Jerzy J. Parysek, Lidia Mierzejewska

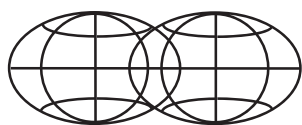## Trajectories of the demographic development of Poland after 1989

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Trajectories of the demographic development of Poland after 1989

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Abstract. One of the major problems of contemporary Poland is its increasingly difficult and complicated demographic situation. This makes the identification of demographic trends of the recent years an important research task. The article presents an assessment of Poland's demographic situation after 1989, i.e. after the change of the country's socio-political system, using the graphic method of trajectories. It is one of the possible, though less popular, methods of studying time series, offering a new perspective on various processes, here demographic ones. The article has two aims: cognitive and methodological.

Contents:

1. Introduction

It is impossible to analyse either changes in the natural environment or socio-economic development without making any reference to humans. That is why it is important to know demographic development patterns of the world, countries, regions, communes, and towns. The current demographic situation and development trends will certainly affect the future, even if growth tendencies and dynamics are going to be different.

Any economic and social activity is conducted within a framework determined by human needs, and if only for this reason demographic development should be taken into account. This means that the planning of socio-economic development, both in space and time, also has to take into consideration the state of the population, the current paths of its development, and forecasts made. It is for those reasons, among other things, that demographic studies are of fundamental significance for people responsible for the satisfaction of social needs, and hence for

socio-economic development, i.e. for authorities at various levels.

The current demographic situation of Poland is bad, primarily due to a low natural increase and the post-1989 emigration of young people, especially after Poland's accession to the European Union in 2004.

There are many causes of the low natural increase that differ in significance and impact. Among them are the absence of the state's population policy, economic conditions, a difficult housing situation, a rise in the working activity of women, changes in the value systems adopted, a crisis of the family (including partnerships), re-evaluation in the morality system (including sexual freedom and abortions), postponing motherhood until a later period in life, a faith crisis, and advancing secularisation of public life, and many other.

The emigration of young people has been largely due to the economic crisis, unemployment, increasing poverty, and lack of perspectives for life. What enhance it are the open labour markets of the European Union states, although recently they have clearly been suffering the effects of the post-2007 economic breakdown.

The demographic situation evolving in the recent years in Poland has generated many unfavourable processes, like the ageing of society and disturbing the age and economic structures of the population, with the country's depopulation as a later consequence. The probable effects of those processes may include disturbances on the labour markets and a threat to the budgets of the state and regions as well as towns and communes (scarcity of funds for old-age and disability pensions, health care, welfare, investment in infrastructure, etc.). In a later perspective, a highly real demographic breakdown can be a threat to the state's existence and national identity. Therefore one cannot but be concerned about the rather carefree attitude of the authorities to the demographic changes taking place, which reduce this complicated problem to a shift in retirement age and seek a solution of disturbances on the labour market in the opening of the state borders to immigrants.

It seems that what is needed in the existing situation – and badly, too – is a population policy whose effects would allow avoiding the potential threats. However, such a policy is impossible to design and implement without the knowledge of the current demographic structures and tendencies.

The aim of this article is to present Poland's post-1989 demographic development in selected categories by plotting trajectories for them. The trajectories are specific, graphic representations of the pathway from the initial to the final year of study, so they illustrate the process currently taking place.

The choice of the study period is not accidental. This is the time after the 1989 turning point, when fundamental changes in the organisation, structure and operation of the state, society and economy took place, also significantly affecting the country's demographic situation. Besides, this is a period of 20 years, which means one in which a generation has reached maturity.

2. The trajectory as a method of study of the development path

The term 'trajectory', deriving from physics and employed in ballistics, denotes the curve, or path, described by a moving body (a projectile in ballistics). Thus understood, a trajectory can be interpreted in both, spatial and temporal terms. In the first case the focus is on the path along which a body moves in space, and in the latter, on the time needed to travel the distance from the starting to the end point (adopted as the target).

