may be true that following rules will lead to “better” policies than otherwise, but it is one question whether the government follows rules and another whether the policies it applies are “good”. In fact, a government that does not abide by rules in general can also follow “good” policies. Accordingly, one should separate the content of economic policy from the way this economic policy is practiced.

Moreover, as we have already emphasized in many instances the issue of economic freedom is theoretically different from that of efficiency, although these two may overlap, of course. While economic policy may (and probably should) be questioned on the grounds of efficiency (fairness or justice), in many cases it cannot in itself be questioned on the grounds of economic freedom. By this argument we are not proposing that the content of economic policy is not important; on the contrary, it is extremely important, but from the perspective of economic efficiency. To sum up, simply because the EFW index is also concerned with the question of which or what kinds of policies are “good” for economic growth it should be seen

⁸ It is worth noting that De Haan and Sturm (2000) also provide a detailed, component-by-component critique of the index. The components the inclusion of which they debate are partly similar to those we exclude from the circle of freedom-related components (see Table 1, first column). More precisely, they doubt that the level of taxes, government spending, or inflation should be included in an index of economic freedom. But they do not base their critique on a well-articulated theory of economic freedom, nor on a well-articulated theory of how economic freedom affects growth. And of course, their approach is not a Hayekian one. We consider the overall criticism against the EFW index of these two leading scholars of the economic freedom literature an important one, which is in many points in accordance with our objections, which provides some support for our theoretical approach, too.

⁹ When looking at this problem from the perspective of growth regressions, we can come to the conclusion that there are several problems with such a method. First, it does not provide answers for some of the most important normative and positive questions (Rodrik 2005). Second, good policies and good institutions move together across countries, which leads some researchers to say that economic policies do not have any effect on growth beyond institutions, or the institutions define the economic policy that is followed in the long run.

as a good measure of economic freedom. It follows that an index which has eliminated policy variables measures economic freedom more accurately.

Our second criticism concerning the EFW index concerns taxation. According to Gwartney et al. (1996:29-30), government taxes reduce economic freedom: “When a government plays favourites – when it takes from one group in order to make transfers to others or when it imposes the costs of public services disproportionately on various groups – the government becomes an agent of plunder.” This is, in our view, a Rothbardian view of taxation (Rothbard (1962[2004]): taxation is theft, pure and simple.¹⁰ However, this view, taken implicitly by the EFW index, is in contradiction with another assertion of Gwartney et al. (1996:22), namely that “there are two broad functions of government that are consistent with economic freedom: (1) protection of individuals and their property against invasions by intruders ..., and (2) provision of a few selected goods – what economists call public goods”. Having in mind these two acceptable functions of a government, the question arises of how these are financed. The only way, of course, is taxation. So the problem is that while the EFW index admits that some governmental functions do not violate economic freedom, it considers their financing via taxation as a violation of economic freedom.

Our viewpoint, based on our theoretical framework, as regards taxation is the following. The necessary governmental functions, in our terminology the freedom-compatible coercive actions (and non-coercive actions), must be financed via taxation. Accordingly, taxes that aim to finance these actions do not violate economic freedom. However, the question of how much tax revenue the government needs in order to finance the freedom-compatible coercive actions (and non-coercive actions) is a matter of efficiency, not of economic freedom. Moreover, freedom-compatible actions are not the only ones; as we made it clear above, freedom-non-compatible government actions by definition reduce economic freedom. The reason why taxes for financing these actions should not be incorporated into the index is that this would be duplication. Clearly, the EFW index cannot avoid the problem of duplication by taking into account both taxes and those (freedom-non-compatible) components (e.g., various controls) that reduce economic freedom.

To provide evidence for the assertions, in Table 1 we categorize the variables of the EFW index according to whether they measure economic freedom in the sense we developed it.¹¹

¹⁰ Clearly, here the maximum of economic freedom means no state. As Rabushka (1991) argues, since every country has some state interference, a rating scheme based on Rothbard (1962[2004]) is more utopian than practical.

¹¹ In our analysis we rely on the EFW index of Gwartney and Lawson (2006), and not the most recent one (Gwartney and Lawson 2007). The reason for this is that the GDP data which we need for the regression analysis

For this, we determined for each particular component whether (1) it represents freedom-compatible coercive activities or freedom-non-compatible coercive activities, because, by definition, both concern economic freedom; or (2) it refers to economic policy; or (3) it is not possible to decide between (1) and (2).

| Components concerning economic freedom “Freedom-related” components | Components not necessarily concerning economic freedom “Other” components | Components concerning economic policy “Policy” components |
|--|--|--|
| <ul style="list-style-type: none"> 1. B. Transfers and subsidies as a percentage of GDP 2. A. Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes 2. B. Impartial courts: a trusted legal framework exists for private businesses to challenge the legality of government actions or regulations 2. C. Protection of intellectual property 2. D. Military interference in the rule of law and the political process 2. E. Integrity of the legal system 3. D. Freedom to own foreign currency bank accounts domestically and abroad 4. B. Regulatory trade barriers 4. D. Difference between official exchange rate and black-market rate 4. E. International capital market controls 5. C. Business regulations | <ul style="list-style-type: none"> 1. C. Government enterprises and investment as a share of total investment 4. A. Taxes on international trade 4. C. Actual size of trade sector compared to expected size 5. A. Credit market regulations 5. B. Labor market regulations | <ul style="list-style-type: none"> 1. A. General government consumption spending as a percentage of total consumption 1. D. Top marginal tax rate (and income threshold at which it applies) 3. A. Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years 3. B. Standard inflation variability during the last five years 3. C. Recent inflation rate |

