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Baha Kalinowska-Sufinowicz*

Telework as a form of limiting human and social capital depreciation among parents with young children

The main goal of the article is to present telework as a form of employment for parents with young children and its evaluation in the context of methods counteracting the depreciation of human and social capital – both from the labour demand and labour supply perspectives. The paper consists of two parts: a theoretical perspective and a practical one. The first part of the paper begins with a reflection on the phenomena of the depreciation of human and social capital in the light of literature review, especially with reference to the situation of parents raising young children. In the following – more practical – section, the concept and types of telework are introduced as well as its advantages and disadvantages from the points of view of employers and employees.

1. Introduction

Since the 1990s, intensive demographic changes have been observed in Poland. These changes are characterised by the decrease of total fertility rate (on the one hand) and the increase of average life expectancy (on the other). As a result, the population structure by economic age has changed, which has macroeconomic consequences for the labour market (limited labour resources, among others) as well as increasing burdens on the state budget in the long run.

The situation on the labour market is, therefore, determined by demographic changes, and at the same time, it conditions their existence and development. The phenomenon of unemployment in Poland affects women to a greater extent than men due to the fact that employers regard women as potential mothers and

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more “troublesome”. Such a perception lowers the competitiveness of women as potential employees and, at the same time, affects procreational decisions. It is also worth emphasizing that a higher level of unemployment among women means greater exposure to the depreciation of human and social capital.

The subject of this paper is a reflection on telework as an opportunity to reduce the conflict between work and family life; in particular, taking care of young children. This form of work can provide a solution to prevent the depreciation of human and social capital in the group of parents raising young children – both women and men. The main goal of the article is to present telework as a form of employment for parents with young children as well as its evaluation in the context of methods counteracting the depreciation of human and social capital – both from the labour demand and labour supply perspectives. The paper consists of two parts: a theoretical portion and a practical one. The first part of the paper begins with a reflection on the phenomena of the depreciation of human and social capital in the light of literature review, especially with reference to the situation of parents raising young children. In the following – more practical – section, the concept and types of telework are introduced as well as its advantages and disadvantages from the points of view of employers and employees.

2. Human and social capital and the question of parenthood

The concept of human capital in the literature of the subject can be understood in different ways. Human capital can be understood as people who are the basis for estimating the value. Models of human capital participation in creating economic growth (i.e., the Cobb-Douglas economic growth model or the Solow-Swan model of economic growth) are set within this perspective. Another approach treats man and human capital separately, and human capital is understood as accumulated skills, abilities, knowledge, energy, and health that are the result of specific inputs (Kunasz, 2004). In this approach, human capital is most often considered as the factor decisive for the situation on the labor market (for example, human capital theories that explain the functioning of the labour market or the occurrence of discrimination on this market).

It is worth noting that the human capital theory was developed by many economists, including Theodore Schultz, Gary Becker, Jacob Mincer, and Solomon Polacheck. In this theory, there is an interesting element concerning the impact of parenthood (particularly maternity) on human capital and the labour market situation. In 1958, Mincer pointed out that earnings of female workers were “less
Telework as a form of limiting human and social capital depreciation...

...dispersed than earnings of male workers”, and also that “earnings of male full-period workers who are heads of families are more unequal than those of single men” (Mincer, 1958). Later, in 1974, Mincer and Polachek compared the levels of earnings among married women, married men, and unmarried women. They expressed the opinion that “the loss or reduction of market earnings of mothers due to demands on their time in child rearing represents a measure of family investment in the human capital of their children. The investment cost has been measured by valuing the reduction of market time at the observed wage rate” (Mincer and Polachek, 1974). In 1982, in turn, Mincer and Haim Ofek made a comparison of real earnings attained at the beginning and end of a professional career. They found out that the longer the child-related career break, the greater the differences between the level of earnings at the end of a professional career (Mincer and Ofek, 1982). Polachek believed that one of the causes of these differences between the levels of earnings was the depreciation of human capital, which occurs during breaks in women’s professional careers.

The issue of social capital, discussed by James Coleman, is also interesting from the point of view of the situation of parents (particularly mothers) on the labour market. In 1988, he distinguished “three forms of social capital: obligations and expectations, information channels, and social norms”. What is more, Coleman highlighted “one effect of social capital that is especially important: its effect on the creation of human capital in the next generation” (Coleman, 1988).

Although child-related career breaks are treated as “family investment in the human capital of next generation”, they without a doubt contribute to the prevalence of depreciation of human and social capital. On the one hand, knowledge and skills are forgotten; on the other, interpersonal relationships vanish. Later, these factors become significant limitations to professional reactivation, which most often affects women/mothers. The fear of “dropping out” from the labour market results in postponing the decision to become a mother, which in turn leads to lower fertility among women. Taking this into account, it is worth considering one of the solutions that may be used to help the group of parents raising young children. At the same time, it should be pointed out that the solution has both advantages and disadvantages, but it is worth further consideration in the context of reducing the phenomenon of depreciation of human and social capital.

3. The concept of telework

Contrary to appearances, it is not so easy to define telework. Maria Montesano claims that “teleworking is not a job” but rather “a way of working”. She also adds
that “teleworking is also known as “working from home”, “telecommuting”, “cyber working”, “mobile working”, and “e-working” (Montesano, 2010).

According to Jack M. Nilles (a theorist of this phenomenon), telecommuting is defined as the partial or total substitution of telecommunications, with or without the assistance of computers, for the commute to/from work (Nilles, 1994).

Janusz Wiśniewski defines teleworking as the form of organisation and/or performance of work using information technology in which a major part of the employee’s time that could be carried out in the premises of the employer is regularly done offsite, within the framework of the employment contract (Wiśniewski, 2007).

In accordance with the Polish Labour Code, telework occurs when work is performed regularly away from the traditional office using electronic communication (Ustawa z 26 czerwca 1974…, 2014). Some doubts might arise due to the fact that “regularity” of work by teleworker away from the traditional office is not precisely defined. Does it mean that daily working from home must continue for 8 hours a day? Or is it enough if the working parent takes work home for 2 or 3 days per week (for example, due to the illness of his/her child)? Or what about a situation in which a working parent spends 5 hours in the company, for example, and he or she works remotely from home or from another location outside the traditional office during the remaining 3 hours? Can this be called telework?

In the Polish Labour Code, there are no answers to these questions. However, it does specify the responsibilities of the employer who engages employees in the form of telework, which basically includes the obligation to provide the necessary equipment (along with its insurance) to cover the costs associated with its installation, service, maintenance, and operation. The provision of technical assistance and the necessary training on hardware support are also included (Ustawa z 26 czerwca 1974…, 2014). Although there is a possibility of using other solutions, this provision is sometimes regarded as overly burdensome by employers, especially taking into account the potential resignation of a teleworker within 3 months without providing reasons for such a decision. In this context, and from the point of view of employers, teleworking may be quite a costly investment in human capital in the enterprise.

4. Types of telework

Based on the place of employment and the information technology used by the teleworker to provide work, several types of telework can be distinguished. One of the most useful approaches is the division of telework into three main groups:
Telework as a form of limiting human and social capital depreciation...

– working from home,
– working away from the traditional office,
– mobile teleworking (Wiśniewski, 2007).

It is worth presenting the fundamental differences between these types of telework.

Home working means performing work at home and communicating with the employer by means of an appropriate means of communication (Wiśniewski, 2007). On the one hand, it might be typical full-time teleworking; or on the other hand, occasional telecommuting in a situation when a young child is ill and the employee may provide work from home at the time of childcare. The English “homeoffice” term is commonly used in Poland. In telecommuting, in turn, work is provided away from the traditional office but in an ordinary fixed place. Various forms of this type of teleworking can be identified (Auriga, 2005; Kalinowska-Nawrotek, 2005); for example:

– a telecentre (also known as a call center) – a work location that is usually in a different place than the headquarters of the organization; it provides access for telecommuting to work equipment; it can be compared to a subsidiary or a branch office;
– telecottages – special kind of telecentres located in rural areas;
– virtual enterprises – involving cooperation between legally and spatially separate business entities working on-line on a certain specific project;
– overseas teleworking – when the recruitment net includes people living in other cities, regional and rural places, or even from overseas.

Mobile teleworking is performed in any location where the teleworker is at a given moment. Thus, the place of providing telework is changeable – it can be either working at home or at the company of a client. A teleworker can also keep in contact with the employer by individual or mass means of communication, even from a car (Kalinowska-Nawrotek, 2005; Wisniewski, 2007).

Irrespective of the definition problems, the legal solutions adopted in the Polish Labour Code and the choice of the teleworking type, it should be pointed out that this option is one of the flexible forms of employment and the organization of working time, which seems to be a win-win proposition both for women (including those who return to the labour market after maternity leave (Kalinowska-Sufinowicz, 2013) and for men (who want to actively participate in the upbringing of their children). It is worth discussing the advantages and disadvantages of telework more thoroughly.
5. The positive aspects of teleworking

In the beginning, it is important to consider the benefits that result from the implementation of telework for employers (see Table 1). The use of this form allows an employer to reduce the cost of operation of the company by reducing the necessary office space, but also to increase the number of employees at the same office space (meaning average labour productivity rises). Besides, teleworking makes it possible to acquire qualified and highly educated people, even if that they cannot be found on the local labour market (Kalinowska-Nawrotek 2005; Kalinowska, 2007); and as a result, this increases the resources of human capital in the company.

Table 1
Advantages of telework for the employer and employee (with young children)

<table>
<thead>
<tr>
<th>Employer</th>
<th>Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>reducing employment costs</td>
<td>avoiding time- and money-consuming commuting and reducing babysitter costs</td>
</tr>
<tr>
<td>higher employee productivity</td>
<td>a better chance of finding a suitable job</td>
</tr>
<tr>
<td>better access to employees</td>
<td>a higher possibility of attaining a work-life balance</td>
</tr>
<tr>
<td>a greater chance of increasing the human capital resources in the company</td>
<td>greater opportunities for professional development</td>
</tr>
<tr>
<td>lower employment turnover and lower cost of staff recruitment</td>
<td>greater motivation to work</td>
</tr>
<tr>
<td>elimination of stress associated with the use of ad hoc solutions</td>
<td>elimination of stress associated with the use of ad hoc solutions</td>
</tr>
</tbody>
</table>

Source: own study on the basis of (Głogosz et al. 2007a; Głogosz et al. 2007b)

Telecommuting also allows for a reduction in employment rotation, and thus, the reduction of costs of staff recruitment. For example, instead of using sick leave, a pregnant employee may work from home, adjusting the pace of work to her well-being and health status.

Working parents with young children who choose the option of homeoffice (away from the traditional office) will be able to reconcile the work at home with the care for a sick child without the necessity of using sick leave or childcare leave.
The employer does not have to worry about replacing such a person in the workplace in a situation of having to stay with a sick child at home. The work performed from home will be more effective than in the situation of substituting the worker with someone else without prior preparation.

As for employees, telework allows them to avoid expenses for communing, to reduce tiredness, and to save time by not commuting (usually during rush hours). When a teleworker spends more time at home, he or she has greater opportunities for work-life balance and for professional development. Because the teleworker can start working earlier, he or she gets extra time to spend with their child and can read a professional book to expand his or her competence, for example. The use of teleworking also helps reduce expenses for babysitters or other forms of emergency care for a sick child. Even if a teleworker is forced to employ a babysitter, he or she will be more relaxed thanks to being around and in greater control of the situation (e.g., administering medication to the child).

Given that telework may be provided practically from any place where there is access to telecommunication and/or information technologies, it should be pointed out that this form of work gives greater opportunities of finding a job than limiting oneself to one’s local municipality. What is more, an employee who teleworks is usually more satisfied, loyal, and is characterised by a stronger motivation to work. A teleworker will also feel more relaxed and less tense than if he or she used sick-child leave or child-care leave, fearing the negative consequences of reduced attendance at work on the part of the employer.

6. Limitations of telework

As mentioned above, it is quite risky for employers to bear the costs of organising the worksite for teleworkers who may opt out of this form of work up to 3 months after starting it (see Table 2). The control and supervision of an employee is also quite difficult when he or she is at home or wherever he or she is working at the moment. When the teleworker does not properly understand the methods used in the job, he or she may temporarily work less effectively. Besides, the employer has less contact with the teleworker who is not physically present in the company. This last factor also promotes atomisation of labour relations in the enterprise and does not facilitate the management of subordinates. Hiring teleworkers requires, in fact, developing new forms of contact and learning new management techniques using the Internet.
Table 2
Disadvantages of telework for the employer and for the employee

<table>
<thead>
<tr>
<th>Employer</th>
<th>Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>the costs and risks of organization of the teleworking place</td>
<td>the lack of resolution between working time and time off</td>
</tr>
<tr>
<td>problems with the supervision of the teleworker</td>
<td>limited contact with the working environment</td>
</tr>
<tr>
<td>worse quality of work can be observed temporarily</td>
<td>limited access to information</td>
</tr>
<tr>
<td>a barrier of resistance to change</td>
<td>less motivation to work</td>
</tr>
<tr>
<td>the atomisation of labour relations</td>
<td>limited access to training, promotion, and employee benefits</td>
</tr>
<tr>
<td>the necessity of studying new management techniques</td>
<td></td>
</tr>
</tbody>
</table>

Source: own study on the basis of (Głogosz et al. 2007a; Głogosz et al. 2007b)

Telecommuting can also be difficult for the employee. The inability of “closing the door” every day after finishing work causes a blurring of the line between working time and time off, often to the detriment of the latter. The lack of social contacts or a motivation to dress smartly when leaving home to meet other people can lead to depressive moods in a teleworker, and less motivation to work. Not everyone is suited to work independently and to manage his or her time effectively and efficiently. Sometimes, it is not easy to explain to the family that “I am home” can mean “I am working.” Moreover, because of being away from the traditional office, the teleworker may have limited access to information, which could result in limited access to training, promotion, or employee benefits. It is very easy to forget about a teleworker who is not physically in the company, especially when allocating cash bonuses or other additional benefits.

