A comparison of the contribution of labor reallocation to aggregate productivity growth: Canada and the United States

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CAED 2012, Nürnberg

Disclaimer

- Vilhuber's research was supported by NSF Grant SES-0820349, SES-1042181, and SES-1042181.
- Part of the research was done while one of the researchers was a Special Sworn Status researcher of the U.S. Census Bureau at the Center for Economic Studies.
- Other data used in this paper are confidential data housed at a Statistics Canada Research Data Center, accessed through the Ottawa Head Office by arrangement with Industry Canada.
- All results presented in this paper have been screened to insure that no confidential data are revealed.
- Research results and conclusions expressed are those of the authors and do not necessarily reflect the views of the Census Bureau, Statistics Canada, or Industry Canada.

Disclaimer (2)

This is work in progress, and results are very preliminary!

Outline

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- We started several years ago with Canadian survey (WES), French and US administrative data (CAED2009).

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- start with same code, sit in front of respective secure terminals
- ... then see what happens....

Replication issues

Slew of issues

- lack of common variable names

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  - 50% of labor productivity growth is dependent on labor reallocation (Foster, Haltiwanger, and Krizan 2001, US data)
  - ... or is it higher: 70% (Lentz and Mortensen 2008, Danish data)

Our approach

Here: evidence on the evolution of labor productivity decomposition ...

- ... for two countries: Canada and the United States...

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- ... caveats at the end

Productivity

Aggregate productivity

$$P_t = \sum_{j \in J} \theta_{jt} p_{jt} \tag{1}$$

θ_{jt} represents the firm's market share (share of labor or share of sales), and p_{jt} is the individual firm's productivity.

Productivity growth

Productivity growth

$$\Delta P_{t,t-k} = \sum_{j \in J_t} \theta_{jt} p_{jt} - \sum_{j \in J_{t-k}} \theta_{jt-k} p_{jt-k} \tag{2}$$

BHC decomposition

- BHC decomposition (Baily, Hulten, and Campbell 1992)

$$\begin{aligned}\Delta P_t &= \sum_{i \in C_t} \theta_{it-1} \Delta p_{it} \\ &+ \sum_{i \in C_t} \Delta \theta_{it} p_{it-1} + \sum_{i \in C_t} \Delta \theta_{it} \Delta p_{it} \\ &+ \sum_{i \in E_t} \theta_{it} p_{it} - \sum_{i \in X_t} \theta_{it-1} p_{it-1} \end{aligned} \tag{3}$$

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&= \textit{Within}
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\end{aligned}$$

- where $J_t = \{C_t, E_t\}$ and $J_{t-k} = \{C_t, X_t\}$

FHK decomposition

- FHK version (Foster, Haltiwanger, and Krizan 2001)

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\begin{aligned}
\Delta P_{t,t-k} &= \sum_{j \in C} \theta_{jt-k} \Delta p_j + \sum_{j \in C} \Delta \theta_j \left(p_{jt-k} - P_{Jt-k} \right) \\
&+ \sum_{j \in C} \Delta \theta_j \Delta p_j + \sum_{j \in E} \theta_{jt} \left(p_{jt} - P_{Jt-k} \right) \\
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- contribution of firm's $p_i, i = t, t-k$ now relative to economy/sector-wide P_{t-k}

GR decomposition

- GR decomposition (Griliches and Regev 1995)

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- productivity differences for entrants/exiters are weighted by the contemporaneous market share of the firm

Baldwin-Gu decomposition

- If new entering firms are taking market share away from both exiting and existing firms, then

$$\begin{aligned}\Delta P_{t,t-k} &= \sum_{j\in C} \bar{\theta}_j \Delta p_j + \sum_{j\in C} \Delta\theta_j \left(\bar{p}_j - P_D\right) \\ &+ \sum_{j\in X} \theta_{jt-k} \left(P_N - p_{jt-k}\right) + \left(S_N - S_X\right)\left(P_N - P_D\right)\end{aligned}$$

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- S_N market share of $j \in E$, S_X market share of $j \in X$

Data

Canadian data - T2/LEAP

T2/Longitudinal Employment Analysis Project (LEAP)

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- No value-added: productivity measured as sales (receipts) per worker

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- ASM/CM: information on employment, wages, sales, value-added

US data

LBD

- longitudinal research file (Miranda and Jarmin 2002)

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- corrects linkages in Business Register

