Ownership Networks and Labor Income [a]

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Motivation

- Firms in business groups represent a large share of public firms in emerging and developed markets

- Evidence that firm value, financing policies, investment, etc, related to business-group affiliation

- **Our goal:** How does business groups affect labor income?
    - Business groups as a source of variation in corporate ownership

    - Business group $\Rightarrow$ Legally independent firms, often in different industries, but controlled by same ultimate shareholder

    - Case study: Chile $\Rightarrow$ High inequality and high relevance of business groups

    - Side effect: Better understand why groups exists, costs and benefits

What is a Business Group (BG)?
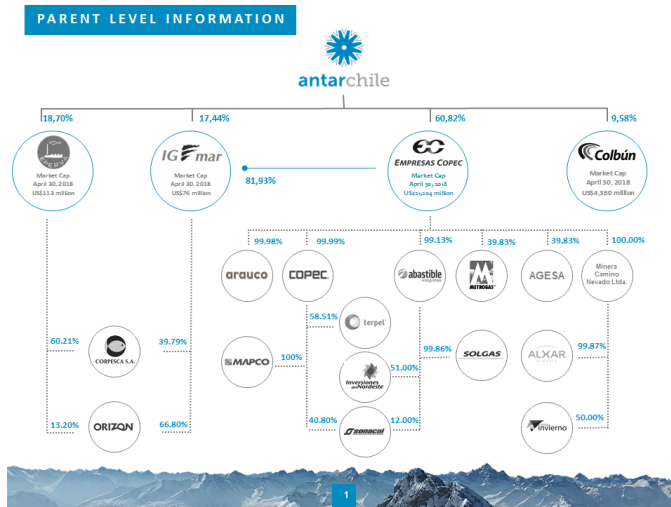
What We Do

- **Data**
  - Matched employer-employee from Unemployment Insurance (2004-2016)
  - Ownership structure of business groups

- **Empirical Strategy**
  - Look at relationship between business group affiliation and labor income
  - We focus on earnings that are received by labor (not owners)
  - Exploit cross-sectional and time-series variation in ownership networks (i.e., business groups)
  - Use AKM (1999) to account for unobserved worker skills
  - Combine with matching procedure given that business group affiliation is not random

Preview of Findings

1. BGs affiliation is related to higher earnings and higher within firm inequality
   - True in the cross-section, and panel, exploiting transitions of firms and workers

2. Both effects are driven by the increase in wages of top workers

3. Two-thirds of the higher earnings result is driven by increase in average skills

4. Mechanisms:
   4.1 Insurance: Not relevant
   4.2 Rent-sharing: Not relevant
   4.3 Hierarchies (Garicano & Rossi-Hansberg, 2015): Relevant

Related Literature

1. **Business Groups**
   Khanna and Yafeh (2007), Almeida and Wolfenzon (2006), Gopalan et al. (2007, 2014), Belenzon et al. (2013, 2022), Bertrand et al. (2002), Kandel et al. (2019)

2. **Common Ownership and Labor/CEOs**
   Anton et al. (2019), Giroud and Mueller (2015, 2019), Belenzon and Tsolmon (2016), Faccio and OBrien (2021), Huneeus et al. (2021)

3. **Firms and Earnings Inequality**
   Mueller, Ouimet, and Simintzi (2017), Alvarez et al. (2018), Song et al. (2019), Lamadon et al. (2019)

Business Groups and Inequality:
Basic Descriptives

Business Group Premium: Higher Average Wage and Higher Wage Dispersion

35,410 firms: 383 business-group firms; 35,027 stand-alone firms
2,436,441 workers: 99,996 in group firms; 2,336,445 in stand-alone firms
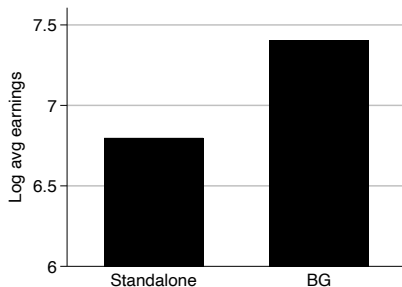
(a) Earnings Average
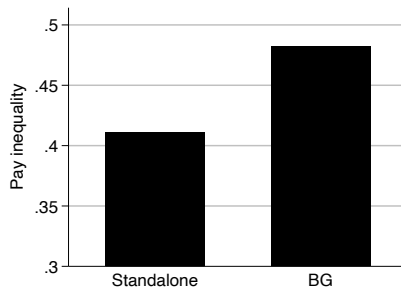
(b) Earnings Dispersion