7. Conclusion

One of the reasons for the decrease of total fertility rate is women’s fear of the deterioration of their situation on the labour market. The child-related career breaks cause the depreciation of human and social capital, which is a significant limitation of the employability of young parents raising young children (women in particular). The solution that is proposed in this paper is telecommuting.
Despite the difficulties in defining and in implementing legal solutions, telework is regarded as an option recommended particularly for working parents who care for young children – recommended by both employees and employers. Many advantages of telework were analysed in this paper. For employers, telework mostly allows for a reduction in employment costs, greater employee productivity, a better chance to increase human capital in the company, and better access to employees. It also allows for lower employment turnover, lower costs of staff recruitment, and the elimination of stress associated with the use of ad hoc solutions. For employees, telework gives them a chance to find a suitable job, to lower commuting expenses, to reduce costs of babysitting, and for professional development. But above all, it allows them to achieve a better reconciliation of work and family life, which also is associated with a greater motivation to work, an elimination of nerve-racking ad hoc solutions, and the reduction of the depreciation of human and social capital.

It should be noted that not all companies are able to introduce solutions such as telework because of the nature of their business (e.g., among personal service workers or among employees whose physical presence is required at a traditional office). But sometimes the limited use of teleworking is a result of lack of theoretical and practical knowledge about this solution (both among employers and workers) as well as a lack of employer trust in the employees. Among the restrictions of teleworking from the point of view of the employer, there are also the costs and risks of organising a worksite away from the traditional office and worse quality of work (at least temporarily), as well as problems with the control of teleworker, a barrier of resistance to change, and an atomisation of labour relations. In turn, for employees, the disadvantages of telework can be the lack of separation of working time and time-off as well as limited access to building social capital, information, training, promotion, career development, and benefits, as well as even less motivation to work.

It is worth noting that telework may not be a commonly used solution because of the limitations associated with specific features of the industry in which the employee works, but also micro-social limitations. Telecommuting requires high self-organisation and reliability in carrying out tasks without constant control and supervision. The flexibility of this solution does not mean the disorganisation of tasks and procrastination, because this could lead to the creation of backlogs and, as a consequence, the loss of the job.

However, there are many positive aspects of teleworking. One of the most important is reducing the depreciation of human and social capital; hence, for working parents (both women and men who care for young children), telecommuting seems to be a highly attractive solution. Teleworking means a greater possibility of attaining a work-life balance than in the situation of work from a traditional office in the standard work-time system for 8 hours a day, 5 days a week, and fixed working hours.
References


Assessing the relationship between business strategy and knowledge acquisition in Polish Manufacturing Enterprises

1. Introduction

Companies that have achieved a certain level of knowledge growth are able to capitalize on the knowledge to improve their results (Tiwana, 2002). Enterprises can obtain their competitive advantages by acquiring useful knowledge. The knowledge acquisition process can take place both in the context of the internal relationships of the firms and of the external relationships with customers, suppliers, and competitors. Dyer and Singh (1998) suggested that external knowledge acquisition becomes critical for firms, and Nonaka (1994) formulated that this is important in value creation for firms. Moreover, Yli-Renko et al. (2001) stated, that external knowledge acquisition provides opportunities for creating new knowledge in firms.

Due to the opinion that knowledge is a key strategic resource, enterprises strive to develop a maximum amount of knowledge in order to improve the success of their business strategy implementation (Drucker, 1993; Bhatt et al., 2005).

This study adapted the concept of knowledge management to analyze which external knowledge acquired in a manufacturing company could contribute most to the achievement of the set strategic goals. Generally speaking, knowledge can be classified either as tacit or explicit knowledge, and information technology (IT) is essentially regarded as a natural medium for managing knowledge (Borghini and Pareschi, 1997; Lev, 2009). External knowledge acquisition refers to the degree of obtaining both external explicit knowledge (such as work reports and...
official documents from business partners) and external tacit knowledge (such as experiences, ideas, and expertise from the employees of business partners).

Tacit knowledge is not easily codified or articulated (Nonaka, 1994), and explicit knowledge is easily expressed and communicated in the form of written documents (Nonaka and Takeuchi, 1995). Tacit knowledge is more indistinct stickier than explicit knowledge (Von Hippel, 1994). Moreover, Reychav and Weisberg (2009) suggested that explicit and tacit knowledge have different economic values.

The proposed research model (which was based on data gathered from 119 Polish manufacturing companies) can enable management staff to analyze the progress of strategy realization over time as the effects of the types of knowledge that is acquired in a company. In this study, the effect of knowledge acquisition in a manufacturing company is investigated via simulation of a model using the Group Method of Data Handling.

This paper provides an empirical analysis of the roles of the types of knowledge acquisition for the implementation of business strategies. The aim of this paper is to empirically test these theoretical arguments in a common empirical setting. The analysis in the paper shows that some kind of knowledge acquisition seems to play a superior role in the implementation of business strategies. The rest of the paper is organized as follows: Section 2 presents a theoretical background of the study; Section 3 presents the dataset and methodology followed in the empirical analysis; Section 4 presents the main findings of the paper; Section 5 summarizes and concludes.

2. Theoretical background

According to Karlsson and Johansson (2006), knowledge is classified as scientific knowledge, technological knowledge, and entrepreneurial knowledge. I argue with Edvinsson (1997) and Lee et al. (2005) that non-financial measures (such as customers) have become increasingly important for company development. Cotora (2007) suggest that it needs to identify the relationships and conversion processes among knowledge and situations, competencies, and partnerships in the companies and their business partners for improving the success of business strategy implementation. Leonard-Barton (1995) stated that a company’s growth is possible by absorbing knowledge from another enterprises. Firms must absorb and transform external knowledge into their own knowledge according to employee experiences, values, and cultures (Cockburn and Henderson, 1998). I argue with Su et al. (2006) that external knowledge can be defined as knowledge about business partners, including product, customer, supplier, industry, operations, and competitor knowledge.
It is interesting to explore the role of external knowledge in manufacturing companies. Firms are capable of acquiring relevant knowledge, both tacit and explicit. Spender suggests that tacit knowledge is referred to as unarticulated, implicit, uncodifiable, or procedural knowledge (Spender, 1994). Explicit knowledge is the specific knowledge that can be formalized, recorded, or codified. This type of knowledge tends to be found in books, manuals, files, or databases. Explicit knowledge is generally viewed as knowledge that has been made explicit via a documentation process. I argue with Chin et al. (2011) that tacit knowledge typically contributes more value to the organization when compared to explicit knowledge, but I try to formulate how external knowledge acquisition (both tacit and explicit) improves the implementation of a business strategy.

The major contribution of this study is that it proposes the exploitation of the potentially useful acquisition of external knowledge that can efficiently provide users the necessary support in the process of business strategy implementation in a manufacturing company.

I adopted the acquisition of measuring knowledge of the organization from Maula et al. (2003). I suggest the following types of external knowledge in the company:

External explicit knowledge about:
- shareholder's finance (F),
- shareholder's IT (IT),
- shareholder's technical resources and infrastructure (TRI),
- shareholder's human resources (HR).

External tacit knowledge about:
- shareholder's core competencies (CC),
- shareholder's products and services (PS),
- shareholder’s technology (T),
- shareholder’s market share (MS),
- shareholder’s customers (C),
- shareholder’s development strategy (DS).

An effective implementation of business strategies should integrate a company’s structure, human resources and company policy (Bolman and Deal, 2003). The implementation of a strategic process is defined as complete when the expected results in companies have been at least 70% achieved after a period time of five years after adopting a document that details a strategic plan.

As presented in Figure 1, the research model posits (from the preceding argument) that both tacit and explicit external knowledge acquisition in Polish
manufacturing enterprises will have an influence on the implementation of business strategies.

The aim of this study is to explore the impact of defined types of the knowledge that is acquired upon the implementation of business strategies in Polish manufacturing enterprises.

The acquisition of external explicit knowledge in a manufacturing company:

\[ KAEE_n = \{F_n, IT_n, TRI_n, HR_n\}; F_n, IT_n, TRI_n, HR_n \in [1; 5] \]

The acquisition of external tacit knowledge in a manufacturing company:

\[ KAET_m = \{CC_m, PS_m, T_m, MS_m, C_m, DS_m\}; CC_m, PS_m, T_m, MS_m, C_m, DS_m \in [1; 5] \]

Knowledge acquisition via books, manuals, files, or databases about business partners and from employees of business partners

A model for the implementation of business strategies in Polish manufacturing enterprises using the Group Method of Data Handling:

\[ ST = A + BKA_n + CKA_m + DKA_n^2 + EKA_m^2 + FKA_nKA_m, \text{ where:} \]

- **BSI** – implementation of business strategies in Polish manufacturing enterprises
- **KA_n, KA_m** – indicators which describe the importance of the acquisition of external explicit and tacit knowledge in a manufacturing company;
- **KA_n, KA_m \in [1; 5]**

A, B, C, D, E, F – estimators

Decision support model for selecting the types of knowledge, which should be acquired for the success of the implementation of business strategies in Polish manufacturing enterprises.

**Figure 1.** A research model
3. Research model

In order to facilitate the Group Method of Data Handling of the defined model, the process of the implementation of strategies (ST) is represented by a set of indicators, noted as:

\[
ST = \begin{bmatrix}
ST_1 \\
ST_2 \\
\vdots \\
ST_n
\end{bmatrix}
\text{, where } n \in \mathbb{N}
\]

In this definition, ST\(_i\) is the i-th ST, and also included in the matrix are indicators that describe the process of the implementation of strategies in each of the 119 Polish manufacturing companies examined in this study.

Each ST\(_i\) is associated with indicators that describe the types of external knowledge acquisition. A matrix KA is provided to show the relationship between external knowledge acquisition in a manufacturing company and the outcome of realized business strategies.

Therefore, external explicit and tacit knowledge acquisition in a manufacturing company provides a set of indicators, noted as:

\[
KA = \begin{bmatrix}
F_1 & IT_1 & TRI_1 & HR_1 & CC_1 & PS_1 & T_1 & MS_1 & C_1 & DS_1 \\
F_2 & IT_2 & TRI_2 & HR_2 & CC_2 & PS_2 & T_2 & MS_2 & C_2 & DS_2 \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
F_n & IT_n & TRI_n & HR_n & CC_n & PS_n & T_n & MS_n & C_n & DS_n
\end{bmatrix}
\]

where \( n, \ m \in \mathbb{N} \) and  
F – shareholder’s finance;  
IT – shareholder’s IT;  
TRI – shareholder’s technical resources and infrastructure;  
HR – shareholder’s human resources;  
CC – shareholder’s core competencies,  
PS – shareholder’s products and services,  
T – shareholder’s technology;  
MS – shareholder’s market share;  
C – shareholder’s customers;  
DS – shareholder’s development strategy.

In this definition, F\(_i\), IT\(_i\), TRI\(_i\), HR\(_i\), CC\(_i\), PS\(_i\), T\(_i\), MS\(_i\), C\(_i\), and DS\(_i\) are the i-th KA, and they are indicators that describe the importance of knowledge acquisition in each of the 119 Polish manufacturing companies.
A model for selecting the types of knowledge that should be acquired for the success of the implementation of business strategies in Polish manufacturing enterprises was built using the Group Method of Data Handling. The multilevel GMDH allows for an optimized synthesis of a mathematical model for a given class of regression functions, and it can be used in both evaluating criteria and quality assessment (Farlow, 1984), (Patalas-Maliszewska, 2013). Both elements of the algorithm are arbitrarily defined by the author. In this study, the elements are defined as:

- the importance of the types of knowledge that should be acquired for the success of the implementation of business strategies in each of the 119 Polish manufacturing companies involved in the study;
- a statement of the completion of the process of implementing a strategy.

4. Decision support model for the implementation of business strategies in Polish manufacturing enterprises using the Group Method of Data Handling

Before the survey was carried out, the respondents were asked if they were able to describe and state if the process of the implementation of a strategy is complete or not. The level of completion of the process of implementing a business strategy was described as the expected results from the realization of a business strategy in a company has been at least 70% achieved after a period of time of five years from the adoption of the strategy (1 point – if you agree / 0 points if you do not agree).

When employees who collaborate with each other within a manufacturing company and its business partners receive useful external knowledge, they feel more motivated to realize a business strategy. The factors relating to the importance of acquiring external tacit knowledge in a manufacturing company were based on feedback surveys and their sources are listed here:

An importance of acquiring external tacit knowledge: The degree of contact between employees by which one employee can help to transform the knowledge and skills of another (Lin, 2007) and may facilitate the realization of a business strategy:

- KAET-factor1: I receive know-how gained from working with colleagues from my business partners infrequently;
- KAET-factor2: I receive know-how gained from working with colleagues from my business partners rarely frequently;
Assessing the relationship between business strategy and knowledge acquisition...

– KAET-factor3: I receive know-how gained from working with colleagues from my business partners marginally frequently;
– KAET-factor4: I receive know-how gained from working with colleagues from my business partners frequently;
– KAET-factor5: I receive know-how gained from working with colleagues from my business partners quite frequently.

The importance of acquiring external explicit knowledge: the degree, that knowledge about business partners is easily expressed and communicated in the form of written documents (Nonaka and Takeuchi, 1995) and may facilitate the realization of a business strategy:

– KAEE-factor1: I receive knowledge in the form of written documents from working with colleagues from my business partners infrequently.
– KAEE-factor2: I receive knowledge in the form of written documents from working with colleagues from my business partners rarely frequently.
– KAEE-factor3: I receive knowledge in the form of written documents from working with colleagues from my business partners marginally frequently.
– KAEE-factor4: I receive knowledge in the form of written documents from working with colleagues from my business partners frequently.
– KAEE-factor5: I receive knowledge in the form of written documents from working with colleagues from my business partners quite frequently.

The data for this study was collected from 119 Polish manufacturing companies between January and September of 2014 (see Table 1).

<table>
<thead>
<tr>
<th>Manufacturing companies</th>
<th>Items</th>
<th>Frequency (N = 119)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>industry</td>
<td>88 (74%)</td>
</tr>
<tr>
<td></td>
<td>construction</td>
<td>16 (13%)</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>15 (13%)</td>
</tr>
<tr>
<td>Department of the company in which the respondent works</td>
<td>management</td>
<td>95 (80%)</td>
</tr>
<tr>
<td></td>
<td>sales and marketing</td>
<td>24 (20%)</td>
</tr>
</tbody>
</table>

This study presents the possibility of defining a decision support model for selecting the types of knowledge that should be acquired for the success of implementing business strategies in Polish manufacturing enterprises. Finding a forecast value for the statement of completing the process of implementing
a strategy (as expressed by the defined types of external knowledge acquisition) is part of the decision-making model.