The first to use the term 'trajectory' in Polish geographical literature was probably A. Kukliński, although in a somewhat different sense. It was applied to the Berlin-Poznań-Warsaw axis, which was supposed to be a prospective axis of dynamic socio-economic development of Poland and Central Europe (Domański, 1999). In the quoted monograph, *The changing map of Europe. The trajectory Berlin-Poznań-Warsaw*, it was fairly commonly employed by the authors of individual chapters. In the present article, however, the term trajectory is understood differently: it is a graphic image of a process (a series of changes in time).

It is hard to indicate the author of this simple but highly interesting methodological approach with any certainty. Applications of this method of the graphic presentation of a process can be found, e.g. in Ormerod (1993) and Hingel (1993), where the diagram of a trajectory is called a connected scatter plot. The method has also been employed many times by one of the authors of this article (cf. Parysek 2002a, 2002b, 2004). Here the authors present their own description and interpretation of the results of its application, supported by their research experience.

A trajectory is drawn using a very simple but highly ingenious solution. An event, or two successive

measurements of a specified variable in time, is plotted as a point in a rectangular coordinate system (e.g. the 1995 natural increase on the *x*-axis and the 1996 one on the *y*-axis, or the other way round). This is repeated for the consecutive years of the time series studied, and the successive points are connected, thus giving a development trajectory (the course of a process).

What is characteristic of the method is that an event, dynamic in nature, is mapped as a point determined in a rectangular coordinate system. This point, however, reflects the change that occurred over a year, and the plotted trajectory, the year-to-year changes that took place in the period under study. Conclusions concerning the changes, and more precisely the process that they indicate, are drawn on the basis of the line (trajectory) plotted, taking into consideration its shape and distances between the points describing successive states. It should be emphasised here that the plotted trajectory illustrates a generalised course of the process, and its interpretation should be supported with an analysis of concrete statistical data.

The trajectories plotted for individual population variables present the demographic development of Poland over the years 1989–2009 in a specific and generalised form.

3. Research results: demographic development trajectories

Trajectories of Poland's demographic development were plotted for the following variables: (a) total population; (b) urban population; (c) rural population; (d) total natural increase; (e) natural increase in towns; (f) natural increase in the countryside; (g) total live births; (h) live births in towns; (i) live births in the countryside; (j) total deaths; (k) deaths in the urban population; (l) deaths in the rural population, (m) total marriages contracted; and (n) total divorces.

The research did not include migration, a variable sometimes greatly affecting the demographic situation. However, the statistical data for this process are unreliable, because there are very few cases of departures abroad and inflows of immigrants reported to vital registration offices. In other words, reports of a change of address do not reflect migration movements.

Total population: In the years 1989–1997 the trajectory shows an increase in the number of Poland's population, then a decline until 2007, followed by an upward tendency again (Fig. 1).
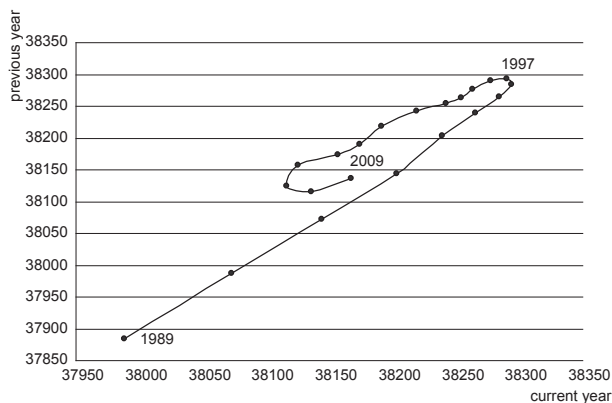

