FDI spillover effects in manufacturing and services: 
Empirical evidence on SEE Economies

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Context

I. Research interest
II. Theory
III. Empirical evidence
IV. Data and Methodology
V. Results
VI. Conclusions
Transition economies (TEs) inherited outdated capital, inefficient production structures from the previous political-economic system (EBRD, 2013).

FDI has significantly increased in TEs over the past few decades.

FDI as % of GDP during 2000-2016
- Croatia - 4.2%
- Slovenia – 2.1%
- World - 3%
I Research interest

• Global FDI stock (UNCTAD, 2017)
  – two-thirds goes to services
  – 26% goes to manufacturing

• FDI in Croatia (Croatian National Bank, 2017)
  – 70% goes to services
  – 15% goes to manufacturing

• In Slovenia (Bank of Slovenia, 2017)
  – 62.3% goes to services
  – 33.2% goes to manufacturing
GDP growth rates in Croatia, Slovenia and in OECD countries

Years of recession:
- Croatia: 2009-2014 (ranging from -0.3% to -7.4%)
- Slovenia: 2009 (-7.8%), 2012 (-2.7%) and in 2013 (-1.1%).
I Research Interest

• In TEs, bank lending is still the main source of funds for technology and knowledge-intensive activities (EBRD, 2018).

• Bank credit policies were restrictive in Croatia and Slovenia after financial crisis. Only firms in countries where banks loosened their credit criteria were able to adopt new technology (EBRD, 2014).

• Prevailing economic conditions in the two economies post financial crisis, questioned the benefits that can be incurred through FDI.
I Research interest

• Why Croatia and Slovenia?
  • geographical, historical and societal similarities
    • (belonged to the same country 1918-1990)
  • different economic conditions
    • GDP per capita (2016)
      • US$12,149 in Croatia
      • US$21,650 in Slovenia
    • Slovenia in EU since 2004, Croatia since 2013
    • Slovenia - EMU member since 2007
II Theory

Multinational corporations
– undertake a significant part of the world’s R&D and employ the most advanced production technologies (Blomström, 1991)
– increasingly decentralise their R&D activities abroad and in less developed markets (OECD, 2011; Branstetter et al, 2018)

• The spillovers occur when local firms benefit from the MNCs affiliate’s superior knowledge of product, process technology or markets, without incurring a cost that exhausts the whole gain from the improvement (Blomström and Kokko, 1997, pg12).

• FDI spillovers could be:
  1. Horizontal
  2. Vertical
     • Backward
     • Forward

→ Market-stealing effects may crowd-out spillovers
II Theory

Productivity spillovers depend on various factors.

1. **Technological gap**
   - Findlay (1978) - theory of relative backwardness
   - Nelson and Phelps (1966)

2. **Absorptive capacity**
   - Knowledge stock

3. **Firm size**
   - Smaller firms are considered source of growth (Acs and Audretsch, 1990)
   - Small firms have fewer access to bank lending (lower collateral) (De and Nagaraj, 2014) especially in less developed financial markets.

4. **Industry competition**
   - Firms in concentrated industries may have more resources (Levin et al., 1985, Heirati et al., 2016)
II Theory

• Knowledge spillovers in services
  – The simultaneity of production and consumption processes (Bishop, 2009)
  – Harder to detect knowledge (Toivonen and Touminen, 2009)
  – Collaboration with external partners is rare (Schmidt, 2015)
  – Intense rivalry and competition prevailing in some industries (Ibert and Müller, 2015)
### III Empirical evidence

**Empirical evidence on transition economies**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Countries Studied</th>
<th>Period</th>
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<tbody>
<tr>
<td>Monastiriotis and Alegria (2011)</td>
<td>Bulgaria</td>
<td>2002-2005</td>
</tr>
<tr>
<td>Gorodnichenko et al. (2014)</td>
<td>17 TEs</td>
<td>2002-2006</td>
</tr>
<tr>
<td>Monastiriotis (2014)</td>
<td>SEE, CEE, Asian TEs</td>
<td>2002-2009</td>
</tr>
<tr>
<td>Orlíc et al. (2018)</td>
<td>Czech Republic, Estonia, Poland, Hungary, Slovakia, Slovenia</td>
<td>2002-2010</td>
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</table>

