Horizon 2020 Twinning project 'Smart EIZ'
Training Workshop 2:
'Training Workshop on Technology Growth and Productivity, including KET'
18-19 May 2017
The Institute of Economics, Zagreb

The two days training workshop (TW) covers a wide of range of theoretical and empirical issues related to interaction of technology and productivity. This TW is divided in two parts.

The first part of the workshop takes a macroeconomic growth orientation and
   (i)   reviews the descriptive and econometric evidence on the link between human capital and growth;
   (ii)   considers open economy growth modelling with estimation in the presence of imported capital goods;
   (iii)   integrates the thoughts on productivity, R&D, human capital and trade in a dynamic simultaneous equation model using data for Croatia.

The first day of TW will be focused on analysis of effort how to increase productivity through research and development. With the exception of technologically leading countries, many countries from rich to poor share the property of having a negative trade balance in the category of machinery and transport equipment (SITC 7). Almost all countries share the insight that human capital is a key factor in delivering talent for research and technology diffusion, improving productivity and the trade balance in machinery. These properties require an integrating perspective to growth including all these properties. **After lunch on the first day, three papers will provide evidence based on firm level analysis in the context of Croatia, addressing the topics of IT, consequences of the war, and creativity & innovation. We conclude the first day with discussing challenges in doing scientific and relevant research for economic development in Croatia.**

The second day continues at the micro-level (the second part) but will shift from private to public policy strategies for technology enabled growth and productivity. After theoretical considerations and the concerning policy rationales and implications, regional FDI spillovers will be discussed.

A central question for the second day is: How to develop a growth oriented innovation strategy to advance manufacturing? Underlying questions include: How to study the 'key enabling' role of technological domains? Which technologies should be prioritized for adaptation and diffusion in order to enable the structural transformation of Croatia? How to converge the perspectives and interests, and design & manage the different roles of stakeholders (research organizations, firms, policymakers) in a systemic KETs strategy for Croatia. **Two case studies which include experience of national experts related to the development of program and project based on intensive use of technology in the national socio economic framework will be presented.**

WORKSHOP PROGRAM

Day 1: 18.05. (Thursday) 09:30 - 17.30

09.30-09.45 Introduction about the workshop program (Aralica, Ziesemer)

09.45-10.30 Human capital and growth: Panel evidence (Thomas Ziesemer)

10.30-11.30 Growth with imported capital goods and limited exports: Growth model and estimation (Thomas Ziesemer)

Coffee break

11.45-13.00 A dynamic simultaneous equation model for R&D policy in Croatia (Thomas Ziesemer)

13.00-14.00 Lunch break

14.00 - 14.30 Information Technology and Productivity: Evidence from firm-level data in Croatia (Škrinjarić Bruno)

Discussant: tba (MERIT)

14.30-15.00 Economic Consequences of the War, Evidence from Firm Level Panel Data (Marina Tkalec)

Discussant: Thomas Ziesemer

15:00 – 15:30 Creativity, innovation and firm performance in an emerging transition economy (Stojčić, N., Hashi, I., Aralica, Z.,)

15.30-15.45 Coffee break

15:45-17:30 Panel Discussion: Technology and Productivity Research challenges and opportunities for Transition Economies

Moderator: Velibor Mačkić,
Nebojša Stojčić, Andrea Mervar, Thomas Ziesemer

Day 2: 19.05. (Friday) 09:30 - 17.00

09.30-10.30: Opening Presentation by Fernando Vargas Cuevas on: Technology and firms' performance: private returns to R&D. Rationale of public interventions: constraints and spillovers. Public support to business R&D: supply side policies (horizontal interventions: direct and indirect)

10:30-11:00 Stojcic Lecture: Regional FDI Spillovers and Productivity of Local Firms in New EU Members States (Stojčić, N., Orlić, E.,)

Discussant: tba (MERIT)

11:00 – 11:30 Mario Čelan Challenges/opportunities about design and implementation technologically intensive project using structural funds in less developed part of Croatia – the case study

11.30-11.45 Coffee break

11:45 – 12:45 Presentation by Rene Wintjes on: Strategies for advanced manufacturing (Renewed interest in manufacturing; Producing and/or using KETs (Key Enabling Technologies: photonics, industrial biotechnology, advanced materials, advanced manufacturing techniques, micro- and nanoelectronics and nanotechnology); KETs based STI strategies and Innovation policy for manufacturing at firm, cluster, and national level)

13:00 – 14:00 Lunch break

Afternoon

14:00 – 15:00 PhD Danica Ramljak

15.00- 15:30 Coffee break

15.30-17.00 Panel discussions How to build a technology focused research and development strategy for Croatia?
Moderator: Zoran Aralica,
        (Ernest Vlačić Emil Perić, Rene Wintjes)