Table 1. Components of the EFW index according to their relevance to economic freedom

in Chapter 6.3 is not available for the years after 2003, and the new EFW index is not calculated back to years before 2004. However, using the old index does not attenuate our main propositions which we will develop in Chapter 6.3. On the contrary, we think if our propositions hold with the old index they would hold to an even greater extent with the new index because the new index contains the same policy components as the old one, and among the freedom-related components we find two additional sub-components in area 2 and three additional sub-components in 5.C. The remaining modifications in the index will not change our categorization of the components. So, in all likelihood, the components referring to the rule of law would have a greater weight, as would business regulation (5.C.), an approach which is more in line with what we will be arguing.

The first group of components consists of those components that embody coercive government actions, and consequently, do concern economic freedom (“freedom-related” components). Amongst them we can find components that refer to freedom-compatible coercive actions. These are the listed components of Area 2, which measure the quality of the rule of law. The remaining components belong to freedom-non-compatible coercive activities, and accordingly reduce economic freedom. Above we referred to these as controls (3.D., 4.B., 4.D, 4.E., 5.C.) and transfers and subsidies (1.B.).

In the second column there are those components of the index that capture only the result of certain governmental or regulatory activities without referring to the way they are executed (“other” components). Consequently, they cannot be measures of economic freedom without further qualification.

Certain measures of the size of government fall into this category, such as the scope of public property. As far as government enterprises are concerned (1.C.), the question of public versus private ownership is, of course, of great importance for efficiency, but to know whether it has something to do with economic freedom, we would have to have more information about the way public ownership is formed. We would have to know whether these state owned enterprises are monopolies.

The other four components (4.A., 4.C., 5.A., 5.B.) in this column are those which have at least one such sub-component that can not be said to measure the reduction in economic freedom. For instance credit market regulations (5.A.) cannot be clearly categorized in the first (freedom-related) column because some of its sub-components (ownership of banks, extension of credit) refer to the size of the private sector in banking, which is important, but does not necessarily tell us anything about economic freedom (see above), while other sub-components which evaluate credit and interest rate controls, of course, refer to a reduction of freedom.

In the third column we listed those components of the index which do not measure economic freedom; rather, they measure the content of policy and whether the government follows “good” policies (“policy” components). The level of government spending (1.A.), and of taxes (1.D.) are such kinds of measures. As we have seen, government spending in itself does not have much to do with economic freedom, because it does not exclusively concern coercive activities, although it has a lot to do with efficiency. As far as taxes are concerned (1.D.), we explained our position above.

The last three components in this column focus on monetary policy (3.A., 3.B., 3.C.). There is no question that bad monetary policy and inflation can cause great social efficiency

losses, but, again, reducing efficiency is not reducing freedom. These measures do not necessarily signal that monetary policy is conducted on the basis of certain rules. Even the growth of the money supply does not tell us whether the fact that the money supply did not grow very fast was the result of a rule or just an accidental event in an arbitrary monetary policy.

In sum, the mere fact that a particular country follows different economic policy compared to another country does not imply that the two countries differ in terms of economic freedom, even if the economic policy of one country may be “better” (more efficient).

As shown above there are three major problems with the EFW index: it aggregates policy variables that can be evaluated on the basis of the criterion of efficiency with institutional variables that can be evaluated on the basis of the criterion of economic freedom, numerous components do not necessarily refer to economic freedom, and there is a duplication through incorporating taxation. These shortcomings clearly point to the fact that the construction of the index itself was largely driven by empirical considerations, as we argued in the introduction.

4. Empirical analysis: the effect of freedom-related and policy measures on income in a cross-section of countries

At first glance it may seem a contradiction that while arguing that the EFW index is not to be regarded as a good measure of economic freedom as we understand it, we use this index in empirical investigations. We do however have good reasons for this. First, we have created three categories of components of the EFW index and we will use these three measures in our analyses. Since the separation of the components is based on our theoretical framework, and this in itself serves to accentuate our argumentation, the possible favorable empirical findings serve to underpin our theory. Second, a possible way of providing a more solid foundation for our argumentation is to compare empirical results based on the EFW index with those based on those components of the index which we argue are more in line with our understanding of economic freedom.

In conducting our empirical investigations we will use the same model that is used in the economic growth literature, which is a neoclassical framework for analyzing how various variables affect economic growth. Relying on the same model will make our results comparable with those of the literature.

More precisely we will investigate whether the different categories¹² of the EFW index have different effects on economic growth or income. Our hypothesis is that the freedom-related components of the EFW index could be seen as rough measures for economic freedom, probably better, or at least not worse, than the original index itself. Clearly, this kind of empirical analysis is not directly about what economic freedom means; such an empirical investigation is impossible. However, based on our results we will be able to provide an answer to the question of why economic freedom affects income, which is somewhat disputed in the empirical literature on economic freedom (see Kapás and Czeglédi 2007b). More precisely, we will be able to point to an alternative ‘channel’ through which economic freedom affects income, one which is not identified in the literature. And as we argued elsewhere (Kapás and Czeglédi 2007a), an explanation for how economic freedom affects growth is an issue that is part of the theory of economic freedom.