Fig. 1. Trajectory of total population

Source: Own compilation on the basis of Central Statistical Office data

Urban population: Until 1991 the trajectory shows the urban population to have a tendency to grow, followed by some disturbances in the years 1991–2000, and then a decline (Fig. 2).
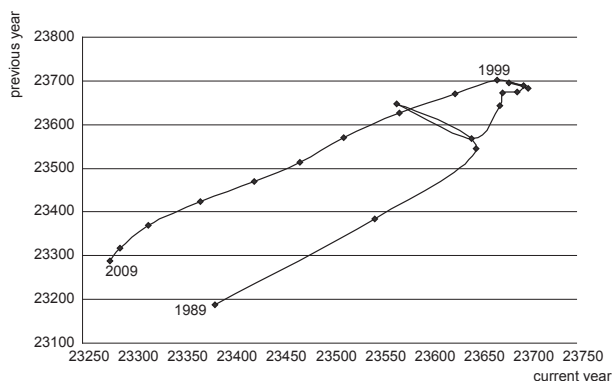

Fig. 2. Trajectory of urban population

Source: Own compilation on the basis of Central Statistical Office data

Rural population: A decline in the number of the rural population lasted until 1998, followed by some disturbances in the next years until 2000, then a drop until 2007, after which it started to climb again (Fig. 3). Those changes are due to a declining natural increase, the ageing of the population, and migration, also caused by the process of suburbanisation gaining in intensity in the first decade of the 21st century.

Total natural increase: The natural increase trajectory shows there to have been a drop in demographic dynamics until 1999. In the following years one can observe some disturbances until 2004, after which the natural increase started to rise (Fig. 4).
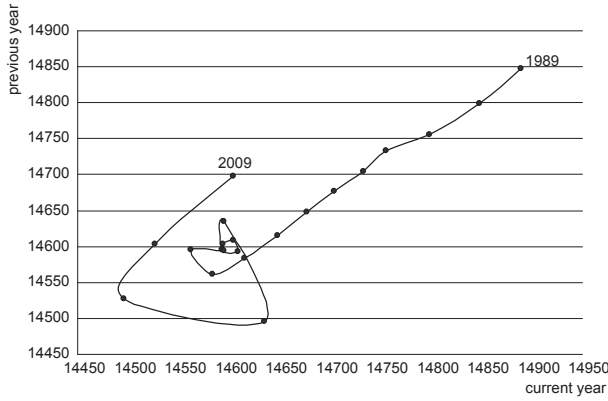
Fig. 3. Trajectory of rural population

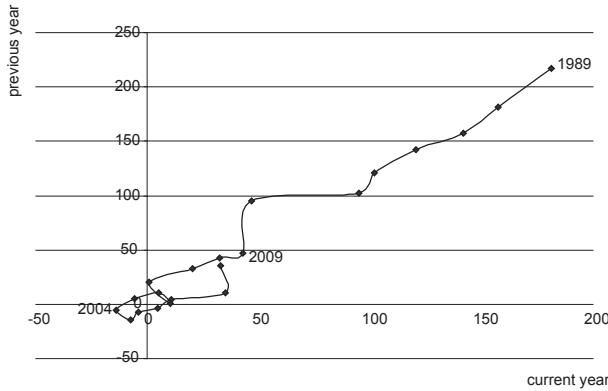*Source:* Own compilation on the basis of Central Statistical Office data

Fig. 4. Trajectory of total natural increase

Source: Own compilation on the basis of Central Statistical Office data

Natural increase in towns: Until 2004, the trajectory documents its systematic decline, followed in later years by an increase (Fig. 5).
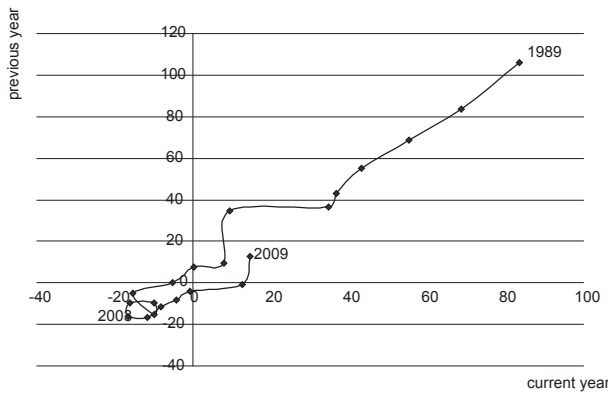