Appendix

Thomas Ziesemer, Department of Economics, Maastricht University, and UNU-MERIT

Four parts of a lecture series
- Basics of development evidence (<10')
- Panel evidence of human capital and growth (35')
- Growth with imported capital goods and limited exports: Model, non-linear estimation for Mauritius (60').
- A dynamic simultaneous equation model for macro-R&D policy in Croatia (75')

The purpose is learning to link theory and empirics, and the related problems and limits
1. Panel evidence with theory only in the background
2. Growth with imported capital goods: Estimation of a theoretical model
3. Empirical methods

Literature that may help

1 Panel evidence on human capital and growth

Ziesemer, T., Gini Coefficients of Education for 146 Countries 1950-2010. Bulletin of Applied Economics, 2016, 3(2), 1-8| December 15, 2016.

Ziesemer, T., What Changes Gini Coefficients of Education? On the dynamic interaction between education, its distribution and growth. UNU-MERIT WP 2011-053.

2 Theoretical background on endogenous growth public and human capital

2a Endogenous growth survey (For technical training use book by Barro/Sala-i-Martin)
Schneider, J., T. Ziesemer "What's New and What's Old in New Growth Theory? Endogenous Technology, Microfoundation and Growth Rate Predictions - A Critical Overview", Zeitschrift für Wirtschafts- und Sozialwissenschaften 115, 1995, Nr. 3, 429-472.
2b *Endogenous growth with public and human capital*
Ziesemer, T. "Public Factors and Democracy in Poverty Analysis", Oxford Economic Papers, 1990, Special Issue on Public Economics, Vol.42, January, 268-280. Reprinted in: P.J.N. Sinclair and M.D.E. Slater (eds.), Taxation, Private Information and Capital, Clarendon Press, Oxford 1991.
2c Ziesemer, T. "Endogenous Growth with Public Factors and Heterogeneous Human Capital Producers", Finanzarchiv, Neue Folge, Band 52, 1995, Heft 1, 1-20.

3 Theoretical background on growth mdoels with imported capital goods and limited exports

3a Classical theory and application to Prebisch-Singer thesis:

> Ziesemer, T. "Economic Development and Endogenous Terms of Trade Determination: Reexamination and Reinterpretation of the Prebisch-Singer Thesis", UNCTAD Review 1995, 17-34. Reprinted in: NEW WORLD ORDER SERIES VOL. XIII, Export-led versus Balanced Growth in the 1990s, edited by Sir Hans Singer, N. Hatti and R. Tandon, B.R. Publishing Corporation Ltd., 1998.

3b Extension to perfect capital movements:

> Ziesemer, T. "Growth with Imported Capital Goods, Limited Export Demand and Foreign Debt", Journal of Macroeconomics, Vol. 17, No.1, 1995, 31-53.

3c Extension to imperfect capital movements and the 1982 debt crisis:

> Ziesemer, T. "A Prebisch-Singer Growth Model and the Debt Crises", in: "DEVELOPMENT ECONOMICS and POLICY", edited by David Sapsford and John-ren Chen, Macmillan 1998, 300-317.

Linking theory and evidence

4 Models with estimations

4a   *Estimating the model*

Mutz, Christine; T. Ziesemer. Simultaneous Estimation of Income and Price Elasticities of Export Demand, Scale Economies and Total Factor Productivity Growth for Brazil, Applied Economics, Volume 40, Issue 22 November 2008 , pages 2921 - 2937.
Habiyaremye, Alexis; T. Ziesemer. Export Demand Elasticities as Determinants of Growth: Estimates for Mauritius. Applied Economics, Volume 44, Issue 9, March 2012, pages 1143-1158.

4b   *Model and related VAR/VECM*

Merging the public and imported capital models and estimates for Trinidad&Tobago:
Jan Simon Hallonsten and Thomas Ziesemer, A semi-endogenous growth model for developing countries with public factors, imported capital goods, and limited export demand, UNU MERIT WP 2016-004.

5 Empirical methods:
- Nearest neighbor fit incl loess/lowess (also eviews manual; books by Fan and Geibels; or Chambers, Cleveland, Kleiner, Tukey)
- GMM SYS, orthogonal deviations
- GMM SYS, difference

- VIF, stepwise regression/combinatorial
- Systems of Regression Equations
- Simultaneous equation system estimation
- Vector autoregressive models
- Nonstationary data, VAR, and VECM basics
- And chapters to understand these; all are (sub-) chapters in
- Greene, Econometric analysis, xth edition, Prentice-Hall.
- Link this literature to the user manual of your preferred software.
- Keep in touch with recent developments through subscription to wp alerts at
  http://nep.repec.org
- and alert e-mails from journal publishers; learn other methods used there.