Aarhus and Hamburg,
September 9th 2010

The religious transition and the transition in support for capitalism

Causality and two models

Martin Paldam, School of Economics and Management, Aarhus University, Denmark[1]

Erich Gundlach, GIGA and Hamburg University, Germany[2]

Abstract:
One of the most well-known facts about development is that it is a grand process causing transitions, so that the level of many variables shifts from a traditional level in low income countries to a – very different – modern level in developed countries. We consider two transitions using the data from the World Values Survey: The transition in religiosity and the transition in the support for capitalism/socialism. Elsewhere we have demonstrated that income is causal to these transitions. Recently, a method has been presented to weed out spuriousness in such processes. The present note shows that the method makes the two transitions go away as well.

1. Address: School of Economics and Management, Bartholins Allé 10, DK-8000 Aarhus C, Denmark.
E-mail: mpaldam@econ.au.dk. URL: http://www.martin.paldam.dk
2. Address: GIGA Institute of Asian Studies. Rothenbaumchaussee 32, 20148 Hamburg, Germany.
E-mail:. Gundlach@giga-hamburg.de. Homepage: http://www.erichgundlach.de

1. Introduction

Gundlach and Paldam (2009a) introduce the DPIV model for causality testing in transitions. It is a long-run causality test using a set of truly exogenous "development potential" variables as instruments. We have used this method to establish causality in six transitions, where each is measured by one transition variable. Recently Acemoglu et al. (2008) have introduced a method – the AJRY model – to reveal spuriousness in such processes. We have previously demonstrated that four of the six transitions – the agricultural transition, the demographic transition, the democratic transition, and the transition of corruption – all appear to be spurious according to the AJRY model (see Gundlach and Paldam (2009a and b). At present we look at the two last transitions:

(i) The religious transition. It is analyzed in Paldam and Gundlach (2010). The transition variable *R* is calculated as the first factor in a factor analysis of 14 items from the WVS. It is demonstrated that *R* is a robust measure, and it is shown that *R* falls to less than half during the transition.

(ii) The transition in support for capitalism, the CS-score (for capitalism/socialism). The CS-score is analyzed in Bjørnskov and Paldam (2010). It is calculated from a WVS-item asking the respondents about their preferences for private versus public ownership to business.

The analysis considers two models for the transition variable $x = R, CS$. For easy reference they are listed in Table 1. The basic model is the panel version of the OLS model, which is one part of the DPIV model.

Table 1. Two models: In the paper $x = R, CS$

Model	Equation	Name
(1)	$x_{it} = \beta_1 y_{it-1} + \alpha + u_{it}$	Basic model
(2)	$x_{it} = \beta_2 y_{it-1} + \gamma x_{it-1} + \alpha_i + \alpha_t + v_{it}$	AJRY model
(3)	$\beta_1 \approx \beta_2/(1-\gamma)$	In the steady state [a)]
Variables used (the β's and γ are the parameters estimated)		
i, countries	x, transition variable	y_{-1}, initial income
t, time	x_{-1}, lagged transition variable	u and v, residuals
α, constant	α_i, fixed effects for countries	α_t, fixed effects for time

Note: An (i,t)-panel is needed to estimate (1) and (2). In the panel each cell should have three data (x, x_{-1}, *income*). (a) Disregarding the fixed effects.

We proceed as follows. Section 2 describes the data, section 3 covers the religious transition, section 4 considers the transition in the CS-score, and section 5 concludes.

2. The data: Two unbalanced panels

The WVS has five waves up to now: W1 from 1982, W2 from 1990, W3 from 1995, W4 from 2000 and W5 from 2005. Altogether, 95 countries have been covered at least once, but only 240 polls have been made; that is 2.5 polls per country on average for all waves. Few WVS items are included in all polls, but *R* is so robust that we have managed to estimate 240 values. The *CS*-score is available for 200 polls. However, for the AJRY model we need a lagged dependent, and that reduces the data substantially, as seen in Table 2.

The transitions analyzed in Gundlach and Paldam (2010a) use about 1000 observations, so we always have at least 800 degrees of freedom in the estimates. However, in the two present panels we only have 126 and 90 observations respectively, and with fixed effects for countries this is reduced to 65 and 40 degrees of freedom. Thus we expect (much) less stability in the estimates.