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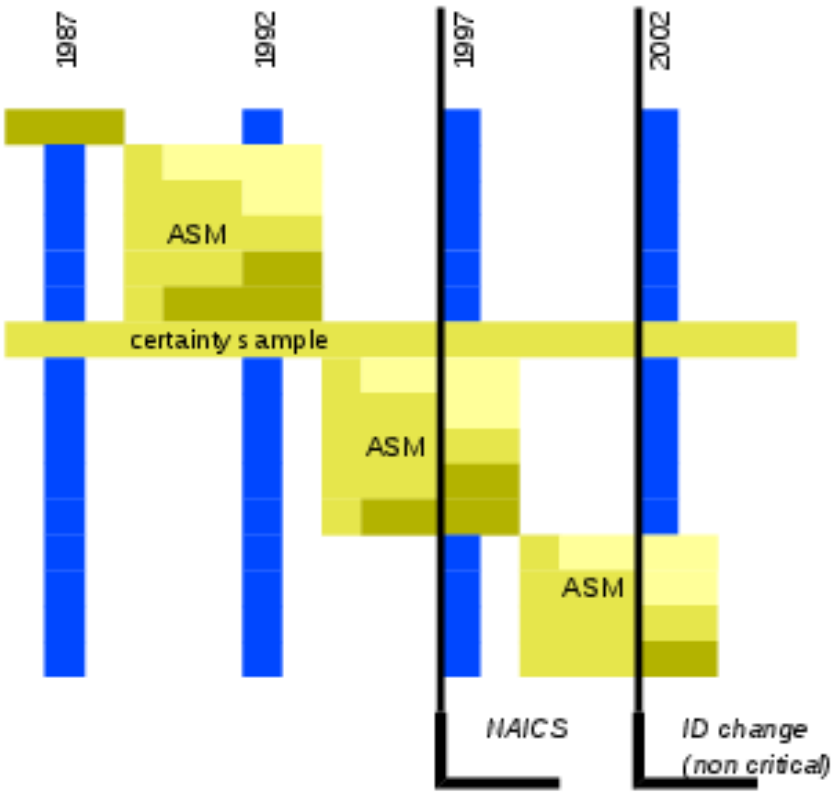
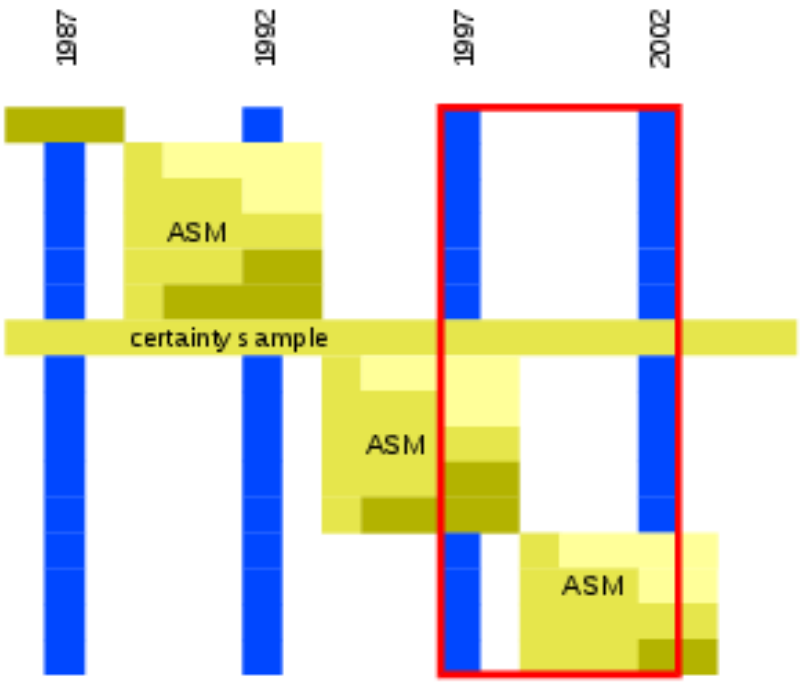
ASM-CM schema



ASM-CM schema



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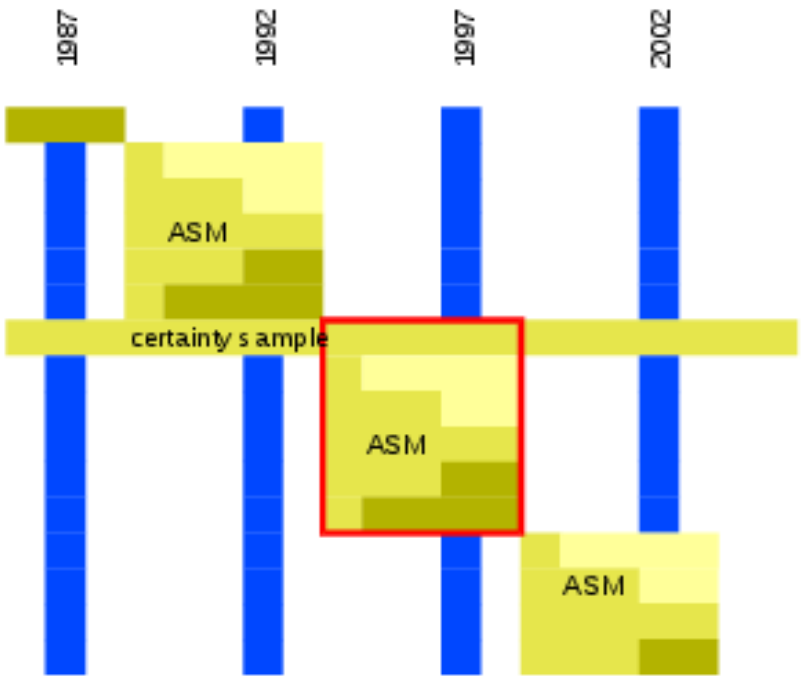

