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CONTENTS

Demographic Transition of Three Populations in Two Countries – The Population of Romania and Hungary Compared*

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The main goal of our study is to describe and to interpret the selected features of demographic behaviour after the regime change. We compare two countries and three populations – the Hungarians in Hungary, the Romanian population, and the Hungarian population living in Transylvania. We are interested in similarities and differences in fertility trends, partnership behaviour, such as marriage, cohabitation, and divorce. Dissimilarities in the social changes and economic development are also outlined. We focus on structure versus culture since the Hungarian population lives within the Romanian institutional settings and under Romanian socio-economic circumstances but, at the same time, they have strong cultural ties with Hungary too. Using vital statistics, we are able to show that the trends of fertility behaviour of the Hungarians in Transylvania is closely related to the Romanian general tendencies, however, several deviations can be also identified. Our study serves as a first step in examining the comparison between Romania and Hungary together with the behaviour of ethnic minorities.

KEYWORDS:
Population.
Fertility.
Family policy.

We are not short of papers studying the demographic behaviour of the Hungarian population, even that of Hungarians living beyond the borders. In the last decade, numerous comprehensive analyses were prepared in the latter topic (for example *Csata–Kiss* [2007], *Veress* [2002], *Kiss–Gyurgyik* [2009]), and continuous researches are being conducted on the stratification of the population as well (*Veress* [2003]). There are a large number of thematic studies on (out)migration (*Gödri–Tóth* [2005]), as well as on migration intentions, the ethnic composition of marriages and the changes of the latter (*Horváth* [2004]). We cannot be dissatisfied with the exploration of the conditions in Hungary either, since newer and newer papers are published on fertility, changes in couple relationships, divorces, ageing, health conditions and migration (*Sik* [1994], *Bukodi* [2004], *Spéder–Kamarás* [2008]). Even an estimation of the total Hungarian population has been prepared recently.

However, there are not plenty of researches where the Hungarian population in Transylvania is studied in a "multiple context", namely is compared with the Romanian and the Hungarian society at the same time. We believe that such kind of comparison could be advantageous not only in understanding the behaviour of the Hungarian population in Transylvania, but also could provide new insights into the demographic changes in the two neighbouring countries, and can give us also some important theoretical lessons. Indeed, such kind of research can contribute to understanding *the role of structure* (the Romanian institutional setting, structural circumstances) *and culture* (Hungarian language use, Transylvania everyday culture) in shaping demographic behaviour.

Demographers are inclined to disregard that the key events of life – birth, moving out of the parental home, marriage, divorce, migration, and out-migration – occur in a given social, economic, and institutional context, and a definite cultural space. Nevertheless, there are an increasing number of studies, which call attention to the determinant role of the institutional systems, structure, and culture. (*Buchanan* [1989], *Thornton–Philipov* [2009]) It is justified to classify also our study among them. The Hungarians living in Romania within the Romanian institutional settings are players of the Romanian labour market, and their behaviour (intentions, decisions, social practice) is embedded in the Romanian social structure. However, they are linked in various ways with Hungary, and the cultural characteristics of the Hungarian population in Transylvania and in Hungary are almost the same. From our research perspective, especially those elements of the culture are of importance that shape everyday life and social praxis, especially demographic behaviour (see *Rehberg* [2003]).

This study can be considered as a "background paper" for a research program that compares Hungarians living in Hungary and in Transylvania with the Romanian population. Here we outline the basic social, economic and institutional contexts (Sections 1 and 5) and – using vital statistics – describe the basic tendencies of demographic behaviour in the three populations (Sections 2–4). Since we are interested in the first half of the life course, we limit ourselves to the trends of fertility, partnership, and touch only migration in the description of population development.

The Generations and Gender Program and as one of its pillars the Generations and Gender Survey (GGS) are ideal frameworks for carrying out research programs, and thus they were so in the case of data collection of both Hungary and Romania.[1] For the sake of a more detailed analysis of the Hungarian population in Romania, a separate data collection was initiated and accomplished in Transylvania. The first wave questionnaires of the GGS (see *Vikat et al.* [2005]) and the Hungarian "Turning Points of Our Life Course" Panel Survey (*Spéder* [2001]) were adapted to the Transylvanian situation. Due to financial constrains, we interviewed only the young (18–45 year-old) population in Transylvania, although in the GGS the total adult (18–75 year-old) population is targeted. Contrary to the earlier investigations in Transylvania, we applied a two-stage sampling (visiting addresses, data collection), and the selection criterion for becoming a sample member was the following: "those people are Hungarians who understand the questions of the questionnaire and are able to answer them". According to our knowledge, we obtained this way a sample representing the Hungarian population of Transylvania in respect of our research better than the former ones.

Finally, we would like to give an account of the accomplishment of comparing the Hungarian populations living in Hungary and in Transylvania (see *Spéder* [2009]). Papers were published on partnership and fertility behaviour (*Pongrácz* [2009], *Spéder–Kiss* [2009], *Spéder–Veress* [2009]), divorce and separation (*Földházi* [2009]), as well as on leaving the parental home (*Murinko* [2009]). The socioeconomic comparisons included the topics of stratification (*Monostori–Veress* [2009]) and Roma ethnicity (*Kapitány–Kiss* [2009]). Specific studies targeted only the situation (for example etnocultural reproduction (*Horváth* [2009]), migration (*Gödri Kiss* [2009])) of the Hungarians in Transylvania or described the methodological issues of the Transylvanian data collection. This paper is based on the introductory chapter of our research report titled "Parallels. Hungarians in the Mother Country and in Transylvania at the Turn of the Century" (*Spéder* [2009]).

Our main goal is to describe and to interpret some crucial elements of the demographic behaviour after the regime change. Meanwhile, we concentrate on the analysis

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[1] For the concept of the Generations and Gender Survey, see *Vikat et al.* [2005]. Data collection in the participating countries was launched in different time. Hungary has its first wave in 2000–2001, Romania in 2004. In this paper, our analysis is based on vital statistics.

of the present situation even if the factors of the late socialist era continue to exert an influence in several respects. According to our intentions, we are dealing with the past only if it is indispensable for understanding the present situation. We are addressing similarly the social context: we cannot aim at the comprehensive comparison of the Hungarian–Romanian situation and within that at the analysis of the circumstances in Transylvania, as this is beyond our possibilities. At the same time it is essential to outline – even if roughly – some specific features of the regime change in Hungary and in Romania and those characteristics of the social and economic transition.

1. Regime change in Hungary and in Romania

The political and economic system in Hungary and in Romania being the subject of our research can be considered essentially the same – democratic competition, market economy based on private ownership –, and it is widely known that both countries are on their way of transition from socialism to capitalism and are on the periphery of the European centre of the global economy. At the same time, we cannot consider them equal either in respect of the starting situation or the way of transition, as a consequence of which the social order of the two countries, which were both already EU members at the time of our study, cannot be regarded the same either. In the present study we will rather focus on the specific features (differences), but we will by no means neglect the basic similarities characteristic of the two countries.

1.1. Objectives, tools, circumstances

At the time of the political transformation, which started in 1989/90, there was a mutual understanding that the socialist regime was untenable. Even if there were debates about the way, extent and nature of changes, it was agreed that the goal of the transformation was the Western social system: competitive private sector, functioning political democracy, welfare. The way of realization depended of course on several external and internal factors, such as the power relations of the ruling elite groups, the distance from the centre in Western Europe, the long-term trends of economic development (state of economic development and structure), cultural traditions and last but not least the expectations of the international organizations (EU, World Bank, IMF, etc.) "being at the birth" of the transition (*Janos* [2003], *King–Szelényi* [2005], *Kornai* [2005], *Sztompka* [2000], *Zapf* [2002]).

1.2. Characteristics of the new system

We agree with those who are of the opinion that there may be significant differences in respect of the "paths" and "destinations" of the transition. According to the typology developed by *King* and *Szelényi*, the transition observed in the two countries cannot be classified in the same category (*King–Szelényi* [2005]). They distinguish three typical paths of the transition from socialism to capitalism: capitalism without capitalists, political capitalism built from the top down and hybrid capitalism built from the bottom up. Out of the three different formations, Hungary (together with the Czech Republic and Poland) can be classified in the first one, Romania (together with Russia) in the second one, while the third one is represented by China.

The main characteristic of the *Hungarian transition* – according to King and Szelényi – is the coalition of the technocrats and the intellectual groups, which hinders the former party/state nomenclature (elite) from becoming the hegemonic participant of the privatization (as for example in Russia). Instead, foreign capital attracted by wage advantage, closeness to Western Europe and the relation network of technocrats dominates privatization, but we should not forget the aspects of security policy in the EU either (*Janos* [2003]). This way of privatization was accompanied by an economic/organizational/technical expertise, which caused that the necessary deindustrialization (the disintegration of the non-competitive industrial structure) was followed by a period of new industrialization. The newly developed industrial sector is export-oriented and produces for the central Western European markets. The role of the state has not fully disappeared either: though it narrowed considerably, it still plays a significant part in ensuring public infrastructure and in the reproduction of human resources (*King–Szelényi* [2005]).

In the capitalism built from the top down, where also the transition *in Romania* can be classified, the former nomenclature (elite) plays a key role in the transition and more precisely in privatization as well. The inflow of direct investment is less lively than in the other two types, actually a shortage of capital and investment is characteristic. So it is more difficult to renew the economic structure in which the primary branches (exploitation and raw materials) came to the front, barter trade among corporations is very frequent. Due to the weak regenerative capacity of industry, the process of re-ruralization is typical. Because of the shortage of work and money, small-scale subsistence farming and household production strengthen. Economic integration and capital inflow are hindered by the fact that the government does not invest enough resources in the training of human capital due to the low budget revenue (*King–Szelényi* [2005]).

Naturally, it is not presumable, and we do not think either, that the transformation of the two countries to be compared can be fully described by the former types, as real processes are always of "mixed nature". It is however important to refer to the

differences in the course of investigating social structures, even if the full EU membership of both countries can be considered the "guarantee of homogeneity".

1.3. The performance of the economy

When qualifying the results of transition, the change in living standard – depending obviously on the economic performance – has a prominent role. The social system has lost its legitimacy just because of its unsuitability in this respect, as, the development of welfare in a wider sense is one of the most important criteria of legitimacy in the modern welfare states as well (*Janos* [2003]). In all the countries concerned, the change over to market economy occurred along with stopping inefficient economic activities, and, as a consequence, with an economic decline and a decrease of incomes and consumption. A growth started only in the middle – at the end of the 1990s, but with a shift in time and at a different pace. For evaluating this social transformation within a country, it is enough to examine the changes in economic performance in many considerations, but if two countries are involved, it is advisable to survey the difference in the level of welfare as well.

For the *accurate comparison* of the economic performance and *level of welfare* in the different countries, data calculated at constant prices, which take into account wage costs and price structure as well, are needed. We used the historical statistical data of *Madison* [2006] for this purpose. These are suitable for describing both dimensions at the same time.[2] According to these data, right before the regime change, the economic performance per capita was in Hungary 1.75-fold of the one in Romania.[3] In the first half of the 1990s, there was a decline in both countries, and then, in the mid-1990s a growth started slowly (see Figure 1). While this process was unbroken till the beginning of the first decade of the new millennium in Hungary, and it even accelerated at the end of the 1990s, Romania suffered again a decline and stagnation (compare *Stanculescu* [2009]), and the next growth phase appeared only around the turn of the millennium. According to the calculations of Eurostat, in 2005, the economic performance of Hungary was 63 percent, while that of Romania 35 percent of the EU27 average (*Eurostat* [2008]). Based on these, at the time of our investigation, the difference between the levels of welfare was slightly larger than in 1989 (1.8-fold).[4]

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[2] Madison gives both GDP and GDP per capita in 1990 Geary–Khamis dollar.

[3] GDP per capita calculated on constant prices was the highest in 1988 (7 031 dollars) in Hungary and in 1986 (4 215 dollars) in Romania; it has been continuously decreasing since then.

[4] Though it is irrelevant in respect of comparative analyses, as they compare the circumstances and behaviour of Hungarians in 2004–2005, we have to remark that in the second half of this decade, when GDP stagnated in Hungary, it grew significantly in Romania, and the difference between the two countries was only 1.53-fold in 2007 (*Eurostat* [2008] p. 3.).

Figure 1. Changes of GDP in five Central Eastern European countries
(constant dollar)

GDP per capita
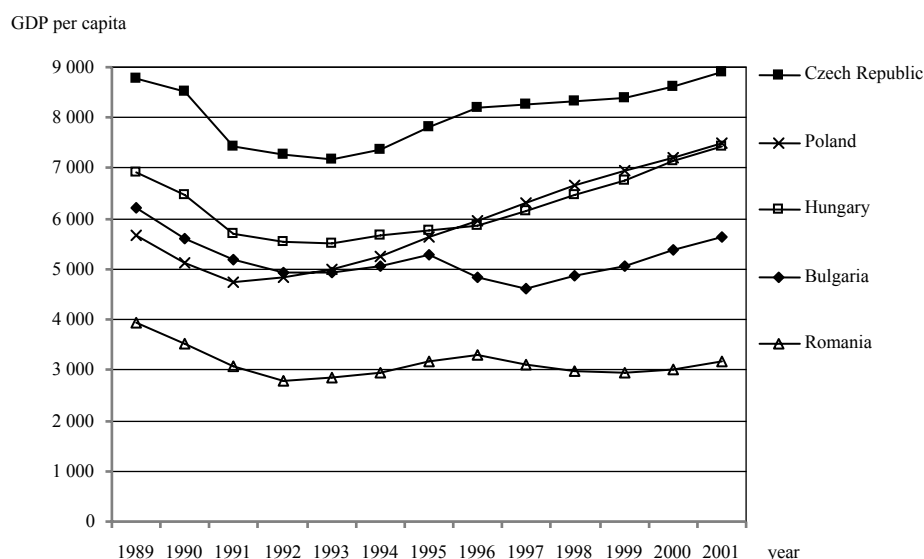
Source: *Madison* [2006] p. 481.

With respect to the changes in the living standard of the Hungarian population in Transylvania, a good starting point can be the examination of trends in GDP in the different regions of Romania. In regional differences, two phases can be distinguished: in the first period between 1990 and 1998, the proportion of industrial production in GDP in the given region was the determinant. The decline was namely the strongest in industrial zones, which were in privileged situation earlier. However, the dissimilarities were not apparent between Transylvania and the Regat (Romanian Old Kingdom) but rather on the level of smaller regional units (counties). There was an above the average decline in Bucharest, Prahova county and in the district of heavy industry and mining in Southern Transylvania (Braşov, Hunedoara, Caraş-Severin counties). The counties in Northern Transylvania populated by Hungarians to a larger extent were less industrialized, so these Hungarian-populated areas of Transylvania felt the decline less than the average (*Constantin et al.* [2003]). In the second period, from the end of the 1990s, when the role of foreign capital became more intensive in Romania as well, the situation of the (former industrialized) regions with better infrastructure supply became more advantageous. The growth in Bucharest is far above the average, and it was significant – even if to a smaller extent – in Banat as well. The growth in the Northwest region was equal to the average in which the development in Cluj Napoca has the key role. In this region, the areas be-

longing to the Partium ("parts" of the former Kingdom of Hungary) – Satu Mare, Bi-
haria, Salăj – performed much below the average. The growth in the Center region
where Hungarians mostly live was below the national average on the whole. The in-
dicators of Tinutul Secuiesc (Székelyföld) are even much more disadvantageous than
the average. On the whole, the relative situation of the Hungarian-populated area
probably worsened compared to 1989. However, this deterioration appeared after
1998 and cannot be attributed to the disintegration of the industrial structure but to
the fact that economic renewal reached these regions less.

Figure 2. Changes of GDP between 1998 and 2006 by regions
(1998=100 percent)
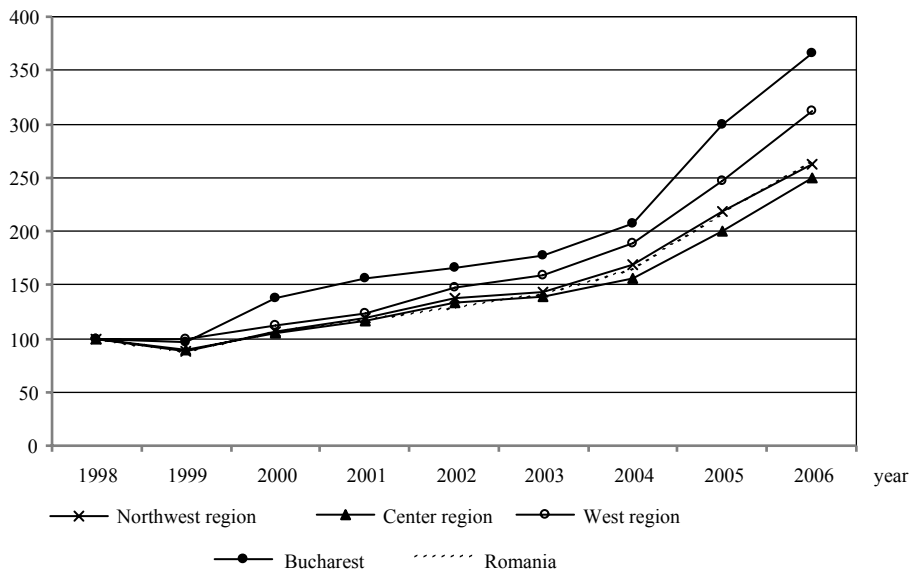
Source: Eurostat.

1.4. Social inequalities, integration

The transformation of the economic structure has numerous negative conse-
quences. One of them is the increase of social inequalities, which occurred mainly in
the 1990s in Hungary, and following the turn of the millennium, we can speak rather
about stabilization (*Tóth* [2005]). This process took place in Romania as well, where
it was presumably also the most dynamic at the beginning of the transition (*Stan-
culescu* [2009]). This is suggested by the fact that at the beginning of the 1990s, the
inflation in Romania was multiple of the one in Hungary (compare *Madison* [2006]

p. 374.), and it is widely known that inequalities increase in inflationary periods.[5] According to the data of Eurostat, in 2001, the gaps between the bottom and top income quintiles were 3.4-fold in Hungary, while 4.6-fold in Romania (*Eurostat* [2008] p. 69.).

As indicated by the preliminary results of an investigation in 2008,[6] income inequalities are lower among the Hungarian population in Transylvania than among the total population of Romania. This can be attributed to two factors: on the one hand, the proportion of Hungarian people belonging to the top income group is lower than the average. It coincides with the result of the census in Romania, which showed that among Hungarians in Transylvania the proportion of those working in the financial or the economic service sectors as well as in administration is much lower than the average. On the other hand, despite the lower average income, the proportion of the poor, socially excluded people is also lower than in the Romanian population. The smaller proportion of poor people may be in connection primarily with the situation of Hungarians living in villages relatively better than the average in the Romanian villages.

2. Fertility

In the former socialist countries, an overall change in the demographic behaviour began after the regime change. The model of "early marriage, early child-bearing" prevailing earlier universally began to disintegrate; young people form their first couple relationship and have children at a higher and higher age (*Sobotka* [2008]). In Western Europe, this process has prevailed already since the 1970s, and even ended in many countries (*Frejka–Sobotka* [2008]), but in the majority of the former socialist countries it is still lasting (*Spéder* [2009]). Among the explanatory factors of the change, the expansion of education, the transformation of values (individualization), the increasing instability of couple relationships, the financial–institutional changes resulting from the regime change are usually referred to, which all brought uncertainties in the life of the people. It is mentioned less frequently, but it has a special importance in our case, that essential changes occurred in the institutions of family policy. As a consequence of all these factors, the total fertility rate (TFR) characteristic

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[5] We cannot state that inflation directly increases inequalities, but that social groups in more favourable situation can assert their advantages over weaker ones more easily in an inflationary environment, as inflation, as a type of "social curtain" conceals the strengthening of differences. (Inequalities increase so that nominal wages rise everywhere.)

[6] Tamás Kiss's personal information based on the investigations "Demography, stratification, use of language" and "Relations of ethnic groups and tolerance".

of the different periods fell very low: in the middle of the first decade of the new millennium, at the time of our data collection, it was around 1.3 in all the former socialist countries which joined the European Union. With the knowledge of the previous general tendencies, it is worth examining separately the changes of TFR in Hungary, Romania and, within that, in Transylvania.

In the years preceding the regime change, total fertility rate was unambiguously higher in Romania than in Hungary (see Figure 3). This was decisively due to the fact that from 1967 to 1989 the demographic policy was based on very strong prohibitions in Romania (compare *Kligman* [1998], *Kiss* [2009], *Muresan et al.* [2008]), which imposed strict sanctions on abortion and did not let up-to-date contraceptive means in the market. Nevertheless, fertility showed strong fluctuations depending always on the practical enforcement of this policy (*Kiss* [2009]). The volatility of the Hungarian social policy can be demonstrated in the changes of fertility too, though it applied first of all stimulating and not prohibiting means (*Spéder–Kamarás* [2008]). The fertility behaviour of the Hungarian population in Transylvania followed the trends in Romania, though, according to estimations, their fertility rate was always lower than the national rate.

Figure 3. Total fertility rate in Hungary, Romania and among Hungarians in Transylvania between 1965 and 2006
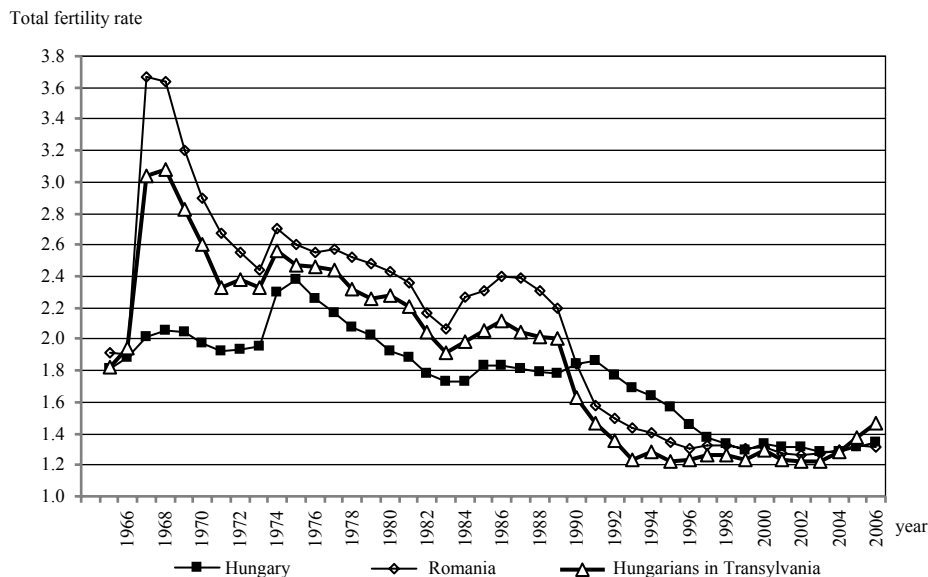
Source: Vital events data, own and Tamás Kiss' (Hungarians in Transylvania) calculations.

Following the regime change, TFR fell from 2.2 to 1.6 from one year to the next in Romania. (Similar decrease occurred perhaps only in the German Democratic Republic (*Zapf–Mau* [1993]).) Also the fertility of Hungarians in Transylvania followed this trend. The evident reason for the sudden decrease is that the direct regulation of contraception stopped and the prohibition on abortion was abolished. In Hungary, the decrease began later and was gradual, and TFR showed even a slight increase until 1991. Since the mid-1990s, total fertility rate has been around 1.3 in both countries. The same can be said about the fertility of Hungarians in Transylvania, but the latest data indicate that in their case, fertility probably began to increase and/or delay ended/slowed down.

The low level of fertility over nearly ten years is misleading in some respects, as its direct reason is that young people of fertility age expect their first and then further children later. If they gave birth to the same number of children at an older age, TFR would (could) reach the earlier level. This is, however, hardly possible, especially in Romania.

Delay of childbearing is well demonstrated by the average age of women at the birth of their first child and by the number of births per thousand women of corresponding age. The first indicator is available only for Hungary and Romania, while the second one is accessible from the year 1994 for the Hungarian population in Transylvania as well. Concerning the average age, the *trend* is *divergent* in the two countries. The one-year difference, which was typical at the turn of the 1990s, increased to more than two years by 2005 (see Figure 4). Since TFR is the same in the two countries, we can conclude that in the decrease of the indicator, delay has a smaller, while giving up childbearing plays a larger role in Romania than in Hungary.

The number of live births per thousand women of the corresponding age (see Figures 5a–5c) reflects the same tendencies but in more (age-specific) details, and due to this, the changes in the fertility can be examined for the Hungarian population in Transylvania as well. It is true for all of the three populations that fertility of the age-group 20–24 decrease radically; that of people aged 25–29 fall slightly and then, at the end of the observed period it is stagnant, while that of the 30–34 year-olds stagnates and after the turn of the millennium begins to increase slowly. Due to the decrease in the willingness to have a child among people aged 20–24, the *fertility of the age-group 25–29 is the highest* in all of the three populations: the typical childbearing age shifted from the early to the late twenties.

It seems, however, that there is a difference in respect of the levels and the dynamics. Right before the regime change, the number of births per thousand women was higher in each age group in Romania than in Hungary. The difference was the most significant among the youngest people: in the age group 15–19 one and a half times, while among 20–24 year-olds one-fifth more children were born. Similarly to the Romanian figures, the rates typical for the Hungarians in Transylvania at that

time – about which we have no accurate information – presumably exceeded the ones in Hungary.

Figure 4. Average age at the birth of the first child in Hungary and in Romania between 1985 and 2006

Average age at the birth of the first child
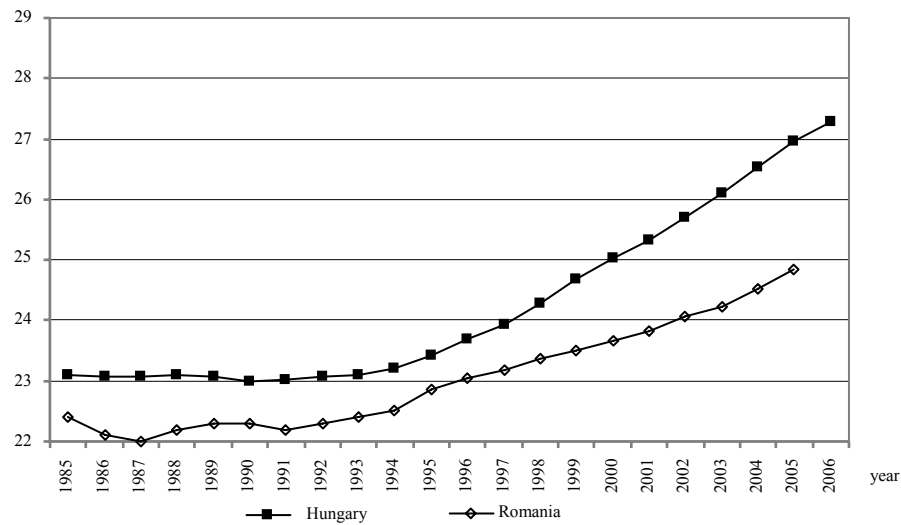
Figure 5a–5c. Live births per thousand women of the corresponding age in Hungary, Romania and among Hungarians in Transylvania between 1989 and 2006

a) Hungary

Live births
per thousand women

b) *Romania*

Age group

■ 15–19   △ 20–24   ✕ 25–29   ▲ 30–34   ▱ 35–39   — 40–44

Live births
per thousand women

c) Hungarians in Transylvania

Age group

■ 15–19   △ 20–24   ✕ 25–29   ▲ 30–34   ▱ 35–39   — 40–44
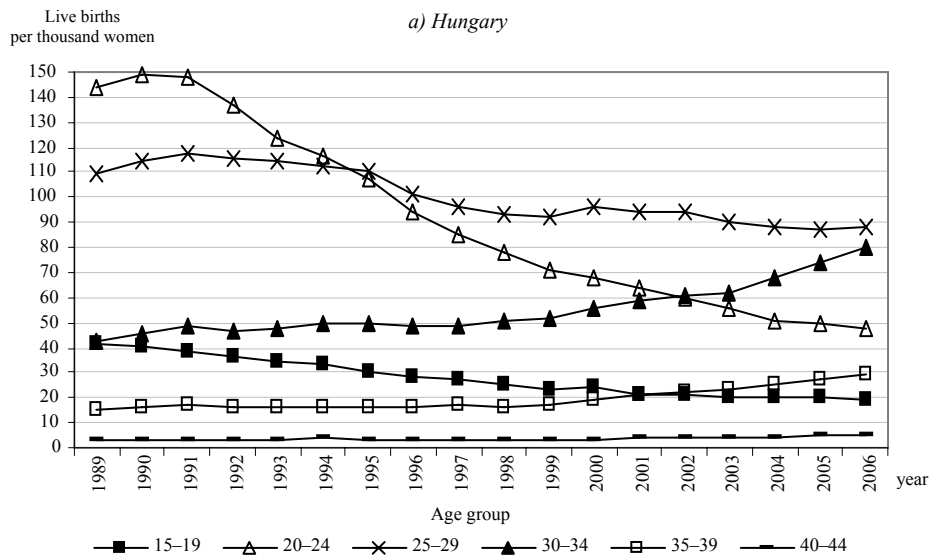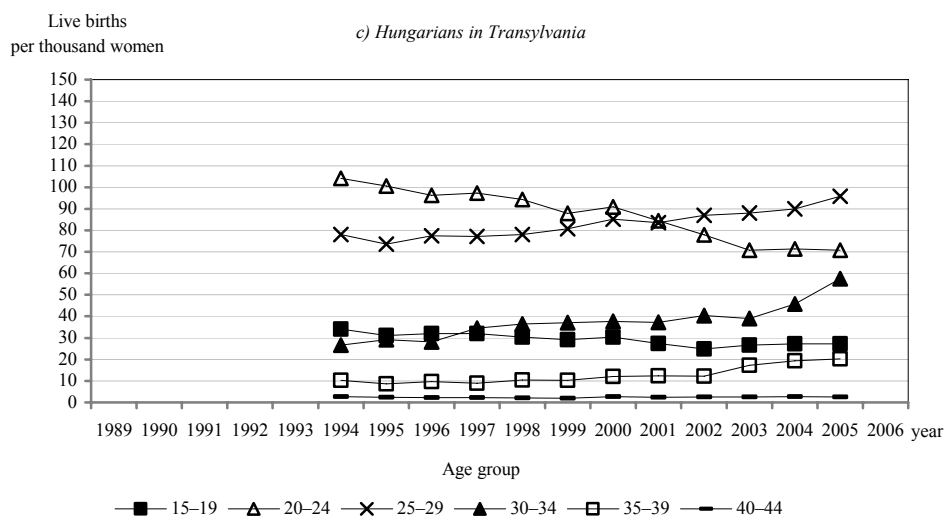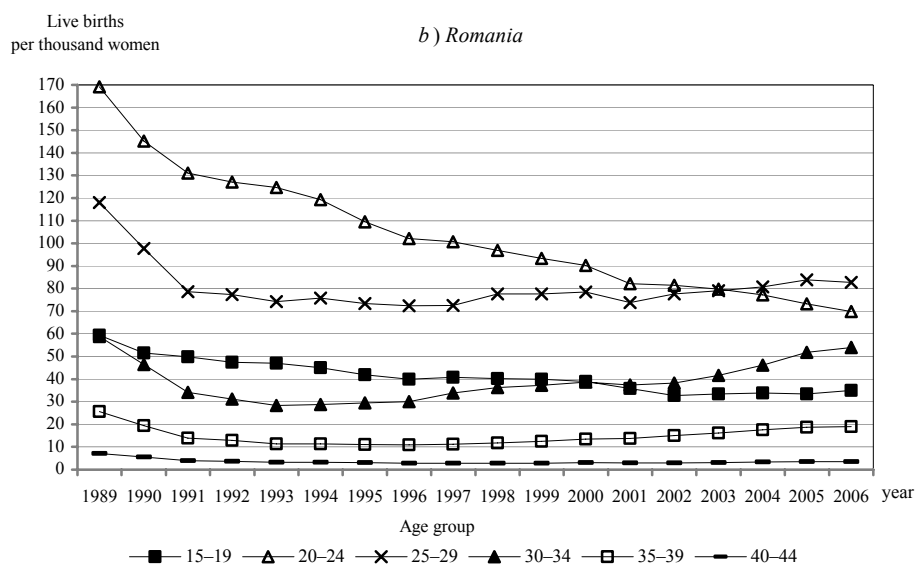
In the observed one and a half decade, this relation turned in some age groups.

At present, among 20–24 year-old people, the willingness to have children is still higher in Romania and Transylvania, but in the age group 25–29 it was nearly the same in 2005 in the three populations. Among 30–34 year-old people, the chance of having a child is one and a half times higher in Hungary than in Romania and Transylvania. On the whole, the number of births per thousand women aged 15–49 years

is the highest, even if only minimally, among the Hungarian population in Transylvania.

The number of extra-marital births rose significantly both in Hungary and in Romania. In the first it increased from 15 to about 40 percent in the observed period, while in the latter it grew from 4–5 percent of 1990 to 30 percent. Thus, stronger dynamics characterized Romania, since the rate increase was at least six-fold there as opposed to about three-fold growth in Hungary. Concerning the Hungarian population in Transylvania, we do not have relevant data.

The formerly detailed topic of births leads to the next theoretical unit, the change in marriages, for which we also have comparative data.

3. Couple relationships: marriages, cohabitation, divorces, ethnic reproduction

The demographic changes, which started in the 1970s in Europe, were manifested in the transformation of couple relationships, the expansion of cohabitation and a reduction in marriages (*Lesthaghe* [1995]). Similar processes began in Central Eastern Europe as well, but the changes in respect of couple relationships cannot be considered uniform (*Sobotka–Toulemon* [2008], *Spéder* [2009], *Hoem et al.* [2009]). There are significant differences between Hungary and Romania as well if we examine the classical demographic indicators. According to the total marriage rate, which presents what percentage of the given population will marry in the course of their life on the basis of the marriage frequency in a given year, half of the population in Hungary and seven tenth of that in Romania can be expected to get married (see Figure 6). It must be known that this indicator is also biased due to the delay, and this phenomenon is stronger in Hungary (*Bongaarts–Feeny* [2006]). Despite this, we assume that in Hungary, fewer young people of today will get married later than in Romania. This hypothesis is supported also by the fact that cohabitation is less widespread in Romania.

Unfortunately, total marriage rate cannot be calculated for the Hungarian population in Transylvania, we can only estimate it. We can determine, however, the crude marriage rate. According to the analyses of researchers in Cluj Napoca (*Kiss* [2009]), it can be definitely stated that willingness to get married is lower among Hungarians in Transylvania than in the whole of Romania (see Figure 7). It must be stressed particularly that a Romanian regulation issued in 2007 in favour of those who get married – a one-time assistance of EUR 250 – raised considerably the proportion of people getting married in the given year (*Kiss* [2009] p. 77.).

Figure 6. Total marriage rate in Hungary and Romania between 1988 and 2004

Total marriage rate
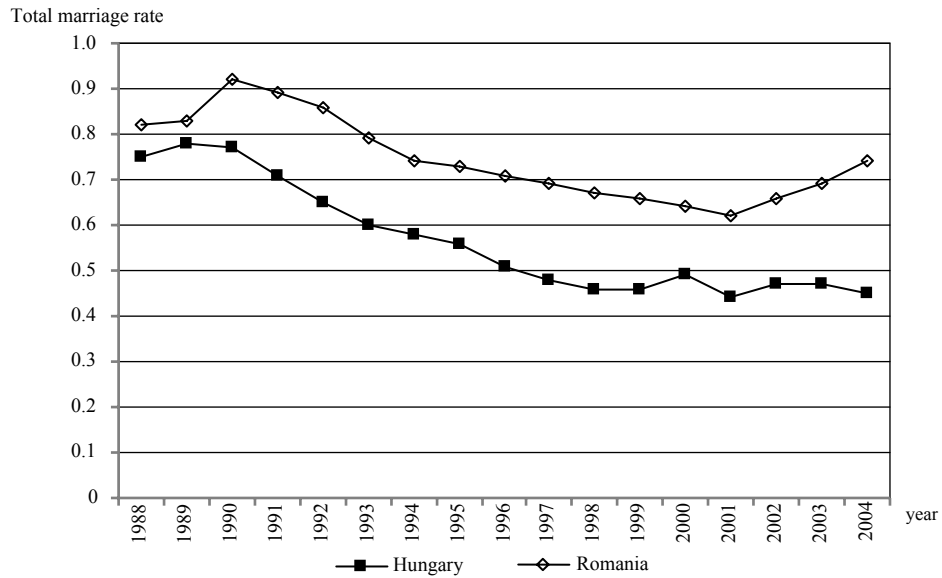
Figure 7. Crude marriage rate of the Hungarian population in Romania and of the total Romanian population between 1992 and 2007

Crude marriage rate
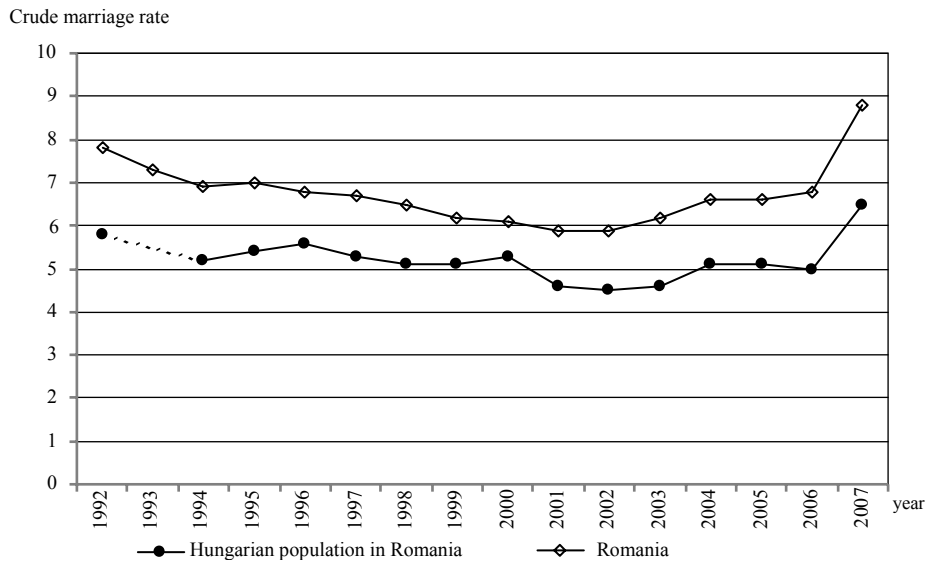
Source: *Kiss–Gyurgyik* [2009] p. 78.

There are significant differences in respect of the *willingness to divorce* as well. According to estimations, 40–45 percent of married people get divorced in the course of their life in Hungary, while this proportion is around 30 percent in Romania (see Figure 8). We do not have separate data for Transylvania in this respect.

It is worth briefly touching upon the *effect of couple relationships on fertility*. Many assume – and we also believe – that the increasing uncertainties of this kind of relationships contribute to the decrease in fertility. This connection may be true in case of certain social groups, but the *Hungarian–Romanian comparison* of essential indicators *does not confirm this*. Though in Romania, more people get married and fewer get divorced, fertility is not higher there than in Hungary. It is of course not the matter of causal relation, presumably other factors play predominant role in it. However, it is worth laying down that the earlier close connection between marriages and fertility on macro-level became loose (*Billari* [2005]).

Figure 8. Total divorce rate in Hungary and Romania between 1988 and 2004
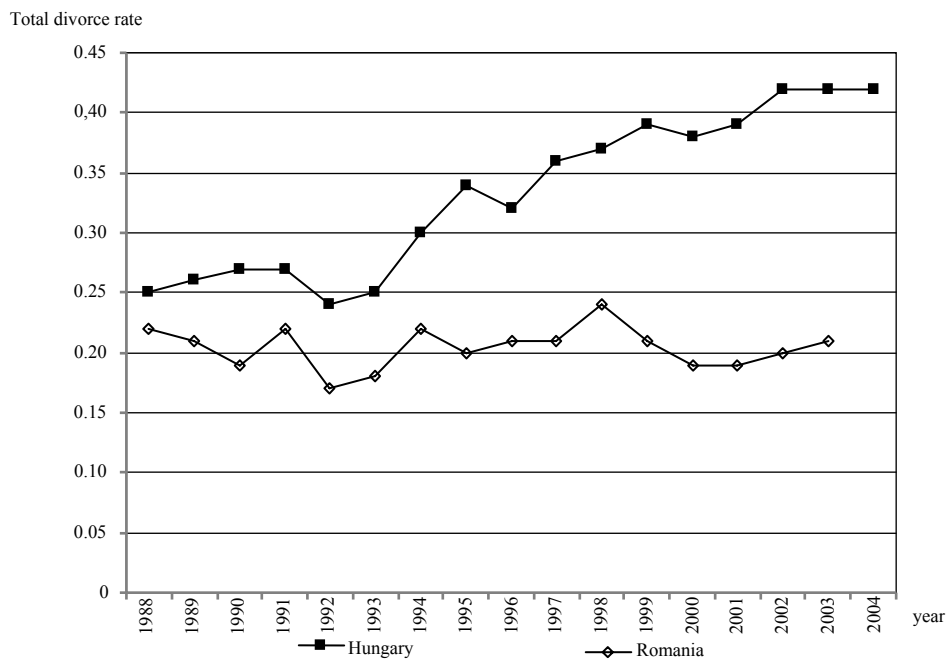
In Transylvania, a separate school was established within the scientific research of couple relationships, which deals with marriage homogamy.[7] It is understandable,

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[7] Hungarian research, of course, also addresses the homogamy of marriages in respect of nationality (for example *Tóth–Vékás* [2008]), but this study doesn't analyse this subject, as the survey "Turning Points of Our Life in Hungary" does not cover it.

as this phenomenon has a cardinal role in ethnic reproduction (*Varga* [2002], *Szilágyi* [2004], *Horváth* [2004], *Kiss–Gyurgyik* [2009]). In the opinion of researchers in Transylvania, marriage heterogamy is one of the key-factors of assimilation mechanism. According to their results, the proportion of homogamous marriages is four fifths: 81.2 percent of Hungarian men and 79.7 percent of Hungarian women married Hungarians (*Horváth* [2004], *Kiss* [2009] p. 85.). We cannot state of course that people born in mixed marriages identify themselves by all means with the majority nation: their identity depends on whether the wife or the husband is of Hungarian nationality, what their language–minority environment is like, etc. Furthermore, we must reckon with dual identity and identity change within generations as well (*Szilágyi* [2002]). We can only indicate here the stressed relevance of this topic in Transylvania.

4. Out-migration

In the two countries, the net migration was of opposite sign in the last two decades: in Hungary immigrants, while in Romania emigrants were in majority. The reason for the latter fact was not only or primarily, that in the last two decades, ten thousands (according to estimations nearly 150 thousand between 1988 and 2006) of Hungarians living in Transylvania left Romania and moved to Hungary. The number of people moving abroad from Romania (temporarily) and living there is namely around a million. According to *Sandu's* estimations [2006], in 2002, 777 thousand Romanian citizens worked temporarily abroad, and another 250 thousand left Romania forever between 1990 and 2003. The out-migration of Hungarians from Transylvania is only a small proportion of that of the total out-migration from Romania, but it has serious significance for the Hungarian population, especially if we take into account that migrants are usually younger than the average. (It is true even if in the last period, just the out-migration of the elder Hungarian population living in Transylvania became stronger.) Romania (and Transylvania) is in any case *a sending country and population.* The differences in the welfare level of Romania and the Western European host countries as well as in that of Hungary and Transylvania surely play a key-role in this process. However, Hungary is a host country, mainly due to the great number of Hungarian immigrants from the neighbouring countries, especially from Transylvania. At the same time, Hungary is not the only target country for Hungarians in Transylvania, and the immigrants in Hungary are not only from Transylvania. The differences in in- and out-migration by countries are much tinged, which is the subject of numerous studies (*Tóth* [2003], *Gödri–Tóth* [2005], *Sik* [1994], *Sandu* [2006]).

5. Different family policy regimes

The regime change did leave no earlier institution system (thus family policy) untouched. On the one hand, it can be considered a general trend in Central Eastern Europe that entitlements were curtailed, re-distribution in favour of lower social groups was forced and the real value of supports decreased (through inflation).[8] On the other hand, entirely different family policy regimes developed in Hungary and in Romania, mainly due to the differences in the earlier institutional systems.

