Schmollers Jahrbuch 121 (2001), 123 – 129
Duncker & Humblot, Berlin

European Data Watch

This section will offer descriptions as well as discussions of data sources that may be of interest to social scientists engaged in empirical research or teaching courses that include empirical investigations performed by students. The purpose is to describe the information in the data source, to give examples of questions tackled with the data and to tell how to access the data for research and teaching. We will start with data from German speaking countries that allow international comparative research. While most of the data will be at the micro level (individuals, households, or firms), more aggregate data and meta data (for regions, industries, or nations) will be included, too. Suggestions for data sources to be described in future columns (or comments on past columns) should be send to: Joachim Wagner, University of Lueneburg, Institute of Economics, Campus 4.210, 21332 Lueneburg, Germany, or e-mailed to ⟨wagner@uni-lueneburg.de⟩.

The Mannheim Innovation Panels (MIP and MIP-S) of the Centre for European Economic Research (ZEW)

By Norbert Janz, Günther Ebling, Sandra Gottschalk and Hiltrud Niggemann[1]

1. Introduction

In 1992, the Centre for European Economic Research (ZEW)[2] was assigned by the German government to conduct an innovation survey representative for the German manufacturing sector leading to international comparable data on the innovation behaviour of German firms. The resulting first wave of the Mannheim Innovation Panel (MIP) entitled as "Prospects of the German Economy" (in German: "Zukunftsperspektiven der deutschen Wirtschaft") was carried out in 1993 as the German part of the

1 The authors thank Georg Licht and Joachim Wagner for helpful comments.

2 For further information see http://www.zew.de.

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first European wide Community Innovation Surveys (CIS) coordinated by Eurostat. Harhoff and Licht (1994) as well as Licht and Stahl (1994) give more detailed information on the first wave of the MIP.

In 1995, the growing importance of service sector industries for the German economy led to a separate, but very closely related innovation survey, the Mannheim Innovation Panel in the Service Sector (MIP-S), entitled as "Services in the Future" (in German: "Dienstleistungen in der Zukunft"). In 1997, this time both surveys were the German part of the second European CIS (CIS 2). Both surveys, MIP as well as MIP-S, are financed by the German federal ministry of education and research (BMBF). Most of the task of the field work is delegated to infas Institute for Applied Social Science at Bonn. MIP-S is cooperative work of ZEW and Fraunhofer-Institute for Systems and Innovation Research (ISI) at Karlsruhe. The quality of the work done is monitored by a scientific advisory board.[3]

To ensure international comparable data on innovation activities, the survey methodology of MIP and MIP-S is strongly related to the proposed guidelines documented in the OECD / Eurostat Oslo-Manual on innovation statistics (OECD / Eurostat, 1997). Both, the MIP and the MIP-S surveys are designed as panels to ensure intertemporal comparability and to allow analyses of innovation dynamics at firm level.

The paper is organized as follows: Section 2 gives more detailed information on the survey methodology, i.e. survey population, sample and response. Section 3 summarizes the main information on the basic definitions of innovation and innovative firms as well as the collected variables. Examples of recent research using MIP and MIP-S are given in section 4. Information on data access to MIP and MIP-S are contained in section 5.

2. Survey Methodology

The target population of the MIP covers legally independent German firms with at least 5 employees from the sectors mining and quarrying, manufacturing, electricity, gas and water supply as well as construction (NACE classes, 10 – 14, 15 – 37, 40 – 41 and 45, respectively).[4] Selected ser-

[3] The members of the advisory board currently are: H. G. Gemünden (chairman, University of Technology, Berlin), P. Brügger (Federal Statistical Office), H. Grupp (ISI, Karlsruhe), D. Harhoff (University of Munich), S. Krebs (VDMA German Machinery and Plant Manufacturing Industry Federation), H. Legler (NIW Lower Saxony Institute of Economic Research), G. Ronning (University of Tübingen) and G. Sandermann (Federal Ministry of Economics and Technology).

[4] NACE (Nomenclature générale des activités économique dans le Communautés européennes) as published by Eurostat.