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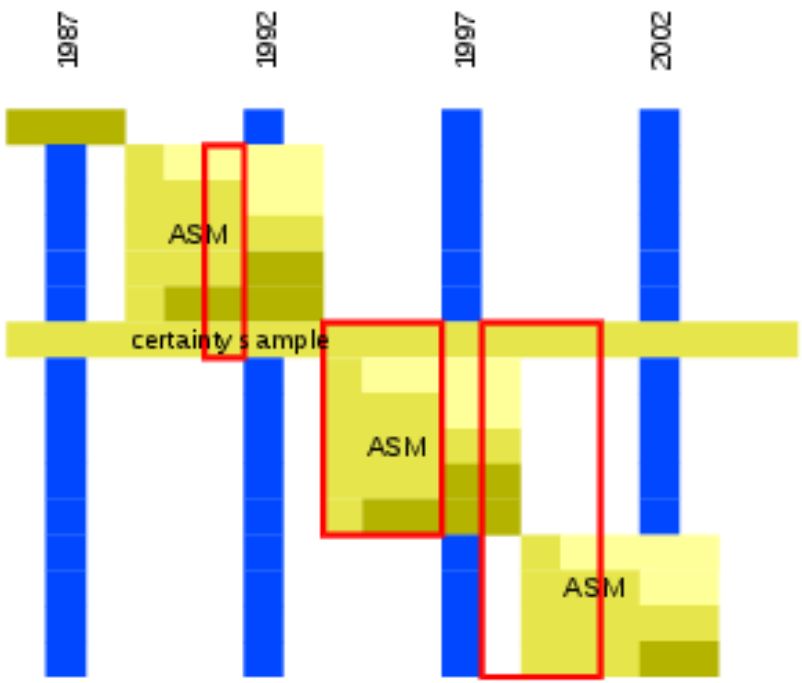
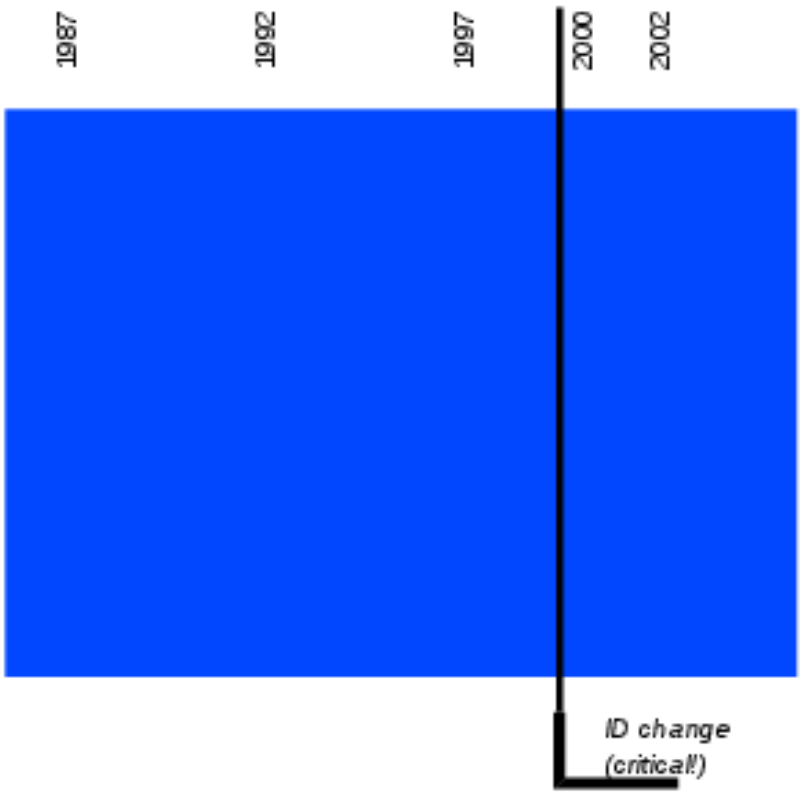