- All the studies refer to the period before the financial crisis
- None investigate Croatia
- Only one study investigates services (Gorodnichenko et al., 2014)
III Empirical evidence - manufacturing

• Horizontal spillovers in TEs:
  • insignificant (Javorcik, 2004; Halpern and Muraközy, 2007; Kosová, 2010; Javorcik and Spatareanu, 2011)
  • negative (Javorcik and Spatareanu, 2011; Damijan et al., 2013; Sabirianova et al. (2005) Orlić et al., 2018)
  • rarely positive (Nicolini and Resmini, 2010; Monastiriotis and Alegria, 2011; Gorodnichenko et al., 2014)

• Horizontal spillovers in developed countries:
  • positive (Haskel et al., 2007; Girma et al., 2008; Keller and Yeaple, 2009; Bode et al., 2012)
  • rarely insignificant (Barrios et al., 2006; Crespo et al., 2012)
III Empirical evidence

• FDI backward spillovers in manufacturing:
  – Positive in TEs
    (Javorcik, 2004; Nicolini and Resmini, 2007; Blalock and Getler, 2008; Gorodnichenko et al., 2014)
  – Insignificant in developed countries
    (Barrios et al., 2006; Haskel et al., 2007; Crespo et al., 2012)

• FDI forward spillovers in manufacturing:
  • Mostly insignificant or negative in TEs
    (Javorcik, 2004; Barrios et al., 2006; Damijan et al. 2013)
  • Insignificant in developed economies
    (Barrios et al., 2006; Haskel et al., 2007; Girma et al., 2008)
IV Data and methodology

• Bureau Van Dijk’s Amadeus firm level data
• Period of study 2006-2014
• System Blundell-Bond (1998) GMM:

\[ TFP_{ijrt} = TFP_{ijr(t-1)} + \alpha_1 \text{horizontal}_{jt} + \alpha_2 \text{backward}_{jt} + \alpha_3 \text{forward}_{jt} + \beta HH_{jt} + \gamma X_{ijrt} + Industry_j + Region_r + Period_t + \varepsilon_{ijrt} \]

\( i \)- firm; \( j \)- industry; \( r \) – region; \( t \) – year

\( TFP_{ijrt} \) – total factor productivity (semi-parametric Wooldridge (2009) estimator)
\( HH_{jt} \) – industry competition control (Hirshman-Herfindahl index)
\( X_{ijrt} \) – firm controls (firms size, human capital, leverage, intangible assets, TFP gap)
\( Industry_j \) – industry dummies
\( Region_r \) – regional dummies
\( Period_t \) – time dummies
IV Data and methodology

- **Horizontal Spillover** 
  \[\text{Horizontal Spillover}_{j} = \frac{\sum_{k \neq j} \text{Foreign share}_i \times Y_i}{\sum_{i \text{ for all } i \in j} Y_i}\]

- **Backward** 
  \[\text{Backward}_{j} = \sum_{k \neq j} \alpha_{jk} \times \text{Horizontal}_{k}\]

- **Forward** 
  \[\text{Forward}_{j} = \sum_{k \neq j} \alpha_{kj} \times \text{Horizontal}_{k}\]

*i - firm, j-industry*

*Foreign share* \(_i\) - takes value 0-1

*Y* \(_i\) - employment

\(\alpha_{jk}\) – the proportion of sector \(j\)’s output supplied to sector \(k\)

\(\alpha_{kj}\) - proportion of inputs of industry \(j\) purchased from industry \(k\).
### V Results – baseline model

\[ TFP_{ijrt} = TFP_{ijr(t-1)} + \alpha_1 \text{horizontal}_{jt} + \alpha_2 \text{backward}_{jt} + \alpha_3 \text{forward}_{jt} + \beta \text{HH}_{jt} + \gamma X_{ijrt} + \text{Industry}_j + \text{Region}_r + \text{Period}_t + \varepsilon_{ijrt} \]

