

**ORGANISATION OF DATA COLLECTION PROCESS  
IN A NEW ENVIRONMENT FOR BALANCE OF PAYMENT STATISTICS<sup>1</sup>**

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Abstract

*A recently adopted EU threshold for collecting the Balance of Payments (B.o.P) data from the ITRS (international transaction reporting system) from banks, established the need to develop direct reporting systems as an alternative. The importance of having timely and reliable information on the B.o.P. statistics in a small and open economy receives even more weight by the prospect of joining the EU and remaining two years in the ERM2 (European Exchange Rate Mechanism 2).*

*The paper describes a project of implementing a direct reporting system for the B.o.P. items: commercial credits, foreign direct investments and accounts abroad. The decision-making process was supported by a simulation technique also focusing on the possibilities to develop similar systems for other items of the B.o.P. The results encourage us to employ high technologies which also demands a significantly higher level of knowledge. Compared to the current data sources, some doubts remain as to whether the quality of the reported data meets the requirements.*

Key words: data reporting, simulation, Balance of Payments, direct reporting.

Povzetek

*Pred kratkim v EU sprejeta omejitev poročanja individualnih transakcij s tujino od bank, zahteva tudi pri nas izgradnjo alternativnega sistema poročanja za potrebe plačilne bilance. Ohranitev dosedanje kvalitete te makroekonomske informacije v majhnem odprtem gospodarstvu in bodoči prehod na sistem ERM2 po vstopu Slovenije v EU pa zahtevata previdno zamenjavo virov podatkov.*

*Članek obravnava izkušnje uvajanja alternativnega sistema neposrednega poročanja na nekaterih delih plačilne bilance (komercialni krediti, neposredne investicije, transakcije na računih v tujini). Zaradi zniževanja negotovosti pri nadaljnji izgradnji celovitega alternativnega sistema poročanja je bila izvedena raziskava s simulacijo. Rešitev ponuja izraba izjemnega razvoja informatike in komunikacij, ki pa zahteva tudi več znanja. Vsekakor skrb za kvaliteto izhodne informacije ter stroške zbiranja podatkov na narodnogospodarski ravni ostaja.*

Ključne besede: statistično poročanje, simulacija, plačilna bilanca, neposredno poročanje.

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## 1. INTRODUCTION

The article deals with one of the main challenges nowadays, namely implementing and maintaining the quality of the statistical reporting system for the Central Bank purposes: “replacing the indirect reporting statistical system with direct reporting”. We focus on the area of the Balance of Payment statistics.

The Central Bank is by law responsible for preparing macroeconomic information on the Balance of Payments (B.o.P.). The information serves as a tool in a decision-making process on monetary policy as well as at a broader economic policy level of a respective country. Consequently, decisions taken on the basis of such information might have a significant effect on an overall economy. For a small and open economy like Slovenia, timely and accurate information on the B.o.P. is very important. But we should also take into account the need to change the exchange rate regime together with Slovenia’s joining the EU and its obligation to stay in the ERM2 for the first two years.

A competitive environment in payment systems and banking as a whole on the one hand and rational behaviour of a bank client on the other hand (growing mergers and acquisitions – globalisation and integration processes) do not allow the Bank of Slovenia to increase the costs of the banking community for collecting more frequent and detailed data. On the contrary, the new EU directive has recently significantly raised the threshold for each transaction to be reported.<sup>2</sup>

A step by step approach in building a direct reporting system by some segments of the B.o.P. (e.g. portfolio investments, commercial credits, foreign direct investments, etc.) is in our opinion strongly recommended, since there is a need for simultaneous running of the old and new systems. The article describes in detail a simulation tool for decision-making support in building an alternative direct reporting statistical system. It analyses the empirical result from an on-going project in the Bank of Slovenia (BoS).

## 2. BALANCE OF PAYMENTS COMPILATION SYSTEM IN SLOVENIA

### 2.1. *The main features of a collection system*<sup>3</sup>

The main reporting system for the B.o.P. (Balance of Payment) is the ITRS (International Transactions Reporting System), which is a closed system. It consists of the positions on non-resident accounts (these explain changes in assets and liabilities in the B.o.P.’s capital and financial accounts) and the transactions settled through these accounts (these principally explain the changes in the B.o.P.’s current account) integrated there. In the reporting form, the position in each non-resident account at the end of the reporting period should equal the position at the beginning of it, plus credit transactions minus debit transactions. The transactions are classified on the basis of their description, as provided by bank clients, and the assignment of a transaction code. There are more than 300 different transaction codes and a list of them is available in the BoS on request. They form the basis of the methodology that allows banking forms (e.g. payment orders and forms relating to incoming payments) to be used in the compilation of the B.o.P. statistics.