The data was received from 119 Polish manufacturing companies, and the variations of the GMDH algorithms (Fig. 2) (Farlow, 1984) were investigated in the author’s Consulting IT computer software system (Patalas-Maliszewska, 2013).

As a result, the best-possible polynomial was obtained (the algorithm evolution process was completed on the second iteration): a decision-support model for selecting the types of knowledge that should be acquired for the success of implementing business strategies in Polish manufacturing enterprises:

\[
ST = 25.95 - 48.20PS - 9.04T + 31.74PS^2 + 2.87T^2 + 0.39PS \times T
\]

where:

- \(ST\) – the statement of completing the process of implementing a strategy;
- \(PS\) – the importance of the type of knowledge: external tacit knowledge about shareholder products and services that should be acquired for the success of implementing business strategies in each of the 119 Polish manufacturing companies involved in the study;
- \(T\) – the importance of the type of knowledge: external tacit knowledge about shareholder technology that should be acquired for the success of implementing business strategies in each of the 119 Polish manufacturing companies involved in the study.

The results of this study validate the existence of a direct effect on the implementation of business strategies in Polish manufacturing enterprises in the context of the acquisition of external tacit knowledge about business partners, especially knowledge about shareholder products, services, and technology.
The results show that the acquisition of external tacit knowledge about partners has an influence on the completion of processing the implementation of a strategy. However, it is very interesting to note that if a worker within a Polish manufacturing company transfers knowledge about his/her products, services, and technology, this facilitates the completion of the process of implementing a strategy in the manufacturing company.

So, by using the proposed ST model, it is possible to forecast the completion of the process of implementing a strategy in a manufacturing company (as presented in Figure 3).

**Figure 3.** Decision support model for the implementation of business strategies in Polish manufacturing enterprises using the Group Method of Data Handling

Thus, in this manufacturing company, is it possible to assess the significance of acquiring tacit external knowledge by defining a five-point scale. According to the formulated model, the estimated values of completing the process of implementing a strategy in a manufacturing company are:
– 3.71 if the importance of the type of knowledge: external tacit knowledge about shareholder products and services (which should be acquired is assessed by 1 point) and the importance of the type of knowledge: external tacit knowledge about shareholder technology (which should be acquired by 1 point);

– 3.67 if the importance of the type of knowledge: external tacit knowledge about shareholder products and services (which should be acquired is assessed by 1 point) and the importance of the type of knowledge: external tacit knowledge about shareholder technology (which should be acquired by 2 points);

– 9.37 if the importance of the type of knowledge: external tacit knowledge about shareholder products and services (which should be acquired is assessed by 1 point) and the importance of the type of knowledge: external tacit knowledge about shareholder technology (which should be acquired by 3 points);

– 20.81 if the importance of the type of knowledge: external tacit knowledge about shareholder products and services (which should be acquired is assessed by 1 point) and the importance of the type of knowledge: external tacit knowledge about shareholder technology (which should be acquired by 4 points);

– 37.99 if the importance of the type of knowledge: external tacit knowledge about shareholder products and services (which should be acquired is assessed by 1 point) and the importance of the type of knowledge: external tacit knowledge about shareholder technology (which should be acquired by 5 points).

Consequently, if both types of knowledge that should be acquired: external tacit knowledge about shareholder products and services as well as external tacit knowledge about shareholder technology are equally important by 5 points, then the value of the outcome of a realized business strategy is defined as 614.75. So, the highest values of the outcome of a realized business strategy in a manufacturing company can be achieved if the importance of the acquisition external tacit knowledge is very high (5 points).

So, it is clearly noted that the acquisition of tacit external knowledge has a positive impact on the achievement of strategic objectives. On the other hand, if the importance of external tacit knowledge acquisition in a manufacturing company is higher, then the chance of completing the process of implementing a strategy in a manufacturing company is higher as well.

This study was motivated by the actual needs of managers of Polish manufacturing companies who have a strong desire to implement a business strategy.
A theoretical model was developed and tested; however, it was evident that external tacit knowledge acquisition can play a critical role in completing the implementation of business strategies.

5. Conclusions

The results of this study demonstrate the positive effect of the acquisition of external tacit knowledge in a manufacturing company on the achievement of a strategy. The results were based on research data gathered from 119 Polish manufacturing companies. I believe that the results point out the obvious; namely, in most cases, the acquisition of external tacit knowledge about a partner’s products, services, and technology can improve the process of implementing business strategies in firms that cooperate with each other. This study suggests that the acquisition of external tacit knowledge in a manufacturing company may be an effective way to achieve strategic results. However, it is hoped that the findings will be valuable for future research on the subject of knowledge acquisition of manufacturing companies.

References


Krzysztof Posłuszny*

Fragmentation and the value-added structure of exports in Polish industry

1. Introduction

The accession to the European Union contributed to Poland’s increasing foreign trade. As a consequence, the Polish economy has witnessed a change in the structure of its GDP creation and the role of its industrial sectors, from a focus on the local market towards the global market-oriented buyers. The growing export market is coupled with the increasing importance of the import of supplies (intermediates), necessary to produce goods of appropriate quality and price. This phenomenon occurs in most economies involved in the international division of labor; i.e., economies subject to cost optimization by splitting value chains. Global value chains are increasingly subject to the process of division of manufacturing sequences; i.e., to fragmentation – a term coined by Jones and Kierzkowski (2000).

In the context of the debate about reindustrializing economies in the European Union and the perspective of returning to the policies supporting development of the industrial production, it seems important to analyze the extent to which value chains changed in the leading industrial sectors in Poland (as compared to other economies of the region). In addition, the fragmentation manifests itself in a value-added creation structure as well as co-dependencies between growth of exports and the intermediate imports. This article focuses on presenting some consequences of the progressing fragmentation on the economy of Poland as well as new issues that arise when analyzing global value chains; in particular, in the context of the currently applied foreign trade statistics. The goal of this paper is to show that fragmentation leads to a growing share of imported value added mainly in high technology sectors, and as a result, exports (traditionally expressed in gross terms) can overestimate competitive positions of these sectors.

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This analysis is supported by the data made available under the TiVA project as described in the document ‘Development on Measuring Trade’ (2011). This project, which is based on the Input-Output matrices of the global economy, offer the opportunity to trace industrial structures and decompose exports in order to identify the domestic and imported components of the value added.

2. Gross production and value added in the sectoral structure of industry

In spite of its decreasing share in the GDP-creating structure, industrial production remains the element defining the long-term position and economic opportunities of the country. However, the contemporary industry is characterized by increasing mobility as well as striving to improve its competition by choosing the right location of investment projects and transferring production capacities. The Global Value Chain (GVC) fragmentation is a process changing the structure of the industry. It involves the allocation of different links in the chain to different countries in order to optimize production and logistical costs. The scale of this fragmentation is demonstrated mainly by an increased share of intermediate import in global production and gross export. At present, it is estimated that approximately 56% of global trade involves indirect products (Mirodout et al., 2009). Even when fuel is excluded, approximately 40% of the global trade of goods involves trading indirect goods.

2.1. Fragmentation of Global Value Chains

GVCs are systems that include processes and activities leading from concept (design) to the final product. The processes and activities involve designing, manufacturing, and marketing, as well as distribution systems and customer service support (Gereffi, 1994), while the fragmentation defined as moving some links of the chain to different countries leads to an increase in exports and supply imports. GVCs call for multi-dimensional analysis and data that is hardly accessible in the current statistical structures. The difficulty in analyzing the structures of GVCs comes from the need to take at least four dimensions into account describing value chains in the analysis (Gereffi and Fernandez-Stark, 2011). These are:

- the entry and exit structures (i.e., the process of transforming materials into the final product);
- the geographic system/structure of the chain (i.e., regional and spatial distribution of the value-chain components);
management and control structures determined by the type of the chain: the demand and supply chain. For more information, see Gereffi (1994) and Stacey (2009);

- the institutional context within which the chain is organised (i.e., the conditions affecting the operation of its elements such as the availability of labor resources and other production factors, the economic policy of countries, and other cost-influencing conditions).

Relatively complete export and import statistics are available only for the first two dimensions, but some interpretation difficulties are also encountered here. Other dimensions can be analyzed mainly as case studies for companies creating and controlling the chains, as they are determined by business strategies of enterprises and regional economic conditions.

In particular, fragmentation of the chains should manifest themselves in multi-phase manufacturing processes that require many components of different types. In each case, one may expect that the technologically advanced sectors with long value-creating chains will use the opportunity to fragment more than those short-chained sectors concentrating on processing one raw material only (Kelly and LaCava, 2014). The value of the global production of the sector with a growing scale of fragmentation should then have a relatively larger share of imports and a lower share of the value added created locally in the sector, as compared to low-fragmentation sectors with a small share in the international division of labor.

Foreign trade statistics do not offer sufficiently precise data for analyzing indirect and final production categories due to the difficulty in identifying the nature of traded goods and their final destinations. In practice, it is a complicated process to analyze the GVC creation structure, as a product originating from a country may be a component of another product forwarded as an indirect element to another country. The value creation structure analysis in such a chain is impeded by the presently applied statistical systems where export is defined in gross terms; i.e., including the value of the goods imported for the purpose of export. For this reason, the sector and product export statistics may be misleading because of double counting.

Research focused on the structure of the value added contained in the gross export is a new trend in analyzing factors that determine fragmentation. The concept of decomposing gross export into the value added from various sources was presented in the work of Koopman et al. (2011), Johnson and Noguera (2011), Foster-McGregor and Stehrer (2013), and Ahmad (2013), among others. In 2013, the OECD released the first version of their Trade in Value Added (TiVA) database, with indices calculated on the basis of global Input-Output matrices for 18 sectors and 58 economies (Trade in Value-added 2012). A project of similar scale
and methodological approach was also implemented in the European Union and is known as the World Input Output Database WIOD (Timmer et al., 2015). The WIOD database was built for 27 EU and 13 non-EU countries and 35 sectors. Because of the scale, complexity, and global reach of the TiVO and WIOD projects, they are among the most useful repositories of data on economies and their mutual relations based on foreign trade operations.

2.2. The structure of the gross export as the value added stream

Fragmentation can be measured by Hummels’ vertical specialization index (Hummels et al., 2001), estimating the degree of integration of the local economy with other economies through export and import. The vertical specialization index is calculated as a share of the value of supply imports in the total value of exports of a country. The research in this area has so far been based either on case studies analyzing a single product (with the supply import identified for the product) or an aggregate basis (dividing products into groups of indirect and final goods, which involved losses of some information). The new TiVA and WIOD databases considerably increase the capacity to analyze and facilitate the analysis of the vertical specialization and sources of value added.

In the TiVA project (on the basis of the information about the global export of the sector), the value added created in the sector and sectoral supply imports, it was possible to decompose gross exports into the components formed by the value added. A detailed description of the decomposition and calculations was presented by Koopman et al. (2011). Three value-added components of gross export were identified: the Foreign Value Added (FVA), which is the value added from the import contained in the gross export; the Direct Value Added (DVA), originating directly in the sector for which the gross export value is defined; and the Indirect Value Added (IndVA), from other domestic economy sectors. The values of the components were calculated from Leontief’s inverse matrix, and for this reason, they are cumulative values: the FVA includes the entire value added from the import contained in the gross export of a sector, imported both directly and indirectly (e.g., to be supplied to other sectors), and the IndVA includes the domestic values added originating directly or indirectly from other domestic sectors.

Table 1 presents the shares of the value added streams that together form gross exports for aggregated sectors of the Polish economy in 1995 and 2009. Practically, all sectors show a growing share of the value added from the import in the gross export structure between 1995 and 2009, especially in technologically advanced sectors such as transport equipment and electrical equipment.
Table 1
The structure of the value added of gross exports in the economy of Poland

<table>
<thead>
<tr>
<th>Sector</th>
<th>Year</th>
<th>FVA</th>
<th>DVA</th>
<th>IndVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food products, beverages, and tobacco</td>
<td>1995</td>
<td>13.8%</td>
<td>27.0%</td>
<td>59.2%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>19.2%</td>
<td>30.3%</td>
<td>50.5%</td>
</tr>
<tr>
<td>Textiles, textile products, leather, and footwear</td>
<td>1995</td>
<td>14.8%</td>
<td>47.7%</td>
<td>44.4%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>29.8%</td>
<td>44.0%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Wood, paper, paper products, printing and publishing</td>
<td>1995</td>
<td>14.2%</td>
<td>41.4%</td>
<td>41.1%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>32.5%</td>
<td>35.1%</td>
<td>32.4%</td>
</tr>
<tr>
<td>Chemicals and non-metallic mineral products</td>
<td>1995</td>
<td>21.3%</td>
<td>37.7%</td>
<td>41.1%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>32.5%</td>
<td>35.1%</td>
<td>32.4%</td>
</tr>
<tr>
<td>Basic metals and fabricated metal products</td>
<td>1995</td>
<td>19.9%</td>
<td>38.1%</td>
<td>42.0%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>32.7%</td>
<td>33.2%</td>
<td>34.1%</td>
</tr>
<tr>
<td>Machinery and equipment, nec</td>
<td>1995</td>
<td>17.3%</td>
<td>45.3%</td>
<td>37.4%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>29.4%</td>
<td>39.2%</td>
<td>31.4%</td>
</tr>
<tr>
<td>Electrical and optical equipment</td>
<td>1995</td>
<td>14.6%</td>
<td>41.9%</td>
<td>43.4%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>34.1%</td>
<td>35.6%</td>
<td>30.3%</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>1995</td>
<td>19.7%</td>
<td>37.9%</td>
<td>42.4%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>38.9%</td>
<td>28.1%</td>
<td>33.0%</td>
</tr>
<tr>
<td>Manufacturing nec; recycling</td>
<td>1995</td>
<td>13.8%</td>
<td>48.1%</td>
<td>38.1%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>26.1%</td>
<td>35.4%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Total manufacturing</td>
<td>1995</td>
<td>17.4%</td>
<td>39.2%</td>
<td>43.4%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>31.9%</td>
<td>34.0%</td>
<td>34.1%</td>
</tr>
<tr>
<td>Agriculture, hunting, forestry, and fishing</td>
<td>1995</td>
<td>12.2%</td>
<td>42.8%</td>
<td>45.0%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>16.6%</td>
<td>47.5%</td>
<td>35.9%</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>1995</td>
<td>14.8%</td>
<td>55.3%</td>
<td>30.0%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>15.9%</td>
<td>62.0%</td>
<td>22.1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1995</td>
<td>15.4%</td>
<td>43.7%</td>
<td>40.9%</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>27.9%</td>
<td>38.2%</td>
<td>33.9%</td>
</tr>
</tbody>
</table>

Source: own calculations based on TiVO database

Patterns of changes in the value-added structure are different, even for countries from the same region. The situation is particularly interesting in the group of Central European countries. Figure 1 presents the structure of gross export decomposition
in five countries: Poland, the Czech Republic, Germany, Slovakia, and Hungary for 1995 and 2009. In the case of each analyzed country, one can see the progressing fragmentation: the share of the value added from imports in the gross exports in 2009 was significantly higher than the share reported in 1995. It applied to both small economies of the Czech Republic, Hungary, and Slovakia, where the share of imported value added in 2009 was 40% or higher, as well as to the medium and large economies of Poland and Germany (although the degree of their vertical specialization is lower and does not exceed 30% of gross exports).

