

Job Variety, Firms and Development

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Papers

- ▶ *Innovation, growth and the environment* (2023) Robin Burgess, Stefano Caria, Tim Dobermann, Allegra Saggese
- ▶ *Labor Markets and Poverty in Village Economies* (2017) Oriana Bandiera, Robin Burgess, Narayan Das, Selim Gulesci, Imran Rasul, Munshi Sulaiman
- ▶ *Why do People Stay Poor* (2022) Clare Balboni, Oriana Bandiera, Robin Burgess, Maitreesh Ghatak, Anton Heil
- ▶ *Economic Development and the Organisation of Labour: Evidence from the Jobs of the World Project* (2022) Oriana Bandiera, Ahmed Elsayed, Anton Heil, Andrea Smurra
- ▶ *Occupational Variety and Economic Development* (WP) Oriana Bandiera, Robin Burgess, Anton Heil, Gabriel Leite-Mariante
- ▶ *Deciphering the Miracle on the Han: How South Korea Escaped Poverty and Transformed its Economy* Ignacio Banares Sanchez, Oriana Bandiera, Robin Burgess, Tim Doberman, Jay Euijung Lee, Jeongkyung Won, Hyunjoo Yang

Introduction

- ▶ Much of development economics is focused on low job-variety settings
- ▶ Much macro development is focused on how to get people into more productive jobs
- ▶ We want to connect these two literatures by looking at development through the lense of job variety

Job variety in 3 settings

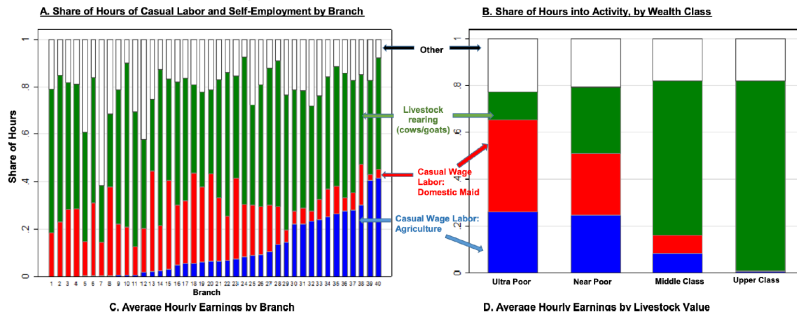
- 1 Bangladesh - low job variety
 - 2 Brazil - Job variety mirroring the world
 - 3 Korea - high job variety
- ▶ We're looking across the full arc of economic development from Bangladesh to Korea through the lens of job variety
 - ▶ A lot of job variety comes from the creation of larger firms employing salaried workers

Bangladesh

2=farming; 3=agriculture day labour(other's field); 4=non agri. Day labour (e.g. construction/road maintenance); 5=factory labour (e.g. garments); 6=livestock rearing; 7=poultry farm; 8=vegetable cultivation/nursery; 9=fisherman/fishery; 10=maid-servant; 11=processing food for selling(making puffed rice, etc.); 12=sewing/tailoring/handicraft in exchange of money; 13=rickshaw/van/truck/bus driver/helper; 14=hawker; 15=business from home; 16=owner of/worker at shop/restaurant; 17=large business/wholesaler/workshop; 18=skilled labour (mechanic/blacksmith/potter/carpenter/mason); 19=community health worker; 20=teacher; 21=service holder (doctor/nurse/engineer/lawyer/journalist/writer); 22=private/NGO officer; 23=govt.officer; 24= private/NGO worker; 25=govt. worker; 26=politician/Union Parishad member/chairman; 27=imam/priest; 28=student; 29=beggar; 30=unemployed looking for work; 31=unable to work/retired/not looking for work; 32=land in share-cropping/rent; 33=renting out asset (shop, tractor, etc.); 34=private tuition; 35=small business/vegetable/betel leaf shop/timber business/ cloth/mobile/triller business/selling packet and carton; 36=old age allowance/widow allowance/freedom fighter allowance/pention; 37=Ayurvedic physician; 38=village police; 39=contractor; 40=deed writer; 41=lives abroad; 42=wood cutter; 43=mad; 44=marriage registrar/Kazi; 45=Hafez; 46=singer/artist; 47=guard/watchman/ gateman; 48=collects paddy/fruits/nuts; 49=prisoner; 50=village doctor; 51=butcher; 52=boatman; 53=clerk; 54=broker (of cow); 55=chef; 56=money lender; 57=cartman; 58=barber; 59=matchmaker; 60= land surveyor; 61=a village watchman/chowkidar; 62=mawlana; 63=player; 64=Sericulture; 65=leaseholder; 66= musical instrument player; 67=homioopath doctor; 68=acts in play/drama; 69=supplier of human resource to foreign countries; 70=chairman/member; 71=painter; 72=laundryman; 73=cobbler; 74=owner of ticket counter; 75=professional circumcission conductor; 76=vendor; 77=palanquin bearer; 78=snake charmer; 79=photographer; 80=in prison(same as 49); 81=sweeper; 82=rickshaw garage/garage business; 83=Astrologer; 84=thief; 85=betel leaves cultivation; 86=street performer with monkey show; 87=nurse-maid/waiting maid; 88=don't know; 89=VGD; 90=making fishing net; 99=N/A, , 100=students (5-14), 101=Domestic income, **102=Teacher**

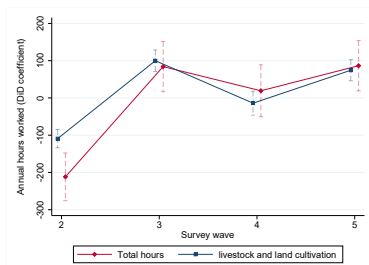
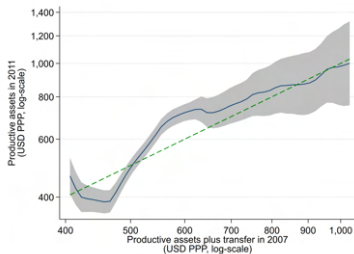
Bangladesh

