"Just Do Your Job": Obedience, Routine Tasks, and the Pattern of Specialization

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Motivation

- How does "culture" affect socioeconomic outcomes, including long-run development?
  - Early seeds: Banfield (1958), Clark (1987), Putnam (1993), Landes (1998)
  - Granato, Inglehart, and Leblang (1996), Guiso, Sapienza, Zingales (2006), Tabellini (2010), Fernandez (2011), Nunn (2012), Gorodnichenko and Roland (2013), Alesina and Giuliano (2015)

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- One narrative in the context of East Asia: "Asian" or "Confucian" values were critical for mobilizing the workforce to achieve economic growth.

> *"Harmony and cooperation were preferred over disagreement and competition." (Huntington 1991, p.24)*

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- **Caveat 1:** Cultural attitudes that promote worker productivity in some activities (e.g., assembly line manufacturing), may not be conducive in others (e.g., computer coding, research)

> *"East Asians, who all share a tradition of strict discipline, respect for the teacher, no talking back to the teacher and rote learning, must make sure that there is this random intellectual search for new technologies and products."*
>
> *(Lee Kuan Yew, Foreign Affairs, March/April 1994, interview by Fareed Zakaria)*

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- **Caveat 2:** Culture is not immutable, but evolves endogenously, partly in response to economic conditions (Bisin and Verdier 2011)

- Growing body of evidence that features of the economic environment in turn affect what cultural attitudes persist and get transmitted across generations

  (Alesina, Giuliano, and Nunn 2013, Giuliano and Nunn 2016)

This project: Overview

- Study one specific aspect of cultural attitudes relevant to workplace productivity:
  - "Obedience in the Workplace" (from the World Values Survey)
  - Propensity to follow instructions vs question them in a work environment
- Three components to this study:

This project: Overview

- Study one specific aspect of cultural attitudes relevant to workplace productivity:
  - "Obedience in the Workplace" (from the World Values Survey)
  - Propensity to follow instructions vs question them in a work environment
- Three components to this study:
  1. Establish a *"Specialization Fact"*: How does Workplace Obedience affect the pattern of specialization?
  2. Establish an *"Obedience Fact"*: How does the (lagged) pattern of specialization in turn shape Workplace Obedience?
  3. Motivated by these facts: Develop an overlapping generations model of endogenous cultural transmission, to understand the co-evolution of attitudes towards obedience and the structure of the economy.

Overview: 1. "Specialization Fact"

- Hypothesize that: Pro-obedience workplace attitudes are beneficial to productivity in relatively *routine* tasks
  - Turn to Autor, Levy and Murnane (2003)'s indices of task *routineness*, coded up from the Dictionary of Occupational Titles
  - Use export data to capture specialization patterns

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  - Use export data to capture specialization patterns

- *"Specialization Fact"*: In countries where the workforce becomes (say) less pro-obedience, this is associated with a relative rise in exports for industries with a lower routine task content.

  As stated, this is a within-country finding.

Overview: 2. "Obedience Fact"

- Hypothesize that: If the economy is oriented towards routine industries at time t, this incentivizes the adoption and transmission of pro-obedience workplace attitudes to generation $t+1$
  - Turn to the micro WVS data.
  - Construct *export-routineness* ($expRT$) to summarize how oriented the economy was towards routine tasks

Overview: 2. "Obedience Fact"

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  - Construct *export-routineness* ($expRT$) to summarize how oriented the economy was towards routine tasks

- *"Obedience Fact"*: More educated individuals less likely to agree that workplace obedience is important: $\frac{\partial ObedWork}{\partial Educ} < 0$, ...

  But: This effect of education is dampened when the individual's birth cohort is exposed to a greater degree of export-routineness during their schooling years: $\frac{\partial^2 ObedWork}{\partial Educ \partial expRT} > 0$.

Overview: 3. Model

Together, the two Facts motivate an overlapping generations model:

- A two-sector economy
- Parents make conscious decisions over how much Human Capital and Obedience to invest in their children
- What the model delivers:
  - Predictions on the determinants of transmitted obedience that are entirely consistent with the "Obedience Fact"
  - Raises the possibility of an "Obedience Trap":

    Specializing in routine sectors entrenches a culture of following instructions, at the expense of expanding into more nonroutine activities.

    A cause for concern? Given the link between routine task specialization and labor market polarization. (Eg: Autor and Dorn 2013, Goos and Manning 2007, Goos, Manning and Salomons 2014, Deming 2016)

Roadmap for this talk

Background on the Data

The World Values Survey (WVS)

Views on socioeconomic and cultural issues around the world:

- Six waves (1981-2014)
- $> 300,000$ observations from 229 surveys (97 countries/territories)
- Typical survey-wave: $>$ 1000 respondents aged 15 and above; stratified random sample
- Includes respondent characteristics:
  - Education: 1 ('Inadequately completed elementary education') to 8 ('University with degree/Higher education - upper-level tertiary certificate')
  - Biodata: Age, gender, number of children, marital status
  - Auxiliary controls: Employment status, Occupation, Size of town

WVS: Obedience in the workplace

Question C061:

> *"People have different ideas about following instructions at work. Some say that one should follow one's superior's instructions even when one does not fully agree with them. Others say that one should follow one's superior's instructions only when one is convinced that they are right. With which of these two opinions do you agree?"*

- Responses:
  - '2'= Follow instructions
  - '1'= Depends
  - '0'= Must be convinced first
- Available in Waves 1-5.

Obedience in the workplace

How are such attitudes consequential?

Example 1:

Obedience in the workplace

How are such attitudes consequential?