![Figure 1. The gross export structure in the economy of selected countries](source: own calculations based on TiVO database)

The progress of fragmentation is differentiated by sectors: more technologically advanced sectors as defined in ISIC (2011), which are manufacturing their products in long value chains, tend to be more fragmented that the sectors producing mass products of short value chains. There are considerable differences between sectors resulting from the demand for the locally produced added value. In the technologically advanced sectors (where fragmentation is one of the processes influencing the technological structure), the domestic value added share in gross exports is relatively low (e.g., for the transport equipment sector in Slovakia and Hungary, the imported value added represents more than 50% of the value of their gross exports). In the case of Poland, import share in this sector also went up, reaching almost 40% in 2009. Figure 2 shows the structure of gross exports in the transport equipment sector. In this context, the widely held view that the success of Slovakia and Hungary in taking over the final production of transport equipment can be questioned, as their export production is based on the imported value added to a degree higher than it is in Poland.
The low-technology sectors are different. Food production is an example of such a sector, playing an important role in the economy of Poland. Figure 3 presents the structure of the value-added sources of exports in this sector. The dominance of the domestic value added in the low-technology sector is visible for all countries, and even smaller countries do not exceed 40% of the imported value added in gross exports. The cases analyzed confirm the thesis that the high-technology sectors foster fragmentation, offering the opportunity to use technological advantages and imported production factors to achieve profit-maximizing value chains. In the case of less advanced technologies and short chains, benefits of fragmentation are limited.
3. Revealed Comparative Advantages Index and value-added structure of exports

One of the common measures of competitiveness based on export values is the Revealed Comparative Advantages Index proposed by Balassa (1965). In the original formula, the RCA index is defined as a relationship of the share of exports of a sector or product in the total exports of a country to the share of exports of a sector or product in global exports. If the value of the index is larger than 1, the country demonstrates its comparative advantage in the sector or product, because the share of its exports is higher than the global average. The index is not precise and unambiguous, but it indicates the position of a sector or product relative to the global market. The debate about features and the relevance of the index was presented by Laursen (1998) and Widodo (2009), among others. It is interesting to analyze to what extent the competitive position of sectors assessed with the RCA index will differ depending on the category of the export measure used: gross or net.

Originally, the RCA index was based on gross export values. In this case, the intermediate import (used for the purpose of export) affects the index of the country, even though it was not produced in the country. In the TiVA project, the database with the RCA indices calculated on the basis of the values added were made available. Therefore, it is possible to compare the gross-export-based (GE) and value-added-based (VA) RCA indices and estimate the scale of deviations introduced by the statistics in gross terms.

The analysis was performed for the same countries as mentioned earlier: the Czech Republic, Poland, Germany, Hungary, and Slovakia (with economies aggregated into nine sectors). In most cases, some differences between the GE-based and VA-based indices can be found, but usually not exceeding 3–5%. However, there are some cases of differences that are important to the extent that the approach based on the traditional gross presentation may lead to misinterpretation. Table 2 compares the RCA VA indexes in 2009 and the differences between RCA GE- and VA-based, calculated as a relative deviation of the RCA GE from the RCA VA. The positive-percentage value of the deviation implies that the RCA based on gross exports was higher than based on the value added.

The results presented in the table indicate the need for proceeding with caution when interpreting the traditional statistics based on gross imports; in particular, when the economic policy activities are based on such statistics. The sectors marked with the asterisk (*) in the table (depending on the calculation either in gross exports or the value-added terms) have contradictory interpretations: e.g., for the Czech Republic (in regard to manufacturing electrical and optical equipment),
the RCA GE index indicates a comparative advantage (RCA>1), while the index is significantly below the advantage threshold (RCA VA=0.7) (when presented by the value added). The sector with the most frequent positive deviation (i.e., with the higher RCA index based on gross exports) was transport equipment. It is one of the sectors that developed powerfully in Central Europe, also because of transferring production capacities from Western Europe. In value-added terms, the RCA indices for this sector are considerably lower than those measured with gross exports (i.e., exports for the sector measured with the value added does not disclose any comparative advantages). In light of the above information, it seems that RCA indices based on value-added exports are more reliable when it comes to drawing conclusions, while the indices are available with significantly larger delays due to statistical limitations.

### Table 2
The maximum relative deviations between RCA based on gross exports (GE) and value-added exports (VA) (2009)

<table>
<thead>
<tr>
<th>Country</th>
<th>Sector</th>
<th>RCA VA index</th>
<th>% deviation from RCA GE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>food products</td>
<td>0.67</td>
<td>-13.5</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>electrical and optical equipment*</td>
<td>0.73</td>
<td>36.5</td>
</tr>
<tr>
<td>Hungary</td>
<td>food products</td>
<td>0.86</td>
<td>-11.2</td>
</tr>
<tr>
<td>Hungary</td>
<td>chemical and non-metallic products*</td>
<td>1.04</td>
<td>-18.9</td>
</tr>
<tr>
<td>Poland</td>
<td>transport equipment</td>
<td>1.39</td>
<td>11.6</td>
</tr>
<tr>
<td>Slovakia</td>
<td>food products</td>
<td>0.84</td>
<td>-19.3</td>
</tr>
<tr>
<td>Slovakia</td>
<td>wood, paper, and printing</td>
<td>1.51</td>
<td>-17.0</td>
</tr>
<tr>
<td>Slovakia</td>
<td>basic metals and fabricated products</td>
<td>1.67</td>
<td>-14.4</td>
</tr>
<tr>
<td>Slovakia</td>
<td>transport equipment</td>
<td>1.38</td>
<td>35.8</td>
</tr>
</tbody>
</table>

Source: own calculation based on TiVA 2013 data

### 4. Conclusions

The progressing fragmentation and, as a consequence, a growing share of the imported value added make the gross export category (which is commonly used in trade statistics) of little value for analysis of the economic role and competi-
tive position of sectors. However, thanks to new projects based on I-O matrices of the global economy, it is possible to decompose gross exports into respective domestic and foreign value-added streams. Analyzing the value-added structure in Central European countries, one may see a growing share of the value added from imports in gross exports (in advanced technology sectors in particular, which make the economies of these countries more sensitive and susceptible to external shocks). Low-technology sectors tend to export mainly the domestic value added, and in their cases, the difference between gross exports and exports less the foreign value added is of lower significance.

The need to analyze the value-added structure of the export also manifests itself when assessing the competitiveness of the sectors with RCA indices. In this case, one may be misled using the gross export category in sectors with a significant share of foreign value added. The results indicate the importance of prudence in analyses based on gross export data; in particular, in the case of the sectors characterized by advanced fragmentation. Use of the I-O matrices of the economy significantly improves the quality and expands the opportunities of the analyses; however, the main disadvantage of the I-O matrices is a several-year delay of statistics, limiting their possible application for the purpose of ongoing economic policy.

References


1. Introduction

Catholic social teaching addresses social, economic, political, and cultural issues. It exhibits both theoretical and practical aspects. Firstly, it formulates moral principles for social and economic life. Secondly, it elaborates on their practical application on ruling economic relationships and within a specified time. It means that Catholic social teaching has a moral character of teaching.

Catholic social teaching isn’t an ideology, “but rather the accurate formulation of the results of a careful reflection on the complex realities of human existence, in society and in the international order, in the light of faith and of the Church’s tradition. Its main aim is to interpret these realities, determining their conformity with or divergence from the lines of the Gospel teaching on man and his vocation, a vocation which is at once earthly and transcendent; its aim is thus to guide Christian behaviour. It therefore belongs to the field, not of ideology, but of theology and particularly of moral theology” (John Paul II 1987, no. 41).

The most important source of Catholic social teaching are the Pope’s statements (in particular, their social encyclicals) and documents of general councils. Encyclicals are directed to the entire Church and to people of goodwill.

2. Review of social encyclicals

Rerum Novarum is regarded as the encyclical by which Leo XIII initiated Catholic social teaching. This document constituted the Pope’s response to the growing influence of socialist and communist movements amongst Catholic workers. In the encyclicals, both socialism in the Marxist understanding and blind capitalism were rejected. Markets were noticed as the social institution, which
enables the exchange of goods manufactured by producers (Leo XIII 1891, no. 7). At the same time, the encyclical calls for personal liberty (Leo XIII 1891, no. 28), which presumably also comprises freedom of action in the market (it constitutes an extension of basic freedoms), provided that it doesn’t threaten common good or doesn’t harm others (we have here an indication of the need of state institutions being in charge, guarding fair market policy law). Exploitation of the employee by the employer has a negative effect on market demand; by not receiving fair remuneration, the employee won’t be able to buy necessary goods available on the market. However, by keeping a part of the employee’s remuneration, the employer will be privileged (Leo XIII 1891, no. 34). In the encyclical, the Pope referred mainly to the labor market by calling for a need to implement protective employee policy by the state (Leo XIII 1891, no. 26, 27). The encyclical author also appreciated private property (Leo XIII 1891, no. 6, 8).

Forty years after announcing the Encyclical Rerum Novarum, Pope Pius XI issued the encyclical devoted to a renewal of the social system and its adaptation to Gospel norms. As regards the role of the state, the encyclical pointed out that the government cannot be only a guard of law and order, but must play an active part in the citizen’s life by providing freedom of individual action on the one hand and protection of social relations on the other, especially in respect to weak and poor people (Pius XI 1931, no. 25). The Pope recalls that the Catholic Church is obligated to speak out on all topics related to morality, including those in economic life (Pius XI 1931, no. 41). One of the basic human rights is the right to property, which has a dual character: individual (serves the good of individuals) and social (with public goods in mind). Thanks to the right to property, the man can meet his needs (Pius XI 1931, no. 45). It is necessary here to notice that, first, the right to private property enables the functioning of markets and economic development. The exchange of goods and services presupposes their private ownership. The social character of private property means that, not only self-interest, but also the common good should govern its use (Pius XI 1931, no. 49). The state must not interfere excessively into the right to private property by heavy taxes (Pius XI 1931, no. 49). The Pope appeals for the fair distribution of goods so workers can receive remuneration to meet their family needs (Pius XI 1931, no. 61). Therefore, they will be also able to participate more widely in markets. The Pope recalls that human work does not conform to an ordinary good that you can buy and sell just like any other commodity. The work involves a man who has dignity (Pius XI 1931, no. 83). The social good is threatened by unfettered free competition that is based on mistaken individualistic economics. The free market as such is good and useful, but it requires wise supervision. A legal and social system is necessary for the entire economic life (Pius XI 1931, no. 88). Unlimited free competition favors
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Wealth accumulation in the hands of few who, in selfish ways, decide economic trade-offs, arrogate economic power, and consequently destroy the free market (Pius XI 1931, no. 106). The Pope, observing daily economic life, writes: “Free competition has destroyed itself; economic dictatorship has supplanted the free market; unbridled ambition for power has likewise succeeded greed for gain; all economic life has become tragically hard, inexorable, and cruel” (Pius XI 1931, no. 109). The Pope calls for noble competition based on aspirations for justice. He is opposed to communism and individualistic liberalism (Pius XI 1931, no. 114). One of the evil sources is man’s concentration on worldly goods (Pius XI 1931, no. 129). Man (Christian) should use material goods not for its spiritual damage but best to develop the human spirit by bringing it closer to God (Pius XI 1931, no. 131). Acquisition of wealth at all costs through harm inflicted on others is a great evil (Pius XI 1931, no. 134).

The Encyclical Divini Redemptoris Pius XI is devoted to an analysis and evaluation of communism. The Pope encounters the great threat of communism, which inflicts human rights, societal institutions, private property, and (above all) religion. Communism is based on materialism. Communism is evil in negating personal freedom and human dignity (Pius XI 1937, no. 10). It is necessary to notice that the abolition of private ownership impedes the evolution of markets. Communism is an anti-market ideology. The Pope recalls that man has a duty to care about worldly goods, such that they serve to achieve an eternal good (Pius XI 1937, no. 34). The greed of tangible goods poses a threat to man – man should not seek his happiness in richness, because there he won’t find it (Pius XI 1937, no. 44). Man should also forego selfish pleasures by directing his funds to help the poor. The Pope calls for a return to humble life forms (Pius XI 1937, no. 48). Regarding the role of nation states and international political relations, the Pope advocates removing all artificial obstacles in economic life based on distrust and hate, because all nations form one family (Pius XI 1937, no. 76).

In the Encyclical Summi Pontificatus, Pius XII states that a concentration only on earthly matters is a human mistake, because it favors loosening faith in Christ (Pius XII 1939, no. 3). The Pope notes that the human soul suffers from internal emptiness and depletion in a period of great technical achievements and material progress (Pius XII 1939, no. 5). As one of the societal institutions, the market should be organized in order to provide harmonious improvement of human nature (Pius XII 1939, no. 47). The market must not be subordinated to the state as an ultimate purpose in which there is absolute power (Pius XII 1939, no. 48). Man is threatened when the state annihilates private initiative and abolishes the private sector. They belong to a natural order, because they are based on personal responsibility and private initiative (Pius XII 1939, no. 49). The Church has always contributed to cultural development and is a supporter
of civilization, provided human progress preserves morality and honors God as the aim in earthly life (Pius XII 1939, no. 77).