- No relevant changes in earnings inequality decomposition between 2004 and 2016 ▸ Details

Empirical Strategy: Panel Regression

$$\overline{y}_{jts} = \beta BG_{jt} + \gamma LogEmployment_{jt} + \delta comp_{jt} + \psi_{ts} + \epsilon_{jts}$$

- j, t, and s are firm, year, and sector
- $\overline{y}_{jts}$ is average log wage or log wage standard deviation
- BG_{jt} is a dummy for firms that belong to a BG in year t
- $LogEmployment_{jt}$ and $comp_{jt}$ control for firm size and workforce composition

Dependent variable: Log of Average Wages in Different Deciles

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		All	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	Top-bottom
Business Group		0.427***	0.290***	0.323***	0.349***	0.374***	0.398***	0.423***	0.446***	0.474***	0.499***	0.494***	0.205***
		(0.025)	(0.023)	(0.025)	(0.026)	(0.027)	(0.028)	(0.029)	(0.030)	(0.030)	(0.029)	(0.026)	(0.019)
Log employment	0.076***	0.071***	0.031***	0.049***	0.054***	0.058***	0.061***	0.066***	0.074***	0.083***	0.098***	0.119***	0.091***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Observations	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322	258,322
R-squared	0.228	0.236	0.235	0.255	0.248	0.242	0.241	0.244	0.244	0.241	0.233	0.219	0.161
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Higher Within-Firm Inequality in BG Firms ▸ Top-coded

	(1)	(2)	(3)	(4)	(5)	(6)
	Std Deviation of Log Earnings			Inter-decile range		
				90-10	90-50	50-10
Business Group		0.053***	0.056***	0.637***	0.176***	0.221***
		(0.006)	(0.006)	(0.065)	(0.026)	(0.026)
Log employment	0.021***	0.020***		0.155***	0.055***	0.038***
	(0.001)	(0.001)		(0.007)	(0.003)	(0.003)
Observations	258,322	258,322	258,322	258,322	258,322	258,322
R-squared	0.134	0.135	0.138	0.147	0.077	0.156
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	0.412	0.412	0.412	2.925	1.660	1.729
SD DV	0.160	0.160	0.160	1.492	0.552	0.598

$$y_{i,j,t} = \theta_i + \phi_j + X'_{i,t}\Omega + \tau_t + \epsilon_{i,j,t}$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log average earnings			Std Deviation of Log Earnings			Inter-decile range: 90-10		
	Baseline	AKM	Matching	Baseline	AKM	Matching	Baseline	AKM	Matching
Business Group	0.427***	0.115***	0.158***	0.053***	-0.006	0.023***	0.637***	-0.025	0.260***
	(0.025)	(0.009)	(0.021)	(0.006)	(0.007)	(0.006)	(0.065)	(0.064)	(0.068)
Observations	258,322	258,320	79,393	258,322	258,320	79,393	258,322	258,320	79,393
R-squared	0.236	0.800	0.574	0.135	0.451	0.221	0.147	0.455	0.227
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matching-cell FE	No	No	Yes	No	No	Yes	No	No	Yes
Mean DV	6.805	6.805	7.043	0.412	0.412	0.458	2.925	2.925	3.293
SD DV	0.520	0.520	0.506	0.160	0.160	0.130	1.492	1.492	1.430

What Happens When a Firm and Workers Join a BG?