4.1. The model of Mankiw, Romer and Weil (1992)

We will use the Mankiw, Romer and Weil (1992) specification to examine how the freedom-related and policy components of the EFW index affect growth, as compared to the EFW index itself. Mankiw, Romer and Weil (1992) estimates a human capital augmented Solow-model, in which human capital is treated very similarly to physical capital.¹³ Thus the production function becomes

$$Y = F(K, H, AL) = K^\alpha H^\beta (AL)^{1-\alpha-\beta}, \text{ where } \alpha + \beta < 1 \quad (1)$$

In the equation Y means real GDP, K is physical capital, H is human capital and AL is effective labor.

Assuming that human capital is accumulated in a similar way to physical capital, and making some algebraic manipulation with the model, we arrive at the following final testable equation for the steady state per capita income:

$$\ln\left(\frac{Y}{L}\right) = \ln(A_0) + gt + \frac{\alpha}{1-\alpha-\beta} \ln(s_k) + \frac{\beta}{1-\alpha-\beta} \ln(s_h) - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+\delta) \quad (2)$$

where s_k and s_h are the rates of savings (investment) in physical and human capital respectively, and $A_t = A_0 e^{gt}$ is the level of labor-augmenting technology increasing with a

¹² We dropped the ‘others’ category because this measure cannot give us enough information about whether the actions they measure concern freedom.

¹³ This method is frequently used in the economic growth literature, and in the literature on economic freedom and growth as well. See e.g., Heitger (2004), Easton and Walker (1997).

constant rate (g). In addition, n is the growth rate of population (work force) and δ is the rate of amortization of physical and human capital.

In a given year the first two terms on the right hand side are constant (e.g., $t=0$), and, as Mankiw, Romer and Weil did, we also suppose that the constant is subject to country specific shocks. This assumption, together with the one claiming that savings in human and physical capital are independent of these shocks, make it possible to estimate the above equation with ordinary least squares.¹⁴

4.2. Data and sample

As follows from the above equation we need data for GDP per capita, investment in physical and human capital, and population growth. Our source for GDP per capita, investment and population is the Penn World Table of Heston, Summers and Aten (2006). Although the database covers the years from 1950 until 2004, GDP data for a large number of countries is not available for 2004. Thus, we will use the GDP data for 2003, and we use the real GDP data based on purchasing power parity and a chain link method. We measure population growth as the (geometrical) average growth rate of the whole population between 1980 and 2003. Data on investment as a share of GDP comes from Heston, Summers and Aten (2006) as well, and represents the average rate between 1980 and 2003.

Our source of data on human capital investment is the database on different schooling measures of Barro and Lee (2001)¹⁵. This database provides educational data for 5 year intervals between 1960 and 2000. In our regressions investment in human capital is proxied by the average years of secondary schooling between 1980 and 2000 in the whole population beyond the age of fifteen.¹⁶

¹⁴ Note that there is an alternative specification to the equation (2), which includes the level of human capital instead of its investment rate (Mankiw, Romer and Weil 1992:418). Our results, for two reasons, do not depend on which specification we use. First, we do not intend to test the validity of the “neoclassical” model; that is, we do not apply parameter restrictions. Second, the literature is unclear as to whether the usual educational variables should be used as a proxy for the level of, or the investment in, human capital (see footnote 15).

¹⁵ Available at <http://www.cid.harvard.edu/ciddata/ciddata.html>.

¹⁶ In using secondary education as a proxy for human capital formation we follow the tradition of the literature inspired by Mankiw, Romer and Weil (1992), and Barro (1991). The papers using the method outlined in the text (such as Heitger 2004, or Easton and Walker 1997) also use secondary education for this purpose. It is clear however that there are serious concerns about using average years of different kinds of formal education as proxies for human capital investment as elaborated by Dinopoulos and Thompson (1999). On the other hand, Földvári and Leeuwen (2008) argue that average years of education is a proxy of the growth rate of the human capital stock, rather than that of the stock itself. For reasons mentioned in footnote 13 this debate does not have much to do with our conclusions. In addition, we ran the same regressions as those in the text by using primary and higher education, and average years of education in the total population, and the results are very similar to those that we achieved with the secondary school variable.

We decided to choose 1980 as the initial year, because EFW index data is very scarce for the years before this. In what follows we will examine the effect of our freedom-related and policy measures on income by adding these measures to the Mankiw-Romer-Weil (1992) equation described above. In this way we follow the work of Easton and Walker (1997). Since we disaggregate the aggregate EFW (chain-linked) index, we face more data limitations.

In the sample those countries are included which have data for our freedom-related and policy variables constructed in the way described in the Appendix B. The availability of human capital data places some more limitations on the database and, in some cases, so does the availability of GDP data. Eventually we arrived at a sample of 84 countries.¹⁷