Figure 1: Features of Rural Labor Markets for Women



Bangladesh

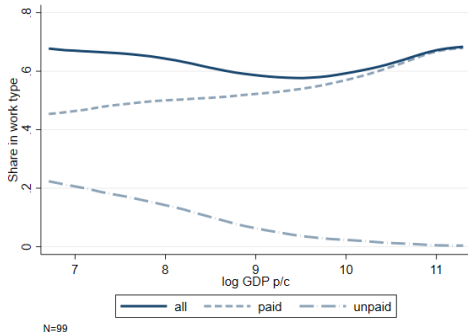
- ▶ Moving individuals from casual wage labour to self-employment in livestock can have large welfare effects
- ▶ In some settings, people are trapped and cannot change occupation by themselves



Bangladesh

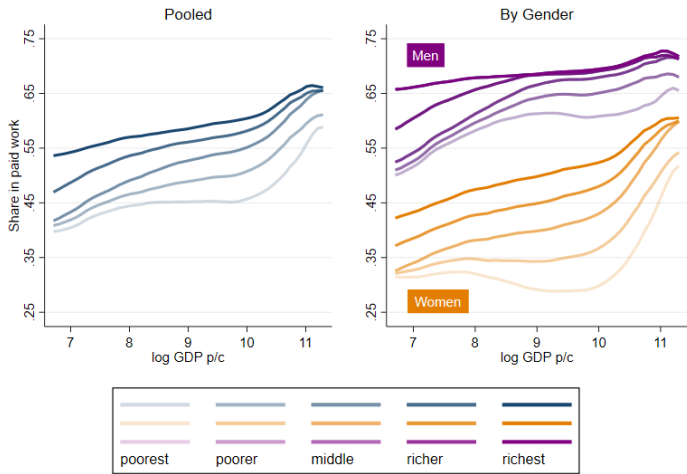
- ▶ In rural Bangladesh people only do 3 things
- ▶ There are possible improvements in welfare from changing the productive activities of the poor
- ▶ This is what a lot of development economics has focused on this and some improvements are possible within this occupational structure
- ▶ But large change are accompanied by fundamental transformations in the organisation of labour

Jobs of the World - Marketization



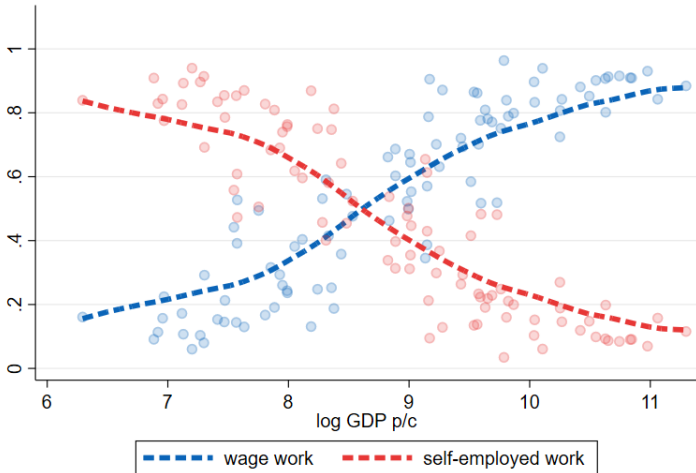
at low levels of development people work to produce what they consume, then markets split the two choices

Jobs of the World - Marketization, wealth vs. gender



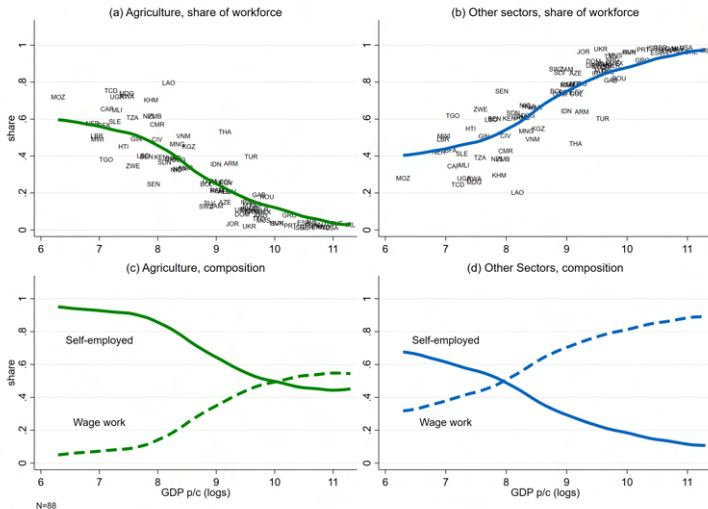
N=86

Jobs of the World - Emergence of Firms

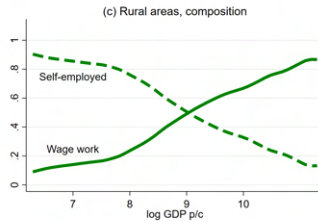
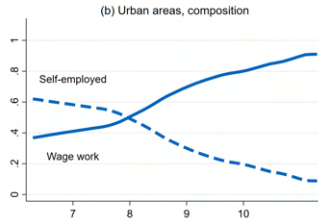
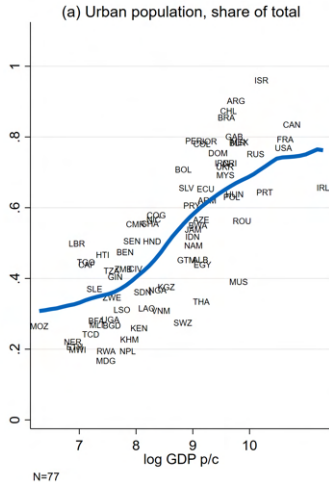


