The measurement of transaction costs in Poland, 1996-2014

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Abstract

The empirical validation of the transaction cost concept proved to be a major intellectual endeavour that has yielded only partial success. Particular difficulties have been encountered in the measurement of such costs at the micro or macro level. The paper of Wallis and North (1986) is one attempt to provide a measure of transaction costs in the national economy. Their attempt is to define "transaction sectors" and relate the levels of output (i.e. costs incurred) in such sectors to the level of gross national / domestic product. Among these costs one finds: a) costs of management, sales, administration and control, b) costs of financing, insurance, distribution, c) (some of the costs) of the public sector / the State.

Apart from the original research concerning the US, there have been relatively few studies describing other economies (e.g. Australia, Argentina, Bulgaria). The paper joins the discussion on the macroeconomic interpretation of transaction costs started by Wallis and North. While we had hoped to trace the evolution of the transaction sectors as well as the pattern of transaction activities in non-transaction sectors as defined above, the availability of data prevented us from accomplishing ambitious research tasks. This paper is basically a replication of the study Wallis and North (1986) did for the US albeit for a much shorter time span (nineteen years). It contains a short description of the methodology used by these authors, the application of the method to the data on the Polish economy from the mid-1990s to 2014. We compare the findings with Wallis and North and other authors of studies on macroeconomic transaction costs and provide some interpretations of the results. Basically, our findings are remarkably close to the estimates of other teams. However, serious ambiguities in Wallis-North conceptualization make us sceptical as to the merits of this research subprogramme within neo-institutional economics. The implications for the understanding of economic growth and development remain unclear.[1]

JEL classification: D23, O11, O52, P27
Keywords: Poland, transaction costs, transaction sector

[1]The earlier versions of this study were presented at the 9th Annual Conference of International Society for New Institutional Economics, Barcelona, 22-25 September, 2005 (Sulejewicz, Graca, 2005, *Measuring the Transaction Sector in the Polish Economy, 1996 – 2002*) and at the 4th Conference of the World Interdisciplinary Network for Institutional Research (WINIR), Utrecht, 14-17 September, 2017.

1. Introduction

Brief introduction of the concept of transaction costs

The dominant paradigm in economic thinking, i.e. neoclassical economic theory privileges the market and the use of pricing mechanisms as a form of economic activity. The theory contends that, under most circumstances, free market exchanges lead to optimum results in allocation of scarce resources. It was the fundamental insight of Ronald Coase to note that having adopted such a view, one has difficulty in explaining other forms of economic organization, notably the firm. Why should firms exist (where market forces are suspended), if it is the market that solves the economic problem?[2] His answer was simple but then rather unusual for conventional economics: market is not a free good, or more precisely, the use of the price system is costly. He called the costs of using the price system "transaction costs" (Coase, 1937).

> "*In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal with and to what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on*" (Coase, 1960, p. 15).

The costs of using a market are not merely the costs of information gathering, assessment and use (a lot of that is contained in prices) but also safeguarding contractual rights (and hence writing, protecting, executing contracts). Thus, critical economists have identified:

a) search and information costs (finding buyers and sellers, communicating with them through a stock exchange, fair, or advertising, etc.),

b) bargaining and decision costs (when writing a contract it is crucial to decide and accept – and pay for – the degree of detail of the agreement),

c) supervision and enforcement costs (we need to monitor the behaviour of our contractors – delivery timing, amount and quality of the good/service etc.).

If buyers or sellers have an incentive to behave opportunistically, they might cheat at every stage of the process, they may hide information, pretend to be somebody else (for instance a trustworthy company), renege on the contract if they can go away unpunished or simply steal the money (e.g. by not replacing a faulty product). Discovering what they are like in reality is no easy matter – and is obviously costly.

Thus "the costs of running the economic system" as described by K. Arrow are a separate and nontrivial category of economic life. One should not think that only "outside" market transactions are costly in this sense. Internal costs of management / organization may also be considerable:

a) the costs of setting up, maintaining and changing an organization (design),

[2] The economic problem is precisely "the allocation of scarce resources that have competing uses" as introduced into textbook economics by Lionel Robbins in the 1930s.

b) the costs of running an organization (information, costs of decision making, monitoring the execution of tasks / orders, measuring performance of employees.

It is argued that transactions are responsible for most overhead costs, so that management is a key function contributing to their level but also allowing for their reduction (Miller, Vollman, 1985). Let us be clear: cost is not something an economist is happy about, economizing on (the sum of) production costs and transaction costs is the objective function of any organization, especially, of course, of the business firm (Williamson, 1985).

Understanding that execution of something that is assumed totally unproblematic in neoclassical economics provides the cornerstone to the institutional analysis of the economic activity. If transaction costs are zero (as assumed by neoclassicals) then there is no rational basis for institutional choice. It does not matter. On the other hand, non-zero transaction cost world (as much closer to reality) makes the economic understanding of institutional setups and their change possible.

Consulting any standard textbook shows that in "pure economics" markets and managerial transactions are implicitly assumed to take place against a well-defined and well-behaved political background. "Institutional arrangements consistent with a capitalist market order hold, and this means that a particular local, national, or international organization of the political economy exists. Of course, the provision of such an organization and the public goods associated with it also involve costs. These are political transaction costs. These are, in a general sense the costs of supplying public goods by collective action (…)" (Furubotn, Richter, 1998, p. 47). These can be the costs of:

a) setting up, maintaining and changing a system's formal and informal political organization (establishment of the legal framework, the administrative structure, the judiciary, educational system, etc.),

b) running a polity (to build a monopoly of organized violence, defence, legislation, administration of justice, etc.).

Just as before, information, decision making, monitoring, enforcement of compliance are all costly.

All the previously mentioned types of costs can most probably be divided into "variable" transaction costs, in the sense that they depend on the volume or number of certain transactions and into "fixed" ones. The latter would be the set-up (or change) costs of a new basic organization. From the point of view of received theory, these are the costs that have to be *added* to production and transportation costs, the costs that are normally recognized in accounting systems of, say, a firm. Unfortunately, such an approach which amounts to complementing standard private and public accounting framework (and the theoretical model of neoclassical economics) with positive transaction costs is deceptively simple (see below).

Measuring transaction costs

"Empirical studies of transaction costs almost never measure these costs directly" (Williamson, 1985 (1998), p. 35). Nevertheless, if the transaction cost as a heuristic device is to settle fully into mainstream economics, we need to provide it with precise empirical content and a definition allowing measurement. The predominant application of the concept and the need for measurement arises in the context of comparative governance of business dealings. For instance, is a joint venture better an arrangement than sales agency, or franchise,

or fully owned subsidiary? At the sectoral level, there have been several, not very formal, approaches to the practical measurement of transaction costs in the – so far only national – economy.

Let us take market transaction costs. For instance, prices of similar or identical goods are not usually the same over adjacent or even in the same market. Although consumers know that price differences are significant for certain products, many avoid expending time, effort, and money to find the lowest-price seller. One can reasonably hypothesize that the relative price differences (as reported to the average price) may be interpreted as measures of search cost avoided by consumers, and therefore, as measures of their own transaction costs. What they do not pay as costs they pay as price. Thus costs of marketing would qualify as transaction costs. There are standard microeconomic estimates of the difference between production costs and the price paid for the commodity by the final consumer (Scherer, 1987). When average transport costs and average indirect tax are excluded, the average marketing cost may be around 40-50% of the final price.

Tentative measures of internal managerial transaction costs yield similar magnitudes. If we accept, as suggested above, that overhead costs are an approximation of transaction costs, their share in total costs (or value added) has, in the US, reached levels between 35% and 60% (Furubotn, Richter, 1998, p. 51). Since these general administrative costs include production costs as well (e.g. utilities, depreciation, repair) a very crude (split) estimate of ½ would yield a share of circa 20% transaction costs in total costs of a firm. If profit margins are included and "outside" market transaction costs added the sum of market and organizational transaction costs may reach 40-60% of the final price paid by consumers.

We have indicated above that some of these costs are recurrent, i.e. variable. What is clear is that, especially, in periods of radical social and economic change, that is in periods when new institutions are being built, there must be substantial investment outlays, the costs of setting up the new system must be borne. Market transformation in Eastern Europe is a paramount example of such systemic change. Is there a way to measure these transaction costs?

Other challenges are in store as well. In practice, it is not easy to distinguish between production costs and transaction costs. For example: if production is lost due to delays in planning, is it the result of slow planning (transaction costs) or of a technology that cannot adapt quickly to late changes in the plan (production costs)? Double sourcing (maintaining supplies from two plants) rather than one may be seen as increasing production costs (because a firm is renouncing economies of scale) or increasing transaction costs (securing supplies given uncertainty and/or opportunistic behaviour on the part of a would-be monopolistic supplier). On the other hand, choice of that particular structure may be an ex-post indication that other forms of organizing supply are even more expensive (in terms of transaction costs). Lai (2013) distinguishes latent transaction costs from actual transaction costs: when the latent transaction costs are prohibitively high, no transaction takes place, no actual transaction costs are incurred and thus the share of transaction sectors should be zero. Nevertheless, with latent transaction costs declining, transaction happen, transaction sectors and actual transaction costs do appear and increase.

Thus a neat separation of production costs dependent on technology and transaction costs dependent on behaviour is not (always) tenable[3].

[3]"The transaction costs and transformation costs of buying (and selling) a house are, at the appropriate margins, substitutes for one another and therefore can be treated the same theoretically" (Wallis, North, 1986, p. 99).

2. Methodology

Our study is based on the methodology of measuring transaction costs elaborated by Wallis and North (1986)[4]. They did the pioneer attempt at macroeconomic measurement of transaction costs for the US economy. Their "basic approach is to segregate economic activities and actors into those that are primarily associated with making market exchanges and those that are not. The sum of resources used by those associated with transacting make up our estimate of the transaction sector" (p. 97). The "transaction function" is an equivalent of the "transformation function" as costs are only incurred in either area when the expected benefits from doing do exceed the costs of doing so. Inputs into a transaction function are no different from ordinary inputs (land, labour, capital, entrepreneurship). "When we speak of transaction costs we mean the economic value of the inputs used in performing the transaction function (…). Transaction costs include the value of labour, land, capital and entrepreneurial skill used in making exchanges. We measure the size of the transaction sector by determining which labour, land and capital costs should be included in the transaction sector" (p. 97). Since part of the transaction costs are not observable (e.g. time spent looking for appropriate houses to buy or waiting for buyers to come by) Wallis and North introduce the measure of the "transaction *services*" not full transaction *costs*: transaction services are the observable part of transaction costs (e.g. services of lawyers and realtors; p. 99). Using (their) analogy with national income accounts, they only try to capture that part of transaction costs that flows through the market.

Transaction costs inside firms are also identified by the function that particular employees (i.e. these are labour costs) perform. They "regard the firm as a bundle of contracts" whereby a hierarchy of contracts involves owners, managers, foremen, workers. At the top of the sequence (hierarchy)[5] transaction costs involve processing and conveying information, at lower levels conveying information is complemented with monitoring the labour contract. In the simple stylized example they provide, Bill Gates (they use Henry Ford) first, purchases the firm's output and the producers (sellers) are the people actually making the [products]; and secondly, he purchases the transaction services of the intermediate occupations in order to coordinate, enact, and monitor the exchange he makes with those who provide transformation services (p. 100). They are aware that "making detailed decisions on who does and who does not perform transaction functions in a given firm or industry is impossible short of an intimate and exhausting study of the process of transforming inputs into outputs in each industry. We have chosen a compromise method to get at transaction services within firms" (p. 100). They single out occupations that provide primarily transaction services to the firm and the residual ("by elimination") are transformation services. "The wages of employees in these 'transaction occupations' constitute our measure of the transaction sector within firms" (p. 100).