Following the change of the political system, Romania broke up with the restrictive population policy of *Ceausescu*. So, it is not a coincidence that raising any aspects of population policy was taboo for a long time, and though demographers indicated the problem of low childbearing already at the end of the 1990s (*Gateau* [1997]), substantial measures were hardly taken (*Muresan et al.* [2008]). At the time of our investigation, the maternity leave of insured women was six months and they got 85 percent of their earlier salary over this period. After this, they could be on childcare leave for two years, and they get RON 800 (EUR 230) assistance. If the mother returns to work before the expiry of the child raising support, she gets RON 300 (EUR 85) wage supplement for the time of her eligibility for child raising support (*Muresan et al.* [2008]).

The regime change in Hungary was not followed directly by the transformation of family policy. Family allowance was made universal and its amount was raised by the last communist government in April 1990 due to the abolishment of price supports depending on the number of children. The Antall government handled the question of population growth as a matter of priority and made efforts to maintain and supplement the system, for example by introducing childcare benefit in 1993. The turn was brought by the "*Bokros package*"; since that time there have been endless political debates about it, and the changes have been continuous and essential (*Ignits–Kapitány* [2006], *Gyarmati* [2008]). While the changes carried out in the framework of the Bokros package made family assistance dependent on income, the comprehensive act of the Orbán government restored the universality of certain elements (family allowance, childcare allowance), extended the system with tax allowance, and reinforced childcare fee compensating income loss. The socialist governments succeeding from 2002 strengthened the principle of universality, cut down the supports connected to taxing capacity, and kept continuously the idea that the family support system serves to handle poverty.

Following the regime change, the real value of family allowance fell in both countries (*Gábos* [2005], *Muresan et al.* [2008]). In Hungary, the wage-proportional childcare fee compensating income loss – which is due until the second birthday of

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[8] There are of course opposite examples as well (for example Slovenia (*Stropnik et al.* [2008])).

the child – was in force except for the period of 1995 and 1998. Childcare allowance was first subject to insurance legal relationship, then to defined income limit, and finally it became universal.

6. Concluding remarks

The main goal of our study was to describe and to interpret the selected features of demographic behaviour after the regime change. We compared two countries (Romania, Hungary) and three populations (the Hungarians in Hungary, the Romanian population and the Hungarian population living in Transylvania). We were interested in similarities and differences in fertility trends, partnership behaviour, such as marriage, cohabitation, and divorce. Differences in the social changes and economic development were also considered.

Although both countries followed the way from communism to market economy and democracy, we agree with those who are of the opinion that there may be significant differences in respect of the "paths" and "destinations" of the transition, and Romania and Hungary do not belong to the same cluster of countries in this regard. According to the accurate measurement of *Madison* [2006], there are decisive differences especially in the level of living between the two countries, and the populations living in them. Based on these data, right before the regime change, the economic performance per capita was in Hungary 1.75-fold of the one in Romania.

Concerning demographic trends, in the years preceding the regime change, total fertility rate was unambiguously higher in Romania than in Hungary. This was mainly due to the fact that from 1967 to 1989 the population policy was based on very strong prohibitions in Romania, which imposed strict sanctions on abortion and did not let up-to-date contraceptive means in the market. The fertility behaviour of the Hungarian population in Transylvania followed the trends in Romania, though, according to estimations, their fertility rate was always lower than the national rate. Following the regime change, TFR fell from 2.2 to 1.6 from one year to the next in Romania. Also the fertility of Hungarians in Transylvania followed this trend. The evident reason for the sudden decrease is that the direct regulation of contraception stopped and the prohibition on abortion was abolished. In Hungary, the decrease began later and was gradual. Since the mid-1990s, total fertility rate has been around 1.3 in both countries (*Muresan et al.* [2008], *Spéder–Kamarás* [2008]). The same can be said about the fertility of Hungarians in Transylvania.

Stronger differences could be identified in partnership behaviour. On the one hand, popularity of marriage (compare total first marriage rate) in Hungary is much

lower than in Romania, on the other hand, divorce propensity is higher in Hungary. According to estimations, 40–45 percent of married people get divorced in the course of their life in Hungary, while this proportion is around 30 percent in Romania. Although we do not have separate data for Transylvania, the figures for people living there are probably closer to the Romanian ones. These results direct our attention to the "questioning" of the assumed relation between childbearing and partnership. Many assume – and we also believe – that decreased marriage propensity and increased willingness to divorce will contribute to lower fertility. This correlation may be invariably true in the case of certain social groups but it is not confirmed by the Hungarian–Romanian comparison of essential indicators. Though more people get married and fewer get divorced in Romania, fertility is not higher there than in Hungary.

We regard our study as a first step to compare Romania and Hungary and also to take the behaviour of ethnic minorities into consideration. Our results, which are based on data analyses using official and vital statistics, show several similarities but also some differences. This justifies further research on demographic transition of different populations. Surveys such as the GGS containing socio-economic characteristics and ideational features (values, attitudes) of the social groups in the two countries may enable deeper insight into the demographic transition that started with the regime change and is still ongoing today.

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Evaluation of the Competitiveness
of the Hungarian Regions*

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After the Hungarian regime change, in line with economic transformation, serious differences evolved among regions. Between 2000 and 2008 the economic growth of the NUTS 2 regions varied considerably despite the increase in the gross domestic product. Following a short literature review, the study evaluates the competitiveness of the seven Hungarian regions in two periods (2000/2001 and 2007/2008) based on the competitiveness pyramid model (*Lengyel* [2000]) serving as a methodological tool. This approach comprises five factors determining regional competitiveness. Setting up an order, the paper aims to highlight the differences in the competitiveness of the regions.

KEYWORDS:
Regional analysis.
Competitiveness.

Although it is less researched than corporate and national competitiveness, regional competitiveness is also a relevant notion. The study addresses the latter subject. Using the pyramid model (*Lengyel* [2000]), it evaluates the competitiveness of the seven Hungarian NUTS 2 regions in two periods (2000/2001 and 2007/2008). Our aim is to observe the changes by exploring the strengths and weaknesses of the individual regions. Reviewing the available literature, we make a thorough examination of the various, micro and macro level definitions of competitiveness with particular emphasis on highlighting the special aspects of regional competitiveness. We concentrate on five areas (research and development, foreign direct investments (FDI), the development of human capital and the state of physical infrastructure) and analyse the competitiveness characteristics of the small and medium-sized enterprises (SMEs) sector with the help of several indicators. The data for the calculations were collected from the web-sites and publications of Eurostat and the Hungarian Central Statistical Office. For the assessment of the state of SMEs sector, business tax return data of the Hungarian Tax and Financial Control Administration were used.

1. Defining competitiveness

In the age of accelerated globalisation, the concept of competitiveness gains more and more ground both in scientific and everyday life, although it might be difficult to define it precisely. For instance, competitiveness in sports, culture or arts includes the suitability to take part in a competition, the realistic chance to win or gain a good position, but it does not necessarily mean overtaking all the other competitors, getting first position. A similar approach can be applied in the field of economy (*Blahó* [2008] p. 132.). As a collective term, competitiveness indicates the capability or tendency to compete under market conditions, the ability to gain and maintain economic positions in market competition, as shown by an increase in business success, market shares and profitability (*Lengyel* [2000] p. 962.). It is a comprehensive economic phenomenon with several definitions and calculation methods. We cannot talk about a unified approach in connection with it.

In economy, competition takes place simultaneously among a large number of participants at the level of commodities, services, production factors, industrial sectors, regions within a country, international regional integration and finally at that of

global economy. We start the discussion of the various definitions at the lowest level, and then proceed upwards. Accordingly, the notion of competitiveness is based on the product, the commodity. This implies merchantability, that is, the product is needed, it has a market, it is marketable. In parralel, it includes price-competitiveness where demand and supply meet, since exchange is only possible if the price is suitable. Cost competitiveness has to be also mentioned here. It is obvious that a company can permanently stay in the market only as long as it makes profit, which makes continuous innovation possible (*Botos* [2000]). Thus, the competitiveness of a commodity depends on its price and its physical quality (and the factors determining these); it can be realised both as an "exchange value" and a "use value" at the same time. The first means that the seller can make profit on top of the costs, while the second one indicates that the buyer uses the commodity, finds it useful, and thanks to it, expects improvement in welfare (*Szentes* [2005]). The successful marketing of any product or service includes the information of potential buyers, suitable market research and marketing activity, so the product level notion of "competitiveness" cannot be separated from modern marketing techniques.

According to one of the definitions, corporate competitiveness is the ability of a company to permanently offer the consumers products and services which they are more willing to buy than the products of the competitors under conditions profitable for the company, while keeping the norms of social responsibility (*Chikán* [2008]). Consequently, corporate competitiveness cannot be narrowed down to the processes of the real economy, it also includes the company's contribution to social welfare (which is undoubtedly difficult to measure). The company has to create value both for the consumers and the owners at the same time. The condition of the foregoing facts is that by accomplishing the market competition criteria permanently better than its competitors, the company shall be capable of perceiving and accommodating to the environmental and in-company changes (*Chikán–Czakó–Kazainé Ónodi* [2006] p. 9.). Based on a more detailed definition, approaching from profit rate and market share, competitiveness of a company means primarily its ability to continuously produce competitive products and services in the sense defined formerly, so that, on the one hand, the aggregate profit rate will not fall below the average profit rates of other companies competing in the same market (even after the deduction of contingent state support and benefits), and on the other hand, its market share (the turnover on the given market in percent) will not decrease, but grow or at least stagnate (*Szentes* [2005] p. 113.). Since SMEs play a crucial role in a country's employment conditions, it is reasonable to apply a special definition for their competitiveness. The SMEs sector of a region, country or macroregion can be regarded as competitive if it is capable of a considerable and growing contribution to the rise of economic output and employment rate of the given geographical region through its activity (*Némethné Gál* [2010] p. 190.).

The notion of competitiveness at the level of national economy is more difficult to define and it is a matter of debate in the literature on competitiveness. Starting from the micro-level definition, the competitiveness of a nation is marked by its ability to produce and sell products and services in a way that it improves the nationals' welfare and the companies' efficiency (*Chikán* [2008]). In this approach, the results of success are, among others, the improving balance of trade, improving export market shares[1] and ability to attract capital, and a better position in the international division of labour.

According to the European Commission, "competitiveness is understood to mean high and rising standard of living of a nation with the possible level of involuntary employment, on a sustainable basis" (*CEC* [2003] p. 6.). Based on the definition of OECD, national competitiveness means the ability of a given country to generate, while being exposed to international competition, relatively high income and employment levels (*Wysokinska* [2003]). Improving competitiveness results in higher productivity in the long run. According to the most comprehensive definition of national competitiveness, an economy is competitive if the population's standard of living is high and rising, and the employment rate is sustainably high. To be more precise, the level of economic activity does not lead to unsustainable balance of trade and does not endanger the welfare of future generations.

2. Special characteristics of regional competitiveness

The concept of a region is handled differently in various sciences; in economics we can refer to two things when we use the words, "region" or "regional". We can speak about regional integration (for example the European Union, MERCOSUR constituted by four South American states (Argentina, Brazil, Paraguay and Uruguay) or the Asian ASEAN (Association of Southeast Asian Nations)). These we call macroregions to differentiate them from the second type of regions, that is, the regions inside a given country, which constitute a level between the local and the national ones. In the course of Hungary's preparation for the EU-accession, seven NUTS 2 regions were created, while the county-system was kept. A region is a coherent area inside a country, containing more neighbouring settlements or parts of settlements. (*Lengyel* [2000] p. 966.). The regional, mesolevel competitiveness can be defined similarly to the definitions given in the previous chapter. Thus, it describes the ability of regions to sustainably generate relatively high income and em-

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[1] About the unstable link between the rise in export and competitiveness in Hungary see *Botos* [2009].

ployment levels in the face of international (global) competition (*Deákné Gál* [2004] p. 5., *CEC* [1999]). In this description, high income is shown by the gross domestic product (GDP) per capita, while the level of employment is indicated by the employment rate. This approach is the closest to our conception of regional competitiveness.

In short, competitiveness both at micro and macro levels, that is, at the level of companies, industrial sectors, regions, supra-national regions (mesoregions) means that sustainable income and profit is realized by the marketing of commodities and services, which contributes to the growth of economic welfare and employment (*Botos* [2000]).

However, there is no agreement in the literature on the relevance of the concept of competitiveness. Both the national and regional concept of competitiveness were criticised by *Paul Krugman* in his classic work (*Krugman* [1994]). According to him, the term is too widely used; it is too general and "unscientific", which is acceptable in everyday use, but cannot be regarded as a well-founded notion in scientific life; it is not a macroeconomic category. The concepts linked to the improvement of competitiveness, like real income and rise in the standard of living, are connected to marketability, especially when we speak about a relatively closed economy. Nations do not behave and compete like corporations. Uncompetitive companies go bankrupt, get liquidated, which is unimaginable in the case of a nation. Krugman acknowledges the competition among states for status and power, but not the economic competition. For instance, the strengthening of Japan's status as a result of accelerated economic growth does not mean that the standard of living is decreasing in the United States, in other words, the welfare of a country does not depend on its competitiveness in the global market. Economic growth and international trade are not zero-sum games, but rather positive-sum games, that is, they bring profit to all participants. He regards the obsession with competitiveness as dangerous for several reasons: it leads to protectionism, trade wars, and the wastage of budget sources, similarly to the superfluous investments made in the cold war atmosphere of the 1950s. "So let's start telling the truth: competitiveness is a meaningless word when applied to national economies. And the obsession with competitiveness is both wrong and dangerous." (*Krugman* [1994] p. 44.) According to him, the expression of competitiveness can be used as a synonym for productivity, especially in large, less open economies, like the United States.

Similarly, *Porter* [1990] dismisses the concept of national competitiveness; it is marketability that he considers relevant and comparable at the level of national economy. But he still regards industrial competitiveness as applicable; his famous diamond model is the starting point for industrial analyses.

We believe Krugman's objections are relevant at national level, but considering regional competitiveness, protectionism does not exist. We share the view of *András*

Bakács, according to whom competitiveness can also be approached as an abstract, unobserved notion, which is determined by a group of measurable variables. Taking only one of them may give an incomplete, misleading picture (*Bakács* [2003] p. 5).

While interpreting the concept of regional competitiveness, we should not forget that the regional level is situated between micro and macro levels, so we can start from the micro level, that is, from the companies of a given region, or proceed by using the macro level concepts of competitiveness (*Lengyel* [2000] p. 970).

Here, ex post or "realised" and ex ante or "conditional" competitiveness shall be mentioned. The first one refers to the past performance of the economy using the well-known economic indicators (for example GDP per capita, relative labour costs, employment indicators). However, it should not be forgotten that certain indicators used to evaluate national competitiveness are irrelevant in the case of regional competitiveness. So, certain regions do not have their own exchange rate policy, or monetary and international trade policies. As opposed to "realised" competitiveness, the ex ante approach examines underlying conditions, factors necessary to hold on in our globalised world economy, and not certain indicators or indicator systems of economic performance. It concentrates primarily on business environment and inputs, and less on economic performance (*Lengyel* [2000] p. 972).

It must be emphasised that the conditions of an individual region are not independent of those of others, so each measurement requires comparison. (For example the compatitiveness of a region may improve due to not only its endeavours but also to the insufficient performance of the other regions of the country.)

This study aims to explore the competitiveness of the Hungarian NUTS 2 regions and the temporal changes thereof in the period between 2000 and 2007.

3. Competitiveness of the Hungarian regions

Based on the foregoing discussion, competitiveness is influenced by several determinants. Here, we focus on five underlying factors, using *Lengyel*'s pyramid model [2000].

Each of them has an effect on labour productivity and employment rate, and through them, on the income produced in a region, which determines the standard and conditions of living of the population in that area. The constantly rising level of subsistence is one of the indicators of competitiveness, as made clear in the previous chapters.

We analyse the *research and development activity of the regions*, that is, their ability to innovate through expenses on research and development measured in pro-

portion to the gross domestic product. New technology means competitive advantages for companies. Through the fast introduction of the latest technologies, they can improve their positions and thus enhance the productivity of the whole region. Of course, innovation may come from outside the area, but it is still the successful research and development activity of the given region that is decisive.

The second factor is the *regional distribution of foreign direct investments* (FDI), which indicates the ability of the individual areas to attract capital. Through the imports of foreign capital, the region usually gets access to new markets, and labour productivity improves too. The distribution of new technologies is added as a positive effect to the ones discussed in the previous paragraph. Foreign companies may favourably influence SMEs if they employ them as suppliers.

The *state of human capital*, as the element determining the quality of one of the production factors, is studied through the proportion of the population with higher education in the age group between 25 and 64. The last but one factor is the *physical infrastructure*, which is described by the data concerning the length of motorways.

Finally, the *state of the SMEs sector* determining the employment rate is examined. This sector, being capable of accommodating itself to the dynamic, rapidly changing economic conditions, is vital to the competitiveness of a region. Small and medium-sized enterprises generally join a global company as suppliers, and this way, they appear on the global market directly through that company. The regional SMEs are evaluated by means of their export performance, productivity and profitability.

3.1. Research and development

Research and development (R&D), that is, the introduction of innovations and new technologies faster than the competitors, mean competitive advantage; the quality of R&D can be of crucial importance for competitiveness, both at national and regional levels. Exploring this activity is not an easy task; it is usually approached through expenditure in proportion of GDP.

The predominance of the Central Hungarian region containing Budapest is not surprising, since the most important state and enterprise research centres are focused here. It has a clear first position throughout the period; in 2000 approximately one-and-a-half times more than the national value was spent on R&D in this region in the proportion of GDP. In 2007, this rate somewhat decreased due to an increase at national level. The rate of R&D expenditure fell below the national average in the rest of the regions in both of the years. Except for Southern Transdanubia, every single region managed to increase its R&D expenditure in proportion to GDP between 2000 and 2007, in accordance with the national tendency. It is fortunate that a kind of equalization took place; the dispersion of R&D expenditure of the regions' GDP de-

creased sharply. There have been only minor changes in the order of the regions. Western Transdanubia moved from the last to the fourth position, while Southern Transdanubia fell back to the last place.

Table 1

R&D expenditures given in the percentage of the region's gross domestic product

Region	R&D expenditure in the percentage of the region's GDP		Regional value (percent) (National average=100 percent)		Change in R&D expenditures (2007/2000)
	2000	2007	2000	2007	
Central Hungary	1.20	1.33	152	137	1.11
Central Transdanubia	0.36	0.50	46	52	1.39
Western Transdanubia	0.19	0.60	24	62	3.16
Southern Transdanubia	0.39	0.37	49	38	0.95
Northern Hungary	0.22	0.42	28	43	1.91
Northern Great Plain	0.60	0.85	76	88	1.42
Southern Great Plain	0.59	0.84	75	87	1.42
Hungary	0.79	0.97	100	100	1.23

Source: Eurostat.

Table 2

Composition of R&D expenditures
(percent)

Region	Business enterprise sector	Government sector	Higher education	Business enterprise sector	Government sector	Higher education
	2000			2007		
Central Hungary	52.46	29.51	18.03	53.03	29.55	17.42
Central Transdanubia	42.11	23.68	34.21	50.00	18.00	32.00
Western Transdanubia	42.11	15.79	42.11	62.50	14.06	23.44
Southern Transdanubia	7.50	17.50	75.00	21.62	16.22	62.16
Northern Hungary	45.45	9.09	45.45	47.73	11.36	40.91
Northern Great Plain	45.90	11.48	42.62	50.00	10.71	39.29
Southern Great Plain	23.33	45.00	31.67	39.29	27.38	33.33
Hungary	46.67	28.00	25.33	51.58	24.21	24.21

Source: Eurostat.

With regard to the compositon of R&D expenditures there is not a huge difference between 2000 and 2007 taking the whole country into account. The share of the business enterprise sector increased slightly, whilst that of the government sector decreased. The contribution of higher education virtually remained unchanged. Concerning the seven regions, the business enterprise sector played an important role especially in Central Hungary and Western Transdanubia in 2007. On the contrary, in Southern Transdanubia, despite the remarkable increase, it still plays a minor role.

In spite of the growth of the last few years, expenditure on R&D in proportion of GDP remained under 3 percent set as target in the Lisbon Strategy[2], in all regions, and at national level (in Hungary), economic policy has not paid appropriate attention to innovation.

3.2. Regional distribution of foreign direct investments

The lack of domestic R&D capacities can be partly compensated by foreign direct investments (FDI) if new technologies, leadership methods are introduced in the country. In addition, new workplaces can be created and the labour productivity can be improved. Of the complementary elements, the feedback effect is of crucial importance in investment and the establishment of the local supplier network. Nowadays, the primary condition of competitiveness is the improvement of the ability to attract foreign capital, especially in catching up, undercapitalized economies (*Szentes* [2005]). This is, of course, the same at regional level, but in the assessment of the results, it should be taken into consideration that the available data does not reflect reality.[3]

Partly due to the imperfection of data mentioned above, Central Hungary is far above the other regions both in terms of absolute and per capita values. Only this area and Western Transdanubia exceeded the national average in both years. In the period analysed, the foreign investment per capita at least doubled everywhere in nominal terms, except in Southern Transdanubia, while it almost tripled at national level. There was no change in the order of the regions, the differences, however, continued to grow. The smallest increase of foreign investment was measured in Southern Transdanubia, the region with the lowest numbers in 2000. Compared to the national average, Southern Great Plain, Northern Great Plain and Northern Hungary also became worse. The most conspicuous change happened in the Central Transdanubian region. Almost 80 percent of the rise in foreign investments of national level

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[2] For more details on the Lisbon Strategy see *Gács* [2005].

[3] For instance, the headquarters of several business associations are located in Budapest, while their activity covers the whole country (about the problem see *Antalóczy–Sass* [2005]).

is due to Central Hungary and Central Transdanubia, the remaining 20 percent is divided among the other five regions. Foreign capital continues to flow mainly into the three most developed regions of the country; in 2007, the total foreign capital invested in the four least attractive regions was less than that of Western Transdanubia in the second place. Regarding per capita data, in 2007, foreign investment in the four worst-performing regions altogether hardly exceeded the third Central Transdanubia.

Table 3

Foreign-owned enterprises

Region	Amount of foreign investment (billion HUF)		Foreign investment per capita (thousand HUF)		Change in foreign investment per capita (2007/2000)	Foreign investment per capita compared to the national average (percent)	
	2000	2007	2000	2007		2000	2007
Central Hungary	3 758.5	10 384.0	1 327.6	3 584.0	2.70	242.83	237.41
Central Transdanubia	391.3	1 251.2	349.1	1 132.5	3.24	63.86	75.02
Western Transdanubia	600.2	1 640.0	597.9	1 643.4	2.75	109.36	108.86
Southern Transdanubia	108.9	160.7	109.2	167.4	1.53	19.97	11.09
Northern Hungary	254.4	472.3	195.3	381.9	1.96	35.72	25.30
Northern Great Plain	206.5	495.2	132.1	327.1	2.48	24.15	21.67
Southern Great Plain	181.8	429.6	131.7	321.9	2.44	24.09	21.32
Hungary	5 576.6*	15 164.3*	546.7	1451.9	2.66	100.00	100.00

* The amounts include various items (foreigners' real estate purchase, capital investments in nonprofit organizations, etc.) that can not be shared among the seven regions. Therefore they are higher than the sum of the regional data.

Source: *HCSO* [2003], [2009].

3.3. Development of human capital

In our approach, next to technological innovations and the presence of foreign capital, the third factor determining competitiveness is the human capital, the qualification of labour force. The sectors producing high value added require creative, qualified employees. As a result of the expansion of higher education after the regime change, the composition of the population became different.[4] The same could be observed in every region.

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[4] We do not take into account the quality change in higher education.

Table 4

Population with higher education in proportion of the age group of 25–64
(percent)

Region	2001	2006	2011*
Central Hungary	21.33	24.32	27.34
Central Transdanubia	11.80	14.30	16.65
Western Transdanubia	12.70	15.47	18.08
Southern Transdanubia	11.49	14.02	16.39
Northern Hungary	10.84**	13.30	15.63
Northern Great Plain	10.84**	13.44	15.86
Southern Great Plain	11.51	14.35	17.07

* Prediction.
** Giving data to three decimal places, Northern Great Plain shows better result.
Note. There are no data available for 2007–2008, but the order is the same in 2006 and 2011.
Source: HCSO Demographic Research Institute.

The first place of the Central Hungary is not surprising in this respect either, since this area has the most renowned universities, moreover, Budapest is the intellectual and higher educational centre of the country. As regards the other regions, the proportion of the population with higher education in the age group between 25 and 64 exceeded 15 percent only in Western Transdanubia in 2006. The order between 2001 and 2006 changed only inasmuch as the previously fourth Southern Great Plain took the third position of Central Transdanubia. According to the predictions, no change is expected until 2011 in this respect. At the same time, the proportion of the population with higher education is continuously increasing since the rate of the youth that takes part in tertiary education is higher than that of the population aged between 25 and 64 having at least one degree.

3.4. The state of physical infrastructure

As mentioned, the state of the infrastructure is approached through the length of motorways, which starting from a low base, almost doubled in Hungary between 2000 and 2007. Although this growth happened considerably unevenly in the individual regions, a kind of equalization can be observed.

Considering the length, in 2000 more than half of the motorways concentrated in Central Hungary and Central Transdanubia; this fell back to little more than one third by 2007. The shift of proportions concentrated on Southern Transdanubia, Northern

Hungary and Northern Great Plain. In 2000, there were no motorways in the first two regions yet. In the period examined, Hungary's motorway network became more even, helping the less developed regions become part of the country's economic life. As a result, Northern Hungary overtook Western Transdanubia considering the length of motorways per one thousand square kilometres. There were no other changes in the order of the regions, except for Northern Great Plain overtaking Southern Transdanubia in the race of the regions with no motorways.

Table 5

The length of motorways in Hungary

Region	Length of motorways (km)		Motorway per one thousand square kilometres (km)		Change in the length of motorways (2007/2000)
	2000	2007	2000	2007	
Central Hungary	123	129	17.78	18.65	1.05
Central Transdanubia	135	188	12.14	16.91	1.39
Western Transdanubia	72	96	6.36	8.47	1.33
Southern Transdanubia	0	76	0.00	5.36	–
Northern Hungary	64	140	4.76	10.42	2.19
Northern Great Plain	0	108	0.00	6.09	–
Southern Great Plain	56	121	3.05	6.60	2.16
Hungary	*450*	*858*	4.84	9.22	191

Source: *HCSO* [2009], Eurostat and own calculations.

3.5. Competitiveness of the small and medium-sized enterprises sector

In the following we are going to evaluate the competitiveness of the micro[5], small and medium-sized enterprises sector based on the business tax returns of 2001 and 2008.[6] Our scope of research covers not only individual companies and company clusters, but the whole of the SMEs sector. It needs to be clarified at the beginning that the distortion mentioned in connection with foreign direct investments is present here as well; the central Hungarian region is far above the rest of the regions. The

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[5] We are aware of the fact that the situation of the different size categories (micro, small and medium enterprises) may differ, but for a temporal comparison, aggregate data are suitable, too.

[6] Databases are available at ECOSTAT Government Institute for Strategic Research of Economy and Society. The financial changes causing considerable distortions in favour of Western Hungary were filtered out.

importance of the analysis of the company cluster lies in the fact that SMEs play a decisive role in the state of employment and thus, in social welfare both at regional and national level. The high rate of employment is one of the criteria of competitive regions, and it is not possible without successful SMEs.

Table 6

Regional distribution of the registered capital of SMEs

Region	2001 (percent)	2008 (percent)	Change (percentage point)
Central Hungary	65.86	66.06	0.20
Central Transdanubia	6.28	6.09	−0.19
Western Transdanubia	4.72	7.53	2.81
Southern Transdanubia	4.89	4.37	−0.52
Northern Hungary	6.28	4.74	−1.54
Northern Great Plain	5.99	5.83	−0.16
Southern Great Plain	5.98	5.38	−0.60
Total	*100.00*	*100.00*	

Source: Own calculations based on tax returns.

The dominance of the Central Hungarian region is similar in scale to its significance in connection with foreign investments: two thirds of the registered capital of SMEs concentrated in this area in 2001, and this figure rose somewhat by 2008. The position of Western Transdanubia improved considerably; in 2001, it had the last position, while it became second in the last year of the examined period. Accordingly, the percentage rates dropped in the other regions, the last place was taken by Southern Transdanubia, replacing Western Transdanubia. The Northern Hungarian region suffered the biggest position loss.

For the evaluation of international competitiveness, we turn to the export market performance; and we examine the rate of revenue from exports compared to aggregate net revenue of the sector. Regarding the whole country, the SMEs sector improved only a little.[7] Simultaneously, a remarkable realignment took place among the individual regions. Central Hungary fell below the national average, while Western Transdanubia gained first position and Northern Great Plain also showed consider-

[7] The dual structure of the Hungarian economy is justified by the fact that in the case of large industrial enterprises, this indicator was 40 percent in 2008; almost 80 percent of the income from exports, present in business tax returns, as well as 57 percent of the total net revenue can be connected to the enterprises with more than 250 employees.

able improvement. Southern Transdanubia, first in 2001, fell back to the last but one position by 2008, being only slightly better than the also worsening Southern Great Plain region.

Table 7

Export revenue of the SMEs sector as a proportion of aggregate net revenue

Region	Revenue from exports / aggregate net revenue (percent)	Regional value (National average=100)	Revenue from exports / aggregate net revenue (percent)	Regional value (National average=100)
	2001		2008	
Central Hungary	15.01	111	13.49	98
Central Transdanubia	13.43	99	14.71	107
Western Transdanubia	10.54	78	19.67	143
Southern Transdanubia	16.66	123	11.66	85
Northern Hungary	10.96	81	13.16	96
Northern Great Plain	9.33	69	13.66	99
Southern Great Plain	12.04	89	11.27	82
Total	13.53	100	13.77	100

Source: Own calculations based on tax returns.

Table 8

Revenue per employee in the SMEs sector

Region	Revenue per employee (HUF)		Revenue per employee (Hungary=100)	
	2001	2008	2001	2008
Central Hungary	15 654 046	24 172 934	119	120
Central Transdanubia	13 188 556	17 431 260	100	87
Western Transdanubia	10 078 082	17 692 476	77	88
Southern Transdanubia	10 924 725	15 500 622	83	77
Northern Hungary	10 150 389	14 848 377	77	74
Northern Great Plain	11 841 324	16 977 674	90	85
Southern Great Plain	11 738 044	17 719 461	89	88
Hungary	13 153 091	20 067 960	100	100

Source: Own calculations based on tax returns.

The operational performance, productivity, efficacy of the SMEs sector is approached through net revenue per employee. According to Table 8, the performance

of the SMEs sector was above average in Central Hungary throughout the period in contrast with the other NUTS 2 regions (only Central Transdanubia reached the national level in 2001). In the period examined, Central Transdanubia and Northern Great Plain experienced considerable loss in their positions, while the previously last Western Transdanubia became second, in a tie with Southern Great Plain.

Table 9

The aggregate profit before taxes of the SMEs sector

Region	Aggregate profit before taxes (thousand HUF)		Change* (2008/2001)	Aggregate profit of the region in relation to the national total (percent)	
	2001	2008		2001	2008
Central Hungary	523 817 823	553 682 258	106	56.32	57.18
Central Transdanubia	81 063 757	71 309 242	88	8.72	7.36
Western Transdanubia	44 380 631	69 300 966	156	4.77	7.16
Southern Transdanubia	70 383 808	57 553 661	82	7.57	5.94
Northern Hungary	83 537 819	47 471 968	57	8.98	4.90
Northern Great Plain	75 891 315	85 501 641	113	8.16	8.83
Southern Great Plain	51 065 024	83 429 038	163	5.49	8.62
Hungary	*930 140 177*	*968 248 774*	104	*100.00*	*100.00*

* Since the values are nominal, most of the increase is due to depreciation.
Source: Own calculations based on tax returns.

Between 2001 and 2008, Central Hungary is still dominant regarding the profit prior to taxes, although less than in the case of registered capital. Examining the other regions, we can observe a remarkable progress made by Western Transdanubia and Southern Great Plain. The former one had the last position in 2001, but it was already second in 2008. The situation of Southern Transdanubia and Northern Hungary obviously deteriorated, the latter one fell from the second to the last place.

4. Summarizing evaluation of the Hungarian regions

In accordance with the preliminary expectations, we can state that the most competitive region of Hungary is Central Hungary containing Budapest. It gives the best performance in both years we examined. It is only the export performance of its SMEs sector in 2008 that fell below the national average. The examination of the rest of the regions gives more interesting results.

In 2000/2001 Central Transdanubia is in second or third place in all categories except for research and development. However, its positions somewhat declined in the period examined since it was preceded by Western Transdanubia in several respects.

The most noteworthy progress took place in this latter region, its position changed for the better or stagnated in all aspects, except for the length of motorways. Especially its SMEs sector has developed remarkably. It became the second most competitive region after Central Hungary by the second half of the first decade of the 2000s.

While Western Transdanubia made the most spectacular advance, the situation of Southern Transdanubia became much worse. It declined or stagnated in every respect, compared to the other NUTS 2 regions. In 2007/2008, it was the last in the ranking of the regions on the basis of innovations, foreign-owned enterprises, and motorways. According to our categorization, it is clearly the least competitive region.

The status of Northern Hungary in the categories, taken into account in the final order, did not change, except for the progress made as regards motorways and for the deterioration experienced in the rating of profit before taxes of the SMEs sector. Its position improved in the final order, however, due to the setback that Southern Transdanubia suffered.

Northern Great Plain and Southern Great Plain are approximately at the same level of compatibility, the former one improved significantly in two SMEs sector categories (see Tables 7 and 9), the latter showed development in the level of its inhabitants' education and the aggregate profit before taxis of its SMEs sector. At the end of the period, they clearly overtook Northern Hungary in the aggregate order. (See Table 10.)

Table 10

The order of the regions by the aspects examined

Region	2000/2001	2007/2008
Central Hungary	1	1
Central Transdanubia	2	3
Western Transdanubia	5	2
Southern Transdanubia	4	6
Northern Hungary	5	5
Northern Great Plain	4	4
Southern Great Plain	3	4

Note. The table is based on a total of seven indicators (R&D expenditures, foreign direct investments, length of motorways, export performance, revenue per employee, profit before taxes, population with higher education). The order is set up according to the arithmetic averages of the positions in individual categories.
Source: Own calculations.

In the next step, we move one level up in the competitiveness pyramid and examine the regional income level, the gross domestic product that has the biggest influence on the standard of living. (See Table 11.)

Table 11

Gross domestic product per capita of the regions compared
to that of Hungary and the corresponding order

Region	2000*	2007*	2000	2007
Central Hungary	154.32	164.35	1	1
Central Transdanubia	96.40	92.92	3	3
Western Transdanubia	113.31	98.14	2	2
Southern Transdanubia	75.36	68.22	4	4
Northern Hungary	64.27	64.07	7	6
Northern Great Plain	64.50	62.96	6	7
Southern Great Plain	73.30	66.80	5	5

* Hungary = 100.0.
Source: HCSO.

Table 12

Employment rate of the regions compared to that of Hungary
and the corresponding order

Region	2000*	2007*	2000	2007
Central Hungary	107.66	110.41	2	1
Central Transdanubia	105.44	107.47	3	3
Western transdanubia	112.70	109.63	1	2
Southern Transdanubia	94.56	88.61	5	6
Northern Hungary	88.10	87.82	6	7
Northern Great Plain	87.90	89.00	7	5
Southern Great Plain	98.19	95.09	4	4

* Hungary = 100.0.
Source: HCSO.

The order of the regions is not the same (except that of the first three regions in the second period) as the sequence we made in Table 10 since GDP is determined by numerous factors. In spite of the considerable decline discussed earlier, Southern Transdanubia could preserve its relative position due to the significant advantage it pos-

sessed. Western Transdanubia is firmly holding the second place, though its value of GDP per capita has dropped compared to the national average. There is a great difference between competitiveness of this region measured by us and its positon regarding GDP in 2000. It seems that its strong foreign-owned enterprises were able to offset the weakness of its SME sector.

Competitiveness has better explanatory power at one level lower in the pyramid, in relation to employment. The regions in the first four positions are the same in 2007 as the first four regions in the competitiveness ranking set up by us. In the examined period Southern Transdanubia sustained the highest decrease in employment rate showing its weakening competitiveness. But owing to its initial advantage, this region still has a slightly better position regarding employment in 2007 than Northern Hungary.

5. Conclusion

The assessment of the performance of the NUTS 2 regions is of vital importance, not just for the EU-funds, but also for the fact that considerable regional differences can harm the economic and social development of the country as a whole. In the longer run, it would be unacceptable both economically and politically to have serious differences between regions regarding standard of living. In this study, we evaluated the competitiveness of the Hungarian regions based on the competitiveness pyramid model.

We can not expect dramatic changes during such a short time and our results confirm this assumption. There is a kind of inertia in regional competitiveness and it is very difficult to achieve a much better position. The factors determining competitiveness do not improve overnight. It does not mean, however, that remarkable changes are excluded. Of the changes experienced in the competitiveness of the Hungarian regions, besides the improvement of Western Transdanubia, the setback of Southern Transdanubia stands out. The latter can be traced back mainly to the worsening performance of research and development and to that of the SMEs sector. The decline in the competitiveness of this region is also reflected by employment data. Therefore the country's regional policy should focus on this area.

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Impact of the Global Crisis on Trade Relations between the European Union and China

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The paper concentrates on bilateral trade relations and does not tackle other, sometimes extremely important areas of political, economic, cultural and other contacts between the European Union and China. China became the largest supplier to the EU in 2005. The global crisis has further enhanced bilateral trade relations, since China's share in total extra-EU imports rose from 15 to almost 18 percent. Not less importantly, the Asian country proved to be the only export market of the EU with positive growth in 2009. Still, substantial Chinese trade surplus, although declining, remained more than manifest. The statistical analysis identifies partly widely different member country performance with China, with special reference to the new member countries of the EU. Hungary, as several other countries, could substantially increase its exports to China in 2009. Still, the largest winner was Germany that accounts for almost half of the total EU exports to the Asian country and could establish a much more balanced trade flow than most of the other member countries. Recently, China is the second largest extra-EU market for the EU, ahead of Russia and Switzerland, and the largest extra-EU supplier of not less than 13 member countries, including the United Kingdom and France (ahead of the USA), as well as the Czech Republic, Hungary and Romania (ahead of Russia). Even more importantly, in the first half of 2010 China became the largest exporter to Germany, surpassing the half-century long traditional EU-member exporters, both the Netherlands and France.

KEYWORDS:
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The post-1945 period had been experiencing several but mostly mild economic recessions in different parts of the (developed) world. They were not harmonized in time, so that any slowdown of growth in the USA could be partially or fully compensated by continuous growth in other centres of the global economy, mainly in the European Union and/or Japan. Similarly, signs of recession in Europe and/or Japan could be tempered by ongoing strong growth in the USA. However, the global financial and economic crisis started in the USA in 2007–2008 did not save any major growth centre of the world economy. Both due to its strength and to the high level of global interdependence, it affected the entire developed world and had serious impacts on many developing countries as well. More importantly, the new feature of the current crisis consists in converting international trade to the key victim. Previous crises may have hit domestic growth in general or the development of selected sectors in particular, but they hardly affected international trade negatively. Just the opposite, the latter used to be one of the key factors that could alleviate the depth and the negative consequences of crisis in any part of the world economy. This time, international trade became the most affected sector of the economy everywhere, since negative GDP growth rates in practically all developed economies generated the collapse of international trade. Obviously, particularly hit were open economies, heavily relying on international trade, a key factor or, in case of smaller countries, the genuine engine of their previous high or sustained growth. While GDP growth declined by about 3 percent in the OECD world in 2009, their trade collapsed by about 20 percent or more.

Not least in this context, EU–China trade relations deserve special attention.

First, their combined share in global trade is about 30 percent of total (excluding intra-EU trade, or near to 50 percent including this factor).

Second, China became the largest supplier of the EU in 2005, replacing the USA and steadily increasing the gap between itself and other main exporters to the EU since this year. At the same time, the EU represents the second largest supplier of China, behind Japan and well ahead of the United States. In addition, the gap between Japan and the EU as the largest exporters to the Chinese markets started to decrease in recent years and the EU may become soon the largest supplier of China.

Third, just in the most critical year of the global crisis (2009), China became the largest exporter for the first time in modern economic history, replacing Germany that used to be the world champion in the last years when it had sent the USA to the second place less than a decade ago. It is noticeable that China took the leading position of Germany just in 2009 when economic recession and global trade collapse hit both countries (and with Germany as well the EU as such) at full vigour. In fact, global exports of China fell by 16 percent, while Germany's exports experienced a

decline of 17.1 percent. This relatively small difference in decline plus the first stage of the depreciation of the euro against the US dollar, to which the Chinese currency had been unofficially fixed (until June 2010), resulted in the change at the top of global exporters in favour of China.

Fourth, for the first time in the period of 30 years of practically uninterrupted economic growth based on export-orientation, the „Chinese model" became seriously challenged. In fact, China has been the only large national economy with an almost unlimited domestic market that embarked on the export-oriented development pattern experienced and largely benefited by smaller East Asian (and, in most recent period, also by most of the Central and Eastern European) countries. All other large economies, including the rapidly emerging countries, such as Brazil, India, Russia, South Africa, Turkey, etc. had been basing their economic development much more on the domestic market than on external demand. (Mexico has to be mentioned as a very special case due to its particular links to the United States.)

Fifth, and finally, the impact of the crisis on bilateral trade in general and on EU export performance in particular serves as a special field of analysis. Considering the introduction of a unique anti-recession stimulating package in China (USD 584 billion) and the strong revival of the Chinese economy already by autumn 2009, as testified by the GDP growth rate of 8.7 percent in the crisis-hit year, the EU's global competitiveness and its ability to make use of new export chances in extra-EU trade (in other words, a growing extra-EU orientation of EU trade) can be – at least partially – tested by the survey of bilateral trade relations.

1. Some methodological remarks

This article is very limited in time. It only deals with the period between 2008 and the first four months of 2010 for which statistical data were available. The main focus concerns changes from 2008 to 2009, and where available and interesting, including the first four months of 2010. Although the crisis started in the autumn of 2008 and the first negative impacts on growth and trade could be observed in the last quarter of this year, the full strength of the crisis can be most adequately identified and analysed by comparing 2008 and 2009 figures.

The author is fully aware of the risks attached to a short-term survey and the conclusions and lessons to be drawn out of it. However, he is convinced that, by considering some potential shortcomings, such a short-term analysis is able to provide useful results. Evidently, EU–China trade relations did not start with the global crisis. On the contrary, they had been developing for decades, with an accelerated speed following China's membership in the World Trade Organization (WTO) (2001).

Therefore, several trends generated before the crisis could either benefit from or become damaged by the current global crisis. In addition, short-term responses to the crisis include EU (and, more importantly, member country or company-level) policies in search of new markets in the period of serious demand fall in the EU itself. Nevertheless, also the impact of Chinese responses to the crisis (stimulus package, slower but still outstanding growth) has to be taken into account. Finally, current statistical figures should not be decoupled from longer term processes that characterize both the changing economic environment in China and in the EU. In fact, short-term trade benefits ripped by the current crisis may become important building blocks of longer-term business contacts, while potential costs of the crisis on bilateral trade relations may turn out as unavoidable costs of a bilateral learning process.

In consequence, the forthcoming statistical survey has to be read with utmost care, but, hopefully, not without a number of useful lessons and, partly, of policy recommendations. Beyond general lessons both for the EU and China, as global players in the world economy in general, and in world trade in particular, several points may be of special interest for Hungarian policy-makers. Among others, they include the impact of and opportunities offered by EU membership on the geographic pattern of Hungary's trade relations, a more multi-dimensional trade and economic policy of China towards different countries of the EU, Hungary's potential regional role in developing "special" contacts with China, including the business interests of Chinese companies in or oriented to Hungary (not disregarding the role of the Chinese community already settled in the country), as well as the longer-term strategy of foreign (transnational) firms located in Hungary and looking for both the Chinese market (exports) and supply (imports) from China.