Example 2:

> *"Singaporeans are academically brilliant and they have a tremendous respect for authority. A similar team in the US would keep questioning and want to have a healthy dialogue every step of the way. This may be good in the early stage of a project's development. But it's a real problem during the execution. Singaporeans rarely revisit and question the purpose of a task. They have a great ability to translate something from requirement to developed product. They just get it done. . . . [However,] ideas are seldom generated, as no incentives for creativity exist in the Singaporean education system. In three years of operation, our facility has not produced a single patent, and there is no record of new ideas."*
>
> *(quoting a director of R&D at a medical device MNC located in Singapore)*

http://sudhirtv.com/2013/05/17/why-has-singapore-failed-to-prepare-its-citizens-adequately-for-the-knowledge-economy/

Aggregating to the Country Level

Needed: A country-level measure of workplace obedience attitudes at various points in time, $t = 1990, 1995, \ldots$

- As a start: Can take a simple average of obedience scores for respondents from a *country-cohort-gender* bin, and then take a weighted-average of these based on the age structure of the workforce at time t
- However: Prevailing economic conditions can affect reported responses

  Eg: Someone currently working as an assembly-line worker more likely to agree with following instructions

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- However: Prevailing economic conditions can affect reported responses

  Eg: Someone currently working as an assembly-line worker more likely to agree with following instructions
- To address this: Extract a country-cohort-gender specific component ($\hat{D}^g_{cb}$) of reported workplace obedience attitudes...

  ... after controlling for respondent observables (including employment status and occupation) and country-survey wave fixed effects

Aggregating to the Country Level

Estimate:

$$ObedWork_{r,cbw} = \beta_0 + \beta_1 Educ_{r,cbw} + \beta_X X_{r,cbw} + D^g_{cb} + D_{cw} + \epsilon_{r,cbw}. \quad (1)$$

Details

- r: respondent; c: country; w: WVS wave
- b: birth cohort (e.g.: 1965-1969, 1970-1974, 1975-1979...)
- $Educ_{r,cbw}$: Education
- $X_{r,cbw}$: Other respondent controls (number of children, marital status, employment status, occupation, size of town)
- D^g_{cb}: country-cohort-gender fixed effect
- D_{cw}: country-survey wave fixed effect
- $\epsilon_{r,cbw}$: idiosyncratic noise

Aggregating to the Country Level

Estimate:

$$ObedWork_{r,cbw} = \beta_0 + \beta_1 Educ_{r,cbw} + \beta_X X_{r,cbw} + D^g_{cb} + D_{cw} + \epsilon_{r,cbw}. \quad (1)$$

Details

- Then compute:

$$AvgObedWork_{ct} = \sum_{(c,b,g)} \omega^g_{cbt} \hat{D}^g_{cb}. \quad (2)$$

  where ω^g_{cbt} is the population share of (c, b, g) in the workforce aged 25-64 at time t.

- Results similar when using in place of the $\hat{D}^g_{cb}$'s:
  - a simple (c, b, g)-average measure
  - a predicted cohort-gender fixed effect from country-by-country regressions

Task Routineness

Premise: Obedience would be a complementary attribute for workers who are engaged in routine tasks.

From Autor, Levy and Murnane (2003): Details

- Index measures (0-10 scale) coded up from the 1977 Dictionary of Occupational Titles (DOT), US Dept of Labor
- Map to industry measures using weights from 1960 US Census PUMS
- Five raw measures:
  - $T^{r,c}$, routine cognitive: Set Limits, Tolerances, Standards
  - $T^{nr,c1}$, nonroutine cognitive (interactive): Direction, Control, Planning
  - $T^{nr,c2}$, nonroutine cognitive (analytic): Math
  - $T^{r,m}$, routine manual: Finger Dexterity
  - $T^{nr,m}$, nonroutine manual: Eye-Hand-Foot Coordination

Task Routineness

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- Map to industry measures using weights from 1960 US Census PUMS
- Compute three summary measures of industry task routineness, similar to Autor and Dorn (2013):

$$\begin{aligned} RTC &= \ln(T^{r,c}) - \ln(T^{nr1,c}) - \ln(T^{nr2,c}) \\ RTM &= \ln(T^{r,m}) - \ln(T^{nr,m}) \\ RT &= RTM + RTC \end{aligned}$$

A first look at the routineness measures

- Manufacturing features the highest degree of task routineness, on both cognitive and manual dimensions.

	Agriculture, Mining & Construction	**Manufacturing**	**Services**
Routine cognitive	4.84 (1.90)	5.87 (0.81)	4.00 (1.57)
Nonroutine cognitive, interactive	2.23 (1.81)	1.44 (0.37)	2.24 (0.90)
Nonroutine cognitive, analytical	3.05 (0.94)	2.97 (0.52)	3.76 (0.82)
Routine manual	3.61 (0.43)	3.98 (0.27)	3.74 (0.56)
Nonroutine manual	2.06 (0.45)	1.32 (0.33)	1.14 (0.76)

A first look at the routineness measures

Cognitive vs Manual task routineness (within manufacturing):

	Cognitive (RTC)		**Manual (RTM)**
Five Least Routine		Five Least Routine	
Not specified food industries (122)	-0.869	Logging (230)	-0.039
Drugs (181)	-0.613	Dairy Products (101)	0.428
Guided missiles, space vehicles, and parts. Ordnance, and Aircraft and parts (362)	-0.374	Cement, concrete, and gypsum, and plaster products (251)	0.619
Plastics, synthetics, and resins; Soaps and cosmetics; Agricultural Chemicals; Industrial and miscellaneous chemicals (346)	-0.311	Sawmills, planing mills, and millwork (231)	0.620
Newspaper publishing and printing (171)	-0.305	Beverage (120)	0.774
Five Most Routine		Five Most Routine	
Logging (230)	1.079	Not specified food industries (122)	1.451
Apparel and accessories, except knit (151)	1.080	Engine and turbines; Construction and material handling machines; metalworking machinery; machinery, except electrical, n.e.c.; etc. (176)	1.474
Footwear, except rubber and plastic (221)	1.141	Drugs (181)	1.519
Yarn, thread, and fabric mills (142)	1.308	Newspaper publishing and printing (171)	1.644
Knitting mills (132)	1.410	Printing, publishing, and allied industries except newspapers (172)	1.766

