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Does labour law increase youth and total unemployment? Analysis of a new dataset

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Abstract

Using longitudinal data on labour law for 63 countries over the period 1991–2013, the present study estimates the impact of labour regulation on unemployment. The dynamic panel data analysis distinguishes between the short-run and long-run effects of regulatory change. It is observed that worker-protective labour laws in general have no unfavourable effect on both total and youth unemployment.

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I. Introduction

In the 1990s the OECD's *Jobs Study* (see OECD, 1994) made the argument for liberalizing labour laws as part of a strategy for enhancing labour market flexibility and thereby boosting job creation. Since the late 1990s La Porta and his collaborators (see for e.g. La Porta et al., 1997 Beck et al., 2003, Botero et al., 2004) had been arguing that the civil law countries interfere more in the market and their pro-labour policy exerts a negative influence on their employment and productivity. During the 2000s similar arguments were made by the World Bank (2007: 19): 'laws created to protect workers often hurt them.'

A growing number of studies, however, suggest that the supposed negative effects of labour laws may be either very small or simply non-existent (Blanchflower, 2001; Baker et al., 2005), and that such laws could, in fact, have beneficial effects on productivity and innovation (Acharya, Baghai and Subramanian, 2012a and 2012b). In the light of this evidence, some scholars have called for a reappraisal of the assumptions underlying equilibrium-based models of the labour market (Freeman, 2005).

Our contribution to this debate is an empirical one and makes two methodological innovations. Firstly, we make use of a recently constructed data set, the Labour Regulation Index of the Centre for Business Research (CBR), which provides the most detailed and systematic analysis of trends in labour law over time (1970-2013) in 63 countries. It differs from the most commonly used alternatives (the OECD's Employment Protection Index and the World Bank's Employing Workers Index) in providing a continuous time series based on consistent coding of primary legal sources covering the full range of laws governing individual and collective work relations. Secondly, we analyse the impact of labour law on the economy using econometric techniques which distinguish between short-run and long-run effects of legal change and take into account dynamic interactions between legal and economic variables. These techniques mark an advance on the more static cross-sectional and

time invariant analyses which have mostly been used until now to analyse the economic effects of labour laws.

2. The Present Study

The Labour Regulation Index (LRI) is one of a number of databases developed at the Centre for Business Research in Cambridge since the mid-2000s which provide longitudinal data on changes in labour and company law. The LRI is based on a "fine-grained" approach to the coding of primary legal sources which makes it possible not just to indicate the presence or absence of a worker-protective law in a given country, but to estimate magnitudes concerning the degree of protection conferred on workers by a given legal rule. These are represented using graduated scores between 0 (indicating little or no protection of workers) and 1 (indicating high protection of workers). Coding algorithms or protocols are used in an attempt to ensure consistency in the scoring of legal rules, and primary sources are reported in full alongside the scores for particular variables.[1]

The LRI contains forty indicators in all, spread across five sub-indices:

1. AC: Alternative employment contracts (self-employment, part-time work, fixed-term employment and temporary agency work);
2. RT: Working time (daily and weekly working time limits and rules governing overtime and night work);
3. RD: Dismissal (procedural and substantive rules on termination of employment);
4. ER: Employee representation (rules on collective bargaining, the closed shop and codetermination) and
5. IA: Industrial action (the extent of legal support for the right to strike, including rules on secondary and political strikes).

The study covers a sample of 63 countries covering 12 former-Socialist countries which started market economy transition in the 1990s: Bulgaria, China, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia and Slovenia.

What is the impact of labour protection on unemployment?

To examine the proposition that protection of labour leads to unemployment we shall use dynamic panel data modelling technique. This econometric method involves regressing the labour regulation scores (LRI) against measures of unemployment rates for the 63 countries. Although the data on labour laws are available for a long period, 1970-2013, the data on unemployment rates are not available for the whole period (without any break). We consider two unemployment rates:

1. TOTALU: Total Unemployment as percentage of total labour force (modelled ILO estimate);
2. YOUTHU: Total Youth Unemployment as percentage of total labour force in the age group 15-24 (modelled ILO estimate).