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<sup>2</sup> The limit is set to 12.500 EUR Regulation (EC) No. 2560/2001 of the European Parliament and of the Council of 19 December 2001 on cross-border payments in euros, OJ L 344, 28.12.2001.

<sup>3</sup> Based on the contribution to the ECB publication: European Central Bank: Accession Countries: Balance of Payments / International Investment Position statistical methods, Frankfurt, October 2001.

The main reporting pillars of the ITRS are:

- (i) Reports on the transactions settled between residents and non-residents via bank accounts (the so-called non-resident accounts). These accounts comprise:
  - the banks' foreign correspondent accounts (nostro and loro accounts, including the Central Bank); and
  - the non-bank resident accounts abroad.The transactions are classified using descriptions provided by bank clients.
- (ii) Customs declarations as the main source for recording merchandise (compiled by the Statistical Office of the Republic of Slovenia, SORS).
- (iii) Reports to the BoS on registered credits granted and disbursed abroad.
- (iv) The BoS accounting data.
- (v) Commercial bank balance sheet data.
- (vi) Data on direct investment (reinvested earnings).
- (vii) Reports on goods sold to non-residents in duty-free and border shops.

Some estimates are used in the B.o.P. and I.I.P. (International Investment Position) for the valuation of the data on imports, incoming travel, labour income, short-term trade credits, foreign exchange and deposits of resident households in foreign banks.

For the I.I.P., data are collected from residents' reports on inward and outward direct investment, reports of enterprises on short-term trade credits and some of the other above-mentioned sources.

The B.o.P. and I.I.P. are compiled on the basis of the reports from the following agents:

- (i) commercial banks, which report on the transactions between resident and non-resident entities (banks, enterprises, individuals, etc.) as well as on the transactions for their own accounts;
- (ii) non-bank residents report on the data on their accounts held abroad, on inter-company accounts with foreign partners and on the sale of goods in duty-free shops. They also report on short-term trade credits granted to non-residents as well as those obtained from them;
- (iii) residents report on the inward and outward direct investment stocks and transactions;
- (iv) the SORS provides the data derived from customs declarations;
- (v) the Bank of Slovenia provides its accounting data; and
- (vi) residents report on the data on loans and long-term trade credits granted to non-residents and obtained from them.

There is no special threshold for the ITRS data.

The B.o.P. is compiled monthly and disseminated no later than seven weeks after the end of the reference month. Although the data have been available since 1988, only the data for the key B.o.P.'s items are available for the period 1988-1993. The figures for the period 1988-1991 exclude the transactions with the countries of former Yugoslavia. The I.I.P. is compiled yearly and disseminated no later than six months after the end of the reference year. The data have been available since 1994.

A high level of transparency has been reached by adopting the SDDS standard.<sup>4</sup> An advance release calendar is published on the Bank of Slovenia web side (<http://www.bsi.si>) and in its Monthly Bulletin.

### 3. IMPLEMENTING DIRECT REPORTING SYSTEMS

The liberalisation of our economy has already been taking place for several years. Significant changes in legislation were adopted in 1999. Since then, we have been looking for alternative sources of data for external statistics.

It seems that the main concern for the quality of the B.o.P. statistics that caused an unbalanced result regarding the total world position is statistics on securities or portfolio and direct investment items of the B.o.P.<sup>5</sup> The Bank of Slovenia implemented a direct reporting system for these items on a monthly basis together with the legislative changes concerning the Foreign Exchange Act. The supplementary executive regulation kept an obligation for authorised dealers (banks and brokers) to report on the securities between residents and non residents. Data are provided for stocks and flows. A potential lack of information might derive from the transactions of residents avoiding domestic intermediaries. Therefore, the Bank of Slovenia is strongly interested in sharing information and databases with international institutions (e.g. ECB, BIS) or on a bilateral basis with Central Banks.

Our main concern remains in avoiding a possible lack of information from the most important source of data for the B.o.P, i.e. the ITRS. The greatest impact of a lack of information would be reflected in the items such as Services, Income, Current transfers and Capital account.