Preferred Research Design: Matching Difference-in-Difference

- **Treated firms:** Firms that join business groups (105)

- **Control firms:** Selected with matching using coarsened exact matching (Iacus et al., 2012)

- **Matching on:** Industrial sector, deciles for the number of workers and total payroll, and whether the firm is publicly listed or not, in two rounds

- We matched 104 out of the 105 firms, we present results with all the potential controls but weighted by the number of control firms available in each match

- Main specification:

$$\overline{y}_{jrt} = \beta(Entry_j \times Post_{jt}) + \alpha_j + \alpha_{rt} + \epsilon_{jrt}$$

Business Group Transitions ⇒ Increase in Earnings Dispersion

	(1)	(2)	(3)	(4)	(5)	(6)
	Log average earnings			Std Deviation of Log Earnings		
Estimation:	Firm Fixed Effects		Matching-DID	Firm Fixed Effects		Matching-DID
Business Group	0.037**	0.013*		0.016***	0.014**	
	(0.015)	(0.007)		(0.006)	(0.006)	
Post × Entering Group			0.022			0.019***
			(0.018)			(0.007)
Observations	258,017	258,015	8629	258,017	258,015	8629
R-squared	0.950	0.973	0.964	0.829	0.847	0.855
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Year FE	Yes	Yes	No	Yes	Yes	No
AKM Controls	No	Yes	No	No	Yes	No
Cell-Year FE	No	No	Yes	No	No	Yes
Mean DV	6.806	6.806	7.079	0.412	0.412	0.485
SD DV	0.520	0.520	0.456	0.160	0.160	0.100

Business Group Transitions: Effect on Dispersion, not Average
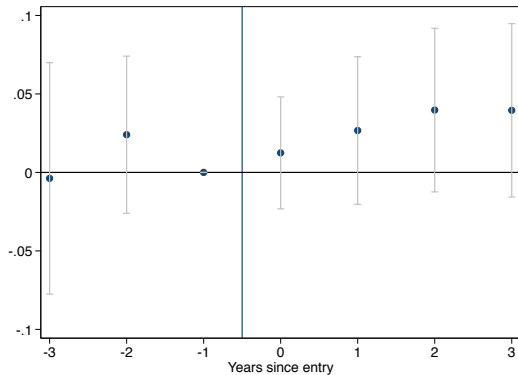
(c) Log Average Earnings
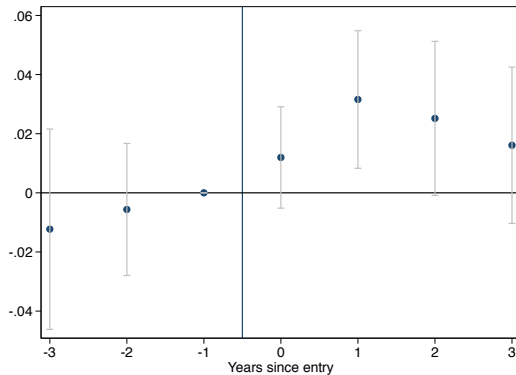
(d) Log Earnings Dispersion

Business Group Transitions ⇒ Increase in Earnings at the Top

	(1) 0-10	(2) 10-20	(3) 20-30	(4) 30-40	(5) 40-50	(6) 50-60	(7) 60-70	(8) 70-80	(9) 80-90	(10) 90-100	(11) Top-Bottom
Panel A: Firm Fixed Effects											
Business Group	-0.001	0.015	0.023	0.032*	0.035*	0.043**	0.038**	0.039**	0.045**	0.053***	0.054***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.015)	(0.018)
Observations	258,017	258,017	258,017	258,017	258,017	258,017	258,017	258,017	258,017	258,017	258,017
R-squared	0.855	0.904	0.919	0.926	0.931	0.937	0.941	0.942	0.938	0.922	0.816
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Matching-DID											
Post × Entering Group	-0.025	-0.006	0.001	0.006	0.011	0.022	0.020	0.012	0.028	0.040*	0.064***
	(0.025)	(0.021)	(0.020)	(0.020)	(0.019)	(0.019)	(0.021)	(0.022)	(0.022)	(0.021)	(0.024)
Observations	8629	8629	8629	8629	8629	8629	8629	8629	8629	8629	8629
R-squared	0.921	0.935	0.946	0.951	0.955	0.959	0.960	0.960	0.958	0.948	0.855
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cell-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Worker Transitions ⇒ Higher Earnings