These two series are available for the period 1991-2013 for all 63 countries covered in the study.

We use the real growth rate (GGDP) as the control variable. This is expected to net out the country-specific effects of time-trend and cyclical fluctuations on unemployment rates. In our earlier papers (Sarkar, 2013;Deakin-Malmberg-Sarkar, 2014) we have used the log of real GDP; for international comparability these are to be converted into a common currency using purchasing power parity exchange rates. Due to currency exchange market complications and the arbitrariness involved in finding a common basket of commodities the true picture of country-wise time-trend and cyclical fluctuations may be obscured. Furthermore for some countries these PPP GDP data are not available. So we think GGDP is

a better control variable. The relevant data are easily available from online World Bank source.

As mentioned before labour regulation (LRI) data are collected from the source of CBR (Centre for Business Research, University of Cambridge) hitherto unavailable.

All other data are collected from the online World Bank source:

http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators (Last accessed on 14th June 2015).

We start by postulating a long-run relationship involving the dependent variable X (the unemployment rate, TOTALU or YOUTHU), the control variable Y (GDP growth rate, GGDP) and the independent or causal variable Z (labour regulation as measured by various LRIs taken one at a time) as follows:

$$X_{it} = \psi_i Y_{it} + \pi_i Z_{it} + \eta_{it} \quad (1)$$

where i stands for countries, t stands for time-periods (years), ψ_i and π_i are the long-run parameters, and η_{it} is the error term.

We are interested to know whether there exist long-term and short-term effects of Z (labour protection) along with Y (GDP growth rate) on X (unemployment rate) and whether there exists a stable adjustment path from the short-term relationship (if any) to the long-run relationship.

Following Pesaran, Shin and Smith (1999), our panel data analysis is based on the following error correction representation:

$$X_{it} = \theta_i (\eta_{it-1}) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta X_{i,t-j} + \sum_{k=0}^{q-1} \psi_{ik} \Delta Y_{i,t-k} + \sum_{l=0}^{r-1} \pi_{il} \Delta z_{i,t-l} + \mu_i + \phi_{it} \quad (2)$$

where X stands for unemployment rate, Y stands for GDP growth rate, Z stands for labour regulation indices (taken one at a time); Δ is the difference operator, θ_i is the country-specific error-correcting speed of adjustment term, λ_{ij}, ψ_{ik} and π_{il} are the coefficients of the lagged variables, μ_i is the country fixed effect and ϕ_{it} is the disturbances term. The existence of a meaningful long-run relationship with a stable adjustment dynamics requires $\theta_i < 0$.

Within this general structure, we can have three alternative models. At one extreme, we have a dynamic fixed effect (DFE) estimators model, in which intercepts are allowed to vary across the countries but all other parameters and error variances are constrained to be the same. At the other extreme, we can estimate separate equations for each country and calculate the mean of the estimates to get a glimpse of the overall picture. This is a mean group estimator (MG) model, which can give consistent estimates of the averages of parameters in a dynamic panel data analysis (Pesaran and Smith, 1995). The intermediate alternative is a pooled mean group (PMG) estimator, as suggested by Pesaran, Shin and Smith (1999). This allows intercepts, short-run coefficients and error variances to differ freely across the countries, but the long-run coefficients are constrained to be the same; this means that $\psi_i = \psi$ and $\pi_i = \pi$ for all i in equation (1), while θ_i, λ_{ij}, etc. of equation (2) may differ from country to country.

Using the STATA-based software developed by Blackburne and Frank (2007), we estimate each of the above three models (MG, PMG and DFE). We use the Lag Exclusion Wald Test for each variable separately to determine the lag structure of the regression. We use the Hausman test to select the appropriate model, comparing two at a time (PMG vs MG, MG vs DFE, and so on). All the estimates are reported in Tables 1 and 2.

To supplement our analysis of dynamic panel data models we have conducted the VEC (Vector Error Correction) Granger Causality/Block Exogeneity Wald Tests (based on DFE model) to ascertain the direction of causality.[2] We have used Schwarz information criterion) to determine the order of the VAR (Vector Auto regression) model and subtracted 1 from that to arrive at the order of the VEC model. These are reported in Table 3.