4.3. Results for the freedom-related and policy measures

In our first regression analysis we want to show that our freedom-related measure has a positive relationship with income, and we would like to compare its effect with that of the policy variable. To reach this goal, we run regressions for three equations: (1) for the original Mankiw-Romer-Weil (1992) equation, (2) for the equation with the EFW index, and (3) for an equation in which we substitute the EFW index with our freedom-related and policy measures. Thus, the three equations to estimate are:

$$\ln(\text{GDP})_i = \text{const} + \alpha_1 \ln(\text{I/GDP})_i + \alpha_2 \ln(\text{SCHOOL})_i + \alpha_3 \ln(n_i + g + \delta) + u_i, \quad (3)$$

$$\ln(\text{GDP})_i = \text{const} + \pi_1 \ln(\text{I/GDP})_i + \pi_2 \ln(\text{SCHOOL})_i + \pi_3 \ln(n_i + g + \delta) + \pi_4 \ln(\text{EFW})_i + v_i \quad (4)$$

$$\ln(\text{GDP})_i = \text{const} + \gamma_1 \ln(\text{I/GDP})_i + \gamma_2 \ln(\text{SCHOOL})_i + \gamma_3 \ln(n_i + g + \delta) + \gamma_4 \ln(\text{FR})_i + \gamma_5 \ln(\text{Pol})_i + e_i \quad (5)$$

The variables refer to those defined above: I/GDP is the share of investment within GDP, SCHOOL is the average years of schooling, n is the average growth of population, EFW is the original (chain-linked) EFW index, while FR is the measure of freedom-related activities and Pol is our policy variable, while u_i , v_i , and e_i are the error terms. In addition, $g+\delta$ is assumed to be 0.05 as in Mankiw, Romer and Weil (1992).

The results for these equations are presented for our sample of 84 countries in Table 2. These results, on the one hand, reaffirm the results of various papers (e.g., Heitger 2004), and

¹⁷ Because of the lack of GDP data we had to drop Haiti and Myanmar. As usual in growth regressions, oil exporting countries (Bahrain, Iran, Kuwait and Venezuela) are excluded. In the case of the Republic of Congo, there are only four observations of the schooling variable, and so we took the mean of these four (as opposed to the five observations with the other countries).

on the other hand, they add some additional insights. They reaffirm that investment in both kinds of capital and population growth is significant, and that the former two coefficients range somewhere between 0,5 and 1 in the original Mankiw-Romer-Weil – equation, while that of the population growth plus the rate of technological change and amortization is well above one (with a negative sign). As compared to Heitger’s result our coefficient (see Table 2) is even larger (above two), which may be attributable to the fact that we use the growth rate of the overall population instead of that of the working age population.

| | 1. | 2. | 3. | 4. | 5. | 6. |
|---------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Constant | 0.183 (0.13) | -1.208 (-0.95) | 0.357 (0.25) | 0.076 (0.06) | 0.219 (0.16) | 0.022 (0.02) |
| ln(I/GDP) | 0.526 (3.12) ^a | 0.312 (1.90) ^c | 0.365 (2.35) ^b | 0.372 (2.40) ^b | 0.529 (3.09) ^a | 0.368 (2.46) ^b |
| ln(SCHOOL) | 0.639 (6.71) ^a | 0.525 (6.27) ^a | 0.495 (5.45) ^a | 0.492 (5.50) ^a | 0.638 (6.63) ^a | 0.493 (5.59) ^a |
| ln(n+g+δ) | -2.595 (-4.70) ^a | -2.268 (-5.00) ^a | -2.247 (-4.77) ^a | -2.280 (-4.86) ^a | -2.596 (-4.65) ^a | -2.278 (-4.91) ^a |
| ln(EFW) | | 1.666 (3.53) ^a | | | | |
| ln(FR) | | | 0.906 (4.18) ^a | 0.913 (4.30) ^a | | 0.913 (4.34) ^a |
| ln(Pol) | | | -0.107 (-0.33) | -0.039 (-0.16) | -0.026 (-0.10) | |
| SD(Pol) | | | -0.035 (-0.37) | | | |
| R ² | 0.816 | 0.851 | 0.861 | 0.860 | 0.816 | 0.860 |
| adj. R ² | 0.810 | 0.844 | 0.850 | 0.851 | 0.807 | 0.853 |
| AIC ¹⁸ | 127.468 | 111.589 | 110.344 | 108.465 | 129.456 | 106.503 |
| N | 84 | 84 | 84 | 84 | 84 | 84 |

Table 2. Results for equations (3), (4) and (5)

Heteroskedasticity robust t-statistics are in parentheses. Letters in the upper index refer to significance: a: significance at 1 percent, b: 5 percent, c: 10 percent. T-values without an index mean that the coefficient is not significant even at the 10 percent level.

As regards our results one interesting thing is that the coefficient of the EFW index (ln EFW, in column 2) is much higher than for example in Easton and Walker (1997), whose estimation is less than one (0.61, Easton and Walker 1997:331). Our result implies that a country that has a one percent higher EFW index than another one which has otherwise the same characteristics concerning investment in human and physical capital and population growth, will have about 1.67 percent higher per capita GDP. However, this estimation does not seem to be exaggerated when compared with the results in Gwartney and Lawson

¹⁸ Akaike Information Criterion. Note that this criterion cannot be used to compare the specification of column 2 with those of columns 3-6, because the variable Ln(EFW) includes the variables ln(FR) and ln(Pol).

(2004:42).¹⁹ Thus, this difference may be due to the difference in the sample, and the time span.

The estimation of equation (5) (columns 3-6) gives some new results in addition to the previous ones. Our results with the freedom-related measure turned out to be significant with the expected sign. In addition, the coefficients of the two investment variables become smaller which means that economic freedom has a direct and indirect effect as well, and the latter works through capital accumulation (and this indirect effect makes the coefficients smaller in columns 2, 3, 4 and 6 as opposed to those in column 1). Based on our results we can conclude that the equation in column 6 is the most appropriate specification of the four (columns 3-6).²⁰ From a theoretical standpoint this means that the Mankiw-Romer-Weil model augmented with our freedom-related measure provides the best explanation for the end-of-period income among the six models.