*Table 1: A percentage of information left by the implementation of a threshold of €12,500 or €50,000 in the ITRS*

Percentage of information left (%) B.o.P.'s Item \ Threshold	EXPORTS		IMPORTS	
	€12,500	€50,000	€12,500	€50,000
<i>TOTAL for Services</i>	84.0	72.0	84.7	73.9
Transport	77.3	65.7	83.7	74.7
Travel	91.4	85.7	82.8	77.6
Communication	86.6	83.8	97.0	91.3
Construction	94.6	86.2	93.0	76.5
Insurance	95.7	90.8	94.3	89.5
Financial	68.3	58.0	68.9	57.8
Computer and Information	93.7	83.8	88.9	74.6
Royalties and license fees	83.8	72.4	95.5	89.2
Other business services	70.2	36.7	80.8	61.4
Personal, cultural and recreational	78.0	62.1	80.9	72.9
Government services	99.3	99.3	100.0	100.0

Source: The Bank of Slovenia, Financial Statistics, A calculation on the data for the period Jan – Apr 2002.

<sup>4</sup> An IMF's standard for the subscribed countries of the regular publication of key national macroeconomic data in line with the calendar set in advance. Slovenia is a subscriber from the very beginning in 1997.

<sup>5</sup> IMF, Balance of Payment Report for 2000, Washington, 2001.

The services would undergo more than 15% of the loss of data regardless of the export or import part. Other business services that seem to be the most perspective kinds of services for Slovenia nowadays would suffer most from implementing the threshold in the ITRS data.

In addition to many other activities in searching alternative sources for external statistics, a new approach has taken place in the form of a project implementing a direct reporting system in some segments of reporting.

### 3.1. Case study: direct investments, trade credits and transactions in accounts abroad

The project of preparing a new reporting system on some external statistics is approaching its final phase in Slovenia. A new user-friendly application has been prepared for reporters, which can be downloaded from the BoS web side. Reporters use an e-mail communication with a special security protocol. Less important data were removed from the old forms. The BoS runs data quality control via the interactive communications with a reporter.

In August 2001, the BoS collected the first set of data for the "C" report form – monthly data on the transactions with non-residents from the accounts abroad. Other two forms involved are: the SKV form – monthly data on the accounts payable and receivable from the transactions with non-residents – stocks and flows, and the SN form – yearly data on foreign direct investment. In the old reporting system, the SKV form was reported of on a quarterly basis. In simulation that follows, the possibility of the introduction of the quarterly SN reports to be dealt with. We have already benefited from more accurate and frequent reporting which has also been less time-consuming. A new Oracle environment application has been developed for the database input process. Data are automatically loaded into the central database. An automatic answer is sent to a reporter in case of discrepancies.

In taking into account the above-mentioned situation from the Central Bank's statistical point of view, an overall concern arises: How to use the advantages of an information era? In that sense, reengineering processes in a data collection system using new communications means with a large number of reporters are the main factors in managing a statistical system.

### 3.2. A research approach or methodology

The aim of the analysis is introducing a universal working place for receiving different kinds of reports instead of specialised ones. A *simulation* has to answer the question: How many universal service facilities – bank employees would be needed to efficiently run the data collection system in the future?

Using a simulation, we expected to get a set of systems responses for different operating conditions. Because it is usually difficult to measure a lack of precision in simulation results, two approaches are pointed out:

1) *Quantitative approach*: On the basis of the past and current data on receiving, controlling and processing statistical information by each employee involved, a stochastic model could be established for further decision-making support. Receiving statistical reports represents the system of service facilities with a queuing mechanism.

a) Data seizure and a program for a simulation technique (software used: GPSS – General Purpose Simulation System) exist in two phases:

- i) A simulation of the old system, which includes: 14 specialised serving facilities (3 for the C monthly report forms, 7 for the SKV monthly report forms and 4 for the SN yearly forms),
  - ii) A simulation of the system currently implemented (10 specialised service facilities),
- b) Each phase took a few steps:
- i) A formal description – a block diagram and a mathematical model,
  - ii) Preparing and running a simulation program,
  - iii) Analyses of the results of the simulation experiments.

The main concern in running the model was a lack of the exact data distribution of the reports' arrival time and waiting time in the queue. However, a numeric generator of random numbers to simulate both distributions is used.

