# Export markets and labor allocation in a low-income country

Workshop on Macroeconomic Policy and Income Inequality

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# Motivation

- Low-income countries have drastically increased their engagement in international trade (Hanson (2012))
  - Low and middle income country share of world exports grows from 21 to 43% between 1992 and 2008
  - Their share of exports in GDP more than doubles from 26 to 55% between 1992 and 2008

# Motivation

- 70 to 80% of employment in low-income countries in small, informal, household-run businesses
  - Gollin (2002, 2008), Nataraj (2011)

- Informal businesses are less productive than formal counterparts
  - La Porta and Shleifer (2008, 2014), Nataraj (2011)

- Systematic negative relationship between prevalence of employment in informal, household businesses and economic development
  - Aggregate income differences across countries reflect inefficient allocation of resources across sectors and firms (Hsieh and Klenow (2009), Restuccia and Rogerson (2008))

  - Reallocation of workers from informal businesses to more productive establishments can increase aggregate productivity

# Motivation

- International trade can contribute to economic development through reallocation of workers out of household businesses toward more productive establishments
  - Large literature on trade and labor markets in less developed countries (Goldberg and Pavcnik (2007), Harrison, McMillan, and McLaren (2011))

- An unexplored margin of labor reallocation in response to trade due to a combination of data limits:
  - Only data on formal sector workers,
  - Only data on urban workers, or
  - Unable to observe this margin in the data

# This paper

- Examines the relationship between international trade and allocation of labor across the informal and formal sectors in a low-income country

- The labor force module of the Vietnam Household Living Standards Survey includes information on the household business sector
  - The survey records whether a person works for an employer in household business or registered enterprise sector
  - Focus on reallocation across this margin
  - 85% of workers economy wide (66% in manufacturing) employed in household business sector

- Large export shock due to the U.S.-Vietnam Bilateral Trade Agreement (BTA) implemented in December 2001
  - Main policy change is a decline in U.S. tariffs on VN exports

- Evaluate the impact of this reallocation on aggregate labor productivity in manufacturing

# Related Literature

- International trade and labor markets
  - Goldberg and Pavcnik (2007), Harrison, et. al. (2011), Kovak (2010), Topalova (2010), McCaig (2011), Menezes-Filho and Muendler (2011)

- Policy distortions and aggregate productivity in developing countries
  - Restuccia and Rogerson (2008), Hsieh and Klenow (2009), Bloom and Van Reenan (2007), McMillan and Rodrik (2011)
    - Prevalence of microenterprises notable component of firm distribution in LDCs
      - Gollin (2002, 2008), Hsieh and Olken (2014), La Porta and Shleifer (2014)
    - Many studies focus on the effects of supply-side constraints on the growth and formalization of microenterprises (Banerjee and Duflo (2005), de Mel, McKenzie, Woodruff (2013))

  - We examine the role of trade distortions, which disproportionally lower profitability of more productive establishments (Melitz (2003))

# Roadmap

- Conceptual framework
- The nuts and bolts of the study
  - The U.S-Vietnam Bilateral Trade Agreement
  - Household business definition
  - Data description
  - Empirical methodology
- Findings
- Aggregate productivity gains from reallocation
- Conclusions

# Export Costs and Household Business Employment

- Expansion in exports due to declines in US tariffs on Vietnamese exports
- Firms differ in profitability due to heterogeneity in marginal cost of production
  - Marginal costs differences could reflect entrepreneurial ability (Lucas (1978)) or productivity (Melitz (2003))
  - Hh businesses relatively less productive (Gollin (2008), La Porta and Shleifer (2014))
- Fixed cost of exporting
  - Declines in export costs disproportionally benefit more productive firms
- Labor reallocates from household businesses toward more productive firms

# Export Costs and Household Business Employment

- Household businesses do not need to directly compete with exporting firms in product markets

- General equilibrium effects through labor market
  - Declines in export cost increase aggregate labor demand

