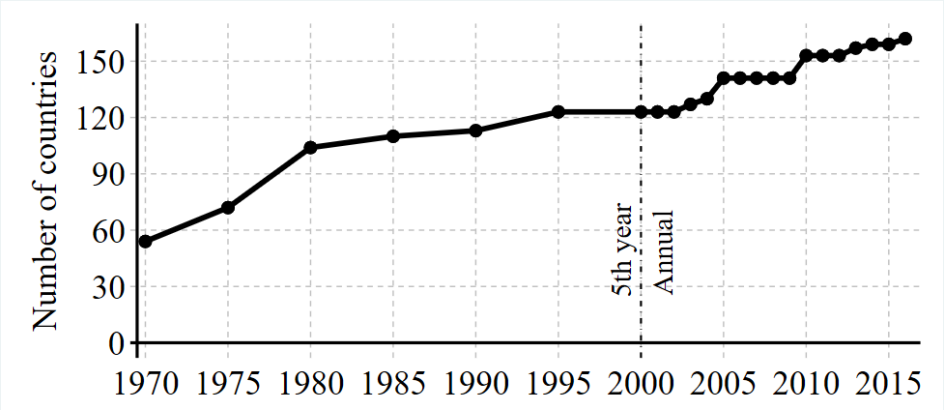
9. Economic Freedom: The *F*-index

The Fraser Index measures the freedom to run a private business.[1] It has the following five components: government size, legal quality, stable money, free trade and regulations. It started in 1970 with data for 54 countries, since then it has increased to 162 as seen on Figure 1. From 1970 to 2000, it was reported with 5-year intervals, since then it has been annual. The Fraser Index is carefully made in a transparent way, but it is built in the spirit of libertarianism, and the group behind the index is keen to state that it shows that more freedom causes higher income.

The eight sections of Chapter 9 start by some descriptive statistics for the *F*-index (s1). Then the transition curve is estimated, and it is demonstrated that it is rather robust (s2). The causality tests show that while the causality in the short run is from *F* to development, the long-run causality is from development to *F* (s3). Finally, the *B*-index (from Chapter 8) is compared with the *F*-index (s4). While the two indices have a weak correlation, they do tell the same story about the transition.

Figure 1. The *F*-index: Number of countries from 1970 to 2016



9.1 Some statistics and the development over time for the F-index

Figure 2a gives a few descriptive statistics for the *F*-index. In principle, *F* goes from 0 to 10,

[1] The Fraser Index was defined in Gwartney *et al*. (1996). See also the annual volumes, latest Gwartney *et al.* (2018). It is used as a measure of the economic system of countries. As I look at the socialism/capitalism dimension, it may be acceptable.

but half of the scale contains 95% of the observations. The 2,871 observations for the index have an almost normal distribution with an average of 6.5 and a standard deviation of 1.2. Figure 2b reports first differences of the index. It is rarely constant, but 50% of the changes are in between −0.08 and 0.11. Economic systems are always changing, but most changes are small. Only 0.13% of the changes are larger than ±1 *F*-point, and 2.78% exceed ±0.5 *F*-points.

Figure 2. Some descriptive statistics for the *F*-index

Figure 2a. Probit diagram of *F*-index

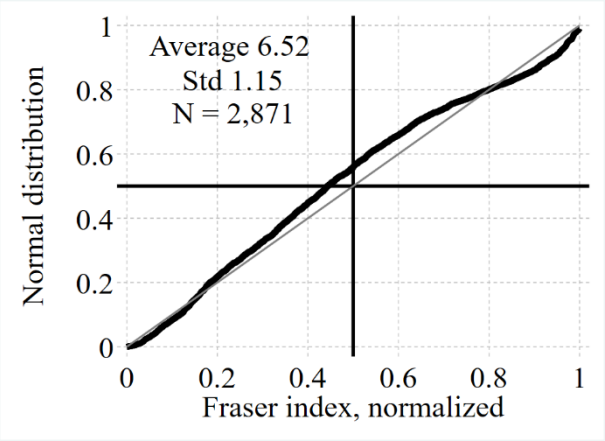
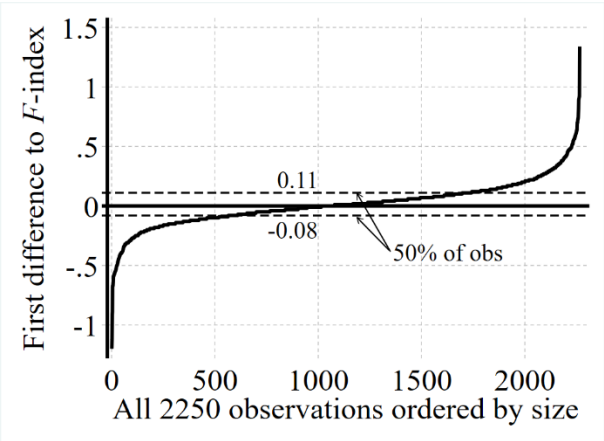