The Findings

Consider first the impact of aggregate labour laws (simple average of all forty indicators, ALLLAB) on unemployment. The causality test (which is based on DFE model) shows no causal relationship between unemployment rate and the aggregate labour law or its various components excepting ER). Accordingly two of the three models considered here (namely MG and DFE) show no significant relationship between the unemployment rate and the aggregate labour law or its various components.

The PMG model, however, shows a long-term negative relationship (but no short-term relationship) between the overall LRI scores and the unemployment rate. The Hausman test supports the PMG model giving credence to the finding of negative relationship. When we break the LRI down into five sub-indices, the PMG model shows negative relationship for three cases: regulation of working time (RT), alternative employment contracts (AC) and the law governing industrial action (IA) and no significant relationship in the case of ER. In each case Hausman test supports the PMG model. As for the effect of dismissal protection (RD) it is positive in the PMG model and the Hausman test supports DFE model which shows no significant effect.

As for the youth unemployment the causality test again supports a causal relationship from labour regulation relating to employee representation (ER) to youth unemployment rate. The PMG models show significant negative effect of all but two components of labour regulation (namely, ER and RT) on youth unemployment. The Hausman supports PMG

model in all but one (namely RT) cases. The DFE model is found to be appropriate for RT and it shows no significant effect. Only for ER, a positive effect on youth unemployment found in the PMG model can be confirmed.

There is no evidence of endogeneity: the state of total or youth unemployment is not influencing various aspects of labour regulation. Nor there is any causal influence of growth rate on aggregate labour law and its various components.

As a by-product of our causality tests we find mutual causation between growth rate and unemployment rate. This finding coupled with our dynamic panel data modelling shows a negative relationship between growth rate and unemployment rate: higher unemployment dampens growth and lower growth in turn contributes to rising unemployment. This corroborates with the finding of Sarkar (2013) in the context of a study of the unemployment consequence of EPL indicators for 23 OECD countries.

4. Summary and Conclusion

In the perspective of dominant orthodox standpoint against state-intervention to protect the interest of labour, this paper examines the unemployment consequences of labour regulation on the basis of new data hitherto unavailable for 63 OECD and non-OECD countries over the time span 1991-2013. It uses three alternative dynamic panel data models – dynamic fixed effect, mean group and pooled mean group models and examines the short-term as well as long-term effects of labour regulation on various measures of unemployment rate – over-all unemployment rate and youth unemployment rate. To supplement the dynamic panel data modelling, it also uses VEC (Vector Error Correction) Granger causality. It arrives at the conclusion that stricter labour regulation does not lead to increasing total and youth unemployment. Rather various aspects of labour regulation reduce unemployment.

Thus our study casts serious doubt on the orthodox standpoint that strictness of labour regulation hurts labour through increased unemployment. As a by-product of our study we find a clear dampening impact of rising unemployment (which is not found to follow from strict labour regulations) on growth rate which in turn aggravates unemployment problem. We reaffirm the standpoint of Sarkar (2013, p.1346):

"The policy prescription should be employment generation by other means (perhaps Keynesian policy of fiscal stimulus rather than neoliberal 'hire and fire' labour regulations) to tide over sluggish demand and production".

END NOTES

1 For further details, see Deakin, Lele and Siems (2007). For more general discussion of the "leximetric" methods used to create these data sets, see Deakin and Sarkar (2008); and Siems and Deakin (2010); and for helpful discussion of coding such "synthetic" indices more generally, see OECD (2013, ch. 2). The LRI data set is publicly available at: http://www.cbr.cam.ac.uk/research/projects/project2-20output.htm [last accessed 19 December 2014].

