Spend, Baby, Spend: Windfalls, Specialization and Government Misallocation

Radosław (Radek) Stefański

Department of Economics, University of St Andrews and OxCarre, University of Oxford

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Introduction

- Investigate impact of structural transformation in open economy on sec/agg productivity with focus on role of government
- In particular examine ST induced by windfall revenue
- Concentrate on natural resource windfalls (fuel, ore, metals), but same mechanism for aid, war reparations, EU structural funds, bailouts etc.
- 1) Macro Data: Govt. emp. share greater in resource-rich ctries
- 2) Construct model in which (optimally) higher government emp. emerges as consequence of windfall-induced labor reallocation
- 3) Compare opt. and obs. size of govt in order to obtain estimate of misallocation and impact on welfare and productivity

Introduction

- Why should government employment be larger in RR countries?
- Governments largely provide non-traded services ex: law enforcement, defense, infrastructure, arbitration etc.
- So, standard 'Dutch-Disease' mechanism should hold:
- Traded (mfg.) shrinks and non-traded (non-mfg.) to expand
- Need to capture windfall induced changes in sect size/prod *not* driven by govt: Kuralbayeva and Stefanski (JIE, 2013)
- Provide evidence that resource rich regions have:

 a. small but relatively productive Mfg sectors
 b. large but relatively unproductive non-Mfg sectors

 Theory of specialization: explains prod. as a conseq. of size
 - Survival of fittest: Mfg. shrinks, only best workers remain
- In this paper: Add role for productive government to above

This is interesting because:

- Pins down an important channel of the 'resource curse'
 RR countries tend to employ 'too-many' people in govt
- I take the most charitable view of government possible:
- No: corruption, waste, electioneering, graft, conflict etc.
- Yet, predicted opt. govt. still far smaller than obs. govt.
- Indicative of poor quality of institutions in RR countries
- Literature also identifies poor inst. as source of res curse: van der Ploeg (2010), Robinson et al. (2006), Collier and Goderis (2009), Collier and Hoeffler (2005) etc.

Contribution: use entirely diff, compl, model-based method:
1) Provide new evidence confirming that inst. qual is a key driver of res curse through its impact on labor allocation
2) Quantify prod/welfare cost of this particular channel

Outline:

- Establishing the Facts
- Model
- Estimation/Results

Data:

$$Y = \underbrace{\underbrace{A + C + S}_{\text{Non Res. Non-Mfg.}} + \underbrace{M}_{\text{Mfg.}} + \underbrace{MU}_{\text{Mining and Utilities}}$$

- Macro Data: Cross Country Panel (33 ctries, 1980-2007)
- Sectoral productivity:

$$Y_s = D_s(K_s)^{\alpha_s}(h_s L_s)^{1-\alpha_s}$$

- Sectoral size: emp. shares
- Proportion of the labor force employed in the public sector
- Disaggregated govt. data scarce but overwhelmingly in NM
- Natural resource windfalls: (fossil fuel, metals, ore exports)/GDP

RR regions have:

- 1) small but relatively productive Mfg sectors (K&S, 2013)
- 2) *large* but *relatively unproductive non-Mfg* sectors (K&S, 2013)
- 3) *large* government sectors (This paper)

Facts 1 & 2: Baseline Results from KS (2013) <

	M. Emp.	$\log(D_m)$	$\log(D_s)$	
log(NRE)	-0.014*** (0.002)	0.068*** (0.014)	-0.012*** (0.002)	
logLprod	0.650*** (0.127)			
sqlogLprod	-0.031*** (0.006)			
log(D)		1.458*** (0.078)	0.888*** (0.011)	
Time FE	yes	yes	yes	
Obs.	340	340	340	
<i>R</i> ²	0.256	0.567	0.953	
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

- RR regions have:
- 1) small but relatively productive Mfg sectors
- 2) large but relatively unproductive non-Mfg sectors

Fact 3: RR countries: relatively larger govt.

	G. Emp.	G. Emp.	G. Emp.	G. Emp.	
log(NRE)	0.014*** (0.004)	0.017*** (0.004)	0.013*** (0.004)	0.021*** (0.004)	
logLprod			0.045*** (0.008)	0.045*** (0.008)	
NM. Emp.				-0.595*** (0 103)	
Time FE	no	yes	yes	yes	
Obs.	340	340	340	340	
R^2	0.045	0.061	0.139	0.220	
Standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

RR regions have:

- 1) small but relatively productive Mfg sectors
- 2) large but relatively unproductive non-Mfg sectors
- 3) *large* government sectors

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A story of self-selection and (de)specialization

- Roy (1956) model of self selection
- Well known: resources induce ST from M to NM:
- Higher income from resources \rightarrow Higher demand for all goods
- M (traded) imported, NM (non-traded) produce locally
- Labor shifts to NM to satiate higher demand
- Self-selection of people takes place:
- Those best suited to M remain (M prod. \uparrow)
- New workers in NM less productive than old (NM prod. \downarrow)
- Govt. provides productive public goods to private firms:
- Paid for by a lump sum tax on consumers
- Since govt goods NT, same reallocation effect as above
- Most charitable view of govt possible (best chance of success)

Model:

- SOE, Static, Measure 1 of agents, abilities: $\{z_s^i, z_m^i\} \sim D(z_s, z_m)$
- NM (non-traded), Oil and M (both traded)
- Trade balanced, period by period