The "Specialization Fact":
From Workplace Obedience to the Pattern of Specialization

Uncovering Specialization Patterns

$$\log(Export_{cit}) = \alpha_0 + \alpha_1 AvgObedWork_{ct} \times RT_i + \sum_{\{l,m\}} \alpha_{lm} L_{l,ct} \times M_{m,i} + D_{ct} + D_{ci} + \epsilon_{ict} \quad (3)$$

- c: country; i: industry
- t: 1995-1999, 2000-2004, 2005-2009, 2010-2013
- $\log(Export_{cit})$: From BACI (CEPII)
- Uncovering sources of comparative advantage through interaction terms between exporter country characteristics ($Obedience_{ct}$, $L_{l,ct}$) and industry characteristics (RT_i, $M_{m,i}$); cf., Nunn and Trefler (2014)

Uncovering Specialization Patterns

$$\log(Export_{cit}) = \alpha_0 + \alpha_1 AvgObedWork_{ct} \times RT_i + \sum_{\{l,m\}} \alpha_{lm} L_{l,ct} \times M_{m,i} + D_{ct} + D_{ci} + \epsilon_{ict} \quad (3)$$

- D_{ct}: Country-year fixed effects
- D_{ci}: Country-industry fixed effects
- Difficulty in comparing obedience scores across countries

  $\Rightarrow$ Focus on how *within-country* changes in country characteristics affect the pattern of specialization across industries
- OLS; country-clustered standard errors
- In practice: Use a five-year lagged value of $AvgObedWork_{ct}$

The Specialization Fact

- Higher workplace obedience associated with ↑ exports in routine industries
- Even controlling for Heckscher-Ohlin forces (Romalis 2004) and several institutional sources of comparative advantage (rule of law, cf., Nunn 2007, Levchenko 2007, Costinot 2009; fin. devt, cf., Manova 2013)

Dependent variable:	**Log (Exports$_{cit}$)**					
	(1)	(2)	(3)	(4)	(5)	(6)
Routineness measure:	Overall	Overall	Overall	Overall	Cognitive	Manual
AvgObedWork$_{ct}$ × Routineness$_i$	2.7172***	6.2967***	4.0717***	4.1475***	3.3510***	2.1426
	[0.5355]	[1.1119]	[0.9450]	[1.1171]	[1.2141]	[2.0081]
Phy. Capital Stock$_{ct}$ × Capital Intensity$_i$			0.1660***	0.1500***	0.1552***	0.1533***
			[0.0448]	[0.0532]	[0.0541]	[0.0551]
Human Capital Stock$_{ct}$ × Skill Intensity$_i$			0.9432***	0.6860***	0.6539***	0.9870***
			[0.2074]	[0.2084]	[0.2124]	[0.1926]
Rule of Law$_{ct}$ × Industry$_i$ dummies?	N	N	N	Y	Y	Y
Financial Devt$_{ct}$ × Industry$_i$ dummies?	N	N	N	Y	Y	Y
Country-year (ct) dummies?	Y	Y	Y	Y	Y	Y
Country-industry (ci) dummies?	Y	Y	Y	Y	Y	Y
Observations	15,345	13,522	13,287	11,819	11,819	11,819
No. of countries	58	58	57	56	56	56
R^2	0.9639	0.9667	0.9673	0.9708	0.9707	0.9707

The Specialization Fact: Remarks

- Effects load on RTC (cognitive) rather than RTM (manual)
- Coefficient estimate of 3.3510 for $AvgObedWork_{ct} \times RTC_i$:
  - For the median five-year change in $AvgObedWork_{ct}$, exports 1.2% lower in a one s.d. higher RTC_i industry.
  - Slightly smaller in magnitude to corresponding Heckscher-Ohlin effects
- Robust to controlling for: Table
  - $AvgObedWork_{ct}$ interacted with: (i) industry skill-intensity; (ii) industry value-added share
  - RTC_i interacted with: (i) country human capital; and (ii) country $\ln(Y/L)$
  - $AvgObedChild_{ct}$: Importance of obedience as a child quality Details
- Robust to dropping one country at a time.

The "Obedience Fact":

How the (lagged) Pattern of Specialization Shapes Workplace Obedience

Introducing Export-Routineness

Qn: How does past exposure to a routine task-intensive economy shape one's obedience attitudes?

- *expRTC*: Compute weighted-average *RTC* of country exports from 1962-2000 (Feenstra et al.), and from 2001-2013 (BACI CEPII)

  Take five-year moving-window averages

- For transition countries, associate the *expRTC* values of the original country at the time of cohort exposure.