Another striking feature of the results (see Table 2) is that the coefficient on the EFW index is not lower than that of our freedom-related measure. Thus, holding all the other variables constant, the direct effect of institutions and policies incorporated in the EFW index is greater than that of the freedom-related measure. However, since the other coefficients have changed as well, this refers only to the direct effect. At first glance this may seem to be surprising, since we have been arguing for the importance of freedom-related institutions, but this result does not contradict what we are saying. First, our argument was about what we mean by economic freedom, not about the effect of economic freedom on growth. Second, this result does not indicate the unimportance of freedom-related institutions. Instead, it shows that there are other components within the EFW index which move together with income.

However, these latter components are not those which we associated with policy as shown in column 3-5. The policy variable is insignificant, and it does not seem to have an indirect effect either, because the coefficients of the other variables do not change after adding the policy variable. Surprisingly, these results do not change substantially when including a measure for the variability of economic policy (Table 2, column 3): in this case, both the policy measure and its standard deviation expressing the volatility of economic policy are insignificant, although the latter has the “expected” sign. This is, we think, attributable to the fact that our policy variable as well as its standard deviation masks systematic relationships

¹⁹ They apply a different specification, where the index is included in square. For example in the case of Spain their results would imply that a one percent change in the EFW will lead to a more than two percent change in per capita GDP.

²⁰ This conclusion is confirmed formally by looking at adjusted R² and the Akaike Information Criterion AIC.

behind the data: a country with a steadily rising score for economic policy can have the same standard deviation as a country with a drastically oscillating one.

Having said that, it seems to be straightforward to investigate whether separating policy variables into fiscal and monetary policy lets us draw some more telling conclusions about the effect of economic policy. However, Table 3, which shows the result for an equation which is the same as equation (5), with the exception that we replaced the policy variable with its two subcomponents (fiscal and monetary policy), does not tell us more than the results in Table 2 do. Column 1 in Table 3 is the same as column 6 in Table 2, and then we add the two policy variables in columns 2-4. As is clear, neither of them is significant statistically, irrespective of whether they are added separately or together. What is more, fiscal policy has the “wrong” sign, showing that richer countries have a lower score for fiscal policy; however this relationship is insignificant (the p-value of the fiscal policy variable in column 4 is 0.459).

| | 1. | 2. | 3. | 4. |
|---------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Constant | 0.022 (0.02) | 0.443 (0.33) | -0.003 (-0.00) | 0.409 (0.30) |
| ln(I/GDP) | 0.368 (2.46) ^b | 0.373 (2.50) ^b | 0.360 (2.38) ^b | 0.365 (2.41) ^b |
| ln(SCHOOL) | 0.493 (5.59) ^a | 0.485 (5.43) ^a | 0.492 (5.58) ^a | 0.485 (5.42) ^a |
| ln(n+g+δ) | -2.278 (-4.91) ^a | -2.190 (-4.44) ^a | -2.261 (-4.76) ^a | -2.177 (-4.35) ^a |
| ln(FR) | 0.913 (4.34) ^a | 0.896 (4.15) ^a | 0.910 (4.33) ^a | 0.894 (4.15) ^a |
| ln(fiscal) | | -0.105 (-0.79) | | -0.102 (-0.74) |
| ln(mon) | | | 0.051 (0.37) | 0.0453 (0.34) |
| R ² | 0.860 | 0.861 | 0.861 | 0.862 |
| adj. R ² | 0.853 | 0.852 | 0.852 | 0.851 |
| AIC | 106.503 | 107.903 | 108.335 | 109.770 |
| N | 84 | 84 | 84 | 84 |

Table 3. Results for the equations with policy subcategories

Heteroskedasticity robust t-statistics are in parentheses. Letters in the upper index refer to significance: a: significance at 1 percent, b: 5 percent, c: 10 percent. T-values without an index mean that the coefficient is not significant even at the 10 percent level.

The insignificance of the policy variable may, at first glance, seem to be puzzling even in our framework: while we argue that the content of economic policy does not affect economic freedom, it matters from the viewpoint of economic efficiency, and through efficiency it could affect income. However, we think the mechanism through which policy may influence income is not so simple: economic policy affects income only when various institutional arrangements are also in place and support the policy. If so, this underpins our argument that,

primarily, it is the freedom-related institutions that have an impact on income, and policy alone does not.²¹ This is not to say that efficiency or economic policy is not important in economic growth. But it is to say that economic freedom is the first order determinant. Government actions that are in accordance with the criterion of efficiency, but are not in accordance with the criterion of economic freedom, will not generate economic growth in the long run.

It must be noted, however, that our definition of what belongs to the area of economic policy is constrained by the EFW index, that is, the index itself does not necessarily contain all elements of economic policy. Thus our economic policy category may not include every aspect of what is usually deemed to be a “country’s economic policy”. We see, for instance, the principal role that economic policy can play not in seeking to improve outcomes by direct interventions, but in seeking to improve the institutions through which the outcomes emerge, where “improvement” means to better enable the individuals to advance their own purposes (see also Vanberg 2005:36, 38).