	(1)	(2)	(3)	(4)
		Earnings growth		
Business Group	0.084***	0.078***	0.077***	0.037***
	(0.023)	(0.023)	(0.019)	(0.013)
Observations	2,489,486	3,688,694	2,510,300	2,489,486
R-squared	0.020	0.029	0.031	0.484
Sector-Year FE	Yes	Yes	Yes	Yes
Worker controls	No	No	Yes	No
AKM Worker FE	No	Yes	Yes	No
Worker FE	No	No	No	Yes
Mean DV	0.207	0.226	0.229	0.207
SD DV	0.544	0.572	0.579	0.544

Mechanisms

Mechanisms: Exploiting Heterogeneity Analysis

1. Incentives: Unemployment insurance within BGs (Cestone et al., 2017)
   - Should imply negative BG premium, counterfactual with our results
   - Alternative incentive story: Tournaments $\Rightarrow$ ↑ teams, ↑ competition, ↑ dispersion
   - Alternative incentive story: Comparisons between firms within BGs

2. Rent-Sharing: Family ownership $\Rightarrow$ Labor relations $\Rightarrow$ Rent sharing (Muller and Philippon, 2010)
   - Interaction with family owned BG
   - Alternative rent-sharing story of nepotism and agency problems appears counterfactual

3. Organizational Advantage: More complex organization $\Rightarrow$ ↑ Value of workers (Garicano & Rossi-Hansberg, 2006)
   - By increasing the returns to knowledge
   - Interaction with proxies of business group complexity, e.g., number of layers, number of sectors, size of firm at the top

Heterogeneity Analysis: Testing the Mechanisms

	(1) Group # Firms	(2) Group # Employees	(3) Group # Sectors	(4) # of ownership layers	(5) Employment firm at the top	(6) Firm at the top	(7) Largest firm	(8) Family group
Panel A: Log avg earnings								
Business group $\times$ Z	0.002*	0.012	0.013**	0.034**	0.011*	-0.064	-0.178***	-0.043
	(0.001)	(0.015)	(0.005)	(0.014)	(0.006)	(0.048)	(0.065)	(0.033)
Business Group	0.243***	0.234***	0.289***	0.290***	0.289***	0.346***	0.302***	0.311***
	(0.032)	(0.072)	(0.017)	(0.017)	(0.017)	(0.045)	(0.018)	(0.023)
Panel B: Top decile								
Business group $\times$ Z	0.001	-0.007	0.006	0.028*	0.015**	-0.039	-0.183**	-0.012
	(0.001)	(0.017)	(0.006)	(0.017)	(0.007)	(0.053)	(0.075)	(0.038)
Business Group	0.329***	0.390***	0.359***	0.360***	0.359***	0.394***	0.373***	0.365***
	(0.039)	(0.082)	(0.020)	(0.020)	(0.020)	(0.051)	(0.020)	(0.027)
Panel C: Inter-decile range 90-10								
Business group $\times$ Z	-0.001	-0.027*	-0.013**	-0.013	0.007	0.009	-0.049	0.068**
	(0.001)	(0.016)	(0.006)	(0.016)	(0.008)	(0.056)	(0.054)	(0.034)
Business Group	0.188***	0.291***	0.168***	0.168***	0.168***	0.160***	0.171***	0.134***
	(0.034)	(0.076)	(0.018)	(0.018)	(0.018)	(0.053)	(0.019)	(0.022)
Observations	258,320	258,320	258,320	258,320	258,320	258,320	258,320	258,320
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AKM controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- **Robust Fact:** Ownership networks increases the wages of top workers, relative to bottom

- Results are robust to sorting of skills and sorting of firms to business groups

- One mechanism consistent with the data: Organizational advantage of business groups
    - Allows for higher returns to knowledge $\Rightarrow$ Match effect between high-skill workers and BGs