Fig. 5. Trajectory of natural increase in towns

Source: Own compilation on the basis of Central Statistical Office data

Natural increase in the countryside: The natural increase in the countryside followed a different pattern. Until 1999 the trajectory shows a downward tendency, then disturbances until 2004, and since that year, a rise again (Fig. 6).
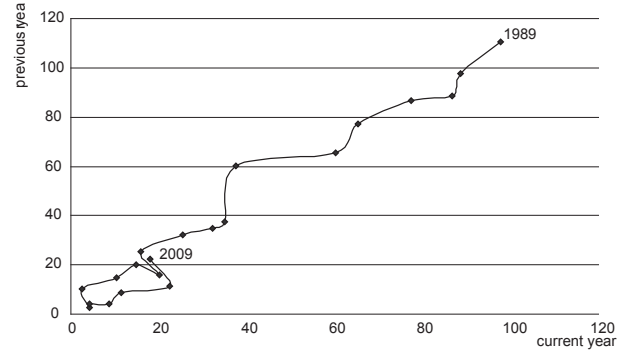

Fig. 6. Trajectory of natural increase in the countryside

Source: Own compilation on the basis of Central Statistical Office data

Live total births: The trajectory of births is very clear. Until 2003 its shape shows a drop in the number of births and then growth again. Thus, this unfavourable tendency was reversed (Fig. 7).
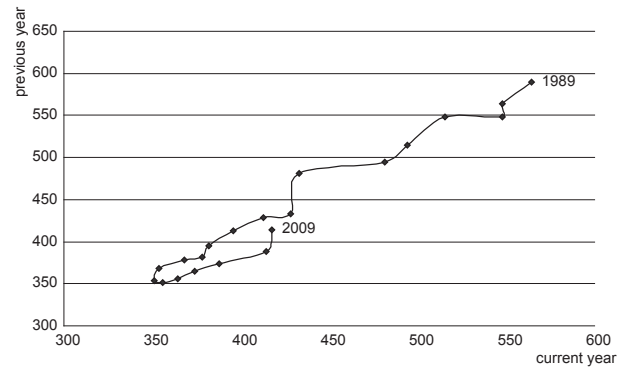

Fig. 7. Trajectory of live total births

Source: Own compilation on the basis of Central Statistical Office data

Live births in towns: The trajectory of urban births is similar to that of total births. Here too there is a drop in the number of births until 2003 and then a reversal of this tendency, i.e. growth (Fig. 8).

Live births in the countryside: The situation in the countryside looks different again. Up to 2002 we can talk of disturbances in the process, then of a short-lived monotonic slump until 2004, and a rise in the following years (Fig. 9).

Total deaths: The death trajectories can be seen to describe two loops. One embraces the years 1989–1999, when after a rise in the number of deaths
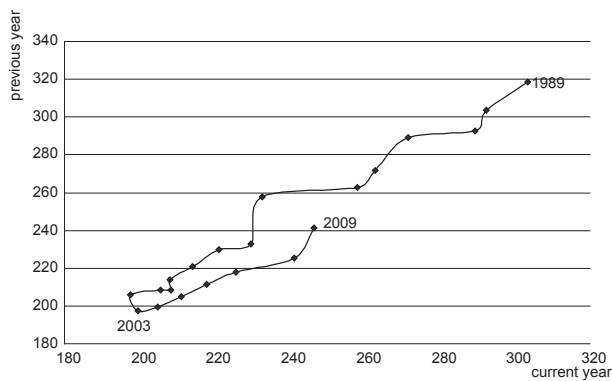
Fig. 8. Trajectory of live births in towns