In sum, the above points to the fact that only those “good” policies affect income which are accompanied with “good” (freedom-related) institutions. That is, we do not put the polity in the center of our explanation of the growth process. It is not very much debated what one means by sound economic policy, but low inflation and a balanced budget will not lead to economic growth if these are not embedded in the institutions of economic freedom in which entrepreneurship has the possibility to be productive and to play that dynamic role.

4.4. The exogeneity of economic freedom

A usual problem in growth econometrics is the possible endogeneity of the variable in question, which makes the estimation of the variable inconsistent. In what follows we will examine the endogeneity of the freedom-related variable. Technically, this means that the residuals from the equation of column 6 in Table 2 correlate with the freedom-related measure. What this means intuitively is that it is not only true that the freedom-related institutions increase income, but it may also be true that higher income leads to an improvement in freedom-related institutions. Another possible explanation for the

²¹ This conclusion is to some extent in line with the one drawn by Easterly and Levine (2003), who find that macroeconomic policy variables (such as inflation, real exchange overvaluation, and openness) do not affect growth if we take into account the effect of institutions (including the rule of law and the regulatory burden).

endogeneity is that there is a third factor (in addition to GDP and freedom-related institutions) that explains the evolution of both.

The usual way to handle the problem of endogeneity is to use instrumental variables or two-stage regression. The basic idea is to find so called “instruments” that correlate (partially) with the endogenous variable, but do not correlate with the residuals from the structural (second stage) equation. Thus, a good instrument is a variable that does not explain the dependent variable directly, only indirectly, through the potential endogenous variable.

A crucial task here is thus to select a good instrument. We accept the argument of Acemoglu (2005:1040-1041), according to which the first stage regression needs a theoretical explanation: one must have some theoretical reasons to choose a particular instrument, and the technical conditions (as regards the correlation of the instruments) are not enough. Our view is that one has to provide theoretical reasons that support both crucial assumptions of the two-stage least squares models; that is, we need instruments which the concept of economic freedom we presented before claims do not directly explain income, but only through their contribution to economic freedom.

Appropriate instruments can possibly be found among those variables that affected the evolution of the law. The reason behind that is that the most important constituent part of economic freedom is the rule of law²², which is, to a large extent, rooted in the history of a country. The rule of law is a concept which has evolved in the common law tradition and has a different connotation or means at least “less” in the civil law tradition. How this difference arose is brilliantly shown by Glaeser and Shleifer (2002). They argue that the historical design of legal systems in France and England as far back as the 12th and 13th centuries has had long-lasting effects on how these two legal systems operate. Both France and England opted for different levels of control that the sovereign exercised over judges, and these historical choices account for many distinctive features of the legal systems that we observe today.²³ The historically different paths of both countries led to different degrees in the stability and generality of the law, i.e., different commitment to the rule of law.

²² The rule of law embodies the principles of certainty, generality and equality of the law (Hayek 1960). The implication is that governmental actions are bound to rules laid down beforehand.

²³ The important thing is that both countries opted for a system that was more efficient for each country at the time. As the English king commanded greater power over his subjects than the French king did, it was more efficient in England to leave the adjudication of disputes to well-informed local decision makers, such as juries, than to delegate it to less well informed and possibly biased state-employed judges who were more insulated from bullying as in France. Put differently, France chose to rely on state-employed judges precisely because local feudal lords were too powerful: there was no possibility of effective local justice when these lords’ interests were involved. England, in contrast, had weaker local lords, and its juries were less vulnerable to subversion. As a consequence, it could afford the luxury of entrusting adjudication to local juries.

Based of the above it seems obvious to use as an instrument the legal origin of a country (which may be English, French, Scandinavian, German or socialist). In addition, we chose certain variables of religion; expressing adherence to certain religions measured as a share of the population that can be associated with religion in general (that is, the relative size of each religious group within the total number of religiously-inclined people). Although the characteristics of the religious groups people belong to in a country may not affect the formal law, they certainly have an effect on informal institutions that characterize the *de facto* behavior of the players; and the rule of law is a *de facto* category.

Thus, our first stage equation consists of variables of legal origin from the *Doing Business in 2004* and of religious adherence from Robert Barro's dataset.²⁴ Of these 15 possible instruments²⁵ we found five significant (at the 5 percent level): English legal origin dummy, French legal origin dummy, the share of Catholics, share of Protestants, and the share of other Eastern religions. Table 4 shows the results for the simple OLS estimation of the structural equation (column 1), for the first stage equation (column 2), and for the 2SLS estimation (column 3).

| | 1 | 2 | 3 |
|---------------------------------|--------------------------------|------------------------------|--------------------------------|
| | Dependent variable: | | |
| | ln(GDP) | ln(FR) | ln (GDP) |
| | OLS | OLS | 2SLS |
| Constant | 0.022 (0.02) | -0.063 (-0.10) | -0.046 (-0.04) |
| ln(I/GDP) | 0.368 (2.46) ^b | 0.142 (1.71) ^c | 0.301 (1.97) ^b |
| ln(SCHOOL) | 0.493 (5.59) ^a | 0.120 (2.00) ^b | 0.431 (3.98) ^a |
| ln(n+g+δ) | -2.278 (-4.91) ^a | -0.322 (-1.31) | -2.144 (-4.79) ^a |
| ln(FR) | 0.913 (4.34) ^a | | 1.299 (3.48) ^a |
| English legal origin | | 0.192 (2.13) ^b | |
| French legal origin | | 0.263 (2.18) ^b | |
| Share of Catholics | | 0.232 (2.39) ^b | |
| Share of Protestants | | 0.645 (4.51) ^a | |
| Share of other eastern religion | | 0.984 (3.78) ^a | |
| R ² | 0.860 | 0.584 | 0.852 |

²⁴ <http://www.economics.harvard.edu/faculty/barro/data.html>. For a brief discussion for these data, and for an example for their use see McCleary and Barro (2006).