N=91

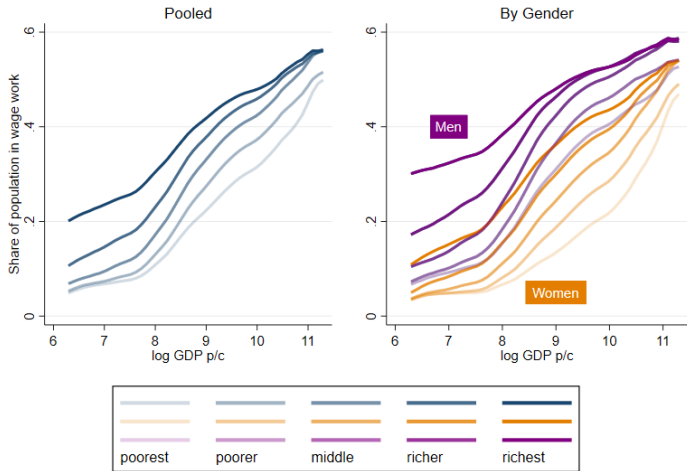
Jobs of the World - Emergence of Firms, agriculture



Jobs of the World - Emergence of Firms, urban



the emergence of firms by gender and wealth



N=76

The Third Transition - Job Variety

- ▶ With development firms grow
- ▶ Well known: more growth -> more vertical differentiation -> higher productivity -> more growth..
- ▶ Is that all?

Measuring job variety

- ▶ Jobs defined according to International Standard Classification of Occupations (ISCO) 1988 version - 9 major job groups and 372 possible jobs at the 3-digit level.
- ▶ We measure job variety as the smallest number of distinct 3-digit codes that jointly make up 90% of the workforce

Measuring job variety

Examples of jobs by ISCO-1 code:

- 1 Managers – “Sales, marketing and development managers”
- 2 Professionals – “University and higher education teachers”
- 3 Technicians – “Veterinary technicians and assistants”
- 4 Clerks – “Tellers, money collectors and related clerks”
- 5 Services – “Shop salespersons”
- 6 Agriculture – “Animal producers”
- 7 Crafts – “Printing trades workers”
- 8 Machine operators – “Heavy truck and bus drivers”
- 9 Elementary – “Street vendors ”

Jobs accounting for 90% of workforce

Mozambique (2007)

ISCO	Description
331	Primary education teaching associate professionals
343	Administrative associate professionals
516	Protective services workers
523	Stall and market salespersons
613	Market-oriented crop and animal producers
621	Subsistence agricultural and fishery workers
711	Miners, shotfirers, stone cutters and carvers
712	Building frame and related trades workers
742	Wood treaters, cabinet-makers and related trades workers
832	Motor-vehicle drivers
913	Domestic and related helpers, cleaners and launderers
915	Messengers, porters, doorkeepers and related workers

Jobs accounting for 90% of workforce India (2009)

ISCO	Description
121	Directors and chief executives
232	Secondary education teaching professionals
241	Business professionals
331	Primary education teaching associate professionals
341	Finance and sales associate professionals
419	Other office clerks
512	Housekeeping and restaurant services workers
513	Personal care and related workers
514	Other personal services workers
516	Protective services workers
522	Shop salespersons and demonstrators
523	Stall and market salespersons
611	Market gardeners and crop growers
612	Market-oriented animal producers and related workers
613	Market-oriented crop and animal producers
621	Subsistence agricultural and fishery workers
712	Building frame and related trades workers
713	Building finishers and related trades workers
714	Painters, building structure cleaners and related trades workers
	Metal moulders, welders, sheet-metal workers, structural- metal preparers, and related trades workers
721	
723	Machinery mechanics and fitters
724	Electrical and electronic equipment mechanics and fitters
741	Food processing and related trades workers
743	Textile, garment and related trades workers
832	Motor-vehicle drivers
911	Street vendors and related workers
913	Domestic and related helpers, cleaners and launderers
915	Messengers, porters, doorkeepers and related workers
921	Agricultural, fishery and related labourers
931	Mining and construction labourers
932	Manufacturing labourers
933	Transport labourers and freight handlers

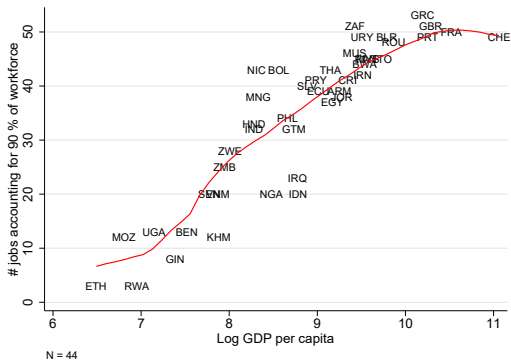
Jobs accounting for 90% of workforce

France (1999)

ISCO Description

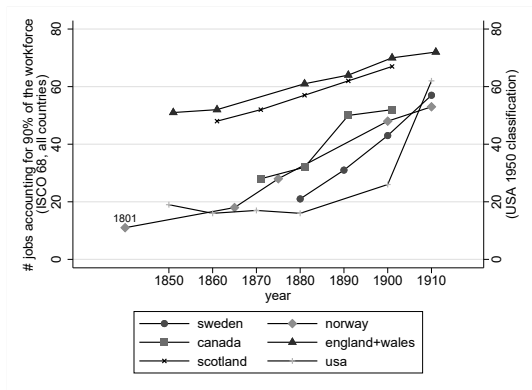
122	Production and operations department managers	512	Housekeeping and restaurant services workers
123	Other department managers	513	Personal care and related workers
131	General managers	514	Other personal services workers
213	Computing professionals	522	Shop salespersons and demonstrators
214	Architects, engineers and related professionals	611	Market gardeners and crop growers
222	Health professionals (except nursing)	612	Market-oriented animal producers and related workers
232	Secondary education teaching professionals	613	Market-oriented crop and animal producers
299	Professionals no elsewhere classified	712	Building frame and related trades workers
311	Physical and engineering science technicians	713	Building finishers and related trades workers
312	Computer associate professionals		Metal moulders, welders, sheet-metal workers, structural-metal preparers, and related trades workers
322	Modern health associate professionals (except nursing)	721	preparers, and related trades workers
323	Nursing and midwifery associate professionals	722	Blacksmiths, tool-makers and related trades workers
331	Primary education teaching associate professionals	723	Machinery mechanics and fitters
334	Other teaching associate professionals	724	Electrical and electronic equipment mechanics and fitters
341	Finance and sales associate professionals	741	Food processing and related trades workers
343	Administrative associate professionals	799	Craft and related trade workers not elsewhere classified
344	Customs, tax and related government associate professionals	815	Chemical-processing-plant operators
346	Social work associate professionals	826	Textile-, fur- and leather-products machine operators
411	Secretaries and keyboard-operating clerks	827	Food and related products machine operators
413	Material-recording and transport clerks	828	Assemblers
414	Library, mail and related clerks	832	Motor-vehicle drivers
419	Other office clerks	833	Agricultural and other mobile-plant operators
421	Cashiers, tellers and related clerks	913	Domestic and related helpers, cleaners and launderers
499	Clerks not elsewhere classified	915	Messengers, porters, doorkeepers and related workers
		932	Manufacturing labourers
		933	Transport labourers and freight handlers