Source: Own compilation on the basis of Central Statistical Office data
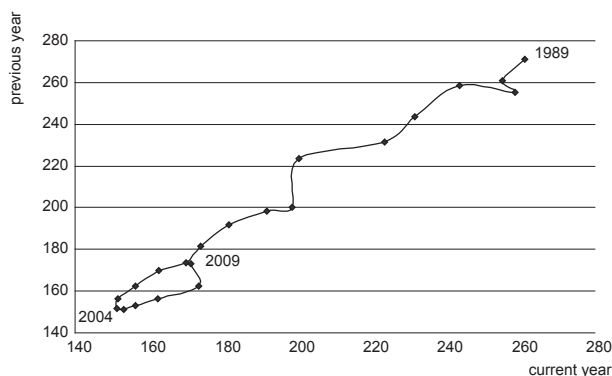

Fig. 9. Trajectory of live births in the countryside

Source: Own compilation on the basis of Central Statistical Office data

the figure started to drop in 1992, and another in the years 1999–2009, with a decline until 2003 and another rise since then (Fig. 10).
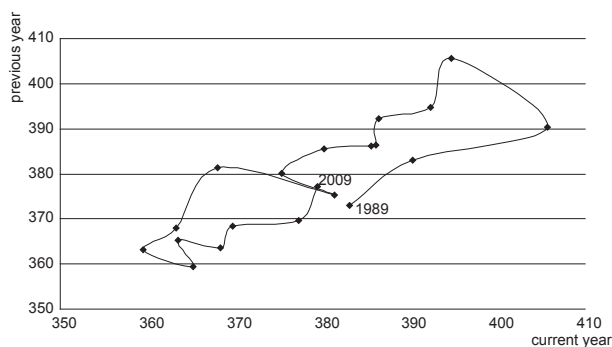

Fig. 10. Trajectory of total deaths

Source: Own compilation on the basis of Central Statistical Office data

Deaths in the urban population: The pattern of urban deaths shows disturbances in the years 1989–2002, ending with a rise in their number until 2009 (Fig. 11).
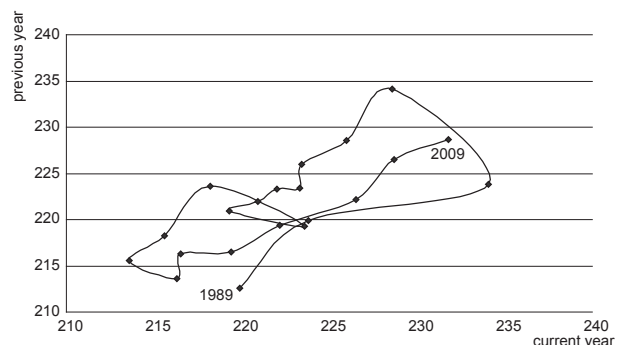

Fig. 11. Trajectory of deaths in the urban population

Source: Own compilation on the basis of Central Statistical Office data

Deaths in the rural population: The situation in the countryside looks a bit different. Until 1992 there was an increase in the rural death rate, followed by a decline lasting until 2003. The period after this date shows disturbances of the index (Fig. 12).
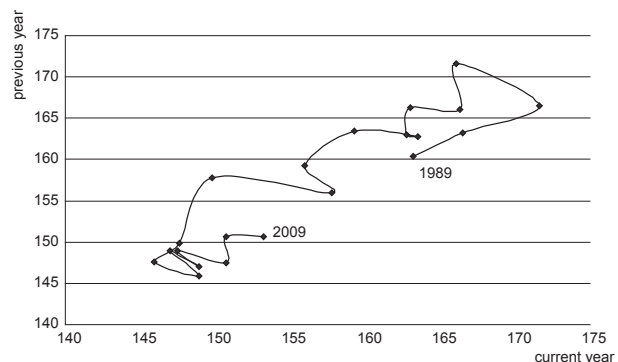

Fig. 12. Trajectory of deaths in the rural population

Source: Own compilation on the basis of Central Statistical Office data

Total marriages contracted: The total number of marriages shows a downward tendency until 1997. Then until 2000 the trajectory describes a loop, after which there is a drop in the number of marriages until 2003 and then a rise again. The situation in the years 2008 and 2009 is similar to that in 1989 and 1990 (Fig. 13).