Finally, it has to be stressed that the paper is fully focused on short-term trade developments. It does not deal with a large number of extremely important issues affecting EU–China relations. They have been dealt with, parallel to this survey, in another in-depth analysis in the framework of the last stage of a multi-annual strategy project on China.[1] Main sections of the EU–China study address the character of bilateral trade, with special regard to processing and direct trade flows, major barriers to enhancing bilateral trade and market access and the interdependence between European investments in China and their impact on bilateral trade relations. Increasingly importantly, also European interests in and fears of Chinese investments in the EU (and its neighbourhood or "competitive markets") have been identified. In addition, China's changing image of Europe(an Union) in its new global position as well as, to some extent, Europe(an Union)'s China-picture (as far as available) have been

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[1] Between mid-2006 and mid-2010 a four-year and annually renewed project financed by the Prime Minister's Office of the Hungarian Government and in cooperation with the Hungarian Academy of Sciences has been carried out in the Institute for World Economics. The referred analysis is part of the last year's output and will be published later.

devoted special attention to. Probably most importantly, the question of the sustainability of the export-oriented growth pattern of China requires utmost attention, both as a consequence of (and lessons from) the global crisis and as a significant contribution to the discussion on the "end of export-oriented growth" in Hungary and several other highly open small economies of (Central and Eastern) Europe. Unfortunately, all these issues do not form part of this statistical paper.

All primary statistical data have been taken from the monthly bulletin of Eurostat.[2] Also the author's own calculations are based on these figures.

2. Impact of the global crisis on EU–China trade

In 2010, two important milestones of EU–China relations will be celebrated. First, it is the 45th anniversary of establishing diplomatic relations between Brussels and Beijing. Second, the first bilateral trade agreement that is still the legal basis of the current economic relations, was signed in 1985, so 35 years ago. Of course, bilateral relations today cannot be compared to those enshrined in the 1985 treaty. On the one hand, trade experienced a unique development and became a cornerstone of bilateral relations with substantial global impact. On the other hand, bilateral relations were extended to a large number of areas, from joint technological programs (Galileo, Erasmus, environment, etc.) through bilateral treaties in transportation, communication, tourism, culture, etc. to trade and trade-related issues (investments, public procurement, intellectual property rights, health safety, technical standards) negotiated both bilaterally and in the framework of the WTO. Although these issues do not form part of this study, it has to be emphasized that the impact of the global crisis on the most important field of bilateral relations, namely trade, has to be embedded into this framework. Trade developments between 2008 and April 2010 may become an important element of how future chances and risks of bilateral relations in the framework of growing global interdependence (and an even more rapidly growing role of China in this setting) will be perceived, used or prevented.

The paper is structured as follows. First, EU–China trade will be examined as part of the total extra-EU trade (see Tables 1 to 3). Second, trade of the individual EU member countries with China will be surveyed (see Tables 4, Annexes 1 to 3)[3]. Third, and finally, the importance of trade relations in total extra-EU trade of the EU and of the member countries will be addressed (see Annexes 4 to 6).

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[2] EUROSTAT [2010]: *External and Intra-European Union Trade*. Monthly statistics. No. 6. Luxembourg.

[3] Due to lack of space, Annexes 1–6 are published on the website of the *Hungarian Statistical Review* (www.ksh.hu/statszemle/).

Table 1

Trade of the EU with main partner countries and regions
(EUR billion)

Country/region	2008			2009		
	Exports	Imports	Balance	Exports	Imports	Balance
Total extra-EU	1 309.8	1 564.9	–255.1	1 095.1	1 199.6	–104.5
USA	250.0	186.9	+63.1	204.6	159.7	+44.9
Russia	105.0	177.9	–72.8	65.6	115.4	–49.8
Switzerland	98.0	80,3	+17.7	88.6	73.8	+14.8
China	**78.4**	**247.9**	**–169.5**	**81.7**	**214.7**	**–133.0**
Turkey	54.1	46.0	+8.1	43.9	36.1	+7.8
Norway	43.8	95.8	–52.1	37.6	68.7	–31.1
Japan	42.3	75.2	–32.9	36.0	55.8	–19.8
United Arab Emirates	31.7	5.9	+25.8	25.1	3.8	+21.3
India	31.6	29.5	+2.1	27.5	25.4	+2.1
Brazil	26.4	35.9	–9.5	21.6	25.7	–4.1
Canada	26.1	23.9	+2.2	22.4	17.8	+4.6
Republic of Korea	25.6	39.6	–14.0	21.5	32.0	–10.5
Australia	25.2	11.2	+14.0	21.8	8.1	+13.7
Ukraine	25.1	14.5	+10.6	13.9	7.9	+6.0
Near and Middle East	111.4	87.0	+24.4	96.2	55.7	+40.5
Latin America	79.6	97.4	–17.7	63.6	71.1	–7.5
ACP*	67.7	76.5	–8.8	57.3	53.7	+3.6
North Africa	59.2	88.6	–29.4	55.6	57.9	–2.3
Western Balkan countries	33.0	13.9	+19.1	25.5	11.2	+14.3

* African, Caribbean and Pacific Group of States.
Source: EUROSTAT [2010]: *External and Intra-European Union Trade*. Monthly statistics. No. 6. Luxembourg.

Table 2

Dynamics of EU trade with main extra-EU partner countries and regions in 2009
(2008 = 100)

Partner country/region	Exports	Imports
World trade of EU	81.7	79.1
Intra-EU trade	80.8	80.6
Extra-EU trade	83.7	76.7
USA	81.8	85.5
Russia	62.6	64.9
Switzerland	90.4	91.9
China	**104.1**	**86.6**
Turkey	81.1	78.5
Norway	85.8	71.7
Japan	85.1	74.3
India	87.0	86.1
Brazil	81.8	71.6
Canada	85.8	74.5
Republic of Korea	84.0	80.8
Australia	86.5	72.3
Ukraine	55.4	54.5
Mexico	72.6	72.3
Non-EU27 Europe	76.8	73.1
Africa	90.3	67.1
Near and Middle East	86.5	62.4
Latin America	79.9	73.0
Asia*	92.8 (88.4)	82.6 (79.2)
Candidate countries	79.9	78.7

* With China (in brackets excluding trade with China).
Source: Eurostat as quoted in Table 1 and own calculations.

Table 3

Share of main partner countries/regions in total extra-EU trade of the European Union
(percent)

Country/region	Exports			Imports			Balance		
	2008	2009	2010*	2008	2009	2010*	2008	2009	2010*
EU27	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
USA	19.1	18.7	17.9	11.9	13.3	11.7	24.4	43.0	41.7
Russia	8.0	6.0	5.8	11.4	9.6	10.6	–28.2	–47.7	–52.1
Switzerland	7.5	8.1	8.1	5.1	6.2	5.9	6.8	14.2	13.4
China	**6.0**	**7.5**	**8.5**	**15.8**	**17.9**	**17.6**	**–65.6**	**–127.4**	**–105.4**
Turkey	4.1	4.0	4.4	2.9	3.0	3.0	3.1	7.5	9.3
Norway	3.3	3.4	3.3	6.1	5.7	5.7	–20.2	– 29.8	–27.0
Japan	3.2	3.3	3.4	4.8	4.7	4.6	–12.7	– 19.0	–15.1
India	2.4	2.5	2.6	1.9	2.1	2.4	0.8	2.0	–0.2
Brazil	2.0	2.0	2.2	2.3	2.1	2.1	–3.7	– 3.9	–0.4
Canada	2.0	2.0	2.1	1.5	1.5	1.4	0.9	4.4	4.8
Republic of Korea	2.0	2.0	2.0	2.5	2.7	2.7	–5.4	–10.1	–8.0
Australia	1.9	2.0	2.1	0.7	0.7	0.6	5.4	13.1	12.5
Ukraine	1.9	1.3	1.2	0.9	0.7	0.6	4.1	5.7	4.3
Near and Middle East	8.5	8.8	8.2	5.6	4.6	5.1	9.4	38.8	21.6
North Africa	4.5	5.1	4.8	5.7	4.8	5.2	–11.4	–2.2	–8.4
Latin America	6.1	5.8	6.3	6.2	5.9	5.9	–6.8	–7.2	–2.4
ACP**	5.2	5.2	5.2	4.9	4.5	4.3	–3.4	3.4	3.5
Western Balkan countries	2.5	2.3	2.0	0.9	0.9	0.9	7.4	13.7	8.6

* From January to April.
** African, Caribbean and Pacific Group of States.
Source: Eurostat as quoted in Table 1 and own calculations.

Table 4

Share of the individual EU member states in total EU trade with China
(percent)

EU member state	Exports			Imports			Balance		
	2008	2009	2010*	2008	2009	2010*	2008	2009	2010*
EU27	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Germany	43.4	44.6	47.4	20.8	21.4	23.1	10.3	7.2	4.7
France	11.5	9.6	9.6	7.7	8.3	8.3	6.0	7.5	7.4
Italy	8.2	8.1	7.5	9.5	9.0	9.4	10.1	9.5	10.8
United Kingdom	7.8	7.0	7.1	13.2	14.2	13.1	15.7	18.7	17.6
Netherlands	5.1	5.8	5.2	16.3	17.2	17.3	21.5	24.1	26.5
Belgium	4.4	5.3	5.2	5.4	4.8	4.4	5.9	4.6	3.8
Sweden	3.4	3.6	3.1	1.9	1.9	2.0	1.2	0.9	1.1
Spain	2.7	2.4	2.2	6.9	5.6	5.9	8.8	7.5	8.7
Finland	2.6	2.3	1.9	1.3	1.1	0.9	0.7	0.3	0.1
Austria	2.5	2.4	2.3	1.3	1.2	1.2	0.7	0.5	0.4
Ireland	2.0	2.0	1.6	0.8	0.8	0.6	0.2	0.1	(0.1)**
Denmark	1.9	1.9	1.5	1.7	1.7	1.7	1.7	1.6	1.8
Portugal	0.2	0.3	0.2	0.5	0.5	0.6	0.7	0.7	0.9
Luxembourg	0.2	0.2	0.1	1.7	1.5	0.7	2.3	2.4	1.1
Greece	0.1	0.1	0.1	1.4	1.4	1.4	1.9	2.2	2.3
Poland	1.1	1.3	1.3	2.5	2.6	2.7	3.2	3.4	3.8
Hungary	1.0	1.1	1.2	2.3	2.2	2.2	2.9	2.9	3.0
Czech Republic	0.7	0.7	0.8	1.9	2.0	2.2	2.5	2.8	3.2
Slovakia	0.5	0.7	1.0	0.8	0.7	0.7	1.0	0.7	0.4
Romania	0.2	0.3	0.3	1.0	0.9	0.9	1.3	1.3	1.4
Slovenia	0.2	0.1	0.1	0.3	0.3	0.3	0.3	0.4	0.4
Bulgaria	0.1	0.1	0.2	0.3	0.2	0.2	0.4	0.3	0.1
Estonia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Malta	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0
Lithuania	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.2	0.3
Latvia	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Cyprus	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.2	0.2
NMS12***	4.0	4.5	5.0	9.7	9.4	9.6	12.3	12.3	13.0

* From January to April.
** Positive trade balance.
*** New member states of the EU.
Note. Total exports to and total imports from China and total trade balance are always 100.
Source: Eurostat as quoted in Table 1 and own calculations.

2.1. General features of EU–China trade in the crisis

In 2008, EU exports to China reached EUR 78.4 billion, while imports amounted to EUR 247.9 billion, resulting in a serious trade deficit of EUR 169.5 billion, very similar to the US trade deficit with China in the same year. The crisis has produced rather controversial developments. EU exports, due to several factors, continued growing to EUR 81.7 billion, while imports could not avoid the impact of overall recession and amounted to EUR 214.7 billion. As a result, the trade deficit of the EU became smaller, but still substantial (EUR 133 billion). China remained the largest exporter to the EU market and could maintain its 34 percent advantage vis-à-vis the USA, and expanded its leading role against Russia (from 40 percent in 2008 to 86 percent in 2009). Not less importantly, China became the third largest market for extra-EU exports, ahead of Russia, due to rapidly declining imports of Russia suffering both from the collapse of oil prices and the overall recession. In addition, the gap between exports to Switzerland and China decreased from 25 percent to less than 10 percent, with prospects of becoming China the second largest EU export market behind the USA in the very near future (see Table 1).

Table 2 looks at the impact of the crisis on the EU's bilateral trade relations with its most important partner countries and regions. The first observation is that the crisis caused a general and deep decline of trade flows from 2008 to 2009. Global exports of the EU fell by more than 18 percent, while imports declined even quicker to more than 20 percent, partly due to lower prices of energy and raw materials and partly to the general decline of demand. Behind this "curtain", however, several important notes can be made.

First, EU exports experienced a smaller decline in extra-EU relations (–16.3%) than in intra-EU trade (–19.2%). It means that, mainly as a result of the crisis, the EU had to become more extra-EU-oriented and tried to mitigate the adverse effects of the crisis by finding new markets outside the crisis-hit integration area, and particularly in countries that could keep their positive growth rate and disposed of large domestic markets. Second, as an evident exception, China proved to be the only market to which, notwithstanding the global decline, EU exports could continue growing by 4.1 percent.[4]

All other export markets of the EU shrunk, however, the extent was rather different. As compared to the 16.3 percent decline of overall extra-EU exports, mainly non-European markets show a relatively lower decline (such as Japan, India, Canada,

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[4] Among the first 50 export markets of the EU there were only five more to which the EU could increase its exports in 2009 as compared to 2008. Their importance, however, cannot be compared with that of China, since they occupy rather modest positions in the export ranking list of the EU (Libya is 32st, Lebanon 40st, Vietnam 41st, Gibraltar 45th and Iraq 50st). The total increment of exports of EUR 2.6 billion was less than the increase of EU exports to China by EUR 3.3 billion.

Korea, and Australia). Exports to Asia only fell by 7.2 percent, as compared to more than 20 percent decline in extra-EU European markets in general or in the markets of candidate countries (Western Balkans and Turkey), in particular.

Extra-EU imports indicate a general and strong decline. First, the decline was deeper in extra-EU trade (–23.3 percent) than in intra-EU trade (–19.4 percent). In other words, EU imports became more inward-oriented, a development that certainly reflects not only the impact of the crisis but also the falling trend of energy and raw material prices of which the EU used to be the largest or one of the largest buyer.[5] Second, and more important for our study, Chinese exports to the EU decreased by 13.4 percent, but much less dramatically than the overall decline. In addition, the drop of imports from China was the slowest one behind Switzerland, among all major suppliers of the EU market.

Comparing the rate of decline between extra-EU exports and imports, some further remarks can be made. In general terms, imports fell more than exports as a result of the different commodity composition of exports and imports, changes in commodity prices, sustained dynamics of growth in several major extra-EU partner countries (first of all in China), and successful efforts of different EU member countries to divert exports to non-stagnating extra-EU markets. The overall gap between export and import decline was 7 percent, while it reached almost 20 percent in case of China and more than 10 percent in selected extra-EU countries (Japan, Brazil, Canada, Australia, as well as Africa, the Near and Middle East or Asia).

Growing EU exports to China as well as less than average decline of imports from China resulted in the continuous increase of China's weight in total extra-EU exports and imports (see Table 3). Just in the most critical year of the crisis, in 2009, China's share in total extra-EU exports jumped from 6 to 7.5 percent and, based on the data of the first four months of 2010 continued growing to 8.5 percent. As a result, not only Russia was replaced in the third place of the most important EU markets by China, but in the first months of 2010 China became the second largest market for the EU ahead of Switzerland. This dynamics can be supported by additional comparisons as well. Although the USA remains by far the most important export market of the EU, the gap between exports to the USA and to China started to narrow quickly in the years of the crisis (from less than one-third to almost 50 percent). Also, exports to China and to Latin America stood at the same level in 2008. However, in 2009 the gap in favour of China was already 29 and in the first four months of 2010 not less than 35 percent.

China became the leading supplier in extra-EU imports already in 2005. Despite declining figures in 2009, China could substantially increase its leading role in 2009,

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[5] Among the 50 largest suppliers of the EU, only two could increase their sales in EU markets (Bangladesh, ranking 37th and Qatar ranking 46th).

due to the fact that imports from China fell less dramatically than EU imports from other parts of the world. In 2009, almost 18 percent of extra-EU imports originated in China, as compared to less than 16 percent a year earlier. Moreover, the gap between imports from China and the USA (the EU's second largest supplier) grew from 33 percent in 2008 to 50 percent in the first four months of 2010 (irrespective of the slight decrease of China's share as compared to 2009).

Finally, the impact of the crisis on the trade balance of the EU deserves attention. Despite the fact that EU–China bilateral trade revealed an improving balance for the EU in 2009 (due to further increasing exports and decreasing imports), the relative importance of the trade deficit in this bilateral relation jumped from 65.6 to 127.4 percent. In other words, in 2008 EU trade deficit with China amounted to about two-thirds of total extra-EU trade deficit. In contrast, and despite all favourable developments, the deficit of bilateral trade reached 127 percent of the EU's total trade deficit, and the higher than 100 percent figure was maintained even in the first four months of 2010. (Thus, the EU's extra-trade balance would indicate a surplus without the "China deficit".) While higher EU exports (and temporarily declining imports from China), accompanied by the substantial appreciation of the Chinese currency against the euro (as a result of the depreciation of the euro against the US dollar between mid-2009 and mid-2010) may have generated some positive signs of a more balanced bilateral trade, the heavy and persisting structural deficit could not be remedied. Once imports from China rebound (very likely already in 2010) and the euro starts to appreciate against the US dollar (as it, in fact, did in the last weeks), the huge imbalance in bilateral trade may become a priority issue of EU policies and business complaints vis-à-vis China.

2.2. EU–China trade on a disaggregated level: evidence from EU member countries

As usual, behind the general figures of EU–China trade we can identify different member country attitudes or strategies, concerning exports (and its composition), imports (and its final destination) as well as bilateral trade balances resulting from different export and import patterns.

Annex 1 focuses on the question to what extent did individual EU member countries contribute to the EU export growth of 4.1 in 2009 and how the decline of imports from China by 13.4 percent was distributed among member countries. Concerning exports, the outstanding result is that, despite the general crisis and the collapse of trade for all EU member countries, not less than 18 out of 27 member countries could increase their exports to China in 2009. Out of them, 14 were able to outpace the average increase of 4.1 percent, with a clear dominance of the new member

countries (9 out of 12, as compared to a relation of 5 to 15 in the "old" ones). The most remarkable growth could be registered in China-related exports by Romania and Slovakia (over 30 percent each), even if we have to take into account the relatively low initial level of exports in 2008. This remark is correct as compared to the volume of exports to China of most old member countries, but the figure has to be placed into the general economic performance of the respective new members. But more member countries with much higher economic performance (GDP) and with exports to China could register high export growth rates of about 20 percent, such as Belgium, the Netherlands and (from a low basis) Portugal among the EU15, and Poland and Hungary from the group of the new members. The latter is the more important, because trade-vulnerable new members suffered a more serious collapse of their overall exports than old member countries. In their case, chances on the Chinese market, combined with further export drive, searching for new markets and the role of foreign companies redirecting (or rapidly increasing) their sales in China can explain the outstanding performance. Beyond growth rates, absolute figures have also to be considered in order to come to a correct general assessment. Germany with a 7 percent increase of exports covered almost 75 percent of the total increment of EU exports to China in 2009. In contrast, some key EU countries (such as the United Kingdom, Spain or, also France, due to the adverse action of its president to China, by hosting the Dalai Lama[6]) were not able to benefit from the growing Chinese market and, indirectly, from the huge stimulus package of the Chinese government, while another large EU country, Italy could only achieve a less than average growth of its exports to China. Evidently, short-term differences do not allow drawing longer-term conclusions. However, it seems to be clear that the advantages of German competitiveness within the eurozone based on a decade-long conscious economic policy could become manifest also on the Chinese market. One can only guess to what extent the excellent German performance is based on a longer-term German political and economic strategy that, looking at the growing constraints in the European integration and, at the same time, at the rapidly changing global environment, has targeted a more extra-EU-oriented pattern in general, and a more China-oriented one, in particular.

In contrast to the export performance of EU member countries towards China, imports from China showed a general decline (excepting Malta). However, behind this overall picture, a rather differentiated import performance of the individual member countries can be identified. Altogether 11 member countries registered an import decline less than the EU average of 13.4 percent. Seven old and four new member countries belong to this group, including France, the United Kingdom, Ger-

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[6] The French attitude resulted in calling off the regular EU–China summit planned for the French Presidency in the second half of 2008.

many, the Netherlands as well as the Czech Republic and Poland. Imports to Hungary corresponded to the EU average (–14 percent). Trade of the new member countries with China in the core crisis year delivers two important and positive messages. On the one hand, exports grew by 17 percent, several times higher than total EU exports (4.1 percent). On the other hand, imports fell more than total EU imports (by 16.5 percent as compared to 13.4 percent, respectively).

Annex 2 shows total extra-EU and China-related growth rates of exports and imports of the individual EU member countries. It can be seen that China was an engine of additional demand for 25 member countries (excepting the special case of Luxembourg and, for other reasons, that of Slovenia). Out of the 25 "beneficiaries", 8 old and 10 new member countries indicated higher exports than in 2008, while another 7 countries (6 old and 1 new members) experienced a decline of their exports to China but less than the overall decrease of their exports.

It is of particular interest to compare total extra-EU and China-related export dynamics in 2009 (as compared to 2008). The average gap on EU level was a bit more than 20 percentage points (83.7 versus 104.1 percent, respectively). The "growth gap" of the individual members covered a scale from a small difference (see France or Greece) up to 70 percent (Cyprus). Considering the countries with higher export volumes in 2009 (more than EUR 1 billion, plus Hungary with EUR 900 million) only, it oscillates between 20 and 40 percentage points.[7] Belgium, Hungary and Poland (plus Portugal as a small exporter) belong to the "highest gap group", while Swedish, Czech (and much more modest Bulgarian and Maltese) exports represent a 30 percent gap. However, for the overall performance of the EU, the most important countries, such as Germany, Italy, Netherlands, but also Finland belong to the 20 to 30 percent gap section.

As a general conclusion, it has to be underlined that exports to China helped most EU member countries in dampen the very negative impacts of the crisis on their exports. Of course, the Chinese market could not compensate the overall loss but without the improved market access to China the collapse of exports would have been even more serious.

While total extra-EU imports fell by 23.3 percent, imports from China "only" declined by 13.4 percent. The latter was less than average in altogether 21 countries (including seven new members), indicating that China's competitiveness in European markets suffered less from the global crisis than that of its main competitors.[8] This

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[7] Slovakia, otherwise a rather modest exporter to China in total EU exports to this country, is an interesting exception, with more than 50 percent of growth gap between total and China-related exports. Only a case study could identify the underlying factors in general, and their sustainability, in particular.

[8] Interestingly, imports from China declined more than general imports in countries with very small amounts of Chinese imports in EU comparison (Slovakia, Bulgaria, Estonia, Latvia but also Austria). Luxembourg, as a transit country for commodities imported from China, is a special case.

about "ten-point gap" can be closely followed in figures for Germany, Italy, Finland (and Slovenia). The largest growth gap was registered by Greece (35 percentage points in favour of China), probably not decoupled with the several year long Chinese strategic steps to convert the country (and its ports) to a regional hub of adopting and transporting Chinese commodities to different EU member states.[9] Several countries with relevant imports from China can be grouped into the 10 to 20 percent "gap", such as France, the United Kingdom, the Netherlands, Portugal, and from the new members, Poland, Hungary, the Czech Republic and some other countries of meaningless relevance. In general, imports from China resisted the global collapse of imports of most EU member states successfully and pointed to the sustained or steadily growing competitiveness of Chinese commodities in almost all EU markets even in the period of serious recession. In this context, a rapid revitalization of imports from China, including even bigger challenge to European competitiveness in its home markets, can be predicted for the post-crisis period.

Annex 3 examines the trade balance of the individual member countries with China. As it has already been mentioned, EU deficits started to decline in the crisis period, without changing the fundamental character of structural imbalance.[10] It has to be stressed that bilateral deficits may have very different causes due to the economic policy of the individual member countries. One group is represented by Germany, where imports from China overwhelmingly support competitive domestic production, not least by obtaining Chinese inputs by German companies working in China (international subcontracting). A second group, represented by the Netherlands and Luxembourg generates huge deficits because of re-exporting a large part of Chinese imports to other EU member countries (or even outside the EU).[11] A third group consists of member countries mainly importing Chinese goods for internal consumption (Italy, Spain, Portugal, Greece). Two additional groups include countries with mixed economic objectives. One tries to use Chinese imports both for getting cheap (competitive) inputs for production and, at the same time, satisfying consumer demand in the low-cost segment (France, United Kingdom, but also the Czech Republic, Poland). The other one attempts to combine low-cost consumer goods imports with developing a regional hub for re-exporting Chinese products. At least in recent years, Hungary could be considered as part of both groups, unifying competitive inputs, low-

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[9] China's presence in the Greek financial market immediately following the agreement between Greece and the IMF (plus the EU and the European Central Bank) is a logical upgrading of strategic presence in the "weak abdomen" of the European integration.

[10] The deficit of the first four months of 2010, if calculated for the whole year, would be not less than that in 2009. Since EU imports are expected to resume in the second half of 2010, trade deficit could be substantially higher and the coverage ratio lower than 40 percent (although higher than in 2008).

[11] Rotterdam, as the most important international port of the EU, is an ideal place for obtaining and redistributing commodities coming from China (and, of course, from other parts of the world as well).

priced consumer goods and redistributing part of the commodities imported from China across the region.

One of the basic messages of the annex is that, similar to the overall EU deficit, all member countries register a deficit in their bilateral trade with China (excepting the first months of 2010 for Ireland). Another key message is that due to successful exports and the consequences of economic recession at home, all member countries (excepting Malta) could partly substantially reduce their deficit in bilateral trade with China. The most outstanding results were reported by Germany, Sweden, Austria (and Ireland) that could halve or reduce even more their deficit between 2008 and 2009. While in 2008 Germany still reported the third highest bilateral deficit in its trade with China (following re-exporting Netherlands and partly re-exporting United Kingdom), in the first four months of 2010, its deficit shrank substantially, ranking Germany on place 6 (with a trade deficit not very much higher than that of Poland). Also the new member countries kept pace, since the deficit reduction by almost EUR 4.500 million represented a deficit in 2009 at 78 percent of the deficit in 2008 (similar to the EU average).

The changes can even more clearly followed by the respective coverage data. In this respect, EU member countries can be classified into several categories. The highest coverage group (where export figures approximate the most import figures) includes Ireland, Finland, Germany, Austria and Sweden (with 70 to 95 percent of coverage in 2009). Interestingly, excepting Germany the group incorporates small competitive economies that could benefit from exporting to China, either based on the successful penetration of their own transnational companies (Ericsson, Nokia, etc.) or on identifying niches for smaller exporters and/or delivering goods produced by foreign companies in their country (United States in Ireland, Germany in Austria). A second group consists of countries with average coverage ratio, such as France, Belgium, Italy and Denmark. The third group that includes most of the new member countries (excepting Slovakia and tiny Estonia) as well as consumption-oriented Southern European members, such as Spain and Portugal (let alone Greece) represents substantially lower than average coverage ratios, a sign of highly unbalanced trade in favour of imports from China. It has to be noted that the average coverage ratio of the new member countries was 18.2 percent in 2009, a bit less than half of the 38 percent EU average, indicating the rather weak export position of this group while being a primary target of imports from China. Finally, a fourth group (Greece, Cyprus, Lithuania and, for being a large re-exporter, Luxembourg) can be set up with the lowest (less than 10 percent) coverage ratio.

The crisis period has generally improved the coverage ratio of all member countries, excepting that of France (not independently from the Chinese import barriers established in consequence of *Nicolas Sarkozy*'s talk with the Dalai Lama). This process clearly manifested in figures of 2009 seemed to continue in the first months

of 2010 as well for most countries and for the EU in general, as well.[12] Between 2008 and the first four months of 2010, the Irish balance turned to positive, while Finland could improve the coverage ratio by 30 percent. However, the most important change was the rapid improvement of the German coverage ratio, from 66 percent in 2008 to 79 percent in 2009 and to 88 percent in the first four months of 2010. Again, it calls attention that small member countries of the EU, such as Austria, Sweden, Belgium (and the already mentioned Finland) could substantially improve their bilateral trade coverage indicator. From the new member countries, also Hungary can be placed into this group, while other relevant new members, Poland and the Czech Republic could follow this trend at a lower speed as well (Slovakia is a special case that needs further investigation, while coverage ratios for all other countries do not need special interpretation due to the very low level of trade flows). Still, the "coverage gap" of about 50 percent between the average figure for the new member countries and the EU average did not change in a meaningful way.

Table 4 summarizes the share of the member countries in the total exports, imports and trade balance of the EU with China.

It strikes the reader that Germany is the dominant exporting country of the EU. Already in 2008, German exports to China were equivalent to the aggregate exports of the next seven (!) EU member countries (France, Italy, United Kingdom, Netherlands, Belgium, Sweden, Spain). Moreover, the crisis period experienced a rapid increase of the German weight, so that in the first four months of 2010 German exports to China became almost as high as the total exports of all old EU member countries to this market. At the same time, the relative share of other key EU members, such as France, Italy, the United Kingdom and Spain has been falling, most probably as a result of two key factors. One can clearly be identified, as differences in global competitiveness, as already demonstrated in the eurozone (and in its internal tensions). The other, namely a strategic background of developing trade relations with the fastest growing economy of the world available in Germany and lacking in other main EU countries needs further in-depth investigation. The share of new member countries experienced a modest but continuous increase (from 4 to 5 percent) indicating the discovery of the Chinese market. In this context, Hungary's gradually increasing part as well as the rapid growth of Slovakia's export share has to be mentioned.

Imports from China by individual EU member countries provide a much more balanced picture. While Germany is the largest importer, with increasing share between 2008 and January–April 2010 (from 20.8 to 23.1 percent)[13], mainly re-

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[12] The only EU country with declining coverage ratio has been Slovenia, mainly due to its lack of interest (or competitiveness) in the Chinese market.

[13] Since the German economy does not show signs of domestic demand-driven recovery, the increasing import share of Germany has to be connected to growing reliance on imported Chinese inputs used in German manufacturing to be able to successfully meet the challenge of global competitiveness.

exporting Netherlands and double-player United Kingdom belong to the leading importers. Concerning the new member countries, their share remained stable at about 10 percent or the double of their share in EU exports to China. However, it has to be noted that the figures of Poland and the Czech Republic were increasing. It cannot yet be assessed whether it has been the sign of a new Chinese strategy to conquer some of the new member country markets by consumer goods or by growing production linkages or it can be considered as a temporary phenomenon. In any case, in the next period, Hungary should follow the development of this process closely.

Finally, the share of the individual member countries in total deficit of the EU–China trade requires some remarks. First, in 2008 the largest share in EU trade deficit has been registered by the Netherlands and the United Kingdom (due to their re-exporting role), followed by Germany, Italy and Spain (for the two latter countries mainly due to domestic consumption). The impact of the crisis on EU–China trade has dramatically changed this picture practically overnight. While the share in total EU deficit with China continued growing for the Netherlands, the United Kingdom, Italy and France (and remained steady for Spain, as of January–April 2010), due to its successful export activity, Germany's share in total deficit fell from 10.3 to less than 5 percent in the first months of 2010. While the Netherlands, the United Kingdom, Italy, Spain and France represented 62 percent of total EU deficit in 2008, their share rose to 71 percent according to the statistics covering the period January–April 2010. The share of the new member countries in the China-related trade of the EU remained steady with 12–13 percent of the total (but with clear increases for Poland and the Czech Republic).

2.3. Importance of trade relations with China in the overall framework of extra-EU trade of the member countries

The real importance of trade with China (both exports and imports) can best be measured by the share of China in the total extra-EU trade of the individual member countries. Figures contained in Annex 4 can be analysed from a static (shares) and a dynamic (growth or decline of shares) point of view.

In 2008, none of the EU members reported a double-digit share of China in its extra-EU trade. While exports to China in the total extra-EU trade amounted to 6 percent, five member countries exceeded the average, led by Germany with 9.4 percent and followed by Luxembourg (8.2%) and Finland (7.1%). All new member countries remained below the EU average (including Slovakia), signalising that for them, as for most of the old ones, Chinese market opportunities have not yet been adequately realized. The crisis generated a new situation, in 2009 Germany, and according to the data of the first four months of 2010 also Finland, and maybe to the greatest surprise,

Slovakia reported two-digit shares of exports to China in their respective total extra-EU exports. In fact, Slovakia became the leading EU country focused on exports to China, closely followed by Germany.

It is particularly convincing, how dynamically the EU and most member countries increased the share of China in their total extra-EU exports. In other words, most of them recognized and tried to utilize the new opportunities offered by the fast-growing Chinese economy, in clear contrast to largely falling demand in the EU (and in some of their traditional markets, as Russia, Ukraine or the Western Balkan countries). In less than two years, EU exports to China enhanced their share in total extra-EU exports from 6 to 8.5 percent, or by 2.5 percentage points. An even quicker geographic reorientation towards the Chinese market took place in case of Slovakia (from 5.9 to 14.5 percent), and, with the largest impacts on EU–China trade, in German exports (a reorientation by almost 5 percentage points). In addition, very strong geographic restructuring of more than 3 percentage points characterized Finnish and Hungarian (plus Cypriote) exports. The bulk of the EU countries reported growing weight of China in their respective total extra-EU exports between 2 and 3 percent (Austria, Belgium, as well as the Czech Republic, Poland and Bulgaria among the new members). Another large group of countries with substantial influence on total EU–China trade increased its China-share of exports by 1 to 2 percentage points (Sweden, United Kingdom, Netherlands, Italy, Greece and Romania). Declining weight of China in total extra-EU trade could only be registered by Luxembourg and Ireland, and both can be explained by special reasons (fall of EU demand affecting Luxembourg's re-exporting activities and serious recession with restructuring problems in Ireland). The average of the new members followed the overall trend of the EU (growth of the share of exports to China by 2.7 percentage points, and that of imports by 2.5 percentage points).

The share of imports from China, already in leading position since 2005, continued growing by revealing an almost 2 percentage points market share growth between 2008 and 2009 (with a small and most likely temporary small decline in the first four months of 2010). Already before the crisis, in 2008, imports from China were in the two-digit range for all EU members, excepting some almost negligible partners (as Portugal and four new members). On the other hand, not considering the special case of Luxembourg (with 75 percent of extra-EU imports originating in China), some members, notably Hungary, the Czech Republic and Denmark imported more than 20 percent of their total extra-EU supplies from China. Out of them, three other countries with great impact on EU–China trade, namely Germany, the Netherlands and the United Kingdom registered a share of China in total extra-EU imports higher than the average of the EU27. Based on the figures of the first four months of 2010 (similar to full-year figures of 2009), Hungary had the highest orientation to China in its extra-EU imports (disregarding the special case of Luxem-

bourg), closely followed by the Czech Republic. It is remarkable that another four EU members have surpassed the 20 percent margin, namely Denmark, the Netherlands, Greece and Germany.

Despite the recession in the EU and the collapse of international trade, China was able to keep on strengthening its leading role as the main supplier of the EU in general, and more and more EU countries, in particular between 2008 and early 2010. While the share of China in total extra-EU imports rose by 1.6 percentage points between 2008 and January–April 2010, several EU members registered much higher increases in their trade with China. As an exception, China could increase its presence in the extra-EU imports of Greece by 8.6 percentage points (from 12.2 to 20.8 percent). Although with astonishing dynamics, Chinese market shares grew between 4 and 5 percentage points in total extra-EU imports of the Czech Republic and Romania, by 3 to 4 percentage points in the case of Germany, Denmark and Hungary and by 2 to 3 percentage points for France, the Netherlands, Portugal, Poland, and the average of the new member countries.[14]

Based on the figures contained in Annex 4, two additional annexes (Annexes 5 and 6) have been compiled in order to show the ranking (and the change in ranking) of China as an export market and an import source for the individual EU member countries and for the EU as a whole.

In total extra-EU exports China could gradually upgrade its position (see Annex 5). While in 2008 it was the 4th largest export market for the EU (behind the USA, Russia and Switzerland), in 2009 it overtook Russia (partly due to the deep Russian recession also based on the collapse of oil prices), and according to the figures of the first four months of 2010 even Switzerland. In conformity with figures for January–April of 2010, it occupied place number two in total extra-EU exports of Germany, the United Kingdom (in both cases following the USA) and of Slovakia (following Russia). For another 7 EU members China was/became the third largest extra-EU export market (Belgium, Denmark, France, Italy, Austria, Finland and Sweden). Excepting Slovakia, the new member countries followed this trend, but starting from a lower initial level. Still, the Chinese market became the fourth most important extra-EU market for the Czech Republic and Hungary by early 2010.

Special attention can be devoted to the dynamics of the ranking of leading extra-EU export markets. While in total extra-EU exports, China jumped from place four to place two between 2008 and early 2010, in some member countries, even more spectacular changes took place. Its ranking improved by 6 places in Bulgarian and by 5 places in Romanian exports (but with low volumes). More important is the dra-

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[14] The unique dynamism cannot be shadowed by the fact that in some markets, China lost relative weight. However, most of them belong to (almost) negligible markets of China's export offensive or the negative development can be attributed to special factors (declining re-export activities by Luxembourg, structural problems in Finland, Ireland or Slovakia).

matic increase of the relevance of the Chinese market for Hungarian exports (a raise of four places, but also for Belgium and Slovakia (each of three places). Since China used to be one of the three most important export outlets for several big EU export-ers, the changes are less spectacular but not less telling. In less than two years, the Chinese market advanced one place ahead for Germany, Denmark, the Netherlands, Austria and Sweden, replacing such traditional export markets as Switzerland, Rus-sia, Turkey, the Ukraine, Croatia, Serbia, but also the USA (see Slovakia) or Japan (see Denmark).

Even more relevant is China's position in extra-EU imports (see Annex 6). It is well known that it became the largest supplier of the EU by 2005. It is, however less evident, how dynamic the process of becoming the leading supplier of more and more EU members was just during the crisis period. While in 2008 China ranked first as the main extra-EU import source for 6 countries (Germany, Greece, Italy, Spain, Luxembourg and the Netherlands), it became the leading supplier to 10 coun-tries in 2009 and to 13 countries according to the statistical figures covering the pe-riod January–April of 2010. In addition, and based on the latest available statistics, China was the second largest supplier to another 8 EU members (in five cases behind Russia), and the third biggest exporter to another 5 countries.[15]

It requires special attention that China was able to further strengthen its supplier position in different EU markets just at the time of deep recession and collapsing trade (including substantial but less than average decline of Chinese deliveries to the EU member country markets). Between 2008 and early 2010 imports from China ex-ceeded those of previous traditional leading exporters to Portugal (Nigeria and Bra-zil) and to Romania (Russia and Turkey). In five cases, China switched from second to first supplier. This happened between 2008 and 2009 in imports of the Czech Re-public and Hungary (also due to the declining price of energy imports from Russia). Even more remarkable are the changes reflected by trade figures of January–April 2010. In this period, imports from China to France and the United Kingdom sur-passed those from the USA, and to Denmark from Norway.[16] Definitely, these de-velopments do not point to any change in the fundamentally export-oriented and of-fensive strategy of China, whatever the official declarations and the new concepts of the Chinese government may be.[17]

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[15] Only in Bulgaria's extra-EU imports it ranked fourth.

[16] Based on German statistics, in the first half of 2010 China became the leading exporter to Germany sur-passing the traditional ones. (See Bundesministerium für Wirtschaft und Technologie [2010]: *Aussenhandel der Bundesrepublik Deutschland nach Laendergruppen und Laendern. Referat IC2*. August 18. Berlin.)

[17] The issue of switching from export-oriented to domestic demand-driven growth has been extensively analyzed in another paper prepared in the framework of the concluding part of the China strategy project. (See Inotai, A. [2010]: *A világgazdasági válság és a kínai külgazdaság-politika*: *hatások és válaszok*. (*The Global Economic Crisis and China's External Economic Policy*: *Impacts and Reactions*.) Manuscript. Budapest.)

3. Concluding remarks

Despite the short period covered by statistical data and the elaboration of a number of key issues affecting EU–China relations (including trade) in other studies, the survey can provide some very important lessons. They can be summarized in the following points.

– China, concerning its high GDP growth rate, rapidly increasing domestic demand in selected sectors (for example cars) and its economic stimulus package provided support to the crisis-ridden EU economies in increasing their exports to China. In fact, China was the only relevant country to which EU exports continued growing in 2009. As a result, China became the second largest export market of the EU by early 2010, ahead of all traditional export markets excepting the USA.

– Irrespective of economic recession and falling volume of Chinese exports to the EU, China could not only consolidate its first place in extra-EU imports but could continue raising its share in this field remarkably.

– Resulting from growing exports and (provisionally) declining imports, the EU could narrow its huge deficit in trade with China. However, as a result of overall trade developments in the crisis, more than 100 percent of the deficit in extra-EU trade can now be attributed to deficit produced in bilateral trade between the EU and China.

– As a consequence of carefully built-up competitiveness and probably also of a longer-term strategy, Germany's key and increasing position in EU–China relations, particularly concerning EU exports have been confirmed by all statistical figures.

– The most important new member countries could keep pace with overall developments in EU–China trade flows. Even more, in some cases they provided better than average record, even if their weight in total EU–China trade remained modest. The same applies for trade developments between Hungary and China.

– It is not yet clear to what extent the crisis period initiated a new quality of EU–China trade based on growing EU exports and declining or stagnating EU imports, with better prospects for bringing downwards the huge EU trade deficit, a major (potential) argument of protectionist forces in the EU (member countries) and of all those demanding the rapid revaluation of the Chinese currency. Most likely,

imports from China will regain strength in 2010, while also EU exports to China may continue growing. As a result, bilateral trade will be more a two-way street but with persistent large imbalance in favour of China.

– Most recent figures (both taken from Chinese statistics and from Eurostat, as used in this paper) indicate that China will not become less competitive. In addition, it will not be able to abandon its three-decade old export-oriented growth pattern at least for the next years to come.

– Therefore, the EU's strategy should focus on increasing exports to China, establishing a virtual two-way street of investments by further supporting EU capital exports to China but, increasingly, by bringing more Chinese capital to Europe (partly for debt management of some eurozone countries, but mainly for more competitive production in Europe and substitution of direct imports from China).

– Finally, several member countries, not least some of the new ones, should make better use of their comparative advantages of becoming new regional hubs of the growing Chinese presence in the European integration.

Poland and Hungary – Reactions to the Crisis and Future Prospects

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Poland was the only EU member state to have succeeded in expanding its economy in spite of the crisis, and some of its short-term indicators (namely those of retail trade, construction) were more favourable than the average. The aim of the analysis is looking into the secret of the relative Polish success and revealing the reasons for the marked differences from the Hungarian performance.

KEYWORDS:
Financial crisis.
Economy.
Demography.

This study aims to reveal basic differences between Poland and Hungary concerning the situation resulted from the outburst of the financial crisis in 2008. Some of the dissimilarities arose from the government measures taken after the crisis spread across Europe, but some of the hidden elements had already been present in the structures of the representative economies well before 2007. Various studies and analyses dealt with the issue, mentioning factors of the relatively closed economy of Poland, the traditional banking sector, the financial support of the EU. Poland seemed to be unique in many dimensions among the European Union member states, in terms of its GDP-growth, retail trade or construction performance. In this study, we draw conclusions that might shed light on what caused Poland's success and what lessons Hungary will be able to learn from this. The short-term indicators, available for the first four-five months of 2009, might shadow the picture.[1] The Polish society had to face the loss of a high share of its political elite in the Smolensk disaster, they were suffering from the inundations just like Hungary did, but according to various sources, these events did not affect the evaluation of economic processes, the exchange rate, or the WIG index of the Warsaw Stock Exchange (*The Warsaw Voice* [2010]).

1. Emergence of the crisis, major signs based on main short-term indicators

The subprime crisis started in the United States in 2007. The first signs were affecting the real estate market, where prices began to drop in mid-2006, later the unfavourable signs occurred in the banking sector and by September 2008 a number of failures and governmental bail-outs took place.

In industry of the EU, after years of unbroken growth, the constant and deepening decrease of production, first measured in May 2008 compared to the corresponding month of the previous year, was a warning sign. In Hungary, the loss of momentum had already been shown in 2007 but an explicit deceleration was only perceptible in the first semester of 2008, then a decline was recorded in the second semester. Poland's production was less volatile, a pronounced drop was only measured in the third quarter of 2008.

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[1] The source of data is Eurostat unless otherwise stated. For comparability purposes, that of Hungarian data, in most cases, is the same but where such data are unavailable, HCSO data were used.

Retail trade was another division showing unambiguously unfavourable processes. In the EU, the volume growth of retail sales slowed down in 2007, but the first decline was only measured in March 2008. In Poland, a marked deceleration occurred at the beginning of 2008 and the first drop was noticed in November 2008, but the balance altogether was positive for the year. In 2009, Poland was the member state raising its retail sales the most (by 2.9 percent, compared to the EU's –1.6 percent), however, in comparison to the high basis, a negative turn took place in 2010. The declining trend of Hungarian retail sales began in March 2007 and the continuous decrease is still lasting.