In 1961, Pope John XXIII announced the Encyclical Mater et Magistra. He recalls in it that the Church not only cares for leading souls to holiness, but also takes the needs of daily people’s lives into account (life conditions, prosperity, and success in different fields) (John XXIII 1961, no. 3). He recalls erroneous doctrines of economic life based on automatically operating forces of nature that are blind to moral concerns. Unrestricted self-interest, unlimited free competition, and a lack of intervention on the state’s part contribute to widening poverty and concentrating wealth in the hands of a few (John XXIII 1961, no. 11–13). The Pope resembles the statements of Leon XIII concerning a mistake in treating human labor as a marketable good, because labor is an action of a human person. Employment contracts must be concluded with respect to principles of fairness and justice, such that financial and real working conditions do not inflict on human dignity (John XXIII 1961, no. 18, 21). In establishing worker salaries, justice also requires taking into account the financial condition of enterprises (John XXIII 1961, no. 34). The risk is unlimited free competition, which has led to the accumulation of enormous riches and unlimited power in the hands of a few (John XXIII 1961, no. 35). Pope John XXIII stresses the priority of private enterprises. However, the state should act according to the principle of subsidiarity (John XXIII 1961, no. 51–53), with the aim of combating economic disorders and massive unemployment. This intervention shouldn’t suppress the freedom of private action, but should enable it (John XXIII 1961, no. 55).

Economic freedom is prerequisite for economic development. “Experience has shown that where personal initiative is lacking, political tyranny ensues and, in addition, economic stagnation in the production of a wide range of consumer goods and of services of the material and spiritual order – those, namely, which are in a great measure dependent upon the exercise and stimulus of individual creative talent” (John XXIII 1961, no. 57). Therefore, the Pope expects innovation and the creation of markets for new goods from business people. On the other hand, without the proper state interference into economic chaos, exploitation, dishonesty, and poverty for part of the citizens appears (John XXIII 1961, no. 58). Salaries shouldn’t be the result of free market and competition, because the stronger may then exploit the weakness of employees by imposing poor wages (John XXIII 1961, no. 71). Economic freedom for the weaker market side is only apparent because, in fact, the employers can exploit employees by paying them low wages while maximizing their own benefits. The Pope confirms the human right to private property and freedom in deciding economically, by default, indicates the important role of the market mechanism to implement the right to private property by purchase and sale transactions (John XXIII 1961, no. 109).
Private property protects the right to freedom and contributes to the creation of a healthy social order (John XXIII 1961, no. 111). However, private property also has a social function that manifests itself in the help for persons being in a difficult financial situation for example. Private property allows for charity actions and Christian love of neighbor (John XXIII 1961, no. 120). The Church calls for the state to provide basic public goods, because the market isn’t able to provide these goods. He has particularly the rural population in mind (John XXIII 1961, no. 127). Due to specific economic characteristics of agricultural products, the state should regulate their prices so that agricultural production isn’t too risky and provide farmers equitable remunerations. Moreover, since agricultural products meet the basic needs of man, their prices should allow for their acquisition by everyone (John XXIII 1961, no. 137–140). Science and technological development (new technical releases in order to meet consumer needs) can be a threat to maintaining the correct hierarchy of values. The expansions of markets can crowd out spiritual values, not to say their oblivion. Overvaluing the amenity of life and prosperity (John XXIII 1961, no. 176). The Church recalls that all social institutions should serve individual people. Also, the market is such an institution, so it should therefore be organized in order to serve every man (John XXIII 1961, no. 219). The market should be treated as a tool that man uses to make it easier to achieve higher purpose; i.e., becomes better, both in natural as well as supernatural terms (John XXIII 1961, no. 246). The Church reminds the human right to rest on Sundays. The Catholic shouldn’t work on Sundays, but to spend this time with family in order to deepen the bond and participate in the Eucharistic Sacrifice. Employers, employees, and consumers should keep this commandment. This means that markets should not be open on Sundays (John XXIII 1961, no. 248–253).

The next encyclical of John XXIII is the Encyclical Pacem in terris. All relations between people must be based on the fundamental principle that man is a person, because he has a mind and free will as well as rights and obligations resulting from the very nature of man. Only then will people’s lives be properly developed (John XXIII 1963, no. 9). To implement human rights, institutions ensured by powerful authorities are inevitable, which protect man (among others) in case of illness, incapacities to work, old ages, indirect loss of livelihood (John XXIII 1963, no. 11), and enable him to acquire education (John XXIII 1963, no. 13). In all of these cases (more or less), severe market failures occur; that is, markets do not provide socially efficient solutions. Man also has a natural right to fair working conditions and business activity (John XXIII 1963, no. 19 and 20). Market participation is an implication of basic human rights. Another implication is the right to private ownership, which contributes to protect human dignity, strengthen peace, and increase in prosperity (John XXIII 1963, no. 21). Private ownership
is, however, subject to social obligations (John XXIII 1963, no. 22). All areas of societal relations must be based on truth (John XXIII 1963, no. 35). This means that each man (producer, consumer, seller) involved in a market is required to act truthfully and don’t use lies. Then, the market is useful and represents human dignity. Authorities have a valid role in the function and development of society. Their main aim should be the common good. Economic development is one of its elements, including providing public goods, poverty support, increased family responsibilities, and accidents (John XXIII 1963, no. 64).

An important document of the Church is the Pastoral Constitution on the Church in the Modern World Gaudium et spes, which appeared in 1965. The purpose of all social institutions should be the person (Gaudium et spes, no. 25). This also applies to the market, which should be organized such that the person is enabled to act according to its entity. Human pride and egoism are basic causes of societal dysfunction (Gaudium et spes, no. 25). The council recalls above all the necessity to respect each human person and help each human in need. The council considers the following practices shameful in socio-economic life: abortion, psychological compulsion, inhuman living conditions, prostitution, trade in women and young people, and inhumane working conditions in which the employee is treated simply as a tool for profit (Gaudium et spes, no. 27). The Church is opposed to individual opportunism, which manifests itself in economic life; e.g., in fraud, tax avoidance or other social evils (Gaudium et spes, no. 30). The council recalls that man is the author, center, and purpose of the entire economic and social life. Economics and its progress, including the enhancement of markets, contribute to better meet people’s needs. The Church expresses its anxiety for economic conditions in which poor people lose while the rich simultaneously gain (Gaudium et spes, no. 63). The Church definitely approves economic progress, provided that it serves man as a whole (in financial, moral, spiritual, and religious aspects) (Gaudium et spes, no. 64).

“Economic development must remain under man’s determination and must not be left to the judgment of a few men or groups possessing too much economic power or of the political community alone or of certain more powerful nations” (Gaudium et spes, no. 65). Growing economic inequalities are dangerous, accompanied by intense individual and social discrimination. Particularly, it is necessary to help farmers (Gaudium et spes, no. 66).

Encyclical Populorum progressio is devoted to worldwide social and economic inequality. Real development of man and society cannot be limited only to economic progress. Development of every man and the entire man is necessary (Paul VI 1967, no. 14). Acquisition of goods by a man is fully entitled; however, this may be by greed and lead to materialism in all of its forms to oppress the spirit (Paul VI 1967, no. 18). Private property is subject to social restrictions, be-
cause it isn’t possible to use the private ownership right without damage to the common good (Paul VI 1967, no. 23). The market should be organized in order to serve every man – without exception. “Economics and technology are meaningless if they do not benefit man, for it is he they are to serve” (Paul VI 1967, no. 34). The Pope calls for the implementation of the principle of social justice in trade relations among stronger and weaker nations (Paul VI 1967, no. 44).

It isn’t acceptable to forget about poor countries in which poverty and hunger prevail. “On the part of the rich man, it calls for great generosity, willing sacrifice and diligent effort. Each man must examine his conscience, which sounds a new call in our present times. Is he prepared to support, at his own expense, projects and undertakings designed to help the needy? Is he prepared to pay higher taxes so that public authorities may expand their efforts in the work of development? Is he prepared to pay more for imported goods, so that the foreign producer may make a fairer profit? Is he prepared to emigrate from his homeland if necessary and if he is young, in order to help the emerging nations?” (Paul VI 1967, no. 47).

The Church notices that free trade between nations is acceptable if neither party differs unduly in the degree of richness. Market economies cannot be governed only by free and unfettered competition, because it raises economic dictatorship. The freedom of trade market will be right when it is based on the social justice principle (Paul VI 1967, no. 59). It’s not about the abolition of competition, but its maintenance within the limits of justice. On the international level, the Church calls for the creation of international conventions in order to establish general rules concerning price adjustment (Paul VI 1967, no. 61).

In the apostolic letter Octogesima adveniens, Pope Paul VI analyzes new social issues, including those concerning markets. He admonishes the issue of producing and offering unnecessary products while part of people can’t meet basic needs (Paul VI 1971, no. 9). Participants in the market are also social media offering their products (services). The owners of media are morally obliged to provide the truth, for influence they trigger on people and values, which they offer (Paul VI 1971, no. 20). The Christian cannot support doctrines which are opposed to his concept of man. This applies to both Marxism and Liberal doctrines (Paul VI 1971, no. 26). Market development and technological progress should be subordinated to human progress in truth, development of moral awareness, opening to others, and towards God (Paul VI 1971, no. 41). The Pope calls for international relations based on justice and thinking in terms of the common good rather than on power. No country should be dominated economically – each country should have development potentialities in terms of cooperation (Paul VI 1971, no. 43). He also points out to the threat that may appear from international companies if they use their economic power in social, cultural, and political fields (Paul VI 1971, no. 44). Business activity is essential – it should be used to create human
conditions for the exchange of goods, to be based on mutual recognition of rights, and to confirm human work dignity. It should support the dialogue and cooperation between labor market parties. Business activity may also be a threat to freedom and, therefore, requires political intervention (based on the subsidiarity principle) (Paul VI 1971, no. 46).

John Paul II’s Encyclical Laborem exercens is devoted to work. He writes about the so-called labor market. Although the Pope explicitly doesn’t use this term (due to the fact that work is associated with human dignity), work has a personal dimension as well, as it isn’t possible to lead and use this approach to human beings as people of working existence (John Paul II 1981).

In the next Encyclical (Sollicitudo rei socialis), John Paul II expresses his anxiety for the imbalances in the development of different regions of the world. From one side, there are areas rich in goods; on the other side, backward areas (John Paul II 1987, no. 14). Some have access to rich markets in products, other not. The Pope recognizes the role of basic human rights, which is a right to economic initiative. He notices that it is important not only for the individual but also for the common good. Entrepreneurship as a creative subjectivity of the citizen cannot be limited (John Paul II 1987, no. 15). Entrepreneurship creates new markets, implements new products and services, and forms places of employment. The Pope harshly assesses the arms trade without restrictions. From one side, economic assistance and action in favor of poor countries’ development are limited; on the other side, weapons without any barriers get to these countries. Such economic relations lead to death rather than to development (John Paul II 1987, no. 24). Underdevelopment is accompanied by overdevelopment, relying on unlimited access of some to a huge variety of material goods, their continuous replacement by new products. The Pope is worried about materialism accompanied by radical insatiability. Continuous advertising and proposals to purchase new products raise aspirations on the one hand but don’t enable to satisfaction of the deepest human desires on the other; and what’s more, they drown them out (John Paul II 1987, no. 28). Market development is connected to a certain extent with the expansion of the attitude “to have” at a cost to the attitude “to be.” Good markets create the culture of possession.

In the centenary of issuing the Encyclical Rerum Novarum of Pope Leo XIII, Pope John Paul II announced the Encyclical Centesimus annus. In the context view of the fall of political and economic systems based on Marxism, he writes about their economic incapacities that result from violating human rights, including the right to economic initiative, right to private property, and freedom in economic fields (John Paul II 1991, no. 24). Man is created to freedom, and this anthropological fact cannot be destroyed. However, it is necessary to remember that man while aspiring to do good is inclined to do bad (John Paul II 1991, no. 25).
The right to private property is a human right, enhancing his personal freedom (so to speak). Private property isn’t an absolute right but is subject to social restrictions based on the law of the universal allocation of goods (John Paul II 1991, no. 30). Producing goods is no end in itself but also for other’s use who, by paying a fair price, consented by free agreement to become owners of goods. The Pope appreciates here the incentive of competitive producers to acknowledge the needs of their customers by which appropriate goods are produced. Entrepreneurship is a wide variety of societies (John Paul II 1991, no. 32). The formations of enterprises and their growth is a realization of human freedom (John Paul II 1991, no. 32). On the other hand, the Pope writes:

“It would appear that, on the level of individual nations and of international relations, the free market is the most efficient instrument for utilizing resources and effectively responding to needs. But this is true only for those needs which are “solvent”, insofar as they are endowed with purchasing power, and for those resources which are “marketable”, insofar as they are capable of obtaining a satisfactory price. But there are many human needs which find no place on the market. It is a strict duty of justice and truth not to allow fundamental human needs to remain unsatisfied and not to allow those burdened by such needs to perish” (John Paul II 1991, no. 34).