Wallis and North consider also a third category: intermediaries. Here, all of the resources, that is total value of the inputs used by the intermediaries, are included in the transaction sector and provide the measure of transaction costs. The problem in this case is to decide which firms/industries are properly classified as "transaction industries" (intermediaries). The authors include real estate and finance, banking and insurance, the legal

[4] For purposes of compatibility of results and availability of Polish data we have decided to update our 2005 study of the application of the Wallis and North (Dollery and Leong) methodology. For somewhat different approaches see: Bischoff, 2002; Dalen, Vuuren, 2005.

[5] Wallis and North mix temporal and spatial (vertical) metaphors in describing the "bundle".

profession, wholesale and retail trade. With some hesitation they add "protective services" (police, guards, etc.) – unfortunately necessary for enforcing one's property rights.

All in all, according to Wallis and North, increases in transaction costs reduce net social welfare (p. 103). And yet, "none of our transaction services are unproductive. They all represent the resource costs of making exchanges which, on net, make the parties to those exchanges better off (even when transaction costs are included)" (p. 103-104).

Coming to the empirical procedure of the measurement of macroeconomic transaction costs, it is worth, first, presenting Dollery's and Leong's (1998) division of economic activities distinguishing between the private and public transaction and non-transaction sectors of the economy (Table 1) – following Wallis' and North's (1986) study.

Table 1.
Transaction and non-transaction industries and services

Private sector		Public sector	
Production subsector	Transaction subsector	Production subsector	Transaction subsector
Agriculture Construction Mining Manufacturing Transport / Storage Services	Financial intermediaries (w/o insurance) Insurance Real estate Wholesale trade Retail trade	Education Health Rail/Air transport Public utilities Social welfare Communications	Public administration Public order Defence Postal services

Source: Dollery, Leong (1998), table 1, p. 209.

In order to determine the transaction costs in the private production sector Wallis and North "estimated all of the resources used in the transaction industries" (p. 111). The researchers considered the following industries as transaction industries – Finance, Insurance and Real Estate (FIRE) and Wholesale and Retail Trade. The value of all the resources were taken directly from input/output tables or estimated basing on historical data. The resources estimates were then added up yielding transaction costs in private transaction industries.

The transaction costs in private non-transaction industries were estimated using a more complex method. Producing mainly non-transaction goods and services, these industries – Agriculture, Construction, Mining, Manufacturing, Transport and Storage, and Services (business services; hotel and lodging places; other personal services, including private household; entertainment and recreation; medical and other health services; private education; organizations; other professional and related services; p. 148) – engage in exchange as well, i.e. are related with transaction costs. Wallis and North emphasized that since it is a very complex matter to isolate the resources devoted to transaction from those used in transformation (production) they concentrate "only on the labour costs associated with the transaction sector" (p. 104). In order to estimate transaction costs in this sector the researchers determined and defined "transaction" occupations – describing them as "type I" workers –and isolated them from non-transaction occupations. Wallis and North enumerated a variety of professions (pp. 126-127):

a) "Managers, owners, and proprietors: including other managers, administrators, dealers (in trade), bankers (in FIRE);

b) Foremen: including foremen, inspectors, gaugers, weighers, postmasters, and conductors;
c) Sales workers: including a variety of agents, shipping agents, purchasing agents, insurance and real estate agents; sales clerks, sales workers, newsboys, sales agents, and other sales workers;
d) Clerical workers: bookkeepers, cashiers, secretaries, stenographers, office machine operators, telephone operators, typists, shipping clerks, receiving clerks, clerks, and other clerical workers;
e) Professional workers: accountants, lawyers, judges, notaries, and personnel and labour relations workers;
f) Protective workers: police, guards, watchmen, marshalls, sheriffs, detectives, and constables."

Next, Wallis and North found the share of "type I" workers in total employment for each industry and multiplied these shares by employee's compensation across industries. By adding up these results the researchers got the transaction costs in private non-transaction industries.

Wallis and North developed two estimation methods of transaction costs in the public transaction sector, whereas they laid greater emphasis on the first one. The first method involve dividing the public sector into two subsectors (as in Table 1). In the case of those government activities that were classified as transaction services, transaction costs were measured as government expenditures in these activities. In the case of government non-transaction services Wallis and North proceeded as with private non-transaction industries, i.e. they calculated the share of "type I" workers in all government employment and multiplied these shares by employee compensation in non-transaction government services. The sum of these compensations constituted their estimate of transaction costs in the non-transaction part of government.

The second method Wallis and North employ to estimate the transaction costs in government "is less complete in its coverage, but avoids the problem of classifying defence expenditures and provides a minimum estimate of the transaction sector in government"[6] (p. 119). This method consists simply in treating the entire public sector as a non-transaction industry and proceeding as with the private non-transaction industries.

Wallis and North divided all the transaction cost by GNP to relate transaction cost to a variable that could give some imagination of the size of transaction costs in the economy.

3. Methodology of measurement of transaction costs in Poland and metadata

We attempted to apply the theoretical framework described above to the Polish economy. Our aim was to cover a possibly long time span in our analysis. However, because of numerous problems with the availability and comparability of detailed and reliable data we had to limit our analysis to the period 1996-2014. At the time we wrote this paper comparable data for 2016 on employment and employee compensation were not available. Still, the transaction costs estimates are not fully comparable between most of the years and it is rather the trend than the precise values that is important to look at. We attempted to follow the approach of Wallis and North (1986) as closely as possible, mainly for the reason of

[6]We only mention here that Wallis and North encountered some problems with classifying defense expenditures, however, we don't explain this issue (see more in: Wallis, North, 1986).

comparability of results. However, in estimating the transaction costs in the public sector we chose the alternative method briefly presented by Wallis and North, since we wanted to avoid problems with data adjustment. We are aware of the fact, that the application of the second method leads to an underestimation of transaction costs, still we can determine their minimum level.

We attempted to divide economic activity according to Wallis and North (1986), WN, and Dollery and Leong (1998), DL, as shown in Table 1. The current classification used by Poland's CSO is the PKD 2007 (*Polska Klasyfikacja Działalności* – the Polish Classification of Activity), which divides socio-economic activity into sections, divisions, groups, classes and subclasses. PKD2007 is compatible with NACE Rev.2. up to the "class" level. The next level – subclass – regards the Polish economy only. Since we operate at the section and divisions levels our classification is fully compatible with NACE Rev.2. The previous versions of socio-economic activity classification were EKD, PKD 2001 and PKD 2004, which were elaborated on the basis of NACE Rev.1.The data we used in our study are based on all these classifications and we tried to adjust the data as much as possible. The most significant differences between the classifications regard PKD 2007 and PKD 2004 (Table 1A – Appendix). The classifications PKD 2007, 2004, 2001 and EKD seem more or less the same at the level of sections (although some sections are altered) and divisions, however at the more disaggregated level there are more significant differences. Hence, the years 1996-1999, 2001-2002, 2004-2008 and 2010-2014 are not directly comparable. In general, since the data used to estimate the transaction costs in this study come from different sources and numerous adjustment were made in the case of all of them throughout the analysed period, the comparability of the estimations between individual years is somewhat limited.

We adjusted the PKD classifications to the classifications according to the methodology of WN (Table 2). However, the adjustment needs some comments. Firstly, we had access to data (employment and global output) only at the section and some division level. According to the PKD classification we were able to isolate "Rail transport" only at the level of groups, from what results, that we had to treat the sector "Transport" as general, and assigned it entirely to the private production subsector. Secondly, we excluded the sections "Households hiring employees and producing for their own use" and "Organizations and exterritorial groups" because of lack of available data (however, these sections are not very significant, yet the exclusion leads to some underestimation of our transaction costs results). Thirdly, some sections, e.g. "Manufacturing", according to the Polish classification contain some sort of services – however at a very high level of disaggregation – which makes is impossible to isolate and add to the sector of services and therefore adjust perfectly to the WN and DL classifications. However, since "Manufacturing" and "Services" both belong to the (private) production sector, it is not a significant problem. However, the same issue regards some sections from the private non-transaction sector – a few sections contain some kind of services, which makes a precise isolation of services in general very difficult. Fourthly, the section "Trade and repairs" (classified as private transaction sector) contains some economic activity that should be considered as public transaction services. However, we were not able to isolate this activity from our data.

As we can see in Table 2, the shaded areas show that it was impossible to adjust fully the Polish classifications to the division of economic activity according to WN and DL. Since this problem appears mainly in the government sector, to solve this issue we decided to apply the second method of transaction costs estimation proposed by WN, i.e. treating the entire government as a non-transaction sector.

Our further analysis was determined by the availability of disaggregated data as well. What contributed to the limitation of our study is the lack of a more detailed division of the employed (which is the basis for the selection of "type I" workers) and employees compensation – only data divided into sections were at our disposal. This made a thorough adjustment of the classification of WN and our classification impossible. The data on employment ("type I" workers) and employment compensation were taken from a survey – Z-12 – conducted every two years by Poland's CSO what means that these data have all the deficiencies related to survey data. It is especially important to have in mind that the more the disaggregated data, the less exact the estimations, i.e. it may be that some very specific professions or specializations were not drawn every time the survey was conducted, what does not mean that there were no such professions/specializations in Poland that year. WN and DL estimated the transaction costs in non-transaction services analysing census data, which give a very thorough, detailed and precise picture of the number of "type I" workers in the economy. The authors used census data also because their very long period of analysis allowed for such an analysis. Mainly because of the problem of system change (from "centrally planned" to "market economy") our period of analysis started only after the beginning of transition. Analysing census data in this case would limit our estimates to 2-3 years and it is therefore we chose the Z-12 surveys.

Throughout the analysed period, many changes occurred in the methodology applied in conducting the Z-12 survey. Among these changes were, among other things, such that in the period 1996-2001 the statistical office applied a different classification of professions and specializations from that in the next years, which varied from year to year (in the consecutive years). However, these changes don't seem to influence the estimates considerably. A more significant effect is visible between the period before 2010 and starting from 2010. The classification applied in 2010 is very detailed and this allowed us to select more precisely "type I" workers. The result might be that the estimates for previous years may be somewhat overstated. Another issue is that the data in the Z-12 surveys until 2004 concern only the fully employed and after 2004 – both the fully employed and part-time employees. The last very important information about the Z-12 data, that may influence our results, is that the survey concerns only economic entities that employ more than 9 persons.

