



CompNet The Competitiveness Research Network

MULTIMSPROD – TSI 2022

5th Progress Report

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Introduction

Content: Brief introduction of TSI project, context and goal of progress report, structure of the report.

Access to cross-country comparable micro-based data entails many challenges due to confidentiality concerns, different requirements for data access and lastly heterogeneity in data structure. MULTIMSPROD aims to provide national authorities of participating productivity boards with the tools to improve their ability to analyze productivity and economic development and design policy reforms.

This ambitious objective is achieved by providing the beneficiaries with

1. harmonized data (micro-aggregated and cross-country comparable) to conduct policy analysis and produce policy recommendations,
2. the necessary training to ensure that the beneficiaries can fully exploit the potential of the micro-based data infrastructure, and
3. finally with a network to share best practices and common goals.

MULTIMSPROD started in October 2022 for a period of 24 months. Initial participating countries include Germany, France, Slovenia, Slovakia, Portugal and Latvia. After approval of the European Commission Austria became the 7th member of the program.

This report is the fourth of in total of five quarterly progress reports which have the goal of documenting the current project status, highlighting achievements, and pointing out risks and problems.

The report is structured as follows: Section 1 documents the project progress and describes submitted deliverables, section 2 describes the country specific progress in constructing the MDI and section 3 describes recent activities in research projects in collaboration with NPBs, section 4 provides some insight on the MDI training and section 5 presents an outlook and the next milestones and planned steps.

1. General Progress Report

*Content: Description of recent events (i.e., 13th CompNet Annual Conference) and activities (MDI Launches), with their current status. This report builds on the previous progress report dated March 18, 2024. In the last few months we kept focusing on retooling for the next phase of the TSI deliverable which centers primarily on continued development, training, and research with the Micro Data Infrastructure (MDI). While continuing working on the **Extended MDI** (delivery D2.3 and D4.1), we carried the second MDI Launch, consolidated our new Microsoft Teams networking platform, and we are working to deliver an **MDI specific Special Training** (delivery D3.2).*

Deliverables

Content: listing and description of the submitted deliverables and those in progress

- D1.1 Website (ongoing updates)
- D2.7 Workshop and Annual Conference
- D3.2 Special Training (ongoing)
- D2.2 Data Access Toolkit (MDI focus)
- D2.3 Extended MDI (ongoing)
- D4.1 Presentation of Extended MDI (ongoing)

13th CompNet Annual Conference

The **13th CompNet Annual Conference** on “Competitiveness and Firm Productivity in a Disintegrating Global Economy” took place on 20-21 June 2024 in La Valletta, at the Central Bank of Malta. During the event experts, researchers and policy makers explored relevant challenges for firms in the current economic landscape. Keynote speaker Prof. Ottaviano (Bocconi University) offered interesting insights on the importance of comparative advantages, while other sessions explored topics from fragmentation to climate change. In addition, Eric Bartelsman presented the work by the MDI group during a special training session on ‘CompNet Micro-data Infrastructure and Application’. This recording will be made available to productivity boards as part of their training program (D3.2). The event also included four posters by the CompNet research teams – including participating productivity boards, on the topics of trade and competitiveness, energy, firm dynamics and monetary policy. The code and research tools will also form part of the new training program (D3.2).

Second MDI Launch

After the first MDI Launch in January 2024, joint effort among CompNet staff, NSIs and NPBs, the second MDI Launch took place on May 17th 2024, in the context of the delivery of an **Extended MDI** and **Extended MDI Output** (D2.3; D4.1).

In this Launch, there were two main objectives:

- **The delivery of an extended MDI Output.** To this regard, the team refined the research routines and ensured the correct running of the codes in additional countries. The updated outputs were then presented as posters during the 13th CompNet Annual Conference in Malta (D4.1).
- **Improvement of the infrastructure.** Launch 2.0 served to validate and test the current infrastructure (D2.3). Some of the difficulties encountered in Launch 1 called for an improved infrastructure, relying on well documented metadata as well as a better standardized structure. The infrastructure was tested in Slovenia and is the focus of the next weeks of work before Launch 3, on the 26th August 2024.