The free market must be completed with the control of the society and of the state in order to satisfy all basic needs of the society as a whole (John Paul II 1991, no. 35). It is necessary to care about the access to markets, among others, by overthrowing barriers to entry and monopolies so that all nations could participate in it (John Paul II 1991, no. 35). Marketing establishes goods, and new releases enable us to better satisfy different human needs. Quality of life is improved. On the other hand, a rising culture of consumerism is detrimental to physical and spiritual health. The market also provides products to meet needs that hamper human maturity. It is necessary to bring man up to participate in the market and to competently use the right to choose. Responsible producers and consumers and the intervention of official authorities are needed (John Paul II 1991, no. 36). Economic development must also respect environmental constraints due to the responsibility towards future generations (John Paul II 1991, no. 37). The economy and the market are only two of the societal functions with an ethical dimension. Social life cannot be limited only to produce goods and provide services. Economic freedom is only one element of human freedom (John Paul II 1991, no. 39). The market mechanism isn’t able to protect and ensure everyone’s goods (employee rights, environmental protection, collective goods). There are goods that by their very nature aren’t and shouldn’t be possible to sell or buy (John Paul II 1991, no. 40). The market mechanism generates many benefits; for example, better use of stores, exchange of products, based on consumer’s needs,
conclusion of contracts. However, an “idolatrous” view of the market that does not consider the existences of goods is detrimental, which by their nature cannot be ordinary goods (John Paul II 1991, no. 40). The Marxist view of market capitalism is false, because communism leads to deficiencies and economic failure (among others). Morally correct unconstrained production threatens consumers “when man becomes embroiled in a web of false and superficial satisfactions” (John Paul II 1991, no. 41). Manipulation must be the consequence of irresponsible mass media (John Paul II 1991, no. 41). Morally correct market functions must be enclosed within just legal systems for freedom protection. A radical ideology of capitalism based on a blind belief in solving all problems of market forces is fallacious. The Church recognizes a positive role of market and enterprises, provided that they are directed towards the common good (John Paul II 1991, no. 43). The market economy cannot work in an institutional, legal, and political vacuum (John Paul II 1991, no. 48). It is necessary to protect human freedom, a certain degree of security, private property, stability of money, and efficient public service. State intervention shouldn’t be exaggerated. It must be based on the subsidiarity principle that indicates that “a community of a higher order should not interfere in the internal life of a community of a lower order, depriving the latter of its functions, but rather should support it in case of need and help to coordinate its activity with the activities of the rest of society, always with a view to the common good” (John Paul II 1991, no. 48).

The state and the market shouldn’t be an aim in itself – they are supposed to serve the human person (John Paul II 1991, no. 49). The development of markets and economic development contribute to strengthen peace; therefore, there is a collective responsibility for promoting development (John Paul II 1991, no. 52).

In 2009, Benedict XVI announced the Encyclical Caritas in veritate. As an area of human activity, the market must resist the tendency not to search for and rely on truth.

“Without truth, without trust and love for what is true, there is no social conscience and responsibility, and social action ends up serving private interests and the logic of power, resulting in social fragmentation, especially in a globalized society at difficult times like the present” (Benedict XVI 2009, no. 5).

Benedict XVI refers to the issue of globalized markets, with the tendency to move to low-cost production sites in order to be able to sell at lower prices and remaining competitive. This rush to low-cost production induces the states to compete with each other in order to attract foreign capital by favorable taxation and loosening legal rules protecting the working classes. This leads to the deterioration of social security schemes (Benedict XVI 2009, no. 25). However, it is necessary to notice that, thanks to the move to low-cost production, places of employment are created in poor countries. Of course, the issue of violating
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human rights of working classes in poor countries still remains. The dramatic problem is hunger in the world. The Pope recalls the ethical imperative for solidarity and sharing for the universal Church. Without institutional provisions that ensure regular and appropriate access to food and water, the market isn’t able to solve the problem of hunger. It is necessary to eliminate structural causes that contribute hunger and promote the development of agriculture in poor countries by investing in the country infrastructure, organization of markets, and education. The international community should sympathize with economically poor countries by financing projects such that, in the longer run, these countries are able to satisfy consumer demand themselves (Benedict XVI 2009, no. 27). Pope Benedict XVI characterizes the market from a broader perspective than the pure economic one as follows:

“In a climate of mutual trust, the market is the economic institution that permits encounter between persons, inasmuch as they are economic subjects who make use of contracts to regulate their relations as they exchange goods and services of equivalent value between them, in order to satisfy their needs and desires. The market is subject to the principles of so-called commutative justice, which regulates the relations of giving and receiving between parties to a transaction. But the social doctrine of the Church has unceasingly highlighted the importance of distributive justice and social justice for the market economy, not only because it belongs within a broader social and political context, but also because of the wider network of relations within which it operates. In fact, if the market is governed solely by the principle of the equivalence in value of exchanged goods, it cannot produce the social cohesion that it requires in order to function well. Without internal forms of solidarity and mutual trust, the market cannot completely fulfil its proper economic function. And today it is this trust which has ceased to exist, and the loss of trust is a grave loss. It was timely when Paul VI in Populorum Progressio insisted that the economic system itself would benefit from the wide-ranging practice of justice, inasmuch as the first to gain from the development of poor countries would be rich ones. According to the Pope, it was not just a matter of correcting dysfunctions through assistance. The poor are not to be considered a “burden”, but a resource, even from the purely economic point of view. It is nevertheless erroneous to hold that the market economy has an inbuilt need for a quota of poverty and underdevelopment in order to function at its best. It is in the interests of the market to promote emancipation, but in order to do so effectively, it cannot rely only on itself, because it is not able to produce by itself something that lies outside its competence. It must draw its moral energies from other subjects that are capable of generating them” (Benedict XVI 2009, no. 35).

The market cannot solve all social problems. Business activity cannot be completely separated from the political arena, which should promote justice by
redistributing income and wealth. Within a morally acceptable market economy, the stronger ought not dominate above the weaker. Otherwise, freedom disappears, and into its place power enters (which contradicts justice). Benedict XVI writes:

“The market can be a negative force, not because it is so by nature, but because a certain ideology can make it so. It must be remembered that the market does not exist in the pure state. It is shaped by the cultural configurations which define it and give it direction. Economy and finance, as instruments, can be used badly when those at the helm are motivated by purely selfish ends. Instruments that are good in themselves can thereby be transformed into harmful ones. But it is man’s darkened reason that produces these consequences, not the instrument per se. Therefore it is not the instrument that must be called to account, but individuals, their moral conscience and their personal and social responsibility” (Benedict XVI 2009, no. 36).

The Pope calls for developing the economics of gift; i.e., market actions that aren’t based only on the logic of profit but also on voluntary giving. It is about market function, on which in a freeway, in conditions of even chances, they will conduct the company’s activity that carries out various institutional objectives. Some are intended for profit, and others can be used for mutual aid and social objectives, extending beyond the logic of equal value exchange and profit as a purpose in itself (Benedict XVI 2009, no. 38). In contemporary economies, consumers and their associations have great power. It is necessary to remember that buying isn’t only an economic act, but also a moral one. The consumer is a person bearing responsibility for his/her market choices. Therefore, it is necessary to incessantly bring consumers up for competent and responsible consumerism. The Pope encourages us to provide fair prices for producers for purchases of products coming from poor countries. Market transparency is a necessary condition for fair prices (Benedict XVI 2009, no. 66).

3. Conclusions

Markets are social institutions that help better meet consumer wants by enabling the exchange of goods and services. Moreover, markets favor economic development and strengthen peace among nations. Markets are part of social relations and cannot operate apart from societal embedding.

As such, all decisions of market participants have a moral dimension, because these are people’s actions. The human person is the main market subject. Market participants are requested to act in a trustworthy fashion – each manipulation and lie in market activity means an instrumental treating the person.
The market is that human relation that must be based on the principle of respect towards every person. Therefore, each transaction that intends to despise one contract partner is morally wrong. The producer, seller, and consumer not only bear an economic responsibility for their market choices, but also a moral one.

Market freedom means that all transaction parties possess in reality (rather than only formally) equal rights. Market freedom represents an extension of personal freedom. In order to ensure compliance with the freedom of market, state institutions have to prevent private market power by a competition policy. A threat to the social good is unfettered free competition. Market competition is socially useful, but it requires wise supervision, particularly with respect to the protection of weak and poor people.

The Church calls the state to provide basic public goods, since the market isn’t able to provide them. Without appropriate institutional provisions, markets won’t solve the problem of hunger in the world.

One of the basic human rights is the right to private property, which has a dual character: individual (it serves the individual good) and social (it has the public good in mind). Private property represents a prerequisite for the functioning of market mechanisms and economic development. The individual and social character of private property means that it ought to be used not only with respect to pure self-interest but also to the common good. Private property ensures personal freedom and contributes to a healthy social order.

It is necessary to remember that the so-called labor market has a peculiar character, because human labor isn’t an ordinary good. Labor involves a man who has dignity. Wages shouldn’t be the result of exploitation of weaker employees by stronger employers; otherwise, freedom on labor markets is only apparent. Then will we have the appearance of economic freedom.

Market provision of established foods and new releases enables us to better satisfy human needs. Quality of life is improved. Currently, market thinking spreads into all areas of human life; however, it may be a threat to the harmonious improvement of human nature (which has both material and spiritual dimensions). Market development crowds out spiritual values by overvaluing the amenity of life and prosperity. The currently rising culture of consumerism hampers physical and spiritual health. It is necessary to bring man up to participate in the market through competently utilizing the right to choose.

Promoting individual entrepreneurship is inevitable for innovation and the creation of new markets. The Church expects business people to form enterprises and develop markets. Private initiative and individual prudence of individuals enhance the improvement of living conditions. Entrepreneurship creates new markets, implements new products and services, and forms places of employment.
Trade relationships among stronger and weaker nations should be based on the principle of fairness. Weaker countries ought not to be exploited by stronger countries. Therefore, it is necessary to develop international principles with respect to social justice. It is necessary to care about the access to markets for poor countries, among others, by overcoming barriers to entry and monopolies so that all nations can participate in worldwide economic development.

References

[12] Pius XII (1939) Summi Pontificatus.
Rafał Warżała*

Specialization and business cycles fluctuations of Polish regions

1. Introduction

Most theoretical analysis tries to prove the similarities between regional and nationwide economic fluctuations. Some researchers indicate that an entire country’s business cycle is the result of cyclical changes in the various regions. On the other hand, this aggregated approach to the analysis of business cycles can be eliminated from the study characteristics of the different regions of the country, and thus, limit the state of knowledge on the characteristics of the course of cyclical fluctuations in regional terms. Carlino and Sill (2000) show that there is a strong divergence of cycles run in the regional and national cycle (based on cyclical changes in real income growth). There are some indicators presented in the literature examining the convergence rate of individual region’s components (Crone, 2003).

Economic development means social, territorial, and regional cohesion (among others). Taking this into consideration, Poland (as a relatively new member of the EU) carried out administrative reform, aiming at creating larger and less economically diverse administrative divisions. After accession to the EU, Poland has been acquired development programs operating within this union, among which one of the most important is the realization of regional policy.

The final goal of European integration to be achieved through the “common market” and the “economic and monetary union” also includes “economic and social cohesion”, both the members and within themselves. This is testified by the weight given to regional policy and structural funds; and so, regional convergence is one of the most important objectives of the EU1.

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1 The art. 128 of The EU Treaty states, that: “The Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least-favored regions or islands, including rural areas”.

The analysis of regional economies is also possible in the convention optimum currency area. As a defined region creates an optimum currency area (if using common currency with other regions) does not reduce the level of welfare. These are, therefore, areas with a common currency or fixed exchange rates relative to other regions and in relation to other regions – variable exchange rates (Borowiec, 2001).

As a member of the EU, Poland is also obligated to join the common currency – the euro. This implies questions about the impact of adopting the single currency on the level of real convergence, both at the regional level in individual countries and within the framework of integration groups (as the EU). The links between the economic and monetary union and economic and regional convergence is widely researched and described in the literature. The links are two-ways. On the one hand, the economic and monetary union may be an instrument to achieve economic and social cohesion. On the other hand, economic convergence is also a prerequisite to accomplish an effective EMU. It is believe, that real convergence helps the effective working of economic and monetary union and raises net benefits of the union (Artis, 2003; Barrios and Lucio, 2003).

The purpose of this paper is to investigate the relationship between the cyclical fluctuations in Poland on a regional perspective and the level of specialization of regional economies. This will determine the correlation between the morphology of regional business cycles and the level of their specialization. The process of structural homogenization is, on the one hand, an important feature of real convergence and, on the other hand, one of the determinants of the asymmetry of shocks. The evolution of economic structures is measured by the Krugman specialization index.

2. **Theoretical basis of regional business cycles in the light of the literature**

Generally, there are two streams of views on international and interregional effects of deepening economic integration in the literature. The first supports the idea that economic integration leads to symmetrical changes, which in turn leads to more synchronized business cycles in terms of both national and regional levels (Marelli, 2007; Barrios and Lucio, 2001). The second concept is derived from the work of Krugman (1991), who believes that economic integration causes an increase of regional concentration of industrial activity, which in turn will lead to sectoral or even regional shocks, increasing the likelihood of asymmetric shocks and divergent business cycles (Krugman, 1993; Krugman, 1991).
The regions are characterized by asymmetry of cyclical fluctuations when changing their economic activity in relation to other regions. This phenomenon has its cause in two sources (Fatas, 1997):

– regional-level diversification of production resulting from the specialization of the region in particular type of production and so-called industry-specific shocks, associated with different mobility levels of production factors;
– diversified economic policy in the regions.

The problem of asymmetry of economic shocks experienced by the regions is also one of the optimum currency area criteria. In the literature, it is pointed out that business cycles across countries (regions) within an “optimum” currency area should not be out of phase (McKinnon, 2002). The aspect of asymmetry of economic shocks since the creation of the euro-zone has been studied among euro-area member states. The issue of symmetry business cycle fluctuations is important in the context of supra-regional (and national) monetary policy. Moreover, if fiscal policy is subject to strict controls and harmonization at a supranational level, the effects of the use of such instruments should be predictable (according to the theory of optimum currency areas) and similar across the common currency area (Frenkel, Nickel, 2002).

From the point of view of the theory and criteria of the optimum currency area OCA (as important as the fact of shock), it is the way to respond to any disruption (as determined by the effectiveness of the union economic policy instruments). If in one country, the effects of the shock will be positive, and in the other one – negative, harmonization of economic policies within the EU would be senseless (Weimann, 2003).

Research shows that the effect of international specialization in the EU is ambiguous. This is also confirmed by Montoya and de Haan’s research. In their paper from 2007, they found that synchronization has increased on average for the period considered with some exceptions during the eighties and the beginning of the nineties of the twentieth century (using the correlation coefficient of the regional cycles with the Euro Zone benchmark). But the correlation of the business cycle in some regions with the benchmark remained low or even decreased (Montoya and de Haan, 2007).

However, the lack of economic or commercial interdependence between countries can indicate the occurrence of such phenomena in the interregional scale. Being mutually convergent, regional business fluctuations may exhibit cyclical desynchronization with national business cycles that refer to countries to which they belong (Fatas, 1997).

As a result of tariff reduction as well as transport costs and administrative differences, a reduction of transaction costs between regions causes different
levels of economic development in the interregional scale. As a result, it leads to the geographical concentration of industries. Reduction of transaction costs leads to a divergence between regions in terms of industry structure and increase specialization of individual regions (Krugman, 1993).