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vice sector industries were covered in the first 2 waves before the MIP-S started in 1995. MIP-S covers German firms with at least 5 employees from business related and distribution service sector industries, i.e. the branches wholesale and retail trade, transportation, storage and communication, as well as financial intermediation, real estate, renting and business activities, sewage and refuse disposal (NACE classes 50 – 52, 60 – 64, 65 – 67, 70 – 74, 90, respectively). Public services and most of the consumer related services are excluded.

In contrast to most other European countries, in Germany there is no business register. Therefore, other databases have to serve as sampling frames. MIP and MIP-S use the database of Germany's most important credit rating agency Creditreform to construct the frame population from which the sample is drawn.[5] The samples of MIP and MIP-S are drawn as stratified random samples. Firm size (8 size classes according to the number of employees in MIP and 7 in MIP-S), branch of industry (mostly according to 2-digit NACE classes) and region (East and West Germany) are used as stratifying variables.

Both surveys are designed as panels, e.g. the questionnaire is sent to the same set of firms every year, with the exception of firm exits. Additionally, the sample is refreshed every second year by a stratified random sample of newly founded firms and other firms that moved into the frame population, e.g. because of changes in the branch of industry or firm growth to at least 5 employees. The sampling is disproportional, i.e. the sampling probabilities vary between cells: Large firms, firms from East Germany and firms from heterogeneous cells according to labour productivity are oversampled.

Since 1998, the sampling scheme differs slightly every second year for cost reasons. In the even years, a shortened questionnaire is sent to the sub-sample of firms which have answered the questionnaire at least once or which have been added to the sample in the preceding year. The full sample is used every odd year. Additionally, the most relevant variables are asked retrospectively for the preceding even year to maintain the panel structure with yearly waves.

MIP and MIP-S are voluntary mail surveys. The questionnaire is usually sent to the sampled firms in early spring with two mail reminders in late spring and early summer. Additionally, selected firms are phoned. In 1999, 10,557 and 11,737 firms were sampled in MIP and MIP-S respectively. 2,502 responded in MIP and 2,418 in MIP-S. This corresponds to response rates of 23.7 % and 20.6 %. On average about 2,000 to 2,500 firms have responded in the surveys. A telephone non-response survey with 1,000 realised interviews

[5] See Licht and Stahl (1994) and Almus et al. (2000) for detailed information on the Creditreform database.

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is carried out in both surveys in autumn to check for a possible non-response bias in the variables of main interest. Expansion factors corrected for non-response bias are available for single cross-sections.[6]

3. Surveyed Information

The Oslo-manual (OECD / Eurostat, 1997) developed by OECD and Eurostat and first published in 1992 serves as the methodological basis for the European CIS as well as the German MIP and MIP-S. It gives basic definitions of product and process innovations, innovation activities and components of innovation expenditure related to these activities. The notion of innovation in the Oslo-manual focuses on three aspects of innovation: The innovation should be technology oriented, i.e. based on (technologically) new knowledge. It should be implemented, i.e. either introduced onto the market (product innovation) or used within the production process (process innovation). The products (including services) and processes should be new or significantly improved to the firm, they do not have to be new to the market, economy or world. Thus, innovation according to the Oslo-manual does include diffusion of innovation which can be seen as imitation activities. An innovative firm is a firm which has implemented at least one innovation within the last three years.

Innovation expenditure includes expenditure for finished, abandoned, and ongoing innovation projects. According to this, non-innovative firms can have innovation expenditure. Innovation expenditure comprises all current expenditure (personnel, materials, services, etc.) as well as capital expenditure for innovation. Innovation expenditure is in particular R&D expenditure[7], expenditure for machinery and materials, expenditure for the acquisition of external knowledge (patents, not patented inventions and licenses), expenditure for product design and production preparations, expenditure for training of employees, expenditure for market tests and market introductions if these activities are directly related to innovation projects.