MDI Special Training Session

Training modules are still under development. We are currently setting up a server infrastructure to mirror the environment users of the MDI will face when accessing confidential data through one of the network nodes. A video explaining the MDI infrastructure was taped during the Malta conference and will serve as initial reference for additional trainings we will provide over the next few months. Following the recommendations from our last Steering Committee Meeting held on the 22nd of April of 2024 we will develop a combination of one-on-one trainings as well as self guided videos, and code solutions. The extension of the grant will facilitate the continued development of the MDI in all the respective countries. Trainings will be delivered when the infrastructure in a particular country is deemed to be fully operable and useable by the National Productivity Board.

2. Country specific MDI development progress

Content: Status of the current MDI set-up/data access

- *Description of efforts to access the data (accreditation, signing of contract)*

- *Data preparation and harmonization.*

Austria

The formal agreement with the Statistical Office of Austria remains in effect, with two data access points. Currently, both are operational for constructing the MDI, and for constructing the CompNet dataset. Access to the data is now available to users affiliated with The Geneva Graduate Institute and IWH Halle. Significant progress has been made, including the extraction of comprehensive metadata files needed for the development of the infrastructure such as AT_datafiles.csv, AT_filename_varnames.csv, and AT_filename_classvar_class.csv. The codebook for categorical variables and the concordance file are completed. The work is being carried out with high priority and close collaboration with Michael Weichselbaumer from the Central Bank of Austria. However, there have been some delays in execution times, leading to a 6-week lag compared to other countries, necessitating further testing and validation to ensure data consistency and accuracy.

France

In France, direct access is available via the CASD boxes. We now have three CASD boxes facilitating development of the network architecture. Regarding infrastructure and data construction, all datasets (BR, BS, CIS, ENER, ICTEC, ITGS, OFATS, PRODCOM, SBS) were built under the previous MDI infrastructure, used to conduct analysis for Launch 1 and 2, and are currently available. Metadata is being created to update the infrastructure to its latest version and reconstruct the data accordingly.

Germany

In Germany, direct access to the data is available from Berlin or Wiesbaden, hence giving CompNet staff approval to work with the data. At the same time, there is currently one NSI staff member working on CompNet and the MDI – one of the assigned staff members resigned to pursue other professional opportunities. The increase load on the single NSI resource has necessitated the development of new tools on the part of the TSI program staff to automate as much as possible the development of the necessary machine readable metadata files that are a key input to the MDI architecture (see MDI-Documentation attached). The MDI team has made these tools available to the German NSI staff and they are expected to make prompt progress.

Funding for the positions is made available by the Ministry of Finance for three years via request from the Council of German Experts (i.e. productivity board in Germany).

Some issues regarding the possibility of having R installed on the MDI environment (similarly to Canada) were raised during the Vienna conference, but this issue is being worked out. Currently the MDI infrastructure will be tested on an internal NSI R-server.

Latvia

Latvia initially requested to the Central Statistical Bureau of Latvia the estimates of the costs for MDI data preparation. As the requested financing could not be covered by local institution nor by Multimsprod budget, the MDI build up is paused in the country. However, the cooperation between Latvia and CompNet materialized through the collaboration with the Baltic International Centre for Economic Policy Studies (BICEPS) to leverage their direct data access, which, after a financing of €3,000 allocated from the CompNet budget to continue accessing data through BICEPS, allows for inclusion of Latvia in the CompNet 10th Vintage.

Portugal

In Portugal the Statistical Office completed the whole construction of the datasets. They recently added the energy dataset to the MDI. All datasets (BR, BS, CIS, ENER, ICTEC, ITGS, OFATS, PRODCOM, SBS) are now part of the MDI infrastructure,

Slovakia

The Slovakian productivity board continues its negotiations with the Slovakian statistical office for: 1. getting access to, and 2. setting up the MDI database. However, challenges such as budget constraints and limited staffing are hindering progress by the National Productivity Board. We continue to reach out to our Slovakian partner for updates but with limited success at this time.