Introducing Export-Routineness

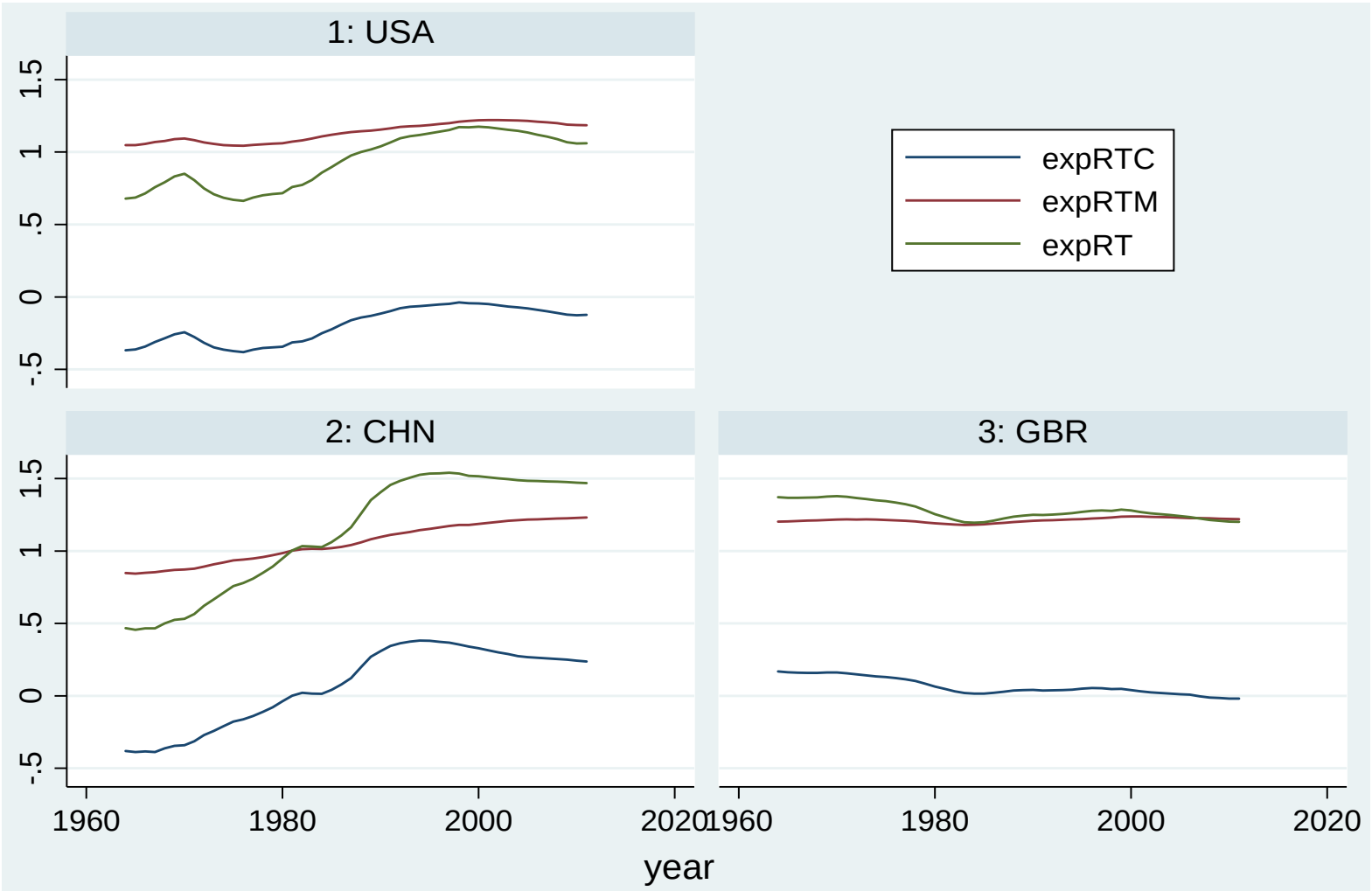
$$\begin{aligned} ObedWork_{r,cbw} &= \beta_0 + \beta_1 Educ_{r,cbw} + \beta_2 Educ_{r,cbw} \times expRTCageA_{cb} \\ &\quad + \beta_3 expRTCageA_{cw} + \beta_g Gender_{r,cbw} + \beta_X X_{r,cbw} \\ &\quad + D_b + D_{cw} + \epsilon_{r,cbw} \end{aligned} \tag{4}$$

$$\begin{aligned} ObedWork_{r,cbw} &= \beta_0 + \beta_1 Educ_{r,cbw} + \beta_2 Educ_{r,cbw} \times expRTCageA_{cb} \\ &\quad + \beta_X X_{r,cbw} + D^g_{cb} + D_{cw} + \epsilon_{r,cbw} \end{aligned} \tag{5}$$

- $expRTCageA_{cb}$: Export-routineness that birth cohort b in country c was exposed to when they were age A, where $A = 0, 5, 10 \ldots$

  For eg.: $expRTCage10_{cb}$ for the cohort c born in the years 1960-1964 is the value of $expRTC$ for 1970-1974.

Introducing Export-Routineness (cont.)



Obedience Fact: Baseline

- More educated individuals less likely to "just follow instructions"
- **BUT:** Greater exposure to cognitive export-routineness during one's schooling years weakens this negative effect of education on obedience.
- Effects strongest for age 5 and age 10 exposure; absent for exposure after age 20. Consistent with a story of cultural transmission at a young age.