²⁵ English, French, Scandinavian, German and socialist legal origin, share of Catholic, Protestant, Orthodox adherents, share of Jews, Muslims, Buddhists (including Shinto for Japan), Hindus, other Eastern religions, other Christians, and other religions in the religious population.

| | | | |
|----------------------------|-----------------------------|-------|-------|
| adj. R ² | 0.853 | 0.540 | 0.844 |
| N | 84 | 84 | 84 |
| Hausman specification test | $\chi^2(4)=1.32$ p=0.859 | | |

Table 4. Results for the 2SLS estimation

Heteroskedasticity robust t-statistics are in parentheses. Letters in the upper index refer to significance: a: significance at 1 percent, b: 5 percent, c: 10 percent. T-values without an index mean that the coefficient is not significant even at the 10 percent level.

The formal (Hansen J-) test of our instruments cannot reject what we established theoretically, namely that the instruments are orthogonal to residuals from the equation of column 3.²⁶ Comparing the coefficients of column 1 and column 3 would suggest that the coefficient did not change a lot, which is confirmed by the formal test. According to the Hausman specification test, the null of exogeneity cannot be rejected at the usual significance level (Table 4). This means that in our regression there is no sign of the fact that higher income leads to greater economic freedom, that is, the freedom-related measure is exogenous in the economic freedom – income relationship.

5. Conclusions

In this paper we evaluated the EFW index on the basis of the Hayekian concept of freedom (Hayek 1960), more precisely on that of its conceptualization in terms of the character of government actions we developed elsewhere (Kapás and Czeglédi 2007a). The major tension between our concept and the way the EFW index measures economic freedom can be found in the fact that numerous components of the index are policy variables which, in our view, do not concern economic freedom.

Although we do not consider the EFW index a good measure of economic freedom, we did some empirical investigation with this index and its components. In these examinations we only wanted to show that using the freedom-related components of the EFW index (which is more in line with our concept of economic freedom) instead of the index itself may lead to even more plausible propositions than those provided by the index. The results provide support for our argumentation.

First of all we found a positive significant relationship between our freedom-related measure and income, while such a relationship was not found between policy components and income. Furthermore, we showed that the freedom-related institutions are exogeneous in the

²³ The test statistics is $\chi^2(4)=1.337$ with a p-value of 0.855, thus the null of orthogonality cannot be rejected.

economic freedom – income relationship, which means that even if freedom-related institutions are not the only ones that can raise the income of a country, the higher income in itself will not improve the freedom-related institutions.

The former findings draw us to the following conclusions. If the original EFW index is in a positive significant relationship with income, while policy components are not, this may mean two things: (1) economic policy affects income only when appropriate (in our interpretation freedom-related) institutions are already in place, (2) freedom-related institutions even alone are capable of positively affecting income. This latter implies that as regards the channels through which economic freedom affects income not only those operate that were identified in the literature, namely those working through efficiency: freedom-related components are in themselves beneficial because they alone can induce income. What our empirical results point to is precisely the fact there exist mechanisms other than those identified in the literature²⁷ through which economic freedom (freedom-related institutions) may affect income. However, revealing this mechanism requires further theoretical and empirical investigations.

²⁷ Various channels, such as investment in human and physical capital, property rights, changes in inequality, social capital, and trust have been identified by different scholars. See Kapás and Czeglédi (2007b) for details.

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Appendix A

The components of the Economic Freedom of the World Index (Gwartney and Lawson 2006)

Area 1: Size of government: expenditures, taxes, and enterprises

1. A. General government consumption spending as a percentage of total consumption
1. B. Transfers and subsidies as a percentage of GDP
1. C. Government enterprises and investment as a share of total investment
1. D. Top marginal tax rate (and income threshold at which it applies)
 - i. Top marginal income tax rate (and income threshold at which it applies)
 - ii. Top marginal income and payroll tax rate (and income threshold at which the top marginal income-tax rate applies)

Area 2: Legal structure and security of property rights

2. A. Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes
2. B. Impartial courts: a trusted legal framework exists for private businesses to challenge the legality of government actions or regulations
2. C. Protection of intellectual property
2. D. Military interference in the rule of law and the political process
2. E. Integrity of the legal system

Area 3: Access to sound money

3. A. Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years
3. B. Standard inflation variability during the last five years
3. C. Recent inflation rate
3. D. Freedom to own foreign currency bank accounts domestically and abroad

Area 4: Freedom to trade internationally

4. A. Taxes on international trade
 - i. Revenue from taxes on international trade as a percentage of exports plus imports

- ii. Mean tariff rate
- iii. Standard deviation of tariff rates
- 4. B. Regulatory trade barriers
 - i. Non-tariff trade barriers
 - ii. Compliance costs of importing and exporting
- 4. C. Actual size of trade sector compared to expected size
- 4. D. Difference between official exchange rate and black-market rate
- 4. E. International capital market controls
 - i. Foreign ownership/investment restrictions
 - ii. Restriction on the freedom of citizens to engage in capital market exchange with foreigners