Figure 2b. Ordered sizes of *F*-changes



The two graphs of Figure 3 report the development of the Fraser Index over time. Figure 3a shows that the first 20 years of the index had small movements, but for the next 10 years, 1990-2000, there was a big rise in connection with the end of Soviet socialism.

Since 2000, the data are annual, and once again it has small movements only. The figure shows an average rise of about 1.6 Fraser points. From 1970 to 2016, income has grown about 1 log point. Thus, a crude estimate is that the change caused/inspired by the end of the Soviet system was almost 1 Fraser point in the group of Others, while the underlying change caused by the rise in income was about 0.6 ± 0.2 Fraser points per income point.

Figure 3b shows the change out of the Soviet model from 1990 and the increase in economic freedom in the rest of the world for comparison. The data from 1970-90 contain few countries from the Soviet bloc. Hungary starts in 1980, while Bulgaria, Poland and Romania start in 1985. These countries give two strange points on the graph. I think it is unlikely that Romania in 1985 (*F* 5.58) had more economic freedom than South Korea (*F* 5.49) and Costa Rica (*F* 5.33). The index for China (*F* 3.64) in 1980 seems much more reasonable.

Figure 3a. The Fraser Index for three country groups

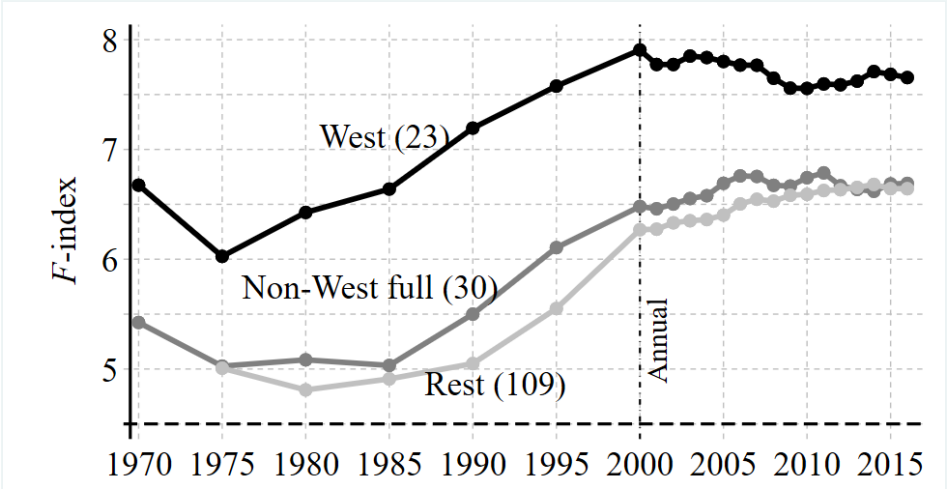
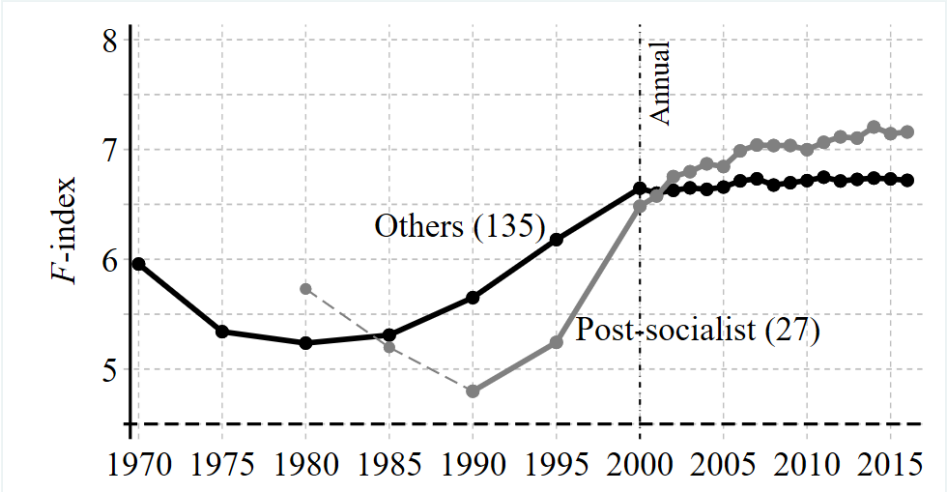