Also, it is a serious problem that the WVS starts with DCs (developed countries) in the first waves, and only gradually adds LICs (low income countries) in the latter waves, so there are few LICs in the two panels. The variability necessary to identify the transition component in the development in the R- and the CS-variable is thus precariously small. We do find the expected main pattern, but the detailed results reveal the problems.

The income for the years 1990, 1995, 2000, and 2005 are taken as the year corresponding to each wave of the panel. The data for income is the natural logarithm to GDP per capita from the Maddison data set. For a few cases, we have estimated the corresponding income using WDI data (World Bank).

Table 2. The polls for the two panels: Sample reduction by the lagged dependent

	W1: 1982	W2: 1990	W3: 1995	W4: 2000	W5: 2005	*N*	Countries
			For the religious transition: The R variable				
R-variable: All	21	43	54	70	52	240	95
Usable in Panel	None	19	32	41	34	126	61
			For the transition in the support for capitalism: The CS-score				
CS-score: All	None	42	53	57	48	200	92
Usable in Panel	None	None	30	33	27	90	50

3. Estimating models (1) and (2): The transition comes and goes

Tables 3 and 4 are termed B-tables in Gundlach and Paldam (2010a). They are constructed as follows: Columns (1) and (2) are models (1) and (2) from Table 1, respectively. The t-ratios in parentheses are based on robust standard errors. Estimates in bold are significant at the 5% level. Estimates (1) and (3) are simple OLS-estimates. The other estimates are panel OLS regressions. The R^2s are not fully comparable for the two types of regressions.

Table 3. The effect of income on the R-variable. Models (1) and (2) are from Table 1

Dependent variable: *R*	Basic model	AJRY model	Mixed model variants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Initial income, y_{it}	**-11.69**	3.61	**-3.97**	3.13	**-15.07**	**-14.62**	**-3.34**
(t-ratios)	(-6.7)	(0.4)	(-4.0)	(0.3)	(-2.7)	(-2.5)	(-3.3)
Lagged dependent, R_{it-1}	No	-0.02	**0.81**	No	0.07	No	**0.84**
(t-ratios)		(-0.1)	(16.7)		(0.5)		(17.0)
Country fixed effects	No	Yes	No	Yes	Yes	Yes	No
Time fixed effects	No	Yes	No	Yes	No	No	Yes
Number of observations	126	126	126	126	126	126	126
Number of groups		61, 4		61, 4	61	61	4
R^2 within		0.360		0.360	0.170	0.164	0.869
R^2 between		0.237		0.172	0.343	0.258	0.349
R^2 overall	0.253	0.120	0.852	0.068	0.337	0.253	0.851

Table 4. The effect of income on the CS-score. Models (1) and (2) are from Table 1

Dependent variable: *TI*	Basic model	AJRY model	Mixed model variants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Initial income, y_{it}	**8.00**	15.40	0.17	11.48	**-23.80**	**-22.80**	0.59
(t-ratios)	(2.6)	(0.7)	(0.1)	(0.5)	(-2.2)	(-2.3)	(0.3)
Lagged dependent, CS_{it-1}	No	-0.17	**0.74**	No	-0.07	No	**0.72**
(t-ratios)		(-0.8)	(10.1)		(-0.3)		(10.7)
Country fixed effects	No	Yes	No	Yes	Yes	Yes	No
Time fixed effects	No	Yes	No	Yes	No	No	Yes
Number of observations	90	90	90	90	90	90	90
Number of groups		50, 3		50, 3	50	50	3
R^2 within		0.362		0.336	0.160	0.155	0.588
R^2 between		0.037		0.141	0.115	0.086	0.649
R^2 overall	0.108	0.069	0.589	0.186	0.138	0.108	0.589

Estimates (1) and (2) are very different. The simple model (1) shows a clear transition, but the AJRY model, where income is supplemented with the lagged endogenous variable and the two sets of fixed effects for time and countries, makes the effect of income vanish. This is the very same picture that was found for the four other B-tables in Gundlach and Paldam (2010a and b).

When we look at the mixed model variants, we see rather different results in the two cases. In the religious transition table, it is the two fixed effects that kill the coefficient to income. When they are in, there is no effect, and when one is missing, the effect remains. In the table showing the political support for capitalism, the effect of income turns very unstable once we leave the basic model. We interpret this as a unit root problem.