Gross domestic product, generally used to assess the overall performance of an economy, had showed very low quarterly growth rates in case of Hungary already in 2007 (compared to the previous quarter, based on seasonally and working-day-adjusted data), and a deceleration started in the second quarter of 2008. The drop was the strongest in the third quarter of 2009, when the volume of GDP was 2.9 percent lower than three months earlier. In the fourth quarter of 2009 a small recovery seemed to start, which was somewhat stronger in the first quarter of 2010. As for Poland, although the growth, formerly fluctuating between 1 and 2 percent quarterly, dropped below 1 percent, the economy only shrank in one quarter, namely in the fourth quarter of 2008, and the decline was more moderate (–0.3 percent in quarter-on-quarter comparison) than in case of Hungary.

2. Reasons for the different phenomena of the crisis

Divergent reactions to the economic difficulties in the two countries are to a large extent rooted in the different structures of the economies, the role, performance and exposure of industries to global and regional events, their robustness and weight in employment and gross value added.

2.1. Sectoral structure of the economy and characteristics of the branches

Behind these phenomena, the examination of the production side reveals very different *structures*. The contribution of agriculture to gross value added (GVA) is similar in the two economies, and is much above the EU average. Poland's agricultural sector is larger to some extent. The share of industry is relatively high in European comparison in both countries, but in Poland is of slightly less importance. There is a visible difference

in the contribution of construction to the value added: its share is apparently higher in Poland due to a revival of the sector in the middle of the decade. Trade and repair, the hotel, restaurant and catering sector as well as transportation and storage also contribute to a higher extent to the value added in Poland, while in our country financial activities produce more of the GVA. (The large weight of the former is a result of the importance of wholesale and retail trade, which counterbalance the relatively smaller transport sector.) There is a marked difference concerning the public sphere, which is greater in Hungary (although still somewhat below EU average) than in Poland.

Table 1

Sectoral structure in Poland and Hungary based on contributions to gross value added and to employment
(percent)

Section	2009		2008	
	Hungary	Poland	Hungary	Poland
	GVA		Employment	
Agriculture, hunting, forestry and fishing	3.0	3.6	7.2	14.0
Industry	24.9	23.0	24.3	23.8
Construction	4.8	7.5	7.4	7.6
Trade and repair; hotels and restaurants; transport, storage and communication	21.2	27.1	25.3	23.3
Financial intermediation; real estate, renting and business activities	23.6	20.2	10.2	8.6
Public administration and defence; education; health and social work; other community, social and personal service activities	22.5	18.6	25.5	22.7

Poland is located on an area 3.4 times as large as Hungary's and it owns a 770 km-long coast on the Baltic sea (*Central Statistical Office* [2009a]). The situation and opportunities of *agriculture* are different in the two countries in many aspects. The area under agricultural utilization in Poland accounts for 53 percent of the land area, as opposed to 65 percent in Hungary. About 8 tenths of the utilized area is arable land in both countries. The role of forested area is also worth mentioning: it makes up approximately 30 percent of the land area in Poland, while only 22 percent in Hungary. Poland is one of the largest agricultural producers of the EU, also benefiting significantly from its European Agricultural Guidance and Guarantee Fund. Given its smaller territory, it is not surprising that Hungary ranks among the firsts only in few aspects (for example, it is the second largest sunflower producer (preceded by France)).

The farm structure surveys conducted in 2007 revealed some basic differences concerning conditions of production. In Poland, total labour force (in annual work

units) is 8.3 times as high as in Hungary, within which family labour force is 13 times more. In Poland, entrepreneurial income was about three times greater at the beginning of the decade and 4-5 times higher before the crisis, and in 2007 the difference reached a record level of nearly 7 times. In our country, net entrepreneurial income in agriculture was 38 percent more in real terms in 2007 than in 2005, while its level was 2 percent below that. In 2008 the processes showed a different picture, as that was a favourable period for agriculture in Hungary[2]: its income indicator jumped by 37 percent, while its Polish equivalent dropped by 7 percent. It is important to note that in 2009 the entrepreneurial income was cut by 5.7 percent in Poland during the year, but it was halved in Hungary.

Industry showed basically similar tendencies in the two countries. The volume of industrial production rose at a much higher rate both in Hungary and in Poland than that of the European average. From 2003, the Hungarian growth rate was usually somewhat below the Polish growth, except for 2005 when the Hungarian industry expanded faster than its Polish counterpart. The engine of growth was manufacturing (especially its chemical and machinery branches) in both countries. The performance of food industry follows significantly different trends: while it has been declining in Hungary for a long while, in Poland it has been rising at a steady annual rate of usually between 3 and 4 percent.

The share of the particular industries is rather different, though. In Hungary, the contribution of manufacturing of machines is overwhelming: nearly half of the production, due to the role of the three large automotive producing companies that were present at this time in Hungary (General Motors, Suzuki, and Audi). At the same time, there were four car producing companies in Poland: Fiat, General Motors, Volkswagen and FSO (Fabryka Samochodów Osobowych – Factory for Passenger Automobiles) (*Frost&Sullivan–Polish Information and Foreign Investment Agency* [2008]), but the contribution of machinery branches to the total production of industry was below one fifth of the total. The significance of food industry is also remarkable: while it provided about one fifth of industrial total in Poland, it only had a share of a mere 10 percent in Hungary. Mining has different roles in the two countries: in Hungary, this branch totally collapsed after the change of regime, and in the period in question, it only provided half a percent of industrial production. Although the situation of mining is not favourable in Poland either, the country is one of the main European coal and copper producers (http://www.infomine.com/countries/poland.asp).

Accession to the EU meant a stable background for Polish construction industry, with annual growth rates of between 9 and 16 percent. Even in the year of the beginning of the crisis, the Polish performance in this respect rose by 10 percent. In 2009, dichotomous processes could be perceived in both countries: in Poland, the situation

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[2] The Hungarian agriculture showed relatively good performance compared to the low basis of 2007, which was to a large extent due to the favourable results of cereal production, in particular, to those of maize production.

worsened but the production level was still rising by 4.5 percent. In Hungary, the disadvantageous situation relatively improved: the shrinking of construction moderated to –4.3 percent, within which civil engineering rose by 6.3 percent, although the erection of buildings declined by 13 percent.

Retail trade reflects the size of the internal market and is sensitive to changes in the purchasing power of the population. After a steady rise before the accession to the EU, real wages slightly dropped in Hungary in 2004. In the subsequent years they picked up again, but in 2007 gross wages in real terms stagnated, while net wages were even cut back by nearly 5 percent. In Poland, gross wages in real terms rose continuously between 2004 and 2007. As a result, retail trade turnover at constant prices was rising in parallel to growing purchasing power between 2004 and 2006 in Hungary, at a rate 2-3 percentage points faster than in the EU27. At the same time, the Polish domestic market was less willing to step up its consumption in 2004 and 2005, but the growth accelerated remarkably in 2006 and 2007, to a two-digit level. Within activity groups, the performance of retail trade units diverged markedly in 2006 and 2007: sales of food, beverages and tobacco have already declined in 2007 in Hungary, while it was still on the rise in Poland. The retail sale of non-food products, also linked to consumption credit expansion, was climbing fast in Hungary, especially in 2004, and was decreasing from 2007, while Poland experienced the opposite of this process, the volume plummeting in 2005 and rising quickly from 2006. Automotive fuel sales were increasing constantly in Hungary at rates of 3-4 percent, except for a rise of 8.6 percent in 2006, while Poland saw a strong fluctuation between a slump of –8 percent in 2005 and a peak of +23 percent in 2006.

Table 2

Indicators of retail sales, 2006–2007

Indicator	Hungary	Poland
Retail sales per inhabitant (EUR)	2 877	3 587
Number of retail units per million inhabitants (including shops of motor vehicles and accessories)	16 473	10 373
Of which: number of petrol stations per million inhabitants	220	266
Number of warehouses per million inhabitants	1 389	762

Out of services, *tourism* is important in both countries, but has very different characteristics. The number of tourism nights spent at collective accommodation establishments amounted to nearly 20 million in Hungary and reached 56.6 million in Poland. It is remarkable, though, that while half of the tourism nights in Hungary were paid for by foreigners, in Poland 82 percent of them were generated by domes-

tic tourists. In 2008, the performance of tourism, measured also by tourism nights, has been improving in Poland after a temporary drop. Hungary at the same time undergoes hard times, not independently of abating foreign interest, and, especially, shrinking demand from Germany. The length of stays is slightly shorter in Hungary but it is diminishing in both countries. Tourism is much more concentrated in Hungary: one third of tourism nights are registered in Central Hungary, and another 20 percent in Western Transdanubia (mainly due to Lake Balaton). Such overwhelming weights are not maintained by any region in Poland, the largest shares being held by Zachodniopomorskie (next to the German border, at the coast of the Baltic sea) at 18 percent and Malopolskie (with Krakow as its centre) at 14 percent. Seasonality seems to be a problem in both countries: more than four tenths of the tourism nights are registered in the summer months.

The *transport* sector is one of the key branches among services, although less significant in Poland, as mentioned before. There, the size of the country, while in case of Hungary its geographical position rather than its size is the key for this. The volume of freight transport has risen after EU accession in both countries, but at a faster rate in Hungary. Passenger transport, however, underwent different processes: it has been plummeting in Hungary, while expanding in Poland, although at a lower rate in comparison to freight transport. The modal split of freight transport is somewhat different: the share of railway is higher, while that of road and inland waterways is lower in Poland. Differences are sharper in passenger transport: the share of passenger cars, although high in Hungary, is exceeded in Poland. In our country the role of railways, coaches and buses is more important than in Poland. Concerning freight traffic, the contribution of international transport is different in the two countries, and so is the dependence on foreign demand. The role of international transport is the largest in road transport in both countries, but its share in performance based on ton-kilometres is 64 percent in Hungary and only 56 percent in the other. In rail traffic, international transport makes up more than half of total performance in our country, while the respective share is hardly more than one quarter in Poland. As regards transit traffic, it is also remarkable in rail transportation in Hungary, while practically negligible in Poland.

2.2. Expenditure side of GDP

The share of final consumption has been declining in both countries since 2005/2006, but it is higher in Poland, about 80 percent. It is 75-76 percent in Hungary. While the difference is even larger, 8 percentage points concerning the final consumption expenditure of households, collective consumption represents a smaller weight in Poland by 3-4 percentage points: 18-19 percent, as opposed to 21-22 per-

cent in Hungary. Gross fixed capital formation has had a higher share in Poland since 2007: in 2008 it was 22 there and 21 percent in Hungary. The balance of external trade in goods and services has been positive in Hungary since 2007: it was improved by the continuous surplus of the balance of services and the positive balance of goods in 2009. In Poland the total balance was negative until 2009. In that year it reached a small surplus due to services.

Gross fixed capital formation seems to have boosted after the accession in Poland and even reached growth rates of 15 and 18 percent, respectively, in the two years before the crisis. In 2008, it practically stagnated in Hungary but was still on the rise in Poland (+8%). 2009 brought a marked decline for our country (–6.5%) and a slight drop for Poland (–0.3%). Due to vigorous *investments* in hotel industry, there were 1488 hotels in Poland in 2008, a capacity nearly 9 percent higher than one year before and 15 percent more than two years earlier. In the meantime, Hungarian hotel industry saw a rising number of establishments until 2008, reaching 875 hotels in the year of the crisis outburst. Another area of dynamic developments is road infrastructure. In Poland, at the end of 2008, there were 765.2 km of motorways and 451.6 km of expressways. The metro line in Warsaw was 27 km longer than in 2007 (*Central Statistical Office* [2009c]). In parallel, the length of motorways in Hungary rose from 858 km in 2007 to 911 km in 2008. The construction of Metro Line 4 started in 2007. At present, the total length of the network in Budapest is 31.4 km, to which the new line would add another 10 kilometres. A reconstruction of Metro Line 2 was implemented between 2004 and 2007. In Poland, the fuel for large-scale investments in road infrastructure and hotel industry is the European football championship to be held in 2012, and also the Polish presidency of the EU in July–December 2011, right after Hungary's (in January–June 2011).

The balance of general government on an accrual basis was negative in both countries. Apart from 2009, the Polish deficit did not exceed 6.3 percent of the GDP, a peak reached in 2003. The disadvantageous circumstances in 2008 and 2009 made it inevitable that government expenditure rise, thus the deficit increased, and it reached 7.1 percent in 2009. The consolidated government gross debt rose to 46 percent by the year of the accession. Since then it has been fluctuating between 45 and 47 percent, however, the financial needs of counter-crisis government measures and the unfavourable economic conditions resulted in a higher level in 2009, namely 51 percent of the GDP. 2003 and 2004, preceding the accession but following a year of parliamentary and local government elections, also brought a massive rise in government expenditure in Hungary. Net lending of government remained at a high level also after the accession to the EU, and peaked in 2006 with 9.3 percent of the GDP. During the following three years, the deficit remained at a lower level, not exceeding 5 percent, and in 2009, it was held at 4 percent. As for Poland, legal measures help keeping the government debt under control, the strongest of which is a limit of 60 percent, fixed in

the constitution (*Warsaw Voice* [2010]). Such strong milestones were not present in the Hungarian legal environment, and after 2006, the steady rise in the debt level induced a forced cut of wages and other demand-reducing measures. These, however, were not strong enough to regain lost confidence in economic policy-makers, and contributed to a lowering level of portfolio and direct investments as well.

External trade. Trade integration for goods and to a lesser extent for services shows that the Polish economy is much less open than the Hungarian one. Calculated on the basis of the goods item of the balance of payments, average of imports and exports divided by GDP results in a ratio of 56–69 percent for Hungary and of 32–36 percent for Poland between 2004 and 2008. This indicator, computed for services, is much lower in Hungary, reaching a mere 10–13 percent in the decade, while in Poland it is even lower: 5–6 percent. This gap has its origin in the basic difference of the two countries: Poland is a definitely larger economy with an internal market of 38 million people, while in Hungary the number of inhabitants is only about 10 million. The Hungarian industry is very much exposed to the demand of its export markets, first of all those in Germany, at the same time Poland has many branches producing primarily for internal markets.

The *balance of payments*, incorporating cross-border transactions of a country, is worth looking into to find basic parallel phenomena. The current account has been negative in the two countries both before and after the accession. The surpluses of the capital and, to an even higher extent, the financial accounts have also been traditional. It is worth noting, though, that in case of the current account, in Hungary a surplus was recorded in 2009 as a result of a more marked drop in imports than in exports; in Poland, the current account alone did not register a positive balance, but jointly with the capital account it did. It means that the crisis resulted in a net financing capacity in both countries.

The size of the current account deficit before the crisis amounted to 6–7 percent of the GDP in Hungary, and turned to a surplus of 0.2 percent by the end of 2009. In Poland it reached about 5 percent of the gross domestic product in 2007 and 2008, but dropped below 2 percent by the end of 2009. The composition of the current account is quite divergent in the two countries: in 2007 our country showed a small surplus on the goods item and a more remarkable one on services (mainly caused by travel), but this was deteriorated by the sizeable deficit on the income item (generally brought about by profit repatriation) and a lower deficit on the current transfers item. Poland's remarkable deficit on trade in goods was only partly counterbalanced by the surplus on services (especially due to transportation and travel), while the negative balance on income (owing also mostly to profit repatriation) was compensated to the extent of about a half by transfers.

Examining incomes and transfers more deeply, it is obvious that the large number of Polish workers finding jobs in the EU after the accession and mainly after UK and

Ireland put an end to the strict obstacles for the new member states affected positively the Polish labour market and at the same time provided a remarkable source of income for family members staying in the country. The compensation of employees, classified under the income item of the balance of payments, reached EUR 3 635 million in 2007, while workers' remittances, categorised under current transfers, amounted to EUR 3,081 million. (In Hungary, the former made up EUR 758 million and the latter was negative, EUR –46 million.) However, due to the also deteriorating labour market situation in Western Europe, the amount of these items dropped in Poland.

Within the financial account, foreign direct investments (FDI) are the most important item. They mean another valuable source of capital – and other factors, such as experience and relationships – for countries with lack of these.[3] Foreign direct investment flows in Poland as a percentage of the GDP have reached more than 5 percent in some years since the accession to the EU. However, this rate halved in 2008 followed by stagnation in 2009. In Hungary a remarkable fluctuation was measured in case of this indicator, reaching 6.5–7 percent in 2005–2006, and declining since then. Direct investment stocks, however, were rising rapidly in percentage of GDP in Poland until 2007, achieving a peak at nearly 39 percent, but dropping to 32 percent by 2008. The volume of FDI compared to GDP was at a much higher level in Hungary, reaching more than half, then in some years about two thirds of the gross domestic product, but the share plummeted by 10 percentage points to 57 percent by 2008. The distribution of foreign direct investment stocks in these countries is not very diverging, nevertheless, there are some differences. Manufacturing attracted the most, approximately one third of the total FDI both in Poland and Hungary, within which, in relative terms, food industry, textile and wood activities, manufacturing of metal and mechanical products proved to be more attractive in Poland, while chemical industry and machine – especially transport equipment – manufacturing had a higher share in Hungary. A sizable gap could be observed concerning financial intermediation, which accounted for 11 percent of the total FDI stock in Hungary and 19 percent of that in Poland, a branch important not only because of its size but also for its role in the crisis. It is significant for agriculture of a generally low performance and income-producing capacity that the primary sector attracted a very low share – about half a percent – of the foreign capital. In both countries various political rules hindered the attraction of foreign capital, including a ban on foreign residents purchasing land.

Among foreign resources, the EU has a major role. Both Hungary and Poland are net beneficiaries of the EU budget. The operating budget balance in 2008 was 1.15 percent of the Hungarian and 1.27 percent of the Polish GNI.

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[3] There is no intention here to deny the possible negative effects of this form of investment, but to explain why there is a more detailed analysis of the FDI-related indicators.

2.3. Financial indicators

Financial markets, standing in the centre of interest since the outburst of the crisis, have various elements worth analysing. Out of these, the characteristics of the monetary institutional sectors, as well as the basic indicators of the capital markets are detailed in the following. Regarding the institutional sectors, we have many data on households, which were shaken by the crisis for monetary reasons as well as for direct effects of reduced demand for labour, not to mention government measures aiming to raise revenues. Detailed data sources on the structure of government revenues and expenditures also enable us to complement this picture.

The number of *credit institutions* in Hungary was 203 in 2007, 651 in Poland. Of that, at the end of 2008 there were altogether 36 banks in the *bank sector* of Hungary, operating as joint stock companies[4], as opposed to hardly more, 43 banks in Poland. The balance sheet total of 159 out of the 203 institutions in Hungary, that is 78 percent, was below 100 million euros, and only one had a balance sheet total of between 10 thousand and 999 million euros. In Poland, out of the 651 institutions, smaller ones were more numerous (89%). Foreign ownership was much more marked in Hungary: 89 percent of banking system assets was under foreign ownership in 2008, while the same indicator for Poland was 67 percent.[5] Loans denominated or indexed to foreign currency accounted for 64.6 percent of the total in Hungary in 2008, and only for 33 percent in Poland. The loans/deposits ratio, expressing the stability of banks, was unfavourably high, 141 percent in our country in 2008, while only 107 percent in the other. The capital adequacy ratio was 11.24 percent in Hungary, while in Poland it decreased from 12.1 percent at the end of 2007 to 10.8 percent at the end of 2008 (*Polish Financial Supervision Authority* [2009]). Non-performing loans accounted for 3 percent of total gross loans in Hungary, but were at a higher – though diminishing – level in Poland: 4.4 percent in 2008 (http://data.worldbank.org/indicator/FB.AST.NPER.ZS). These relatively moderate shares continued to react with a time-lag to the crisis, and rose to 6 percent in Poland and 6.5 percent in Hungary by the second quarter of 2009 (*Unicredit Group* [2009]).

Capital markets in the two countries have both parallel and diverging tendencies and features. Between 2004 and 2007, share prices were rising steadily both at the Budapest (BSE) and the Warsaw Stock Exchanges (WSE) followed by a sudden drop of about a quarter in Hungary compared to the previous year, and of nearly a third in Poland. This decline went on in 2009 as well, although it was milder that year. Another indicator showing the difference in the power of the respective markets is the number of companies listed there: in these terms, the size of WSE is apparent. WSE

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[4] According to Hungarian Financial Supervisory Authority data.
[5] *Source*: Polish Financial Supervisory Authority.

is much less concentrated than BSE. In spite of the disparities in power and significance, both stock exchanges registered a sharp plunge after the collapse of financial markets in the US. BUX reached its lowest ebb earlier, on October 27 at 10 751.23, while WIG 20, the blue-chip index of WSE dropped to 24 852.9 by November 20, 2008.

Table 3

Indicators of stock exchanges, 2007

Indicator	Hungary	Poland
Turnover per GDP (percent)	342.80	204.85
Market capitalisation per GDP (percent)	31.07	46.41
Number of listed companies	41	375
Of which: foreign	39	352
Share of top ten companies in market capitalisation (percent)	96.40	52.80

Source: World Federation of Exchanges and Eurostat.

Both in Poland and in Hungary, the majority of *household assets* were in currency and deposits. However, the share of this type of assets was slowly declining in both countries, although from a different level. In Hungary they accounted for more than 40 percent in 2003 compared with hardly more than one third in 2007. In Poland, their portion was nearly 60 percent in 2003 and 40 percent in 2007. The other overwhelming part of the assets, namely shares and other equities was about one third in Hungary throughout the period until the crisis, which is only slightly moving, while in Poland this type was less typical, only about one fourth of household assets in 2004, although this share was climbing rapidly until 2007. Households clinging to traditional forms of savings are more frequent in Poland: securities other than shares (for example credit default swaps) had an even less important role here (the share of this type was about 1 percent throughout the whole period), while in Hungary it reached 6–8 percent in some years, although showing a visible declining tendency.

The composition of *household liabilities* was only slightly different in the two countries. Loans accounted for the largest share, 86–90 percent in Hungary, and even more, 93–95 percent in Poland. Other accounts receivable have declined sharply by the beginning of the crisis, approximating 10 percent in Hungary and hardly reaching 5 percent in Poland. In Hungary almost 40 percent of total loans were consumer, usually short-term loans, mainly used for purchasing passenger cars and products of retail trade. The share of consumer loans in Poland accounted for a similar share of 38 percent (*Unicredit Group* [2010]).

Financial difficulties of households[6] are apparent from the fact that their consumption was plummeting already in the fourth quarter of 2008 in the EU. Compared to the European average of –0.7 percent, Hungarian households experienced a drop of 3.7 percent (and already stagnation in the third quarter of 2008). The shrinking of household final consumption aggravated in the subsequent quarters, falling the most (by 8.8 percent) in the third quarter of 2009. Meanwhile, Polish households saw a continuous, though decelerating rise, the rate of which gradually diminished from 5.6 percent in the second quarter of 2008 to 1.6 percent in the first quarter of 2010. Retail sales, a most important factor in household consumption, practically showed the same processes and were already examined in detail previously. Various other factors are worth looking into in this respect. One of them is household savings. Although data on them are only available annually, they do show differences. Their rate declined both in Hungary and Poland in the years after the accession to the EU, however, it dropped to a lower level in Poland, namely, to 6.5 percent in 2008, while in Hungary it was cut back to 8.3 percent, both rates well below the European average. Another indicator explicitly showing the rising burdens of households is arrears of loans or utility bills. The share of households with such arrears was 10 percent in the EU in 2008 (same as in 2007) and only slightly greater in Poland (11%), compared with a higher level in Hungary (16%). In the former country 29 percent of households stated that they had been having heavy financial difficulties in paying their debts from hire purchases or loans (same as in the EU on average) in 2008, and 35 percent reported so in Hungary. This was obviously linked to the fact that the share of household loans in foreign currency was more in our country than in the other. Sixty-six percent of loans to households were in foreign currency in Hungary, while they constituted 40 percent in Poland (*Unicredit Group* [2009]). Although these data refer to the second quarter of 2009, the stock of loans was not restructured in spite of such initiatives in order to abate the currency risk. As a result of the plummeting HUF against the Euro or the Swiss Franc, financial burdens of households mounted considerably. As credit rating agencies rated Hungary lower and lower (Poland has not experienced such deratings), the risk of Hungarian state bonds was also rising, pushing interest rates of household loans denominated in HUF also to a higher level. Five-year credit default swaps on government debt reached 597 basis points (bps) in Hungary at their highest, while this margin was only 386 bps in case of Poland (*Unicredit Group* [2009]).

The *structure of government expenditure* is a telltale sign of the priorities and conditions of the public sector. Based on the Classification of the Functions of Government, government expenditure can be broken down into 10 main groups. Of these

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[6] As EU average is only available for households and non-profit institutions serving households, data of the same sector will be used for individual countries as well.

the largest share is required by social protection, which accounts for more than one third of general government in both countries in 2008. (No data for 2009 have been available yet.) However, the trends are different: its share was rising in Hungary from a level of 31 percent in 2000 to 36 percent in 2008, while it was decreasing in Poland from a level of about 42 percent in 2002 to 36 percent in 2008. In our country, the functions with the next largest share are general public services accounting for 19 percent of the total, and three other having approximately 10–12 percent each. These are economic affairs, education and health. "Public order and safety" takes about 4 percent, while the remaining functions around 2–3 percent each. The situation is not very different in Poland, but education represents the second largest weight with 13 percent, and general public services, health and economic affairs account for 11–13 percent each. Public order and safety require slightly more than in Hungary, the remaining functions have shares between 1.4 and 3.3 percent.

Within the *structure of government revenues*, some differences can be observed. The largest item in this is taxes on production: its share in GDP is between 15 and 16 percent (and rising) in Hungary but hardly reaches 13 percent (and declining) in Poland. Social contributions provide 12–13 percent in both countries. Taxes on income and wealth make up about one tenth of government revenues in Hungary and 7 percent in Poland.

2.4. Social and demographic characteristics

Poland's population is more than 38 million, 3.8 times higher than that of Hungary; its population density is also somewhat above the Hungarian level. Poland's demographic situation is less unfavourable than Hungary's. The low fertility rate is a problem in both countries, but the death rate is different. In Hungary the crude death rate is much higher than the EU average and induces a natural decrease, while in Poland the balance of births and deaths is positive and the death rate is below the EU average. The other factor contributing to the actual number of population is migration, the situation of which is also inverse in the two countries. In Hungary, positive net migration mitigates the negative effects of natural decrease, although cannot completely counterbalance them. In Poland, however, strong flows of emigration resulted in a negative migration balance during the whole decade, equalling almost one hundred thousand people altogether since the EU accession (between 2005 and 2009), while the natural increase has been somewhat lower than that (nearly 90 thousand). Thus, the actual change in the population number has been positive in Poland for the second consecutive year in 2009, while the Hungarian population continued to diminish in this decade, too. It must be noted, though, that emigration had strong effects on the income situation of Poland.

Table 4

Demographic indicators, 2008

Indicator	Hungary	Poland
Fertility rate	1.35	1.39
Crude birth rate per thousand inhabitants	9.9	10.9
Crude death rate per thousand inhabitants	13.0	10.0
Natural change of population per thousand inhabitants	–3.1	0.9
Net migration rate per thousand inhabitants	1.6	–0.4
Actual change of population per thousand inhabitants	–1.4	0.5

The age structures have similar tendencies: the proportion of young people is declining, while that of older age-brackets is rising. This can involve many problems, including the sustainability of government expenditure and pension schemes as well as health systems and the balance in the labour market. The share of children below 15 was 14.9 percent in Hungary and slightly more, 15.3 percent in Poland, while that of those above 64 was 16.2 percent in Hungary and less, 13.5 percent in the other country according to the most recent data.

The *health status* of the population is better in Poland, although is below the European average. An indicator reflecting the general condition in this respect is life expectancy, which at birth is 1.4 years more in Poland. The difference is more striking in case of healthy life years (3.7 years for females, 2.4 years for males). Health expenditure per capita at purchasing power parity is lower by about a quarter in Poland. The number of physicians as well as that of hospital beds per population is also fewer there. However, it is known that the health system contributes to the health status of the population by about one fifth, and the rest is influenced mainly by the way of living. The health status according to surveys is relatively better in Poland. As for the way of living, obesity for instance is less of a problem there. Main causes of death are the same: diseases of the circulatory system, malignant neoplasms, and diseases of the digestive system. Nevertheless, their weight differs. In Poland, diseases of the circulatory system make up eight-tenths, malignant neoplasms account for 87 percent, while diseases of the digestive system reach only half of the Hungarian level. As for suicides, the standardized death rate is around six-tenths of the Hungarian indicator.

New disability cases per year equate more than 27 thousand in Hungary, while in the 3.8 times larger population of Poland it is about the double: 53 thousand cases per year. In both countries, disability and benefits linked to it served as a way to flee from the labour market and were supported by the state. However, the increasing number of disabled has meant a large burden for the budget and led to more reason-

able and stricter procedures to justify rights to such benefits. Less than a tenth of the
disabled are engaged in regular occupational activity in Hungary, while about a fifth
of them are present in the Polish labour market (http://data.euro.who.int/hfadb/).

Table 5

Standardized death rates, 2008
(per 100 thousand inhabitants)

Indicator	Hungary	Poland
Death rate, total	926	819
Of which:		
Neoplasms	246	210
Circulatory diseases	429	356
Digestive diseases	68	38
Respiratory diseases	43	40
External causes	61	61
Of which:		
Intentional self-harm	22	14

Education is closely linked to many aspects of life in a society. It has a significant
effect on labour market opportunities, it is not independent from the health condition
either, and it is a point of break-out in several emerging countries.

The general level of education is higher in Poland than in Hungary. The share of
early school-leavers is definitely greater in Hungary, it is more than twice as much as
in Poland.

Table 6

Educational attainment of population, 2008
(percent)

Indicator	Hungary	Poland
Distribution of population by educational attainment		
Primary school	25.0	19.7
Secondary school	58.1	63.2
Tertiary education	16.9	18.1
Early school-leavers *	11.5	5.0

* Percentage of population aged between 18 and 24 with at most lower secondary education and not in fur-
ther education or training.

Tests indicate a lower efficiency of the Hungarian school system, at least at the analysed ages: reading comprehension for instance revealed worse results for Hungarian students. Similarly to the health system, technical conditions alone do not explain this situation. Some basic indicators reveal that the student-per-teacher ratio is higher in Poland (although the difference is insignificant at ISCED (International Standard Classification of Education) Level 3), total public expenditure is basically at the same level (somewhat above 5 percent of GDP), and expressed in Purchasing Power Standard, it is lower at all levels of education in Poland.

Labour market. The activity rate is low in both countries but it is higher in Poland. The same is true for the employment rate. Unemployment was a serious problem for Poland at the beginning of the decade, in some years its rate was twice as high as that of its Hungarian counterpart; in the second half of the decade it started to decline, and before the crisis its level was only slightly higher than in Hungary.

Table 7

Indicators of the labour market, 2009*
(percent)

Indicator	Hungary	Poland
Activity rate (15–64)	61.6	64.7
Employment rate (15–64)	55.4	59.3
Share of part-time workers (within total employment)	5.2	7.7
Share of employees with temporary contracts	8.4	26.4
Unemployment rate	10.1	8.3

* LFS-adjusted series, annual averages.

As *social protection* is a huge item in the budget and has a direct effect on a society's living conditions, it is worth a deeper look into (also based on 2008 data). Social protection expenditure covers seven main areas or groups of supported persons, namely sickness and disability, old age, survivors, family and children, unemployment, housing and social exclusion. Government expenditure may also aim to ameliorate the situation by spending on research and development in this area, and there is also a residual item but these latter two are generally negligible. Out of the above-mentioned seven main areas, "old age" represents the largest share in both countries, but the respective weights are remarkably different: 41 percent in Hungary and 60 percent in Poland. The category of sickness and disability accounts for 21 percent of the social protection expenditure in Hungary, and only for 13 percent in the other country. Smaller but perceivable differences also prevail in other areas: family and children receive relatively more in Hungary, and so do housing and social exclusion. At the same time, it is Poland that spends higher shares on survivors and unemployment.

The exit age weighted by the probability of withdrawal from the labour market is basically the same in the two countries, somewhat above 59 years, lower than the European average of 61 years.[7] The retirement age is 62 years for both sexes in Hungary, while in Poland women have to be 60, men 65 to be able to retire. It is possible to opt for early pension in both countries, and there are several exceptions and pension schemes referring to various occupational groups.

An internationally comparable indicator, the aggregate replacement ratio shows the proportion of income from pensions of persons aged between 65 and 74 years and income from work of persons aged between 50 and 59 years. It is 56 percent in Poland and somewhat higher, 59 percent in Hungary. Both these numbers are above the European average (49%). The number of beneficiaries is also worth taking a look at. In 2009, 30 percent of Hungarians, more than 3 million people were benefiting from pensions or pension-like benefits, 57 percent of whom were receiving old-age and 26 percent disability pensions. In Poland 9.2 million people are pensioners, among whom the number of those receiving pension for inability to work equals to 1.4 million. Thus, the share of both pensioners and within them disability pensioners is lower in Poland (*Central Statistical Office* [2009a]).

In measuring the efficiency of social protection benefits, it is important to direct the flows to the groups who are in need of them. In this respect we can distinguish means-tested and non- means-tested benefits; basically there is a right for everyone to receive the former, while only groups under a certain income level are entitled to the latter. The most recent data are from 2007; in that year, 94.9 percent of social protection benefits were non-means-tested in Poland, the Hungarian ratio (93.4%) was very close to that. Cash benefits make up 65.8 percent of total social protection expenditure in our country. The Polish proportion (80%) is much higher than that level. The portion of non-means-tested benefits in the EU is the highest in the case of health care, old age functions and relief of sickness. In addition to that, both countries offer benefits independent of income only or almost only for invalid persons. In Hungary the share of such benefits is rather high within the "family/children" function, while in Poland it exceeds average within the field of "unemployment".

3. Conclusions and prospects

Poland had better performances during the hard times of the crisis in a number of areas, especially in the real economy. Agriculture, benefiting from the large internal

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[7] These data refer to 2005, but only slight fluctuations could be seen in the time series available from 2001.

market and EU funds, was losing of its profits, but its production was still remarkable. Within industry, the divisions producing mainly for the domestic market were successful. The good results of construction were to a large extent due to high shares of government and EU resources, aiming to step up the infrastructure level by the European Football Championship as well as Poland's EU presidency. Retail trade was also showing good results, in which the size of domestic demand played a determinant role. External merchandise trade, although declining in both directions, influenced GDP volumes less than in Hungary, and so did services trade. The reason for that was Poland's lower level of integration into EU markets compared to that of Hungary. While the Polish national currency also underwent a large depreciation, its effects on exports were favourable and were less deteriorated by the negative effects of foreign currency-denominated loans than what was experienced by Hungary.

The stability of the financial sector was similar in the two countries. It was mainly the lessening confidence of foreign investors, also influenced by credit rating agencies' opinions that led to a massive fleeing of investors from Hungary. The situation of households in the context of indebtedness was a problem, which was not handled easily in either of the countries, still, compared to households' liabilities, there were more assets, and in somewhat more conservative forms in Poland. Non-performing loans, however, seem to be at similar levels now.

Government spending means a reasonable source of help in case of a crisis. The Hungarian government, as a result of its indebtedness of a higher level had less of a manoeuvring capacity and had to cut expenditures earlier. Structural imbalances, originating from social expenditures, health expenditures, etc. are nonetheless unchangeable in the short run. In Poland governmental expenditure on social protection, health or for instance education is lower compared to GDP, in spite of which the health status, educational attainment and poverty mean smaller problems there. In the background of this, social structures, attitudes and cultural factors must also play a role.

Certain short-term indicators in areas such as industry and external trade, and also GDP show improving prospects for Hungary. However, in evaluating these indicators, the level of the low basis has to be taken into consideration, and there are other segments of the economy, for instance internal trade, that have not yet recovered. The indebtedness of households is still a serious problem, demanding constant efforts from the governments to manage currency risks. The labour market continues to show very unfavourable levels of unemployment/employment, and although the first signs of amelioration have already occurred according to the latest results, these at least in part are due to seasonal effects.

In Poland, growth of GDP as well as that of industry has been decelerating. After unfavourable results, construction seems to be picking up again. In parallel, the country saw diminishing volumes of retail sales in the beginning of 2010, but in this case again, the basis effect has to be considered.

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Relative Total Performance Index – An International Comparison in a New Perspective

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Hungary is facing fundamental challenges in the coming years. On the one hand, according to the strategy of Europe 2020, she has to find the way to develop a knowledge-based, more competitive and sustainable economy. On the other hand, relative weakening of her position enhances the importance of convergence. The processes of sustainability and convergence require a new approach to quantify the performance of the member states (among them Hungary), as well as that of the candidate countries. We propose to develop a (relative total performance) index based on international rankings that both expresses the different interpretations of sustainability and gives an opportunity for a comprehensive comparison of different countries.

KEYWORDS:
Sustainable growth.
Convergence theory.
International comparison.

A new strategy and a novel methodological approach were developed for the next period of the history of the European Union. The policy titled "Europe 2020" is to serve as a fundamental reform programme of the Union. One of the key challenges of this renewal is to integrate growth, employment, and *sustainable development*.

Last year two important statistical committees have published papers on how to *reform methodology*. *Stiglitz*, *Sen* and *Fitoussi*'s report summarised what principles and methods were recommended by their research group to measure socio-economic performance (*Stiglitz–Sen–Fitoussi* [2009]). At the same time, the European Committee issued a communication on social progress entitled "GDP and beyond. Measuring progress in a changing world" (*Commission of the European Communities* [2009]). It is important that both papers see the problem of socio-economic performance not as a narrowly defined issue of methodology but as a politico-strategic subject.

By 2010, the transition and development of Hungary reached a milestone. The importance of convergence is continued to be highlighted by the relatively poor performance of the past two decades as well as the negative effects of the crisis. All efforts are to be made to implement both the short- and long-term goals set out by the current development strategy of Hungary (*Adamecz et al*. [2009]).

The issue of how sustainable development and convergence can be harmonized and what methodology can support it are of key importance for domestic economic policy. In addition, in the wider perspective of sustainable development, the relations existing between the Europe 2020 strategy and the monitoring system of socio-economic development raise some important questions:

> *1.* Are the objectives set out by the strategy really based on sufficiently up-to-date premises?
>
> *2.* Should the opportunities to utilise Europe's outstanding competitive advantages in certain areas and her international position be given up due to the grave impact of the current crisis? Is it necessary and possible to elaborate a new strategy based on a different approach?
>
> *3.* Is the set of indicators linked to the Lisbon Strategy or the most complex database of the European Committee and Eurostat (SDI – sustainable development indicators) or the annually updated OECD Factbook (Economic, Environmental and Social Statistics) sufficient to evaluate the candidate countries?

The next chapters will give response to these questions.

1. The fall of strategic thinking

The announcement of the Lisbon Strategy and its priorities reflected the international and European euphoria of the year 2000. Nevertheless, the *integration* of the aspects *of economy, society, technology and legal harmonisation* that were previously subject to separate observations was a major breakthrough. This also continued to serve as a basis for revising strategies (*Zádor* [2005a], [2005b]).

By 2009 it had became clear that the Lisbon strategy and its 2005 renewal did not result in a fundamental change in how Europe progresses and it was not enough to reverse the process during which the United States outperformed the European Union internationally. It was aggravated by the unfolding international financial and economic crisis, which underlined the fact that neither the Union nor most of the member countries have a clear vision.

The Commission has proposed the *European Economy Recovery Plan* to manage the downturn. It shall *co-ordinate budgetary stimulus similarly to the Stability and Growth Pact*, boost demand, and restore confidence, taking into account what bases the member states have and what efforts were made in response to the economic problems. In line with the Recovery Plan agreed on by the European Council, member states are to revise and re-submit their respective stability or convergence programmes assessed by the Commission, considering the *need to ensure the reversibility of fiscal deterioration, to improve budgetary policy-making and to guarantee a long-term sustainability for public finances.*

Europe 2020 involves *four main pillars* (research, development and innovation; business environment; employment opportunities and an integrated energy/infrastructure policy) that were identified by the European Council as priority areas. It is to integrate the main elements of the different strategic programmes of the past decade, like knowledge-based society, sustainable development and social cohesion, and to result in a strategy of smart, sustainable and inclusive growth (*EC* [2010]).

2. Sustainability and strategy – a renewal

Today one of the strategic goals of the EU is to elaborate a set of tasks to ensure new, qualitative convergence. The Europe 2020 strategy aims at harmonising the demand of the European catching up with sustainable development. The Lisbon Strategy, launched in 2000, has made efforts to integrate long run social visions with the short run needs of economic growth in a sustainable way but it has lacked an overall success.

There is a need to renew strategic thinking (*Gáspár* [2008a]), involving the lately emerging trends of the global world. Its content, just like that of competitiveness should be aligned with the principle of sustainability. The actual matter of *sustainable development* must be determined keeping the importance of *social and environmental issues* and the resolutions thereof in mind, as well as taking the diverse correlation between these problems and *economic development* into consideration (*Szabó* [2007]). The *separate and integrated analyses of these three latter areas are a prerequisite for evaluating the international position* of a country, and the tasks emerging from the assessment must also be approached in the same way.

Each individual area was given a thesis (*Zádor* [2009]):

Thesis No 1: Sustained, that is balanced development and growth of the economy presupposes the socially and ecologically sustainable stabilization of the economy. In other words:

> *a*) Economic growth does not result in major domestic and external imbalances; the involvement of external funding is not to finance an already imbalanced situation;
> *b*) Human resources, economic restructuring, innovation, and adaptation are key assets to ensure external and internal funding;
> *c*) Economic growth does not lead to environmental degradation; sustainable development means intensive high-tech rather than extensive development.

Thesis No 2: Social sustainability is about the integration of economic growth and social cohesion. That is, there is a social and political consensus to prevent social degradation. To this end, the systems of social distribution and international funding have to promote solidarity, fairness, and social incentivisation: the redistribution of centralised revenues shall create opportunities through education and an efficient health care system. Social sustainability presupposes a social dialogue to disseminate information and enhance involvement. Quality of life is a key issue for a sustainable society, it is about economic, social and environmental sustainability, in other words about environmentally conscious work and life.

Thesis No 3: One of the key aspects of sustainable development is a holistic approach in which both planning and control take into consideration how the society, economy and environment interact with each other to ensure balanced operation. From an environmental point of view it can be achieved if *a)* the economic and social stakeholders are interested in an environmentally friendly way of work and life; *b)* the development of the urban and transport systems is to enhance the quality of life for the members of society; *c)* the use of available energy supplies is based on a nation-wide consensus.

3. Monitoring and evaluation – an alternative method

Several attempts were made to use composite indices to measure progress (*Bandura* [2005]). We selected from the available, most widely used rankings in order to cover as many aspects of the socio-economic and environmental development as possible. We believe that the findings of the individual rankings will call forth a comprehensive picture that is suitable to assess and compare the development level of the Balkan and East-Central Europe respectively, while offering an exciting opportunity to compare the results of the different types of development analyses (*Adamecz et al.* [2008]). On the one hand, it is to outline the relative situation of a country by *examining several aspects at the same time*; on the other hand, to provide a detailed socio-economic comparison based on *particular indicators* of statistical and questionnaire surveys of individual rankings. Our presentation covers both areas.

3.1. International rankings and the relative total performance index

To handle the findings in a uniform way and to give a comprehensive overview, it must be taken into account that the *rankings mainly reflect the attitudes and value judgments of the Euro-Atlantic world* and only summarize a framework to infer how developed Hungary is and what perspectives of strategic development she has.

One of the main difficulties of a comprehensive analysis is the diverse nature of rankings created for various countries. However, a socio–economic overview requires standardization. A too narrow group of countries (for example regional or subregional groups such as the Visegrád countries) is not adequate to make worldwide comparisons and to explore central/peripheral situations. At the same time, a too wide group may result in a distorted picture: the individual aspects of development do not change in a linear fashion from country to country, their density is greater in the first third of the ranking lists. A wide spectrum is also not proper to highlight qualitative differences between developed and quasi-developed countries.

At first, we included a total of thirty OECD countries in our research, then supplemented it with five countries invited to be full members of the organisation in 2007 – Chile, Israel, Slovenia, Estonia, and Russia, from which the first three became full member in 2010 – as well as five potential members (Brazil, China, India, Indonesia and South Africa) being part of the process of enhanced engagement. Non-OECD EU countries, neighbouring countries and South-Eastern European countries were also covered to make a regional comparison possible. From the latter we have excluded Albania and Moldova because of their largely different development and State Union of Serbia and Montenegro due to the high number of missing data in

some areas. Thus, the circle of countries was extended by ten more (Malta, Cyprus, Bulgaria, Romania, Latvia, Lithuania, Croatia, the Ukraine, Bosnia and Herzegovina, and Macedonia) to include fifty countries in total.