Figure 3b. The path of the post-socialist countries compared to the rest



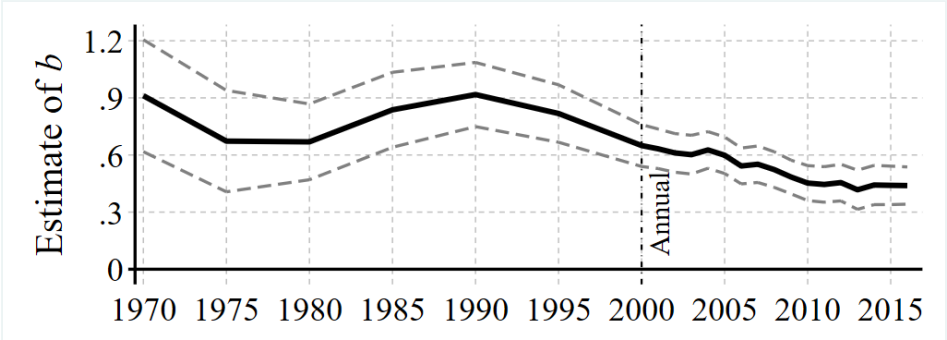
Paldam (2002b) tries to assess how the *F*-index for the Soviet bloc countries would have looked by using a comparison with the transition index from the EBRD. The assessment is that the countries of the Soviet bloc would have been at $F = 3.5$ (± 0.5) in 1970-80 if data had existed.[2] Today they are at 7.1, so a large system change amounts to 3.5 Fraser points. Even in the countries that made the greatest efforts to change, such as Estonia, it took 7 years.

To sort out the time-series movements in the data, an annual cross-country regression explaining *F* by *y* is run. Figure 10 reports the coefficient, *b*, on income – it is positive every year. Its average size is 0.60 with a standard error of 0.03, so the relation is robust, even though

[2] The European Bank of Reconstruction and Development helps financing the change of economic system in the post-socialist countries in Europe. The components of the transition index differ from the ones of the Fraser Index, so the assessment of what the size of the change would have been in the Fraser Index is quite uncertain.

it changes a bit over time. Thus, as predicted by the equivalence hypothesis, the results tally rather well. A rise of *y* by 1 point gives an *F*-change of 0.6 points either way it is measured.

Figure 4. The coefficient, *b*, on income in annual cross-country regression explaining *F*



A few countries have *F*-index observations, but no income, so the number of countries is 3-5 lower than on Figure 7. The figure reports the cross-country coefficient on income from regression (1): $F_{it} = a_t + b_t\, y_{it} + \varepsilon_{it}$, estimated for each *t* from 1970 to 2016. The dashed curves are the 95% confidence interval.

9.2 The transition curve $\Pi^F(y)$ and its robustness

Figure 5 is the kernel estimate of the transition curve $F = \Pi^F(y)$. The curve is almost linear – as the kernel of the *B*-index – with only weak signs of convergence at the two ends, where data are fairly adequate. The curve shows that *F* rises 3 points. This is, once again, a rise of 0.6 Fraser points per income point. Thus, the results from the various methods tally rather well. The near-linearity of $\Pi^F(y)$ causes collinearity when both income and the *F*-index are used as explanatory variables in Chapter 10. The robustness tests are reported in Figure 6.