Marriages in towns: The trajectory of urban marriages closely resembles that of the national total, except that the disturbance loop is longer: it embraces the years 1992–2004 (Fig. 14).
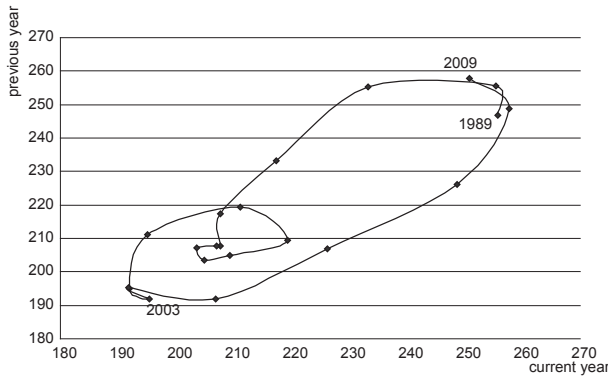
Fig. 13. Trajectory of total marriages contracted

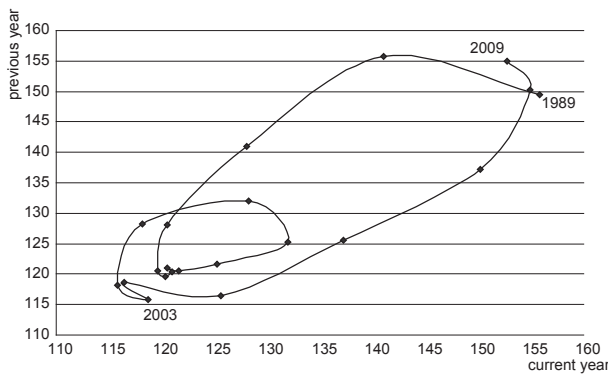*Source:* Own compilation on the basis of Central Statistical Office data

Fig. 14. Trajectory of marriages in towns

Source: Own compilation on the basis of Central Statistical Office data

Marriages in rural areas: The marriage trajectory for rural areas is similar to the trajectories described above. However, worth noting is the decline in the number of marriages lasting until 1994, followed by
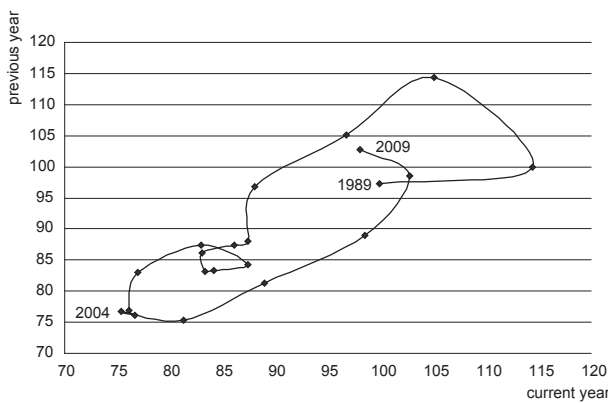

Fig. 15. Trajectory of marriages in rural areas

Source: Own compilation on the basis of Central Statistical Office data

disturbances until 2000, a further drop until 2004, and a rise again until 2009 (Fig. 15).