Backup Slides

Summary Statistics

	(1) Business-group	(2) Stand-alone	(3) Difference p-value
Number of firms	383	35,027	
Total workers	465,858	9,130,398	
Firm employment	435.45	118.97	316.48
	(942.87)	(388.88)	[0.00]
Log Average earnings at the firm	7.41	6.80	0.60
	(0.48)	(0.52)	[0.00]
Log 25th percentile of earnings at the firm	6.87	6.36	0.51
	(0.51)	(0.42)	[0.00]
Log 50th percentile of earnings at the firm	7.17	6.60	0.57
	(0.56)	(0.49)	[0.00]
Log 75th percentile of earnings at the firm	7.49	6.84	0.57
	(0.57)	(0.57)	[0.00]
Firm std dev of earnings	0.48	0.41	0.07
	(0.11)	(0.16)	[0.00]
Workers tenure	2.92	2.60	0.32
	(2.37)	(2.21)	[0.00]
Workers age	37.30	37.91	-0.61
	(3.68)	(4.72)	[0.00]
Female workers	0.24	0.34	-0.10
	(0.18)	(0.28)	[0.00]

$$\underbrace{var(y_{ijt})}_{\text{Overall Dispersion}} = \underbrace{var(\bar{y}_{jt})}_{\text{Between-Firm Dispersion}} + \underbrace{\sum \omega_{jt} \times var(y_{ijt}|i \in j)}_{\text{Within-Firm Dispersion}}.$$

- - - - Total   —— Between
——— Within

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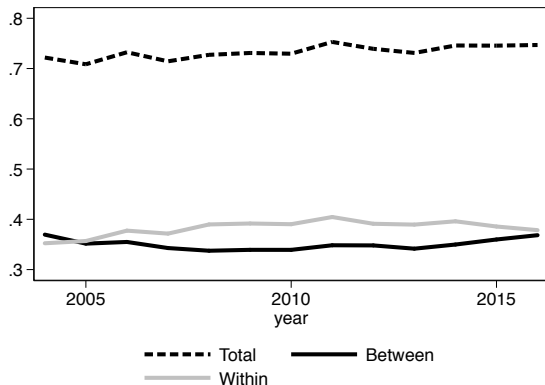
	(1)	(2)	(3)	(4)	(5)	(6)
	Log Average Earnings			Std Deviation of Log Earnings		
Business Group	0.418***	0.426***	0.032*	0.067***	0.070***	0.015**
	(0.027)	(0.026)	(0.017)	(0.006)	(0.006)	(0.006)
Log employment	0.063***			0.021***		
	(0.003)			(0.001)		
Observations	258,322	258,322	258,017	258,322	258,322	258,017
R-squared	0.239	0.242	0.949	0.136	0.139	0.833
Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Employment centiles FE	No	Yes	No	No	Yes	No
Firm FE	No	No	Yes	No	No	Yes
Mean DV	6.704	6.704	6.704	0.417	0.417	0.417
SD DV	0.497	0.497	0.497	0.164	0.164	0.164

Earnings Variance Decomposition

	(1)	(2)	(3)	(4)
	Baseline		Adds group effects	
Variance of worker effects	0.21 (0.51)		0.21 (0.51)	
Variance of avg worker effects		0.07 (0.17)		0.07 (0.17)
Variance of demean worker effects		0.14 (0.34)		0.14 (0.34)
Variance of firm effects	0.07 (0.18)	0.07 (0.18)	0.07 (0.18)	
Variance of avg firm effects				0.00 (0.00)
Variance of demean firm effects				0.07 (0.18)
2 × Covariance worker-firm effects	0.08 (0.19)	0.08 (0.19)	0.08 (0.19)	0.08 (0.19)
Variance of residuals	0.05 (0.12)	0.05 (0.12)	0.05 (0.12)	0.05 (0.12)
Variance of group effects			0.00 (0.00)	0.00 (0.00)
2 × Covariance group-firm effects			0.00 (0.00)	0.00 (0.00)
2 × Covariance group-worker effects			0.00 (0.00)	0.00 (0.00)

Summary Statistics for Firms Transitioning to Business Groups

	(1) Mean	(2) Standard deviation
Firm employment	364.52	955.86
Log Average earnings at the firm	7.24	0.50
Log 25th percentile of earnings at the firm	6.75	0.49
Log 50th percentile of earnings at the firm	7.07	0.53
Log 75th percentile of earnings at the firm	7.72	0.50
Firm std dev of earnings	0.49	0.12
workers tenure	1.96	1.43
Workers age	35.99	8.83
Female workers	0.25	0.20