Table 2.
Comparison of classifications of economic activity [a]

Dollery and Leong			PKD 2007	PKD 2004, PKD 2001, EKD
Private	Production	Agriculture	Agriculture, forestry and fishing	Agriculture, hunting and forestry, Fishing
		Construction	Construction	Construction
		Mining	Mining and quarrying	Mining and quarrying
		Manufacturing	Manufacturing	Manufacturing
		Transport / Storage	Transportation and storage	Transport, storage and communication
		Services	Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities; Accommodation and catering [b]; Education; Human health and social work activities; Arts, entertainment and recreation; Other service activities	Electricity, gas and water supply; Hotels and restaurants; Education; Health and social work; Other community, social and personal service activities

	Transaction	Financial intermediaries (w/o insurance)	Financial and insurance activities	Financial intermediation
		Insurance		
		Real estate	Real estate activities; Professional, scientific and technical activities (in latter versions of PKD this was in real estate activities); Administrative and support service activities	Real estate, renting and business activities
		Wholesale trade	Trade, repair of motor vehicles [a]	Trade and repair [a]
		Retail trade		
Public	Production	Education	Education	Education
		Health	Human health and social work activities	Health and social work
		Rail/Air transport	- (is in Transportation and storage)	- (is in Transportation and storage)
		Public utilities	Electricity, gas, steam and air conditioning supply, Water supply; sewerage, waste management and remediation activities	Electricity, gas and water supply
		Social welfare	- (is in Human health and social work activities and Public administration and defence; compulsory social security)	- (is in Health and social work and Public administration and defence; compulsory social security)
		Communications	Information and communication	- (is in Transportation and storage)
	Transaction	Public administration	Public administration and defence; compulsory social security (should be in social welfare)	Public administration and defence; compulsory social security (should be in social welfare)
		Public order		
		Defence		
		Postal services	- (is in Transportation and storage)	- (is in Transportation, storage and communication)

Note: [a] The shaded areas show the incompleteness of adjustment. [b] Abbreviated label.

Source: Dollery, Leong, 1998; PKD 2007, PKD 2004, PKD 2001 and EKD classifications (http://stat.gov.pl/; access: 25.01.2017).

We did not have data on total employee compensation in the private and public sectors separately in individual sections. We had to derive the estimates in the following way. We took data on gross monthly wages (in October) from the Z-12 survey divided by sections, we multiplied them by 12 months and multiplied the results by data on employment in individual sections (at the end of the year) divided into the private and public sectors (from the GUS publications. Despite the shortcomings of such a solution it was the best way to obtain data that could serve for our calculations.

Since the Z-12 survey was (is) conducted by the CSO approximately every 2 years, we estimated the macroeconomic transaction costs for the following years 1996, 1998, 1999, 2001, 2002, 2004, 2006, 2008, 2010, 2012 and 2014.

At the beginning of this section it was mentioned that we estimated transaction costs in government by applying the second method proposed by Wallis and North (1986). We applied this method because of the specificity of the data (the availability of data of different levels of disaggregation). The second method seemed more appropriate also because of better comparability of the estimates throughout the analysed period, since there is a lot of break-in-

series. Moreover, it solves to a certain extent the problem of the incomplete adjustment of our classification to the classification of WN.

GDP data was taken directly from Poland's CSO website. These data are comparable, since the CSO adjusted the data series.

It seems that we, however, modified the methodology applied by WN and DL. Their classification assigns individual economic activity as entirely private or public. In the case of Polish data in almost every section we could distinguish between activity belonging to the private or public sector. Therefore, we drew an explicit distinction between what is private and public. In this way, we included also some part of agriculture to the public sector (if there were people employed in agriculture belonging to the public sector). The same regarded the private sector – we included all private economic activity that could not be assigned to the WN sections to the section "services". So even when in some years in the section defence, public administration there appeared some people employed in the private sector, we included them in the section services in the private sector of WN classification.

4. Empirical results

Turning to the results obtained by applying the WN methodology to estimate macroeconomic transaction costs in the Polish economy, firstly, we estimated the transaction costs in the private transaction sector. We calculated these costs by taking global output from the PKD sections identified as private transaction services according to Table 1 (see also Table 2) and dividing global output in these economic activities by current GDP. Adding up these shares of global output in GDP we obtained the estimates of transaction costs in the private transaction sector.

The results are presented below in Table 3. Since 1996, stable and rapid growth was being observed in this sector, however the increase and pace of growth was different in individual sections. Transaction costs in the section of "Real estate and business activities" showed the greatest rise in absolute terms, whereas transaction costs in "Financial intermediation" had seen the most significant rise in relative terms. Most transaction costs in the private transaction sector were generated by "Trade and repair". We can see that the increase in transaction costs petered out more or less in the middle of the analysed period and even some decrease could be seen at the end of the period.

Table 3.
Transaction costs in private transaction industries as percentage of GDP in Poland, 1996-2014

Dollery and Leong	PKD 2007	PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Financial intermediaries (w/o insurance)	Financial and insurance activities	Financial interme-diation	1.532	2.61	4.103	5.289	5.064	5.095	6.02	6.908	6.043	6.16	6.36
Insurance													
Real estate	Real estate activities; Professional, scientific and technical activities; Administra-tive and support service activities	Real estate, renting and business activities	9.543	14.2	14.54	19.42	19.48	19.39	20.1	20.55	21.48 [a]	19.5[a]	20[a]
Wholesale trade	Trade, repair of motor vehicles [b]	Trade and repair [b]	27.62	28.9	29.91	32.21	32.54	29.7	29.1	28.02	27.76	26.5	25.7
Retail trade													

Note: [a] Data on global output in the private sector for the years 2010, 2012 and 2014 were not available. We extrapolated this data on the base of historical data. [b] Abbreviated name.

Source: Own calculations based on data from Poland's CSO Statistical Yearbooks of the Republic of Poland (1997-2016) and http://stat.gov.pl/ (access: 25.01.2017).

Next, to estimate the transaction costs in the private non-transaction sector we followed the method by WN. Firstly, we isolated "type I" workers professions and specializations from the data on employment. Then, we summed "type I" workers over sections of economic activity classified as private non-transaction sector and divided this number by total employment in individual sections obtaining the shares of "type I" workers in every kind of private non-transaction economic activity. We multiplied these shares by employees compensation in the appropriate sections and at the end divided these results by current GDP. By adding up these shares in GDP we estimated the total transaction costs in the private non-transaction sector.

The results are presented in Table 4 (the tables 2A-4A in the Appendix show the steps of our calculations). Most transaction costs in this sector were generated by the sections "agriculture, forestry and fishing" and "manufacturing", but also "transport, storage and communication". It can be seen that total transaction costs were surely not driven by this sector.

Table 4. Transaction costs in private non-transaction industries as percentage of GDP in Poland, 1996-2014

Dollery and Leong	PKD 2007	PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Agriculture	Agriculture, forestry and fishing	Agriculture, hunting and forestry	1.434	2.096	2.318	2.284	2.368	1.124	1.052	1.006	0.907	1.132	1.137
		Fishing	0.001	0.001	0.002	0.003	0.002	0.003	0.004	0.002			
Construction	Construction	Construction	0.198	0.349	0.450	0.383	0.343	0.389	0.352	0.430	0.452	0.457	0.454
Mining	Mining and quarrying	Mining and quarrying	0.004	0.013	0.015	0.027	0.028	0.027	0.026	0.028	0.037	0.035	0.037
Manufacturing	Manufacturing	Manufacturing	0.591	1.300	1.542	1.576	1.511	1.687	1.589	1.662	1.309	1.361	1.452
Transport / Storage	Transportation and storage	Transport, storage and communication	0.128	0.316	0.516	0.740	0.758	0.656	0.627	0.687	0.424	0.396	0.411
	Information and communication										0.593	0.569	0.609
Services	Electricity, gas, steam and air conditioning supply	Electricity, gas and water supply	0.004	0.012	0.016	0.022	0.022	0.040	0.039	0.057	0.070	0.115	0.100
	Water supply; sewerage, waste management and remediation activities										0.038	0.038	0.038
	Accommodation and catering [a]	Hotels and restaurants	0.041	0.097	0.112	0.167	0.170	0.141	0.139	0.120	0.141	0.127	0.145
	Public administration and defence; compulsory social security	Public administration and defence; compulsory social security and health insurance	0.001	0.003	0.056	0.002	0.002	0.003	0.005	0.008	0.007	0.000	0.000
	Education	Education	0.017	0.043	0.064	0.055	0.054	0.060	0.055	0.080	0.096	0.084	0.123
	Human health and social work activities	Health and social work	0.020	0.033	0.046	0.051	0.056	0.060	0.083	0.096	0.126	0.146	0.205
	Arts, entertainment and recreation	Other community, social and personal service activities	0.154	0.186	0.300	0.247	0.245	0.356	0.215	0.302	0.065	0.054	0.048
	Other service activities										0.125	0.103	0.150

Note: [a] Abbreviated name.

Source: Own calculations based on data from tables 2A-4A in the Appendix.

As described in the previous section, we applied the second method proposed by WN to estimate the transaction costs in government. We treated government entirely as non-transaction and proceeded as in the case of the private non-transaction sector. What needs to

be emphasized is that by applying this method we underestimated transaction costs in government. The estimates determine the minimum of the size of transaction costs in the public sector.

The results are presented in Table 5 (the tables 5A-7A in the Appendix show the steps of our calculations). As in private non-transaction industries in can be seen that the transaction cost generated in this sector were surely not as big as in private transaction industries. "Public administration and defence; compulsory social security" was the driver of transaction costs in government.

Table 5. Transaction costs in government as percentage of GDP in Poland, 1996-2014

PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	PKD 2007	2010	2012	2014
Agriculture, hunting and forestry	0.05	0.06	0.05	0.05	0.05	0.03	0.04	0.03	Agriculture, forestry and fishing	0.03	0.03	0.03
Fishing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Mining and quarrying	0.06	0.04	0.04
Mining and quarrying	0.10	0.10	0.11	0.09	0.08	0.07	0.07	0.07	Manufacturing	0.06	0.04	0.04
Manufacturing	0.55	0.36	0.39	0.24	0.19	0.14	0.11	0.10	Electricity, gas, steam, air conditioning supply	0.14	0.07	0.06
Electricity, gas and water supply	0.18	0.20	0.25	0.23	0.23	0.19	0.19	0.19	Water supply; sewerage, waste management and remediation activities	0.07	0.07	0.08
Construction	0.07	0.05	0.05	0.03	0.03	0.02	0.02	0.02	Construction	0.01	0.01	0.01
Trade and repair [a]	0.17	0.11	0.11	0.08	0.08	0.04	0.03	0.03	Trade, repair of motor vehicles [a]	0.02	0.01	0.01
Hotels and restaurants	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	Transportation and storage	0.42	0.37	0.34
Transport, storage and communication	0.54	0.66	0.68	0.57	0.57	0.48	0.48	0.56	Accommodation and catering [a]	0.02	0.01	0.01
Financial intermediation	0.50	0.51	0.59	0.36	0.37	0.30	0.29	0.30	Information and communication	0.02	0.02	0.02
Real estate, renting and business activities	0.19	0.24	0.27	0.23	0.20	0.17	0.17	0.21	Financial and insurance activities	0.24	0.21	0.22
Public administration and defence; compulsory social security	0.93	0.98	1.34	1.55	2.54	2.35	2.37	2.48	Real estate activities	0.09	0.06	0.07
Education	0.29	0.31	0.37	0.41	0.42	0.47	0.48	0.44	Professional, scientific and technical activities	0.08	0.07	0.09
Health and social work	0.32	0.29	0.32	0.28	0.29	0.20	0.24	0.25	Administrative and support service activities	0.01	0.01	0.02
Other community, social and personal service activities	0.15	0.16	0.20	0.19	0.20	0.16	0.16	0.17	Public administration and defense; compulsory social security	2.81	2.14	2.59
									Education	0.36	0.36	0.40
									Human health and social work activities	0.26	0.22	0.26
									Arts, entertainment and recreation	0.09	0.09	0.10
									Other service activities	0.00	0.00	0.00

Note: [a] Abbreviated label.