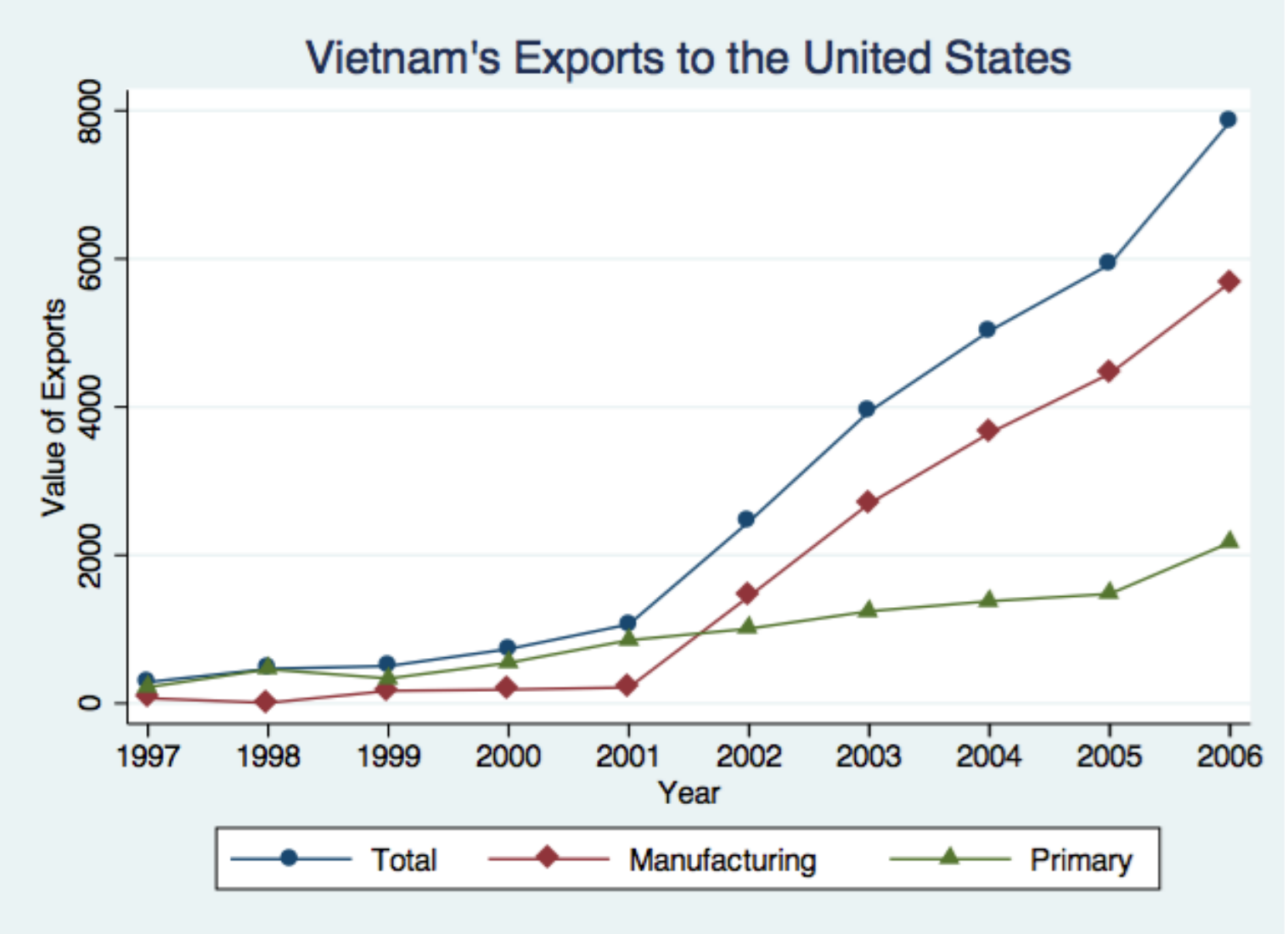
  - This increases the opportunity costs of working in a household business (Lucas (1978))

  - Labor reallocates away from household businesses toward other employers

- This channel consistent with increased wages in areas of VN with greater pre-BTA concentration of exporting industries (McCaig (2011))