Table 5. The power of the three "killers"

The three levels	The model estimated	R^2	ΔR^2	N	Nvar	Df
For the religious transition: The R variable						
Only lagged endogenous	$R_{it} = \gamma R_{it-1} + \alpha + u_{it1}$	0.827		126	1	125
Add Fixed Effects for countries	$R_{it} = \gamma R_{it-1} + \alpha_i + u_{it2}$	0.902	0.075	126	62	64
Add Fixed Effects for periods	$R_{it} = \gamma R_{it-1} + \alpha_i + \alpha_t + u_{it3}$	0.931	0.029	126	66	60
For the transition in the support for capitalism: The CS-score						
Only lagged endogenous	$CS_{it} = \gamma CS_{it-1} + \alpha + u_{it1}$	0.589		90	1	89
Add Fixed Effects for countries	$CS_{it} = \gamma CS_{it-1} + \alpha_i + u_{it2}$	0.884	0.295	90	51	39
Add Fixed Effects for periods	$CS_{it} = \gamma CS_{it-1} + \alpha_i + \alpha_t + u_{it3}$	0.924	0.040	90	54	36

Note: For easy comparisons these regressions are done as simple OLS by including a constant and deleting the USA (that has observations for all waves) and W5. *Nvar* is the number of variables. ΔR^2 is the increase in the R^2 from previous level.

We may consider the three controls in the AJRY model as "killer variables" and then study their effect on the transition variable independent from income. We compare the R^2 in the same OLS regression, disregarding the panel structure and omitting one of the dummies in each set of the fixed effects. In this way the R^2 becomes comparable. This is done in Table 5.

It is obvious that the three killers explain very much of the variation in the two transition variables. We know that polls have considerable measurement error, so one may wonder how much systematic information the three killers leave for income to explain.

5. Conclusions

The AJRY-model is well known from microeconomic studies where it serves to reveal spurious relations. It works a bit like the Granger causality test as it explains as much as possible of the dependent variable by itself and by the panel structure itself (i.e. the two sets of fixed effects) and leaves only the "innovations" in the series. Only if the innovations in series A can explain the innovations in series B, we would accept that A causes B according to this method.

Thus, the innovation of the AJRY paper is the application of the micro causality test to the macro field of growth and development, where it appears to show that *all* long-run relations are spurious. Growth and development is a field with much multicollinearity, where we look for long-run relations, and rather desperately try to sort through the maze of multi-collinearity to find the basic patterns. The fact that such long-run relations are identified as spurious by the said test is perhaps not so surprising.

References:

This is a background paper to the following papers by the authors:

Bjørnskov, C., Paldam, M., 2010. The spirits of capitalism and socialism. A cross-country study of ideology. Accepted for publication in *Public Choice*

Gundlach, E., Paldam, M., 2009a. A farewell to critical junctions. Sorting out long-run causality in income and democrcy. *European Journal of Political Economy* 25, 340-54

Gundlach, E., Paldam, M., 2009b. The transition of corruption: From poverty to honesty. *Economic Letters* 103, 146–48

Gundlach, E., Paldam, M., 2010a. The agricultural, demographic and democratic transitions. Two estimation models with the reverse results. Under revision.

Gundlach, E., Paldam, M., 2010b. The transition of corruption. Causality and two models. Background paper, posted on our home pages, revisions August

Paldam, M., Gundlach, E., 2010. The Religious Transition. A long-run perspective. Under refereeing.

It also refers to:

Acemoglu, D., Johnson, S., Robinson, J. A., Yared, P., 2008. Income and democracy. *American Economic Review* 98, 808-42

Inglehart, R., Basáñez, M., Díez-Medrano, J., Halman, L., Luijks, R., eds. 2004. *Human Beliefs and Values. A Cross-Cultural Sourcebook Based on the 1999-2002 Value Surveys*. Siglo XXI Editiones. México, DF

Inglehart, R., Basáñez, M., Moreno, A., eds. 1998. *Human Values and Beliefs. A Cross-Cultural Sourcebook*. University of Michigan Press, Ann Arbor, MI

Maddison, A., 2003. *The World Economy: Historical Statistics.* OECD. Paris. The data are updated on the Maddison home page: http://www.ggdc.net/maddison/

WVS, World Values Survey is available from: http://www.worldvaluessurvey.org

WDI, World Development Indicators from the World Bank, URL: http://devdata.worldbank.org/dataonline/

Note: Unpublished papers by the authors are posted on their home pages: http://www.erichgundlach.de and http://www.martin.paldam.dk