2 For these tests we have used Eviews 6 Programme.

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Table 1. Impact of Labour Regulation Index on Unemployment (% of total labour force), 1991-2013: Dynamic Panel Data Models[1]

	Models / LABOUR REGULATION	**PMG**	**MG**	**DFE**
(1)	**Aggregate Labour Protection, ALLLAB (Z)**			
	Long-term Relationship			
	Y (GGDP)	-2.813921**	-2.511861*	-1.059011**
	Z (ALLLAB)	-30.62275**	66.36819	-4.290727
	Short-term Relationship			
	θ	-.0879662**	-.3004869**	-.1590675**
	ΔX_{t-1}	.0820046	.0520102	.2271786**
	ΔX_{t-2}	-.0460213	-.0532051	.0603505
	ΔY_t	.05418	.1635039**	.0087404
	ΔY_{t-1}	-.0164972	.0550277	-.0358559**
	ΔY_{t-2}	.0011863	.0303912	-.0227034**
	ΔZ_t	1.769666	3.312511	2.90389
	μ	2.743631**	8.473859*	2.159198**
	Chosen Model[2]	PMG		
(2)	**Labour Protection relating to Alternative Employment Contracts, AC (Z)**			
	Long-term Relationship			
	Y (GGDP)	-.0067065	-5.201142	-1.065705**
	Z (AC)	-18.43793**	-110.6725	.3974514

	Short-term Relationship			
	θ	-.0915122**	-.2712517**	-.1568825**
	ΔX_{t-1}	.260183**	.0404752	.2268352**
	ΔX_{t-2}	.0680156*	-.0490812	.0577729 *
	ΔY_t	-.1606787**	.1531829**	.0087092
	ΔY_{t-1}	-.1454071**	.0522554	-.0351403**
	ΔY_{t-2}	-.0582528**	.0289787	-.0222148**
	ΔZ_t	2.083439	.2550838	.2335153
	μ	1.623676**	3.353047**	1.774964**
	Chosen Model[2]	PMG		
(3)	**Labour Protection relating to Regulation of Working Time, RT (Z)**			
	Long-term Relationship			
	Y (GGDP)	-2.65005 **	-33.37471	-1.053557**
	Z (RT)	-8.183952*	694.3409	-2.522166
	Short-term Relationship			
	θ	-.0899718**	-.2574843**	-.1583727**
	ΔX_{t-1}	.1026938*	.0195815	.228016**
	ΔX_{t-2}	-.0551683	-.0547337	.0591816*
	ΔY_t	.0534837	.17976**	.0081213
	ΔY_{t-1}	-.0082948	.0675425*	-.0353064**
	ΔY_{t-2}	.006931	.0305463	-.0221884**
	ΔZ_t	-4.005883	-2.479787	.9340506
	μ	1.813484**	3.822698	2.033605**
	Chosen Model[2]	PMG		

(4)	**Labour Protection relating to Regulation of Dismissal, RD (Z)**			
	Long-term Relationship			
	Y (GGDP)	-.0097742	-2.684748	-1.041668**
	Z (RD)	2.454712*	-24.56621	-6.519521
	Short-term Relationship			
	θ	-.1662824**	-.2664022**	-.1606205**
	ΔX_{t-1}	.3008512**	.0628135	.2268622**
	ΔX_{t-2}	.1070713**	-.0431893	.0601253*
	ΔY_t	-.1518621**	.1254837**	.0080366
	ΔY_{t-1}	-.1324251**	.0337155	-.0360227**
	ΔY_{t-2}	-.0455346**	.019289	-.0228922**
	ΔZ_t	1.016495	6.174682	1.505802
	μ	.9128412**	4.532979	2.371223**
	Chosen Model[2]			DFE
(5)	**Labour Protection relating to Employee Representation, ER (Z)**			
	Long-term Relationship			
	Y (GGDP)	-2.085659**	1.121133	-1.037474**
	Z (ER)	5.11006	-27.53971	-4.301346
	Short-term Relationship			
	θ	-.1093974**	-.2522959**	-.1581099**
	ΔX_{t-1}	.0938422*	.0539497	.22651**
	ΔX_{t-2}	-.0325436	-.0355576	.0635375*
	ΔY_t	.0481643	.1188448**	.0050019