Source: Own calculations based on data from tables 5A-7A in the Appendix.

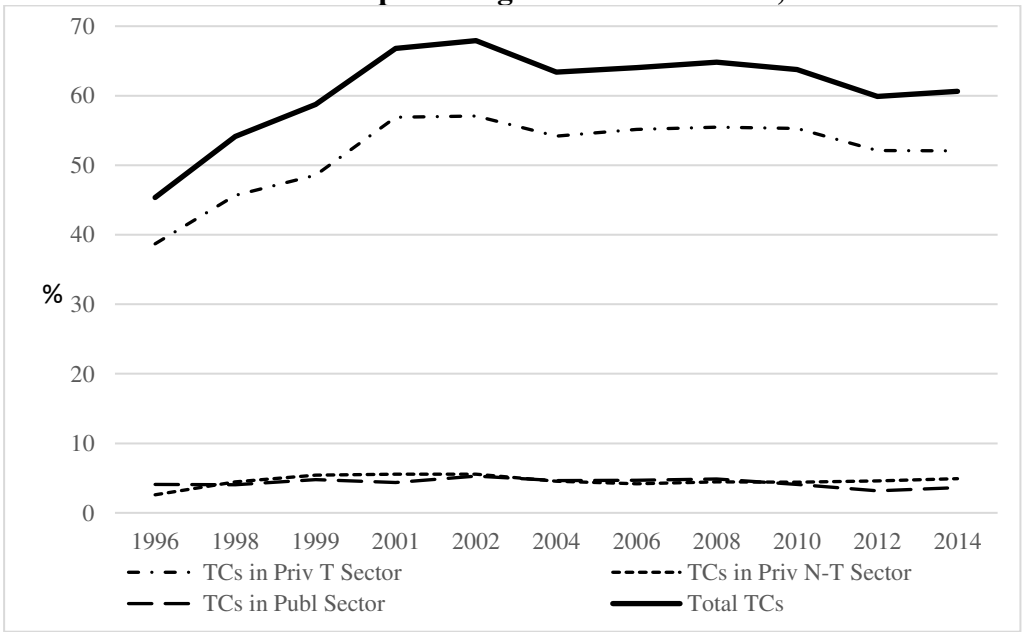
By adding up the transaction cost from tables 3-5 we obtained the transaction costs in Poland at the macroeconomic level. Figure 1 and Table 6 show the transaction costs from both the private and public sectors as well as the total transaction cost. In summary, we can assert the following: in the period of nineteen years, the ratio of total transaction costs in the Polish economy to GDP increased from 45.36% to 60.61%, however, the trend was not monotonic and the transaction costs reached its peak in 2002 (67.93%). We can even say that up till 2002 we could observe a steep increase in transaction costs and after 2002 they began to decrease gradually. A very similar trend is seen in the case of transaction industries of the private sector (a rapid rise from 38.69% in 1996 to 57.08% in 2002 and a, generally, slow decrease to 52.07% in 2014). The private transaction sectors contributed to the greatest extent to visible transaction costs in the economy (about 85%). Both non-transaction industries of the private sector and the entire government showed no considerable changes in transaction costs relative to GDP throughout the analysed period (oscillating between about 2.5% to 5.5%) in comparison to the private transaction sector and amounted up to about one tenth of the transaction costs generated by private transaction industries. The share of these sectors (individually) in total transaction costs was more or less similar and about 6-9%.

Table 6
The transaction sector as a percentage of GDP in Poland, 1996-2014

Category	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Transaction industries, private sector	38.69	45.66	48.55	56.91	57.08	54.19	55.17	55.47	55.29	52.14	52.07
Non-transaction industries, private sector	2.59	4.45	5.44	5.56	5.56	4.55	4.19	4.48	4.39	4.62	4.91
Government	4.07	4.05	4.77	4.35	5.28	4.65	4.67	4.86	4.08	3.17	3.64
Total trans action costs	45.36	54.16	58.76	66.81	67.93	63.39	64.03	64.81	63.76	59.92	60.61

Source: Own calculations based on data from tables 3-5.

Figure 1
The transaction sector as a percentage of GDP in Poland, 1996-2014



Source: Own calculations based on data from tables 3-5.

5. Comparison with other research

Apart from the study of Wallis and North (1986), a few papers replicating their research on macroeconomic transaction costs have appeared to date. For better visualization we provided the graphical results of selected studies (Figure 2). Dollery and Leong have explicitly asked the questions (1998, p. 208) that we tried to address, among others, and with appropriate modifications in our study:

a) Can the findings of Wallis and North be replicated in a country at a middle level of development / in transition (the beginning of our period of analysis)? To what extent are the results of Wallis and North a unique artefact of the US economy?

b) Can the technique developed by Wallis and North be applied in a different institutional milieu using alternative data sources?

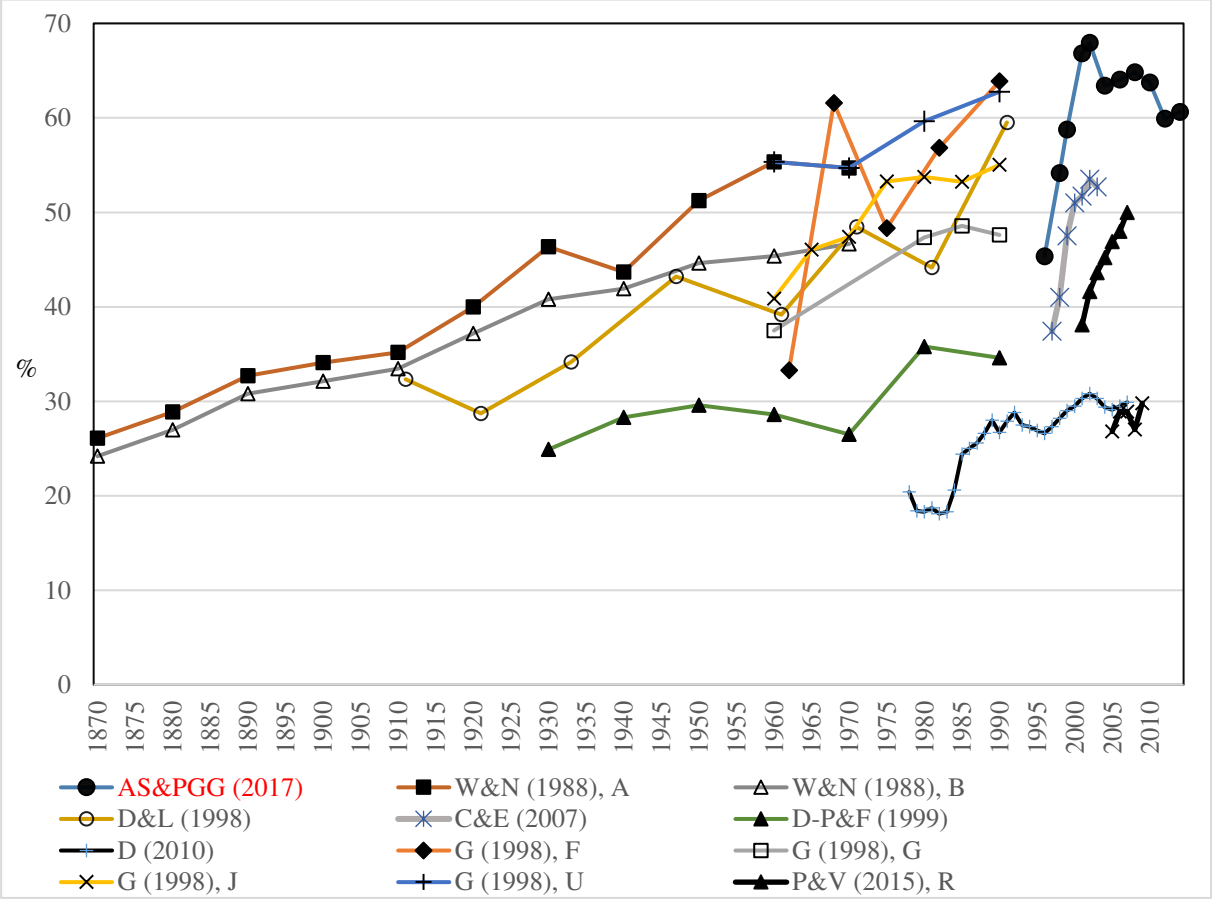
c) Do the results shed some light on the nature of economic development of the country?

In this paper, we extend the applications of Wallis-North investigation. While Dollery and Leong (1998) found essential similarity for two developed capitalist national economies, Dagnino-Pastore and Farina (1999) added significant details for less developed capitalist national economies, Sulejewicz and Graca (2005) and the present text extend, with appropriate modifications the conclusions for the post-socialist countries[7]. Definitions have been standardized and are generally accepted among the group of researchers working in this area. Hence it is safe to conclude that meaningful international comparisons are allowed[8].

[7] The calculations adapted to NACE *Nomenclature statistique des Activités Economiques dans la Communauté Européenne*.

[8] The works referred to include: Chobanov, Egbert, 2007; Da, 2010; Miao, Chen, 2002, [*China Measuring of Transaction Costs and Economy Growth*, "Statistical Research", No. 8, pp. 14-21] quoted in: Zhengchao, Wang, 2012; Da, 2010; Popov, Veretennikova, 2015; Litvintseva, Gahova, 2016.

Figure 2
Comparison of results of selected studies on macroeconomic transaction costs – percentage of GDP [a]



Note: [a] With the exception of the study of Wallis and North (1986) – % of GNP, Ghertman (1998) – % of GNP and Popov and Veretennikova (2015) – % of GRP in the case of the Middle Urals.

Source: Table 6 – AS&PGG (2017); Wallis, North, 1986, Table 3.13, p. 121 – W&N (1988), A, and W&N (1988), B; Dollery, Leong, 1998, Table 7, p. 220, Table 8, p. 222, Table 9, p. 223 – D&L (1998); Chobanov, Egbert, 2007, Table 2, p. 692 – C&E (2007); Dagnino-Pastore, Farina, 1999, Table 6, p. 8 – D-P&F (1999); Da, 2010, Table 2, pp. 285-286 – D (2010); Ghertman, 1998, Appendix I, p. 20 – G (1998), F, G (1998), G, G (1998), J and G (1998), U; Popov, Veretennikova, 2015, Figure 4, p. 37 – P&V (2015), R and P&V (2015), U.

Wallis and North's (1986) estimates show the total transaction costs rising from 26% in 1870 to almost 55% in 1970 (Table 3.13, p. 121).What is not shown in Figure 1 is that share of national income or GNP going to "type I" workers in non-transaction industries (private sector) rose from 1.4% in 1870 to 10% in 1970 (p. 109), the resources used in trade and FIRE (Finance, Insurance and Real Estate) increased from about 20% in 1870 to slightly over 30% (p. 112-113). The share of transaction costs generated in the public sector rose from 3.67% or 1.71% in 1870, depending on the method applied, to 13.9% or nearly 6% in 1970. The authors' argument is that there are three important reasons for the rise in TCs over the century they studied (pp. 122-123):

1) The development of a market economy means the spread of impersonal exchange, the individuals involved in dealing in anonymous markets know less and less about the persons from whom they buy their products. Therefore, the costs of specifying and

executing contracts become more significant with the expansion of the market and growing organization of the economy.