Figure 5. The transition curve for *F*, Fraser, the Main sample

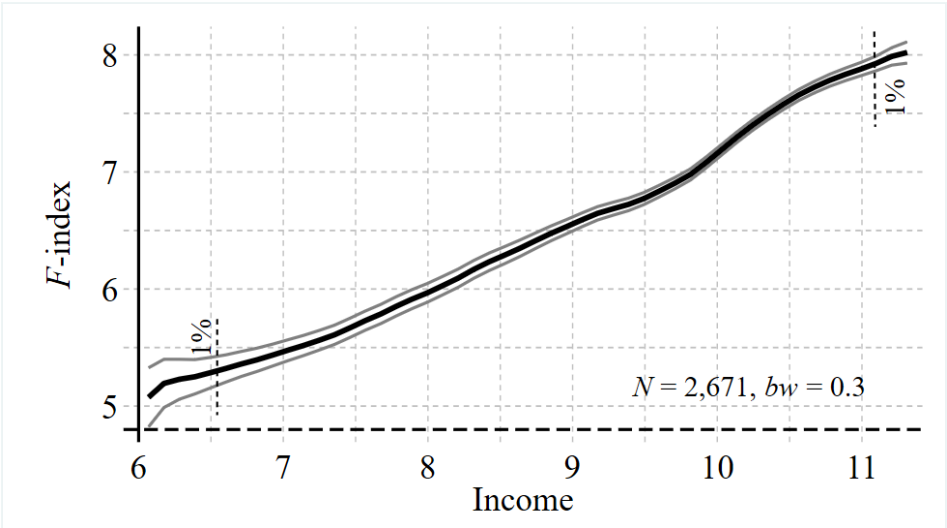


Figure 6. The robustness of the transition curve for *F*

Figure 6a. Kernel for *OPEC* sample

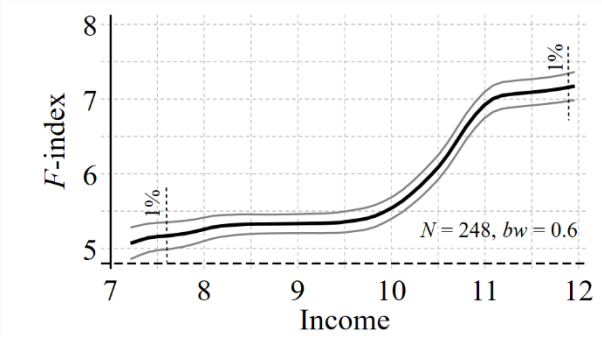


Figure 6b. Robustness of kernel to bandwidth

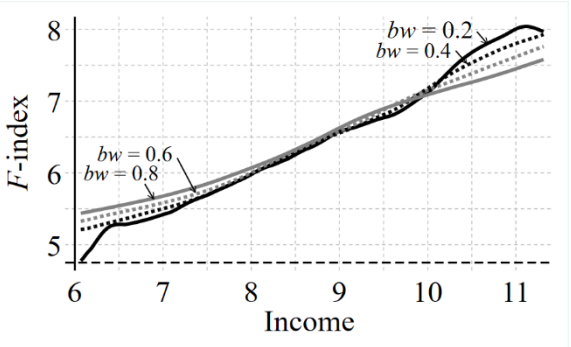


Figure 6c. Annual vs 5-year intervals [a)]

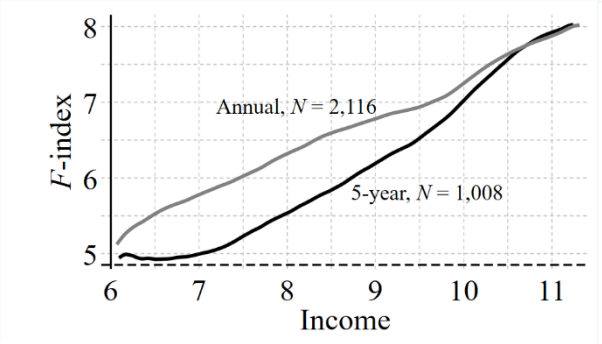
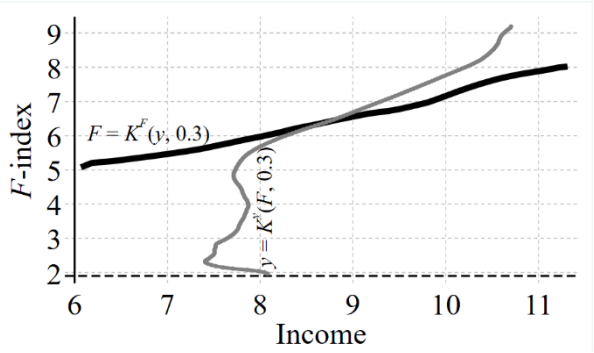


Figure 6d Reverse kernels for beauty-test



The 5-year data are from 1970, 1975, to 2015. The annual data are from 2000 to 2016.