T2LEAP schema



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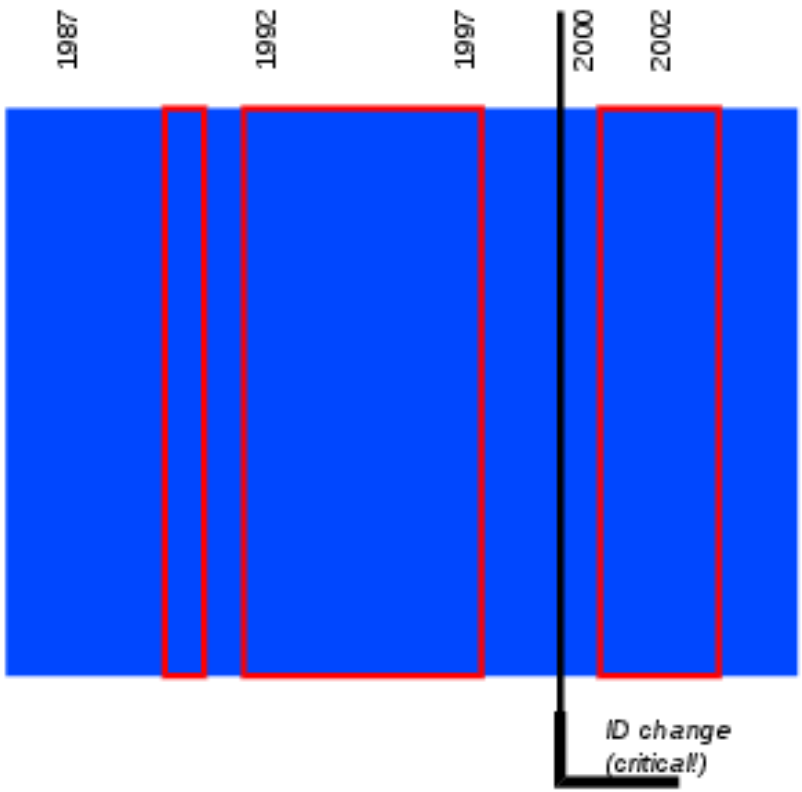