job variety grows with development across countries...



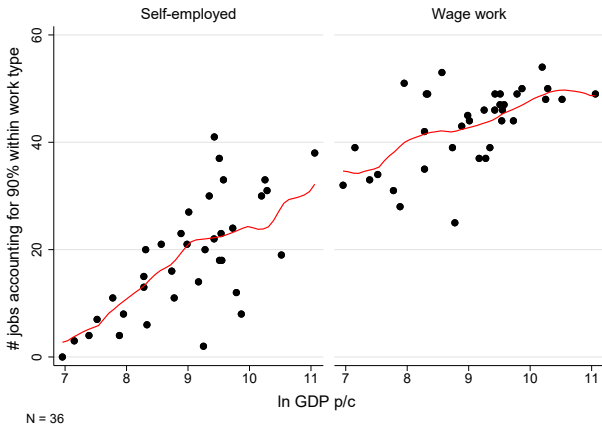
job variety grows with development

... and over time

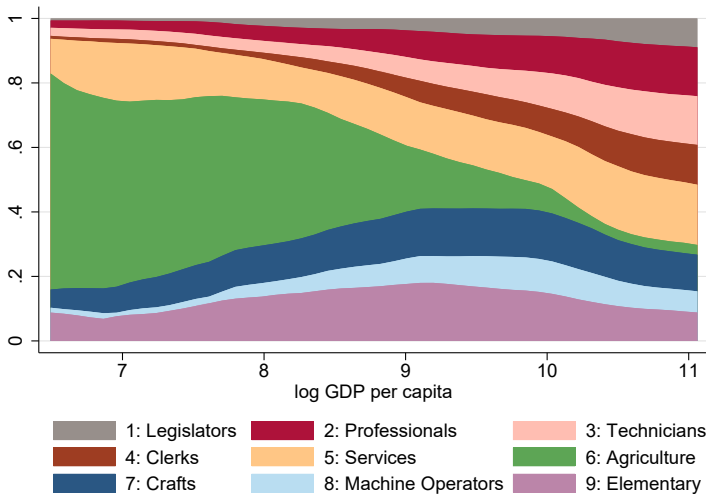


► Micro-data from historical censuses (IPUMS)

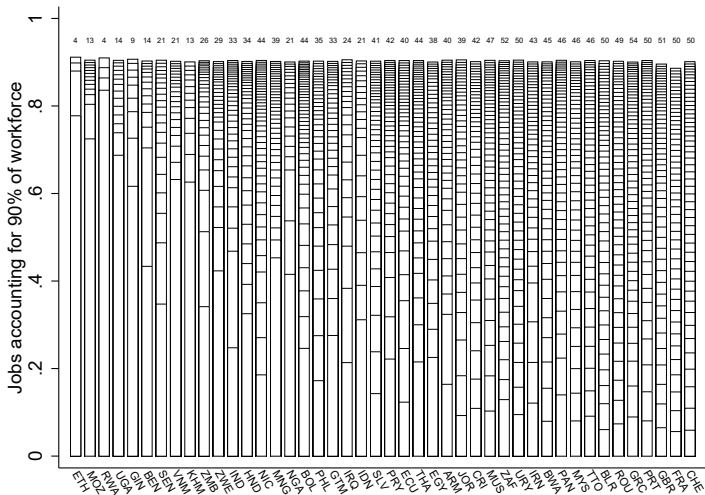
Driven by firms?