Dependent variable:	Importance of obedience in the workplace							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRTC exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
$Gender_r$ (1=Female; 0=Male)	-0.0258*	-0.0242*	-0.0298**	-0.0327***	-0.0288***	-0.0277***	-0.0283***	-0.0236**
	[0.0135]	[0.0129]	[0.0118]	[0.0105]	[0.0104]	[0.0099]	[0.0099]	[0.0101]
$Education_r$	-0.0198***	-0.0203***	-0.0207***	-0.0216***	-0.0236***	-0.0247***	-0.0257***	-0.0255***
	[0.0047]	[0.0043]	[0.0040]	[0.0035]	[0.0032]	[0.0031]	[0.0030]	[0.0030]
$Educ_r \times ExpRTCexposure_{cb}$	0.0095	0.0148**	0.0153***	0.0128**	0.0099*	0.0069	0.0025	0.0053
	[0.0080]	[0.0062]	[0.0057]	[0.0053]	[0.0054]	[0.0063]	[0.0058]	[0.0067]
$ExpRTCexposure_{cb}$	-0.0155	-0.0976**	-0.0851*	-0.0395	-0.0540	-0.0517	-0.0233	-0.0138
	[0.0594]	[0.0477]	[0.0480]	[0.0384]	[0.0431]	[0.0432]	[0.0392]	[0.0395]
Additional controls:	All columns: Dummies for Number of children, Marital status							
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cohort (b) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	50,500	65,202	78,812	90,115	99,231	105,638	106,125	97,893
No. of countries	65	65	65	65	65	65	65	65
R^2	0.0636	0.0624	0.0639	0.0637	0.0647	0.0660	0.0666	0.0665

Obedience Fact: With D^g_{cb} fixed effects

- More stringent specificiation: β_2 estimated from...
  - within-country-wave, cross-cohort variation in *expRTC* exposure, and
  - within-country-cohort-gender variation across individuals with different levels of education.

Dependent variable:	Importance of obedience in the workplace							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRTC exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
$Education_r$	-0.0199***	-0.0204***	-0.0207***	-0.0220***	-0.0239***	-0.0247***	-0.0254***	-0.0251***
	[0.0049]	[0.0046]	[0.0042]	[0.0036]	[0.0033]	[0.0032]	[0.0031]	[0.0030]
$Educ_r \times ExpRTCexposure_{cb}$	0.0106	0.0139**	0.0156***	0.0105	0.0068	0.0044	-0.0010	0.0013
	[0.0077]	[0.0068]	[0.0058]	[0.0063]	[0.0061]	[0.0070]	[0.0066]	[0.0073]
Additional controls:	All columns: Dummies for Number of children, Marital status							
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cty-cohort-gender (cbg) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	50,497	65,199	78,809	90,112	99,228	105,635	106,122	97,889
No. of countries	65	65	65	65	65	65	65	65
R^2	0.0727	0.0719	0.0740	0.0740	0.0756	0.0774	0.0783	0.0792

Obedience Fact: With $Educ_{i,cbw} \times D_{cw}$ interactions

- Soaks up the effect that contemporaneous country conditions may have on the education coefficient.
- Take age 5: One s.d. increase in *expRTC* (0.35) translates into a 0.07 s.d. increase in *ObedWork* for an individual with $Educ = 8$ (complete tertiary).

  Cumulative effect potentially bigger if individuals are exposed to a persistent increase in *expRTC*.

Dependent variable:	Importance of obedience in the workplace							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRTC exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
$Education_r$	0.0217***	0.0189***	0.0081***	0.0083***	0.0068***	0.0032***	0.0013**	-0.0067***
	[0.0023]	[0.0025]	[0.0024]	[0.0016]	[0.0008]	[0.0004]	[0.0005]	[0.0009]
$Educ_r \times ExpRTCexposure_{cb}$	0.0301***	0.0234***	0.0177**	0.0113*	0.0052	0.0012	-0.0073	-0.0057
	[0.0060]	[0.0071]	[0.0073]	[0.0058]	[0.0050]	[0.0053]	[0.0059]	[0.0072]
Additional controls:	All columns: Dummies for Number of children, Marital status							
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cty-cohort-gender (cbg) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
$Educ_r \times$ Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	50,497	65,199	78,809	90,112	99,228	105,635	106,122	97,889
No. of countries	65	65	65	65	65	65	65	65
R^2	0.0774	0.0762	0.0780	0.0777	0.0791	0.0810	0.0819	0.0827

Additional remarks

Results are specific to obedience in the *workplace*:

- No distinct pattern when looking at the importance of obedience as a quality in children ▸ Table

Results robust to ...

- Using overall routineness (RT) instead of RTC ▸ Table
- Using the cognitive routineness of *manufacturing* exports
- Controlling for $Educ_{r,cbw}$ interacted with country-cohort exposure (at age A) to the skill-intensity, as well as the capital-intensity, of exports
- Controlling for education interacted with country-cohort exposure (at age A) to openness, income per capita, population, democracy
- Dropping transition countries ▸ More

A Model of Intergenerational Cultural Transmission

Overview of Setup

0. Two sectors: a "Basic" sector where workplace obedience raises productivity, and a "Complex" sector where the converse holds

1. Obedience and Human capital at time t determine the pattern of specialization at time t

2. Specialization patterns at time t in turn affect Obedience and Human capital at time $t+1$, through the endogenous investment decisions that parents make over cultural transmission and schooling respectively (*a la* Bisin-Verdier)

Basic setup

Consider a representative individual (r) with an endowment of human capital, H_{rt}, and workplace obedience, θ_{rt}, at time t.

- Decides on how to allocate H_{rt} across production activities.

Taking guidance from the Specialization Fact, adopt a within-country (or small-open economy) perspective, with two sectors:

- B ("Basic"): Routine sector where workplace obedience is complementary to human capital

$$y_{Brt} = A_B(f(\theta_{rt})h_{Brt})^{\beta}$$

where: $f' > 0$, $f'' \leq 0$, and $0 < \beta < 1$.

Basic setup

Consider a representative individual (r) with an endowment of human capital, H_{rt}, and workplace obedience, θ_{rt}, at time t.

- Decides on how to allocate H_{rt} across production activities.