	ΔY_{t-1}	-.0102174	.0310233	-.0390979**
	ΔY_{t-2}	.0071198	.0147602	-.0246754**
	ΔZ_t	1.807348	1.425215	1.791387
	μ	1.263516**	2.490747**	2.144474
	Chosen Model[2]	PMG		
6.	**Impact of Labour Protection relating to Industrial Action, IA (Z) on**			
	Long-term Relationship			
	Y (GGDP)	-3.64145**	-3.58262	-1.06236**
	Z (IA)	-59.7962**	41.63707	-.2075066
	Short-term Relationship			
	θ	-.0660721**	-.2489571**	-.1572552**
	ΔX_{t-1}	.0575787	.0737663	.226948**
	ΔX_{t-2}	-.0586787*	-.0224579	.0586035*
	ΔY_t	.0509437	.1104379**	.0083577
	ΔY_{t-1}	-.0110753	.0331329	-.0354256**
	ΔY_{t-2}	-.0032223	.0184382	-.0224953**
	ΔZ_t	-3.42681	-.1360169	.3063282
	μ	2.94293**	-2.657951	1.825902**
	Chosen Model[2]	PMG		

* Significant at 5 per cent level.

** Significant at 1 per cent level.

1 The regressors are estimated from the following long-term relationship and its error correction form.

Long-run Relationship:

$$X_{it} = \psi_i Y_{it} + \pi_i Z_{it} + \eta_{it}$$

where i represents countries, t represents periods (years), ψ_i and π_i are the long-run parameters and η_{it} is the error term.

It's Error Correction Form:

$$X_{it} = \theta_i (\eta_{it-1}) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta X_{i,t-j} + \sum_{k=0}^{q-1} \psi_{ik} \Delta Y_{i,t-k} + \sum_{l=0}^{r-1} \pi_{il} \Delta z_{i,t-l} + \mu_i + \phi_{it}$$

where X stands for unemployment rate, Y stands for GDP growth rate, Z stands for labour regulation indices (taken one at a time); Δ is the difference operator, θ_i is the country-specific error-correcting speed of adjustment term, λ_{ij}, ψ_{ik} and π_{il} are the coefficients of the lagged variables, μ_i is the country fixed effect and ϕ_{it} is the disturbances term. The existence of a meaningful long-run relationship with a stable adjustment dynamics requires $\theta_i < 0$.

2 An appropriate model is chosen on the basis of a series of Hausman tests.

Table 2. Impact of Labour Regulation Index on Youth Unemployment (% of total labour force ages 15-24), 1990-2012: Dynamic Panel Data Models[1]

	Models / LABOUR REGULATION	**PMG**	**MG**	**DFE**
(1)	**Aggregate Labour Protection, ALLLAB (Z)**			
	Long-term Relationship			
	Y (GGDP)	-3.529445**	-1.233614	-1.910824**
	Z (ALLLAB)	-12.20847*	357.9429	8.062965
	Short-term Relationship			
	θ	-.1472593**	-.3474995**	-.2000004**
	ΔX_{t-1}	.0568202	.0353048	.1373136**
	ΔX_{t-2}	-.0452192	-.0545214	.0912965**
	ΔY_t	.1297191*	.3793715**	.0574835*
	ΔY_{t-1}	.0166577	.1653516*	-.0538273*
	ΔY_{t-2}	.0215524	.0878521*	-.0386196*
	ΔZ_t	4.659969	15.13818	5.231402
	μ	5.030305**	24.5134	3.88913**
	Chosen Model[2]	PMG		
(2)	**Labour Protection relating to Alternative Employment Contracts, AC (Z)**			
	Long-term Relationship			
	Y (GGDP)	-3.614146**	-8.258215*	-1.852798**
	Z (AC)	-5.521723**	49.64177	5.758043*