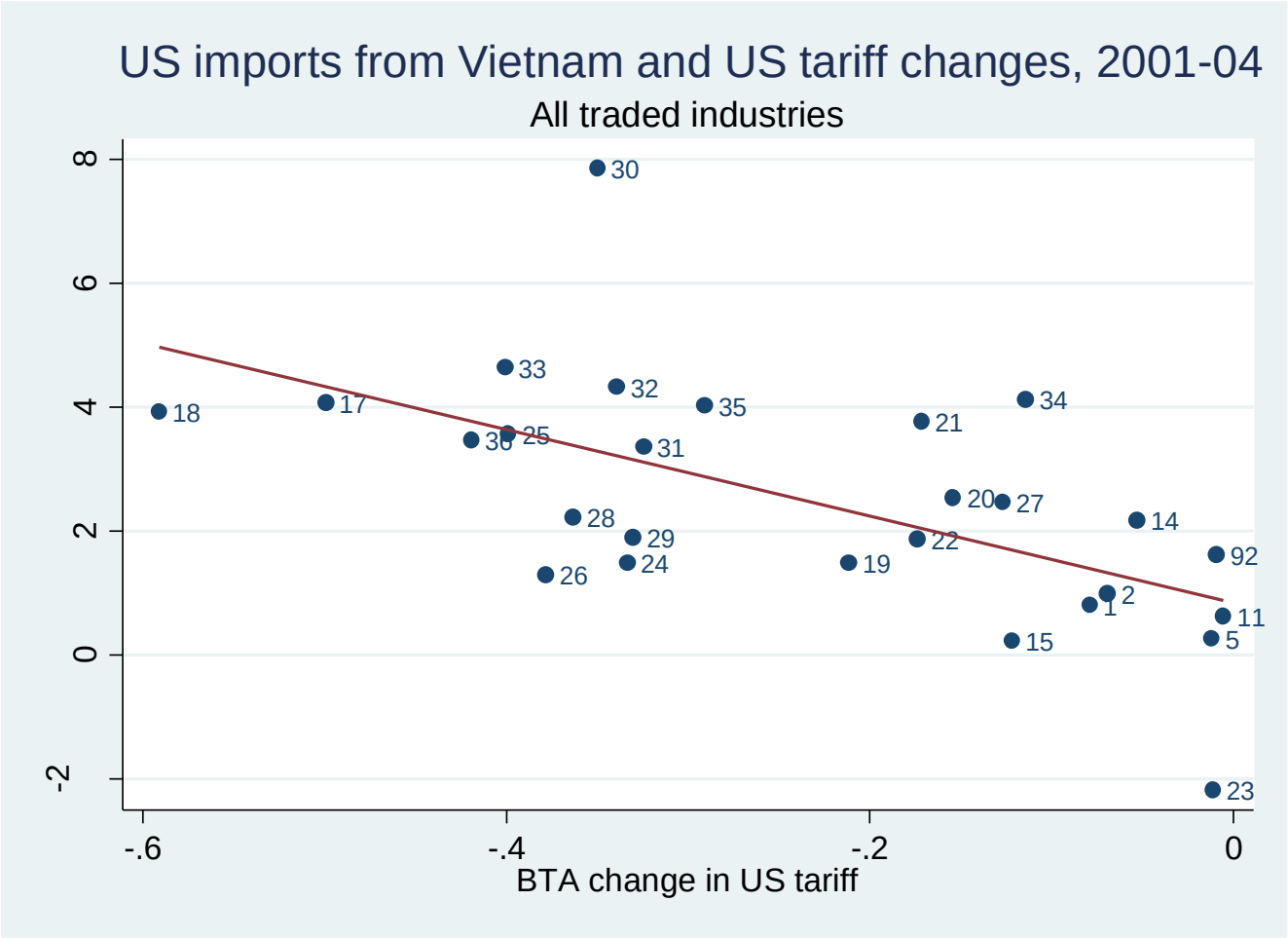
# U.S.-Vietnam Bilateral Trade Agreement

- Implemented in December 2001
- Negligible changes in VN import tariff commitments to US
  - MFN tariffs to the US prior to the agreement
  - Long term commitment to improve market access in services, IPR, FDI
- US grants Vietnam "Most Favored Nation" status
  - Vietnam moved from Column 2 to MFN tariff schedule
- Tariffs decline on average by 21.1 percentage points
  - from 23.4 to 2.4%
  - declines vary across industries (St. dev. is 17.9 ppt)
  - largest in manufacturing




- rapid expansion of trade, concentrated in manufacturing
- value of exports to the US more than triples 2001-2004

# U.S. Tariff declines and export expansion




- Industries with bigger tariff declines experience bigger export growth
- This pattern not pronounced for exports to the EU, nor in pre-reform data