International rankings offer two types of situation analysis: the first is *based on ranking positions,* the second *on the underlying sets of values*. When drawing conclusions from the first ones, we face many issues in addition to the problems of non-cumulative and directly non-comparable rankings. On the one hand, the purpose of country rankings reflects *competitiveness*. To be more precise, it is about the assumption that a higher ranking reflects a better state of affairs and indicates increasing conditions to shape the future as well as a more promising position to develop. On the other hand, the ranking position of individual countries does not reflect the difference between the quality levels of their respective performance and the uneven changes or leaps thereof.

For these reasons, the *sets of values themselves are more representative*. Obviously, due to their nature they are not cumulative either. It can also be an issue that the value data of some indices does not reflect the general standard of performance of the examined countries. That is, it cannot be judged how much a good performance as per a given aspect (for example the level of freedom of economic activities) is actually worth on an international scale, and how much it contributes to the development possibilities.

Therefore, ranking data are also needed to express the hierarchic structure of the global economy and the opportunities for development. In addition, the data are not concentrated around one composite variable, they are comprehensive enough to describe realistic potentials and conditions. Finally, we must add that the current global financial system is based on Euro-Atlantic values and competitiveness, and Hungary is also subject to them.

When comparing the aspects of rankings both the values and the positions must be considered in a complex way. Each must express the *relative performance of the given country compared to the leading ones*. The basis of reference is not a special reference value – which is not even available most of the time – but the best and worst performing countries. It is to examine the actual range of values, since the bottom value is not zero. However, this approach shall not go beyond the scope of competitiveness but to ensure adequate evaluation.

The combined effect of ranking and value data has been considered according to their respective geometric average as follows here (*Gáspár* [2008a]):

$$\text{Relative total performance} = \sqrt{\left(1 - \frac{R_H}{R_{min}}\right)\left(\frac{V_H - V_{min}}{V_{max} - V_{min}}\right)},$$

where R stands for ranking, V for the index value underlying the position, H stands for the Hungarian position or value, respectively. The minimum position is $R_{min}=50$, with one exception: the indices of Malta, Cyprus, and Luxembourg are not ranked because of their small size in the case of ESI (environmental sustainability index). Calculating $1-\dfrac{R_H}{R_{min}}$ will give the relative ranking score of the country, while

$\left(\dfrac{V_H - V_{min}}{V_{max} - V_{min}}\right)$ results in the relative ranking value. The final value of the index com-

bines the two relative performance levels by geometric mean. It can run from 0–1 or 0–100 percent and refers to the overall performance in terms of the country of the higher value.

We have selected four international indicators to compare and to link the rankings numerically. These are as follows:

> – global competitiveness index (GCI) prepared by the World Economic Forum;
> – index of economic freedom (IEF) published by the Heritage Foundation. It has administrative and social aspects too;
> – environmental sustainability index (ESI) calculated by the Universities of Yale and Columbia; and
> – human development index (HDI) of UNDP.

These indicators, when used together, embrace the economic, social, and environmental aspects of competitiveness and sustainability. In addition, instead of one index they provide a more detailed image in some aggregate particular indices (see Table 1).

Regarding values of individual indices of the selected countries, it is realistic and reasonable to distinguish three main groups – *leaders, middle-range and catching-up countries* – and two *subgroups* (*bottom* and *top*) within each of them, that is, we have altogether six groups[1]: *a*) Absolute leaders give 82.6–100 percent of the best performance of the countries; *b*) second line of leaders 66.1–82.5 percent; *c*) top middle range 50.1–66.0 percent; *d*) bottom middle range 33.1–50.0 percent; *e*) promising catching-up countries 16.6–33.0 percent; while *f)* countries falling behind 0–16.5 percent of that.

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[1] Note that these names refer to the selected group of developed and semi-developed countries. Therefore, the "falling behind" category does not allude to the development level of the poorest regions of the world.

Table 1

Relative total performance of Hungary, 2008

Denomination	Ranking score*	Relative ranking score	Ranking value	Relative ranking value	Relative total performance (percent)
GCI	**42**	**0.16**	**4.22**	**0.30**	**21.91**
Basic requirements	39	0.22	4.43	0.22	22.00
Efficiency enhancers	38	0.24	4.31	0.38	30.20
Innovation factors	37	0.26	3.75	0.31	28.39
IEF	**28**	**0.44**	**67.20**	**0.53**	**48.29**
Business freedom	29	0.42	73.90	0.53	47.18
Government size	45	0.10	26.50	0.26	16.12
Freedom from corruption	28	0.44	52.00	0.38	40.89
Labour freedom	18	0.64	66.80	0.36	48.00
ESI	**27**	**0.42**	**52.00**	**0.36**	**38.88**
Environmental systems	32	0.31	38.40	0.23	26.70
Reducing environmental stresses	15	0.68	49.50	0.64	65.97
Reducing human vulnerability	7	0.85	79.80	0.95	89.86
Social and institutional capacity	24	0.48	67.00	0.72	58.79
Global stewardship	35	0.25	30.60	0.25	25.00
HDI	**30**	**0.40**	**87.40**	**0.73**	**54.04**
Life expectancy index	37	0.26	79.90	0.70	42.66
Educational index	24	0.52	95.80	0.90	68.41
GDP index	30	0.40	86.60	0.67	51.77

* Among 50 countries, except for ESI, where 47.

3.2. Relative total performance of Hungary[2]

Hungary, in general, *is in the middle range* of the developed–semi-developed countries, though she shows large discrepancies *by key criteria*: for example, human resources are in the top middle range, business freedom is also ranked close to this, while the environmental conditions are in the bottom middle range. As opposed to

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[2] The following analysis is *based on* the RTP results which are enriched by information from indicators of a wide range of other rankings relying on inward foreign direct investment, outward direct investment, or such as capital access index, doing business index, Kearney's globalisation index, UN index, Fitch Ratings', Standard & Poor's, Moody's ratings, OECD Employment Outlook, OECD Taxing Wages Report, Economic Intelligence Unit's database, EIU e-readiness index, World Economic Forum network readiness index, European scoreboard rankings of the European Committee. For further details, see *Adamecz et al.* [2008].

these, in terms of competitiveness, Hungary is amongst the catching-up countries. This is remarkable because the individual aspects are interrelated, that is, general competitiveness is also about the availability of human resources, the state of the natural environment as well as environmental attitudes.

Figure 1. Relative total performance of Hungary by four indices, 2008
(percent)
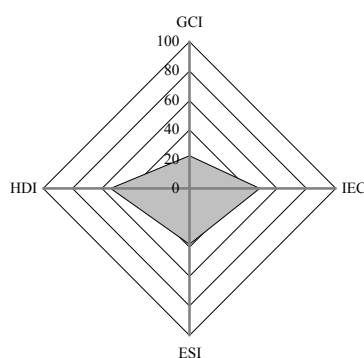
On the one hand, a deeper analysis requires detailed factors. For these latter, key indicators of the composite indices were chosen, for which the rankings also provide performance values. On the other hand, the textual analysis is supplemented with information gained from the overview of other indices and their underlying indicators.[3] These are to provide a deeper insight. (See Figures 2 and 3.)

It should be noted that these individual indices result in a "combined" overview. That is, they indicate *disproportions and* some *inherent stress factors* in how Hungary develops: she belongs to the leading countries in certain areas, but in others, her performance is similar to that of those falling behind. However, not only the entirety of the factors but also *the individual aspects* shows disproportion. The cobweb graphs well illustrate the distortions (or rather imbalances). This *dual disproportion* is a key feature of the Hungarian economy and society.

Out of the fifteen examined individual indicators, seven are in the middle-range, six in the catching-up and only two are in the leader group. It is a good base to characterize the relative situation of our country. Since nine indicators fall into the lower middle-range group or into the catching-up category, that is, in their case, *Hungary performed below the average of the fifty examined countries.*

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[3] For example, ESI that comprises five indicators is calculated by the weighted averaging of their 21 components and their respective 76 variables. These indices include: energy supply, energy supply and economic growth, nuclear energy, electricity generation, energy supply per capita, renewable energy, energy production, oil production, oil prices, water consumption, fisheries, emission of carbon dioxide, municipal waste, energy efficiency, energy intensity, energy dependency, etc.

Figure 2. Composition of the four main indices in terms of relative total performance, 2008
(percent)

Global competitiveness index

Heritage Foundation index of economic freedom

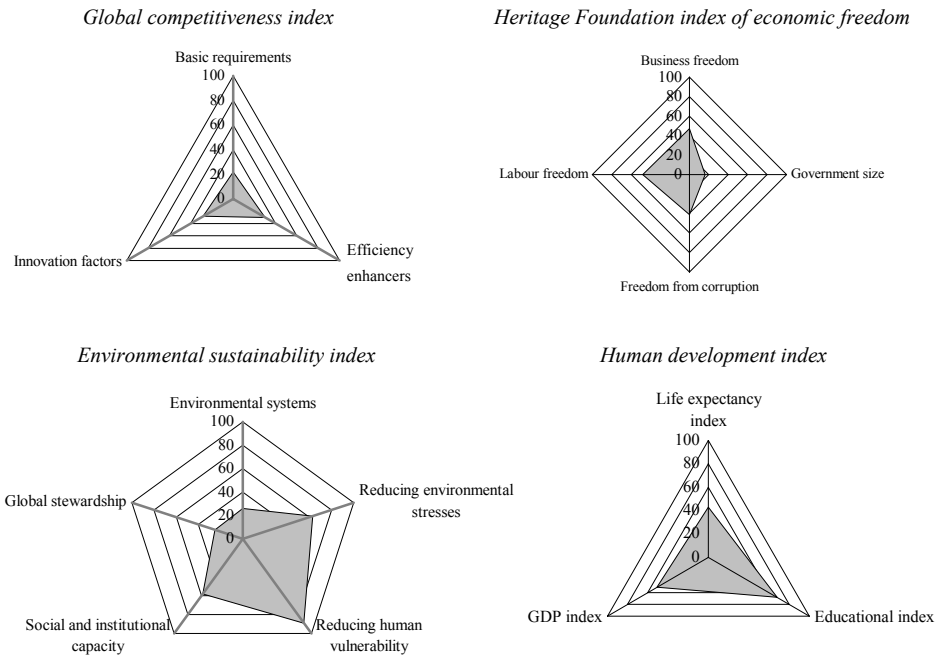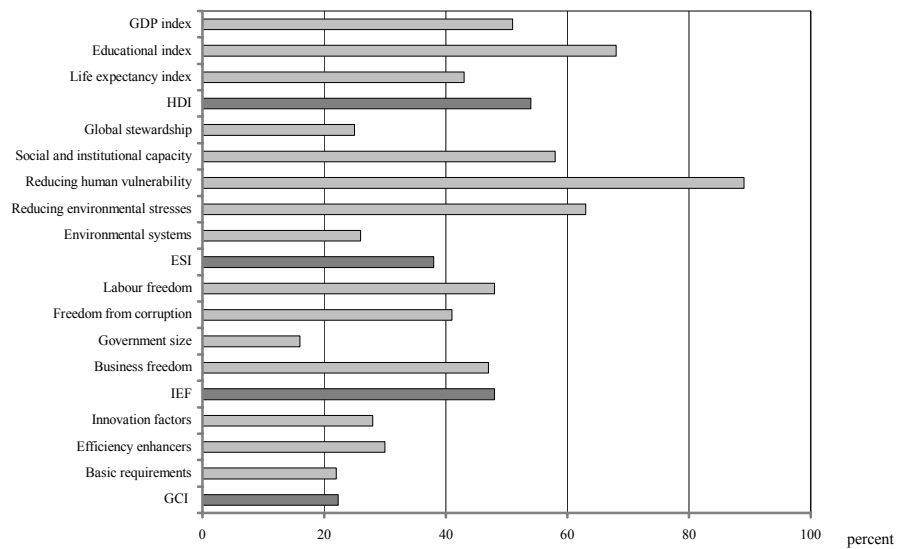*Environmental sustainability index*

Human development index

Figure 3. State of the development categories of Hungary in terms of relative total performance, 2008

As regards human factors (*environmental attitudes,* education and training), we are among the most developed countries. The reduction of human vulnerability – in which our country has promising results – means that socio-economic changes do not bring about environmental degradation. However, our outstanding value is somewhat misleading since the comparison included every country of the world and it was based on such specific variables, like the death rate caused by infections or by floods, hurricanes and draughts, the level of malnutrition, accessibility of drinking water.

Concerning education and training, Hungary is a developed country – the educational index of HDI offsets the low level of incomes. The index of IT society and the GCI indicators show further imbalances: our mathematical and science education is outstanding and we have workforce of diverse qualifications. However, the technical and scientific qualifications show a much less favourable picture, namely the comparative advantages of this asset are not exploited. Another complicating factor that both basic education and adult training are mainly theoretical, not practical: the Pisa research showed above-average scientific and factual knowledge and below-average reading comprehension as well as deductive and practical skills. Based on the parameters, higher education shows deficiencies in the skills of organisation and application management as well as in life-long learning. In other words, our knowledge assets are theoretical, not practical. Our highly qualified workforce is only *a declining potential, namely, it is rather an asset factor than capital.*

From the classical aspect of development/catching-up, based on the *purchasing power parity value of national GDP*, Hungary is at the *bottom of the higher middle range*. The remaining social indicators of environmental sustainability – the social and institutional capacity and the reduction of stress – are mainly peculiar to this category. These indices include indicators on education and research to enhance the understanding of what attitudes the private and public stakeholders show in terms of environmental policies. Environmental stress, water, and air pollution, etc. values have always given a favourable picture compared to those of the developed countries.

The 1990s saw the end of central planning and the revival of a market economy. At the end of 2000, the private sector accounted for 86 percent of the gross domestic product (GDP). Following the crisis of the early 1990s, triggered by political transformation and the collapse of East European markets, the economy rebounded at the end of the decade. Appreciating this, the European Union started accession negotiations with our country in 1998, and she became a full member of the European Union on May 1, 2004.

In 2008, Hungary was in the *bottom middle range* concerning the *freedom of certain economic factors*. This rank is based on economic freedom indicators, on other indices of competitiveness and on the findings of e-readiness rankings. One of the key lessons is that the countries in the middle range show great differences. Our

country is strongly globalized even compared with developed countries: each index on openness and freedom of mobility shows clear signs of liberalization and cross-border integration in terms of economic relations, trading policies, foreign direct investments (FDIs) and the division of labour. The Hungarian legal regulations aim at facilitating foreign direct investments.

At the same time, cross-border flow of FDIs shows discrepancies: inbound FDI is twice as much as what would be required based on the performance of the country, while outbound FDI is less than what the same measure would justify (capital access index). International integration and foreign direct investments need more efficient *state administration* (regulatory environment, governmental efficiency, etc.) than it is today (*falling-behind*) since our political and regulatory environment is complicated and hardly efficient.

This led us to the following issue: each particular indicator *of global competitiveness ranks Hungary in the group of the catching-up countries* of the developed and dynamic world. The rankings of the World Economic Forum is based on institutional, infrastructural, health and educational features and the stability thereof, in which Hungary position is the worst, even if education is far better than the others. The indicators show stability problems and excessive state interference. In terms of financial risks, the credit rating agencies rate Hungary to the upper medium class. This is detailed further by other indices of financial stability. Based on the index measuring the implementation of the Lisbon objectives, there is a significant drop in the performance of Hungary. On the social side, the index of life expectancy within HDI pulls down the index of relative income.

The efficiency enhancers of the global competitiveness index is to highlight the characteristics of the market as well as the technical and higher education. *The Hungarian state* is criticized as oversized, expensive, and *inefficient*. The doing business index shows a contradiction: our business regulations, start-up environment, and lending conditions are ranked as middle range. However, favourable start-up conditions do not offset high taxes and the deficiencies of investor protection, transparency, and responsibility. The capital access index emphasizes a better than average financial environment of capital acquisition, however, the development of the stock market is weak. Another issue is the already mentioned discrepancy between the available human resources and labour market requirements. Foreign investors have different labour market demands and they mainly need blue-collar workforce; the economic activity and employment of technical workforce is below the OECD average; however, Hungary ranked fifth and third respectively in terms of rates of taxes and social contributions among the most developed countries.

Innovation is a key to competitiveness in the group of the most developed countries. There are indicators on how sophisticated and innovative the business environment is. GCI classified Hungary into the catching-up group. This rating can be

supplemented by other indices. In spite of relatively high research and development expenditures and an education system that outperforms the EU average, the *innovative potential of Hungary is low*. One of its causes is the low level of application of the formerly mentioned available assets of knowledge, as well as that of innovation of the business sector. Note that our economy and governance are highly globalised, but our technological adaptation is quite low and the people are not sufficiently open to foreign ideas (with the exception of tourism). Another factor is the low-grade adaptation and exploitation of cutting-edge technologies in enhancing development.

Hungarian consumers are not open to innovative solutions. This may be in connection with their not adequate environmental consciousness highlighted by the index of environmental sustainability. It may result in environmental degradation, for example in water and soil degradation and in the decline of ecosystems and of biodiversity. At the same time, our biodiversity is one of the most valuable national assets.

3.3. Relative total performance of the international environment of Hungary

We have studied which countries are the closest to Hungary in terms of performance. Due to the fact that the different lists of values are not comparable alone and the relative total performance calculations are not available for all the countries, we have chosen a temporary solution: the respective data of only three countries below and above Hungary in the rankings we calculated. Thus, they, together with Hungary, make up 14 percent of the fifty countries. (See Table 2.) We are aware that this list changes from year to year, therefore, we did not weight them based on the vicinity in the rankings, we only paid attention to the characteristics of the group. It is apparent from the summary that the majority of countries showing similar performance to that of Hungary are among the *less- and semi-developed countries*, together with Italy, which underperforms because of its great internal division. The Visegrád countries are all present in the nearest circle, together with the Baltic States. Looking at the entire list, the lower section of the more developed countries, namely the Mediterranean countries, the second and third wave countries of the North in the EU (Lithuania, Latvia, Poland), as well as the semi-periphery of the North American Free Trade Agreement (Mexico) show performance similar to Hungary. It is worth mentioning that the United States of America, the United Kingdom, and Germany have all been listed near Hungary regarding environmental sustainability. In other words, some East-Central European transitional countries have caught up with the most developed regions of the world since the regime change in terms of environmental issues.

Table 2

Position of countries in relation to Hungary in the ranking list of fifty countries

Denomination	Country below and above Hungary in the rankings*					
	–3	–2	–1	+1	+2	+3
GCI	**Indonesia**	**Mexico**	**Croatia**	**Turkey**	**Brazil**	**Greece**
Basic requirements	Russia	Italy	Mexico	Macedonia	South Africa	Poland
Efficiency enhancers	Lithuania	Malta	Latvia	Russia	Indonesia	Brazil
Innovation factors	Indonesia	Latvia	Slovakia	Malta	Poland	Turkey
IEF	**Czech Republic**	**Latvia**	**Republic of Korea**	**Mexico**	**Israel**	**Malta**
Business freedom	Italy	Latvia	Romania	Slovakia	South Africa	Cyprus
Government size	Finland	Malta	Croatia	Austria	Denmark	Belgium
Freedom from corruption	Malta	Israel	Cyprus	Republic of Korea	Italy	Lithuania
Labour freedom	Cyprus	Belgium	India	Slovakia	Latvia	Mexico
ESI	**Chile**	**USA**	**Slovakia**	**Bosnia and Herzegovina**	**Israel**	**United Kingdom**
Environmental systems	Mexico	Germany	United Kingdom	Romania	Poland	Greece
Reducing environmental stresses	Ukraine	Turkey	India	Macedonia	Sweden	Norway
Reducing human vulnerability	Iceland	Czech Republic	Austria	Poland	Sweden	Netherlands
Social and institutional capacity	Ireland	Italy	Estonia	Poland	Czech Republic	Israel
Global stewardship	Macedonia	Estonia	Slovakia	Australia	Czech Republic	China
HDI	**Portugal**	**Czech Republic**	**Malta**	**Poland**	**Chile**	**Slovakia**
Life expectancy index	Bosnia and Herzegovina	Slovakia	Macedonia	Bulgaria	Lithuania	China
Educational index	Lithuania	Latvia	Italy	Russia	Germany	Poland
GDP index	Czech Republic	Portugal	Malta	Slovakia	Estonia	Lithuania

* *Note*. Higher numbers mean better results.

On the OECD basis, the relative total performance of ten Balkan and East Central European countries was calculated (see Figures 4–7). These are (in alphabetical order) Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, the Slovak Republic, and Slovenia. Owing to the high number of missing data, Serbia and Montenegro were not involved in the research. Although this is a great loss; the comprehensive comparison of fifty countries was a good starting point to develop an alternative view on how developed the selected countries of our region are. (See Figures 4–7.)

In terms of *global competitiveness* (see Figure 4), most countries of the region are in the *catching-up or falling behind category*, except for Slovenia and the Czech Republic, which reach the (lower) middle layer of relative total performance. Of the surveyed Balkan countries, Croatia performed better overall than Romania, Bulgaria, and Macedonia, while Bosnia and Herzegovina ranked worst on an OECD basis. Among the competitiveness factors, the basic requirements have the relatively highest position in the Balkan countries where Bulgaria has the most even performance in terms of the different factors. Concerning efficiency, Romania, while in terms of innovation, Croatia held a more advantageous position. Efficiency is the key to competitiveness of the East Central European countries. Only the Czech Republic and Slovenia shows a relative innovation advantage.

The *performance* of the observed countries, on average, was *better* in terms of *economic freedom* (see Figure 5) than in competitiveness. Most of them are classified as "catching up" or "falling behind" on an OECD basis. The East Central European countries approximate the top middle range (the Czech Republic and Slovenia even fall in it), Bulgaria reached the bottom middle range, while Romania and Macedonia are also close to the latter one. At the same time, Croatia performs worse. Note that *overall freedom performance integrates many types and underlying characteristics of freedom*. Transition resulted in a large-scale privatisation mainly in Romania, Macedonia, Bulgaria, and Bosnia-Herzegovina. Oversized government is still a limiting factor in Hungary, Croatia, and Slovenia. Another general characteristic of the Balkan countries is that the advanced stage of privatisation and labour market liberalization are accompanied by deficiencies in the fight against corruption – except for Croatia –, and in the establishment of a business friendly start-up environment.

Environmental issues (see Figure 6) show a quite different picture. Croatia, Slovakia, and Romania reach the top middle range while Bosnia-Herzegovina, Hungary and Poland ranked in the bottom middle one. As a result of the overall state of development, Bulgaria and Macedonia perform better environmentally than Slovenia and the Czech Republic. The factors of "*reducing environmental stresses*" *and* "*reducing human vulnerability*" *play the leading role in the observed countries*. According to international surveys and comparisons, Poland, Croatia and Slovakia are the most environment-friendly countries.

The human factor (see Figure 7) of sustainability is measured by the human development index, which is in all cases in the bottom or top middle categories or very close to them. The differences among the countries are also smaller than for competitiveness or economic freedom. *The structure of the human development index is quite divergent*. Life expectancy indices are the most even as expected. In terms of education, the differences are much higher; however, the GDP performance polarises the countries to the greatest extent. It seems that the Balkan and East Central Euro-

pean countries are better developed in terms of human factors than economically-technically, which offers a better chance to catch up. In case of Slovakia, the Czech Republic and partly Croatia, the three factors of human development are quite even, while Slovenia, Poland, Hungary, Romania, and Bulgaria take an education-based approach.

Comparison over time shows that the *rating of Hungary* improved by 2000 and *declined in the last 8 years*, even set against other stagnating or developing Visegrád countries.

Table 3

Relative total performance of the selected countries
(percent)

Denomination	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Hungary	Macedonia	Poland	Romania	Slovak Republic	Slovenia
GCI	**0.00**	**9.33**	**23.35**	**48.22**	**22.00**	**5.34**	**29.36**	**14.12**	**37.22**	**43.44**
Basic requirements	0.00	9.80	34.87	40.44	22.11	20.87	18.09	7.66	33.21	50.60
Efficiency enhancers	0.00	10.27	12.87	52.15	31.12	3.66	37.15	22.56	47.00	41.52
Innovation factors	0.00	8.16	25.69	55.09	28.69	4.90	25.69	13.95	30.55	45.50
IEF	**8.37**	**34.66**	**13.11**	**53.55**	**48.48**	**28.80**	**21.72**	**30.50**	**54.93**	**25.63**
Business freedom	17.20	31.65	19.90	25.15	47.30	27.33	14.48	48.52	36.71	45.45
Government size	48.80	58.30	18.35	44.06	16.23	68.57	40.75	80.91	53.97	27.39
Freedom from corruption	7.45	24.04	16.67	35.59	41.37	4.08	19.93	9.86	32.96	53.39
Labour freedom	15.16	60.12	8.02	55.71	48.39	33.10	14.14	20.19	45.20	0.00
ESI	**37.06**	**30.50**	**65.30**	**21.59**	**39.53**	**23.48**	**47.68**	**52.48**	**57.49**	**18.83**
Environmental systems	53.33	42.96	57.40	18.76	27.35	44.12	37.82	81.40	68.24	39.53
Reducing environmental stresses	85.66	42.96	96.19	18.11	65.90	64.62	44.93	90.60	30.51	48.26
Reducing human vulnerability	53.28	48.42	74.58	92.93	90.04	34.65	55.12	45.97	97.03	7.19
Social and institutional capacity	4.56	17.91	35.07	51.85	54.40	12.07	53.14	7.47	65.27	30.29
Global stewardship	19.59	17.67	43.39	22.20	25.52	31.68	64.77	13.90	44,62	37.85
HDI	**30.81**	**35.95**	**41.48**	**58.56**	**54.06**	**27.02**	**52.28**	**33.34**	**48.76**	**65.34**
Life expectancy index	49.11	40.89	53.01	56.56	42.79	45.30	51.33	32.78	47.31	59.66
Educational index	30.88	51.24	38.68	53.67	69.95	33.07	63.89	42.82	47.53	81.51
GDP index	15.26	26.62	38.98	57.89	51.86	17.34	42.60	25.10	48.67	61.66

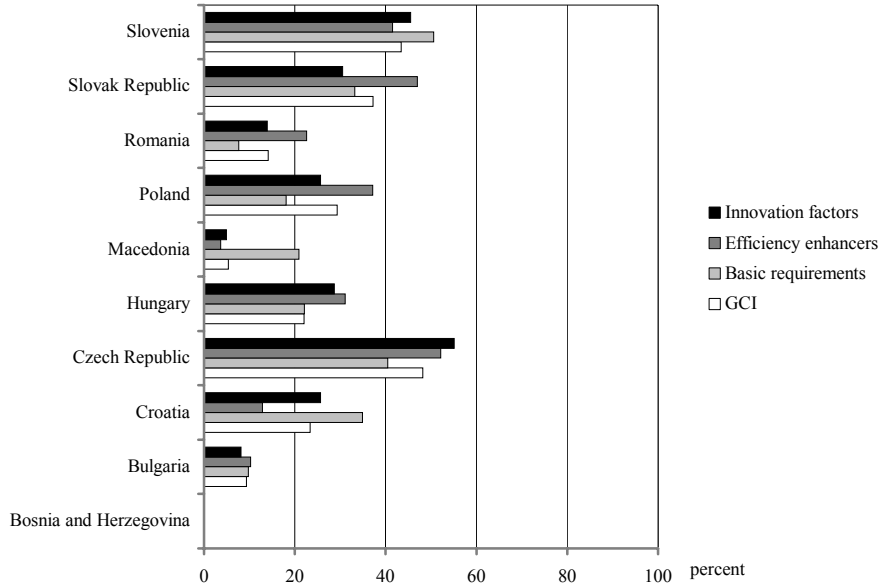*Figure 4. Global competitiveness index of the selected countries, 2008*

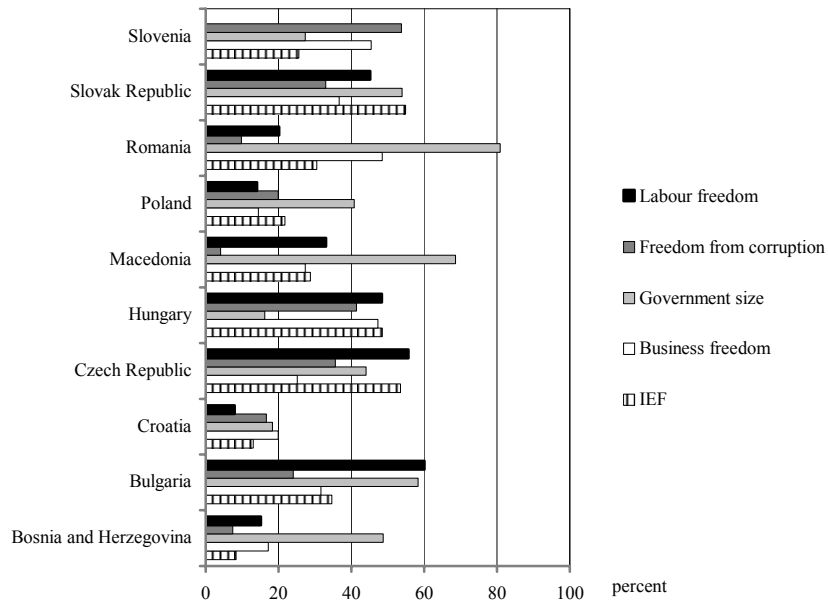*Figure 5. Index of economic freedom of the selected countries, 2008*

Figure 6. Environmental sustainability index of the selected countries, 2008
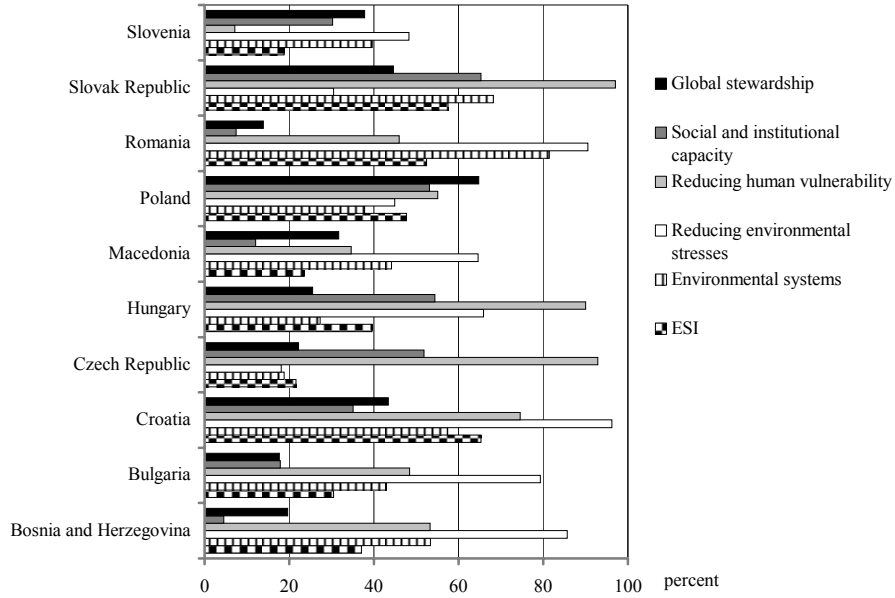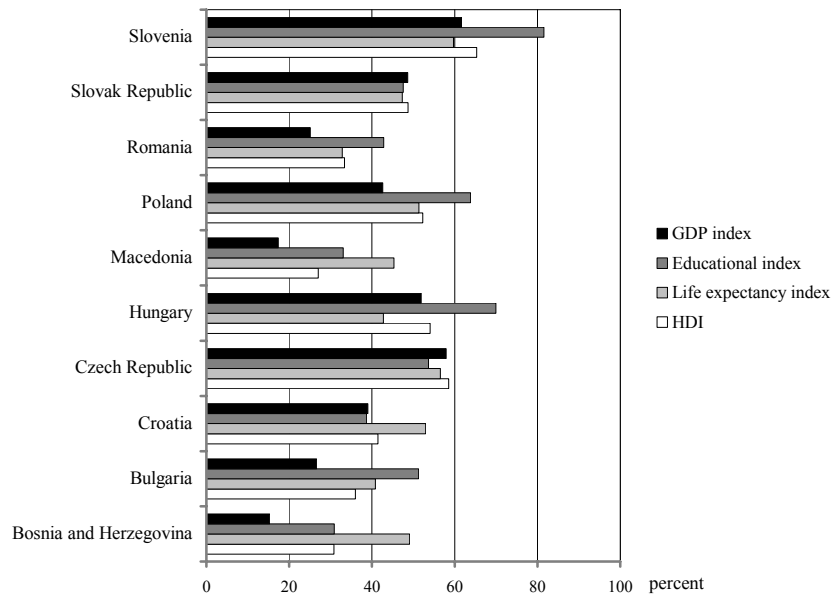

Figure 7. Human development index of the selected countries, 2008

4. Conclusions

The strategy of Europe 2020 is to face fundamental challenges in the coming years. On the one hand, it has to find the way to develop a knowledge-based economy of high competitiveness on the wide interpretation of sustainability. On the other hand, it facilitates European convergence and integration. The processes of sustainability and convergence *require a new approach* to quantify the performance of the member states as well as that of the candidate countries. We suggest *developing a relative total performance index from international rankings* that both expresses the different interpretations of sustainability, using much background information as well as makes a comprehensive cross-country comparison possible.

International *rankings are based on the values and underlying elements of the Euro-Atlantic world*: on a modernisation approach developed over centuries and on the comprehensive concept of sustainable development. Our statements and conclusions on sustainability and convergence of the economy and society of Hungary are supported also by these values. Each ranking highlights a certain factor, their *combined examination* provides a more complex, detailed, and comparable overview on domestic processes and related international reactions based on many indices with several hundred indicators.

Hungary is ranked in the bottom middle range of the developed and quasi-developed world. Our position, which was *not stable*, deteriorated in the second half of the post-regime-change period. Compared with other East Central European countries, Hungary is still ranked currently as a leading country but she is in the lower part of that group.

The performance of our country is approximately *half of the relative performance of the leading countries of the developed world*. The indices showed some *inherent tensions and significant contradictions* typical of the current Hungarian conditions. One of these is the strong economic and political globalisation of the past decades: there are close international relations, investment-friendly legal and institutional systems facilitating cross-border integration, however, cross-border integration and openness are accompanied with weak domestic performance and an inefficient and complicated system of state administration. That is, the channelling guidance, control and strategic management of global impulses are missing. The potentials of international integration are not exploited effectively. Consequently, changes in the global economy may result in detrimental effects on the domestic economy and raise the issue of *reviewing the strategic characteristics of how Hungary becomes an integral part of the global economy.*

The high level of foreign capital inflow to Hungary *is* another *contradiction*. It is excessive in volume. In other words, the incoming capital does not supplement local

savings but substitutes them. It has a serious strategic risk because a basic feature of working capital transfer is that any additionally required working capital will be off-set by an exponentially growing amount of revenue expenditure. At the same time, foreign direct investments to Hungary have limited effects on innovation, additional income generation and local production. High value added products are mainly exported and have low local content. In other words, the relatively abundant inflow of working capital may result in resource extraction and decline in our international competitiveness and in our ranking.

Another essential element to competitiveness is *human capital* that shows the third important contradiction. The indices refer to valuable human assets in Hungary – but the latter ones are *not capitalised*. Firstly, because of deficiencies in equipment (that is, additional assets are required to exploit them), and secondly, because the labour market is less globalized than economy and governance. Thirdly, high value knowledge assets are not applied, not marketed effectively: theoretical skills are not appropriate to accelerate convergence. In addition, consumers and businesses are not sufficiently open to adapt and accept innovations. Finally, our workforce is creative but less sociable and cultured (their individual or specific strengths do not result in a useful and efficient social system to facilitate convergence (in terms of sectors and products)).

Another setback is *our declining international position*. The preservation of the status quo needs a considerable amount of energies. However, they do not serve the convergence of the Hungarian society and economy: there is harsh competition in the middle range to attain a better intra-range position. A lower intra-range position with lower relative performance may result in downgrading and narrowing future perspectives.

In summary, the current situation of Hungary may be well described by the scientific term of "*underperforming latent state of development*": an *emerging economy with considerable and promising but (because of financial and technical deficiencies) not fully utilized human assets*.

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Analysis of Income Inequalities
by Microsimulation*

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The paper presents two applications of the static microsimulation model ECOS-TAX. Firstly, it is examined how the economic crisis afflicted the different strata, and how the income disparities developed in Hungary in the period of 2007 and 2010. The calculations are based on the Hungarian Household Budget Survey, therefore it has been possible to define and to examine different specific segments of the society. Secondly, the probable impacts of a hypothetic version of family taxation are examined by the model. This type of taxation is planned to be introduced in Hungary in the future, although the details has not been elaborated yet. This case study shows that the microsimulation model ECOS-TAX can be an effective tool to quantify the impacts of different tax regulations on the income distribution.

KEYWORDS:
Microsimulation model.
Income inequality.
Taxation.

The economic crisis that burst out at the end of 2008 afflicted Hungary especially heavily. Due to economic equilibrium problems and to high national debt, investors lost their confidence and the Hungarian state had to ask for the support of the IMF, the World Bank and the European Union in order to finance the deficit of the general government. Credit use was subject to fiscal consolidation, which practically meant a drastic reduction of domestic demands. However, the necessary fiscal discipline had a procyclical effect, that is, it resulted in further real losses beyond the already diminishing performance of the private sector. The Hungarian economy decreased by more than 6 percent in 2009, while the decline in final consumption of households was even higher, reaching 6.7 percent. The disposable income of the residential sector was considerably reduced by wage losses that were due to massive layoffs, to the drastic wage reduction of the government sector and to the abolition of the 13th month pension. Another important factor of consumption decrease was that the residential sector had previously accumulated a huge amount of debt, most of which was denominated in foreign currencies. As a consequence of the economic crisis, the domestic currency weakened, which considerably increased the amount of credit repayments. The drastic growth of unemployment and the decrease in living standards are the main sources of serious social tensions. Certainly, the consequences of the crisis afflict primarily the poorest people.

The best source of data where the effects of the crisis and that of austerity measures can be followed across different social strata is the Household Budget Survey (HBS), the results of which are published annually by the Hungarian Central Statistical Office (HCSO). However, these data are published with delay, that is, the income data of 2008 was first published only in the first half of 2010. A possible method of replacing the data to be published later is the so-called microsimulation.[1] The point of this procedure is that the main characteristics and indicators of the micro units (of the households in our case) are determined starting from the last published data by simulating their probable evolution over time. The development of these characteristics is based on the changing macroeconomic environment and on the most probable reactions of the micro units defined by the modeller specifically for different social strata. The economic modelling experts of the ECOSTAT Government Institute for Strategic Research of Economy and Society (hereinafter ECOSTAT) have developed a microsimulation model called ECOS-TAX among others for such purposes. In the following, we analyze the results of the most recent model runs.

The primary purpose of this model is to follow the income inequalities after the outbreak of the economic crisis and to assess their future effects. It is a fundamental

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[1] The methodology is discussed for example by *Molnár* [2003].

issue, what impact the present tendencies will have on sustainable development. Thus Section 1 analyzes the relationship between income inequality and sustainability. The next one discusses the possibilities of microsimulation modelling and presents the activity and experience of ECOSTAT linked to this area. Section 3 examines the results of the model runs. First, the simulation results concerning the forecasted development of income polarization are introduced. Then the possible effects of substituting the present personal taxes were quantified by a family taxation system since the position of different social strata is considerably influenced by the rules of income distribution, among others, by the tax system. The paper ends with some conclusions and policy recommendations.

1. Income inequalities and sustainability

There are different theories and opinions in the academic literature concerning the measure of polarization and its effects on sustainable development. According to a widely shared opinion, both a too low and a too high level of income inequalities may have several negative effects on a society. For example, *Cornia* and *Court* [2001] state that on the basis of income concentrations, the "suitable" value of the calculated Gini-index[2] is between 0.25 and 0.4, which they call the "efficient inequality range". These two limits are more or less typical for the Scandinavian countries and for the United States, respectively. If the level of polarization is too low, there are no work incentives, furthermore labour shirking is typical. The other extreme does not assure incentives either, but weakens social cohesion, and sharpens social tensions. Thus, for example, when we elaborated the model of sustainable development called SOCIO-LINE, the effects of inequalities were also taken into consideration and were formally built in the model (*Cserháti–Révész–Takács* [2001], *Révész* [2006]). In the Soviet bloc countries, inequalities were relatively low, then, after the regime change, increased. However, the main factor of polarization was typically not the good and effective work there but the stabilization of monopolistic and other privileged positions, which were obtained through "social capital" (for example through personal connections). The main problem is that a massive middle class has not evolved so far between the large lower and the small upper classes, although this would be a fundamental condition of a normal democracy and an effectively operating market economy. The global economic crisis has changed/has been changing the social structures in a wrong direction: the middle class weakened/is weakening as several families fell (and are still falling) behind.

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[2] The ordinary Gini-index based on the Lorenz-curve may vary between 0 és 1, where 0 means perfect equality.

Based on the famous Kuznets curve (*Kuznets* [1955]), inequality increases until a certain stage of economic development and decreases thereafter. Although this paradigm has been disproved many times even by empirical data, the idea has emerged lately in the literature in a modified way (see for example *Galor* [2009]). In accordance with this theory, the growth and accumulation of physical capital play a more important role in the aggregate supply, in the earlier stages of economic development. Inequality rather stimulates the development in this period, since a social class emerges and it is able to accumulate large amount of savings, which can be the source of capital accumulation. However, later, which is also true today, the role of human capital is more and more important. The relative yield of human capital is greater than that of physical capital, and the lower level of income inequalities stimulates human investments better. Furthermore, it should be noted that the large amount of foreign direct investments, that is, the import of developed technology in the developing and accession countries makes the catch-up process possible without high inequality level in the household sector.

Figure 1. Income quintile share ratio[3] in the European Union, 2008
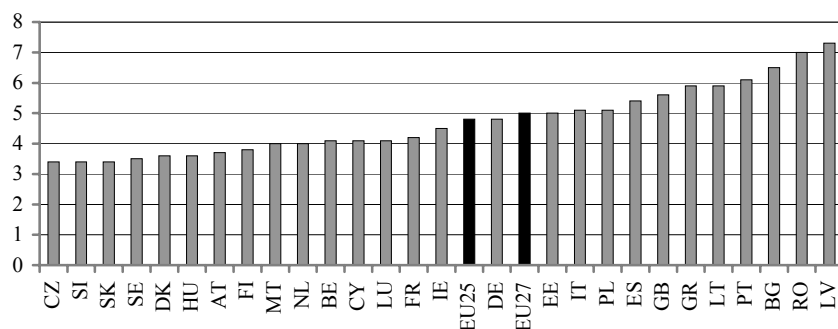
Note. Instead of country names, ISO country codes are used.
Source: Eurostat.

According to Eurostat data[4] (see Figure 1), the income quintile share ratio showing inequality of income distribution was relatively low in Hungary compared to other EU-members before the global economic crisis. However, we think that this value (3.6) is underestimated since the time series of Eurostat show a sudden setback in 2007. In this year, income quintile share ratio was lower than 4 that was below the value of 2006 (5.5). Thus, the value of Figure 1 seems to be unrealistic as the first

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[3] The income quintile share ratio is the ratio of total income received by 20 percent of the population with the highest income (top quintile) to that received by 20 percent of the population with the lowest income (bottom quintile).

[4] For the time being, the Eurostat publishes data until 2008.

austerity measures were taken in 2007 after the government deficit was overshot in 2006. By all means, in Hungary, inequalities could not be considered extremely high before the crisis compared to other EU member states. We think that inequality itself is not the most relevant problem; the key issues are what income level it is realized at and how many people live in (deep) poverty. The poorest stratum reproduces itself in spite of serious government efforts (see *Ferge* [2005]). Unemployment implied by the economic crisis primarily afflicted the undereducated people; therefore, one could assume that income polarization increased during the past two years. One of our main goals was to verify this hypothesis in the absence of officially published data and to quantify income inequality according to different social strata.

2. Modelling of income disparities by microsimulation

Microsimulation models can be used to follow the dynamics of incomes, but primarily, they are tools to assess and to quantify the effects of planned economic policy measures (for example that of tax reforms). These analyses based thereon serve as an integral part of economic policy in several developed economies. In the United States, for example, Congress is not even willing to consider any plans of taking new measures, if such a microsimulation-based analysis is not available. In Europe (for example in Sweden and Italy), the decision makers also use several microsimulation models, and the EU itself has its own tax-benefit microsimulation model[5] too.