	Short-term Relationship			
	θ	-.1450735**	-.3245333**	-.2024167**
	ΔX_{t-1}	.0598953	.0132951	.1385186**
	ΔX_{t-2}	-.0423564	-.0557561	.090848**
	ΔY_t	.1291455*	.350888**	.055276*
	ΔY_{t-1}	.0215075	.1573732**	-.0532707*
	ΔY_{t-2}	.0177451	.0752134 *	-.0377303*
	ΔZ_t	1.501098	.260382	.0698802
	μ	4.531252**	7.991661	4.104394**
	Chosen Model[2]	PMG		
(3)	**Labour Protection relating to Regulation of Working Time, RT (Z)**			
	Long-term Relationship			
	Y (GGDP)	.0147514**	32.90297	-1.861119**
	Z (RT)	51.11888**	-1915.039	-8.426372
	Short-term Relationship			
	θ	-.1854685**	-.3172601**	-.2020437**
	ΔX_{t-1}	.2554598**	.0294361	.1400496**
	ΔX_{t-2}	.1187972**	-.0167457	.0946408**
	ΔY_t	-.3130714**	.4139579**	.0511085
	ΔY_{t-1}	-.257715**	.1855796**	-.0574639**
	ΔY_{t-2}	-.1126625**	.0800786*	-.0403326*
	ΔZ_t	-19.14442*	-15.34793	1.29515
	μ	-2.016399**	3.327752	5.622681**
	Chosen Model[2]			DFE

(4)	**Labour Protection relating to Regulation of Dismissal, RD (Z)**			
	Long-term Relationship			
	Y (GGDP)	-3.129729**	.6353078	-1.896393**
	Z (RD)	-33.41751**	3.541366	-3.284436
	Short-term Relationship			
	θ	-.1520847**	-.3455518**	-.1997061**
	ΔX_{t-1}	.0435357	.0264569	.1383917**
	ΔX_{t-2}	-.0474694	-.0248064	.0930666**
	ΔY_t	.0865302	.3110901	.0520724
	ΔY_{t-1}	.0030248	.1204425	-.0580634**
	ΔY_{t-2}	.0068423	.0578996	-.04106*
	ΔZ_t	12.66582	17.16045	2.586161
	μ	6.526924**	13.40049*	5.015361**
	Chosen Model[2]	PMG		
(5)	**Labour Protection relating to Employee Representation, ER (Z)**			
	Long-term Relationship			
	Y (GGDP)	-3.169465**	-3.903345*	-1.901031**
	Z (ER)	11.32638**	13.25416	-1.34026
	Short-term Relationship			
	θ	-.161759**	-.3247342**	-.1988404**
	ΔX_{t-1}	.0524843	.0541643	.1363921**
	ΔX_{t-2}	-.0205833	-.0066755	.0943367**
	ΔY_t	.1376205**	.2871335**	.0519673

	ΔY_{t-1}	.0259576	.1121816*	-.059497**
	ΔY_{t-2}	.0345306	.0553404*	-.0425389**
	ΔZ_t	3.606302	2.096675	3.875206
	μ	3.488617**	5.732701**	4.792642**
	Chosen Model[2]	PMG		
6.	**Impact of Labour Protection relating to Industrial Action, IA (Z) on**			
	Long-term Relationship			
	Y (GGDP)	-3.870962**	-4.345729*	-1.89049**
	Z (IA)	-40.9487**	221.0408	1.18994
	Short-term Relationship			
	θ	-.1336006**	-.3128196**	-.1993869**
	ΔX_{t-1}	.0207867	.0539986	.1388823**
	ΔX_{t-2}	-.022965	.008572	.0936146**
	ΔY_t	.1266301*	.2472544**	.0513329
	ΔY_{t-1}	.0231658	.1028609	-.0580865**
	ΔY_{t-2}	.0187719	.0601196	-.040912**
	ΔZ_t	-6.324975	-2.447531	.5206674
	μ	6.269741**	-6.335431	4.575723**
	Chosen Model[2]	PMG		

* Significant at 5 per cent level.