Taking guidance from the Specialization Fact, adopt a within-country (or small-open economy) perspective, with two sectors:

- C ("Complex"): Nonroutine sector where workplace obedience hurts the productivity of individual human capital

$$y_{Crt} = A_C(g(\theta_{rt})h_{Crt})^{\gamma}\left(\int_{\tilde{r}\in\mathcal{R}} g(\theta_{\tilde{r}t})h_{C\tilde{r}t}\right)^{1-\gamma}$$

where: $g' < 0$, $g''(\cdot) \leq 0$, and $0 < \gamma < 1$.

Assume: Nature of "nonroutine cognitive" activity generates the scope for human capital externalities.

Basic setup

- Overlapping generations: "myopic altruism"

  Time-t individual maximizes the pdv of income earned by herself and her (unique) time-$(t+1)$ descendent

$$\max_{h_{Brt}, h_{Crt}, H_{r,t+1}, \theta_{r,t+1}} \quad y_{Brt} + y_{Crt} + \delta \left(y_{Br,t+1} + y_{Cr,t+1} \right) - \omega(H_{r,t+1}) - \tau(\theta_{r,t+1} - \theta_{r,t})$$

- Other choice variables:
  - $H_{r,t+1}$: Human capital of next generation.

    Cost in monetary terms given by $\omega(H_{r,t+1})$, where $\omega' > 0$ and $\omega'' > 0$.
  - $\theta_{r,t+1}$: Attitudes towards obedience instilled in next generation.

    "Inertia" cost given by $\tau(\theta_{r,t+1} - \theta_{r,t})$, where $\tau'(0) = 0$ and $\tau'' > 0$ (cf., Bisin and Verdier)

Solving the Model

- Time-t human capital allocation problem is separable from investment decisions.
- Take FOC for individual r and then assume symmetry across individuals. Get:

$$h_{Bt} = \min\left\{\left(\frac{\beta}{\gamma}\frac{A_B}{A_C}\frac{f(\theta_t)^\beta}{g(\theta_t)}\right)^{\frac{1}{1-\beta}}, H_t\right\}$$

$$h_{Ct} = \max\left\{H_t - \left(\frac{\beta}{\gamma}\frac{A_B}{A_C}\frac{f(\theta_t)^\beta}{g(\theta_t)}\right)^{\frac{1}{1-\beta}}, 0\right\}$$

- If A_B/A_C is large, get complete specialization in the B-sector.
- Nature of exercise: Exploring the steady-state behavior of this system (where $H_t = H_{t+1}$ and $\theta_t = \theta_{t+1}$).

Characterization

Case I: Complete specialization in the B-sector.

- Individual decisions push economy towards raising both θ and H.
- Any shift in the deep parameters of the model – in particular, A_B/A_C – that tends to raise θ will also raise H in steady state.

$\Rightarrow$ A complementarity between human capital and obedience, when only the B sector is operative.

- Rationalizing early stages of development?
  - East Asia (high θ, high H) vs Latin America (low θ, low H)

Characterization (cont.)

Case II: Diversified economy.

- Define $\rho_t \equiv y_{Bt}/y_{Ct}$ to be the "routineness" of the economy at time t.
- Manipulating the FOC with respect to θ_{t+1} yields the following prediction on the endogenous transmission of pro-obedience attitudes:
  - (i) When the economy is very nonroutine: $\frac{\partial \theta}{\partial H} < 0$ in a neighborhood of $\rho = 0$
  - (ii) Conversely, when it is very routine: $\frac{\partial \theta}{\partial H} > 0$ as $\rho \longrightarrow \infty$
  - (iii) $\frac{\partial \theta}{\partial H}$ is increasing in ρ
- **Upshot:** The economic environment as summarized by ρ affects the transmission of pro-obedience attitudes, in a manner consistent with the Obedience Fact.

Characterization (cont.)

Case II: Diversified economy.

- Manipulating the FOC with respect to H_{t+1} leads to the following conclusion:

  In steady state, a shift in the deep parameters – in particular, A_B/A_C – that raises θ can now *lower* H instead in steady state.

$\Rightarrow$ This breaks the complementarity between obedience and human capital.

Obedience Traps

When the economy is diversified (i.e., Case II):

- Steady state in θ and H pinned down by the two FOCs
- The presence of human capital externalities in the C sector implies multiple equilibria are possible
  - Eg: Set $f(\theta) = \theta$ and $g(\theta) = 1 - \theta$
  - If A_B/A_C lies in an intermediate range of values, get two stable equilibria: (i) $\theta = 1$; and (ii) θ low
  - (Also, one unstable equilibrium in between.) ▶ Figure

Obedience Traps

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  - (Also, one unstable equilibrium in between.) ▶ Figure
- **Upshot:** Can end up in a high-θ, low-H "obedience trap":
  - The predominant workplace mindset is to follow instructions, and the economy is tilted towards the routine B-sector...
  - ... at the expense of the development and expansion of the nonroutine C-sector.

Conclusion

Conclusion

- Report two new facts on the relationship between cultural attitudes towards workplace obedience and the structure of the economy:
  1. "Specialization": Pro-obedience attitudes associated with more exporting in routine industries
  2. "Obedience": In turn, exposure to a more (cognitive) export-routine economy during one's schooling years shapes pro-obedience attitudes.
- These inform thinking about a model in which parental decisions are actively made over investment in schooling and the transmission of cultural attitudes:
  - How do these co-evolve?
  - How do they shape the structure of the economy in the long run?