Area 5: Regulation of credit, labor and business

- 5. A. Credit market regulations
 - i. Ownership of banks – percentage of deposits held in privately owned banks
 - ii. Competition – domestic banks face competition from foreign banks
 - iii. Extension of credit – percentage of credit extended to private sector
 - iv. Avoidance of interest rate controls and regulations that lead negative real interest rates
 - v. Interest rate controls – interest rate controls on bank deposits and/or loans are freely determined by the market
- 5. B. Labor market regulations
 - i. Impact of minimum wage
 - ii. Hiring and firing practices – hiring and firing practices of companies are determined by private contract
 - iii. Share of labor force whose wages are set by centralized collective bargaining
 - iv. Unemployment benefits – the unemployment benefits system preserves the incentive to work
 - v. Use of conscripts to obtain military personnel
- 5. C. Business regulations
 - i. Price controls – extent to which businesses are free to set their own prices
 - ii. Burden of regulation
 - iii. Time with government bureaucracy – senior management spends a substantial amount of time dealing with bureaucracy

- iv. Starting a new business – starting a new business is generally easy
- v. Irregular payments – irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare

Appendix B

Computation of the measures used in regression analysis

Here we summarize the exact computation of the freedom-related measure we use in our empirical investigations. The meaning of the EFW index components and subcomponents indicated by a number and a capital letter can be found in Appendix A. Our aim is to regroup the components of the original EFW index in a way which fits our concept. Thus, when formulating our categories we require that

- (1) the final index of economic freedom implied by the method be equal to the original index;
- (2) the weights of the different components be equal to those of the original EFW index;
- (3) components be comparable, which means that all components' values should run between 0 and 10.

These three requirements determine exactly how different components and subcomponents should be weighted when constructing our measures. Based on the three groups of components (see Table 1), the following regrouped components meet these criteria.

Freedom-related measure

$$(\text{rule of law}) = \frac{2.A. + 2.B. + 2.C. + 2.D. + 2.E.}{5}$$

$$(\text{transfers and subsidies}) = 1.B.$$

$$(\text{controls}) = \frac{300}{71} \left[\frac{3.D.}{20} + \frac{4.B. + 4.D. + 4.E.}{25} + \frac{5.C.}{15} \right] = \frac{15}{71}(3.D.) + \frac{12}{71}(4.B. + 4.D. + 4.E.) + \frac{20}{71}(5.C.)$$

$$(\text{freedom - related}) = \frac{60}{146}(\text{rule of law}) + \frac{15}{146}(\text{transfers and subsidies}) + \frac{71}{146}(\text{controls})$$

Policy measure

$$(\text{fiscal}) = \frac{1.A. + 1.D.}{2}$$

$$(\text{monetary}) = \frac{3.A. + 3.B. + 3.C.}{3}$$

$$(\text{policy}) = \frac{2}{5}(\text{fiscal}) + \frac{3}{5}(\text{monetary})$$

Others measure

$$(\text{others}) = \frac{300}{79} \left[\frac{1.C.}{20} + \frac{4.A. + 4.C.}{25} + \frac{5.A. + 5.B.}{15} \right] = \frac{15}{79}(1.C.) + \frac{12}{79}(4.A. + 4.C.) + \frac{20}{79}(5.A. + 5.B.)$$

Finally, the implied EFW index becomes the weighted average of our three main categories:

$$\text{EFW} = \frac{146}{300}(\text{freedom - related}) + \frac{75}{300}(\text{policy}) + \frac{79}{300}(\text{others}).$$

Some modifications in practice

What was said above means that our implied EFW index is exactly the same as the original chain-linked index. However, because of the lack of some data we made some modifications so that we would not drop too many countries out of the analysis. The main problem is that when one or more data are missing the formulas worked out above cannot be applied in an unchanged form. Our general method was that when one or more data that we had to sum were missing, we used the mean of the rest and scaled it up. Thus for example, instead of the sum of x_1, x_2, x_3 , we used the value of $3 \times (\text{the mean of } x_1, x_2, \text{ and } x_3)$. The result of the two methods is, of course, the same when all the three data are available, but if some are missing, it will cause a difference between the original and our implied EFW index.

We follow a general rule according to which, when we should sum at least three subcomponents (as in the case of the controls component), there must be at least two values so that we can compute their means. However, taking the mean of one value is technically not impossible, in this case we treat that observation as not available.

Another problem arises from the fact that in some cases we cannot even compute the mean for a component, that is, we would have to compute the freedom-related measure from just two subcomponents of the three. In cases where only one of the three subcomponents of the freedom-related measure is missing, we follow the general rule of sticking to the original relative weights of the components and scale the weighted average up to be between 0 and 10. Thus, for example, in the absence of data for controls components, we arrive at the freedom-related measure as follows:

$$(\text{freedom} - \text{related}) = \frac{146}{75} \left[\frac{60}{146} (\text{rule of law}) + \frac{15}{146} (\text{transfers and subsidies}) \right],$$

where the first ratio's role is to ensure that the measure runs between zero and ten. We proceed in a similar way when either the rule of law or the transfers and subsidies is missing; however, of course, in these latter cases the scaling factor is different. In those cases when two components are missing we do not compute the freedom-related measure.