2) *Qualitative approach*: Several main qualitative changes in a data collection system must be taken into account, at least:

- a) By using modern ways of communications with reporters (e.g. the e-mail system with automatic quality control answers), new working functions may arise (e.g. confidentiality and data security). A huge number of reporters will exchange the security key with the Central Bank's Statistics Department.
- b) Simplifications of the reports oriented towards the accounting information systems of reporters (mainly the non-financial sector).
- c) Sampling the population could significantly reduce the number of reporters.

Each bank employee will deal with a closed group of companies (reporters) and manage receiving all three different kinds of reports. Higher standards of knowledge would be needed.

Due to some empirical data on the number of reports, the number of bank employees, the average time needed for processing a single report, etc., a simulation of the new system presumes a possibility of the reports of higher frequency.

A simulation was running during the period of the maximum utilisation of service facilities, and that means that the period of a respective month (15 days) during which all three kinds of reports as well as one quarterly report received by the Central Bank, were taken into account. On the basis of the empirical data, it is estimated that about 250 reports could be successfully processed on a daily basis.

Unavoidable iterations of simulations have also been accomplished and some important results are presented in the following chapter.

### 3.3. *Simulation results*

As all results, those of the old system also represent the final average results for 10 iterations for each report.

Obviously, the *old system* was relatively busy, which is reflected in "AVG-UTIL-TOTAL-DURING-TIME" in *table 2*. For various reports, working facilities were busy from 92% to 94% of all the available working time. During the day, when all three kinds of reports stand in the

queue, approximately 230 reports are processed in all 14 working places together. It is estimated that a relatively low level of the arrival time results from different means of communication used by reporters. Consequently, the value of information – statistics – prepared was unacceptable (timeliness).

**Table 2:** Simulation results of the old system (specialised service facilities; 3+7+4)

Report	AVG-UTIL-TOTAL-DURING-TIME	AVAIL.TIME	UNAVAIL.TIME	ENTRIES	AVERAGE TIME/UNIT	CURRENT STATUS	PERCENT AVAIL.	CAPACITY CONTENTS	AVERAGE CONTENTS	CURRENT CONTENTS	MAXIMUM CONTENTS
C	0,9217			95	13,9334	AVAIL	100	3	2,760	3	3
SKV	0,9306			78	40,0478	AVAIL	100	7	6,514	7	7
SN	0,9440			78	23,3958	AVAIL	100	4	3,777	4	4

Report	QUEUE	MAXIMUM CONTENTS	AVERAGE ENTRIES	TOTAL ENTRIES	ZEROS	PERCENT TIME/UNIT	AVERAGE TIME/UNIT	SAVERAGE	CURRENT CONTENTS
C	VR	3	0,5231	96	36	37,7	2,5995	3,8233	6,1
SKV	VR	4	0,814	81	26	33,5	5,2247	7,1879	0,9
SN	VR	4	0,9714	79	19	24,5	5,8967	7,5879	1,6

Report	RANDOM STREAM	ANTITHETIC VARIANTS	INITIAL POSITION	CURRENT POSITION	SAMPLE COUNT	CHI-SQUARE UNIFORMITY
C	1	OFF	91864,5	92056,2	192	0,44
SKV	1	OFF	100715,6	100873,7	158	0,53
SN	1	OFF	100709,4	100867	158	0,48

Source: Own calculations, BoS.

The arrival time of reports and their processing time correlate with each other, and therefore, it was not possible to fix one variable and simulate another one in order to find out the equilibrium situation. Therefore, different combinations of variables were used to achieve a higher frequency of reports based on the technological reorganisation of the reporting system. The most significant alternatives in the simulations of the *new system* are presented next.