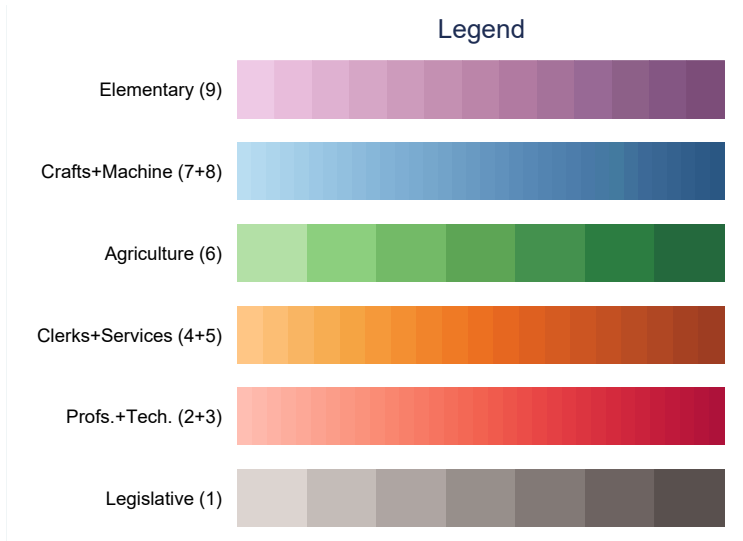
By ISCO-1 digit



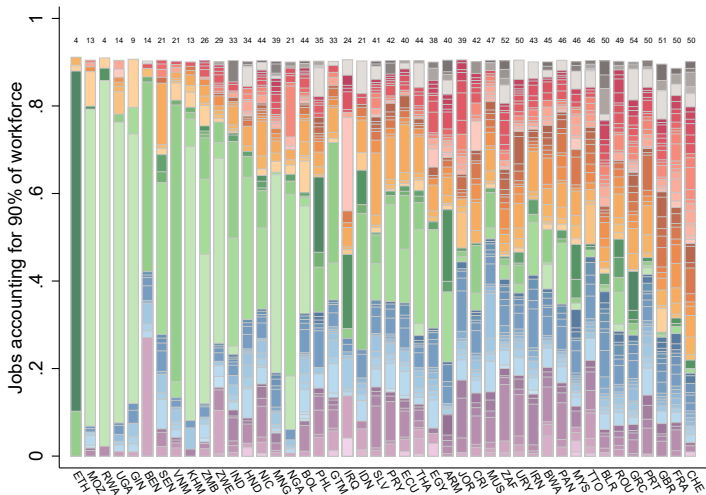
By frequency



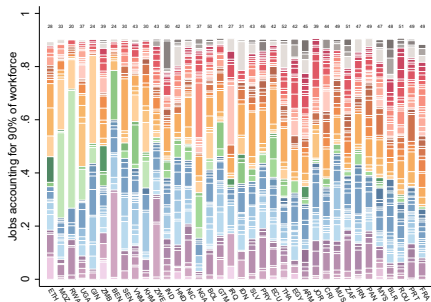
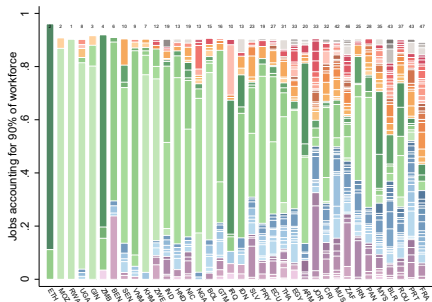
Now colour jobs by ISCO-1 and average skill



By ISCO-1 digit, frequency and skill intensity



Rural vs. Urban

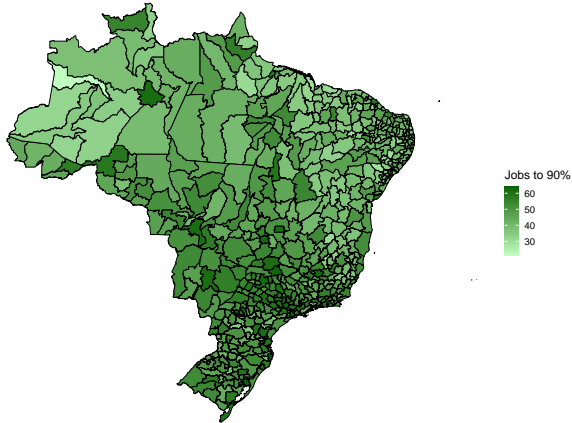


Brazil - Data

Census data

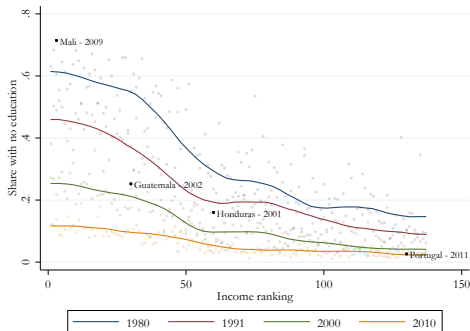
- ▶ all work, formal and informal
- ▶ Harmonised micro-data from 10% sample from National Census, 2000 and 2010
- ▶ 107 industries (3-digit)
- ▶ 558 micro-regions (usual geographic aggregation for a market) - variation in development levels
- ▶ Roughly equivalent to a US commuting zone
- ▶ Average micro-region population in 2010: 340k

Brazil - job variety across micro-regions



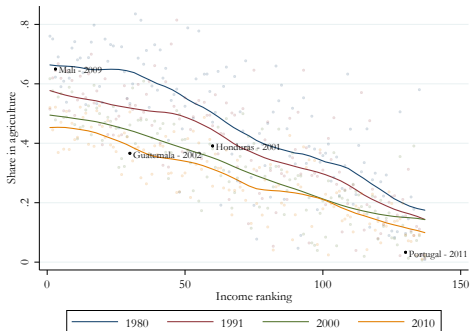
Brazil - education by year

- ▶ Share with no education vs income ranking, by year



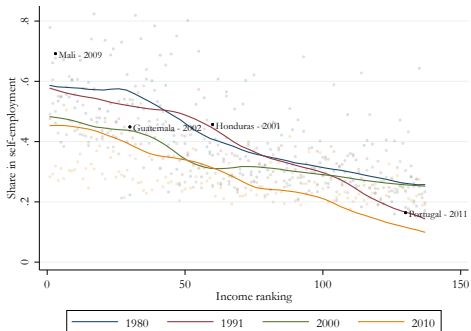
Brazil - employment in agriculture by year

- Share in agriculture vs income ranking, by year

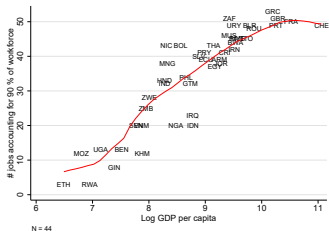


Brazil - self-employment by year

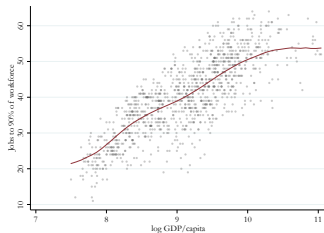
- ▶ Share in self-employment vs income ranking, by year