Slovenia

In Slovenia, we are in the process of completing the harmonization of the main firm-level datasets for the MDI, in collaboration with the Slovenian statistical office and productivity board. The harmonization of the data is largely completed at this time. Currently, access can be obtained by users linked to IWH Halle, EUI, Geneva University or VU Amsterdam.

3. CompNet 10th Vintage

The CompNet 10th Vintage Data Collection is ongoing. The package has already been sent to participating countries, with deadline for submission of results set the 15th of September, extendable if needed. After this, the data checking and building will take a few weeks, with expected first version of the database in October.

This Vintage has some new key improvements and novelties, namely:

- An improved weighting routine that better represents small firm sizes in the CompNet all sample
- Additional years. This varies by country, but at least 1-2 more years are expected, offering a better inclusion of the pandemic period.
- Few additional indicators (e.g. bank debt)

The participant countries, confirmed at the time of this report, are Austria, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Switzerland, and the United Kingdom. Additionally, we are currently in discussions with Belgium, Canada, Finland, Greece, Japan, and Spain regarding their potential participation.

The codes include a series of experimental files, in collaboration with some key stakeholders. These are the following:

1. **EBRD** (CompNet member): by Ralph de Haas (EBRD, KU Leuven), Vincent Sterk (University College London and CEPR), Neeltje Van Horen (Bank of England, CEPR, and University of Amsterdam). The experimental file performs clustering analysis which categorizes firm's start-up strategy and examines their financial performance before, during, and after the global financial crisis.
2. **Firm Growth**: by Matthias Mertens (Massachusetts Institute of Technology), Benjamin Schoefer (UC Berkeley). Includes firm-level regressions and binned scatter plots of several firm-level variables in levels and changes. Goal is to see how these variables change as firms grow and how they differ across firms of different size. The regressions are ones computed only for manufacturing firms and once for all firms.
3. **Business Dynamism** (IWH): by Filippo Biondi (Düsseldorf Institute for Competition Economics), Sergio Inferrera (Queen Mary University of London), Matthias Mertens (Massachusetts Institute of Technology), and Javier Miranda (Halle Institute for Economic Research, Friedrich-Schiller University, CompNet). This chapter computes additional statistics on business dynamics. It studies the relationship between productivity and firm growth.

4. **Zombie Growth Decomposition** (Central Bank Slovakia): by Tibor Lalinsky (Central Bank of Slovakia, CompNet data provider). This exercise assesses and decomposes zombie growth to identify the main underlying factors. Zombies are classified according to different definitions and the shares, durations and decompositions into subgroups of Zombie firms are reported. Finally, a set of regressions is run to quantify the contribution of different determinants of Zombie firms.

4. Project Status

Content: Description of recent activities in research projects using CompNet and MDI and their current status: Description includes communication/collaboration with NPB, datasets used (CompNet and MDI), and intended usage of research output (e.g. for country's productivity report, policy note, full paper).

Policy Briefs

The following are the ongoing collaborations with NPBs on the drafting of two policy briefs. In particular: in collaboration with Latvia NPBs, a policy brief on productivity and, in collaboration with Slovakia NPBs, a policy brief on credit constrained firms.

Latvia

A structural analysis of the Latvian economy was conducted in collaboration with Prof. Janis Priede (University of Latvia) and with inputs from the National Productivity Board (BICEPS). The CompNet 9th Vintage data were utilized to derive stylized facts on productivity and competitiveness measures, job dynamism, industry concentration, trade linkages, resource allocation across size classes, macro-sectors, productivity quantiles, and technological classes. The work focuses on developing a framework to assess Latvia's progress in catching up with other European Union members, particularly in comparison with neighboring Lithuania. It was found that Latvia has been enhancing its competitive stance at a slower pace than Lithuania, with structural imbalances impairing stronger growth. The first draft of the policy brief was completed in December 2023; the second draft was presented during the 3rd TSI Workshop in Vienna in February 2024; and the third draft was completed in May 2024.