The degree of synchronization of business cycles in the regional structure also depends on factors such as the scope of historical ties, the level of economic and trade relations, and cultural affinity between regions. As a result, some regions may appear to have a higher degree of convergence (even without belonging to one country) and the other – against the administrative linkages – will appear rather diversified in this area.

Due to the fact that studies are presented in the literature showing that the common monetary policy in the lack of business cycle convergence is not beneficial to all members of the currency area. This is due to the presence in national or regional scale “asymmetric shocks” (Correia and Gouveia, 2013). The conclusions of the study are the basis of two opposing theoretical concepts.

The first of these is the specialization concept by Paul Krugman, who has proven in his research that economic integration in the regional context leads to a greater degree of development polarization rather than to its unification. This is the result of externalities taking in the single currency area, economies of scale of dynamic production (in relation to the environment), as well as the development of metropolitan areas. The main conclusion that comes from Krugman’s model is that the result of the introduction of the single currency area may be to increase the degree of convergence of business cycles on the state level while increasing the range of divergence at the regional level (Krugman, 1991).

According to the second concept, proposed by Frankel and Rose (1996), as a result of the elimination of economic barriers among countries and regions within single currency area, the trade intensification is rising. In the opinion of the authors, the immediate effect of this process is an increase in the synchronization of cyclical fluctuations. Another factor contributing to the synchronization of business cycle fluctuations (according to the authors) is the implementation of a common economic policy on the integrating area. The difference in the approach to the effects of the optimum currency area created here lies in the formulation of the idea that positive results in this concept reveals ex-post; i.e., as a result of conduct of the single monetary policy and the single currency (Frankel and Rose 1996). Similar conclusions resulted from Salvador Barrios’s and Juan Lucio’s paper (2001). They provide evidence on the positive impact of economic integration on regional business cycle correlation. Their study is based on the special case of two neighboring economies: Spain and Portugal.

In this article, the morphological characteristics of Polish regional business cycles is researched, represented by 16 separate administrative units of local government (i.e., voivodeships). The reference cycle is the business cycle morphology for the country as a whole. The time horizon of the analysis includes quarterly GDP time series growth data from 1st quarter 1996 to 4th quarter 2013. Such a period resulted from comparable data access from the Central Statistical Office.

Current economic analysis focuses on two types of cyclical fluctuations: the classic cycles and growth cycles. The basis of the above-mentioned types of cycles is the morphology and course of individual variation. The choice of individual business cycle concept involves specific business cycle turning point location, as well as duration of the phases. However, this does not mean that economic empirical studies are doomed to relativism. This requires the prior adoption of specific analytical assumptions, as well as formulating definitions, that would be applied (Drozdowicz-Bieć, 2012).

The bases of these analyses are growth cycles. This method allows for the identification of business cycles, even when there is a long period of continuous growth. Then, the absolute value analysis does not bring clear results. This is due to the relatively short time series with unified statistical data methodology. Short time series allow us to extract the growth cycles, while for observation, classic cycles are required for at least several years of the time series (From work on... 1997).

An important aspect of the empirical analysis of economic fluctuations is the optimal choice of indicators that are the basis for assessing the morphology of cycles. Therefore, in the literature, it is pointed out that two main criteria should be fulfilled by economic variables; i.e., the importance of variable and characteristics of statistical time series variable. Taking these conditions into account, the empirical analysis is based on quarterly regional GDP data.

The first step in the analysis of economic fluctuations is to eliminate the seasonality. The most comprehensive seasonal alignment methods are X-12-ARIMA and TRAMO/SEATS. As a result, the method of seasonal adjustment recommended by Eurostat was used in this paper; i.e., TRAMO / SEATS (Grudkowska and Paśnicka, 2007).

For the estimation of cyclical factor from the seasonally adjusted time series of empirical data, the Christiano-Fitzgerald band-pass filter was used, which allows us to obtain estimates of the cycle, both at the beginning and at the end of time series. The procedure for marking the turning points was based on the Bry-Boschan procedure (Adamowicz et al., 2012). For the analysis of morphological features of cyclical fluctuations, the measures of volatility and dispersion were
used. Additional measures embraced the length of the various phases and cycles, standard deviation, coefficient of variation, and the amplitude and intensity of cycles and cross-correlation analysis. On the basis of the results obtained, the morphological characteristics analysis of industrial production in the various regions of the country was conducted.

To quantify the degree of homogeneity of production structures of Polish regions, two different indicators were used for sensitivity analysis. The first is a specialization coefficient (defined as Krugman specialization index) that can be calculated for each region $r$ (Marelli, 2007):

$$KSI_r = \sum_{i=1}^{n} |s_{i,r} - s_{i,0}|$$

Where $s_{i,r}$ is the share of sector $i$ out of total employment in region (or country) $r$ and $s_{i,0}$ is the corresponding share in the reference region. Its value can range from 0 (both regions have the same sector structure) to 2 (the sector structure is totally different). The second is the dissimilarity index, which is the complement to one of the sum of the minima of the sectoral shares of two regions (Marelli, 2007):

$$DIS_r = 1 - \sum_{i=1}^{n} \min(s_{i,r}, s_{i,0})$$

The value of the DIS index range from 0 to 1. The more different the structure, the closer value 1 is to the DIS index.

The subject of specialization analysis was employment. This is because employment data is less sensitive to valuation problems (as compared to value added data).

4. An empirical analysis of convergence in Polish regions

The empirical analysis refers to Polish regions over the period 1996–2013. The data on Polish regions was taken from Regional Statistical Offices from each of the 16 voivodeships (i.e., Statistical Bulletin).

The aim of this study was to evaluate the relationship between the level of specialization at the regional level and the so-called sensitivity of regions to asymmetric shocks. To assess the degree of regional specialization in Poland, a measure proposed by Krugman was used.

The Krugman index has been calculated for four years: 2000, 2004, 2008, and 2012. The calculations have been made for all 16 regions, and the reference
“region” was the country structure as a whole. The index has been calculated for regional employment structure, with shares referring to:

- agriculture, forestry, and fishing;
- industrial sector;
- construction sector;
- trade, repair of motor vehicles, transportation and storage, accommodation and catering, information and communication energy, and manufacturing;
- financial and insurance activities; real estate activities; other services.

Table 1
Krugman specialization index for Polish regions

<table>
<thead>
<tr>
<th>Voivodeship</th>
<th>Index value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolnośląskie</td>
<td>0.30</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>0.11</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>0.49</td>
</tr>
<tr>
<td>Lubuskie</td>
<td>0.27</td>
</tr>
<tr>
<td>Łódzkie</td>
<td>0.15</td>
</tr>
<tr>
<td>Małopolskie</td>
<td>0.20</td>
</tr>
<tr>
<td>Mazowieckie</td>
<td>0.21</td>
</tr>
<tr>
<td>Opolskie</td>
<td>0.11</td>
</tr>
<tr>
<td>Podkarpackie</td>
<td>0.37</td>
</tr>
<tr>
<td>Podlaskie</td>
<td>0.40</td>
</tr>
<tr>
<td>Pomorskie</td>
<td>0.31</td>
</tr>
<tr>
<td>Śląskie</td>
<td>0.38</td>
</tr>
<tr>
<td>Świętokrzyskie</td>
<td>0.41</td>
</tr>
<tr>
<td>Warmińsko-Mazurskie</td>
<td>0.10</td>
</tr>
<tr>
<td>Wielkopolskie</td>
<td>0.12</td>
</tr>
<tr>
<td>Zachodniopomorskie</td>
<td>0.31</td>
</tr>
</tbody>
</table>


According to results showed in Table 1, it can be divided into 3 separate groups. Results of the first group range of 0 to 0.15. The scores of second group range of 0.16 to 0.30, and the third group includes regions with the value of Krugman specialization index exceeding 0.30. The first group includes five Polish regions that are the least specialized in comparison to the reference structure of Polish
economy; ie. Kujawsko-Pomorskie, Łódzkie, Opolskie, Warmińsko-Mazurskie, and Wielkopolskie. The second group is represented by Dolnośląskie, Lubuskie, Małopolskie, and Mazowieckie. The last group embraces the most specialized regions as compared to the reference structure. Regions that belong to this group are: Lubelskie, Podkarpackie, Podlaskie, Pomorskie, Śląskie, Świętokrzyskie, and Zachodniopomorskie.

As Table 1 shows, there is a falling specialization trend in most regions of Poland, especially in those regions where the structure was initially more dissimilar (Świętokrzyskie, Śląskie, Pomorskie, Podlaskie, Podkarpackie, Lubelskie, and Dolnośląskie), due to the heavy specialization in agriculture (Lubelskie, Podkarpackie, and Podlaskie), mining and quarrying (Śląskie and Świętokrzyskie), or trade and other services (Dolnośląskie, Zachodniopomorskie, and Pomorskie). One of the elaborated regions showed a slight increasing trend during the period researched (Mazowieckie), and in the last two cases, there was an approximately stable specialization index level during the research period (Opolskie and Wielkopolskie). This is probably related to the quickly expanding service sector, and so it explains the decreasing relative distance from the “average Polish employment structure”.

The dissimilarity index presented in Table 2 shows a broadly similar picture. The most dissimilar (i.e., most specialized) regions over the research period were Lubelskie, Podkarpackie, Świętokrzyskie, and Podlaskie. Essential differences as compared to the reference structure show Dolnośląskie, Mazowieckie, and Śląskie. The less dissimilar are Kujawsko-Pomorskie and Łódzkie. Some of the elaborated regions appear to have a slight dissimilarity increase (Lubelskie, Mazowieckie, and Opolskie), and there is a decrease trend in some of them (Lubuskie, Małopolskie, and Zachodniopomorskie).

The analysis of the activity of the Polish economy in a regional dimension is determined in the range of operation of the country’s current administrative division; i.e., since 1999. But the Central Statistical Office made a backward calculation of the regional GDP, so it was possible to analyze regional GDP in absolute values since 1995 and since 1996 as index of dynamics. The whole analyzed period started from the 1st quarter 1996 to the 4-th quarter 2013.

Table 3 presents bivariate statistics between individual voivodeships and Poland GDP reference series. In comparison to the analysis based on the industrial production time series, there are some essential differences in morphological fluctuation characteristics. The first is the average coherence level – higher in the case of industrial production. The most coherent GDP time series with the reference series appear such regions as Lubuskie (0.70), Łódzkie (0.62), Zachodniopomorskie (0.54) and Śląskie (0.52). The more dissimilar to the reference series were Małopolskie (0.06) and Świętokrzyskie (0.14).
### Table 2
Dissimilarity Index for Polish regions

<table>
<thead>
<tr>
<th>Voivodeship</th>
<th>Index value</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolnośląskie</td>
<td>0.124</td>
<td>0.107</td>
<td>0.083</td>
<td>0.084</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>0.029</td>
<td>0.038</td>
<td>0.030</td>
<td>0.027</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>0.240</td>
<td>0.180</td>
<td>0.208</td>
<td>0.217</td>
</tr>
<tr>
<td>Łubuskie</td>
<td>0.108</td>
<td>0.100</td>
<td>0.090</td>
<td>0.071</td>
</tr>
<tr>
<td>Łódzkie</td>
<td>0.050</td>
<td>0.065</td>
<td>0.066</td>
<td>0.043</td>
</tr>
<tr>
<td>Małopolskie</td>
<td>0.074</td>
<td>0.020</td>
<td>0.030</td>
<td>0.057</td>
</tr>
<tr>
<td>Mazowieckie</td>
<td>0.075</td>
<td>0.074</td>
<td>0.092</td>
<td>0.114</td>
</tr>
<tr>
<td>Opolskie</td>
<td>0.029</td>
<td>0.027</td>
<td>0.036</td>
<td>0.054</td>
</tr>
<tr>
<td>Podkarpackie</td>
<td>0.177</td>
<td>0.085</td>
<td>0.086</td>
<td>0.159</td>
</tr>
<tr>
<td>Podlaskie</td>
<td>0.193</td>
<td>0.154</td>
<td>0.176</td>
<td>0.148</td>
</tr>
<tr>
<td>Pomorskie</td>
<td>0.130</td>
<td>0.101</td>
<td>0.073</td>
<td>0.082</td>
</tr>
<tr>
<td>Śląskie</td>
<td>0.163</td>
<td>0.152</td>
<td>0.114</td>
<td>0.110</td>
</tr>
<tr>
<td>Świętokrzyskie</td>
<td>0.194</td>
<td>0.123</td>
<td>0.150</td>
<td>0.156</td>
</tr>
<tr>
<td>Warmińsko-Mazurskie</td>
<td>0.023</td>
<td>0.026</td>
<td>0.043</td>
<td>0.040</td>
</tr>
<tr>
<td>Wielkopolskie</td>
<td>0.033</td>
<td>0.062</td>
<td>0.045</td>
<td>0.053</td>
</tr>
<tr>
<td>Zachodniopomorskie</td>
<td>0.130</td>
<td>0.097</td>
<td>0.090</td>
<td>0.084</td>
</tr>
</tbody>
</table>