Supplementary Slides

Constructing $AvgObedWork_{ct}$ Back

Dependent variable:	**Following Instructions in the workplace (0-2)**		
	(1)	(2)	(3)
$Gender_r$ (1=Female; 0=Male)	-0.0291***	---	---
	[0.0099]		
$Education_r$	-0.0240***	-0.0216***	-0.0202***
	[0.0043]	[0.0033]	[0.0029]
Country-cohort-gender (cbg) dummies?	N	Y	Y
Country-wave (cw) dummies?	N	N	Y
	Additional controls: with p-value of test of joint significance		
Dummies for number of children?	Y (0.0315)	Y (0.2095)	Y (0.2227)
Dummies for marital status?	Y (0.0000)	Y (0.1886)	Y (0.0000)
Dummies for size of town	Y (0.0582)	Y (0.1683)	Y (0.2135)
Dummies for employment status?	Y (0.0803)	Y (0.0169)	Y (0.0028)
Dummies for occupation?	Y (0.0000)	Y (0.0000)	Y (0.0000)
Observations	125,709	125,625	125,625
No. of countries	65	65	65
R^2	0.0121	0.0771	0.0856

Appendix Table 1 from ALM (2003)

Back

APPENDIX 1: DEFINITIONS OF TASK MEASURES FROM THE 1977 DICTIONARY OF OCCUPATIONAL TITLES

Variable	DOT definition	Task interpretation	Example tasks from *Handbook for Analyzing Jobs*
1. GED Math (MATH)	General educational development, mathematics	Measure of nonroutine analytic tasks	Lowest level: Adds and subtracts 2-digit numbers; performs operations with units such as cup, pint, and quart. Midlevel: Computes discount, interest, profit, and loss; inspects flat glass and compiles defect data based on samples to determine variances from acceptable quality limits. Highest level: Conducts and oversees analyses of aerodynamic and thermodynamic systems . . . to determine suitability of design for aircraft and missiles.
2. Direction, Control, Planning (DCP)	Adaptability to accepting responsibility for the direction, control, or planning of an activity	Measure of nonroutine interactive tasks	Plans and designs private residences, office buildings, factories, and other structures; applies principles of accounting to install and maintain operation of general accounting system; conducts prosecution in court proceedings . . . gathers and analyzes evidence, reviews pertinent decisions . . . appears against accused in court of law; commands fishing vessel crew engaged in catching fish and other marine life.
3. Set Limits, Tolerances, or Standards (STS)	Adaptability to situations requiring the precise attainment of set limits, tolerances, or standards	Measure of routine cognitive tasks	Operates a billing machine to transcribe from office records data; calculates degrees, minutes, and second of latitude and longitude, using standard navigation aids; measures dimensions of bottle, using gauges and micrometers to verify that setup of bottle-making conforms to manufacturing specifications; prepares and verifies voter lists from official registration records.
4. Finger Dexterity (FINGDEX)	Ability to move fingers, and manipulate small objects with fingers, rapidly or accurately	Measure of routine manual tasks	Mixes and bakes ingredients according to recipes; sews fasteners and decorative trimmings to articles; feeds tungsten filament wire coils into machine that mounts them to stems in electric light bulbs; operates tabulating machine that processes data from tabulating cards into printed records; packs agricultural produce such as bulbs, fruits, nuts, eggs, and vegetables for storage or shipment; attaches hands to faces of watches.
5. Eye Hand Foot Coordination (EYEHAND)	Ability to move the hand and foot coordinately with each other in accordance with visual stimuli	Measure of nonroutine manual tasks	Lowest level: Tends machine that crimps eyelets, grommets; next level: attends to beef cattle on stock ranch; drives bus to transport passengers; next level: pilots airplane to transport passengers; prunes and treats ornamental and shade trees; highest level: performs gymnastic feats of skill and balance.

WVS: Obedience as a quality in children

Return

Question A042:

> *"Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five. (CODE FIVE ONLY)"*

- Out of a list of up to 11 qualities, including: "good manners", "independence", "religious faith", "thrift"
- Responses:
  - '1'= Important
  - '0'= Not mentioned
- Available in all six waves.

The Specialization Fact: Robustness

Return

Dependent variable:	Log (Exports$_{cit}$)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Routineness measure:	Cognitive	Cognitive	Cognitive	Cognitive	Cognitive	Cognitive	Cognitive
AvgObedWork$_{ct}$ × Routineness$_i$	5.4450***	4.4173*	6.2456***	4.4996*	3.8880*	0.3321	4.0146*
	[2.0402]	[2.2089]	[1.8261]	[2.3183]	[1.9782]	[0.4432]	[2.2820]
Phy. Capital Stock$_{ct}$ × Capital Intensity$_i$	0.1197**	0.1002**	0.1091**	0.1164**	0.1170**	0.1097	0.0246
	[0.0508]	[0.0493]	[0.0524]	[0.0505]	[0.0515]	[0.0813]	[0.0494]
Human Capital Stock$_{ct}$ × Skill Intensity$_i$	-0.2500	-0.2483	0.0408	-0.1963	-0.3544	0.2555	-0.0120
	[0.2918]	[0.2919]	[0.3268]	[0.3877]	[0.3033]	[0.2621]	[0.4833]
AvgObedWork$_{ct}$ × Skill Intensity$_i$	5.0082***	3.8110**	5.6078***	3.8810*	3.9639**	0.1573	4.8307***
	[1.6190]	[1.8415]	[1.4816]	[2.0299]	[1.6563]	[0.4896]	[1.6780]
Human Capital Stock$_{ct}$ × Routineness$_i$	-1.3813***	-1.2072***	-1.0000**	-1.2906***	-1.5368***	0.0227	0.1139
	[0.3749]	[0.4004]	[0.3868]	[0.4407]	[0.3836]	[0.2401]	[0.5488]
AvgObedWork$_{ct}$ × Value-Added$_i$		4.2878					
		[4.4404]					
Log(GDP per capita)$_{ct}$ × Routineness$_i$		-0.2530*					
		[0.1390]					
AvgObedChild$_{ct}$ × Routineness$_i$			-12.7887***				
			[3.2894]				
AvgObedChild$_{ct}$ × Skill Intensity$_i$			-9.4481***				
			[3.0923]				
Rule of Law$_{ct}$ × Industry$_i$ dummies?	Y	Y	Y	Y	Y	Y	Y
Financial Devt$_{ct}$ × Industry$_i$ dummies?	Y	Y	Y	Y	Y	Y	Y
Country-year (ct) dummies?	Y	Y	Y	Y	Y	Y	Y
Country-industry (ci) dummies?	Y	Y	Y	Y	Y	N	Y
Industry (i) dummies?	N	N	N	N	N	Y	N
Industry-year (it) dummies?	N	N	N	N	N	N	Y
Observations	11,819	11,819	11,819	12,054	11,819	11,937	11,819
No. of countries	56	56	56	57	56	56	56
R^2	0.9710	0.9710	0.9711	0.9707	0.9710	0.8174	0.9790