Slovakia

Building on the analysis published in the Firm Productivity Report Ch.V, the collaboration with the Slovakian Productivity Boards seeks to extend the research using granular Slovakian firm-level data to investigate the nexus of credit constraints and firms' demographics and productivity. The initial draft of the policy brief was completed in January 2024. Given the current focus of Slovakia on implementing the MDI structure, the work on the second draft is momentarily paused. At the same time, a collaboration with Tibor Lalinsky (Central Bank of Slovakia) on an experimental file on zombie firms has been included in the CompNet 10th Vintage (see section 3). This is useful given concerns with resources available from Slovakia's National Productivity Board. The NPB has been non responsive in the last few months.

Technical assistance to member states

In the context of technical support to NPBs, assistantship is given to France Stratégie on their own report about technology, digitalization, and firm performance, employing both CompNet and MDI data.

In the context of technical support to NPBs, assistance is provided to France Stratégie through collaboration with Alain Durré on country-specific applications of the Enterprise Competitiveness

Indicator constructed in the 2023 CompNet Firm Productivity Report. Specifically, the potential of the Indicator in explaining France's performance in international markets is being evaluated.

Research projects with the MDI with the participation of NPBs

The following are the ongoing research projects using the MDI. All works were presented as posters at the 13th CompNet Conference in Malta, with results from the MDI Launch 2. Find attached to this report.

Trade and competitiveness

This project measures the extent to which productivity growth diffuses across and within countries through European Regional Value Chains (RVCs), shedding light on the underlying mechanisms. The research leverages granular information on firm trade flows in the International Trade in Goods Statistics (ITGS) available in the MDI. Combined with CompNet productivity distributions of European countries, ITGS allows us to construct the average productivity growth of each firm's trade partners weighted by trade flows. This enables us to estimate the co-movements of a firm's productivity with respect to the average productivity of its RVC trade partners.

Previous analyses of CompNet aggregate data supported a two-stage mechanism of productivity transmission: first from the RVC trade partners to the most productive firms in the country, and then from these leading firms to all other firms within the same country. Catching-up is particularly significant but turns negative during crises. The current firm-level analysis covers Finland, France, and the Netherlands. During the COVID crisis, Finland and the Netherlands did not experience significant changes in their responsiveness to RVCs' productivity shocks, whereas France saw a considerable dampening effect. In all these countries, catching-up with more productive RVC trade partners plays a significant role in firms' productivity developments and remains significant even after controlling for R&D intensity.

Monetary Policy

This research project estimates the marginal cost curves of heterogeneous firms to provide evidence on the slope of the Phillips curve. The paper utilizes prices and quantities of outputs and factor inputs of French and Dutch manufacturing firms (merging PRODCOM, SBS, and BS data from the MDI infrastructure) along with exogenous downstream demand instruments from global input-output and trade data to identify the parameters. Model heterogeneity is addressed using a clustering method to classify firms according to their production technology and observed cost shock pass-through. It is found that more productive firms have flatter marginal cost curves and exhibit a lower price response to changes in output. The aggregate Phillips curve is flatter when the more productive firms absorb a larger portion of demand shocks, which generally is the case. The results are also supported by some stylized facts about the wage Phillips curve, estimated using CompNet 9th vintage data for 21 European countries and covering all non-farm business sectors.

Energy

This research project explores how firms can foster energy transition through two main mechanisms. First, it examines the impact of energy price shocks on firms' energy efficiency. Energy efficiency is measured by firms' energy intensity levels and using a stochastic frontier model. To address potential endogeneity in energy prices, a shift-share instrument is constructed based on firm-level energy prices. The findings indicate that increases in energy prices lead to improved energy efficiency, particularly in

response to significant price shocks, and this effect is more pronounced in smaller firms. The study also observes asymmetrical and contemporaneous effects of these shocks.