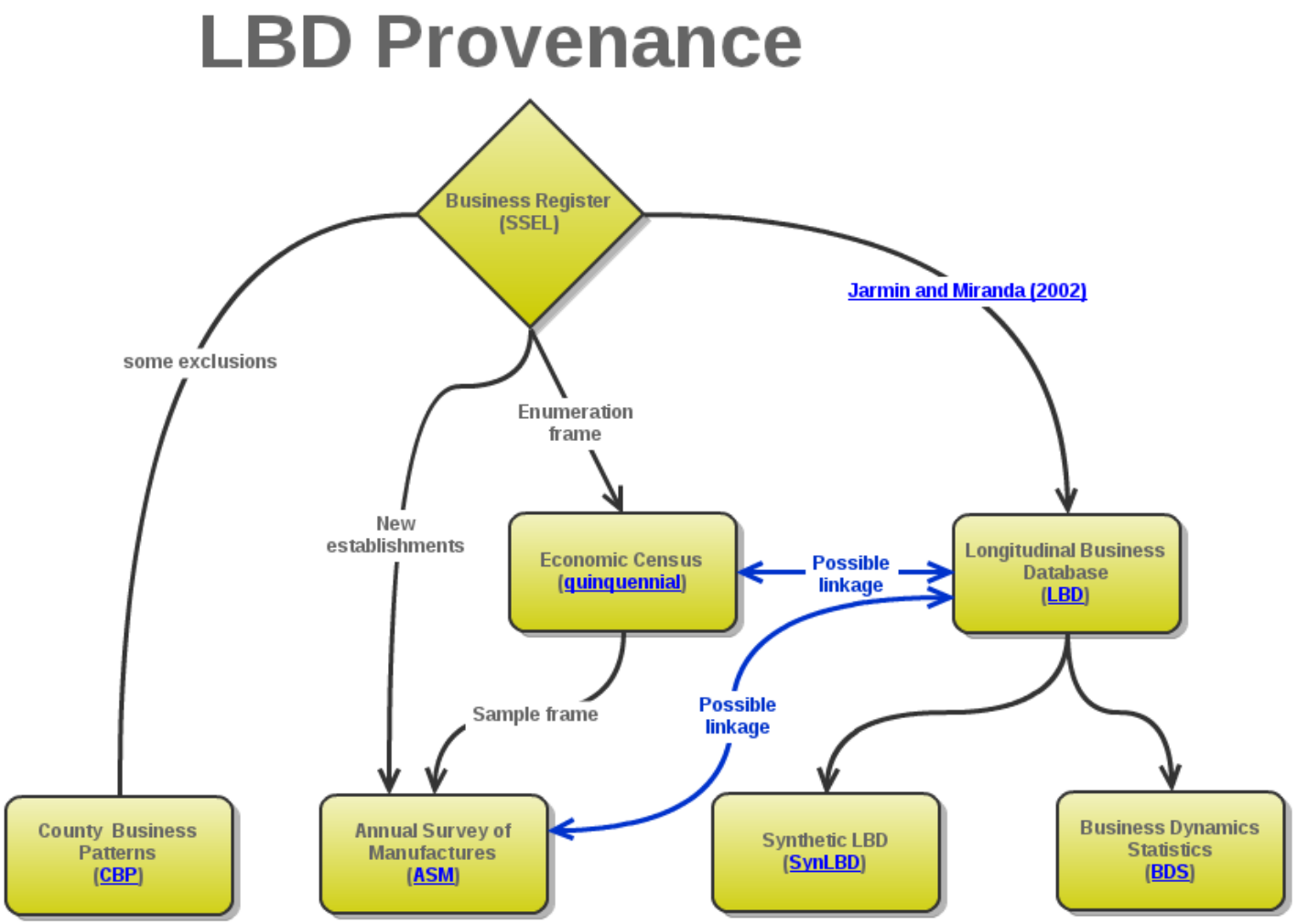
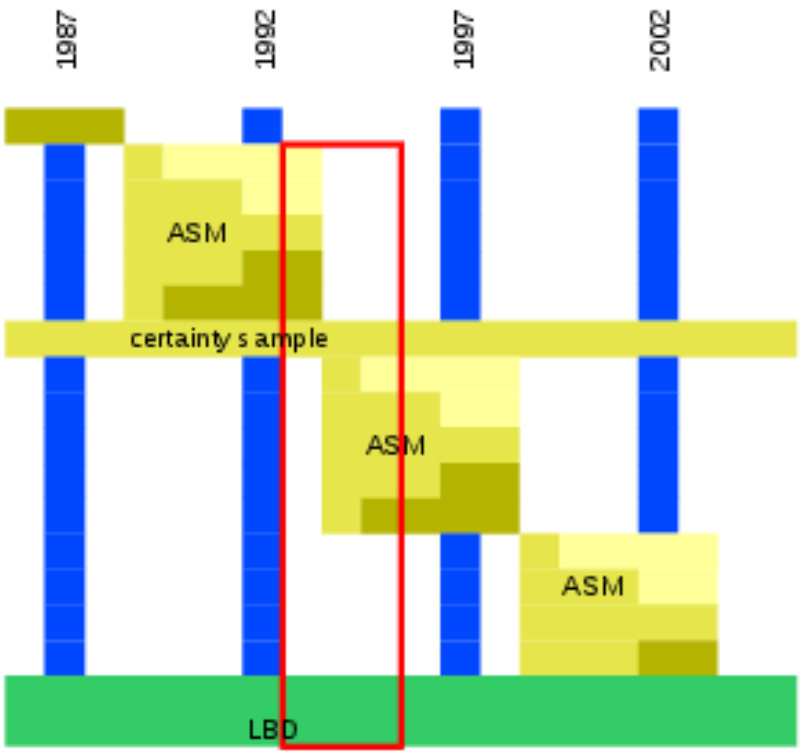