job variety xregions mirrors xcountry patterns

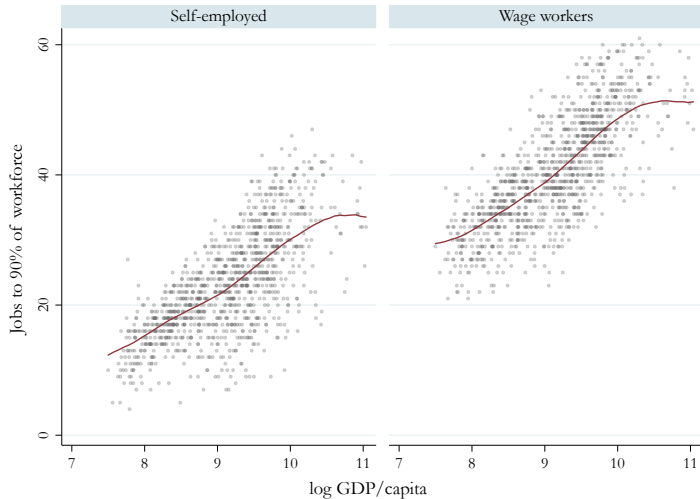


(a) xcountry

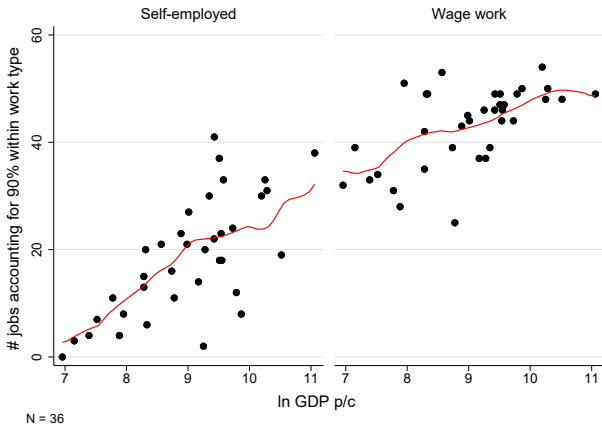


(b) brazil

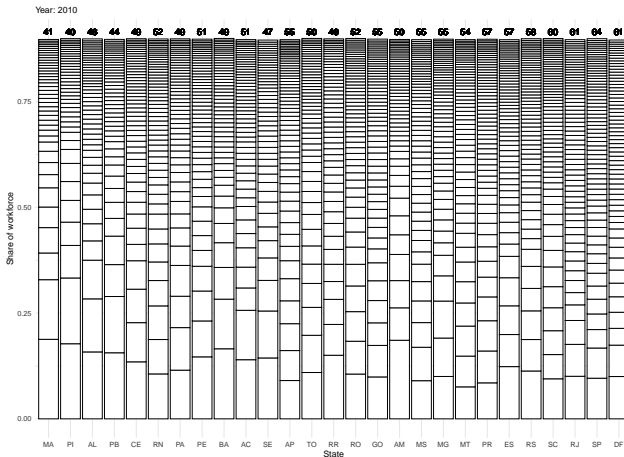
Diversification by work type



... and across the world

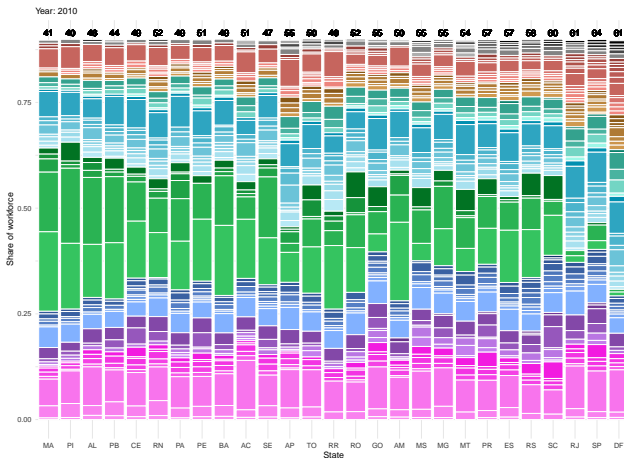


Within Brazil - frequency of jobs increases with GDP

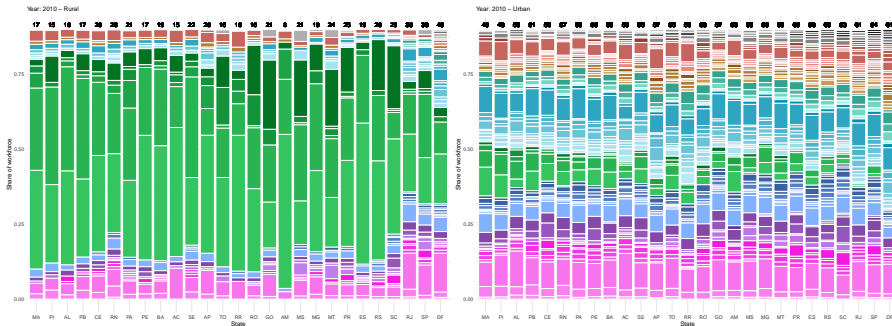


States are ordered by GDP/capita

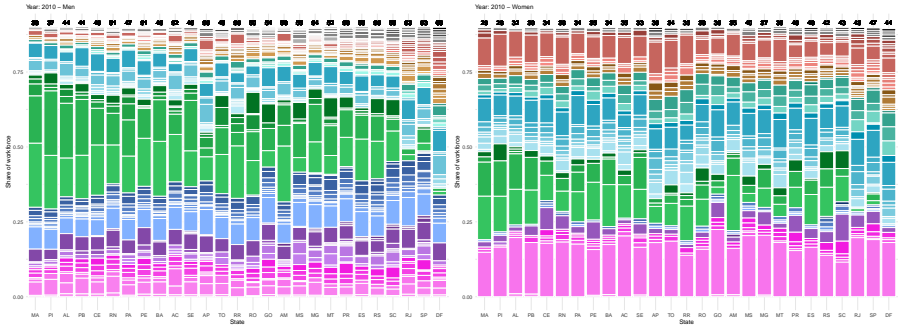
Within Brazil - by ISCO 1-digit, frequency and skill