# US tariffs and exports: other high-income market

| **Industries** | **Traded** | **Manufacturing** | **Traded** | **Manufacturing** |
|---|---|---|---|---|
| Destination market | US | US | EU | EU |
| | **Panel A: Change in ln exports, 2001 to 2004** | | | |
| Tariff change | -5.677*** | -4.331* | 0.372 | 0.142 |
| | (1.474) | (2.111) | (0.675) | (1.070) |
| Observations | 24 | 19 | 24 | 19 |
| R-squared | 0.283 | 0.119 | 0.009 | 0.001 |
| | **Panel B: Change in ln exports, 1997 to 2000** | | | |
| Tariff change | -0.808 | 0.181 | 0.362 | 0.823 |
| | (1.896) | (1.722) | (0.599) | (0.904) |
| Observations | 24 | 19 | 24 | 19 |
| R-squared | 0.011 | 0.001 | 0.011 | 0.035 |

# Worker-level Data

- Vietnam Household Living Standards Surveys
  - Nationally representative hh survey with labor market module
  - Two cross sections 2002, 2004
  - 12 month recall (cover 2001 and 2003)
  - Panel subcomponent
  - 1993 and 1998 household surveys for falsification checks

- Usual information on worker demographic characteristics, education, location, industry affiliation

- Information on the industry of employment
  - 60 overall, 34 traded industries, 22 manufacturing
  - Link to industry level measures of tariffs

# Household businesses

- Informality is a multidimensional concept
- Vietnam differentiates between household businesses vs. registered enterprises
  - All foreign, state, and collective businesses have to legally register as an enterprise
  - Private businesses can legally operate as a
    - household business
    - registered private enterprise
- Consistent with definition in other countries based on registration of firms

# Household business employment

- Information on employer type
  - Self-employment (household farm or a household businesses)
  - Work for another household's business
  - Enterprise sector (private, foreign, state, collectives)

- Indicator for working in a household business
  - 1 if self-employed or work for another household's business
  - 0 if other employer (i.e., enterprise sector)

- Abstract from reallocation of workers within employer groups

# Vietnamese non-farm HH businesses

- Predominantly operate in services (70%)
  - 40% in retail, 10% in hotels and restaurants
- 30% operate in manufacturing
- The most common activities within the manufacturing sector
  - Food and beverages (42.6%)
  - Wood processing (17.9%)
  - Clothing and apparel; dressing and dyeing of fur (11.0%)
  - Manufacture of furniture; manufacturing n.e.c. (8.4%)
  - Textiles (7.9%)

# Household business employment and tariffs

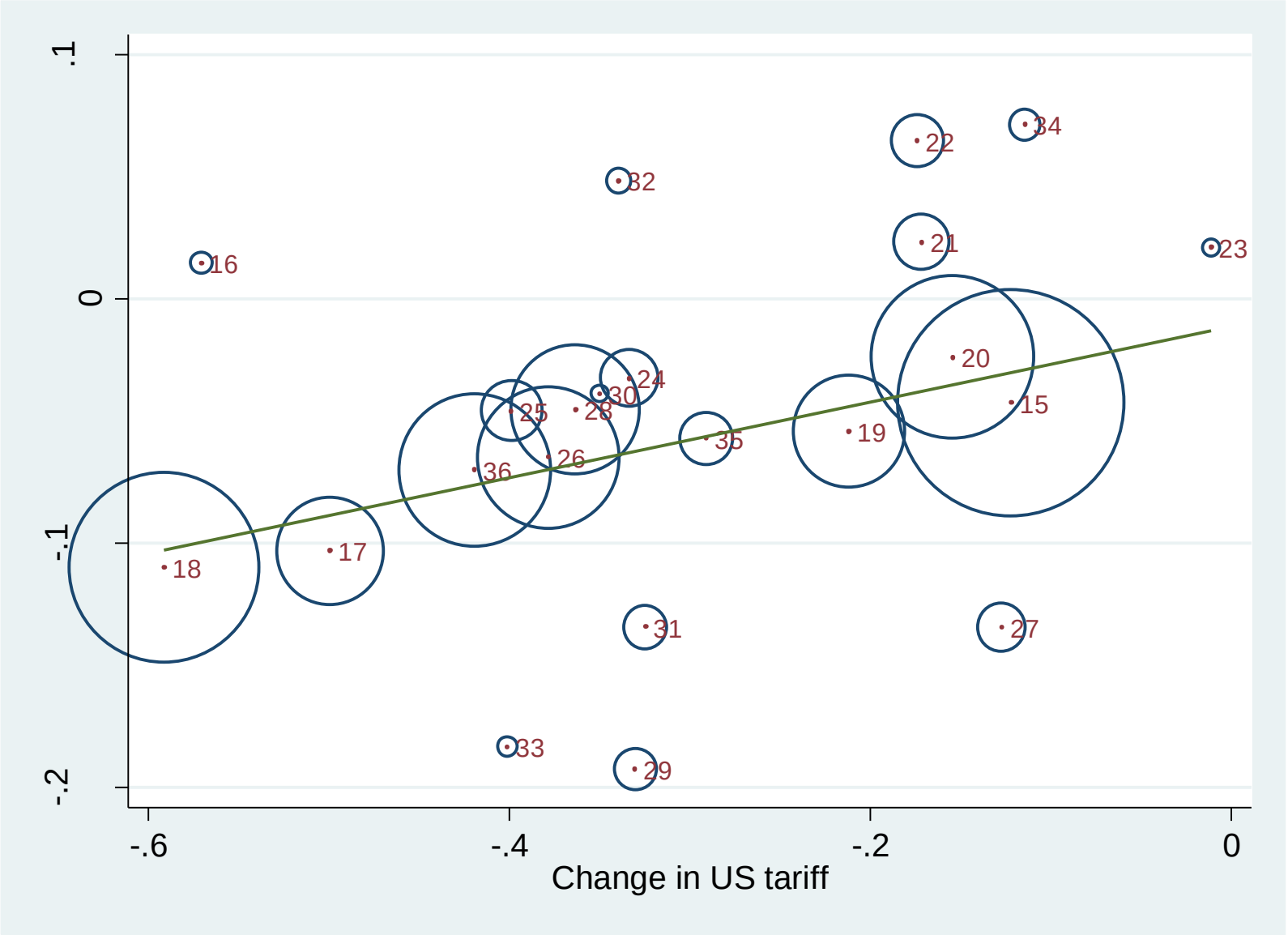
- The relationship between employment in a household business and industry tariffs:

$$H_{ijt} = X_{ijt}\beta_D + \beta tariff_{jt} + \lambda_j + t_t + p_p + \varepsilon_{ijt}$$

where

  - H is an indicator for employment in hh business
  - X is a vector of individual characteristics (age, age squared, education indicators, gender, minority, rural indicator)
  - tariff is the U.S. tariff in industry j at time t
  - $\lambda$ is an industry fixed effect
  - t is a time fixed effect
  - *p* is a province fixed effect

# Hh business employment and tariffs: manufacturing



# Household business employment and tariffs

| | (1) Traded | (2) All industries | (3) Manufacturing |
|---|---|---|---|
| Industry tariff | 0.209*** | 0.127*** | 0.156*** |
| | (0.014) | (0.032) | (0.020) |
| Worker characteristics | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Industry fixed effects? | Yes | Yes | Yes |
| Province fixed effects | Yes | Yes | Yes |
| Number of industries | 34 | 60 | 22 |
| Observations | 176,546 | 248,793 | 27,072 |
| R-squared | 0.415 | 0.591 | 0.293 |

- Traded: Avg. tariff declines 21.1 pct. point → 4.4 pct. point decline in hh business employment
- Manufacturing: Avg. tariff decline 30.3 pct. point → 4.7 pct point decline

# Additional Results

- Falsification Check: No relationship prior to reform
- Greater effects for individuals in internationally integrated provinces
- Greater effects for younger cohorts
- Greater effects for the least and for the most educated
- Results robust to controls for unobserved individual heterogeneity (in a panel subsample)
- Movement across industries in response to tariffs:
  - Structure of industry employment changing *within* the enterprise sector
  - Overall though, little change in industry structure of employment

# Potential Aggregate Labor Productivity Gain

- Labor allocation across heterogeneous economic units (sectors, employers) has consequences for aggregate productivity

- Policy distortions and aggregate productivity in developing countries
  - Restuccia and Rogerson (2008), Hsieh and Klenow (2009), Bloom and Van Reenan (2007), McMillan and Rodrik (2011)

- BTA might increase aggregate labor productivity through the reallocation of workers into the enterprise sector

# Aggregate labor productivity gain in manufacturing

- Focus on manufacturing

- Use standard development accounting approach to compute associated productivity change (Caselli (2005), Gollin, Lagakos, Waugh (2014))
  - Previously applied to productivity gaps between agriculture and non-agriculture

$$\Delta P = s^{BTA}\left(P_e - P_h\right)$$

Where

- $s^{BTA}$ is the share of manufacturing workers reallocated to the enterprise sector due to the BTA
- $P_e$ is productivity in the enterprise sector
- $P_h$ is productivity in the household business sector