2) Technological change and the ever more pronounced economies of scale that have contributed to capital intensive production techniques and the development of large corporations "placed a premium on the coordination of inputs and outputs and on monitoring the numerous contracts involved in production and distribution".

3) "The declining costs of using the political system to restructure property rights (…) which replaced the decision-making ability by executive departments of the government (…) [and] imposed transaction costs on the rest of the economy".

The evolution of the transaction costs in Australia also presents a – generally – rising trend: total transaction sector as a percentage of GDP increased from 32% in 1911 to 59.5% in 1991 (Dollery, Leong, 1998, Table 9, p. 223). As component parts of the total: the private transaction sector rose from 28.3% in 1911 to 49.4% in 1991, and the public sector contribution increased from about 4% in 1911 to over 10% in 1991 (Table 7, p. 220, Table 8, p. 222). The share inside the ownership sectors show that, for the private sector, the bulk of transaction costs arose in private transaction industries: from 26% in 1911 to nearly 45% of GDP in 1991 (i.e. they constituted more than 90%; Table 7, p. 220). In more detail: "trade activities"' stabilized around 20% while significant growth was observed for the "finance" industries which rose to prominence, from mere 2% to 20% at the end of the period (Table 3, p. 215).

For the public sector, transaction services grew from 3.2% to 6.6% (against the contribution of non-transaction services growing from 0.8% to 3.5%; i.e. they constituted around 2/3; p. 219 and Table 6, p. 218). Thus public sector employees in non-transaction sectors contributed considerably more, relatively speaking, than equivalent private sector services. This is understandable – the state's role in a developed market economy is precisely this: provision of services facilitating exchange. While the public transaction services more than doubled in the period of eight decades they still represent only 1/5 of the private transaction services at the end of the period (against 12% in 1911; p. 215 and 218). Nevertheless, the relative increase of the role of the state in protecting and facilitating market exchange is unambiguous.

For the overlapping years, the magnitude of American and Australian transaction services, i.e. observable and measurable part of the transaction costs passing through the market, was generally similar, with the American ratios being from 3 to 15 percentage points higher. The magnitude of public sector transaction activities was also higher in the US, both absolutely and relatively, than in Australia. The ratio in 1970 was almost 14% of GDP (Wallis, North, 1986, Table 3.11, p. 118), whereas the Australian one was somewhat above 6.5% (Dollery, Leong, 1998, Table 6, p. 218) and this represented, in relation to the total, more than 25% (an increase from below 14%). The American State was visibly deeply involved in protecting property rights and safeguarding market exchange. The trend towards its faster growth is unambiguous.

Dagnino-Pastore and Farina (1999), who analysed the transaction sector in Argentina in the years 1930-1990 came to similar results – overall, transaction costs in the Argentinian economy rose, with periods of slight decrease from 24.9% of GDP in 1930 to 34.6% in 1990 (Table 6, p. 8). However, the authors stated, that the transaction costs in Argentina "do not show a sustained growth trend, but rather stagnation in two successive plateaus, with an intermediate upward step" and that "[t]he first impression is that until 1991 the Argentine economy did not take much advantage from the benefits of specialization" (p. 8). The bulk of

transaction cost went to private transaction industries, which – however – did not reveal any specific trend and oscillated between over 16% to 25% of GDP (Table 6, p. 8) throughout the analysed period. The rise in total transaction cost was the effect of an increase in transaction costs generated in government. Among the transaction industries most transaction costs came from Commerce rather than from FIRE. Compared to all the other estimates of transaction costs (Figure 2) transaction costs in the Argentinian economy were the lowest. Dagnino-Pastore and Farina came to the conclusion that "[t]he gap [between the ratios of transaction costs to GDP between Argentina and other countries] widened in absolute (0.13 to 0.22) and in relative (69 to 61%) terms. Of the TC components, TC of transaction industries is the one with a share nearest to that of developed countries; the other extreme are remuneration of Type I employees" (p. 20).

Chobanov and Egbert (2007) carried out a study on the transaction costs in Bulgaria within the period 1997-2003. Their results are the most similar ones to those obtained in our study, which can be explained by the fact that both economies – the Bulgarian as well as the Polish one – are post-socialist countries, that experienced the transformation from a centrally-planned to a market-based economy that had started at the beginning of the 1990s of the 20th century. Total transaction costs in Bulgaria saw a rapid rise throughout the analysed period, starting from 37.4% of GDP in 1997 and reaching 52.7% of GDP in 2003 (Table 2, p. 692). As in the Polish economy, transaction costs in Bulgaria rose very fast at the beginning, coming to a halt (?) around 2002. The increase in total transaction costs was mostly due to the rise in transaction costs in transaction industries, which rose from 28.8% of GDP in 1997 to 36.1% of GDP in 2003 (Table 2, p. 692). This sector generated most of total transaction costs as well. Chobanov and Egbert stated that this increase "can be explained by the liberalization of the Bulgarian economy" (p. 692). Transaction costs in non-transaction industries constituted a much less part of total transaction costs, however, these cost rose considerably in relative terms – with the exception of "Agriculture, hunting and forestry" – being the effect of the privatization of most enterprises in this sector (p. 693). "[T]he efforts the government spent on improving state administration in the transition period" were the main explanation of the increase in government transaction services – from 3.7% of GDP in 1997 to 9.6% of GDP in 2003 (p. 693).Only the sector of non-transaction services remained stable at about 4% of GDP throughout the analysed period (Table 6, p. 694).

The study of Da (2010) on the measurement of transaction costs in China revealed that the proportion of transaction costs in GDP rose from 0.204% in 1978 to roughly 0.3% in 2007, which – according to the author – was a remarkable increase. Transaction cost were the highest in the tertiary industry, whereas the transaction sectors in the primary and second industries showed a low and diminishing relation to GDP. Da concludes, among other things, that "with China's economic growth, China's transaction sectors are embracing an ascending transaction costs, but there is still a big gap between China and developed countries in transaction service level" (p. 297), which can also be seen in Figure 2, if we compare the level of transaction costs in China with e.g. those in the US or Australia.

In an earlier study, Ghertman (1998) calculated transaction costs in France, Germany, Japan and the US between 1960 and 1990, replicating the method of Wallis and North (1986). The study showed that France has seen the greatest increase in transaction costs in this period, both in absolute as in relative terms (from 33.28% in 1962 to 63.86% in 1990, as a share in GNP). On the other hand, the US started with the highest level of transaction costs relative to GNP in 1960 (55.34%), which remained high throughout the analysed period, although the rise was not so considerable (62.76% in 1990). Germany recorded the lowest transaction costs in 1990 (47.61 %) compared with the remaining countries. Ghertman showed, among other

things, that despite of the fact that the analysed countries had experienced convergence of per capita income, institutional differences remained.

The study of Popov and Veretennikova (2015) is another example of the application of Wallis' and North's methodology to calculate transaction costs from a macroeconomic perspective. The authors estimate transaction costs in the Middle Urals (Russia) for the period 2005-2009, which increased from 26.8 to 29.8 (% of GRP). The rise was not monotonic and the level was clearly lower from that recorded in other countries (see Figure 2). The authors explain the latter by the fact that the analysed region is highly industrialized, thus the transformation sector is of much greater importance compared to the economy as a whole. A second explanation is that Popov and Veretennikova did not take into account transaction costs within firms, which would probably increase their estimates by about 4 to 14%. The authors present the estimates of transaction costs in Russia as well (citing a not published study by Erznkyan, 2012), although for a different period – 2001-2007. It is shown that transaction cost in Russia increased monotonically from 38.1 to 50, as a percentage in GDP.

Against these trends, what can we say about the Polish nineteen-year period? The synthesizing graph (Figure 2) shows several economies in historical perspective. First, as we can see, all the results show a similar pattern – transaction costs have generally exhibited a rising trend (with a few sub-periods of some decrease) throughout the analysed periods in every country. Second, the dramatic rise of transaction costs in Poland in the middle of transition from "real socialism" to capitalism clearly stands out. The steepness of the curve demonstrates that profound changes have been occurring in this society. Third, relatively speaking, in terms of GDP ratio, the Polish State contributed merely ½ of the Australian level of public transaction services and about 1/3 of the American level. The privatization drive has deprived the State of much of the productive assets (and concomitant non-transaction activities).

One additional interpretation is that the popular sentiment, fuelled by the media[9], about the abrupt (at the turn of the decades of 1980s/1990s) and dramatic rise in business related criminal activities, fraud and large scale corruption, emergence of organized crime, etc., has found scientific confirmation. Ever growing reliance on private transactions, with massive ownership redefinition, wealth and income redistribution, emergence of new institutional setups for a large number of economic and social activities and is likely to be costly in terms of collective and individual errors, need for erecting safeguards against cheating[10], establishment and enforcement of law.

One notes "zigzags" in some of the parameters. These indicate perhaps some unreliability of the estimates, or drawback in the concept as defined. The level of transaction costs reveals and demonstrates the general degree of confidence in the economic organization, the reliability market economy in satisfying expectations of business security. In other words, they point to an element of culture that is unlikely to change rapidly. Can it vary periodically or oscillate around an implicit level in tune with historic, political events? One would ascribe much greater explanatory power to culture.

[9]And, to be sure, backed up by alarming social statistics.

[10]In the theoretical sense used in new institutional economics. Anecdotal evidence seems to validate "high TC" nature of the Polish economy. An alternative formulation is "low trust' society/economy, and a number of empirical studies seem to confirm these conclusions.

6. Discussion of selected theoretical points

As signalled above, the macroeconomic concept of transaction costs originated in the work of Douglass North. At least four works lay the foundations, reflecting the Authors changing argumentation:

1) North D. C., 1984, *Government and the Cost of Exchange in History*, "The Journal of Economic History", Vol. 44, No. 2, pp. 255-264.
2) Wallis J., North D., 1986, *Measuring the transaction sector in the American economy, 1870–1970*, in: S. Engerman, R. Gallman, eds., "Long Term Factors in American Economic Growth", Chicago, Chicago University Press, pp. 95–162.
3) Wallis J., North D., 1988, *Should transaction costs be subtracted from gross national product*, "The Journal of Economic History", Vol. 48, No. 3, pp. 651–654.
4) North D. C., Wallis J., 1994, *Integrating institutional change and technical change in economic history: A transaction cost approach*, "Journal of Institutional and Theoretical Economics", Vol. 150, No. 4, pp. 609-624.

The calculations accomplished in Wallis and North (1986) fairly consistently confirmed by all other investigations make one concur with the empirical conclusion of Dollery and Leong (1998, p. 228) „Despite some variation transaction costs appear to exhibit an inexorably rising trend". On account of the research performed and own investigations, one may even be tempted to formulate a "law of increasing transaction costs in market economies". It seems that Douglass North is inclined to follow classical political economy in this instance and specify the "law" in terms of tendencies and countertendencies. He specifies the conflicting arguments as "reasons" for the rise in transactions costs (1986) and "tendencies counteracting" the rise (1984).