Within Brazil - Rural vs. Urban

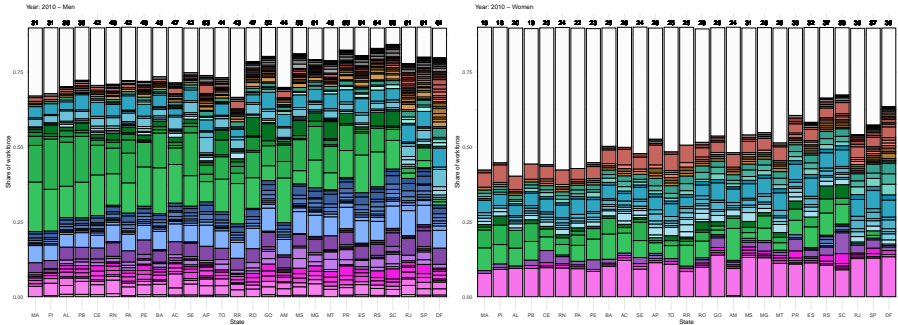


Within Brazil - Men vs. Women



Only considering those in employment

Within Brazil - Men vs. Women

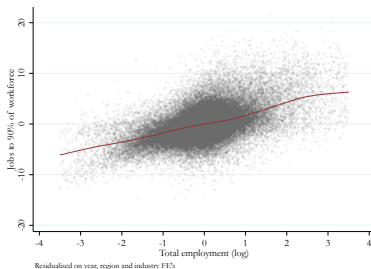


Considering a proxy for domestic work

jobs are more diverse in industries with more employees

At the industry x micro-region level, residualized on industry and micro-region fixed effects - pooled 2000 and 2010 census

$$Jobs_{irt} = \alpha + \beta \log(Employment_{irt}) + \gamma_i + \delta_r + \lambda_t + \epsilon_{irt}$$

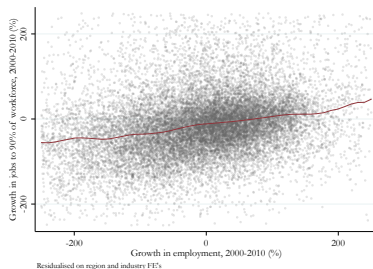


$$\hat{\beta} : 2.01(.13)$$

new jobs appear more quickly in industries with higher employment growth

At the industry x micro-region level, residualised on industry and micro-region fixed effects

$$\Delta Jobs_{irt} = \alpha + \beta \Delta \log(Employment_{irt}) + \gamma_i + \delta_r + \epsilon_{irt}$$



$$\hat{\beta} : 0.08(.002)$$

Next steps - Data

RAIS

- ▶ Universe of **formal** employment contracts, 1985-2021
- ▶ 6-digits occupation and industry classifications, comparable to international standards
- ▶ Able to construct firm-level panel

Regional exports

- ▶ Micro-region level exports, 1997-2022
- ▶ 4-digit HS product code and destination country
- ▶ Allows us to construct heterogeneous exposure to trade shocks (e.g. China entry in WTO, commodity fluctuations, trade liberalization)

Next steps - Empirical analysis

- ▶ Disentangle job creation: within firms x new entrants
- ▶ Does a higher demand shock coming from international trade affect:
 - ▶ Firm entry?
 - ▶ Employment and wages?
 - ▶ Job variety?
- ▶ Mechanisms: direct exposure x demand spillovers
 - ▶ Effect on firms in tradable x non-tradable industries

Next steps - Theory

Why might job fractionalization lead to higher firm productivity?

- ▶ Specialisation: fewer tasks per worker
- ▶ Specialisation: learning by doing
- ▶ Better match between tasks and worker's skill/interests
- ▶ E.g. Rodriguez-Clare (1996), Chaney and Ossa (2012), Bassi et al. (2023)

Other reasons why fractionalization might increase with growth

- ▶ Adoption of new technologies introduces new occupations
- ▶ Higher income allows workers to get more specialised training
- ▶ Increased market size allows production of more varieties of goods