<table>
<thead>
<tr>
<th></th>
<th>Manufacturing</th>
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<th>Service</th>
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<tbody>
<tr>
<td></td>
<td>CROATIA</td>
<td>SLOVENIA</td>
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<td>CROATIA</td>
<td>SLOVENIA</td>
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<td>TFP</td>
<td></td>
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<tr>
<td>L.TFP</td>
<td>0.41***</td>
<td>0.71**</td>
<td>0.93**</td>
<td>0.589***</td>
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<td></td>
<td>(0.036)</td>
<td>(0.040)</td>
<td>(0.200)</td>
<td>(0.0497)</td>
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<tr>
<td>L2.TFP</td>
<td>0.15***</td>
<td>0.060*</td>
<td>0.006</td>
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<tr>
<td></td>
<td>(0.023)</td>
<td>(0.033)</td>
<td>(0.170)</td>
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<tr>
<td>Horizontal spillover</td>
<td>0.15***</td>
<td>-0.034</td>
<td>-0.091***</td>
<td>-0.131***</td>
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<tr>
<td></td>
<td>(0.049)</td>
<td>(0.032)</td>
<td>(0.035)</td>
<td>(0.041)</td>
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<tr>
<td>Backward spillover</td>
<td>-0.47*</td>
<td>0.395***</td>
<td>-1.072**</td>
<td>1.370***</td>
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<td></td>
<td>(0.243)</td>
<td>(0.117)</td>
<td>(0.462)</td>
<td>(0.354)</td>
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<tr>
<td>Forward spillover</td>
<td>-0.55</td>
<td>0.050</td>
<td>1.586**</td>
<td>1.064***</td>
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<tr>
<td></td>
<td>(0.364)</td>
<td>(0.147)</td>
<td>(0.673)</td>
<td>(0.253)</td>
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<tr>
<td>Number of firms</td>
<td>2226</td>
<td>1548</td>
<td>3799</td>
<td>2170</td>
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<tr>
<td>Sargan-Hansen test</td>
<td>0.787</td>
<td>0.562</td>
<td>0.216</td>
<td>0.395</td>
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</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>0.00</td>
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</tr>
<tr>
<td>1st order autocorrel.</td>
<td>0.840</td>
<td>0.149</td>
<td>0.463</td>
<td>0.737</td>
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<tr>
<td>2nd order autocorrel.</td>
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</tbody>
</table>

* 10% significance, ** 5% significance; ***1% significance
V Results – interactions, manufacturing

**Interactions:** horizontal spillovers # year dummies

The positive effects start diminishing after the crisis

Horizontal spillovers in Slovenia insignificant throughout the period
V Results – interactions, manufacturing

Interactions: horizontal spillovers # TFP gap # intangible assets

Findlay (1978) theory of relative backwardness – support found only in Croatia

The effects are insignificant in Slovenia regardless of firm technological advancement and level of absorptive capacity
V Results – interactions, services

*Interactions:* horizontal spillovers # year dummies

Croatia: effects were positive before the crisis. They diminish and become negative after the crisis.

Slovenia: negative effects driven by 2012 (GDP growth rate in -2.7%)
V Results: interactions, services

Interactions: horizontal spillovers # leverage # industry competition (Croatia)
horizontal spillovers # leverage # firms size (Slovenia)

Negative effects are driven by firms with low leverage. After the financial crisis banks had restrictive credit policies.
VI Conclusion

- **FDI horizontal spillovers in manufacturing** are country specific and only positive in Croatia, mainly due to greater scope for knowledge absorption (TFP gap).
- **FDI horizontal spillovers in services are negative** in both countries confirming the theoretical predictions. FDI horizontal spillovers in services are affected by lack of external sources of finance, which operate via different mechanisms in two countries – firms size in Slovenia and competition in Croatia.
- **FDI spillovers are affected by the financial crisis.**
- **Forward spillover** effects are sector specific, while **backward spillover** effects are country specific.
Questions?

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