On the one hand (1986):

(1) The development of a market economy means the spread of impersonal exchange, the individuals involved in dealing in anonymous markets know less and less about the persons from whom they buy their products. Therefore, the costs of specifying and executing contracts become more significant with the expansion of the market and growing urbanization in the economy.
(2) Technological change and the ever more pronounced economies of scale that have contributed to capital intensive production techniques and the development of large corporations "placed a premium on the coordination of inputs and outputs and on monitoring the numerous contracts involved in production and distribution".
(3) "The declining costs of using the political system to restructure property rights via development of commissions, which replaced the decision-making unit of entire legislatures and the development of the rule-making ability by executive departments of the government (…). This type of government growth imposed transaction costs on the rest of the economy".

But, on the other hand (1984):

(1) First, the innovation of organizational forms that reduce the costs of transacting. This is the focus of Williamson's study of the corporation (1981) and much of the economists transaction cost literature.
(2) The second is the substitution of capital for labour to reduce the opportunity for shirking, stealing and opportunistic behaviour and to reduce quality variance.

(3) Finally, the role of government has not been simply a gigantic mechanism for income redistribution raising the costs of transacting. As the foregoing has attempted to argue, the role of government as an impersonal, third party to specify and enforce contracts has been an essential part of the story.

Thus North and Wallis invoke several mechanisms, both more widely economic and more narrowly institutional to account for the *prima facie* surprising fact of rising costs of market functioning. Changes in technology, economies of scale, behavioural consequences of capital-labour substitution, innovation of organizational forms, impersonality of exchange, restructuring of property rights via political systems, specification and public enforcement of contracts, among others, provide for somewhat complex results and contradictory interpretations on the evolution of private and public transaction activities. Firstly, "[t]he proportion of society's resources devoted to exchange has been increasing: this is not surprising." (North, 1984). And yet, when looking at (Australian) data, „[t]he figures in column 3 [top line in fig. F – PGG, AS] do not measure total transaction costs; instead they measure that observable part of transaction costs flowing through the market process, in terms of marketed services, known as transaction services. That these had increased from roughly a third of national income in 1911 to well over 59 percent in 1991 is indeed surprising" (Dollery, Leong, 1998).

"Economists and economic historians have described fundamental structural changes in the American economy in the past century. (...) Our interpretation of the role of transaction costs is consistent with these structural shifts, but leads to a different interpretation of the American economy than has been traditionally associated with this evidence" (Wallis, North, 1986, p. 120). After all, „(…) gains from specialization and the division of labour are not a free lunch" (Wallis, North, 1986, p. 95). This fundamental point was disputed as early as the publication itself – the commentary of Lance Davis focussed on four empirical points:

1) classification into transaction and non-transaction sector is controversial (various relevant definitions are possible);
2) statistical data compiled in the text had been collected for different purposes;
3) individual activities (in present occupation) can be subsumed either as transaction or non-transaction or both;
4) only registered market transactions enter calculation (informal and household sector has been ignored).

But what is more important, the macroeconomic concept of transaction costs is riddled with theoretical ambiguities. While the verbal distinction between transaction services (sectors) and transaction costs is affirmed, in the reasoning provided, transaction services (sectors) are treated as logically equivalent to transaction costs. "Note that those individuals are acting rationally, but the result is to increase transaction costs and thereby reduce net social welfare" (North, 1984). „Because we focus on transaction services rather than transaction costs, our measure should not be interpreted as an estimate of the level of transaction costs within the economy, any more than GNP numbers should be taken as a direct measure of well-being. […] the attempt to capture the benefits of specialization and division of labor has changed the organization of economic activity in the United States over the last century. Remember that none of our transaction services are unproductive. They all represent the resource costs of making exchanges which, on net, made the parties to those exchanges better off (even when transaction costs are included)" (Wallis, North, 1986, p. 104). "The fact that growth of the transaction sector is due primarily to an expansion of intermediate transaction services belies a common but erroneous perception among economists and economic historians that transaction costs do not produce a corollary benefit.

Or, as William Parker put it, they are »waste - sheer, reckless, glorious spendthrift waste«" (Wallis, North, 1988, p. 654).

Let us note that in one paper it seems to be clear that "[t]he numbers suggest that **the growth of the transaction sector may be a drag on economic growth**, that firms incur increasing transaction costs to manage their ever growing size and complexity, and that these costs may gradually erode the productivity gains associated with technological change and economies of scale" (North, Wallis, 1994, pp. 609-10). Therefore, "[w]e believe that there is a plausible, indeed strong, case to be made for the argument that institutional change **and falling transaction costs were a significant source of economic growth** over the last two centuries." (North, Wallis, 1994, p. 622). And they add, significantly, that the exact magnitude of such a contribution remains to be measured.

The authors emphasize that **technical innovation** can lead as easily to reductions in transaction costs as it can to reductions in transformation costs. "Likewise **institutional change** may lead to reductions in either transaction or transformation costs. There is not, and should not be, a one to one identification between institutions and transaction costs or between techniques and transformation costs. **By assuming an implausibly strong link between institutions and transaction costs**, economists have been able to further assume that transaction costs **need not be measured**." And they add an even more fundamental methodological proviso: "Under that assumption, theories that propose an important role for institutional change in explaining the development of economies must necessarily be content with making assertions that can rarely be confirmed or falsified, since the economic variable they rely on, transaction costs, is unobservable" (North, Wallis, 1994, p. 622).

And further, demand theories built on this assumption are forced to conclude that the development of institutional structures embodied **in a growing transaction sector has been a constraint** on the rate of economic growth rather than **an independent source of growth** (*ibidem*). Thus North and Wallis (1994) acknowledge the methodological weaknesses when they assert that **perhaps institutional change has not played an independent role in creating growth**, perhaps transaction costs have been rising in the aggregate and per exchange. "But we cannot determine whether the assumption is accurate if we use a theoretical framework that precludes, by design, the possibility that the assumption is wrong. Now we are in a position to at least **challenge the assumption that transaction costs rise** because of the need to accommodate technical change. In heuristic terms, if the demand for transaction inputs was sufficiently elastic, in the way that the demand for cheap cotton textiles or Model T's was elastic, then a significant **expansion in the size of the transaction sector** could have been induced **by a reduction in transaction costs.** The growth of the transaction sector may **not** have been caused by an increase in the derived demand for transaction services, but by a shift in the supply curve of those services" (North, Wallis, 1994, pp. 622-623). They see both alternatives as consistent with the evidence presented in their earlier work and conclude that there was, as yet, little ground to choose between the two. And they surmise: "the predisposition to favor the derived demand explanation is nothing more than that, **a predisposition**" (North, Wallis, 1994, p. 623).

Lai (2013) labels the contradictory interpretations "the Wallis North paradox in transaction cost measurement": "Without exception, all of these measurements concluded that the transaction sectors as a proxy of transaction costs keep growing over time along with the economic development, implying that the more developed an economy is, the higher their transaction costs would be. (...) This is **the Wallis–North paradox**" (Lai, 2013, p. 1445). He introduces a distinction between Wallis and North's **actual transaction costs** that already occurred as the transaction sectors, and what they neglected to measure, that is "**the latent**

transaction costs that determine what transactions can happen and how big the transaction sectors can be. (…) The latent transaction costs cannot be measured directly since they exist latently" (*ibidem*). "When the latent transaction costs were prohibitively high, no transaction and actual transaction costs would happen and thus the share of transaction sectors should be zero; nevertheless, with latent transaction costs declining, transaction sectors and actual transaction costs will increase. Therefore, a higher share of transaction sectors in an economy reveals that the economy actually has a lower level of (latent) transaction costs. **The Wallis–North approach is still workable** for the transaction cost measurement but **with an inverted** interpretation. (...) Of course, this note left **latent transaction costs unexplained**" (*ibidem*).

One cannot however be satisfied with the solution. As a counter-example let us remind ourselves of one of many firearms incidents in the United States. In February 2018 the shooting at Marjory Stoneman Douglas High School in Parkland, Florida left 17 pupils dead and 17 injured. After the incident, 14 state legislators introduced bills to arm school staffs and resumed concealed weapons (usually hand guns) training for teachers. So far financing training and/or weapon purchase was not to be allowed from federal funds. These would be tantamount to actual transaction costs of secondary education in the state concerned. However, to make Lai's account of Wallis and North work, one should assume that latent transaction costs (in the relevant sphere) in US high schools are even higher.

Generally, the rise of the transaction sector reflects a shift of employment in the primary and secondary sector to employment in **the tertiary sector**. The transaction sector of an economy is exactly that part the tertiary sector which dynamically grows. **Structural change** in transaction sector where productivity is the highest (Loechel, 1995; Bischoff, 2002). A "growing transaction sector indicates **an increasing division of labour**, a **deeper specialisation** and a generally **more intensive exchange** within the economy which correlates with **expanding markets.** On the other hand, it can be argued that an expanding transaction sector is **indicative of increasing inefficiencies** and is due to **a lack of trust** in a (post-socialist) society" (Sulejewicz, Graca, 2005, also quoted in Chobanov, Egbert, 2007).

Finally, let us note that Dollery and Leong (1998) evoked two pieces of research on the structures of the respective economies: Dowie (1970) studied trends in the "services sector" in Australia from 1890 to 1965 drawing on a similar study of Fuchs (1969) for the US economy. What is somewhat embarrassing is the statement that "Dowie's definition of the services sector seems comparable to the Wallis and North definition of transaction industries ("finance", "trade") added to non-transaction industries (community and personal services) and most of the public transaction services (public administration, defence)" (Dollery, Leong, p. 226). The source of our uneasiness is the fact that in the analyses of structural change in the capitalist economies, the economists of the 1960s were attempting to ascertain "ordinary", empirically measurable elements of productive structures of market economies. The closeness of the definition to the ones provided by visibly critical of neoclassical models new institutional economics cannot but raise the question so what is new in the "new economics"? The tentative conclusion is that the concept of "transaction costs" loses its critical edge when is being used in a macroeconomic fashion and transforms itself into an "ordinary" element of the division of labour. Some types of labour are transaction activities while others are not, but both enter into standard accounting schemes. To be sure, we are only talking of the visible, measurable, activities passing through markets, i.e. "transaction services". The (part of?) "true" transaction costs remain invisible: something that Wallis and North describe for example as waiting for customers, searching for clients (expenditure of time). But surely, this is not what was initially implied by the microeconomic concept: contingent cost related with the protection of property rights and impacting upon the institutional structure of production.

Sales costs are sales costs, they may be superfluous from the point of view of customers (*faux frais du capitalisme* as described by Karl Marx[11]) but calling them transaction costs may add little to their theoretical status.

7. Some further hypotheses

The initial identification by North and Wallis of macroeconomic (empirical, historical, actual, incurred) transaction costs has led to ambiguities and a paradox:

(1) If cost (input) interpretation is retained: the market economies, and especially (post-socialist) economies undergoing market transformation, i.e. **development of market democracies**, **are increasingly inefficient**, (gloriously) wasteful. (Some are less wasteful: Japan or Germany economizing on defence spending and governance; others more: France, the US (Ghertman, 1998).)
(2) If cost (input) interpretation is retained, and neoclassical apparatus is adduced (technical change, firm production functions, shifts of supply curve, derived demand) one may have an alternative interpretation in that **expansion in the size of the transaction sector could have been induced by a reduction in transaction costs**. North and Wallis: „Both alternatives are consistent with the evidence presented in our earlier paper and there is, as yet, **little ground to choose between the two**. But the predisposition to favor the derived demand explanation is nothing more than that, **a predisposition**."
(3) If **division of labour and structural change** is retained as interpretation of increasing transaction sectors one reportedly, need worry only if these **do not** increase sufficiently (Russia, Argentina). The study of transaction sectors boils down to largely empirical ascertainment of the rise of „modern" „market" services, a phenomenon which is expected and apparently encouraged.
(4) Yet, in cases of post-socialist transition unprecedented speed of the rise in transaction sectors „clashes" with **conventional positive appraisal of marketisation** of social relations and invites cost interpretation: the growing impersonal character of transactions in the condition of **low trust in society** is suggestive of increasing inefficiencies.