Second, the project develops a new dataset that includes the energy use by product, currently focusing on single-product firms. This dataset integrates information from PRODCOM and energy databases. The analysis produces stylized facts by measuring firms' characteristics across products' energy use distributions. It reveals that, for a given product, larger firms and those with higher overall energy costs tend to use less energy per unit compared to smaller firms.

The current firm-level analysis is based on French data, with plans to extend the study to additional countries, including Austria, Slovenia, and Portugal. In terms of technical support for NPBs, the project has primarily engaged with Austrian NPBs, but also with NPBs from Slovenia, France, and Germany. Additionally, there has been a side collaboration with the OECD.

Firm Responsiveness

The Firm responsiveness research aims to investigate how firms' reactions to shifts in profitability impact job creation, job destruction, aggregate investment, and resource reallocation in the economy. Counter parties from IMAD (Slovenia) expressed high interest in the project applied to Slovenia, which will be employed as soon as data will be ready.

Policy paper on “Reassessing the EU Comparative advantage”, joint work with Prof. Gianmarco Ottaviano

This research project is being conducted under the supervision of Prof. Gianmarco Ottaviano (Bocconi University). It implements the quantitative trade model and computes the related sufficient statistics developed by Prof. Ottaviano and Prof. Huang (City University of Hong Kong) in a recent CEPR discussion paper, utilizing CompNet 9th Vintage data for European countries. The aim is to quantify the exogenous components of relative TFP across countries and industries, revealing new insights into the export-productivity interaction.

Preliminary results were presented by Prof. Ottaviano during his keynote speech at the 13th CompNet Annual Conference, highlighting heterogeneity in the drivers of export participation across European countries. According to these results, traditional Balassa Revealed Comparative Advantage in Europe diverges systematically from Ricardian Comparative Advantage, as measured by underlying relative technology. This implies that in certain sectors, such as the manufacture of chemicals and chemical products in France and the Netherlands, or the manufacture of motor vehicles, trailers, and semitrailers in Germany, factors like low unit input prices, high trade freeness, large local markets, or intense selection may play a larger role than underlying productivity in determining success on international markets.

The project aims to finalize in a full-fledged research paper extending the analysis of Huang and Ottaviano (2024) on European countries.

5. NSIs and NPBs Training

Teams platform and Training material

We are in the process of uploading training materials and videos to our Microsoft Teams networking platform and will make them available to NPBs as their countries infrastructure comes online.

6. Outlook

Content: Outlook on the next milestones and steps ahead

MDI Infrastructure: Overview and Implementation

The MDI infrastructure is finally coming to fruition, offering a comprehensive data and software toolset. This infrastructure incorporates:

1. *Rich Machine-Readable Metadata*: Tailored for each country.
2. *Data Harmonization Tools*: Ensuring consistency across datasets.
3. *Data Catalogue Tool*: Facilitates exploration of available data across the network, enhancing research design.
4. *Advanced Software Modules*: Supports analysis using state-of-the-art techniques.
5. *Mock Training Environment*: Built on a Unix server to simulate real research conditions.
6. *Comprehensive Documentation*: Includes a detailed user manual for both users and National Statistical Institutes (NSI).
7. *Microsoft Teams Networking Site*: Provides robust communication and collaboration support.

Despite its benefits, communicating the complexity of the MDI infrastructure to the National Productivity Boards and National Statistical Offices has been challenging. This has led to some frustration, which we have addressed through one-on-one meetings. These meetings explain the infrastructure's components in detail and outline timelines and next steps. We have also begun providing regular updates on all aspects of platform development to keep our partners informed.

Training and Testing

As the MDI infrastructure becomes operational in various countries, we will shift our focus to training on all aspects of the tool. The primary goal of this tool is to facilitate cross-country research using confidential microdata. To ensure its robustness, we have been conducting a series of code runs, referred to as "rocket launches," which explore high-value research questions identified by the National Productivity Boards, known as "payloads." These exercises will be integral to the upcoming training sessions.