The usefulness of the results depends on the reliability of basic data and on the correct modelling of reactions at micro level. Certainly, the characteristics of the population vary over time, which is an important aspect if one wishes to analyze the middle or long-term effects of policy measures. A microsimulation model is dynamic, if it also takes population dynamics into account. However, it is practically satisfactory to use a simpler static model like ECOS-TAX to assess the sudden effects of a tax reform.

The economic modelling experts of ECOSTAT began to develop a microsimulation model in the spring of 2006 together with the professionals of the HCSO. The HBS income data of 2004 were the latest at that time, therefore, at first, the income data of the following year were simulated within the framework of the joint research. The model was later verified, when the actual data of 2005 were published. The impacts of the 2005 tax reform were modelled, and an experimental case study was also made focusing on the possible changes of family allowances. The results were published in a joint working paper of the HCSO and ECOSTAT (*Cserháti et*

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[5] See details on http://www.iser.essex.ac.uk/research/euromod

al. 2007). The ECOS-TAX microsimulation model has been being developed since 2007, through which we can also follow the dynamics of family incomes for the period of 2007–2010 (see *Cserháti–Péter–Varga* [2009]). A case study of the planned tax reform has been prepared too. The first results are presented in Section 3 of this paper.

In the following, we briefly outline the main characteristics of the ECOS-TAX model. Its input data source is the data of the HBS conducted by the HCSO[6] that refer to a base year. For the time being, the latest information is used, namely, the data of 2007 covering income, expenditure, and living conditions for observed households and persons belonging to them. The 2007 sample comprises 8,547 households and 22,305 persons. The model simulates yearly about 150 income data depending on the characteristics of particular households and on the changing macroeconomic and social environment.

The model shall treat two main problems. On the one hand, income data are typically underreported; therefore consistency between macroeconomic and HBS data has to be assured in every year. On the other hand, every household has a weight in the HBS database, which guarantees that the sample represents the whole household sector in that particular year; and simulation has to maintain the representativeness of the sample during the time interval of simulation too.

The first problem has been solved by using external data sources. Wages, pensions and property incomes, which cover around 80 percent of disposable income of the whole household sector, have been adjusted for the model runs. Regarding wages, we used the personal income tax database of the Hungarian Tax and Financial Control Administration (APEH). As a first step, weights were adjusted in such a way that the limit values of the deciles in the HBS data equalled to those of personal income tax data. Then we compared the wages in "three-dimensional groups" of persons according to deciles, regions and age in the two databases, and modified the HBS data multiplying them by group-specific ratios. It was also ensured that the number of persons with the highest incomes (having more than 15 million HUF in the base year) was the same in both data sets. Data from the Hungarian National Bank were used for the estimation of property incomes. The majority of this latter type of income is net interest, which does not appear in the HBS since only interest withdrawn is reported from realized income. We assessed the distribution of this type of incomes among the deciles. The HBS dataset is not representative for pensioners, thus the values of pensions have been adjusted in such a way that the pension per capita equalled to the value given in the "stADAT" database of the HCSO[7].

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[6] See a detailed description about the HBS in English on the webpage of the HCSO: http://portal.ksh.hu/pls/ksh/ksh_web.meta.objektum?p_lang=EN&p_menu_id=110&p_almenu_id=104&p_ot_id=100&p_obj_id=ZHC&p_session_id=39842802

[7] http://portal.ksh.hu/pls/ksh/docs/hun/xstadat/xstadat_eves/i_fsp001.html

We found a solution to the second problem by using external macroeconomic and demographic data. Since the actual HBS data are published with a one-and-a-half year delay, simulation is nothing else but "forecast" for past periods for what macro data are already available. If one wishes to calculate for the real future, certainly the macroeconomic data have to be first forecasted exogenously. Its suitable tool may be, for example, the ECO-LINE quarterly macro econometric model developed by ECOSTAT. Demographic data are also published by the HCSO, while the HCSO–Demographic Research Institute provides forecasted values. Determination of weights means solution of a mathematical programming problem with these macroeconomic, demographic, and other types of constraints. While determining the original weights for the households, only demographic data are considered. However, additional constraints are regarded, when the weights are adjusted during simulation. The increase of unemployment according to regions and (government and corporations) sectors and the constraints defined by different macroeconomic indicators are taken into account. The wages are simulated differently, based on NACE industries. The social transfers and other incomes are determined year by year specifically for each household according to the actual regulations and the laws of the particular years.

It should be noted, however, that only the income data of the HBS are simulated. There are plans for simulating also the expenditure side in the future by developing a new module for ECOS-TAX. The present version of the model is suitable for "flash" (or rapid) estimation[8] of the HBS income data, that is, it is possible to tackle the problem of the one-a-half-year delay of publishing the actual data.

3. Application of the ECOS-TAX model

In this section, we present two applications of the ECOS-TAX. The first one follows incomes and income disparities during the period of economic crisis. The second one is the examination of the impacts of family taxation with hypothetic parameters.

3.1. Dynamics of household incomes between 2008 and 2010

The dynamics of household incomes has been examined according to the following household characteristics:

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[8] The notion of "flash" or rapid estimation is used by statisticians primarily for the first assessment of the quarterly GDP, which is based on models in the absence of actual data.

– Income deciles
– Number of dependent children
– Age structure of households
– Activity of the household head (active wage earner, inactive pensioner, other inactive person)
– Number of wage earners
– Regions
– Types of settlements.

The results of model runs are summarized in Tables 1–7. The incomes per capita were determined across different social strata. Our hypothesis was that the economic crisis afflicted the particular income deciles to a different extent. The results show that income polarization increased in such a way that the relative position of the lowest five deciles declined by about the same rate, while the relative position of the rest improved. The higher the decile we consider in the upper half of the population, the less the fall is. Only the highest two deciles showed less decrease than the average. However, despite the crisis, the relative position of the lowest decile did not worsened in 2009 (see Table 1) because surplus social incomes could still compensate the falling wages and salaries.

Table 1

Income* polarization by decile
(Previous year = 100.0 or 2007 as a base year = 100.0)

Income decile	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of households
Decile 1 (the lowest)	96.0	100.0	95.7	91.8	379 397
Decile 2	98.4	96.8	96.3	91.8	379 623
Decile 3	99.3	95.7	96.3	91.5	379 321
Decile 4	99.0	95.8	96.4	91.4	378 167
Decile 5	99.5	95.3	96.8	91.7	380 433
Decile 6	100.2	95.3	96.9	92.5	379 556
Decile 7	100.6	95.4	97.0	93.2	378 704
Decile 8	100.5	95.4	97.6	93.6	379 426
Decile 9	101.3	95.0	97.8	94.2	380 005
Decile 10 (the highest)	103.0	95.2	98.0	96.2	378 897
Total	100.6	95.9	97.4	93.9	*3 793 529*

* Net real income per capita.
Source: ECOS-TAX model results.

Éltető [1997] examined the development of the so-called Hungarian Inequality Measure (HIM) in the 1980s. HIM is the ration of the average income of those above the mean to the average income of those below the mean. The value of HIM under the state-controlled economy began to grow in the 1980s, its value was 2.01 in 1987, in case of households with active earners. HIM continued to increase under the circumstances of market economy, its value were 2.38, 2.45, 2.42 and 2.45 in the years between 2007 and 2010, respectively.

Considering the groups set up according to the number of dependent children, one can see that the economic setback afflicted the large families very seriously. Differences can be observed even among families with less than three dependent children in favour of families with one child or without a child. It is perhaps a bit astonishing that the position is/was better with one child than without in 2009 and 2010, but the difference is minimal. Certainly, the crisis afflicted the families with three or more children most of all because the family allowances were frozen. (See Table 2.)

Table 2

Income* polarization by the number of dependent children
(Previous year = 100.0 or 2007 as a base year = 100.0)

Household category according to the number of children	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
No children	103.1	95.4	97.3	95.7	4 529 559
One child	100.8	97.4	97.7	95.9	2 402 609
Two children	97.9	98.3	97.3	93.7	2 020 548
Three or more children	93.6	96.8	97.6	88.4	925 117
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

Considering the age structure, it seems that families comprising more generations could better adjust to the crisis than the average, while the position of those consisting of only young members greatly worsened (see Table 3) since the unemployment rate of young people starting out a career increased considerably during the slump. The activity status of the household heads shows that the relative position of families with an inactive but not a pensioner head definitely deteriorated. (See Table 4.) The regulation of the pension system changed in such a way that pensions could preserve purchasing power relatively better than wages and salaries, thus the relative position of households with a pensioner household head improved. The model provided an obvious result according to the number of wage earners: the fewer earners a family

has, the worse its position is. (See Table 5.) While the inactive households had more than 5 percent real loss in 2009, the households with three or more earners may experience a considerable loss only in 2010.

Table 3

Income* polarization by the age structure of the household
(Previous year = 100.0 or 2007 as a base year = 100.0)

Age structure of the household members	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
Only young	95.7	95.1	97.6	88.8	537 395
Only middle-aged	100.5	94.9	97.9	93.4	894 780
Only aged	102.6	92.9	96.7	92.2	1 269 847
Young and middle-aged	101.4	96.9	97.5	95.9	5 571 500
Young and aged	105.8	99.2	97.4	102.3	113 576
Middle-aged and aged	100.4	96.0	97.3	93.7	678 913
Three generations	98.1	100.6	97.2	96.0	811 822
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

Table 4

Income* polarization by the activity status of the household head
(Previous year = 100.0 or 2007 as a base year = 100.0)

Activity status of the household head	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
Wage earner, active	101.0	95.9	97.7	94.7	2 712 557
Pensioner, inactive	98.9	99.8	97.2	95.9	5 872 090
Other inactive	99.8	94.7	96.1	90.8	981 240
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

Income* polarization by the number of wage earners
(Previous year = 100.0 or 2007 as a base year = 100.0)

Household category according to the number of wage earners	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
No active wage earner	100.3	94.6	96.8	91.9	2 712 557
One wage earner	100.0	95.5	97.6	93.1	3 152 810
Two wage earners	101.9	97.2	97.6	96.7	3 206 271
Three or more wage earners	100.1	99.2	97.6	96.9	806 195
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

Income* polarization by region
(Previous year = 100.0 or 2007 as a base year = 100.0)

Region	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
Budapest	101.2	95.6	97.6	94.4	1 684 665
Pest County	102.4	96.9	97.8	97.1	1 171 890
Central Transdanubia	98.9	96.9	97.5	93.5	1 072 663
Western Transdanubia	103.7	93.1	97.5	94.1	945 868
Southern Transdanubia	99.4	96.3	97.1	93.0	937 476
Northern Hungary	94.8	99.7	97.3	91.9	1 239 775
Northern Great Plain	99.5	96.0	97.0	92.7	1 526 562
Southern Great Plain	97.7	97.8	97.2	92.8	1 298 934
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

Families in the capital city were examined separately in the regional analysis. (See Table 6.) It is conspicuous that the relative position of Budapest became worse than that of Pest County surrounding the capital. This county suffered from the smallest decline compared to other regions. The result can be explained by the fact that families with higher incomes moved out from the capital to the suburbs in the

past 15 years. The relatively worsening position of Budapest shows that, although the income per capita is the highest here, there is a broad and increasing social stratum dropping behind. At national level, the regional differences increased, the traditionally less developed Eastern regions endure the most considerable economic downturn. The setback of the Northern Hungarian region is the largest, but the relative position of the two regions of the Great Hungarian Plain is almost as unfavourable. The results concerning settlement types show that villages are in the worst position. (See Table 7.) The lowest decline is observed in small towns, but this is only the consequence of surplus growth experienced before the economic crisis.

Table 7

Income* polarization by the type of settlements
(Previous year = 100.0 or 2007 as a base year = 100.0)

Type of settlements	Real growth of incomes, 2008 (percent)	Real growth of incomes, 2009 (percent)	Real growth of incomes, 2010 (percent)	Real growth of incomes, 2010/2007 (percent)	Number of persons
Budapest (capital)	101.2	95.6	97.6	94.4	1 684 665
Towns with county rights	99.9	96.5	97.8	94.3	1 932 606
Other towns	103.2	94.8	97.3	95.3	2 844 143
Villages	98.1	97.6	97.0	92.9	3 416 419
Total	100.6	95.9	97.4	93.9	*9 877 833*

* Net real income per capita.
Source: ECOS-TAX model results.

3.2. Investigation of family taxation

Personal income taxes amount to the quarter of state revenues in the EU. There are relevant differences regarding the volume and structure of taxes in various countries. The number and values of tax rates, bands, preferences, exemptions and the types of income fully liable to taxation differ from country to country. Each of them has an influence on the effectiveness of taxation, in particular on the amount of tax revenues, on the measure of redistribution and indirectly on the level of unemployment. Different personal income tax systems have been developed in the countries, and they are far from being uniform even within the EU (see *ECOSTAT* [2010]). In most of the countries, personal income taxation is applied, but there is a family taxation system in Germany, Denmark, France, Belgium, and Luxembourg, while Spain applies a mixed system. Certainly, these latter countries have different types of fam-

ily taxation, thus, for example, the tax rule may allow different shares of income among family members, which affects the calculated tax.

In Hungary, the necessity of introducing family taxation – that stimulates the willingness to have more children – has lately emerged again. Since there are many variants regarding the realization of such a profound change in the taxation system, it is unavoidable to assess the possible effects by model simulations, which allows the quantitative comparison of these variants. The ECOS-TAX model in its present form is already suitable for such types of analyses. The effects of the variants can be compared by determining different sets of parameters. On the one hand, the tax revenue from the residential sector can be determined at macroeconomic level, and on the other hand, the impacts on different segments of the society can also be assessed (for example, it is possible to analyze how the system of redistribution may change).

We present the results of a model run, which simulated the hypothetical scenario of the family taxation system for 2009. The positions of different family types were examined, and the results were compared to the baseline scenario, that is the actual tax system of 2009. The parameters were set in such a way that families can reduce the calculated tax by 20, 50, 75, and 100 percent having one, two, three, or more dependent children, respectively. The resulting net income of this system was compared to the actual realized net income. Figure 2 shows that the family taxation system decreased income inequalities, and the relative position of families with two children became the most favourable. At first sight, it might be astonishing that families with higher incomes benefit more from a family taxation system (see Table 8). The obvious explanation of this phenomenon is that a certain percentage tax deduction means a higher amount of benefit in absolute terms for richer families as their average tax burden is higher.

Figure 2. Annual net household income in different family types
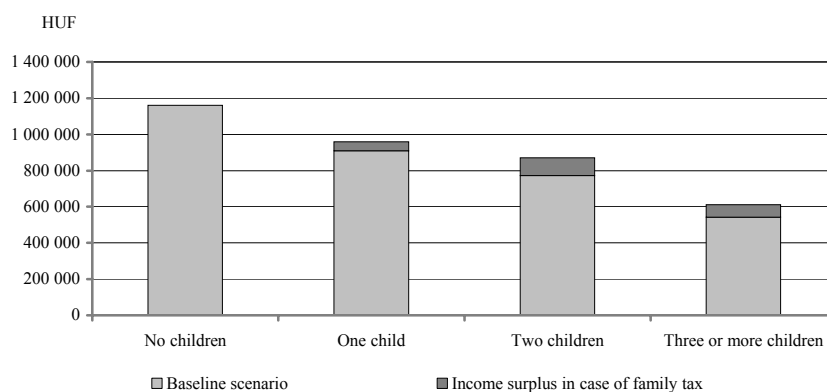
Source: ECOS-TAX model results.

Table 8

Possible surplus income of households in family taxation

Income Decile	Family tax scenario per baseline (percent)	Number of households with			
		no children	one child	two children	three or more children
Decile 1 (the lowest)	100.1	99 884	106 016	99 748	73 227
Decile 2	100.2	160 225	96 516	89 795	33 639
Decile 3	100.6	209 995	92 819	59 291	17 012
Decile 4	100.8	249 931	72 967	46 975	9 387
Decile 5	101.2	252 498	75 935	45 341	5 938
Decile 6	102.0	275 688	66 036	34 227	3 117
Decile 7	102.6	287 225	62 291	24 780	5 036
Decile 8	103.8	293 344	52 356	28 547	5 027
Decile 9	104.9	282 732	57 846	33 944	5 062
Decile 10 (the highest)	108.4	292 532	51 653	29 556	5 391

Source: ECOS-TAX model results.

4. Conclusions

The ECOS-TAX microsimulation model is a tool for following the dynamics of income of different social strata before the official publication of HBS data. The strata can be specified according to all indicators for which the HBS provides information. The model is also suitable for forecasting income data and for quantifying the effects of planned measures, for example, those of a tax reform. This latter one is a topical feature since for the time being the Hungarian tax system is facing profound changes.

In this study, the model was used for two purposes. Firstly, we wished to assess income polarization experienced during the economic crisis. The results showed that income inequalities increased although the position of all deciles worsened. The decline was less than the average only in the two highest deciles. There was a growth in the number of families falling behind. Supposedly, a certain share of them could be compensated for their losses in hidden economy. The negative effects of the crisis were especially serious for young and large families. The simulations proved that income polarization increased as a result of deep recession. The crisis afflicted the poorest strata, the households with three or more dependent children and young peo-

ple starting out a career most of all, while households comprising more generations and having several earners could minimize its effects.

The other investigation is connected to the first one: it quantified the effects of a family taxation system. The actual data of 2009 were compared to the results of an alternative scenario, in which it was supposed that the family taxation had already been employed in 2009. Introducing a family taxation system is on the agenda, although it is unknown which type with what parameters and what tax rates will be applied. Therefore, we assumed a hypothetical case with certain parameters. The results showed that families would do realize surplus income that was larger in the higher income deciles. For the time being, there are several other plans concerning this issue. A probable scenario is the application of flat-rate personal income tax combined with family taxation, which may increase income inequalities. If the long-term goal of economic policy is to decrease the dependence on foreign capital, domestic sources should be accumulated and devoted to capital investment. This may involve the growth of income inequalities. Long-term processes, however, cannot be followed only by static models. Therefore, we intend to develop ECOS-TAX in such a way that it will be capable of taking account of population dynamics as well as suitable for mid- and long-term analyses.

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On the Nature of Nonresponse and Interviewer Effects in the Hungarian Labour Force Survey

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The study reviews the nature of nonresponse particularly in the case of the Hungarian Labour Force Survey and investigates the impact of interviewer and respondent characteristics in counties with a three-level logistic regression model.

One of the main objectives of official statistics is to gather information about the national labour market. It is important both in international and national contexts for the assessment of the national social and economic policies and for the indication of social trouble spots. In international practice, the labour force survey is a widely used statistical tool to provide simultaneous, comprehensive and systematic monitoring of employment, unemployment and underemployment.

No matter how carefully the survey is designed and conducted, some of the desired data will be missing because of refusal to provide information or of failure to make contact with a selected unit. Since non-responding units may be systematically different from the responding ones, nonresponse results in bias. Nonresponse and missing data increase survey (sampling, non-sampling, etc.) errors, while nonresponse rates and biases as a part of non-sampling errors may both influence the quality of survey data.

Within the framework of the Eurostat Grant "Labour Force Survey – Assessing Nonresponse Effect, 2009", we analysed the determinants of household nonresponse in the Hungarian Labour Force Survey to contribute to deeper understanding of the process and reasons for nonresponse as a social phenomenon. We conducted a nonresponse survey based mainly on interviewer observations to collect information on the characteristics of non-respondents.

With regard to the interviewers' important role in the quality of the data collection process and their key part in contacting and convincing potential respondents, a round table discussion and an interviewer attitude survey were conducted.

The paper is organised as follows. Section 1 contains a brief description of the Hungarian Labour Force Survey (HLFS). In Section 2 the usual categories of nonresponse are reviewed with emphasis on those used in the HLFS. In the following section the main characteristics of interviewers are described on the basis of the 2009 Interviewer Attitude Survey conducted by the HCSO. Finally, Section 4 reports on the analysis of the interviewer effects by means of a three-level logistic regression model. This section contains also a brief description of the methodology and the summary of the results of model computations.

1. The Hungarian Labour Force Survey

The Labour Force Survey, introduced in 1992, provides quarterly information on the labour market position of the non-institutional population aged between 15 and

74 (private households). The concepts and procedures used are in accordance with ILO (International Labour Organizations) definitions and Eurostat regulations. The main indicators are employment rate, unemployment and participation rates.

Figure 1. Unemployment rate by counties, 2009
(percent)

	6.0 – 7.9
	8.0 – 10.4
	10.5 – 11.9
	12.0 – 13.4
	13.5 – 16.4
	16.5 – 20.0
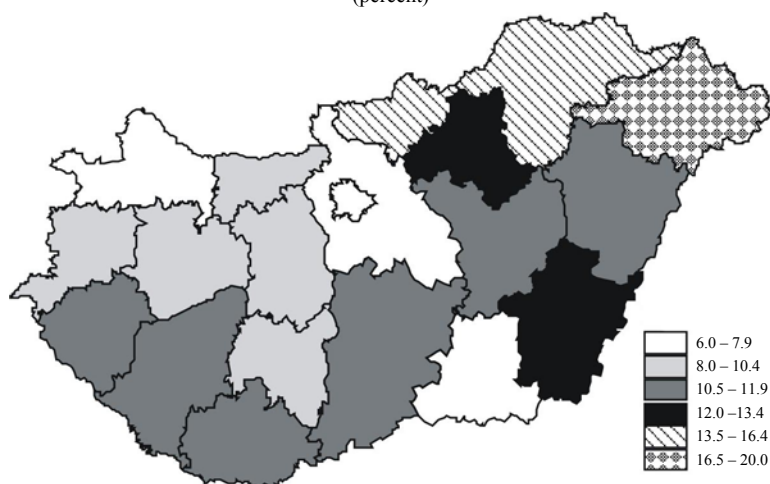
Source: HLFS.

Only those household members are interviewed in the target population, who contribute to the common income/consumption. In addition, the survey provides some socio-demographic information on the population without age limit.

First, face-to-face interviews are carried out using a paper-and-pencil approach, and then, if the respondent agrees, recall interviews are conducted by telephone.

Prior to the first interview, a letter is delivered to the households of the selected sample, explaining the selection and giving information on the interviewer visit for them.

The Labour Force Survey is based on a multi-stage stratified sample design. The sample design strata are defined in terms of geographic units (19 counties and the capital city) and the size categories of municipalities. There are 171 self-representing municipalities in the country, each representing a design stratum by itself. There are also 104 design strata consisting of non-self-representing municipalities, thus the total number of strata amounts to 275. Addresses of the sample come from the register of the 2001 Census. In the self-representing municipalities, dwellings are the primary and ultimate sampling units, while in the other part of the sample, municipalities are the primary, and dwellings are the secondary and ultimate ones.

The quarterly sample consists of three monthly sub-samples of equal size, which do not overlap. It includes about 38,000 households, nearly 100 thousand persons, out of which 66–68 thousand aged between15 and 74 provide labour market information.

The sample has a simple rotation pattern: any household entering the sample at some time is expected to provide labour market information in six consecutive quarters then leave the sample forever. This simple and efficient rotation scheme is called rotation panel. In this panel each monthly sample consists of six pairwise disjoint subsamples associated with the waves 1–6, that is with the numbers of cases that the subsamples have been visited by the interviewers; the subsample of wave 1 consists of new entrants. The subsamples pertaining to the waves have the same design and, apart from attrition and substitute addresses, the same size. The quarterly sample consists of 3x6 pairwise disjoint and (approximately) equivalent subsamples, but any of these belongs to one of the waves 1–6. The overlap between two consecutive quarterly samples is approximately 5/6, the deviation, if any, is caused by attrition and substitute addresses.

Estimated totals or "levels" based on the HLFS sample are computed with the use of Horvitz–Thompson estimator. The weights are estimated in three steps. At the first stage, design (or design-based) weights are determined. For any stratum of the sample, the unique design weights are defined as the ratio of the total number of dwellings in the stratum to that in the subsample for that stratum, which are updated annually based on housing statistics. The design weights are first subjected to a simple adjustment for nonresponse (not eligible dwellings) within a geographic unit. The so-called primary weights (subweights) obtained in this way are used then as input for the calibration procedure. The calibrated weights are determined with the method of generalized raking. The procedure is done separately for the 19 counties and the capital (Budapest). Within each county and the capital, 22 calibration constraints are used, corresponding to the following controls: cell counts of 2x10 age–sex groups, total number of individuals living in big cities (with at least 50,000 inhabitants) and that of households. These controls are updated by the demographic component method for each month, estimating the total number of households.

The sampling errors are computed by suitable adaptation of the "jackknife" techniques with Taylor linearization. The computations have been carried out with the Variance Estimation for Complex Samples (VPLX) software developed by *Robert E. Fay* at the U.S. Census Bureau, Washington, D.C. and with the SAS software.

It can be said that the Hungarian Labour Force Survey remains the most regular, coherent, harmonised, reliable and used source of basic information on the Hungarian labour market.

2. On nonresponses

Nonresponse occurs when eligible units in the selected sample do not provide the requested information, or the provided information is not usable.

There are two main types of nonresponse: unit nonresponse and item nonresponse. Unit nonresponse occurs when a selected unit does not provide any information (in fact the questionnaire form remains empty, or the whole questionnaire is unusable). In case of unit nonresponse, the realised sample will be smaller than originally planned, which leads to increased variance estimates and thus to a lower precision of the estimates. Unit nonresponse has received a great deal of attention, due in part to frequent use of the survey response rate as a widely used indicator of the quality of data.

Weighting techniques are often used to minimize the effect of unit nonresponse. However, a nonresponse error may still affect estimates derived from the data to the extent that the underlying assumptions are not fully met, such as, for example, the sample units are not missing at random.

Item nonresponse occurs when a responding unit does not complete an item or items on the survey questionnaire, or the response(s) obtained is (are) unusable.

A variety of reasons exists for unit nonresponse, and they may vary depending on the mode of the survey and survey design. Unit nonresponse in an interviewer-administered personal visit household survey can occur because no one is at home (not-available), the individual refuses or is unable to participate for example due to language problems. Sample persons in a telephone survey may decline to participate directly, or may be using answering machines and caller identification to screen calls, in some sense show unwillingness without being formally solicited. Sample persons in mail surveys may refuse by failing to return the survey form.

There are many ways to classify nonresponse according to its causes. Unfortunately, no standardised classification exists. In most cases, the classification follows the possible courses of events when selected units are approached to get cooperation in a survey.

First, a contact should be established with the selected unit, address. If it has failed, there are two cases. If the selected unit belongs to the target population (eligible), it should have been the part of the sample. In this case, we have nonresponse due to non-contact. If it does not belong to the target population, it should be excluded from the survey as overcoverage. In many cases, it is a very hard task to determine in practical situation at the fieldwork whether a not-available unit belongs to the target population or not.

If the interviewer can make a contact with the selected unit, it is more convenient to establish whether it belongs to the target population. In case of not, it can be dismissed as a case of overcoverage.

Figure 2. Possible survey outcomes in the Hungarian household surveys
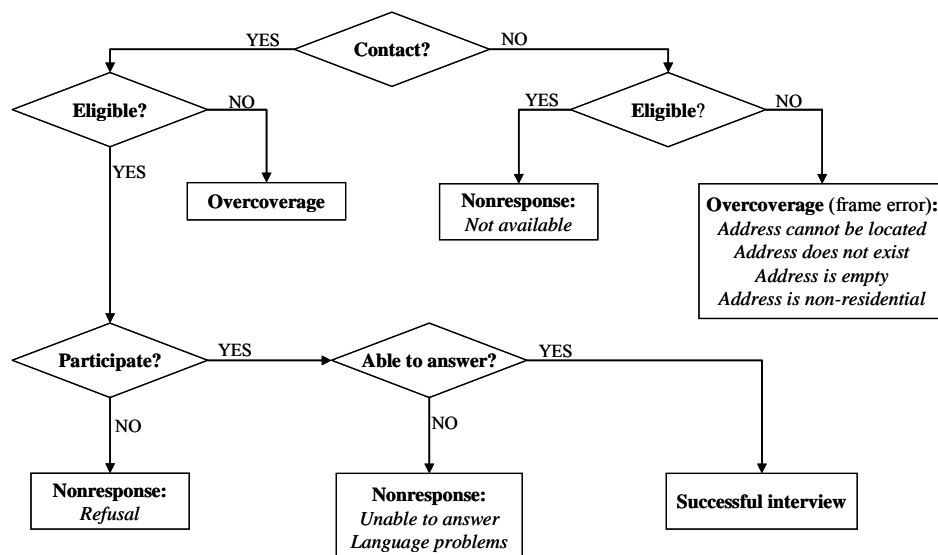
Source: *Betlehem–Cobben–Schouten* [2007].

If contact was made with an eligible unit, its cooperation is needed in order to get the required information. If it refuses the cooperation, we have a case of nonresponse due to refusal.

If contact was made with an eligible, cooperative unit, it may still have problems if it is not able to provide the required information. Reasons for this may be for example language problems.

Finally, if an eligible unit wants to cooperate and is able to provide the required information, then we have a case of response.

It is important to identify and measure the different reasons and components of nonresponse because various levels of nonresponse bias may be associated with them. For example, non-contacts, those who were never given the opportunity to choose whether or not to participate in the survey, may have different characteristics than refusals, who were contacted but choose not to participate, and both may differ from survey respondents on some survey variables. Very different trends over time may exist for some of these components, and the tendencies should be monitored.

The Hungarian Labour Force Survey distinguishes three main types of response and nonresponse categories. The first is ineligible addresses, the second is non-contacted households, and the last is contacted households. In the interest of a more detailed analysis and assisting the work of interviewers, all of them have subcomponents.

Table 1

Detailed response and nonresponse categories of the Hungarian Labour Force Survey in force since 2007

Addresses not eligible	
Address cannot be located	This occurs when it is not possible to locate the address.
Address does not exist	An address does not exist if the building has been demolished.
Address/dwelling is unoccupied or empty	An address/dwelling is unoccupied or empty if nobody is currently living there.
Address/dwelling is non-residential	An address/dwelling is non-residential if it is used for different purposes than those of principal residence (for example business, shop, vacation home, etc.).
Households not contacted	
Household was not available	The members of the household are temporarily or permanently away, or at the time of the interview are not at home.
Household moved	This situation appears when the household moved to another address.
Household contacted	
Interview was successful	
Household refused the interview	The whole household refuses the response.
Household/person was unable to answer	The household/person is temporarily or permanently unable to answer the questionnaire.
Interview failed due to language difficulties, problems	This situation appears when none of the members of the household speaks Hungarian.

The main indicators calculated on the basis of different nonresponse (NR) categories at household level:

$$\text{Total NR Rate} = \frac{\text{not available} + \text{moved} + \text{refused} + \text{unable} + \text{language difficulties}}{\text{answered} + \text{not available} + \text{moved} + \text{refused} + \text{unable} + \text{language difficulties}},$$

$$\text{Non-contact Rate} = \frac{\text{not available}}{\text{answered} + \text{not available} + \text{moved} + \text{refused} + \text{unable} + \text{language difficulties}},$$

$$\text{Refusal Rate} = \frac{\text{refused}}{\text{answered} + \text{not available} + \text{moved} + \text{refused} + \text{unable} + \text{language difficulties}}.$$

Figure 3 represents the time series of nonresponse rates in the HLFS according to the formerly mentioned categories from 2004 to 2010.

Figure 3. Tendency of the nonresponse rates by different nonresponse categories, HLFS 2004–2010
(percent)
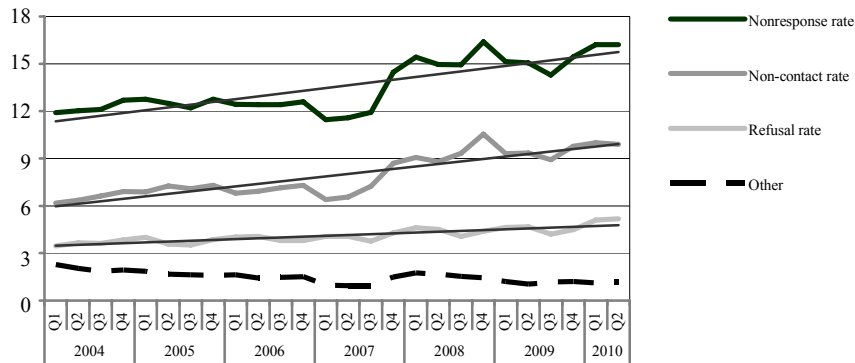
The level of the HLFS nonresponse rate is fairly stable until 2007. However, at the end of that year, a shift can be observed, the reason of which may be the changes in coding of the nonresponse categories. (See Figure 3.) The refusal rate slightly increases throughout the period, while the other two factors (particularly the non-contact rate) are showing a similar but more expressive upward trend.

The response rate depends on several factors. Some of them can be reduced by more efficient fieldwork, some not. Survey statisticians shall do their best to reduce the level of nonresponse, or at least to handle missing data (using an imputation method, "outside data", weighting, etc.) in order to improve survey quality.

3. Key performers of the fieldwork: interviewers

The quality of household surveys depends mainly on fieldwork. The key performers are the interviewers and selected units, households as potential respondents.

Nowadays it is more problematic to collect direct information from people. Behind general distrust, several factors contribute to the decline of response propensity. These are mainly socio-economic factors, which influence both interviewers and respondents.

With regard to the interviewers' key role in the quality of the data collection process and in contacting and convincing potential respondents, we carried out an Interviewer Attitude Survey in June 2009 that covered all HLFS interviewers.

Although participation in the survey was compulsory, a total of 392 question-naires were returned representing a response rate of 92 percent.

The questionnaire that was prepared by the HCSO experts, making use of their international experience, included the following topics: administrative data, general information; HLFS fieldwork; interviewers practice; characteristics of the non-respondents; experience in filling out the nonresponse data sheet.

3.1. Demographic characteristics

In accordance with the stereotype, 82 percent of the interviewers working on the HLFS in June 2009 were female. The majority of the interviewers are over 50 and only 17 percent of them have degree-level qualifications.

Table 2

Demographic characteristics of HLFS interviewers, June 2009

Characteristics	Distribution (percent)
Sex	
Male	17.9
Female	82.1
Total	*100.0*
Age group (years)	
Less than 30	6.1
31–40	11.0
41–50	23.5
51–60	35.2
61–65	17.1
65+	7.1
Total	*100.0*
Educational qualifications	
Primary school or less	2.8
Vocational qualifications without General Certificate of Education (GCE)	7.1
GCE with/without vocational qualification	73.3
College, university	16.8
Total	*100.0*
Base (N)	392

Note. The average age of HLFS interviewers was 51.6 years.

Figure 4. Distribution of HLFS interviewers by age, June 2009
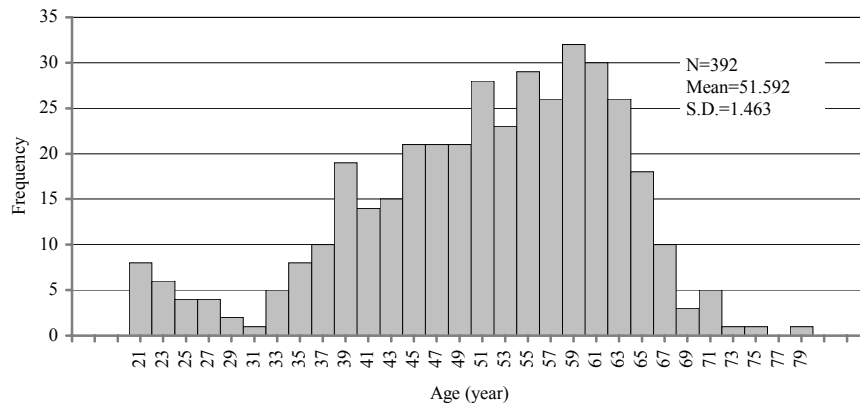
3.2. Experience and labour conditions

Twenty-seven point two percent of the interviewers who worked on Labour Force Survey in June 2009 had worked earlier as interviewers for two or less years, whilst 24.2 percent of them had 10 or more years of such experience. Their average length of experience is 8.4 years.

Figure 5. Experience of HLFS interviewers, June 2009
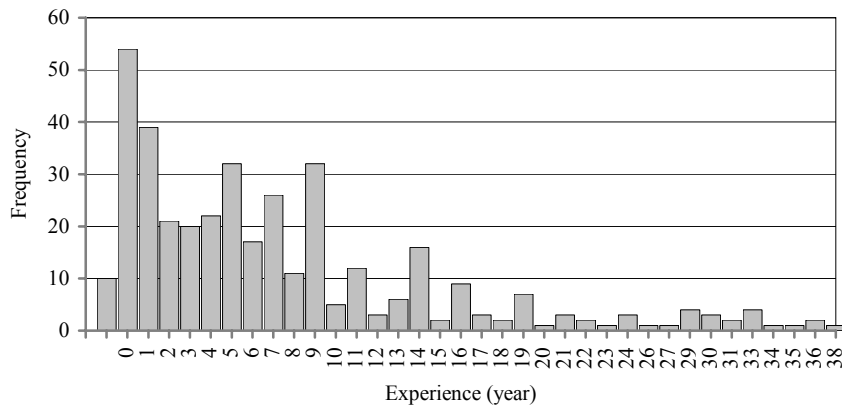
Eleven point five percent of them had previously worked for another survey organisation as market research interviewers and 8 interviewers (2 percent) did it even in June 2009.

One fifth of the interviewers said that small incentives did not motivate respondents to cooperate, more than 78 percent reported on good influence, and 1.5 percent stated that they had negative impact on the response behaviour. It is assumed that incentives increase response rates in poor and undeveloped areas, while they have unfavourable effect in rich and developed regions. This latter may cause further bias to the estimates.

Table 3

Opinion on important factors influenced the response rate in HLFS, June 2009, and the use of telephone interview

Factor	Distribution (percent)
Small incentive	
No influence	20.1
Bad influence	1.5
Good influence	78.4
Total	*100.0*
Advance letter	
Useful	72.2
Useless	27.8
Total	*100.0*
Use of telephone interview	
Yes	64.5
No	35.5
Total	*100.0*
Base (N)	392

Nearly 28 percent of the interviewers do not believe in the positive effect of advance letters. About 65 percent called back the respondent after the first face-to-face interview, if he/she had agreed to it.

Considering the different types of incentives, almost 85 percent of the interviewers, who said that they had beneficial impact on the response behaviour, believe that a small incentive like a bar of chocolate or a pen does have influence on respondents.

Fifty-four percent of the interviewers reported on declining appreciation of their work in the last years, 18.6 percent of whom said that the decrease was significant, which contributed to lower response propensity. According to 43.4 percent, their appreciation has not changed. This latter may also mean that it had formerly been as bad as it was at the time of the survey.

Table 4

Use of incentives, which may improve the HLFS response rate (opinions)

Incentive	Distribution (percent)
Not any, if the selected person do not want to answer	2.1
Small incentive (for example a bar of chocolate, a pen, tea, coffee)	84.4
Small incentive with a price around HUF 1 000	8.0
Gift coupon, money	3.8
Depends on the household	1.7
Total	*100.0*
Base (N)	392

Table 5

Changes in the appreciation of the HLFS interviewers in the last years

Direction and magnitude of changes	Distribution (percent)
Significantly declined	18.6
Somewhat declined	35.2
Significantly improved	0.5
Somewhat improved	2.3
Did not change	43.4
Total	*100.0*
Base (N)	392

3.3. Characteristics of the non-respondents from the interviewers' point of view

The interviewers highlighted "richness, high income" as the main factor of nonresponse to which two characteristics are connected: high level of qualification and hidden (black, grey) income (being typical for entrepreneurs). Sometimes black income is connected to unemployment as well.

The Hungarian Labour Force Survey contains very few and unreliable questions regarding income and wealth, therefore richness as a main factor of nonresponse cannot be analysed with common tools.

The interviewers are not able to characterize nonresponse according to age categories either, because among nonrespondents there are equally young, middle-aged, and old people with different features and for various reasons.

Another factor, which plays a key role in nonresponse is the present social-economic situation. The financial crisis has deepened the social inequalities; and the governmental actions, restrictions and constraints have further increased the distrust of people. These have an effect also on responses required by an "official", "governmental" institution, such as a statistical office.

3.4. Types of non-respondents and reasons for refusal

– Young people (adults) due to unconcern;

– Middle-aged people (typically male) because of engagement, work (typically contractors and highly qualified people);

– Entrepreneurs (typically male) with "muddy" businesses owing to the fear of the Hungarian Tax and Financial Control Administration;

– Old people, mainly pensioners (typically female) as a result of distrust and unconcern (since it is not compulsory);

– High-income wealthy people (mainly those who became rich quickly after the political changes) because of concealment;

– Unemployed people due to undeclared ("black") work and poverty.

3.5. Remark

Since the second half of 2009, a "concentrated" interviewer network has been working on the regular sub-annual household surveys. This means that in the HCSO, we have a staff of fewer but more qualified interviewers and thus the fieldwork procedure is more efficient than it was in June of 2009 when the interviewer survey was carried out.

4. Analysing the interviewer effect on nonresponse in the Hungarian Labour Force Survey with multilevel modelling[1]

In face-to-face surveys, interviewers play a key role in making contact and convincing selected sample units to cooperate in the survey.

In the preceding part of the paper, two different categories of nonresponse as well as the characteristics of interviewers have been described in detail, with focus on the

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[1] The study is based on the paper of *Blom, de Leeuw* and *Hox* [2010].

properties of the HLFS. This provides support for analysing the interviewer effect on nonresponse, which is the main goal of this paper. On the one hand contact (whether the household is contacted or not) and on the other hand cooperation (whether the household answered the questionnaires or not) are modelled as data quality indicators.

The data available for the analysis originate from the HLFS and from the Interviewer Attitude Survey, thus we have data on both households and interviewers. In addition, a third type of data related to spatial features, that is, to counties is also included in the datasets.

There is a natural hierarchy among the different levels of data: a group or cluster of households belongs to an interviewer, and a group of interviewers belongs to a county. One can find intracluster correlation among units belonging to the same cluster, and thus, classical multiple regression is not a suitable tool for analysing the interviewer effect on nonresponse. Multilevel analysis is a standard good practice for this problem therefore, a three-level random intercept logistic regression model was used where households, interviewers, and counties define different levels of hierarchy. The present section begins with a brief description of two- and three-level models.

4.1. Multilevel modelling

Multilevel models have been developed to allow analysis at several levels simultaneously, rather than having to choose at which level to carry out a single-level analysis. The methodology focuses on the variability of nested data sources, for example on students in classes, people in areas, sampling units in interviewers, etc. In the analysis of such data, it usually is illuminating to take account of the variability associated with each level of nesting. There is variability, for example between students but also between classes, and one may draw wrong conclusions if either of these sources of variability is ignored.

4.1.1. Two-level models[2]

In traditional multiple regression analysis one dependent variable is predicted with a number of independent variables, and we assume random sampling from one level only:

$$Y_i = \beta_0 + \beta_1 R_i + e_i.$$ /1/

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[2] By *Hox, de Leeuw* and *Kreft* [1991].

Thus, if there were no interviewer effects, we could predict an indicator Y (such as contact rate, cooperation rate) from the respondent variable R, where i refers to respondents, β_0 is the ordinary intercept, and β_1 is the ordinary regression coefficient (slope). The errors e_i are assumed independent with a variance $var(e_i) = \sigma_e^2$.

If there are interviewer effects, the equation changed to:

$$Y_{ij} = \beta_{0j} + \beta_{1j}R_{ij} + e_{ij}, \qquad\qquad /2/$$

where j refers to the interviewers. In the ordinary regression equation model /1/ there is a single intercept and slope for all respondents. In the multilevel regression equation, it is assumed that the intercepts β_{0j} and the slopes β_{1j} vary between interviewers. This means that the regression parameters β_0 and β_1 are thought of as having a distribution over interviewers with variance σ_0^2 and σ_1^2 and covariance σ_{01}.

To account this variation we introduce explanatory variables I at the interviewer level. The following two regression equations can be written for the intercept β_{0j} and the slope β_{1j}:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}I_j + U_{0j}, \qquad\qquad /3/$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}I_j + U_{1j}, \qquad\qquad /4/$$

where U_{0j} and U_{1j} are the error terms with variance σ_0^2 and σ_1^2, and the regression coefficients are γ. If we substitute equations /3/ and /4/ in equation /2/ and rearrange terms, we obtain the regression equation:

$$Y_{ij} = \gamma_{00} + \gamma_{10}R_{ij} + \gamma_{01}I_j + \gamma_{11}I_jR_{ij} + U_{0j} + U_{1j}R_{ij} + e_{ij}. \qquad /5/$$

Thus we end up with a two-level regression equation /5/ which incorporates respondent, interviewer and interaction variables, and a very complicated error term,

$$U_{0j} + U_{1j}R_{ij} + e_{ij}.$$

Asymptotic standard errors can be calculated for the regression coefficients γ, which allow us to conduct significance tests similar to those in ordinary multiple regression analysis. There are also asymptotic standard errors for the various variance components, which make possible to test whether the variation of the regression coefficients (intercept and slopes) among interviewers is significant.