Thus one is forced to accept complex and uncertain causality of increasing index of transaction activities as a percentage of the gross national output in developed capitalism. One wonders if one can have it both ways, i.e. conceiving:

(1) lowering transaction costs as removal of a barrier to growth and a sign of development and
(2) increasing transaction costs as revealing structural change leading to further growth and a sign of development.

Well, yes, if one thinks about the problem as the development of **capitalist markets** which are:

- wasteful (one needs mention only financialisation, rent seeking on a formidable scale);
- inegalitarian (wealth protection required for the rich);
- (since late 19th century) increasingly corporation-driven, i.e. by ever larger institutional devices "optimized" for rent seeking;

[11] See a. o.: Lee, 2001.

- assisted by growing (indebted) state through the provision of public goods and services whereby it generates massive (land) rents (inverted Henry George hypothesis / state capture).

If one accepts these characteristics, then in order to theorize "late capitalist" development

- we do not need a transhistorical concept of „*transaction cost*" any longer;
- we can do without a concept that is not scalable (in the sense of Williamson's "pragmatic methodology" of new institutional economics) from the theory of the firm to the theory of development (social and economic change), i.e. from "micro" to "macro";
- we are emboldened to draw this conclusion by the last books of Douglass North where the concept of „transaction costs" as a factor explaining long term growth and development is superfluous; it does not appear in the index of either D. C. North, J. J. Wallis, B. R. Weingast, *Violence and Social Orders. A Conceptual Framework for Interpreting Recorded Human History*, CUP 2009 or two subsequent compendia of empirical applications, let alone in the explanatory schemes contained there-in.

While adding a philosophical commentary at the end of the paper is somewhat risky, one is led to hypothesise that identification and measurement of macroeconomic transaction costs (viewed as transaction services) appears to be a degenerated scientific research programme (Imre Lakatos). Methodologically, one would wish for ***theoretically*** **progressive** problem shift: a move to new theories which enable one to (e.g.) predict more than a predecessor theory allowed. A problem shift is ***empirically*** **progressive** if in addition to predicting new observable evidence, *actual observation does indeed confirm this new prediction.* If, on the other hand, a programme fails to display this characteristic, it is no longer *progressive* but has become "***degenerating***". Lakatos himself became rather cautious (after serious criticism) and refrained from advocating elimination of the whole scientific research programmes because, even on his account, it was still rational to stick to a degenerating programme in the hope that it would make a comeback (Lakatos, 1971). Yet, the authors of the original interpretation themselves have not returned to the topic since 1995 despite obvious utility of an update and own suggestions to this effect (J. J. Wallis' research plans on his web site had a brief mention of the topic in early 21st century, but it has since disappeared). While one is left to ponder whether the problem shift to *Violence and social orders* as an explanation of (capitalist) development is a progressive one in itself, the macroeconomic transaction costs calculation as an interpretation of the pattern of growth has debilitating weaknesses.

8. Conclusions

The major reasons for the increase in transaction services proposed by North and Wallis also seem reasonable for the Polish economy. The expansion of the market with its impersonal exchange, transformation of the nature of a great number of social relationships into moneyed ties and contractual arrangements could not but have increased the costs of protecting property rights. Therefore, the costs of specifying and executing contracts become more significant with the expansion of the Polish market. It is difficult to evaluate the second proposition. Technological change in Poland is complex but inflow of foreign capital must

have strengthened the tendency identified by Wallis and North. Finally, the interpretation of the role of the state in both economies needs deeper analysis.

In addressing the questions posed by Dollery and Leong we are lead to believe that some of their conclusions have safely been repeated in this study: empirical results for the American economy are roughly replicated also by a much poorer, less industrialized economy in transition (the 1990s/2000s); secondly, the methodology for measuring the "visible" transaction services developed by Wallis and North, can after suitable modifications be applied in an Eastern European context. The national accounting system in Poland is comprehensive enough to allow fairly detailed comparative studies. Our expectations on the possibility of verification of this thesis in several other Eastern European countries so as to be able to provide a more thorough comparative study of economic transition of the 1990s and 2000s have only partially been fulfilled. Also as for the nature of economic development, we still hesitate to pronounce any judgment, however. The period of two decades (or shorter) seems too short, some variations in specific parameters require further investigation (especially the stagnation of these costs in Poland after 2002). We have no data on the previous years and it is hardly possible to make hypotheses regarding the beginning of the market transition, let alone the period of "real socialism". We do not know whether the increase is a continuation of the former trend – and if yes, since when. While we concur with continuous development of new institutional economics[12] we think that this particular effort has not fulfilled its promise.

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[12] "[I]ts best days lie ahead" (Williamson, 2000, p. 611).

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Appendix

Table 1A
Comparison of Polish classifications of economic activity

PKD 2007, abbreviated label *	**PKD 2004, PKD 2001 and EKD, abbreviated name ***
Agriculture, forestry and fishing	Agriculture, hunting and forestry
	Fishing
Mining and quarrying	Mining and quarrying
Manufacturing	Manufacturing
Electricity, gas, steam and air conditioning supply	Electricity, gas and water supply
Water supply; sewerage, waste management and remediation activities	
Construction	Construction
Trade, repair of motor vehicles *	Trade and repair *
Transportation and storage	Hotels and restaurants
Accommodation and catering *	Transport, storage and communication
Information and communication	
Financial and insurance activities	Financial intermediation
Real estate activities	Real estate, renting and business activities
Professional, scientific and technical activities	
Administrative and support service activities	
Public administration and defence; compulsory social security	Public administration and defence; compulsory social security
Education	Education
Human health and social work activities	Health and social work
Arts, entertainment and recreation	
Other service activities	Other community, social and personal service activities
Households hiring employers and producing for their own use	Households hiring employers
Organizations and exterritorial teams	Organizations and exterritorial teams

Source: Own elaboration on the information on http://stat.gov.pl/ (access: 25.01.2017).

Table 2A. Shares of "type I" workers in total employment in individual economic activities (private sector) in Poland, 1996-2014 (as in October [a])

Dollery & Leong	PKD 2007	PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Agriculture	Agriculture, forestry and fishing	Agriculture hunting and forrestry	0.226	0.288	0.265	0.224	0.283	0.248	0.229	0.207	0.182	0.210	0.212
		Fishing	0.163	0.175	0.164	0.227	0.177	0.304	0.401	0.200			
Construction	Construc-tion	Construc-tion	0.133	0.158	0.171	0.181	0.188	0.257	0.192	0.180	0.200	0.207	0.214
Mining	Mining and quarrying	Mining and quarrying	0.141	0.180	0.172	0.136	0.153	0.172	0.135	0.143	0.141	0.145	0.144
Manufactu-ring	Manufactu-ring	Manufactu-ring	0.138	0.217	0.218	0.231	0.229	0.266	0.238	0.236	0.212	0.223	0.223
Transport / Storage	Transportati on + storage	Transport, storage and communi-cation	0.217	0.366	0.414	0.481	0.465	0.457	0.431	0.433	0.402	0.367	0.351
	Information and com-munication										0.485	0.498	0.448
Services	Electricity, gas, steam and air condition-ning supply	Electricity, gas and water supply	0.145	0.265	0.272	0.230	0.232	0.314	0.288	0.286	0.354	0.349	0.316
	Water supply sewerage waste management and remediation activities										0.281	0.292	0.285
	Accomoda-tion and catering *	Hotels and restaurants	0.180	0.279	0.270	0.326	0.343	0.346	0.341	0.255	0.302	0.314	0.342
	Public administra-tion and defence; compulsory social security	Pub. admin. + defence; compulsory SS and health insurance	0.307	0.889	0.737	0.601	0.529	0.961	0.833	0.841	0.811	0	0
	Education	Education	0.256	0.404	0.361	0.361	0.338	0.336	0.292	0.354	0.412	0.301	0.338
	Human health and social work activities	Health and social work	0.312	0.242	0.214	0.151	0.161	0.175	0.192	0.184	0.213	0.231	0.271
	Arts, entertain-ment and recreation	Other community, social and personal service activities	0.332	0.386	0.390	0.380	0.377	0.467	0.361	0.388	0.672	0.651	0.674
	Other service activities										0.334	0.236	0.280

Note: [a] With the exception of 1996 when the data come from March.

Source: Own calculations based on data from data from the Z-12 survey on the structure of employment and wages made available by Poland's CSO.

Table 3A

Employment (in persons) in individual economic activities (private sector) in Poland, 1996-2014 (as of the 31th of December)

Dollery & Leong	PKD 2007	PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Agriculture	Agriculture, forestry and fishing	Agriculture, hunting and forestry	4262990	4262733	4253440	4237474	4236651	2100522	2103645	2101462	2342874	2345952	2353187
		Fishing	5038	5274	5421	4232	4417	4741	3872	3344			
Construction	Construction	Construction	733950	857189	839567	689733	635374	560628	664797	817493	850497	852906	808322
Mining	Mining and quarrying	Mining and quarrying	11359	20498	21581	37283	38494	36677	38155	41596	52890	54737	58586
Manufacturing	Manufacturing	Manufacturing	2050616	2525507	2426498	2210111	2192774	2327516	2452673	2577432	2347421	2340197	2463564
Transport / Storage	Transportation and storage	Transport, storage and communication	240041	299892	345800	344422	367752	376673	427942	501204	430163	470140	501489
	Information and communication										224274	246506	281515
Services	Electricity, gas, steam and air conditioning supply	Electricity, gas and water supply	11548	14437	16107	23050	23499	31202	32766	47665	45845	80081	71979
	Water supply; sewerage, waste management and remediation activities										47103	49535	51391
	Accommodation and catering *	Hotels and restaurants	158064	192133	186691	196938	193463	198736	212121	258549	222553	231795	236577
	Public administration and defence; compulsory social security	Public administration and defence; compulsory social security and health insurance	796	1025	7941	1086	1168	949	1099	1238	1170	955	643
	Education	Education	31055	37787	43814	45230	47114	52011	64295	80654	89889	113604	153796
	Human health and social work activities	Health and social work	45291	65675	83297	134215	145569	148163	166960	197950	221990	261677	298205
	Arts, entertainment and recreation	Other community, social and personal service activities	221487	203674	245360	205286	225269	240050	248844	263131	39902	38571	33894
	Other service activities										199026	215064	257413

Source: Poland's CSO publications *Employment in the National Economy* (1996, 1998, 1999, 2001, 2002, 2004, 2006, 2008, 2010, 2012 and 2014) – Table 3.