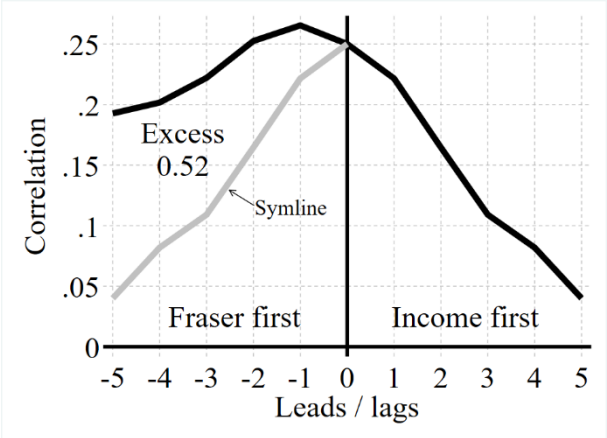
Figure 6a reports the curve for the *OPEC* sample. It is estimated on N = 248 observations, so it has wider confidence intervals. It has a strange bend, and the transition comes later and is slower. Figure 6b shows that the curve for the Main sample is robust to the bandwidth; while Figure 6c shows that the time interval between the data matters a little, though the form of the curve is the same.

9.3 The three causality tests (from Chapters 2.7 and 8)

Figure 6d shows the beauty-test, where the reverse curve and the transition curve are shown together. The $K^F(y, 0.3)$ is the clearest, but also the $K^y(F, 0.3)$ curve may make some sense. Thus, there may be causality both ways.

Figure 7 reports the average correlogram for the 118 countries where the data are complete for the period. The correlations are in the range from 0.05 to 0.25. The form of the curve supports the view that causality is from Fraser to income, but this is a short-run result, and the transition theory deals with the long run.

Figure 7. Correlogram of Income and the Fraser Index with 11 leads/lags



The curves are the average correlogram for 118 countries where the data from 2000 to 2016 are complete. The 118 correlations for each lead/lag have a standard error between 0.052 and 0.056 for the 11 leads/lags, so the correlations above 0.11 are statistically significant. It is all correlations from −5 to 3, but the form of the bend is not well determined.

Table 1. The DP-test for long-run causality from income to the *F*-index

	Dependent variable: *F*	Main model	Robustness of model to instrument variation			
	Estimate	(1)	(2)	(3)	(4)	(5)
	No. Of countries	96	101	96	96	131
			OLS estimates			
(1)	Income, *y*	**0.53**	**0.55**	**0.53**	**0.53**	**0.49**
	t-ratio	(11.7)	(12.8)	(11.7)	(11.7)	(10.6)
(2)	Centered R^2	0.59	0.62	0.59	0.59	0.46
			IV estimates: *y* is instrumented			
(3)	Income, *y*	**0.50**	**0.55**	**0.50**	**0.57**	**0.61**
	t-ratio	(7.5)	(9.5)	(7.5)	(9.2)	(9.2)
(4)	Instruments	*biofpc, geofpc*	*bioavg, geoavg*	*animals, plants*	*axis, size, climate*	*coast, maleco*
(5)	First stage partial R^2	0.47	0.55	0.47	0.54	0.51
(6)	CD F-statistic	**40.65**	**59.22**	**41.57**	**35.63**	**43.22**
	CD critical value	19.93	19.93	19.93	22.30	22.30
(7)	Sargan test	**0.12**	***3.41***	**0.01**	**2.21**	**3.72**
	(*p*-value	0.73	0.06	0.93	0.33	0.16
		Hausman test for parameter consistency of OLS and IV estimates				
(8)	C-statistic	**0.39**	**0.00**	**0.47**	**1.00**	7.70
	p-value	0.53	0.99	0.49	0.32	0.01
(9)		Check for reverse causality (2 works but all are smaller)				
	CD F-statistic	15.07	**26.50**	15.05	***18.64***	**26.56**

The observations are averages of 2005-2010. All specifications include a constant term (not reported).

The result from Figure 7 indicates that liberalizations have positive effects on income already within a few years. This contradicts the analysis in Chapter 3 that dealt with the very

big liberalization in the post-socialist countries, where the short-run effects were very negative, giving substantial reform costs before the positive effects came to dominate. Most of the big change in the post-socialist countries is not covered by the data used for Figure 9b.

The DP-test reported in Table 1 finds that in the long-run causality is strongest from income to the Fraser Index. The reverse test for causality from the *F*-index to income sometimes has strong instruments too, so there is simultaneity. However, the instruments are always strongest from income to the *F*-index. Also, the average size of the OLS estimates of the coefficient on income is 0.53, while it is 0.55 for the TSIV estimates, so they are very close.