When interviewer variation occurs, the responses of different respondents who are all interviewed by the same interviewer are more alike than those of respondents who interviewed by different interviewers. Statistically this is often expressed as the interviewer intraclass correlation. In well-conducted face-to-face interviews, the intraclass correlation typically clusters around 0.02. (See *Kish* [1962])

A multilevel analysis with no explanatory (respondent and interviewer) variables at all, the so-called intercept-only model, produces σ_e^2 and σ_0^2, which can be used to estimate the intraclass correlation for the interviewer effect,

$$\rho = \frac{\sigma_0^2}{\sigma_0^2 + \sigma_e^2}.$$

The intercept-only model is a useful starting point for an analysis, because it indicates how much variance is due to the interviewer.

4.1.2. Three-level random intercept model[3]

The three-level random intercept model is a straightforward extension of the two-level model. The dependent variable in this case is denoted by Y_{ijk}, where i refers to the respondents, j to the interviewer and k to an area variable. More generally we can talk about level-one unit i in level-two unit j in level-three unit k. The three-level model with one explanatory variable may be formulated as a regression model

$$Y_{ijk} = \beta_{0jk} + \beta_1 R_{ijk} + e_{ijk}, \qquad\qquad /6/$$

where β_{0jk} is the intercept in level-two unit j within level-three unit k. For the intercept we have the level-two model,

$$\beta_{0jk} = \gamma_{00k} + U_{0jk}, \qquad\qquad /7/$$

where γ_{00k} is the average intercept in level-three unit k. For this average intercept we have the three-level model,

$$\gamma_{00k} = \gamma_{000} + V_{00k}. \qquad\qquad /8/$$

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[3] See *Snijders* and *Bosker* [1999].

This shows that we have three residuals, as there is variability on three levels. Their variances are denoted by

$$var\left(e_{ijk}\right) = \sigma_e^2 ,$$

$$var\left(U_{0jk}\right) = \sigma_0^2 ,$$

$$var\left(V_{00k}\right) = \sigma_{00}^2 .$$

The total variance between all level-one units now equals $\sigma_e^2 + \sigma_0^2 + \sigma_{00}^2$, and the population variance between the level-two units is $\sigma_0^2 + \sigma_{00}^2$. Substituting /8/ and /7/ into the level-one model /6/ using the triple indexing notation γ_{100} for β_1 yields

$$Y_{ijk} = \gamma_{000} + \gamma_{100} R_{ijk} + V_{00k} + U_{0jk} + e_{ijk} . \qquad /9/$$

4.1.3. Three-level random intercept logistic regression model

In the case of a binary outcome (dependent) variable – such as contact and cooperation at household level – observed values are usually assigned as either 0 or 1. When such a variable is treated as if it were continuous, predicted values – indicating the probability of the event occurring – can fall outside the [0,1] interval. Moreover, the assumption of normality at level one (respondent, household) is not realistic as the random effects can no longer be assumed to have a normal distribution or to have homogeneous variance.

In order to ensure that the predicted values lie within the [0,1] interval, a transformation of the level-one predicted probability can be used with the following link function:

$$P\left(Y_{ijk} = 1 | \beta, e\right) = \frac{exp\left(\eta_{ijk}\right)}{1 + exp\left(\eta_{ijk}\right)} ,$$

where η_{ijk} represents the log of the odds of success. For the level-one model /9/ the expression of η is

$$\eta_{ijk} = \gamma_{000} + \gamma_{100} R_{ijk} + V_{00k} + U_{0jk} + e_{ijk} .$$

4.2. Analysis method

The dependent (outcome) variables are contact and cooperation. In the analysis, the HLFS sample units were linked to the questionnaire of those interviewers who undertook the first contact attempt with them in the second quarter of 2009. This resulted in a dataset of 383 interviewers for 5123 sampling units.

To answer our question, we applied a three-level random intercept logistic regression model where sample units (households) were nested within interviewers nested within counties.

When analyzing data with logistic regression, ordinary statistics to R-squared does not exist. Therefore to evaluate the goodness-of-fit or explained variability of the logistic models, several pseudo R-squareds have been developed. They range from 0 to 1 as in the case of ordinary R-squared, but various pseudo R-squareds may result in different values.

To compare variance components, *McKelvey* and *Zaviona*'s method (for details see *Snijders–Bosker* [1999]) was used to rescale the model with explanatory variables to the metric of the intercept-only model as *Blom, de Leeuw* and *Hox* [2010] suggested. The variance of the sample unit (household) error ($var\left(e_{ijk}\right)=\sigma_e^2$) is assumed to be $\pi^2/3$ in logistic models.

The models were estimated using Supermix developed by Scientific Software International.[4]

4.2.1. Sample-unit- (household-) level variables

Most of the sample-level variables including outcome variables such as contact and cooperation are derived from the LFS dataset.

Regarding interviewer strategy of contact and cooperation, we could use the only available information at sample unit level: whether the last contact attempt was made outside working days or not.

We used also some variables regarding the housing and neighbourhood (surroundings) situation of the sample unit, based on interviewer observations. These include the *type* (detached family house, terraced (or twin) house, multi-unit house with less or more than ten dwellings) and the *state/condition* (excellent (new, renovated), good, satisfying, run-down) of building and the character of the environment of the building such as *surroundings* (traditional urban, housing estate (blocks of flats), suburb (residential district), family houses (villas), rural, outskirts, unsatisfactory from social point of view).

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[4] http://www.ssicentral.com/supermix/index.html

In addition, the average composite index value of territorial development (including urbanicity) was used (*Faluvégi–Tipold* [2009]).

4.2.2. Interviewer-level variables

The available interviewer variables can be classified into different groups. We examined interviewer background variables such as age, sex, qualifications, and experience. The second group of variables concerns the strategies for example in making an interviewer report on the request of information from neighbours in case of non-contact or in leaving message when nobody is at home.

The third group regarding persuasion of the sample unit to cooperate in the survey includes variables such as whether the interviewer enquires about a convenient time to carry out the interview in case of refusal, or he/she tries to contact other members of the household.

Regarding work-related variables, we used the days worked for LFS in a month.

4.2.3. County-level variables

To characterize the 19 counties and the capital city (see Figure 1), we used the following variables: GDP, net monthly average earning, number of the registered unemployed and population size at county level.

4.3. Results

This section reviews the models applied in case of successful contact and cooperation, namely a three-level intercept-only and random intercept logistic regression models.

4.3.1. Predictors of successful contact

In order to evaluate the adequacy of the multilevel model to the data, intercept-only model (the model contains only an intercept term) was fitted to screen different intercept variances at each level.

The intraclass correlations in the intercept-only model show that the variance induced by systematic differences among interviewers $\left(\rho_0 = \sigma_0^2 \big/ \left(\sigma_0^2 + \sigma_{00}^2 + \sigma_e^2 \right) \right)$ is greater than the variance between counties $\left(\rho_{00} = \sigma_{00}^2 \big/ \left(\sigma_0^2 + \sigma_{00}^2 + \sigma_e^2 \right) \right)$. Household-

level units account for 77 percent of the variance, the interviewer level for 20.5 percent and the county level for 2.5 percent.

Table 6 shows the results of the intercept-only model and those of the model with all significant household, interviewer and county variables.

Table 6

Successful contact results with three-level models

Variable	Intercept-only model	Model with all significant explanatory variables
Intercept	1.8808 (0.1054)*	1.8791 (1.03)
Surroundings composed of blocks of flats		−0.4501 (0.1126)
Contact attempt made at weekend		−0.2832 (0.0982)
Interviewer's age		0.0299 (0.0061)
Asking neighbourhood as a contact strategy		0.8089 (0.3172)
Net average earning at county level		−0.0197 (0.0086)
σ_e^2 (household level)	3.29**	not calculated
σ_0^2 (interviewer level)	0.8753 (0.1366)	0.7859 (0.1254)
σ_{00}^2 (county level)	0.1076 (0.0584)	0.0852 (0.0542)
Pseudo- R^2 (household level)		not calculated
Pseudo- R^2 (interviewer level)		0.1021
Pseudo- R^2 (county level)		0.2082

* Standard error.
** Fixed at distributional value, assumed to be $\pi^2/3$.

The differences in contact rate are partly characterized by the surrounding buildings and by the contact attempts made at weekend. Both have negative regression effect, which means that they entail lower contact rates. The negative effect of the housing estates may be due to the fact that reaching the selected address can be difficult there for technical reasons (for example entry was hindered by bars or doorbell problems). Weekend contact attempts are less successful since only the last attempts appear in the data set, and they (as the last chances to contact the households) fall on weekends.

Interviewers applying a strategy of "asking neighbourhoods" and older fieldworkers achieve higher contact rates.

To compare variance components, we calculated pseudo- R^2 as mentioned in Section 4.2. It indicates that household, interviewer, and county variables explain 10 percent of interviewer variance and 21 percent of country variance.

4.3.2. Predictors of successful cooperation

The intraclass correlations in the intercept-only model show the same as it was in the case of contact rates: the variance induced by systematic differences among interviewers is much greater than the variance between counties. Seventy-nine percent of the variance is ascribed to the household-level units, 18 percent to the interviewer level and 3 percent to the county level.

Table 7 presents the results of the intercept-only model and those of the model with all significant household, interviewer and county variables.

Table 7

Successful cooperation results with three-level models

Variable	Intercept-only model	Model with all significant explanatory variables
Intercept	1.2202 (0.1012)*	1.5283 (0.8593)
Composite territorial development indicator		–0.1218 (0.0581)
Contact attempt made at weekend		–0.2389 (0.0860)
Surroundings composed of family houses		0.3695 (0.1095)
Surroundings composed of blocks of flats		–0.2512 (0.1189)
Interviewer's age		0.0223 (0.0051)
Interviewer's qualifications		0.1817 (0.0981)
Interviewer's workload		–0.0290 (0.0113)
Making contact with another member of the household		0.4391 (0.1196)
Net average earning at county level		–0.0148 (0.0075)
σ_e^2 (household level)	3.29**	not calculated
σ_0^2 (interviewer level)	0.7581 (0.1113)	0.5970 (0.0944)
σ_{00}^2 (county level)	0.1216 (0.0556)	0.0481 (0.0367)
Pseudo-R^2 (household level)		not calculated
Pseudo-R^2 (interviewer level)		0.2125
Pseudo-R^2 (county level)		0.6045

* Standard error.
** Fixed at distributional value, assumed to be $\pi^2/3$.

The last two rows of the table shows that the household-, interviewer-, and county-level variables decrease the variance at all levels and explain 21 percent of interviewer variance and 60 percent of county variance.

The differences in cooperation rate are characterized by surrounding buildings, the composite indicator of territorial development and by contact attempts made at

weekend. All relations are in the expected direction; as regards contact attempts made at weekend, the explanation is the same as it was in the case of the contact rate.

The elder and/or highly qualified interviewers who contact other members of the households achieve a higher rate of cooperation, while those who work too many days on LFS only a lower one. This latter may be explained by the burden that the interviewer work entails and by the lack of time to convince reluctant persons.

4.4. Summary of results and conclusion

In this study, we investigated if there were systematic differences among Hungarian counties and HLFS interviewers in respect of the contact and cooperation rates, and if these could be explained by the observable characteristics of the household-, interviewer- and county-level variables and by the various interviewer characteristics.

It was found that systematic differences were greater among interviewers than among counties in the case of both contact and cooperation rates. Over 70 percent of the variance is at household level and around 20 percent is at interviewer level.

Regarding explanatory variables, there is difference between the predictors. In the case of cooperation, more interviewer characteristics are significant. Households that are contacted by elder, more qualified interviewers are more likely to cooperate in the survey.

As for the contact rate, "asking neighbourhoods" or (in case of cooperation) "contacting another member of the household" has a positive effect on the indicators.

In both cases, there is little chance that those households cooperate, which are contacted outside working days (weekend).

The complex territorial development indicator shows significant effect only in the case of cooperation: it is more probable that households living in less developed territorial units are willing to cooperate.

We found that interviewer-observation-derived indicators regarding the building and surroundings of a sampled unit predict both contact and cooperation.

Based on the results, interviewers' attitude and characteristics explain only a part of the variance, differences between interviewers are described also by several other interviewer-level variables.

The study highlights the important role of interviewers and that of their work since it is feasible to achieve better contact and cooperation rates, if the interviewers are carefully selected and well trained. However, in case of extreme circumstances (housing estates, etc.) and situations (visiting rich people, etc.), elaboration of special techniques and solutions is needed.

The results are in line with the interviewers' opinion on non-respondents as described in the interviewer survey and summarized in Section 3.3.

We hope that further factors to be explored in a subsequent paper, might improve the explanation of variance components.

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Integrated Sub-Annual Sampling Surveys of Small Enterprises in Hungary in the 2000s

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The author reviews the sub-annual sampling surveys of small enterprises conducted by the HCSO in the recent decade. The paper deals with the general characteristics of the surveys, stratification, determination of sample size by strata and sample selection. Data collection, methods of estimation and investigation into its correctness are discussed as well.

KEYWORDS:
Sample selection.
Estimation.
Small enterprises.

One of the main characteristics of the Hungarian economy is that there are many small enterprises in the various sections. Though their performance in the output is not determinant in many fields, it is significant almost everywhere. This is reflected by the system of business statistics: the surveys cover also the small enterprises, statistical information expressing the development of economy includes their data as well. Thus business statistical surveys cover numerous, largely small institutions. Their majority is enterprise (including also sole entrepreneurs).

According to the definition of Act XXXIV of 2004 on Small and Medium-sized Enterprises (SMEs) and Subsidizing SME Development, an enterprise is qualified as small if

1. its total staff number is 10–49 persons,
2. its annual net turnover is at most HUF equivalent of EUR 10 million, furthermore
3. its annual balance sheet total is at most HUF equivalent of EUR 10 million.

(If the total staff number of an enterprise is less than 10 persons, furthermore its annual net turnover and annual balance sheet total are at most HUF equivalent of EUR 2 million, it is qualified as a micro enterprise.)

The Hungarian Central Statistical Office (HCSO) – in accordance with international practice – classifies the enterprises on the basis of the persons employed by them in *size categories*. In statistics, enterprises set into size categories denoted by

– 40 (20–49 persons employed),
– 30 (10–19 persons employed),
– 22 (5–9 persons employed),
– 21 (since 2001 15, 12, 11 instead of it; 1–4, since 2001 3–4, 2 persons, 1 person employed) and
– 10 (0 person employed)

are qualified as *small enterprises,* independently from their net turnover and balance sheet total (small enterprises with less than 5 persons employed are called also *micro enterprises*).

Most business statistical surveys are partly *full-scope* (with a complete enumeration), partly they are based on *sample selection* and are *sampling surveys*. For the length of time they have played an essential role in business statistics.

Sampling surveys have four components. The first one is *sample selection* it-self, when the elements of the *sample* are selected from the population. The second part is *data collection*, when data of the sampling units are collected (similarly to full-scope surveys). The third component is *estimation*, in the course of which inferences are drawn from the population as the whole to the sample as a part. (The correctness of these inferences depends considerably on the *representativity* of the sample. For this see *Kruskal–Mosteller* [1979–1980], *Kish* [1987].) The fourth, last component of a sampling survey is *the investigation into the correctness of the estimation*. Its purpose is twofold: characterizing and monitoring the correctness (accuracy and reliability) of the estimation – namely *variance estimation* – on the one hand, discovering the most important error factors, possibly eliminating them or reducing their effect, and improving the correctness of the estimation by this on the other hand.

According to their frequency, there are

– in the course of the year continuous, monthly or quarterly, panel-type, *sub-annual*,
– annually repeated (*yearly*),
– rarely or irregularly repeated, furthermore,
– single, occasional

business statistical surveys. The paper reviews the sub-annual sampling surveys of small enterprises conducted by the HCSO in the 2000s (for their preliminaries see *Éltető et al.* [1997]; *Telegdi* [1993], [2001]).

1. Features of the surveys

The sub-annual sampling surveys of small enterprises in industry and construction carried out by the HCSO in 2000 covered the industrial sections C *Mining and quarrying,* D *Manufacturing* and E *Electricity, gas and water supply,* furthermore, section F *Construction* (NACE Rev. 1). Data were collected monthly. The surveys of small enterprises as a part of the so-called general module covered NACE sections A–K and M–O in 2000. Within these, the one for labour statistical data was monthly, while those for the output and investments of the small enterprises were quarterly.

The survey for the output did not cover section J *Financial intermediation*. The questionnaires containing questions only on the given month and quarter, respec

tively, were the following (in parenthesis their reference number in the National Statistical Data Collection Program is shown):

> – Monthly statistical data of industry, simplified report (1043),
> – Monthly statistical data of construction (1025),
> – Monthly labour statistical data (1109),
> – Quarterly output data, simplified report (1762),
> – Quarterly output data, simplified supplementary report (1768),
> – Quarterly investment data (1014).

Since 2001, the HCSO has been carrying out the business statistical sampling surveys of small enterprises uniformly as parts of the *Sub-annual integrated data collections*. Until 2007, the surveys covered sections A–D, F–K, M–O and – until 2003 – E (NACE Rev. 1), since 2008, they have been covering sections A–C, E–N and P–S (NACE Rev. 2). They are partly monthly, partly quarterly. Their question-naires, which continue to contain questions only on the given month and quarter, respectively, are (were) the following:

> – Monthly (since 2004 integrated) simplified business statistical re-port, Industry (1043),
> – in 2001 Monthly business statistical report, Construction (1025), since 2002 Monthly (since 2004 integrated) simplified business statis-tical report, Construction (1938),
> – Monthly (since 2004 integrated) business statistical report, Agri-culture (since 2003 Agriculture, trade) and service (1872),
> – in 2001 Quarterly simplified business statistical report, Industry and construction (1875), furthermore, Quarterly business statistical re-port, Financial intermediation (1014), since 2002 Quarterly (since 2004 integrated) business statistical report, Industry, construction and financial intermediation (1874),
> – Quarterly (since 2004 integrated) simplified business statistical report, Agriculture (since 2003 Agriculture, trade) and service (1878).

Among the variables observed there are both simple (which cannot be represented as the sums of other variables) and compound variables (the sums of simple vari-ables). *The most important ones are industrial production, production of construc-tion activities, number of persons employed, net turnover and new investments. The purpose of the surveys is the measurable (capable of calculating sampling error) and acceptably accurate estimation of these variables for the various (two-digit level)*

divisions, furthermore, the breakdown of the estimates for (four-digit level) classes and counties.

The *target populations* of the sampling surveys include the active (industrial, construction) small enterprises with 5–49 persons employed, belonging to the corresponding sections. Their estimated weight in industrial production, production of construction activities, number of persons employed, net turnover and new investments is 9, 34, 28, 24 and 16 percent, respectively. Enterprises between 2004 and 2007 in section E (NACE Rev. 1), since 2008 in section D (NACE Rev. 2) with at least 5, in the other sections with at least 50 persons employed are enumerated completely. Their estimated weight in industrial production, production of construction activity, number of persons employed, sales and new investments is 84, 33, 54, 61 and 74 percent, respectively. Micro enterprises with less than 5 persons employed – their estimated weight in industrial production, etc. is 7, 33, 18, 15 and 10 percent, respectively – are not surveyed; their totals are estimated in an other way.

The *sampling frames* for the surveys are provided by the *Enterprises and their Surveys* (EATS). It rests on the *Business Register* (BR), which is maintained by the HCSO on the basis of administrative records and its own surveys. (Although it is continuously updated, obviously it does not provide a complete coverage.) The EATS is created in such a way that the continuously changing BR is frozen at the first weekend of each month. The frames are set up in September of the previous year. *Observational* and at the same time *sampling units* are the enterprises of the EATS belonging to the appropriate sections and size categories, and having a so-called obligatory data-supplier status (indicating that the enterprise is active). Their totality is the sampling frame. Its size, that is the number of the observational units is shown quarterly (in the last month of the quarters) until 2007 according to NACE Rev. 1 in Table 1, from 2008 to 2010 according to NACE Rev. 1 and NACE Rev. 2 in Table 2.

Table 1 shows the "unpleasant" size of the population: it is too large to be enumerated completely, however it is not large enough to be sampled with a small sampling rate. The usually not negligible growth in the number of small enterprises at the beginning of the years has the following explanation. The statistical variables (among them the size category) mirror usually the state at the beginning of the year, determined at the end of the previous year. Its cause is that the sources of the statistical variables are only in a smaller part the surveys of the HCSO, in a greater part the data of the tax authorities, however their decisive majority is based on the tax declaration of the enterprises, therefore they are transferred not continuously, but once a year, at the end of August. Considering the time demand of data editing, dispatch, data-supply and processing, these tax data could be used at best in the last quarter. – The small enterprises between 2004 and 2007 in section E, since 2008 in section D have been enumerated completely, thus they have not belonged to the sampling frames since 2004 (their number was 154 and 120 in the first quarter of 2004 and 2010, respectively).

Table 1

The number of small enterprises in the sampling frame in quarters 2000. I–2007. IV.

Quarter	Industry	Construction	Finance	Others	Total
2000. I.	11 616	6 275	397	31 396	49 684
II.	11 489	6 270	384	31 250	49 393
III.	11 647	6 429	394	31 748	50 218
IV.	11 651	6 483	391	31 762	50 287
2001. I.	12 094	6 668	375	34 004	53 141
II.	12 166	6 668	378	34 119	53 331
III.	12 175	6 746	382	34 270	53 573
IV.	12 202	6 881	377	34 450	53 910
2002. I.	12 547	7 135	393	35 914	55 989
II.	12 570	7 226	389	36 098	56 283
III.	12 608	7 341	390	36 323	56 662
IV.	12 716	7 534	398	36 883	57 531
2003. I.	12 827	7 492	381	36 695	57 395
II.	12 822	7 651	381	36 859	57 713
III.	12 854	7 803	387	37 203	58 247
IV.	12 903	7 933	391	37 627	58 854
2004. I.	13 141	8 290	386	40 336	62 153
II.	13 073	8 330	384	40 309	62 249
III.	13 018	8 304	380	40 187	61 889
IV.	13 088	8 510	391	40 764	62 753
2005. I.	12 972	8 553	407	41 473	63 405
II.	12 928	8 545	413	41 454	63 340
III.	12 939	8 573	419	41 616	63 547
IV.	12 973	8 734	429	42 009	64 145
2006. I.	13 013	9 071	443	43 464	65 991
II.	12 931	9 122	439	43 510	66 002
III.	12 906	9 209	443	43 641	66 199
IV.	12 954	9 367	450	44 142	66 913
2007. I.	12 690	9 405	473	44 779	67 347
II.	12 659	9 425	478	44 788	67 350
III.	12 553	9 325	473	44 462	66 813
IV.	12 512	9 312	483	44 425	66 732

The data collection covers obviously those small enterprises which exist during the survey, have an obligatory data-supplier status and were selected from the sampling frame in the course of sample selection.

Table 2

The number of small enterprises in the sampling frame in quarters 2008. I–2010. II.

Quarter	Industry	Construction	Finance	Others	Total
			NACE Rev. 1		
2008. I.	12 686	9 812	530	46 454	69 482
II.	12 644	9 811	534	46 479	69 468
III.	12 570	9 742	530	46 274	69 116
IV.	12 519	9 697	532	46 140	68 888
2009. I.	12 260	9 311	555	45 724	67 850
II.	12 145	9 209	551	45 369	67 274
III.	12 248	9 386	567	45 816	68 017
IV.	12 309	9 476	584	46 364	68 733
2010. I.	11 949	8 916	629	45 943	67 437
II.	11 952	9 052	641	46 429	68 074
			NACE Rev. 2		
2008. I.	12 767	10 058	580	46 077	69 482
II.	12 726	10 056	584	46 102	69 468
III.	12 647	9 983	582	45 904	69 116
IV.	12 575	9 941	583	45 789	68 888
2009. I.	12 250	9 520	628	45 452	67 850
II.	12 137	9 411	623	45 103	67 274
III.	12 248	9 595	640	45 534	68 017
IV.	12 309	9 696	662	46 066	68 733
2010. I.	11 910	9 144	680	45 703	67 437
II.	11 912	9 290	696	46 176	68 074

The incoming data are – the missing ones being imputed according to Chapters 3–4 – grossed up (since 2008 not only according to NACE Rev. 1, but according to NACE Rev. 2 too), then drawn together with the observed data of the enterprises enumerated completely and the estimated data of the micro enterprises not observed.

2. Sample selection

The surveys are based on *stratified* probability samples selected by a modified version of stratified simple random sampling without replacement (SSRSWOR).

Since 2008, stratification has been performed not only according to NACE Rev. 1, but according to NACE Rev. 2 too. The criteria for forming *strata* are the following.

1. Economic activity: for estimating by divisions and reducing variance, according to NACE Rev. 1

> – in the only division (45) of construction the various (three-digit level) groups, beyond this since 2001 in group 45.2 class 45.21, class 45.25 and the other classes,
> – in the only division (55) of section H *Hotels and restaurants* until 2001 subdivisions 55.1–55.2 and 55.3–55.5, since 2002 subdivision 55.1–55.2, group 55.3 and subdivision 55.4–55.5,

moreover

> – in 2000 within divisions 50 and 52 groups 50.2 and 52.7, respectively, in addition, the other groups,
> – since 2002 within division 37 groups 37.1 and 37.2, within divisions 50 and 63 groups 50.1 and 63.4, respectively, furthermore, the other groups, within divisions 14, 22, 28, 29, 36, 60, 80 and 51 classes 14.21, 22.22, 28.11, 29.24, 36.14, 60.24, 80.42 and 51.70 in 2002, 51.90 since 2003, respectively, additionally, the other classes,
> – since 2005 within division 15 class 15.81 and the other classes,

according to NACE Rev. 2

> – in construction (divisions 41–43), within group 42.1 the various classes, otherwise the various groups,
> – within divisions 45, 46, 47 and 56 groups 45.1, 46.9, 47.3 and 56.1, respectively, moreover, the other groups, within divisions 10, 18, 25, 31, 49, 52 and 85 classes 10.71, 18.12, 25.11, 31.09, 49.41, 52.29 and 85.59, respectively, furthermore, the other classes

have been distinguished.

2. Size: for reducing variance, categories 40, 30 and 22 are handled as separate strata.

3. Area: for obtaining more homogeneous strata from the point of view of non-response, small enterprises with headquarter in Budapest and the countryside are differentiated. (This has a certain variance reducing effect as well.)

Distinguishing the small enterprises – in accordance with the foregoing – on the basis of their economic activity, size category and place of headquarter, thus according to NACE Rev. 1

    – in 2000

       $30 \times 3 \times 2$ industrial + $5 \times 3 \times 2$ construction + $30 \times 3 \times 2$ other = 390,

      – in 2001

       $30 \times 3 \times 2$ industrial + $7 \times 3 \times 2$ construction + $28 \times 3 \times 2$ other = 390,

      – in 2002–03

       $36 \times 3 \times 2$ industrial + $7 \times 3 \times 2$ construction + $34 \times 3 \times 2$ other = 462,

      – in 2004

       $34 \times 3 \times 2$ industrial + $7 \times 3 \times 2$ construction + $34 \times 3 \times 2$ other = 450,

      – since 2005

       $35 \times 3 \times 2$ industrial + $7 \times 3 \times 2$ construction + $34 \times 3 \times 2$ other = 456

strata (the small enterprises in section E have been enumerated completely since 2004), according to NACE Rev. 2

      – since 2008

       $37 \times 3 \times 2$ industrial + $11 \times 3 \times 2$ construction + $54 \times 3 \times 2$ other = 612

strata have been formed.

One of the most essential points of stratified sampling surveys is *the determination of sample size by strata*. In case of a too large sample, data can be collected only at high expenditure, however, in case of a too small sample, the parameters wanted cannot be estimated well enough. Besides the determination of the size of the whole sample, its allocation is also made – not afterwards, but simultaneously, interactively. It is performed in such a way that different sample sizes are calculated by strata under different conditions for correctness (accuracy and reliability) of the estimation, and those are chosen among them, the increase of which no longer improves the estimation considerably.

Accuracy is construed in the following way. Assume that *the relative margin of error* $v^{(m)}$ for the net turnover of all enterprises (those enumerated completely or sampled) is given. Let us denote the relative margin of error for the net turnover of the enterprises sampled by v, the weights of the net turnover of the enterprises enumerated completely and sampled, preliminarily expected for the reference period at the time of the sample selection by $w^{(t)}$ and $w^{(r)}$, respectively. From the fact that the net turnover of the enterprises enumerated completely can be calculated without any sampling error, one can simply conclude that

$$v = \frac{w^{(t)} + w^{(r)}}{w^{(r)}} v^{(m)}.$$

This means that the relative margins of error for the net turnover of the enterprises sampled and of all enterprises are inversely proportional to the weights of the enterprises in the two groups in consideration. The definition of the relative margin of error implies that the value of the net turnover of the sampled enterprises estimated from the sample differs from the "true", unknown value in a degree less than $100v$ percent with a high probability.

To construe *reliability*, the value of the former probability (the probability level used to the calculation of the *confidence interval* covering the true population total with this probability) is specified. Through this, a percentile u of the random variable with standard normal distribution is determined implicitly.

Let v_j and w_j be the relative margin of error and weight of the jth stratum, respectively, then the definition of the relative margin of error and the fact that sample selection is performed in the various strata independently from each other imply that

$$\sum_j \left(w_j v_j \right)^2 = v^2 .$$

As for values v_j, a lower relative margin of error should belong to a larger weight, but to a smaller extent than in case of an inverse proportion: an a times lower relative margin of error to an a^2 times larger weight (for example, a half as low relative margin of error to a four times larger weight). One gets through a simple calculation that the relative margin of error of the various strata can be determined by the formula

$$v_j = \frac{v}{\sqrt{w_j}} .$$

If the values v_j were determined in such a way that an a times lower relative margin of error should belong to an a times larger weight, then – denoting the number of strata by J – the relative margin of error could be determined by the formula

$$v_j = \frac{v}{w_j \sqrt{J}} ,$$

while if the value of the relative margin of error of each stratum were – independently from the weight – the same, this common value could be calculated by the formula

$$v_1 = \frac{v}{\sqrt{\sum_j w_j^2}} \; .$$

The former one results in an optimal sample allocation – corresponding to the Neyman optimization – in respect of the relative margin of error on the whole population, the latter one on the various strata (each of them is considered to have the same importance). The solution chosen is the middle course between them.

In order to determine the necessary sample size by strata, one needs the sizes N_j of the various strata (their values estimated preliminarily are the numbers of small enterprises belonging to the strata in the EATS at the time of the sample selection), the design of the method of estimation, in other words *the way of grossing up*, furthermore, the values estimated preliminarily of the measures C_j of *the relative estimation uncertainty* – depending on the way of grossing up too – by strata. As grossing up is performed without using auxiliary information, by *simple inflation*, C_j is the preliminarily estimated *coefficient of variation* of net turnover for the various strata in the reference period. Its source is the sampling survey of small enterprises conducted in the previous year.

Given size N_j of the stratum, standard normal percentile u, coefficient of variation C_j and relative margin of error v_j which we would not like to exceed, grossing up by simple inflation, the theoretically necessary sample size n_{1j} can be obtained by the formula

$$n_{1j} = \frac{N_j u^2 C_j^2}{u^2 C_j^2 + N_j v_j^2} \; .$$

Giving the value 0.95 to the probability level (then $u = 1.96$), the following formula is obtained:

$$n_{1j} = \frac{\left(1.96 C_j\right)^2 N_j}{\left(1.96 C_j\right)^2 + N_j v_j^2} \; .$$

The necessary sample sizes by strata are calculated with various relative margins of error, and the theoretically necessary sample sizes are determined on the basis of these simulation experiments. The percentage sampling rate can be calculated by the aid of the formula

$$100\frac{n_{1j}}{N_j} = \frac{100}{1+\left(\dfrac{v_j}{1.96C_j}\right)^2 N_j} \ .$$

As it appears, besides the sample size the sampling rate depends on N_j too: given relative margin of error v_j and coefficient of variation C_j, a larger N_j involves a smaller (though not to the same extent) sampling rate. The larger is the stratum (N_j), the more determined is the sample size (the value of n_{1j}) by the quotient of the relative margin of error and the coefficient of variation (v_j/C_j).

According to the experience gained from the surveys, a characteristic feature of small enterprises is that the number of respondents is less than the sample size specified by the sampling design to a not negligible extent. Therefore, the actual sample sizes n_{0j} are determined by dividing the theoretically necessary sample sizes n_{1j} by the corresponding response rates expectable on the basis of the investigation into the non-response performed in the course of the surveys of the previous year. While determining the sample size, the capacity of the units of the HCSO performing data collection are taken into account too (with special reference to that operating in Budapest and Pest County), and the sample size is specified in such a way that it should not cause too great non-response (a sample of 1500 units with 300 non-respondents is better than a sample of 3000 units with 1000 non-respondents).

The sample size and the sampling rate are shown until 2007 in Table 3 quarterly (in the last month of the quarters, according to NACE Rev. 1). The high sampling rate among the financial small enterprises is caused by their small number and large weight.

Sub-annual sampling surveys are performed each year from the sample selected at the end of the previous year. In the course of sample selection only those enterprises can be chosen which have an obligatory data-supplier status according to the state of the EATS valid for January 1st. This restriction, which means that the sampling frame is narrowed, is made because pursuant to the experience, the output of enterprises existing, but having a non-obligatory data-supplier status (being liquidated or going bankrupt, etc.) is negligible, while the response rate among them is very low.

The successfulness of the sub-annual business statistical sampling surveys demands the maintenance of the sample selected. Its important element is the replacement of the sampling units after some time, in other words, the *rotation* of the sample. Thus, a basic question is the following: to what extent is the assumption grounded in the fact that the true value of a variable characterizing the population is close to the value estimated from the sample? It can occur – though with a low probability – that the sample reflects the population badly. A reason for applying rotation

is – besides the reduction of the data-suppliers' burdens – the protection against it. The rotation in the periodic statistical sampling surveys is regulated by the HCSO.

Table 3

The sample size and the sampling rate in quarters 2000. I–2007. IV.

Quarter	Industry		Construction		Finance		Others		Total	
	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)
2000. I.	1 574	13.6	1 266	20.2	158	39.8	6 383	20.3	9 381	18.9
II.	1 537	13.4	1 233	19.7	148	38.5	6 214	19.9	9 132	18.5
III.	1 517	13.0	1 210	18.8	147	37.3	6 121	19.3	8 995	17.9
IV.	1 506	12.9	1 195	18.4	143	36.6	6 046	19.0	8 890	17.7
2001. I.	1 544	12.8	1 170	17.5	162	43.2	6 318	18.6	9 194	17.3
II.	1 519	12.5	1 126	16.9	160	42.3	6 170	18.1	8 975	16.8
III.	1 496	12.3	1 119	16.6	159	41.6	6 126	17.9	8 900	16.6
IV.	1 475	12.1	1 101	16.0	156	41.4	6 065	17.6	8 797	16.3
2002. I.	1 719	13.7	1 133	15.9	154	39.2	6 318	17.6	9 324	16.7
II.	1 695	13.5	1 121	15.5	152	39.1	6 240	17.3	9 208	16.4
III.	1 683	13.3	1 105	15.1	152	39.0	6 183	17.0	9 123	16.1
IV.	1 662	13.1	1 092	14.5	151	37.9	6 133	16.6	9 038	15.7
2003. I.	1 814	14.1	1 170	15.6	155	40.7	6 266	17.1	9 405	16.4
II.	1 776	13.9	1 150	15.0	154	40.4	6 174	16.8	9 254	16.0
III.	1 748	13.6	1 132	14.5	153	39.5	6 116	16.4	9 149	15.7
IV.	1 729	13.4	1 104	13.9	151	38.6	6 073	16.1	9 057	15.4
2004. I.	1 743	13.3	1 204	14.5	157	40.7	6 384	15.8	9 488	15.3
II.	1 715	13.1	1 179	14.2	154	40.1	6 288	15.6	9 336	15.0
III.	1 687	13.0	1 159	14.0	152	40.0	6 243	15.5	9 241	14.9
IV.	1 667	12.7	1 151	13.5	150	38.4	6 195	15.2	9 163	14.6
2005. I.	1 710	13.2	1 206	14.1	151	37.1	6 292	15.2	9 359	14.8
II.	1 688	13.1	1 176	13.8	151	36.6	6 213	15.0	9 228	14.6
III.	1 663	12.9	1 155	13.5	150	35.8	6 158	14.8	9 126	14.4
IV.	1 639	12.6	1 137	13.0	151	35.2	6 093	14.5	9 020	14.1
2006. I.	1 614	12.4	1 147	12.6	146	33.0	6 111	14.1	9 018	13.7
II.	1 583	12.2	1 127	12.4	144	32.8	6 047	13.9	8 901	13.5
III.	1 578	12.2	1 110	12.1	142	32.1	5 990	13.7	8 820	13.3
IV.	1 558	12.0	1 090	11.6	141	31.3	5 926	13.4	8 715	13.0
2007. I.	1 564	12.3	1 126	12.0	146	30.9	6 089	13.6	8 925	13.3
II.	1 550	12.2	1 111	11.8	145	30.3	6 048	13.5	8 854	13.1
III.	1 524	12.1	1 095	11.7	145	30.7	6 007	13.5	8 771	13.1
IV.	1 504	12.0	1 083	11.6	143	29.6	5 952	13.4	8 682	13.0

The aspects taken into account while establishing the rotation of a sample (the willingness for supplying data, the measure of dropping out of the sampling units, etc.) depend on the features of the given survey to a great extent. In case of business statistical surveys, it is not always easy to find the observational units and to draw them into the data-supply. For making the work of the HCSO units performing data collection easier and the data collection more successful, the measure of rotation should be not too great.

Taking the foregoing into account, the sample selection of the small enterprises by strata (formed according to NACE Rev. 1) was performed until 2007 in the following way. A random number h_i was produced for each enterprise in the sampling frame. For this purpose, the random number g_i with uniform distribution between 0 and 1, belonging to the enterprise in the BR was taken. Until 2001, furthermore, between 2005 and 2007, h_i was equal to g_i, between 2002 and 2004 to $(1 - g_i)$. For increasing the chance of being selected for enterprises not in the sample in case of 2000 3, since 2001 3–5 years earlier (this assures rotation), h_i's belonging to these enterprises were increased by 2. In order to give a secondary preference to the enterprises in the sample in the previous year (this improves the response rate), h_i's belonging to these enterprises were increased by 1. Then the enterprises *were arranged by the decreasing order of the random numbers* modified in the former way. This means that in a certain year the enterprises in a given stratum followed one another in the following way: those units which belonged to the sample *1*) in the previous year but not 3 or 3–5 years earlier, *2*) neither 3 or 3–5 years earlier nor in the previous year, *3*) both 3 or 3–5 years earlier and in the previous year, *4*) 3 or 3–5 years earlier, but not in the previous year. Subtracting g_i from 1 was equivalent to arranging the random numbers *increasingly*. This decreased the chance that an enterprise which got out of the sample, would get into it again even after three years.

Having determined the *random order* of the small enterprises and the sample size as described formerly, selecting the sample in a stratum is equivalent to taking the appropriate number of units from the top of the ordered list. It is easy to see that this strategy complies with the requirements of rotation (except for some small strata, where the number of enterprises, which had not been in the sample 3 or 3–5 years earlier, was not large enough) and the improvement of the response rate.

As grossing up has been made not only according to NACE Rev. 1, but also according to NACE Rev. 2 since 2008, sample selection was made in six steps in 2008: *1*. The preliminary 2008 numbers of small enterprises belonging to the various strata in line with NACE Rev. 1 were established. *2*. On this basis, sample sizes by strata

complying with NACE Rev. 1 were determined as the foregoing. *3*. A sample of the corresponding size was selected by strata consistent with NACE Rev. 1 in the way mentioned formerly. *4*. The preliminary 2008 numbers of small enterprises belonging to the various strata in conformity with NACE Rev. 2 and the sizes of the sample selected by strata according to NACE Rev. 2 were produced. *5*. The sizes of a supplementary sample by strata pursuant to NACE Rev. 2 were determined on this basis. *6*. A supplementary sample of the corresponding size was selected by strata in accordance with NACE Rev. 2 in the former way. In both the third and sixth steps, h_i was equal to $(1 - g_i)$.

Table 4

The sample size and the sampling rate in quarters 2008. I–2010. II.

Quarter	Industry		Construction		Finance		Others		Total	
	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)	sample size	sampling rate (percent)
					NACE Rev. 1					
2008. I.	1 676	13.2	1 198	12.2	140	26.4	5 976	12.9	8 990	12.9
II.	1 643	13.0	1 167	11.9	139	26.0	5 883	12.7	8 832	12.7
III.	1 625	12.9	1 144	11.7	138	26.0	5 801	12.5	8 708	12.6
IV.	1 611	12.9	1 116	11.5	136	25.6	5 781	12.4	8 594	12.5
2009. I.	1 471	12.0	1 259	13.5	118	21.3	5 695	12.5	8 543	12.6
II.	1 454	12.0	1 239	13.5	117	21.2	5 616	12.4	8 426	12.5
III.	1 440	11.8	1 224	13.0	117	20.6	5 537	12.1	8 318	12.2
IV.	1 419	11.5	1 195	12.6	117	20.0	5 438	11.7	8 169	11.9
2010. I.	1 479	12.4	1 239	13.9	126	20.0	5 611	12.2	8 455	12.5
II.	1 429	12.0	1 230	13.6	125	19.5	5 548	11.9	8 332	12.2
					NACE Rev. 2					
2008. I.	1 658	13.0	1 264	12.6	143	24.7	5 925	12.9	8 990	12.9
II.	1 629	12.8	1 228	12.2	142	24.3	5 833	12.7	8 832	12.7
III.	1 610	12.7	1 200	12.0	141	24.2	5 757	12.5	8 708	12.6
IV.	1 588	12.6	1 166	11.7	139	23.8	5 701	12.5	8 594	12.5
2009. I.	1 504	12.3	1 313	13.8	130	20.7	5 596	12.3	8 543	12.6
II.	1 487	12.3	1 290	13.7	129	20.7	5 520	12.2	8 426	12.5
III.	1 475	12.0	1 273	13.3	128	20.0	5 442	12.0	8 318	12.2
IV.	1 453	11.8	1 245	12.8	128	19.3	5 343	11.6	8 169	11.9
2010. I.	1 513	12.7	1 283	14.0	134	19.7	5 525	12.1	8 455	12.5
II.	1 464	12.3	1 271	13.7	133	19.1	5 464	11.8	8 332	12.2

In 2009, the sample selection was performed by strata formed according to NACE Rev. 2, with $h_i = (1 - g_i)$ similarly as until 2007.

The sample selection performed according to the aforementioned is a modified version of SSRSWOR: strictly speaking, the various strata are divided into groups and the enterprises are selected from the groups into the sample with different probabilities. In spite of this modification, the sample is considered as an SSRSWOR at the estimation.

The sample size and the sampling rate are shown from 2008 to 2010 in Table 4 quarterly (the last month of the quarters) according to NACE Rev. 1 and NACE Rev. 2.

In the course of the surveys, the new enterprises (formed or registered after the selection of the starting sample) get continuously into the sampling frame, but no unit is selected among them into the sample.

3. Data collection

The small enterprises belonging to the sample get the questionnaires for the whole year by mail. They must fill in two copies of this form: one is kept by them and the other is sent back by mail. The file of the sampling units existing in the reference period and having a data-supplier status is sent on the so-called dispatching list to the units of the HCSO performing data collection. In case of non-response, the staff of these units must urge data supply by phone or mail on this basis.

The number of respondents and the response rate determined on this basis are shown quarterly (in the last month of the quarter) until 2007 in Table 5 according to NACE Rev. 1 and from 2008 to 2010 in Table 6 according to NACE Rev. 1 and NACE Rev. 2.

Tables 5 and 6 show the deterioration of response in 2001, 2007 and 2009. In 2001, the response rate decreased probably because the scope of enterprises privileged was narrowed in the course of sample selection, and thus a bigger rotation was performed. In 2007, the response declined presumably because of the reorganization of the HCSO units performing data collection.