Overview of LBD data



ASM-CM-LBD schema



Methodology for US

Matching methodology using LBD

- Define births/deaths/continuers in LBD

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- Create panel weight to match birth/death rates in LBD (here: by ten size-classes)

Data definitions

Imputations

- We impute missing sales based on data for surrounding years for the same firm.
- When employment is missing, we assume the plant is inactive (dead)

Adjustments

- Productivity = (real value of) sales/worker
- Trim top and bottom 2% of productivity by removing from the panel.

Comparing

Common characteristics

- Long time series

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- Data accessible in restricted access environments

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- Results need to pass disclosure review

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Differences

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Results

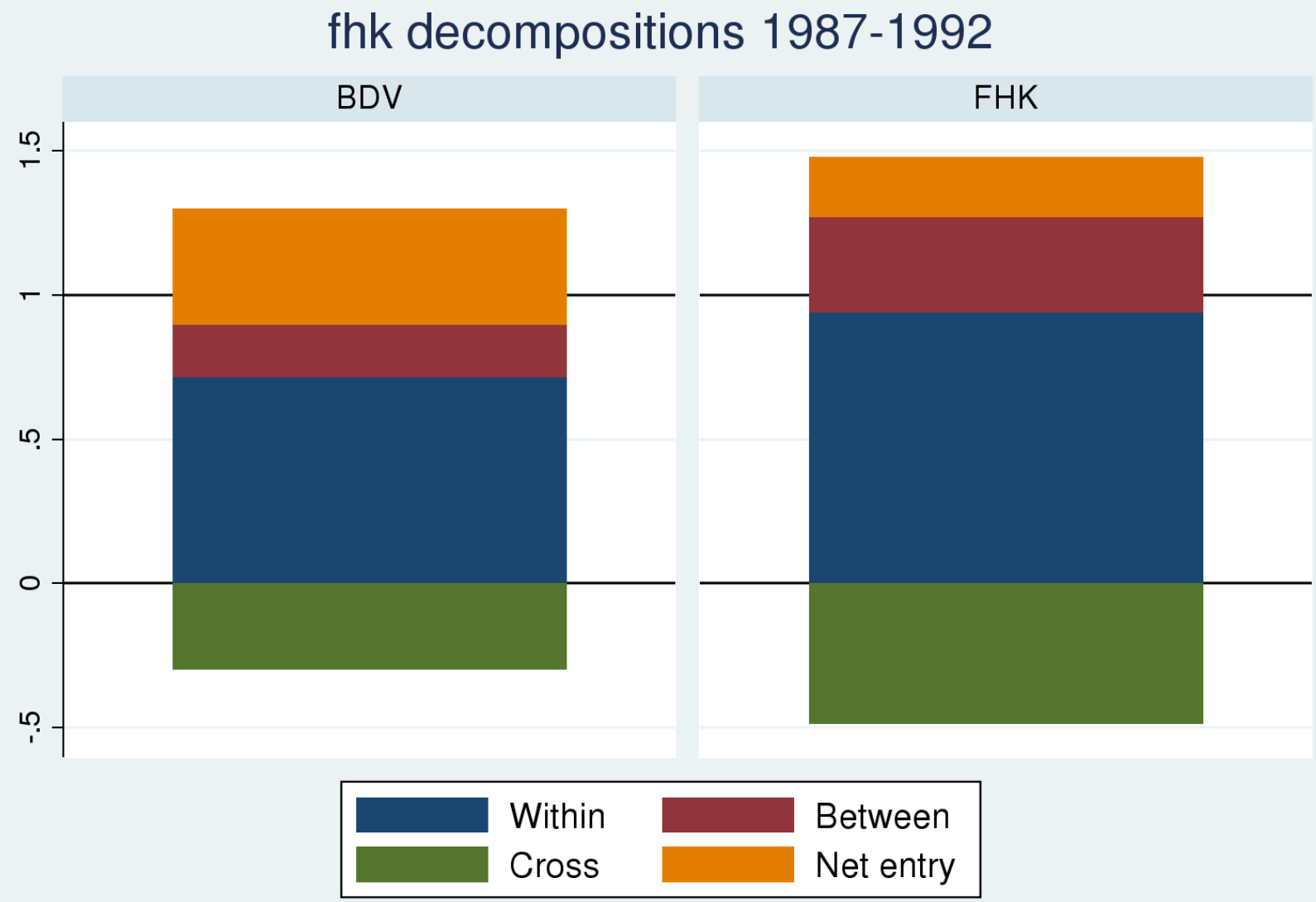
Previous results

Enormous literature

The literature is enormous. Many studies provide some summary of previous studies.

- Within-plant contribution between 0.79-1.2 (Foster, Haltiwanger, and Krizan 2001)

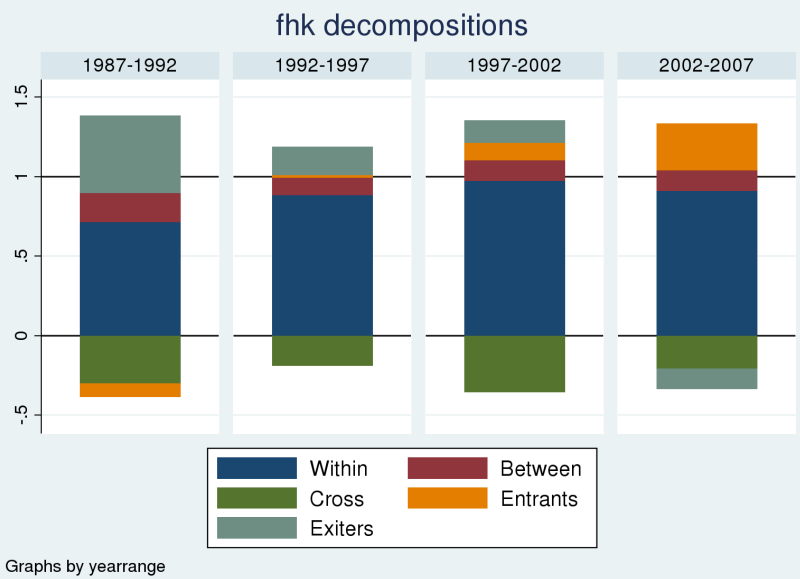
Comparing to FHK2001

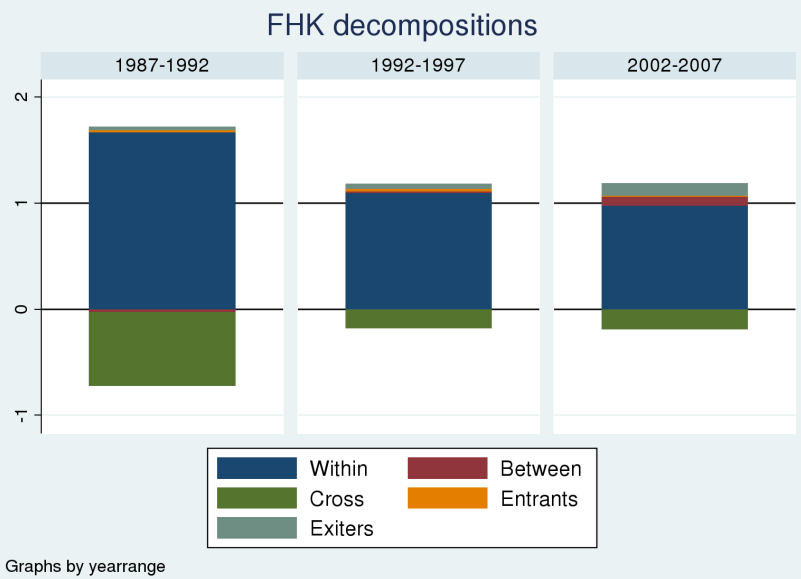


Comparing to Baldwin and Gu (multiple)