Placebo: Obedience in Children

Return

- No distinct pattern when looking at the importance of obedience as a quality in children

Dependent variable:	Importance of obedience in children							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRTC exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
$Education_r$	0.0182***	0.0074***	0.0043***	0.0042***	0.0020***	-0.0029***	-0.0054***	-0.0078***
	[0.0015]	[0.0007]	[0.0006]	[0.0007]	[0.0003]	[0.0001]	[0.0003]	[0.0005]
$Educ_r \times ExpRTCexposure_{cb}$	-0.0008	-0.0020	-0.0009	-0.0009	-0.0007	0.0016	0.0034	0.0060*
	[0.0038]	[0.0019]	[0.0017]	[0.0028]	[0.0026]	[0.0023]	[0.0026]	[0.0032]
Additional controls:	All columns: Dummies for Number of children, Marital status							
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cty-cohort-gender (cbg) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
$Educ_r \times$ Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	139,846	168,464	194,801	216,683	226,297	224,158	213,344	192,202
No. of countries	93	94	94	95	95	95	95	95
R^2	0.1697	0.1697	0.1689	0.1694	0.1689	0.1675	0.1647	0.1638

Obedience Fact: With Overall Routineness (RT)

Return

Dependent variable:	Importance of obedience in the workplace							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRT exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
$Education_r$	0.0001	0.0028	-0.0040	0.0002	0.0020	0.0008	0.0037	-0.0034
	[0.0019]	[0.0027]	[0.0032]	[0.0028]	[0.0027]	[0.0035]	[0.0047]	[0.0059]
$Educ_r \times ExpRTexposure_{cb}$	0.0229***	0.0161***	0.0122**	0.0086*	0.0054	0.0026	-0.0029	-0.0037
	[0.0043]	[0.0055]	[0.0060]	[0.0047]	[0.0036]	[0.0040]	[0.0047]	[0.0055]
Additional controls:	All columns: Dummies for Number of children, Marital status							
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cty-cohort-gender (cbg) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
$Educ_r \times$ Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	50,497	65,199	78,809	90,112	99,228	105,635	106,122	97,889
No. of countries	65	65	65	65	65	65	65	65
R^2	0.0774	0.0762	0.0780	0.0777	0.0791	0.0810	0.0819	0.0827

Obedience Fact: Robustness

Return

Dependent variable:	Importance of obedience in the workplace							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExpRTC exposure at:	Age 0	Age 5	Age 10	Age 15	Age 20	Age 25	Age 30	Age 35
				World Trade Flows data only (1962-2000)				
$Educ_r \times ExpRTCexposure_{cb}$	0.0301***	0.0234***	0.0177**	0.0110*	0.0014	-0.0023	-0.0109	-0.0122
	[0.0060]	[0.0071]	[0.0073]	[0.0059]	[0.0050]	[0.0054]	[0.0065]	[0.0075]
				Drop transition countries				
$Educ_r \times ExpRTCexposure_{cb}$	0.0317***	0.0240***	0.0179**	0.0143***	0.0083*	0.0035	-0.0086	-0.0090
	[0.0060]	[0.0072]	[0.0076]	[0.0051]	[0.0042]	[0.0054]	[0.0062]	[0.0069]
				Manufacturing Exports Only				
$Educ_r \times ExpRTCexposure_{cb}$	-0.0154	0.0744***	0.0575***	0.0124	-0.0176	-0.0118	-0.0185	0.0213
	[0.0310]	[0.0256]	[0.0179]	[0.0142]	[0.0129]	[0.0156]	[0.0176]	[0.0205]
				Controlling for $Educ_r \times$ Country-Cohort Exposure to Export Skill- and Capital-Intensity				
$Educ_r \times ExpRTCexposure_{cb}$	0.0579	0.0918***	0.0638*	0.0206	-0.0039	-0.0317	-0.0616**	0.0109
	[0.0438]	[0.0310]	[0.0345]	[0.0373]	[0.0265]	[0.0236]	[0.0294]	[0.0391]
				Controlling for $Educ_r \times$ Country-Cohort Exposure to Income per capita, Openness, Population, Democracy				
$Educ_r \times ExpRTCexposure_{cb}$	0.0257	0.0207	0.0227**	0.0227***	0.0081	-0.0031	-0.0173**	-0.0182**
	[0.0166]	[0.0135]	[0.0110]	[0.0067]	[0.0065]	[0.0081]	[0.0068]	[0.0077]
Additional controls:				All columns: Dummies for Number of children, Marital status				
Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
Cty-cohort-gender (cbg) dummies?	Y	Y	Y	Y	Y	Y	Y	Y
$Educ_r \times$ Country-wave (cw) dummies?	Y	Y	Y	Y	Y	Y	Y	Y

Obedience Traps

Return