** Significant at 1 per cent level.

1 See Table 1 note 1.

2 See Table 1 note 2.

Table 4. Causal relationship among labour regulation, unemployment rate and GDP growth rate in 63 countries, 1991-2013: VEC Causality Analysis

Part No	Dependent variable	Excluded independent variable	Chi-square	Degree of freedom	Probability
I.A					
	TOTALU				
		GGDP	28.21613**	2	0.0000
		ALLLAB	0.657682	2	0.7198
	GGDP				
		TOTALU	21.83796**	2	0.0000
		ALLLAB	1.293538	2	0.5237
	ALLLAB				
		TOTALU	0.486517	2	0.7841
		GGDP	0.043413	2	0.9785
I.B					
	YOUTHU				
		ALLLAB	0.955398	2	0.6202
		GGDP	28.38116**	2	0.0000
	GGDP				
		ALLLAB	1.182799	2	0.5536
		YOUTHU	17.51055**	2	0.0002
	ALLLAB				
		YOUTHU	0.404080	2	0.8171
		GGDP	0.016631	2	0.9917
II.A	TOTALU				
		GGDP	28.72205**	2	0.0000
		AC	2.413114	2	0.2992
	GGDP				
		TOTALU	21.81807**	2	0.0000
		AC	0.237224	2	0.8882
	AC				
		TOTALU	0.697236	2	0.7057
		GGDP	0.996034	2	0.6077
II.B	YOUTHU				
		GGDP	28.45877**	2	0.0000
		AC	2.854787	2	0.2399
	GGDP				
		YOUTHU	17.77444**	2	0.0001
		AC	0.257692	2	0.8791
	AC				
		YOUTHU	0.042010	2	0.9792
		GGDP	1.101131	2	0.5766
III.A	TOTALU				

		GGDP	27.33986**	2	0.0000
		RT	0.358725	2	0.8358
	GGDP				
		TOTALU	22.68703**	2	0.0000
		RT	6.741335*	2	0.0344
	RT				
		TOTALU	0.668054	2	0.7160
		GGDP	3.253739	2	0.1965
III.B	YOUTHU				
		GGDP	27.11455**	2	0.0000
		RT	1.215597	2	0.5445
	GGDP				
		YOUTHU	18.22627**	2	0.0001
		RT	6.499512**	2	0.0388
	RT				
		YOUTHU	0.207576	2	0.9014
		GGDP	2.971913	2	0.2263
IV.A	TOTALU				
		GGDP	26.36193**	2	0.0000
		RD	1.622008	2	0.4444
	GGDP				
		TOTALU	22.67152**	2	0.0000
		RD	0.777440	2	0.6779
	RD				
		TOTALU	0.870160	2	0.6472
		GGDP	0.961389	2	0.6184
IV.B	YOUTHU				
		GGDP	26.51501**	2	0.0000
		RD	2.144202	2	0.3423
	GGDP				
		YOUTHU	18.29557**	2	0.0001
		RD	0.720094	2	0.6976
	RD				
		YOUTHU	1.586901	2	0.4523
		GGDP	1.301163	2	0.5217
V.A	TOTALU				
		GGDP	29.65759**	2	0.0000
		ER	6.329378**	2	0.0422
	GGDP				
		TOTALU	21.96070**	2	0.0000
		ER	1.762230	2	0.4143
	ER				
		TOTALU	1.970337	2	0.3734
		GGDP	4.610896	2	0.0997

V.B	YOUTHU				
		GGDP	29.40567**	2	0.0000
		ER	8.980469*	2	0.0112
	GGDP				
		YOUTHU	17.68131**	2	0.0001
		ER	1.665063	2	0.4349
	ER				
		YOUTHU	2.320846	2	0.3134
		GGDP	4.687064	2	0.0960
VI.A	TOTALU				
		GGDP	27.83743**	2	0.0000
		IA	2.305311	2	0.3158
	GGDP				
		TOTALU	21.67828**	2	0.0000
		IA	2.859865	2	0.2393
	IA				
		TOTALU	0.363395	2	0.8339
		GGDP	2.538226	2	0.2811
VI.B	YOUTHU				
		GGDP	27.70982**	2	0.0000
		IA	2.396006	2	0.3018
	GGDP				
		YOUTHU	17.58598**	2	0.0002
		IA	2.852920	2	0.2402
	IA				
		YOUTHU	0.068173	2	0.9665
		GGDP	2.346121	2	0.3094

*Significant at the 5% level: the null hypothesis of no causality is rejected.

** Significant at the 1% level: the null hypothesis of no causality is rejected.