In addition to the innovation related variables – product innovation, process innovations, innovation expenditure – most of the quantitative variables are available for every firm in every year. These are especially: number of employees, sales and exports (not for financial services within MIP-S), to-

[6] More detailed information on the survey methodology is available in Janz et al. (2000).

[7] The definition of R&D according to OECD (1994) used in official R&D statistics is explicitly nested in the definition of innovation.

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tal wage costs, training costs (only MIP-S), material costs (only MIP), capital expenditure, stock of capital (only MIP), expenditure for investments in IT-capital (only MIP-S) and skill structure on four different levels.

Additional variables are available for firms having innovative activities: R&D-expenditure, R&D-personnel (only MIP), share of sales with product innovations, share of sales with market novelties and share of cost reduction due to process innovations.

More detailed information on special topics of innovation behaviour and other fields of interest are only available for some years, sometimes only for single cross-sections. These are for example: factors hampering innovation activities, objectives of innovations, cooperation activities related to innovation activities, patenting activities, usage of different technologies, sources of information for innovation activities etc. Most of these variables are of qualitative nature. For more detailed information on the availability of variables in single cross-sections see Janz et al. (2000).

4. Recent Research

Different topics have been tackled using MIP and MIP-S data. These can broadly be grouped into three categories: innovation and employment, innovation and firm strategies, and innovation and technology policy. In the following we present some selected examples for research in these fields.

Papers within the first category deal especially with the effects of innovation activities on labour demand. Labour quite often is modelled heterogeneously to allow for different effects on differing skill groups. Falk and Seim (2000) investigate the impact of information technology on high-skilled labour in services using panel data from the MIP-S. They estimate labour demand functions using Random- and Fixed-Effect-Tobit-Models. They find a positive, but surprisingly small effect of IT-investment to sales ratio on the share of high-skilled workers.

Incorporated within the second topic are aspects of internationalisation (e.g. exports), environmental activities, patenting and firm cooperation. Ebling and Janz (1999) analyse the interrelation between innovation and export activities of services sector companies within a simultaneous equation framework for discrete variables. They find a significantly positive impact of innovation on exports, but no effect from exports on innovation. The locational choice of patenting activities is theoretically and empirically investigated by Inkmann et al. (2000). For German manufacturing firms, traditional determinants of international trade flows only have limited impact on patenting abroad. Using a game theoretic approach, Kaiser (2000) ana-

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lyses cooperation activities of German service sector firms. Cooperation only has weak effects on innovation expenditure.

More political questions, like the effects of technology policy on the appropriability of technical knowledge and aspects of technological diffusion are summarized in category three. Beise and Stahl (1999) deal with the effects of publicly funded research in universities, polytechnics and federal research labs on industrial innovations in Germany. They find that less than one tenth of innovating firms are directly dependent on results of publicly funded research.

The ZEW annually reports indicators on innovation activities expanded to the population of German firms to the German government (see Ebling et al., 2000a and 2000b). They form an important input to the annual reports on Germany's technological performance published by the German government (see Legler et al., 2000).

5. Data Access

Single cross-sections of MIP and MIP-S are freely available in anonymized form as public use files for purely non-commercial basic research. After signing a contract in which research project and project members are specified the data are sent by e-mail or on floppy disk in various data styles. It is not possible to use the data for teaching purposes.

Different methods are used to prevent single firms from being identified: All variables measured in money amounts are only available as ratios to sales or employees and additionally are made anonymous using the disguised random factor method, i.e. these variables are multiplied by a firm specific unique random factor which is uniformly distributed on the interval [0.5;1.5]. The factor is constant across waves for a given firm. Very large values of some variables are censored from the right. Moreover, some variables representing shares in sales or employees are grouped. Some very large conglomerates which nevertheless could be identified quite easily are removed from the data set.

Researchers having experience with the public use file are given the opportunity to work with the original data within the rooms of the ZEW. About 40 research groups outside ZEW have signed contracts for the public use files and about ten have used the data within ZEW. In spring 2000, the first MIP user conference took place in Mannheim with about 50 participants. It is planned to establish the user conference every second year.

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