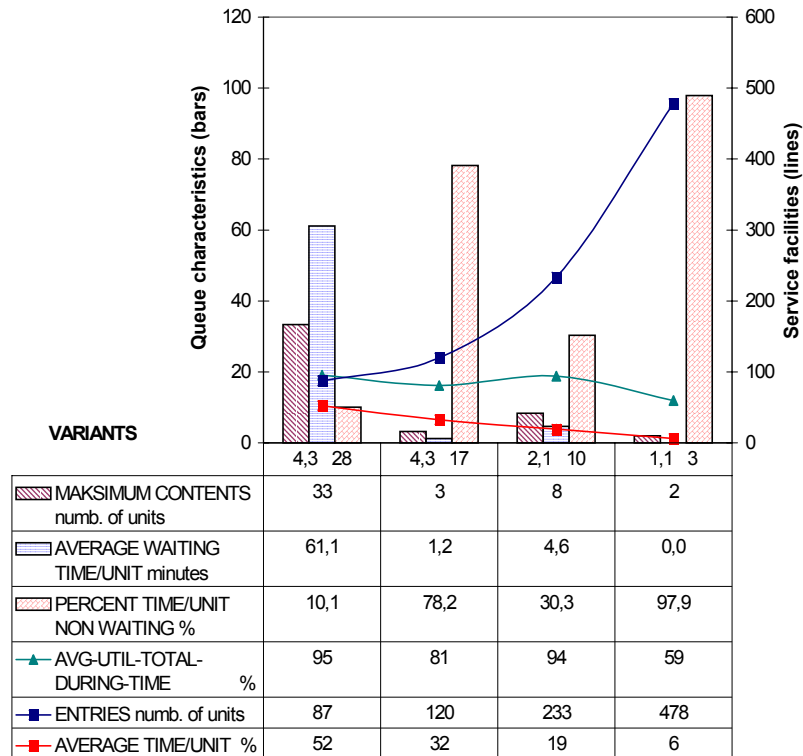
In the following *chart 1*, the alternatives are expressed in numbers: e.g. “4,3 28”. Number “4,3” stands for the average arrival time of each 4 minutes with a standard deviation of 3 minutes. Number “28” stands for the average time needed to process a single report.

In *the first case* (from the left hand-side to the right hand-side), the conditions of the old system are simulated with the exception of using only 10 universal service facilities, and that is in fact the main feature of the new system. On the one hand, despite reducing service facilities, almost the same level of the utilisation of the available working time (95%) can be reached; on the other hand, the “productivity” is insufficient, since only 87 reports were successfully processed. The targeted result was to process 250 reports per day. “AVERAGE TIME/UNIT” is too high (52 minutes for one report).

In *the second case*, we keep the same level of the arrival time, but we cut down the average time to process one report at the level of 17 minutes. The number is simply derived from the total available time and the number of all reports to be processed (5,100 different reports). Consequently, the simulation shows that the queues are almost removed (80% of the reports are not waiting). But we still have not processed enough reports on a daily basis to be finally successful (only 120 reports have been processed). At this phase, it should be stressed that the average time needed for the execution of one report is cut down by the fact that each

reporter on average sent at least two different reports to the same bank employee in the Bank of Slovenia.

Chart 1: Simulation results of the new system (universal service facilities; 10)



Source: Own calculations, BoS.

In the case of *the third alternative*, taking into account our experience of the existing project, we were surprised by the rapid arrival time (especially by the “C” report) as a consequence of the efficient electronic data reporting system. Therefore, we have increased the arrival time by one half (2,1) compared to the previous time (4,3). The results of the simulations in the third variant are almost optimal, as regards the target system results. On average, almost enough reports are processed per day (233 reports). The effective average time to execute one report is close (19 minutes) to the theoretically calculated time (17 minutes). The conditions in the queue are acceptable: the average waiting time is just 4 minutes, the maximum number of the reports in the queue (8) is lower than the number of service facilities (10) – “CAPACITY CONTENTS”. In other words: *ten bank employees have the same level of productivity as in the old system but they perform their tasks at a higher level of quality.*

*The fourth case* is more or less a theoretical one and thus imposes a possible further influence of a higher technological development. High standards concerning both “1,1 3” variables are established. Almost full utilisation of the process is reached: there is no queue, bank employees and reporters are exploited irrationally and the productivity level is extremely high.

On the basis of the above analysis, we could estimate that the expectable level or output of the future system would potentially be even somewhere between the 3<sup>rd</sup> and 4<sup>th</sup> alternative,



however close to the 3<sup>rd</sup> variant. But an adequate level of control should be kept at the same time as well. A fully automated process would not support solutions for new methodological questions, e.g. financial innovations. In that sense, fully automated quality control would imply automatic acceptance of potential error.

On the other hand, from the viewpoint of the method applied, we have to bear in mind that the independence of the main variables was not fully applied and that further simulations with the system, knowing the distributions of variables, should be of great concern in the future.