# Aggregate labor productivity gain in manufacturing

- We start with the "standard" Cobb-Douglas production function for thinking about how to measure productivity differences across sectors

$$Y_i = A_i K_i^{\alpha} L_i^{1-\alpha}$$

- Under assumptions of perfect competition and markets, this leads to the familiar result:

$$w_i = MRPL_i = (1-\alpha) ARPL_i$$

- This suggests two approaches for measuring labor productivity gap:
  - ARPL (Gollin, Lagakos, and Waugh (2014))
  - Wages (Vollrath (2014), Herrendorf and Schoellman (2015))

$$\frac{w_e}{w_h} = \frac{MRPL_e}{MRPL_h} = \frac{ARPL_e}{ARPL_h}$$

# Aggregate labor productivity gain in manufacturing

| | Average revenue product of labor | Earnings |
|---|---|---|
| Productivity ratio | 9.0 | 1.82 |
| Adjusted for hours & human capital | 6.0 | 1.24 |
| Importance of worker heterogeneity | 37% | 70% |

- Productivity is higher in the enterprise than in the household business sector
  - Consistent with La Porta and Schleifer (2008, 2014), Nataraj (2011), Hsieh and Olken (2014)
- Reallocation of workers would be productivity-enhancing
- Adjust the gap for worker heterogeneity across the two sectors
  - Hours worked
  - Education
  - Accounting for worker heterogeneity matters

# Aggregate labor productivity gain in manufacturing

- How can one reconcile the estimates of the gap based on ARPL vs. earnings?
- Distortions facing the firms (Hsieh and Klenow (2009))
  - Profit function:

$$\pi_i = (1-\tau_{Yi})P_iY_i - (1+\tau_{Li})w_iL_i - (1+\tau_{Ki})r_iK_i$$

  - Relationship between ARPL and wage gaps:

$$\frac{w_e}{w_h}\frac{(1+\tau_{Le})/(1-\tau_{Ye})}{(1+\tau_{Lh})/(1-\tau_{Yh})} = \frac{MRPL_e}{MRPL_h} = \frac{(1-\alpha_e)}{(1-\alpha_h)}\frac{ARPL_e}{ARPL_h}$$

# Aggregate labor productivity gain in manufacturing

| | Average revenue product of labor | Earnings |
|---|---|---|
| Productivity ratio | 9.0 | 1.82 |
| Adjusted for hours & human capital | 6.0 | 1.24 |
| Share of hours reallocated | 0.050 | 0.050 |
| Annual productivity change | 3.5% | 0.5% |

- After adjusting for heterogeneity, the ratio is 6.0
- The associated percentage change in productivity due to BTA reallocation from household businesses to enterprises is then 3.5%
- Similar results within textiles and apparel as well as within one major manufacturing centre

# Aggregate labor productivity gains

- Allow output-labor elasticity to differ across the two sectors
  - Output-elasticity of 1 and 0.68 in informal and formal sector (Restrepo-Echavarria (2014))
  - Elasticity ratio of about 1.5, MRPL gap drops from 6 to 4

- Measurement concerns:
  - Use of two different surveys:
    - Earnings per worker similar in enterprise sector
    - Gap exists even in data from 2006 from one survey
  - Measurement concerns more severe for microenterprises
    - Understate revenue up to 30% (de Mel et al. (2009)): 6 drops to 4.2
    - Overstate effective hours work (Fafchamps et al. (2014))

- Gap drops from 6 to 3.7 if adjusted for both and to 2.5 if adjusted for output-labor elasticity as well (1.1% annual gain)

# Conclusions

- We find that labor reallocates from hh businesses to the enterprise sector with increased export opportunities
  - Effects bigger for individuals in more internationally integrated provinces and for younger workers

- Demand-side policies, which disproportionally benefit initially more productive firms, aid relative expansion of jobs in the registered enterprise sector in low income countries

- Employment shifts toward industries with greater declines in export costs among VN employers in the enterprise sector
  - Employers in the enterprise sector most directly impacted

- Removal of export distortions predicted to improve aggregate labor productivity through the reallocation to the enterprise sector

# Thank you