• Cons:
$$\max((c_s^i)^{\frac{\sigma-1}{\sigma}} + \nu(c_m^i)^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}$$

s.t. $p_s c_s^i + c_m^i \le w^i + G(L_g) p_o O - T$

• Firms: $\max p_s Y_s - \int_{i \in \Omega^s} w_s^i L_s^i di$ s.t. $Y_s = AG(L_g) \int_{i \in \Omega^s} z_s^i di$ $\max Y_m - \int_{i \in \Omega^m} w_m^i L_m^i di$ s.t. $Y_m = AG(L_g) \int_{i \in \Omega^m} z_m^i di$

• Trade:
$$m - G(L_g)p_o O = 0$$

• Govt:
$$G(L_g) = 1 - \frac{\psi}{\psi + L_g}$$
 $T = w_g L_g$

• MC:
$$L_k \equiv \int_{i \in \Omega^k} di \text{ for } k = s, m, g \quad L_s + L_m + L_g = 1$$

 $c_s = Y_s$
 $c_m = Y_m + m$

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Govt Employment

- How is govt. employment chosen?
- Two cases considered:

1) Govt. employment is exogenous, taken from data

2) Optimal govt. employment from following maximization:

$$\max_{0 \le L_g \le 1} \int_{i \in \Omega} U(c_s^i(L_g), c_m^i(L_g)) di, \tag{1}$$

 $c_s^i(L_g)$ and $c_m^i(L_g)$: demand functions from utility max. problem

Heterogenous Agents: Simple Example (constant L_g)



- Assume deg. D: $\{z_s^i, z_m^i\} = \{e^i, e^{1-i}\}; \sigma = 1; \nu = 1; A = 1$
- $w_m^i = G(L_g) z_m^i$ and $w_s^i = p_s G(L_g) z_s^i \to w^i = \max\{w_g, w_s^i, w_m^i\}$
- We can show that: $p_s = 1 + \frac{p_o O}{e} \therefore \uparrow O \to \uparrow p_s \to \downarrow \overline{i}_s, \overline{i}_m$
- \uparrow M Prod and \downarrow S and NM Prod (if L_g not too big)

Heterogenous Agents: Simple Example (optimal L_q)



- Suppose govt re-optimizes after increase in O• It can be shown that: $\frac{\partial L_g^{opt}}{\partial poO} > 0$ $\uparrow\uparrow$ M Prod and \downarrow (?) S and NM Prod

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Estimation

- Assume $\{z_s^i, z_m^i\}$ are iid and drawn from a Frechet dist.
- Generalizing to correlated skills doesn't change results much
- Why Frechet?
- Maximal extreme value dist.: agents best activity within sector
- L&W(2013) and K&S(2013) to explain talent distributions
- Eaton & Kortum (2002) param. Ric. models of int. trade
- Log Linear solutions
- Frechet governed by dispersion parameter, $\theta = 2.43$
- Match wage dispersion (US CPS)
- Set $\psi = 0.025$ so that optimal govt employment in model without oil matches govt emp. in 'average' RP country
- Match oil exports directly to data

	Data		Model		Mo	odel/Da	ata
Windfall		No	Obs.	Opt.	No	Obs.	Opt.
Elasticities		Gov.	Gov.	Gov.	Gov.	Gov.	Gov.
M. Emp., L_m	-1.42	-0.96	-1.61	-0.78	0.67	1.14	0.55
M. Prod, D_m	6.82	2.97	2.54	2.21	0.44	0.37	0.32
NM. Prod, D_s	-1.25	-0.74	-0.75	-0.38	0.59	0.6	0.3
NM. Price, p_s	4.8	3.67	2.68	2.69	0.76	0.56	0.56
G. Emp., L_g	1.65	_	1.65	0.21	_	1	0.13

Results: Cross Country Emp. and Prod.

- Ex cross-cntry var in res explains large part of prod/size diff
- ...even accounting for obs govt size
- 'Optimal' govt size much smaller than obs govt size
- Results in smaller size/prod effects:
- Govt misallocation exacerbates these aspects of DD
- How does govt misallocation impact agg. prod and welfare?

Results: Observed Resource Curse

	Rel. Prod. (D^{obs}/D^{opt})	Rel. Welf. (U^{obs}/U^{opt})	Rel. Prod. (D^{obs}/D^{opt})	Rel. Welf. (U^{obs}/U^{opt})	
log(NRE)	-0.007*** (0.001)	-0.005*** (0.001)			
NRE			-0.194***	-0.122***	
			(0.025)	(0.024)	
Time FE	yes	yes	yes	yes	
Obs.	340	340	340	340	
R^2	0.114	0.085	0.182	0.106	
Standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

- 10 pp increase in resource export share is associated with:
- a 1.94% lower aggregate productivity
- a 1.22% lower welfare
- The consequences of govt. misallocation are large

Conclusion:

- Pin down an important channel of the 'resource curse'
 - RR countries tend to employ 'too-many' people in govt
 - Indicative of poor quality of institutions in RR countries
 - Has a large impact on productivity and welfare
- Ties into an emp lit that identifies inst. as source of res curse: van der Ploeg (2010), Robinson et al. (2006), Collier and Goderis (2009), Collier and Hoeffler (2005) etc.
- Contribution: use entirely diff, compl, model-based method:
 1) Provide new evidence confirming that inst. qual is a key driver of res curse through its impact on labor allocation
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