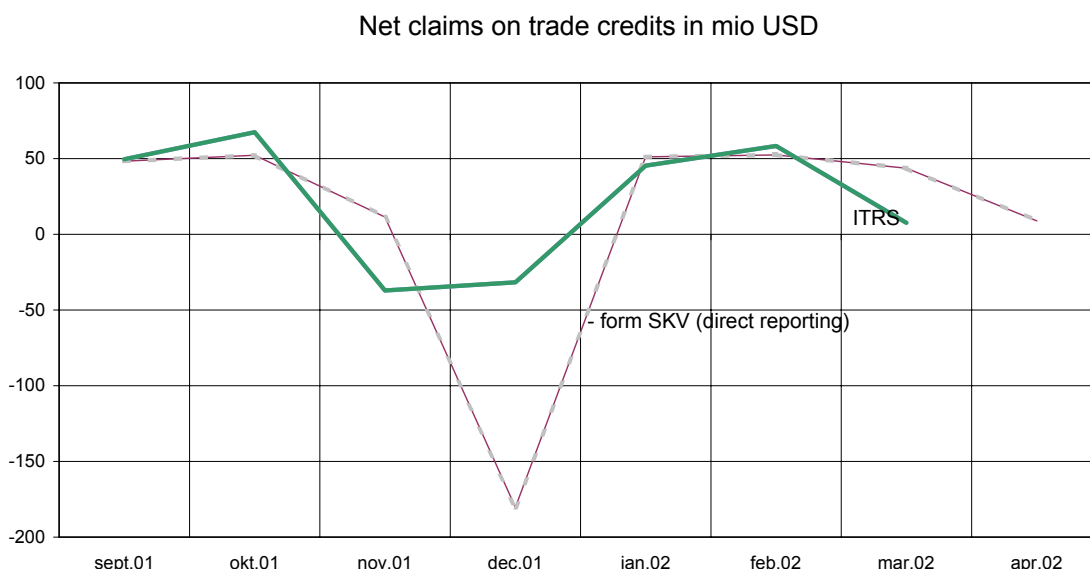
#### 4. THE COMPARISON OF STATISTICS PRODUCED BY A DIFFERENT REPORTING SYSTEM

##### 4.1. Direct versus indirect reporting on trade credits

Parallel running and the comparison of a final output from the data collected by the old and new systems is a necessary process, although time- and resource consuming. It is nevertheless a good starting point for the new system, if the results can be simultaneously compared with the old one at least for a while in order to keep or even improve the quality.

The chart is showing us the trade credits within the period of eight months. In addition to some methodological differences regarding the data compiled from both sources, flows and stocks show similar movements. We could say that, generally speaking, the expectable quality has been reached. The only exception to this statement is December, when the net position significantly differs. This fact could be explained by a fundamentally different type of a data source, i.e. the accounting data on the SKV form and the data compiled from the payments on the ITRS.

Chart 2: Trade credits from the ITRS and from direct reporting – the SKV form



Source: BoS data.

## 5. CONCLUSIONS

Substantial changes in the overall environment, i.e. the integration processes towards the EU and the EMU as well as the opening of Slovenia's economy through liberalising the capital market, must be reflected in the changes in the organisation systems as well as in the Public institutions. The management of a complex statistical information system is faced with a problem of keeping and/or even improving the quality of information for a decision-making process at a macroeconomic level. On the other hand, a growing technological and communication environment plays a crucial role in implementing a faster exchange of information as well as giving greater possibilities for a needful adjustment of the statistical requests on the Central Bank's part, taking into account the accounting information systems of reporters. The SDDS standards of the IMF show us the way towards the sound macroeconomic statistics encompassing a reliable, timely, adequate and accurate performance.

This research and a practical implementation of the project have shown us that it is possible to implement an efficient alternative direct reporting system. The exchange of international experience is of vital importance in this area. We have found that an additional source of information taken from all the population of potential reports should be provided at least on an annual basis, since good sampling is one of the preconditions in a direct reporting system. An accurate and timely central business register is also very important, not only at national but also at local level. Countries should harmonise their registers, methodologies and compilation practices as much as possible in order to avoid multilateral asymmetries.

The main project of introducing new reports for trade credits has provided us with satisfying results when compared to the old system.

But still, some doubts exist, since the cost effects of collecting data at the overall national economy level have not yet been compared. Two strong blocks of reporters, banks and multinationals are urging to reduce the costs of reporting to the Central Bank.

Implementing direct reporting systems takes time (parallel running) and resources (knowledge, registers, infrastructure, etc.).

Last but not least: in the case of EU and EMU accession countries, the time of changing the reporting system is even more inconvenient, since they will change their exchange rate regimes as well. The Bank of Slovenia has set up an infrastructure for a further implementation of a direct reporting system for external statistics. However the main source of data, i.e. the ITRS system, has still to be replaced.

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