Table 4A
Employee compensation (in PLN) in individual economic activities (private sector) in Poland, 1996-2014

Dollery&Leong	PKD 2007	PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	2010	2012	2014
Agriculture	Agriculture, forestry and fishing	Agriculture, hunting and forestry	6425.52	10344.12	13872.24	18747.36	16027.68	20138.16	23365.08	29675.52	30815.76	37382.88	39190.08
		Fishing	6735.72	9633.36	18559.44	21647.40	18943.80	18750.00	24553.32	29929.56			
Construction	Construction	Construction	8733.00	15618.36	21092.88	23967.72	23278.56	25211.76	29548.68	37676.04	38352.24	42083.28	45099.84
Mining	Mining and quarrying	Mining and quarrying	10234.20	21465.12	26681.64	41539.44	38986.08	40371.84	54702.60	60258.60	70917.24	72454.56	75434.76
Manufacturing	Manufacturing	Manufacturing	8998.08	14368.32	19665.36	24037.92	24350.88	25389.00	29111.52	35151.48	37971.96	42554.64	45381.24
Transport / Storage	Transportation and storage	Transport, storage and communication	10654.08	17436.96	24231.36	34818.60	35908.80	35535.96	36359.40	40694.40	35394.00	37363.44	40164.00
	Information and communication										78823.32	75536.04	83091.84
Services	Electicity, gas, steam and air conditioning supply	Electricity, gas and water supply	11527.08	18622.92	25090.20	31988.40	32909.04	37682.16	43687.08	53757.72	62005.20	67323.84	75300.84
	Water supply; sewerage, waste management and remediation activities										41436.36	42378.96	44653.44
	Accomodation and catering *	Hotels and restaurants	6279.96	10988.28	14971.92	20291.28	20814.00	19182.84	20515.56	23484.36	30282.60	28348.68	30894.96
	Public administration and defence; compulsory social security	Public administration and defence; compulsory social security and health insurance	9866.76	18691.44	64797.96	19831.92	31941.48	28171.44	62414.04	104072.52	103858.68	0.00	0.00
	Education	Education	9432.60	16884.24	27345.24	26468.52	27430.20	32092.68	31240.08	35971.20	37511.64	40053.00	40686.96
	Human health and social work activities	Health and social work	5998.68	12672.60	17241.84	19834.08	19484.40	21417.24	27728.64	34065.72	38355.84	39340.56	43642.92
	Arts, entertainment and recreation	Other community, social and personal service activities	9024.12	14295.12	21102.96	24678.72	23355.60	29594.52	25547.52	38060.04	34834.20	35171.52	35908.56
	Other service activities										27128.28	32880.12	35789.64

Source: Own calculations based on data from data from the Z-12 survey on the structure of employment and wages; made available by Poland's CSO.

Table 5A
Shares of "type I" workers in total employment in individual economic activities (public sector) in Poland, 1996-2014 (as of October)

PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	PKD 2007	2010	2012	2014
Agriculture, hunting and forestry	0.226	0.244	0.224	0.243	0.275	0.251	0.275	0.233	Agriculture, forestry and fishing	0.242	0.239	0.232
Fishing	0.124	0.138	0.101	0.198	0.258	0.273	0.294	0.206	Mining and quarrying	0.102	0.073	0.083
Mining and quarrying	0.073	0.084	0.091	0.091	0.087	0.103	0.094	0.100	Manufacturing	0.210	0.193	0.225
Manufacturing	0.208	0.229	0.237	0.242	0.233	0.223	0.233	0.228	Electricity, gas, steam and air conditioning supply	0.303	0.286	0.291
Electricity, gas nad water supply	0.231	0.256	0.257	0.259	0.262	0.276	0.288	0.315	Water supply; sewerage, waste management and remediation activities	0.267	0.253	0.291
Construction	0.228	0.207	0.214	0.213	0.215	0.235	0.222	0.268	Construction	0.283	0.215	0.294
Trade and repair *	0.662	0.615	0.636	0.637	0.739	0.675	0.583	0.709	Trade, repair of motor vehicles *	0.677	0.638	0.651
Hotels and restaurants	0.374	0.388	0.369	0.368	0.406	0.349	0.345	0.344	Transportation and storage	0.525	0.496	0.500
Transport, storage and communication	0.390	0.437	0.411	0.444	0.467	0.476	0.517	0.576	Accommodation and catering *	0.390	0.283	0.361
Financial intermediation	0.902	0.897	0.919	0.908	0.932	0.810	0.867	0.925	Information and communication	0.378	0.340	0.412
Real estate, renting and business activities	0.366	0.396	0.408	0.396	0.328	0.350	0.359	0.429	Financial and insurance activities	0.911	0.897	0.931
Public administration and defense; compulsory social security	0.778	0.731	0.783	0.741	0.757	0.721	0.715	0.717	Real estate activities	0.643	0.546	0.654
Education	0.157	0.155	0.152	0.153	0.151	0.152	0.170	0.164	Professional, scientific and technical activities	0.277	0.244	0.338
Health and social work	0.170	0.153	0.151	0.152	0.159	0.152	0.162	0.162	Administrative and support service activities	0.434	0.517	0.644
Other community, social and personal service activities	0.424	0.416	0.431	0.417	0.438	0.372	0.384	0.397	Public administration and defence; compulsory social security	0.806	0.662	0.805
									Education	0.125	0.130	0.142
									Human health and social work activities	0.174	0.158	0.189
									Arts, entertainment and recreation	0.330	0.334	0.367
									Other service activities	0.399	0.409	0.526

Note: [a] With the exception of 1996 when the data come from March.

Source: Own calculations based on data from data from the Z-12 survey on the structure of employment and wages made available by Poland's CSO.

Table 6A

Employment (in persons) in individual economic activities (public sector) in Poland, 1996-2014 (as of the 31th of December)

PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	PKD 2007	2010	2012	2014
Agriculture, hunting and forestry	95766	80927	68920	52226	44938	38996	36926	36961	Agriculture, forestry and fishing	33208	32088	31706
Fishing	7827	7133	6219	2904	1879	867	709	449	Mining and quarrying	120081	119382	101649
Mining and quarrying	327778	276520	235107	179250	170526	153126	143309	143016	Manufacturing	89036	66564	54221
Manufacturing	1108225	574759	496551	291409	248006	187879	152846	127665	Electricity, gas, steam and air conditioning supply	113324	63358	58537
Electricity, gas and water supply	247837	238280	230815	222509	214582	194469	183681	165913	Water supply; sewerage, waste management and remediation activities	93833	93938	95760
Construction	134731	81411	75436	47340	41157	28178	26122	22371	Construction	14731	14092	11675
Trade and repair [a]	96988	57422	43842	32037	27679	19007	15529	13290	Trade, repair of motor vehicles [a]	9159	4141	2923
Hotels and restaurants	29867	29506	29580	20281	17487	17601	16601	17332	Transportation and storage	271204	259868	242247
Transport, storage and communication	592225	559000	492440	369928	356910	328101	310724	307922	Accommodation and catering [a]	14829	14613	12106
Financial intermediation	175421	163763	159247	77655	76493	72370	66853	65806	Information and communication	13476	12573	10602
Real estate, renting and business activities	205365	200668	177889	149342	173929	160081	145641	144161	Financial and insurance activities	49962	49251	49741
Public administration and defence; compulsory social security	401707	429775	431512	524660	837670	850658	879896	918143	Real estate activities	44330	39627	37806
Education	880764	869981	864489	862712	847477	947485	962403	957847	Professional, scientific and technical activities	83087	78290	74894
Health and social work	964325	955703	883713	734760	706096	556354	548426	549660	Administrative and support service activities	8910	9716	9649
Other community, social and personal service activities	143721	146405	143098	135658	140323	140460	145665	150702	Public administration and defence; compulsory social security	968930	957254	970504
									Education	989961	972378	970360
									Human health and social work activities	542434	528890	529054
									Arts, entertainment and recreation	108536	108406	111026
									Other service activities	1715	2553	2613

Note: [a] Abbreviated name.

Source: Poland's CSO publications *Employment in the National Economy* (1996, 1998, 1999, 2001, 2002, 2004, 2006, 2008, 2010, 2012 and 2014) – Table 3.

Table 7A
Employee compensation (in PLN) in individual economic activities (public sector) in Poland, 1996-2014

PKD 2004, PKD 2001, EKD	1996	1998	1999	2001	2002	2004	2006	2008	PKD 2007	2010	2012	2014
Agriculture, hunting and forestry	10231.68	17219.76	22698.12	28275.72	31846.92	32365.80	41777.64	43061.04	Agriculture, forestry and fishing	58527.12	71835.48	75780.12
Fishing	8901.84	14495.64	15526.08	19497.48	25690.68	29534.04	30199.92	31176.00	Mining and quarrying	71183.64	80939.76	84754.80
Mining and quarrying	18163.20	26122.44	34669.92	42738.48	45306.84	43262.88	52071.60	64389.36	Manufacturing	44385.24	52937.64	57167.40
Manufacturing	10255.92	16551.72	22281.48	26707.08	26857.08	30941.88	34227.24	42255.12	Electricity, gas, steam and air conditioning supply	57394.92	62104.44	65246.52
Electricity, gas and water supply	13677.60	19653.72	28123.20	31503.12	33163.20	33078.36	38911.08	45500.52	Water supply; sewerage, waste management and remediation activities	40813.56	44895.84	47196.12
Construction	9185.52	16554.24	22035.24	26102.40	29307.72	29007.96	32350.56	44937.24	Construction	48845.04	57940.92	59622.60
Trade and repair *	11521.56	19439.52	27125.40	29635.68	32422.08	31649.52	35985.96	44672.88	Trade, repair of motor vehicles *	50664.96	49873.80	65152.56
Hotels and restaurants	10735.32	15847.80	20327.88	24053.28	21297.00	23605.80	25361.40	31769.88	Transportation and storage	42680.76	47116.80	48903.12
Transport, storage and communication	10134.00	16462.80	22612.44	27073.56	27899.52	28917.48	31954.92	40894.44	Accommodation and catering *	38082.24	40680.48	41277.72
Financial intermediation	13631.64	20992.68	27135.60	40274.28	42636.72	47261.16	54180.60	62447.04	Information and communication	62706.12	73061.40	75097.92
Real estate, renting and business activities	11163.72	18108.00	24730.44	30038.04	28903.80	29144.40	35225.88	43929.12	Financial and insurance activities	76244.88	77701.92	80587.92
Public administration and defence; compulsory social security	12868.08	18886.20	26643.24	31144.92	32476.08	35726.88	40307.76	48449.40	Real estate activities	44949.84	46478.28	48500.76
Education	9056.16	13786.92	19201.20	24388.44	26466.12	30376.44	31430.76	35947.56	Professional, scientific and technical activities	51268.68	58263.36	63197.40
Health and social work	8350.92	12213.96	16171.08	19894.20	20815.20	22310.16	29223.36	36332.04	Administrative and support service activities	38261.64	38259.60	48627.84
Other community, social and personal service activities	10391.64	15693.24	22006.44	26030.64	26337.36	28512.00	30540.12	36761.52	Public administration and defence; compulsory social security	52013.28	54965.76	56993.64
									Education	42048.24	46317.96	49238.40
									Human health and social work activities	40063.92	42171.24	43875.00
									Arts, entertainment and recreation	37518.36	39748.68	43161.96
									Other service activities	35755.32	43463.88	48172.68

Source: Own calculations based on data from data from the Z-12 survey on the structure of employment and wages; made available by Poland's CSO.