One can draw inferences, give *estimation* for the variables characterizing the sub-annual activity of the small enterprises from the data of respondents, namely the observations realized in the sample of enterprises are generalized, *grossed up.*

Table 5

The number of respondents and the response rate in quarters 2000. I–2007. IV.

Quarter	Industry		Construction		Finance		Others		Total	
	number of respon-dents	response rate (percent)	number of respon-dents	response rate (percent)	number of respon-dents	response rate (percent)	number of respon-dents	response rate (percent)	number of respon-dents	response rate (percent)
2000. I.	1 358	86.3	1 144	90.4	145	91.8	5 574	87.3	8 221	87.6
II.	1 348	87.7	1 136	92.1	139	93.9	5 643	90.8	8 266	90.5
III.	1 340	88.3	1 120	92.6	138	93.9	5 568	91.0	8 166	90.8
IV.	1 331	88.4	1 058	88.5	133	93.0	5 520	91.3	8 042	90.5
2001. I.	1 272	82.4	984	84.1	152	93.8	5 236	82.9	7 644	83.1
II.	1 276	84.0	980	87.0	148	92.5	5 097	82.6	7 501	83.6
III.	1 253	83.8	973	87.0	150	94.3	5 222	85.2	7 598	85.4
IV.	1 234	83.7	963	87.5	149	95.5	5 206	85.8	7 552	85.8
2002. I.	1 501	87.3	994	87.7	143	92.9	5 552	87.9	8 190	87.8
II.	1 483	87.5	980	87.4	143	94.1	5 511	88.3	8 117	88.2
III.	1 474	87.6	968	87.6	141	92.8	5 457	88.3	8 040	88.1
IV.	1 458	87.7	958	87.7	139	92.1	5 369	87.5	7 924	87.7
2003. I.	1 620	89.3	1 011	86.4	150	96.8	5 576	89.0	8 357	88.9
II.	1 598	90.0	988	85.9	149	96.8	5 506	89.2	8 241	89.1
III.	1 569	89.8	974	86.0	146	95.4	5 397	88.2	8 086	88.4
IV.	1 543	89.2	950	86.1	144	95.4	5 234	86.2	7 871	86.9
2004. I.	1 528	87.7	990	82.2	148	94.3	5 418	84.9	8 084	85.2
II.	1 507	87.9	943	80.0	144	93.5	5 371	85.4	7 965	85.3
III.	1 491	88.4	964	83.2	144	94.7	5 433	87.0	8 032	86.9
IV.	1 469	88.1	951	82.6	141	94.0	5 285	85.3	7 846	85.6
2005. I.	1 544	90.3	1 033	85.7	150	99.3	5 708	90.7	8 435	90.1
II.	1 517	89.9	1 014	86.2	150	99.3	5 651	91.0	8 332	90.3
III.	1 496	90.0	999	86.5	147	98.0	5 599	90.9	8 241	90.3
IV.	1 469	89.6	979	86.1	147	97.4	5 498	90.2	8 093	89.7
2006. I.	1 443	89.4	1 006	87.7	140	95.9	5 545	90.7	8 134	90.2
II.	1 436	90.7	989	87.8	140	97.2	5 481	90.6	8 046	90.4
III.	1 391	88.1	968	87.2	141	99.3	5 378	89.8	7 878	89.3
IV.	1 336	85.8	916	84.0	141	100.0	5 334	90.0	7 727	88.7
2007. I.	1 307	83.6	919	81.6	129	88.4	5 222	85.8	7 577	84.9
II.	1 300	83.9	946	85.1	133	91.7	5 233	86.5	7 612	86.0
III.	1 276	83.7	951	86.8	132	91.0	5 209	86.7	7 568	86.3
IV.	1 283	85.3	939	86.7	128	89.5	5 125	86.1	7 475	86.1

Table 6

The number of respondents and the response rate in quarters 2008. I–2010. II.

Quarter	Industry		Construction		Finance		Others		Total	
	number of respondents	response rate (percent)	number of respondents	response rate (percent	number of respondents	response rate (percent	number of respondents	response rate (percent	number of respondents	response rate (percent
					NACE Rev. 1					
2008. I.	1 472	87.8	1 036	86.5	134	95.7	5 193	86.9	7 835	87.2
II.	1 419	86.4	986	84.5	132	95.0	5 172	87.9	7 709	87.3
III.	1 414	87.0	1 019	89.1	130	94.2	5 240	90.3	7 803	89.6
IV.	1 323	82.1	957	85.8	127	93.4	5 049	88.1	7 456	86.8
2009. I.	1 254	85.2	1 002	79.6	111	94.1	4 747	83.4	7 114	83.3
II.	1 221	84.0	1 003	81.0	111	94.9	4 669	83.1	7 004	83.1
III.	1 194	82.9	988	80.7	113	96.6	4 621	83.5	6 916	83.1
IV.	1 153	81.3	935	78.2	113	96.6	4 462	82.1	6 663	81.6
2010. I.	1 235	83.5	1 026	82.8	121	96.0	4 888	87.1	7 270	86.0
II.	1 155	80.8	974	79.2	117	93.6	4 692	84.6	6 938	83.3
					NACE Rev. 2					
2008. I.	1 449	87.4	1 089	86.2	138	96.5	5 159	87.1	7 835	87.2
II.	1 392	85.5	1 035	84.3	136	95.8	5 146	88.2	7 709	87.3
III.	1 387	86.1	1 065	88.8	134	95.0	5 217	90.6	7 803	89.6
IV.	1 287	81.0	993	85.2	131	94.2	5 045	88.5	7 456	86.8
2009. I.	1 285	85.4	1 037	79.0	122	93.8	4 670	83.5	7 114	83.3
II.	1 246	83.8	1 036	80.3	122	94.6	4 600	83.3	7 004	83.1
III.	1 230	83.4	1 020	80.1	123	96.1	4 543	83.5	6 916	83.1
IV.	1 189	81.8	968	77.8	123	96.1	4 383	82.0	6 663	81.6
2010. I.	1 277	84.4	1 055	82.2	129	96.3	4 809	87.0	7 270	86.0
II.	1 199	81.9	1 000	78.7	125	94.0	4 614	84.4	6 938	83.3

A very important part of business statistical sampling surveys is the follow up of the realization of data collection, the continuous investigation into the extent and reasons of non-response. Information on non-response is given by the receiving system of the HCSO through the so-called code MV19. Its values, the receiving codes are the following.

000 Reason not yet clarified
1 Reasons belonging to the enterprise
    101 Enterprise closed down without any legal successor

102 Enterprise being liquidated or adjusted finally, not active
103 Enterprise being bankrupted, not active
104 Enterprise not yet active
105 Enterprise suspending activity for other reasons
107 Enterprise removed, address unknown
108 Address not existing
111 Incorrect activity classification
112 Incorrect size category classification
113 Enterprise active not in the given county
115 Enterprise closed down with a legal successor
116 Active enterprise being liquidated or adjusted finally
117 Active enterprise being bankrupted
118 Enterprise without any regular activity included in NACE

2 Reasons connecting with the activity of the enterprise

201 The enterprise has no activity relating to the survey
202 Activity of the enterprise relating to the survey ended
203 The enterprise has no activity in the reference period relating to the survey
204 The questionnaire would be negative for other reasons

8 Subjective factors

801 Response is refused
802 Questionnaire will be sent late
803 Unsuccessful enter into contact with the enterprise
804 Based on an agreement, the enterprise sends the questionnaire late

999 Questionnaire received

It appears that 15–35 percent of non-response arise (less than in the previous decade) from the – partly necessary – errors of the BR (reasons connected to the enterprise and its activity). In these cases, non-response is actually justifiable from the point of view of the enterprise: either it did not receive the questionnaire at all or it got it wantonly and could not fill it. The share of the 000 ("reason not yet clarified") and 803 cases ("unsuccessful enter into contact with the enterprise"), which are not always unambiguously separable, is the highest (35–70 percent). The number of small enterprises refusing response *unmasked* is higher than it was in the 1990s (15–30 percent). 2–5 (in January 5–15) percent of the small enterprises send/sent the questionnaire late, thus, they can be considered as non-respondents only at the time of the processing. (For a more detailed discussion of non-response, see, for example, *Kovar–Whitridge* [1995], *Telegdi* [1999].)

Among the non-respondents, the *missing data* of those small enterprises are *replaced,* in other words *imputed* individually by 0, which presumably would have sent a negative questionnaire. These enterprises are specified on the basis of code MV19

provided by the receiving system and the experience arising from the posterior comparison with full-scope data coming partly from external sources. Among the non-respondents, those small enterprises are (were) handled as if they had sent a negative questionnaire which

> – have a code MV19 101–105, 111 or 201–204,
> – in 2000 belonged to the size category 30 in construction,
> – in 2000 did not send the investment statistical questionnaire, but forwarded the labour statistical one,
> – since 2001 did not send the quarterly questionnaire, but forwarded that of the last month in the quarter.

The missing data of the other non-respondents were not imputed individually until 2001. (As it will be shown in the next chapter, however, the estimation applied was equivalent to imputing these missing data with the mean – but in their aggregate, not individually). Since 2002, the missing data of these non-respondents have been imputed individually too. The method of imputation is given in the next chapter.

4. Estimation

In the course of *estimation*, inferences *by strata* are drawn from the data of respondents, the variables of the sub-annual surveys of small enterprises (among which the most important ones are industrial production, production of construction activities, number of persons employed, net turnover and new investments) are estimated, namely the observations realized in the sample are grossed up. Some strata are divided into two parts: small enterprises of the stratum with *outliers* are separated. (For outliers see for example *Barnett–Lewis* [1984]; *Csereháti* [2004a], [2004b].) Besides the sampled and thus grossed up ordinary strata, completely enumerated and hence not grossed up seeded strata (containing enterprises with outliers) are also formed through this. Since 2002, a part of the seeded enterprises has been determined on the basis of their net turnover data in the BR in the beginning of the year; they are seeded permanently in each month and quarter, respectively (if they respond; otherwise they are not considered to be seeded). The other part is determined on the basis of survey data monthly and quarterly, respectively.

Both the permanently and not permanently seeded small enterprises are determined by variables in the following way. In order to compare enterprises of different strata, their data are – through subtracting the mean of the variable in the stratum and

dividing the difference by the standard deviation of the variable there – standardized *by strata,* and then the standardized value is modified according to the sample size of the stratum. (This modification is necessary because the fewer is the data, the higher is the probability of a higher value.) The modified standardized values related to the given variable are arranged by decreasing order. Enterprises with modified value larger than a threshold are considered to be outliers. (The threshold values for the various variables are determined on the basis of mathematical and experimental considerations.) Small enterprises with one or more outlier data are seeded.

Since 2002 after the determination of the seeded enterprises, the missing data of those non-respondents have been imputed, the data of which were not imputed by 0. The imputation is made by the mean value of the amalgamated Budapest–countryside stratum calculated without the seeded enterprises according to NACE Rev. 1 in 2008 and NACE Rev. 2 since 2009.

In the course of the processing, a few indicators, *parameters* related to the variables of the survey are estimated by strata on the one hand for the various sampled strata, on the other hand for amalgamating these, the seeded and the other completely enumerated strata (set into such size categories). Estimation is performed for the strata used at the selection of the sample, following this, first the grossed-up and the corresponding seeded strata, then Budapest and the countryside, thereafter the various size categories, finally the activity units are amalgamated. Since 2008, estimation has been made according to both NACEs, but in 2008 according to NACE Rev. 2 only subsequently, and the result of this estimation is used only in 2009, as a base.

For characterizing the aggregate of small enterprises, the *population total* of the various variables is estimated. Among them, the estimation of the population total of the simple variables is performed directly from elementary data. Within the various sampled strata, the following is made. The *sample weight*

$$q_j = \frac{N_j}{n_j}$$

is determined, where N_j is the number of all enterprises belonging to the jth stratum (its size), and n_j is the number of the sampling units (respondents, imputed as negative or – since 2002 – not negative) among them. In the calculations a *correction factor* k_j is applied. Its value is 1 since 2002 in case of $N_j - n_j < 7$, otherwise it is determined on the basis of the representativity of the sample. The value of k_j deviates from 1 depending on to what extent the mean of the previous year's net turnover – available completely from the BR – for the sample differs from that for the population. Within the strata, the population total Y_j is estimated in such a way that the

sample total y_j is multiplied by the product of the correction factor and the sample weight:

$$Y_j = k_j q_j y_j.$$

It means that apart from the correction factor, grossing up is made by simple inflation, that is Y_j is estimated by the Horvitz–Thompson estimator (for example *Särndal–Swensson–Wretman* [1992]) with equal selection probabilities. Earlier, in the nineties, ratio estimation using net turnover data from two years earlier than the reference period – later ones were not available – as auxiliary information was performed for certain strata (*Telegdi* [2001]). However this did not turn out to be better – just because of the time distance – than simple inflation. (As a matter of fact, the correction factor "brings back" something from ratio estimation.)

In case of strata enumerated completely, on the one hand $N_j = n_j$ obviously which implies that $q_j = 1$, on the other hand $k_j = 1$, therefore the population total is the sample total:

$$Y_j = y_j.$$

The population total of the compound variables is estimated by adding the estimates of the corresponding simple variables.

For the union of strata, the estimate of the population total Y is the sum of the estimates for the strata:

$$Y = \sum_j Y_j.$$

As regards the strata and their unions, the percentage growth related to the total of the preceding year's similar month or quarter (in 2008 only according to NACE Rev. 1) and to that of the previous month or quarter (in 2008 according to NACE Rev. 2 only from February and the 2nd quarter) as a base, that is the (percentage) *value indexes*

$$100 \frac{Y_j}{Y_{0j}} \quad \text{and} \quad 100 \frac{Y}{Y_0},$$

respectively, are determined.

For both the simple and compound variables, the *population mean* was (has been) estimated from the population total (for the reference period) until 2001 by the formulas

$$\overline{Y}_j = \frac{Y_j}{k_j N_j}, \quad \overline{Y} = \frac{Y}{\sum\limits_j k_j N_j},$$

since 2002 by the formulas

$$\overline{Y}_j = \frac{Y_j}{N_j}, \quad \overline{Y} = \frac{Y}{\sum\limits_j N_j}$$

for the strata and their unions.

As since 2002

$$\overline{Y}_j = \frac{Y_j}{N_j} = \frac{k_j y_j}{n_j} = k_j \overline{y}_j$$

for the strata, thence the population mean $\overline{Y}_j$ has been equal to the sample mean only in case of $k_j = 1$.

The (corrected empirical) variance was (has been) determined until 2001 by the formula

$$\sigma_j^2 = \frac{1}{n_j - 1} \sum_{i=1}^{n_j} \left(y_{ji} - \overline{Y}_j \right)^2 = \frac{1}{n_j - 1} \left(\sum_{i=1}^{n_j} y_{ji}^2 - n_j \overline{Y}_j^2 \right),$$

since 2002 by the formula

$$\sigma_j^2 = \frac{1}{n_j - 1} \sum_{i=1}^{n_j} \left(k_j y_{ji} - \overline{Y}_j \right)^2 = \frac{1}{n_j - 1} \left(k_j^2 \sum_{i=1}^{n_j} y_{ji}^2 - n_j \overline{Y}_j^2 \right)$$

for the strata, where y_{ji} is the (reference month's or quarter's) value of the corresponding variable for the ith small enterprise of the jth stratum selected into the sample (respondent, imputed as negative or – since 2002 – not negative). The coefficient of variation

$$C_j = \frac{\sigma_j}{\overline{Y}_j}$$

of the strata also has been specified.

Within the strata, the deviation σ_{Y_j} of the population total of the various variables, the *sampling* or *standard error* was (has been) estimated until 2001 by the formula

$$\sigma_{Y_j} = \frac{k_j N_j \sigma_j}{\sqrt{n_j}} \sqrt{1 - \frac{n_j}{k_j N_j}} \, ,$$

since 2002 by the formula

$$\sigma_{Y_j} = \frac{N_j \sigma_j}{\sqrt{n_j}} \sqrt{1 - \frac{n_j}{N_j}} \, .$$

Obviously for the strata enumerated completely $\sigma_{Y_j} = 0$.

As regards the unions of strata, the standard error is the square root of the sum of squares of the standard errors for the strata:

$$\sigma_Y = \sqrt{\sum_j \sigma_{Y_j}^2} \, .$$

For the strata and their unions the *relative errors*

$$\lambda_j = \frac{\sigma_{Y_j}}{Y_j} \quad \text{and} \quad \lambda = \frac{\sigma_Y}{Y} \, ,$$

respectively, are determined. Obviously for the strata enumerated completely $\lambda_j = 0$.

Around the (point) estimate of the total of the various variables, a confidence interval can be designated by the aid of the standard error. Namely, according to the reliability requirement mentioned in Chapter 2 (when the probability level is 0.95), one can determine the *absolute margins of error*

$$\Delta_j = 1,96\sigma_{Y_j} \quad \text{and} \quad \Delta = 1,96\sigma_Y \, ,$$

respectively, for which with probability 0.95 (in case of sample selection repeated many times under identical conditions, out of 100 samples 95 times on an average) the (absolute) confidence intervals

$$\left(Y_j - \Delta_j, Y_j + \Delta_j \right) \quad \text{and} \quad \left(Y - \Delta, Y + \Delta \right)$$

encircle the "true" population total.

The values

$$v_j = \frac{\Delta_j}{Y_j} \quad \text{and} \quad v = \frac{\Delta}{Y}$$

of the relative margin of error (which is at the same time the radius of the relative confidence interval) are calculated from the absolute margin of error. Obviously for the strata enumerated completely $\Delta_j = v_j = 0$.

For the sampled strata and their unions, the sampling error of the value indexes is estimated – in 2008 only according to NACE Rev. 1 – as

$$\sigma_{Y_j}^{(i)} = f_j \frac{\sigma_{Y_j}}{Y_{0j}} \quad \text{and} \quad \sigma_Y^{(i)} = \frac{\sqrt{\sum_j [Y_{0j} \sigma_{Y_j}^{(i)}]^2}}{Y_0} .$$

The term f_j is calculated in the following way (for example *Särndal et al.* [1992]). Within the sampled strata, only those sampling units (respondents, imputed as negative or – since 2002 – not negative) are considered which belonged to the sample and the same stratum in the base period as well, furthermore, which were respondents or imputed as negative then. Let us denote their number by m_j, their reference and base period's value by z_{ji} and x_{ji}, respectively (the m_j values of z_{ji} are among the $n_j > m_j$ values of y_{ji}), moreover, their sum by z_j and x_j, then the corresponding means are

$$\overline{z_j} = \frac{z_j}{m_j} \quad \text{and} \quad \overline{x_j} = \frac{x_j}{m_j} ,$$

the standard deviations are

$$\sigma_{1j} = \sqrt{\frac{1}{m_j - 1} \left[\left(\sum_{i=1}^{m_j} z_{ji}^2 \right) - m_j \left(\overline{z_j} \right)^2 \right]} \quad \text{and} \quad \sigma_{0j} = \sqrt{\frac{1}{m_j - 1} \left[\left(\sum_{i=1}^{m_j} x_{ji}^2 \right) - m_j \left(\overline{x_j} \right)^2 \right]} ,$$

$$C_{1j} = \frac{\sigma_{1j}}{\overline{z_j}} \quad \text{and} \quad C_{0j} = \frac{\sigma_{0j}}{\overline{x_j}} ,$$

in addition the correlation coefficient of the reference and base period's value is

$$r_j = \frac{\frac{1}{m_j - 1}\left[(\sum_{i=1}^{m_j} z_{ji} x_{ji}) - m_j \overline{z_j} \cdot \overline{x_j}\right]}{\sigma_{1j}\sigma_{0j}} \; .$$

The term f_j is determined by the formula

$$f_j = \frac{\sqrt{C_{1j}^2 + C_{0j}^2 - 2r_j C_{1j} C_{0j}}}{C_{1j}} \; .$$

The formula implies that in case of the permanence of the coefficient of variation in time, that is in case of $C_{1j} = C_{0j}$

$$v_j^{(i)} = v_j \sqrt{2\left(1 - r_j\right)} \; .$$

It appears from the foregoing that if $r_j = 0{,}5$ then $v_j^{(i)} = v_j$, and if $r_j > 0{,}5$ then $v_j^{(i)} < v_j$ (in the extreme case $r_j = 1$ the value of $v_j^{(i)}$ is 0). Obviously for the strata enumerated completely $v_j^{(i)} = 0$.

The breakdown of the estimated population totals for classes and counties, the estimation of the population total of micro enterprises with less than 5 persons employed, the formation and estimation of monthly and quarterly labour statistical variables, just as the yearly sampling surveys of small enterprises are discussed in a forthcoming paper.

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Restructuring of Agricultural Statistics at the Turkish Statistical Institute in the Process of Preparing for EU Membership

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There have been some actions in order to restructure the statistical system of Turkey in the context of harmonization with the Acquis Communautaire for a long time. Among them, the most important attempt was the enactment of the Statistics Law of Turkey (No. 5429) in November 2005. Under this law, the statistical system of the country went through a fundamental transformation, and agricultural statistics was restructured in the Turkish Statistical Institute (TurkStat). In this study, firstly, brief information is given on the re-organized structure of TurkStat, then the new state of agricultural statistics and relevant actions are discussed in detail. Lastly, some agricultural statistics issues of the Hungarian Central Statistical Office (HCSO) and TurkStat are compared.

KEYWORDS:
Agricultural statistics.
Law.
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Although the share of agricultural employment in total employment and the number of agricultural holdings tend to decrease in Turkey, the role of agriculture is still very important in the country. The number of agricultural holdings is 3 076 649, their average size is 6.1 ha (*TurkStat–Prime Ministry of the Republic of Turkey* [2001]) and the share of agricultural employment is 25.9 percent (*TurkStat–Prime Ministry of the Republic of Turkey* [2007]). Agriculture also has an important part in the exports of Turkey. The main agricultural products exported are hazelnut, dried fig, raisin, dried apricot, pistachio, cereals, fruits, vegetables, cotton, tobacco, olive, tea and oil seeds. By reason of the crucial role of this section, to produce accurate agricultural statistics is of great importance.

The most important crop products of the country are cereals, pulses, sugar beet, tobacco, fruits, vegetables, oil seeds, nuts and tea, while the main animal products are poultry, bovine animals, sheep and goats. As a general overview of Turkey's agriculture, the following TurkStat data on agricultural land and livestock can be given:

Agricultural land, 2008 (1 000 hectares):

- Total utilized agricultural land: 39 122;
- Total arable land: 21 555;
- Area of vegetable gardens: 836;
- Total land under permanent crops: 2 950;
- Area of orchards: 1 693;
- Area of vineyards: 483;
- Area of olive plantation: 774.

Number of livestock, 2008 (heads):

- Bovine animals: 10 946 239
- Sheep and goats: 29 568 152
- Poultry: 249 043 739
- Horses: 179 855.

1. Restructuring of TurkStat

In order to implement a restructured statistical system including agricultural statistics, the Statistics Law of Turkey (No. 5429) came into force in November 2005.

Under its provisions, the Turkish Statistical Institute consists of the Statistics Council and the Presidency of TurkStat. The organizational structure is shown in Figure 1 (*TurkStat* [2008b]).

Figure 1. Organizational structure of TurkStat
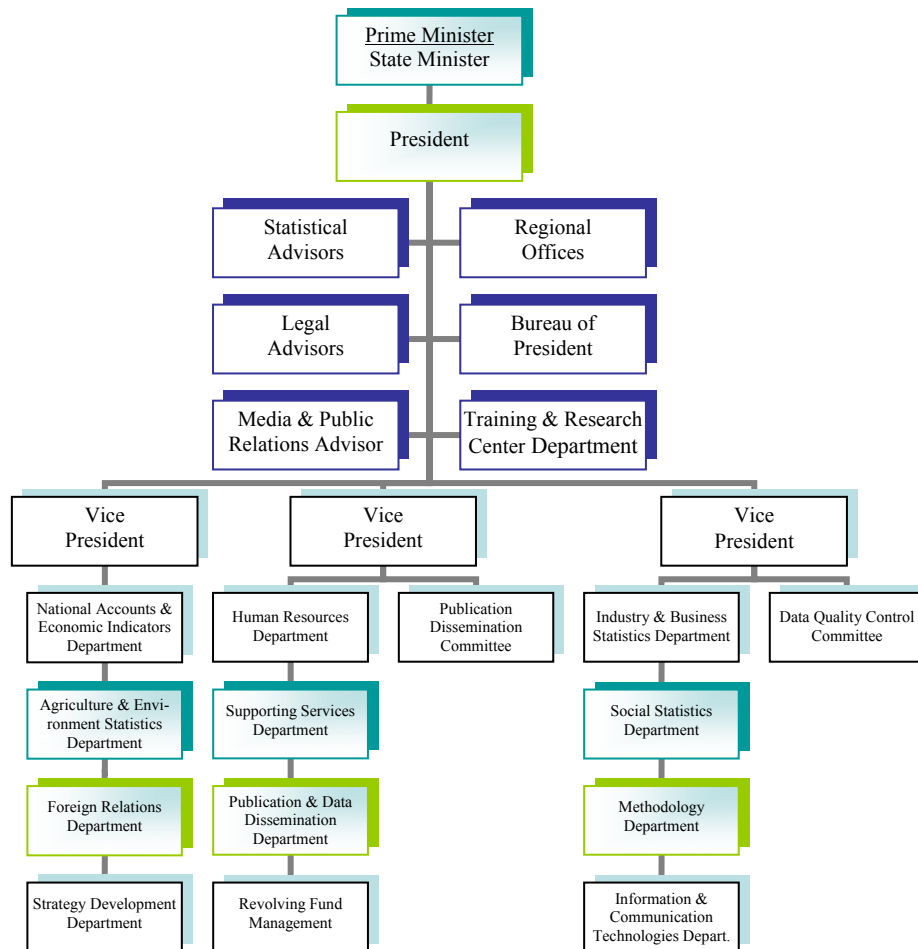
Source: TurkStat.

The main task of the Statistical Council is to advise on the Official Statistics Programme and official statistics. The President of the Turkish Statistical Institute is also the chair of the Council, which consists of the representatives of various governmental and non-governmental organizations. The Council meets at least once a year according to the law.

The Presidency of the Turkish Statistical Institute – that implements the legal standards and performs tasks assigned to it – consists of central and provincial organizations. The central organization comprises the main service and advisory units, as well as the auxiliary service units. Within the central departments and regional directorates of the Presidency, provisional or permanent groups and teams may be set up depending on the nature of work to be carried out.

TurkStat has 26 regional offices. Their principal tasks are compiling, evaluating, controlling, analyzing and transferring to the head office data relating to their specific geographical area and providing the infrastructure necessary for regional statistics.

2. Agricultural statistics at TurkStat

The compilation of agricultural statistics began in 1927 with the establishment of the Agricultural Statistics Division in the Central Statistical Department set up in 1926 after the foundation of the Republic. Agricultural censuses were conducted in 1927, 1950, 1963, 1970, 1980, 1991 and 2001.

The name of the responsible department was Agriculture and Industry Statistics Department before the Statistics Law of Turkey was adopted. Agricultural statistics have since been compiled by the Agriculture and Environment Statistics Department founded within the meaning of the law.

The duties of this department are as follows:

a) to compile and evaluate statistical information relating to the agricultural sector;

b) to carry out statistical research on land use, agricultural production, agricultural structures and sub-sectors, to evaluate the results and calculate the related indicators;

c) to conduct studies on agricultural balance and economic accounts of the agricultural sector, and to calculate the related indicators;

d) to conduct surveys and research in the field of environment – including water, air, land, wastewater, solid wastes, pollution and polluting emissions, biodiversity, expenditures on environmental protection, and water, air, land, noise and visual pollution – and to evaluate data collected by the related institutions and organizations on the basis of measurements and observations;

e) to compile the data needed for natural resources accounting;

f) to follow the standards and methodological developments in the
field of activity and carry out national and international projects;
g) to perform similar duties assigned by the President.

Agricultural statistics within the Agriculture and Environment Statistics Department are divided as follows (*Official Gazette of the Turkish Republic* [2008]):
Current agricultural statistics

- Crop production statistics
- Agricultural equipment and machines statistics
- Animal statistics
- Fishery statistics
- Forestry statistics
- Supply balance sheets
- Agricultural price statistics
- Remote sensing

General agricultural censuses
Agricultural holding surveys

- Agricultural holding (farm) structure survey
- Crop production statistics survey
- Animal production statistics survey
- Agricultural holdings' (household') wage structure survey
- Marine fishery survey

Other studies on agriculture.

2.1. Division of agricultural statistics at TurkStat and its activity

In the previous department there were two sections, the Agriculture, Hunting and Forestry Statistics Section and the Agricultural Price and Internal Terms of Trade Section, which dealt with agricultural statistics. In the current department, established after the law was adopted, the Agriculture Statistics and the Environment Statistics Groups work. Agricultural statistics are compiled by the first one including seven teams. These teams are specialized in the fields as follows: crop production statistics; animal production statistics; agricultural price statistics; agricultural structure statistics; farm register system; agricultural environment; balance and accounts; remote sensing.

Crop production statistics. In Turkey, crop production statistics are compiled from two sources: official records and agricultural censuses. The former ones consist of

statistics related to agricultural land, volume of production, number of trees, yields, fertilizers, agricultural chemicals, organic farming, agricultural equipment and number of machines. In general, data related to area, agricultural equipment and machines, fruits and viticulture are collected from agricultural holdings in agricultural censuses.

Statistics on area (including land under protective cover), production, yield and number of trees have been compiled by the crop production statistics team. Three estimations are made in a year (in August, November and in March of the next year).

The agricultural structure (production, price and value) publication, issued annually as hard copy and CD, includes the data of production, agricultural equipment and machines, and some agricultural indicators at NUTS 3 level.

A study about crop production statistics obtained directly from agricultural statistics was first conducted in 2006. Some detailed analyses on viticulture statistics were also planned between 2008 and 2010. Besides these, there are some studies about some agriculture-based basic industries such as olive and olive oil, sunflower, cotton, hazelnut and grape production. They have been made by TurkStat, the Ministry of Agriculture and Rural Affairs (MARA) and the Ministry of Industry and Trade.

Animal production statistics. Livestock and fishery statistics have been compiled by the Animal Production Statistics Team. General agricultural censuses and administrative registers are used for this purpose. Statistics on animal numbers and productivity of animal husbandry are obtained from the first ones, while data on bovines, sheep and goats, poultry, camels, pigs, horses, mules, asses, apiculture, sericulture, eggs, honey, wax, silk cocoon, red and white meat, milk, hide, wool, animal hair and mohair are gathered from annual livestock statistics.

These latter statistics are compiled from the registers of MARA, slaughterhouses and factories. Data on sericulture are collected from the competent association by e-mail. Animal production statistics are based on the calculations made by TurkStat. Livestock statistics are presented annually in hard copy, on CD and in database.

A study about obtaining livestock statistics directly from agricultural statistics was first carried out in 2006. The data on meat and milk are planned to be acquired directly from agricultural holdings, and meat and milk statistics to be compiled by using a questionnaire in accordance with EU standards.

Fishery statistics concern sea products, aquaculture and inland (fresh water) products. Sea products data are compiled annually by TurkStat from surveys conducted in 28 provinces. Information on aquaculture is obtained from establishments performing intensive, semi-intensive and extensive production and/or fish raising activities, while data on inland water production are collected by MARA. These are sent to TurkStat annually. Fisheries statistics are presented to users annually as hard copy and CD.

Agricultural price statistics. In this context, the unit price received by farmers (PRF) is collected and the producer price index (PPI) for agricultural sector (output index) is calculated. PRF includes the initial prices of field products, vegetables,

fruits, livestock and animal products (altogether 227 products) (in various details); PPI for agricultural sector (output index) covers agriculture, forestry and fishery.

Prices received by farmers were collected monthly from 73 provinces where bazaars operate and from 786 district offices of MARA via internet and postal service. Producer prices are gathered every month from commodity exchange markets, unions and institutions, fish market halls and cooperatives, the Ministry of Environment and Forestry, The Turkish Grain Board and the Turkish Sugar Authority in order to compute PPI for agricultural sector (output index). Agricultural price statistics are published as a yearbook with CD.

In 2011, a pilot survey is going to be implemented for the purpose of calculating the input price index and compiling land prices and rents. The indicators used for analyzing purchasing power rates and welfare changes in the agricultural sector will be obtained by its means.

Agricultural structure statistics. These statistics are compiled from general agricultural censuses and agricultural holdings' wage structure surveys. In agricultural censuses, the data related to legal status, activities of holdings other than crop production and/or animal husbandry activities, land use, number of land parcels, cultivated area by products, irrigated area, irrigation sources and system, production system, usage of chemical fertilizers and pesticides, number of animals, existence of agricultural equipment and machinery, buildings used for agricultural purposes and other buildings, composition of households and employment are compiled. Statistics related to the wage structure of agricultural holdings are acquired from two surveys: the agricultural holdings' (households') wage structure survey, and the state agricultural holdings' employment and wage structure survey. The results of these latter ones are presented as a news bulletin and on the internet annually, while those of the general agricultural censuses are available as hard copy and CD.

The 2006 Agricultural Holding (Farm) Structure Survey has already been completed. The next (8th) General Agricultural Census will be conducted in 2011.

Farm register system. Studies on the statistical farm register system have been carried out using the 2004 Direct Income Support (DIS) and Farm Register System of MARA. Under a project implemented by TurkStat, the MARA 2004 DIS database was received and analyzed, and 19,000 lists were updated by means of outsourcing in 2005 and 2006. (The rest of them will be updated in the coming years.) Then these registers were used by TurkStat as a frame for agricultural surveys in 2006.

The Farm Register System is planned to be improved by MARA in the context of upgrading Turkish Statistical System, thus, it will include, for example, more variables related to the holdings engaged in olive growing and viticulture.

Agricultural environment, balance and accounts. The studies on agri-environment indicators, supply balance sheets, agricultural accounts and food safety statistics are made by the Agricultural Environment, Balance and Accounts Team.

Plant protection products and fertilizer sales statistics by their types and organic farming statistics have been compiled within the context of agri-environment indicators. In addition, a pilot survey has been carried out at farm level in order to make statistics on the usage of plant protection products for selected crops, and a study on compiling plant protection products sales statistics by provinces has been initiated in cooperation with MARA as from 2009.

Information on the resources and use of selected agricultural products is included in the supply balance sheets to estimate quantities potentially corresponding to human consumption over a reference period. The data sources of agricultural production, trade of primary and processed products, household consumption and inventory assets are annual agricultural statistics, trade statistics, household income and budget surveys and administrative registers, respectively. The studies on compiling supply balance sheets for processed products such as olive oil, meat and milk products have been continued. In 2009, initial and final stock data were planned to be gathered and technical conversion coefficients to be updated using data of agro-industry.

Studies on establishing economic accounts for agriculture (EAA) and on the relevant methodology (EAA/EAF 97 Rev.1.1) of Eurostat were initiated in 2006 and are scheduled to be completed until 2011. Simultaneously, the examination of data sources and data collection for EAA was continued in 2007.

Methodological studies are underway to develop food safety statistics. Organic farming data covering number of holdings, cultivated area and production have been obtained at province level from MARA since 2004. In cooperation with MARA, data from food industry are planned to be collected, and food consumption data obtained from the household budget survey are to be analyzed.

Remote sensing. Studies on the land use / cover area frame statistical survey (LUCAS) have been made by using aerial photos, cadastral maps and satellite images by the Remote Sensing Team.

TurkStat will carry out field applications in cooperation with MARA. In addition to these studies, a questionnaire form will be applied to the farms that correspond to the selected parcels in order to compile statistics on land, crop pattern, machinery, fertilizer usage and agricultural technical practices (*TurkStat* [2008a]).

2.2. Projects carried out in agricultural statistics at TurkStat

At TurkStat there are some ongoing projects to upgrade the agricultural statistical system of Turkey. They are as follows (*TurkStat* [2006]):

      – Improvement of animal production statistics;
      – Compilation of balance sheets;

– Calculation of economic accounts for agriculture;
– Development of forestry statistics;
– Determination of typology of agricultural holdings;
– Preparatory work for agri-environmental statistics;
– Betterment of agricultural price statistics;
– Introduction of a data collection system on meat production and eventually the early "estimates" of production;
– Development of current statistics on vineyards and crops;
– Estimates of the production and direct consumption of animal products, meat and milk. Implementation of meat statistics;
– Development of an approach to collect information on units engaged in subsistence and semi-subsistence farming;
– Enlargement and strengthening of the reporting scheme for the development of an environment-related indicator on pesticide use.

2.3. Studies carried out by TurkStat in cooperation with other institutions

There are some other studies on the agricultural statistical system of Turkey for what not TurkStat has primary responsibility. Thus, all data related to forestry statistics are compiled and kept by the Ministry of Environment and Forestry. MARA, which is the main institution having control over the Farm Accountancy Data Network (FADN), carried out a pilot survey on FADN. The present agricultural information system in the agricultural statistical system of Turkey is shown in Table 1.

The main instruments for cooperation in agriculture statistics between TurkStat and other institutions are the Statistical Programme, protocols, field applications and data exchange. In Turkey, the following institutions provide data to TurkStat:

– Ministry of Industry and Trade
– Ministry of Environment and Forestry
– Tobacco, Tobacco Products and Alcoholic Beverages Market Regulatory Authority
– Turkish Sugar Authority
– Union of Chambers and Commodity Exchanges of Turkey
– Producer unions.

Concerning studies conducted by TurkStat in cooperation with MARA, 802 district and 81 provincial offices of MARA and the MARA Strategy Development Board play a significant role in data flow. The former ones obtain data from MARA district offices and transmit them to the latter one, which performs data quality check. Then, information is transmitted to TurkStat, where data analyses and valida-

tion are carried out. For some studies, TurkStat directly obtains information from MARA provincial offices. The data flow diagram for the studies carried out by MARA and TurkStat is shown in Figure 2 (*TurkStat* [2006]).

Table 1

The present agricultural information system in the agricultural statistical system of Turkey

Main institution responsible	Survey/data

TurkStat	Agricultural censuses
	  – Land size
	  – Number of livestock
	  – Labour force
	Sample surveys
	  – Farm structure survey
	  – Crop production survey
	  – Livestock and fishery survey
	  – Agricultural holdings wage survey
	  – Pesticide usage survey
	Surveys on establishing economic accounts for agriculture

TurkStat & MARA	– Crop production – Animal production – Agricultural prices
MARA	FADN
Other institutions	Data on sugar, tobacco and forestry

Source: TurkStat.

Figure 2. Data flow diagram for the studies carried out by MARA and TurkStat
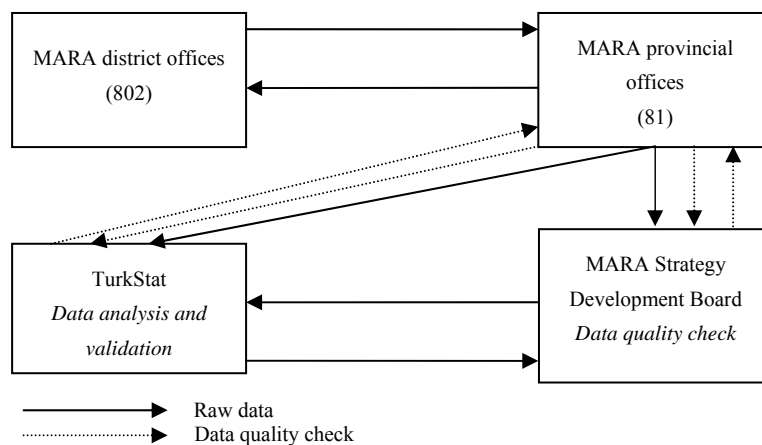
Source: TurkStat.

In the EU harmonization process, many studies in agricultural statistics have been conducted by TurkStat in coordination with other institutions (especially with MARA) in order to fulfil the main target of making the Turkish statistical system fully compliant with the European Statistical Requirements Compendium. The requirements on an agricultural statistics system are presented under "Statistics on agriculture, forestry and fisheries" in Domain 4 of the Compendium. It includes ten modules, which are presented in Table 2 together with some modules on food safety (from Domain 1). All these have also been studied by the TurkStat Agricultural Statistics Group. The level of harmonization of the modules of agricultural statistics has developed over the years in Turkey in the process of preparing for EU membership. These levels are presented in the following table by division of labour among TurkStat, MARA and other institutions.

Table 2

The level of harmonization of different agricultural statistics modules by division of labour among TurkStat, MARA and other institutions*

Level of harmonization	Main responsibility		
	TurkStat	TurkStat and MARA	TurkStat and other institutions
Mainly harmonized	4.02.01 Agricultural structures		4.05.01 Forestry statistics
Partly harmonized	4.01.03 Milk and dairy products statistics	4.01.01 Crop products statistics 4.01.02 Livestock, meat and eggs statistics 4.06.01 Fisheries statistics 1.09.04 Statistics on products with distinctive marks (including organic production and farming) 4.04.01 Agricultural accounts and prices 4.07.01 Agri-environmental statistics 4.08.01 Rural development statistics	
New objective	1.09.03 Food consumption statistics	1.09.01 Food safety statistics: cross-cutting issues 1.09.02 Statistics on control and monitoring activities 4.03.01 Land use and land cover	

* As included in the Statistical Requirements Compendium 2009.

3. Comparison of agricultural statistics at HCSO and TurkStat

Hungary is an EU member state whose agricultural statistical system has many similarities with that of Turkey. Therefore, to achieve EU membership, it is useful for this latter country to analyse the Hungarian agricultural statistical system and to compare HCSO and TurkStat applications of agricultural statistics. There are both differences and similarities in the practice of the two organizations. Some agricultural issues at HCSO and TurkStat are compared as follows:

– HCSO is the main institution responsible for compiling agricultural statistics in Hungary. There are, however, studies conducted by the Ministry of Agriculture and Rural Development (MARD) and also others carried out by both of these organizations. Similarly, in the Turkish agricultural system, agricultural statistics are collected by TurkStat in close cooperation with MARA.

– In the Hungarian office, agricultural statistics are compiled by the Agriculture and Environment Statistics Department together with the regional offices. The structure of data collection is the same in TurkStat.

– HCSO's Section of Economic Accounts for Agriculture deals with the income of the agricultural households sector, agricultural price statistics and agricultural labour input statistics besides the economic accounts for agriculture. In TurkStat there is not a section which comprises all agricultural monetary issues, they belong to the responsibility of different teams instead.

– Administrative data can be used as data sources other than statistical surveys according to Regulation (EC) No 2005/124 and Decisions 98/377/EC and 97/621/EC of the EU. In the Hungarian Farm Structure Survey 2007 (FSS 2007) an organic farming database was used in order to obtain organic farming data, so there were no detailed questions about organic farming in the FSS 2007 questionnaire. This practice indicates to us that if there are good administrative data on a characteristic in a system, they can be used instead of surveying that feature. TurskStat also uses administrative data obtained from MARA to compile organic farming statistics.

– HCSO has conducted regular farm structure surveys except for general agricultural census years. After the last agricultural census (held in 2000), there were farm structure surveys in 2003, 2005, 2007 and in June 2010. In TurkStat, general agricultural censuses are carried out every ten years. The next (8th) one will be conducted in 2011. In

contrast to censuses, the 2006 Agricultural Holding (Farm) Structure Survey was carried out in the context of an EU project.

– It is also important to note that not all kinds of fruits are surveyed in the orchard survey (OS) implemented by EU member states but only those that were determined by Eurostat on the basis of production density of the kinds of fruits in the given country. For example, only apple, pear, apricot and peach were measured by HCSO in OS 2007. In TurkStat there are no regular separate orchard surveys. The data on orchards, covering all kinds of fruits, have been collected in general agricultural censuses and other agricultural surveys conducted by TurkStat.

4. Conclusions

Agricultural statistics have a great importance in the Common Agricultural Policy of the European Union. Because of this fact, it is crucial to compile them according to the European Statistics Code of Practice, observing the issues of professional independence, mandate for data collection, adequacy of resources, quality commitment, statistical confidentiality, impartiality and objectivity, sound methodology, appropriate statistical procedures, non-excessive burden on respondents, cost effectiveness, relevance, accuracy and reliability, timeliness and punctuality, coherence and comparability, accessibility and clarity, in harmony with the Statistical Requirements Compendium of Eurostat.

In addition to previous studies, some new ones in agricultural statistics, recommended by the EU, have been initiated at TurkStat to ensure full compliance with the formerly mentioned documents. A great effort has been made to upgrade the statistical system of Turkey congruously with EU requirements, and there is a great tendency to make the agricultural statistical system of the country fully consistent with the Acquis Communautaire. In the interest of harmonization, agricultural statistics at TurkStat were restructured and studies for the harmonization have been performed.

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