9.4 Comparing the B and F indices

The two chapters on the Transition in the Economic System yielded the same qualitative conclusion: Both the *B*-index and the *F*-index showed that the main causal flow in the long run is from *y* to *B* and *F*, though there is some causality the other way in the shorter run.

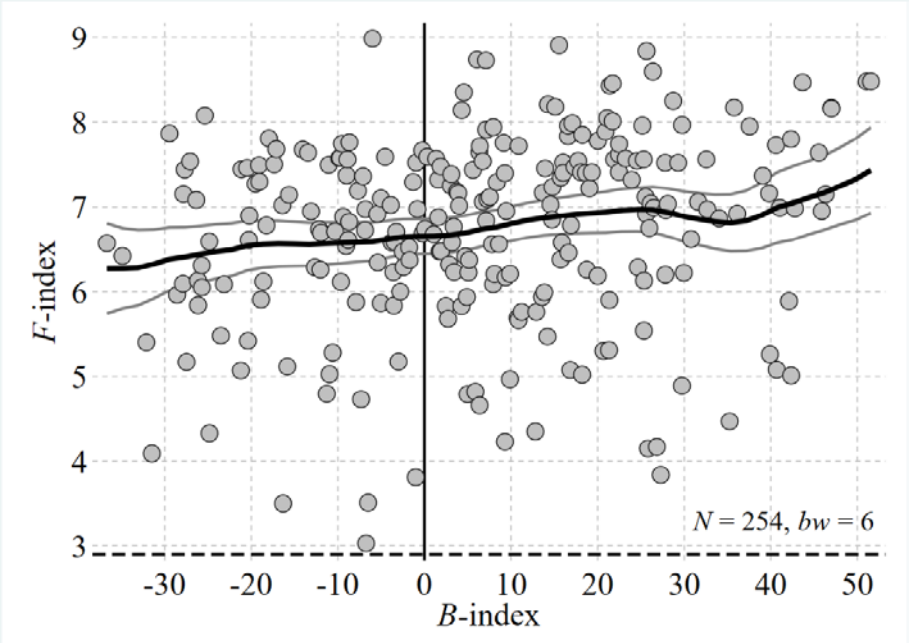
The two transition curves $B = \Pi^B(y)$ on Figure 8.4b and $F = \Pi^F(y)$ on Figure 5 look similar: They are approximately linear and have a positive slope. 100 observations for each of the two transition curves have a correlation of $\text{cor}(K^B(y), K^F(y)) = 0.95$, so the transition path is the same, but this does not mean that the observations for the two indices are the same. The *B*-index can be combined with the corresponding values of the *F*-index and income for 254 of the 295 observations. Table 7 shows the correlations. They are all significantly larger than zero, but the correlation of the two system-indices is only 0.20.

Table 2. Correlations of the corresponding 254 observations for all three series

	Income	*B*-index	*F*-index
Income	1		
B-index	**0.29**	1	
F-index	**0.59**	**0.20**	1

Figure 8 shows how the scatter of the two indices looks. If we interpret the Fraser Index as the original research team thought as the freedom to run a private business, the aggregate index should surely be correlated to preferences for capitalism. The weak connection between the two indices is thus a bit of a puzzle. It can be explained in two ways: (i) The indices do measure something different: In particular, it is possible that preferences (*B*) and realities (*F*) differ. (ii) They have large uncorrelated measurement errors.

Figure 8. Explaining the *F*-index by the *B*-index: The scatter and the kernel



The coefficient, *b*, on *B* in the regression. $F = a + bB$ is nicely significant, but in $F = a + bB + cy$ the coefficient *b* becomes insignificant. The two system variables are only related due to the common transition.

(i) It is possible that components of the *F*-index are better correlated than the aggregate index. As shown in Bjørnskov and Paldam (2012), the *B*-index is better correlated to the legal quality component of the index than to the other component.

(ii) The *B*-index is based on 295 polls of about 1,600 respondents each. The question posed was not very clear, and it is possible that many respondents had given little thought to the economic system they preferred. The reader may wonder how well an African farmer would be able to answer the said question. The dimension of saliency is important for the *B*-index.

However, for all of that, it is still satisfactory that the long-run transition curves in the two indices are so similar. It would be neat if it could be demonstrated that the preferences led to the system and that this caused the development, but from the above it is clear that the data are too weak for the purpose. In the long run, development causes system changes, and successful systems lead to preferences for the system. However, we also find simultaneity even in the long run. In the short run, the causality is rather from the economic system to income.