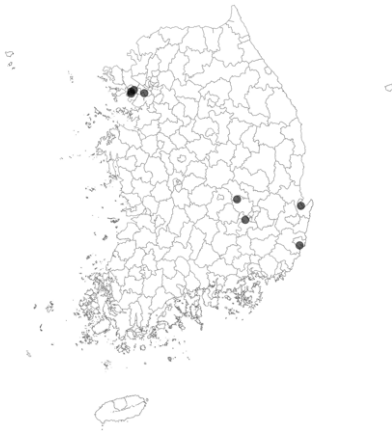
Korea - Spatial Industrial Policy

Industrial Parks up to 1965



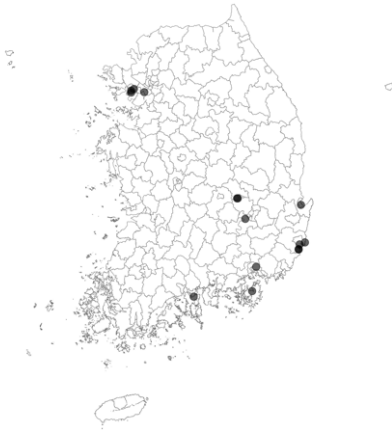
Korea - Spatial Industrial Policy

Industrial Parks up to 1970



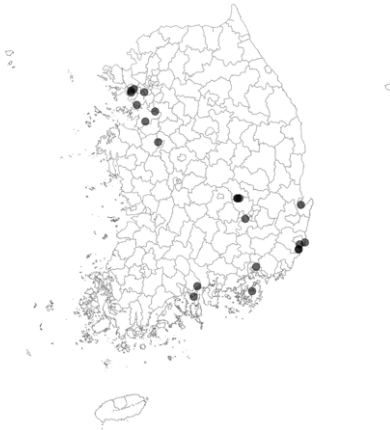
Korea - Spatial Industrial Policy

Industrial Parks up to 1975

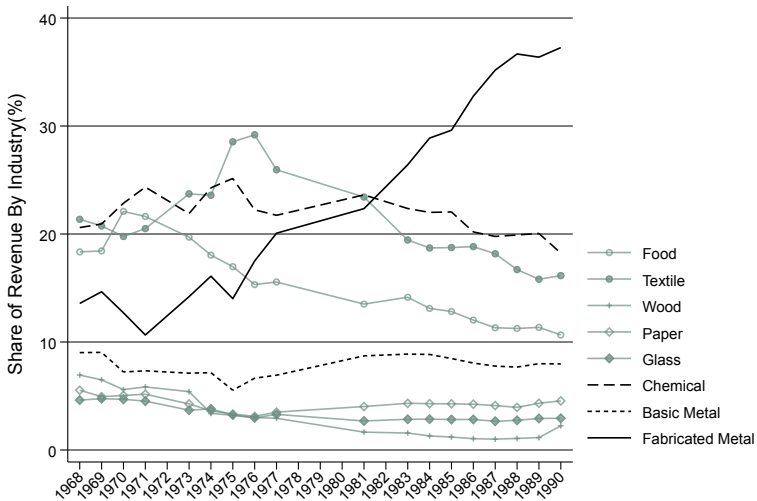


Korea - Spatial Industrial Policy

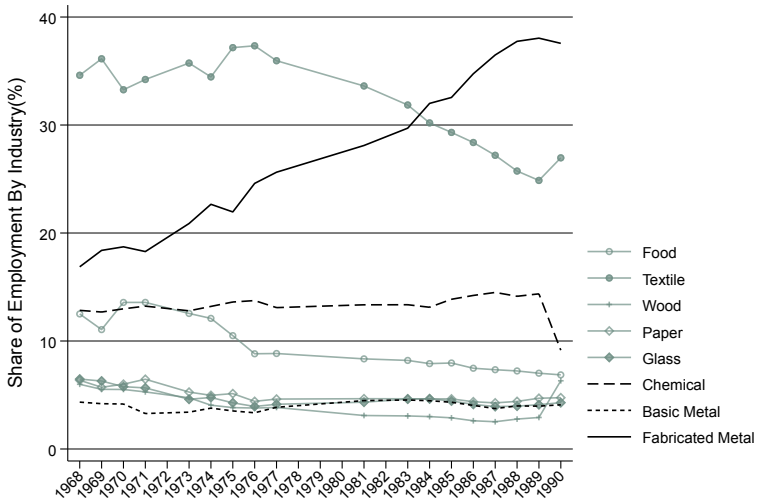
Industrial Parks up to 1985



Korea - Spatial Industrial Policy

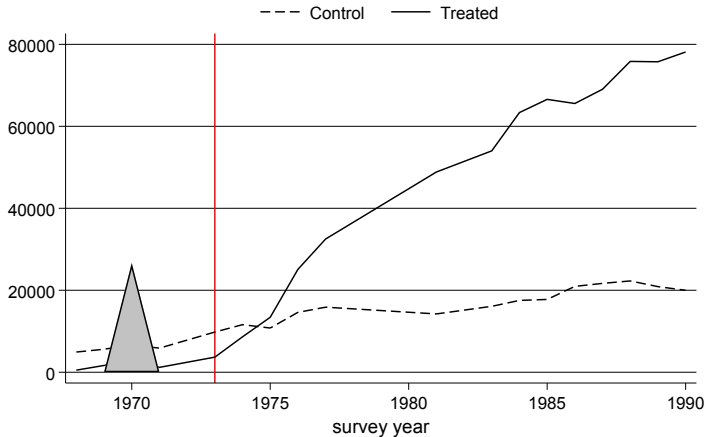


Korea - Spatial Industrial Policy



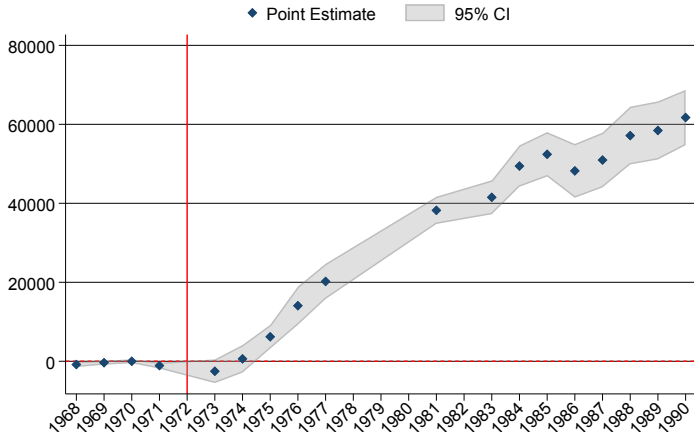
Korea - Spatial Industrial Policy

Raw trends of employment (Cohort year 1972)



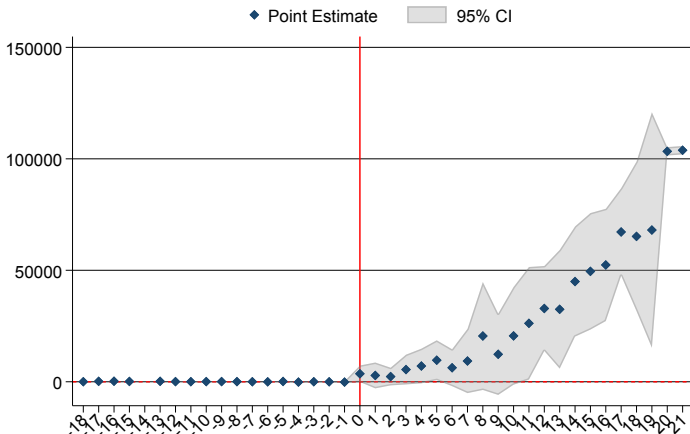
Korea - Spatial Industrial Policy

Event study of employment (Cohort year 1972)



Korea - Spatial Industrial Policy

Aggregate event study of employment (Cohort year 1972)



Korea - Spatial Industrial Policy

Aggregate event study of production (Cohort year 1972)