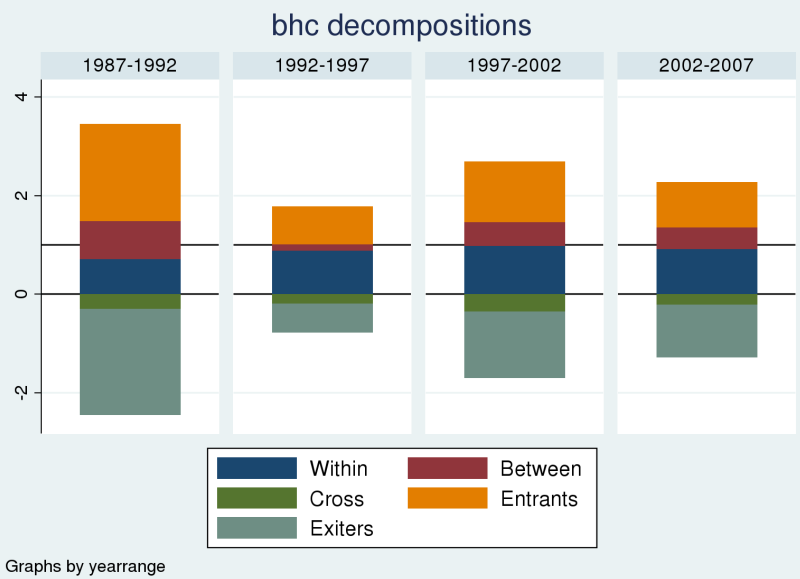
to come

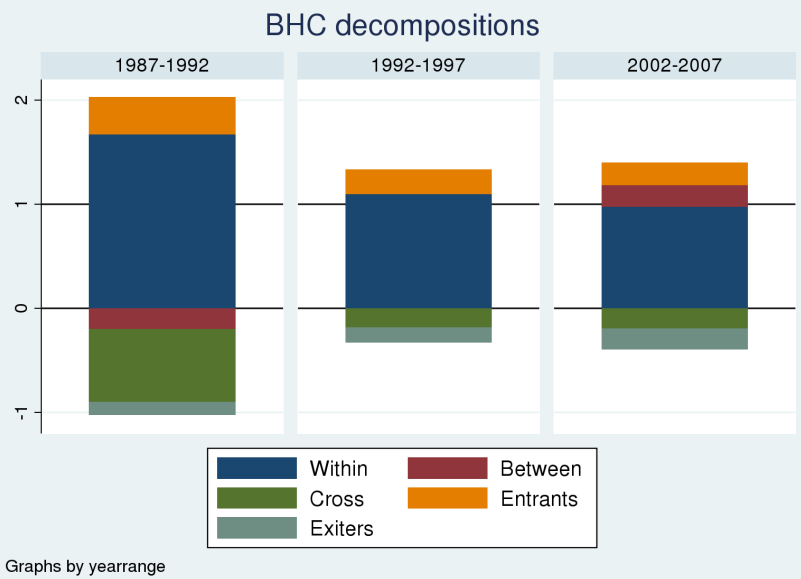
US and Canada: FHK



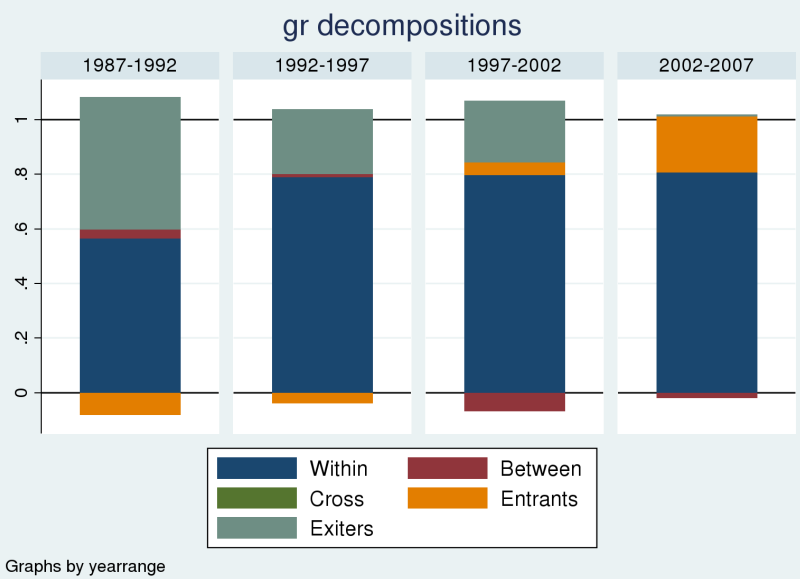


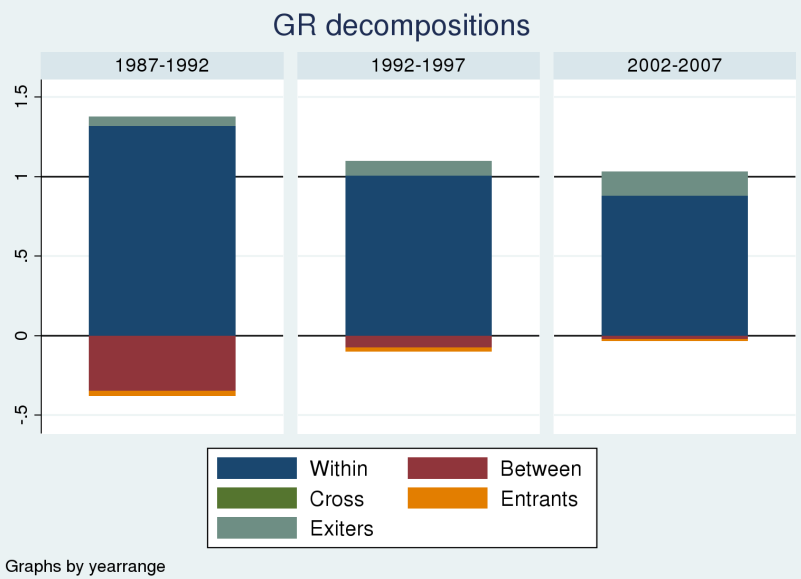
US and Canada: BHC



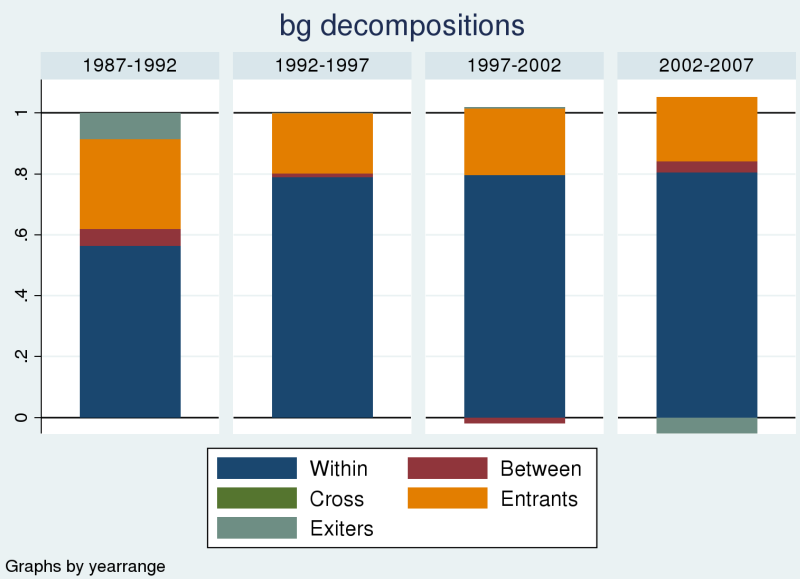


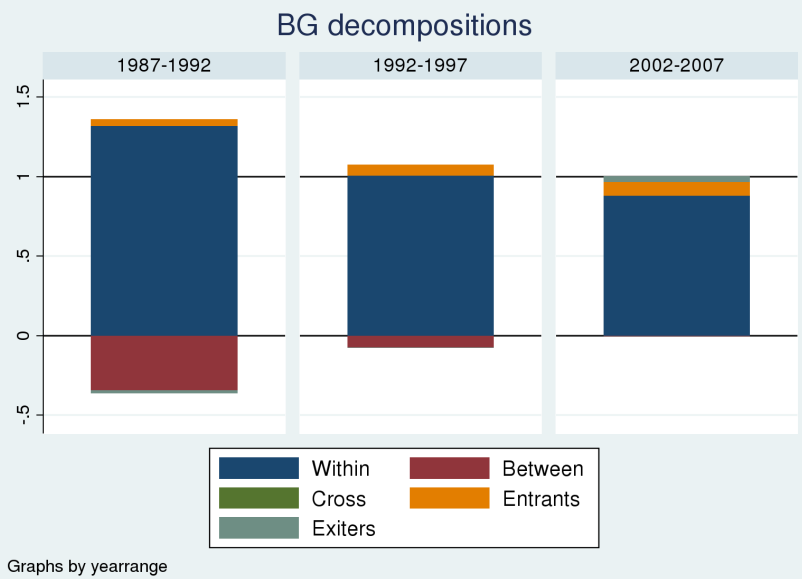
US and Canada: GR





US and Canada: BG





Variations and robustness checks

- Variations in k (3 years, 5 years, 1 year?) [easy in Canada, not in US] (already noted in Foster, Haltiwanger, and Krizan (2001))

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  - Missing data [currently very simple (simplistic) impute]
  - Importance of measuring at firm level [only way in Canada, only in EC years in US]

Preliminary conclusions and speculation

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  - ... due to measurement at firm vs. establishment level?
  - ... due to fundamentals?
- decreasing role of cross effect (all), between effect (GR,BG) in Canada?
- In the US, positive net effect of entry/exit, but secular increase in role of entrants/decrease in role of exiters?

Thank you.

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