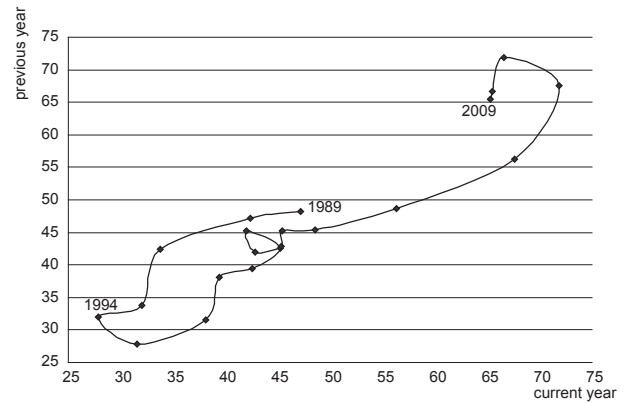*Total divorces:* The trajectories of total, urban and rural divorces show similarities. Generally, until 1994

Fig. 16. Trajectory of total divorces

Source: Own compilation on the basis of Central Statistical Office data
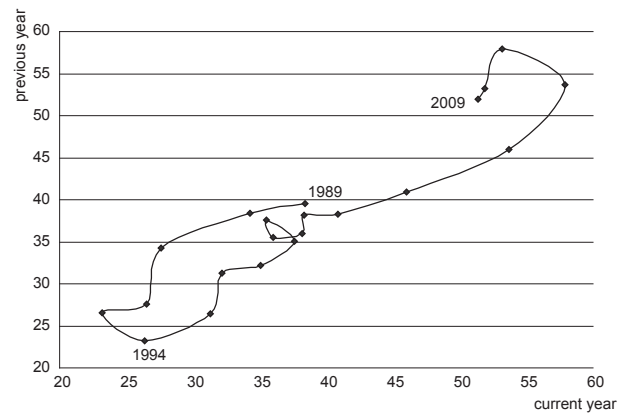

Fig. 17. Trajectory of divorces in towns

Source: Own compilation on the basis of Central Statistical Office data
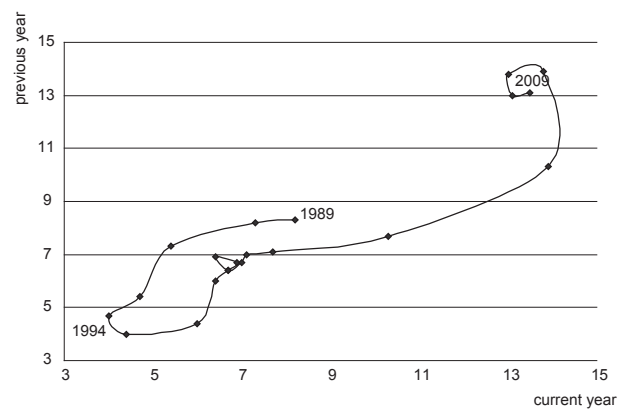

Fig. 18. Trajectory of divorces in rural areas

Source: Own compilation on the basis of Central Statistical Office data

there is a steady decline followed by a slow increase in the number of divorces, with some disturbances at the turn of the century. The end of the first decade of the 21st century shows a drop in the number of divorces, although in the countryside an upward tendency prevails again (Fig. 16, 17 and 18).

4. Conclusions

A trajectory is a graphic depiction of an ongoing process. It opens up new possibilities of interpreting what is (the current year) against what is used to be (the previous year). It allows identifying progressive and regressive processes as well as situational cycles and disturbances in a process. It also illustrates the dynamics of change (distances between the successive points of the trajectory). In this way it gives a new aspect to an analysis and comparison of processes, which is the greatest asset of this analytical tool.

The plotted trajectories of demographic processes that took place in Poland over the years 1989-2009 only show their course. A more detailed analysis would require reference to numerical data on the one hand, and on the other, a study of the cause-and-effect relations holding among the processes involved, which is absent from a paper of a generally methodological and synthesising nature.

It seems that the method proposed here may prove a valuable tool in an analysis of the so-called demographic transition, but a concrete decision in this matter will only be possible after concrete studies have been performed.

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