Source: As in Table 1

### Table 3
Bivariate statistics with the Poland GDP reference series

<table>
<thead>
<tr>
<th>Time series</th>
<th>Coherence Ratio</th>
<th>Mean Delay</th>
<th>Cross-correlation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r_0$</td>
<td>$r_{max}$</td>
<td>$t_{max}^{(1)}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dolnośląskie</td>
<td>0.38</td>
<td>–0.67</td>
<td>0.57</td>
<td>0.65</td>
<td>–1</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>0.44</td>
<td>0.73</td>
<td>0.58</td>
<td>0.70</td>
<td>1</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>0.62</td>
<td>–0.47</td>
<td>0.74</td>
<td>0.77</td>
<td>–1</td>
</tr>
<tr>
<td>Łubuskie</td>
<td>0.42</td>
<td>0.45</td>
<td>0.61</td>
<td>0.64</td>
<td>1</td>
</tr>
<tr>
<td>Łódzkie</td>
<td>0.70</td>
<td>–0.04</td>
<td>0.83</td>
<td>0.83</td>
<td>0</td>
</tr>
<tr>
<td>Małopolskie</td>
<td>0.06</td>
<td>–0.50</td>
<td>0.22</td>
<td>0.25</td>
<td>–1</td>
</tr>
<tr>
<td>Mazowieckie</td>
<td>0.50</td>
<td>0.34</td>
<td>0.68</td>
<td>0.69</td>
<td>1</td>
</tr>
<tr>
<td>Opolskie</td>
<td>0.34</td>
<td>–0.20</td>
<td>0.56</td>
<td>0.56</td>
<td>0</td>
</tr>
<tr>
<td>Podkarpackie</td>
<td>0.32</td>
<td>0.60</td>
<td>0.52</td>
<td>0.59</td>
<td>1</td>
</tr>
<tr>
<td>Podlaskie</td>
<td>0.31</td>
<td>0.10</td>
<td>0.55</td>
<td>0.55</td>
<td>0</td>
</tr>
<tr>
<td>Pomorskie</td>
<td>0.46</td>
<td>–0.36</td>
<td>0.65</td>
<td>0.65</td>
<td>0</td>
</tr>
<tr>
<td>Śląskie</td>
<td>0.52</td>
<td>–0.35</td>
<td>0.70</td>
<td>0.70</td>
<td>0</td>
</tr>
<tr>
<td>Świętokrzyskie</td>
<td>0.14</td>
<td>0.59</td>
<td>0.34</td>
<td>0.38</td>
<td>1</td>
</tr>
<tr>
<td>Warmińsko-Mazurskie</td>
<td>0.35</td>
<td>0.14</td>
<td>0.59</td>
<td>0.59</td>
<td>0</td>
</tr>
<tr>
<td>Wielkopolskie</td>
<td>0.46</td>
<td>0.49</td>
<td>0.64</td>
<td>0.67</td>
<td>1</td>
</tr>
<tr>
<td>Zachodniopomorskie</td>
<td>0.54</td>
<td>–0.92</td>
<td>0.62</td>
<td>–0.81</td>
<td>4</td>
</tr>
</tbody>
</table>

1 The + (−) sign refers to a lead (lag) in quarters with respect to the reference series.

Source: As in Table 1
Some regions appear average leading of business cycles phases with respect to reference series (Kujawsko-Pomorskie, Lubelskie, Mazowieckie, Podkarpackie, Świętokrzyskie, and Wielkopolskie) and some of them are lagged (Dolnośląskie, Łódzkie, Małopolskie, Opolskie, Pomorskie, Śląskie, and Zachodniopomorskie). Three of the Polish regions appeared average almost coincident fluctuations with respect to reference series (Lubuskie, Podlaskie, and Warmińsko-Mazurskie). The highest cross-correlation level was in the cases of Lubuskie (0.83), Łódzkie (0.77), Kujawsko-Pomorskie, and Śląskie (0.70). In the case of the Zachodniopomorskie voivodeship, there was almost a quarter lag of average business cycle, and the cross-correlation index was high but negative (–0.81). This allows us to state that it is one of the most dissimilar Polish regions in the aspect of business cycle fluctuations.

As the table 4 shows, most of the regional business cycle length oscillated around ten quarters. The longest business cycles were in Małopolskie, Mazowieckie, and Opolskie voivodeships. By contrast – the shortest were marked in Dolnośląskie, Łódzkie, Podkarpackie, Pomorskie, Warmińsko-Mazurskie, and Wielkopolskie. In most of the regions, the upward business cycle phases were longer than the downward ones. Exceptions in that case were Kujawsko-Pomorskie, Lubuskie, Opolskie, and Wielkopolskie.

### Table 4

**Analysis of regional GDP cycles with respect to the reference series**

<table>
<thead>
<tr>
<th>Phases and cycles average duration</th>
<th>Reference series</th>
<th>P – T</th>
<th>P – P</th>
<th>T – P</th>
<th>T – T</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLAND</td>
<td>4.86</td>
<td>9.67</td>
<td>5.50</td>
<td>9.50</td>
<td></td>
</tr>
<tr>
<td>Dolnośląskie</td>
<td>5.00</td>
<td>9.80</td>
<td>5.60</td>
<td>9.80</td>
<td></td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>6.00</td>
<td>1.00</td>
<td>5.50</td>
<td>10.60</td>
<td></td>
</tr>
<tr>
<td>Lubelskie</td>
<td>4.71</td>
<td>9.33</td>
<td>5.33</td>
<td>9.33</td>
<td></td>
</tr>
<tr>
<td>Lubuskie</td>
<td>6.00</td>
<td>1.80</td>
<td>6.20</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Łódzkie</td>
<td>6.80</td>
<td>1.40</td>
<td>5.40</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Małopolskie</td>
<td>7.20</td>
<td>1.75</td>
<td>7.75</td>
<td>11.50</td>
<td></td>
</tr>
<tr>
<td>Mazowieckie</td>
<td>5.60</td>
<td>1.25</td>
<td>6.20</td>
<td>11.00</td>
<td></td>
</tr>
<tr>
<td>Opolskie</td>
<td>7.60</td>
<td>1.50</td>
<td>7.00</td>
<td>13.50</td>
<td></td>
</tr>
<tr>
<td>Podkarpackie</td>
<td>4.83</td>
<td>9.50</td>
<td>5.50</td>
<td>8.80</td>
<td></td>
</tr>
<tr>
<td>Podlaskie</td>
<td>6.40</td>
<td>1.00</td>
<td>6.40</td>
<td>10.75</td>
<td></td>
</tr>
<tr>
<td>Pomorskie</td>
<td>4.71</td>
<td>9.33</td>
<td>5.33</td>
<td>9.33</td>
<td></td>
</tr>
<tr>
<td>Śląskie</td>
<td>5.33</td>
<td>1.40</td>
<td>6.00</td>
<td>10.60</td>
<td></td>
</tr>
<tr>
<td>Świętokrzyskie</td>
<td>4.80</td>
<td>1.50</td>
<td>7.80</td>
<td>11.80</td>
<td></td>
</tr>
<tr>
<td>Warmińsko-Mazurskie</td>
<td>4.83</td>
<td>1.00</td>
<td>6.00</td>
<td>9.20</td>
<td></td>
</tr>
<tr>
<td>Wielkopolskie</td>
<td>6.60</td>
<td>1.40</td>
<td>5.60</td>
<td>9.75</td>
<td></td>
</tr>
<tr>
<td>Zachodniopomorskie</td>
<td>5.17</td>
<td>9.67</td>
<td>5.33</td>
<td>10.00</td>
<td></td>
</tr>
</tbody>
</table>

Explanation: PP – a business cycle defined by upper turning points, TT – a business cycle defined by bottom turning points, TP – the upward phase of the cycle, PT – the downward phase of the cycle.

Source: As in Table 1
According to theoretical issues made in the first part of the paper, there is a correlation between the level of regional specialization and sensibility to demand (supply) shocks. The higher the specialization, the more potential for vulnerability to business cycle fluctuations. So, the goal of the third part of research was to assess relationship between the level of specialization (or dissimilarity) and morphological features characteristics for particular Polish regions.

Analyzing the average standard deviation values of particular regions, which are presented in Table 5, we can point to the voivodeships, that have the least value of that index; i.e., Kujawsko-Pomorskie (6.82), Śląskie (7.07), Lubelskie (7.21), Lubuskie (7.26), Opolskie (7.53), and Podkarpackie (7.88). The same situation takes place in the coefficient of variation index. Comparing the issues with results obtained in the specialization level measured by the Krugman specialization index or dissimilarity index, for the above-mentioned regions, the correlation between the two issues can be proven. So, it can be concluded that the hypothesis of relationship between the level of specialization and business cycle fluctuation sensitivity was confirmed. All of the above-mentioned voivodeships belong to the group of less-specialized regions. The two exceptions were Lubelskie and Podkarpackie (but this can be due to their heavy specialization in agriculture).

Table 5
The intensity of the Poland GDP time series and the individual voivodeships in the years 1996–2013

<table>
<thead>
<tr>
<th>Time series</th>
<th>Standard deviation (in p.p.)</th>
<th>Coefficient of variation (in%)</th>
<th>Average amplitude (in %)</th>
<th>cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLAND</td>
<td>7.92</td>
<td>7.13</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Dolnośląskie</td>
<td>7.76</td>
<td>6.96</td>
<td>2.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Kujawsko-Pomorskie</td>
<td>6.82</td>
<td>6.20</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Lubelskie</td>
<td>7.45</td>
<td>6.73</td>
<td>2.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Lubuskie</td>
<td>7.21</td>
<td>6.54</td>
<td>2.8</td>
<td>3.1</td>
</tr>
<tr>
<td>Łódzkie</td>
<td>7.26</td>
<td>6.60</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Małopolskie</td>
<td>8.21</td>
<td>7.37</td>
<td>2.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Mazowieckie</td>
<td>10.50</td>
<td>9.28</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Opolskie</td>
<td>7.33</td>
<td>6.70</td>
<td>2.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Podkarpackie</td>
<td>7.88</td>
<td>7.12</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Podlaskie</td>
<td>8.76</td>
<td>7.91</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Pomorskie</td>
<td>7.91</td>
<td>7.12</td>
<td>2.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Śląskie</td>
<td>7.07</td>
<td>6.44</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Świętokrzyskie</td>
<td>7.94</td>
<td>7.19</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Warmińsko-Mazurskie</td>
<td>8.11</td>
<td>7.34</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Wielkopolskie</td>
<td>9.10</td>
<td>8.12</td>
<td>2.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Zachodniopomorskie</td>
<td>8.17</td>
<td>7.43</td>
<td>2.7</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Source: As in Table 1
The opposite group was regions with a relatively high level of standard deviation. These are: Mazowieckie (10.50), Wielkopolskie (9.10), Podlaskie (8.76), Małopolskie (8.21), Zachodniopomorskie (8.17), Warmińsko-Mazurskie (8.11), and Świętokrzyskie (7.94). Simultaneously, most of these regions are characterized by relatively higher specialization index levels. The exception is connected with Małopolskie, Wielkopolskie, and Warmińsko-Mazurskie voivodeships.

The difference in standard deviation is confirmed in average amplitude dimensions. The highest amplitude of upward and downward deviations have regions with relatively high sensitivity to business fluctuations; i.e., regions with a high specialization index. In the research results, we can observe Dolnośląskie, Kujawsko-Pomorskie, Lubelskie, Mazowieckie, Małopolskie, Opolskie, Podlaskie, Pomorskie, Wielkopolskie, and Zachodniopomorskie. Some of them (Lubelskie, Opolskie, and Pomorskie) show relatively low standard deviation levels, which can be interpreted as relatively balanced average business cycle fluctuations. The others business cycles are characterized by more heterogeneous business fluctuations.

5. Conclusions

Economic analysis of the variability of individual business cycles in regions is important in the context of carrying out adequate regional policy, stimulating balanced development throughout the country. This is also important in the context of the redistribution of EU funds. If the process of decentralization of economic policy will progress, knowledge of the course and specificity of fluctuations allows us to respond appropriately to regional changes in the economic situation.

Assessing the GDP cyclical fluctuations in the Polish regions during 1996–2013, it can be concluded that the research issues are not uniform and clear. Regions have different sensitivity to economy “shocks,” both positive and negative. In comparison to industry production fluctuations elaborated in earlier papers, it can be concluded that GDP fluctuations are smoother. It is confirmed both by lower standard deviation and the coefficient of variation. GDP fluctuations appear to have different turning point location, as well as average upward, downward, and cycle amplitudes.

The results of the regional specialization measuring are ambiguous. Most of them appear falling specialization, and the others show stable specialization levels. Only one voivodeship – Mazowieckie – appeared to have a lightly growing specialization level during the analyzed period. Some of the regions are relatively heavily specialized in agriculture or mining, which makes them more stable in the business fluctuations analyses.

Despite a few exceptions, a correlation can be observed between the level of regional specialization and the degree of sensitivity to economic disturbances.
Regions that are less specialized and have more-diversified production structures show greater resistance to economic fluctuations. This is confirmed by the analysis of the morphology of cycles on a regional basis.

Concluding, it can be stated that EU membership does not seem to have caused any negative effects on regional economic convergence. However, appropriate economic policies must be designated and implemented whenever there is a risk of reversing the process of economic cohesion.

References


Baha Kalinowska-Sufinowicz: **Telework as a form of limiting human and social capital depreciation among parents with young children** • Managerial Economics 2015, vol. 16, no. 2

**JEL Classification**: J2, J240, J710

**Keywords**: telework, depreciation of human and social capital, parent, women

The main goal of the article is to present telework as a form of employment for parents with young children and its evaluation in the context of methods counteracting the depreciation of human and social capital – both from the labour demand and labour supply perspectives. The paper consists of two parts: a theoretical perspective and a practical one. The first part of the paper begins with a reflection on the phenomena of the depreciation of human and social capital in the light of literature review, especially with reference to the situation of parents raising young children. In the following – more practical – section, the concept and types of telework are introduced as well as its advantages and disadvantages from the point of view of employers and employees.

Justyna Patalas-Maliszewska: **Assessing the relationship between business strategy and knowledge acquisition in Polish Manufacturing Enterprises** • Managerial Economics 2015, vol. 16, no. 2

**JEL Classification**: M2, D24

**Keywords**: business strategy, knowledge acquisition, Polish manufacturing companies, GMDH

This study analyzes the interplay between the characteristics of business strategy implementations and their interaction with different types of knowledge in the manufacturing enterprise. It is based on a survey and data obtained from 119 Polish manufacturing enterprises. This study is innovative in applying the Group Method of Data Handling to the business context. This article develops a framework of achieving the strategy’s goals in terms of the types of knowledge acquisition in a manufacturing company, and further discusses the research results.

Krzysztof Posłuszny: **Fragmentation and the value-added structure of exports in Polish industry** • Managerial Economics 2015, vol. 16, no. 2

**JEL Classification**: F62

**Keywords**: international trade, global value chains, fragmentation, globalization

The accession to the European Union contributed to an increase in Poland’s foreign trade, and the growing export market is coupled with an increasing importance of intermediate imports, which is necessary to produce goods of appropriate quality and price. This phenom-
Enron is a part of the process of fragmentation in global value chains. Fragmentation of the value chains should manifest themselves, in particular, in a multi-phase manufacturing process that requires many components of different types. In this paper, the recently available OECD database of the Trade in Value Added (TiVA) has been used to assess changes in the composition of gross exports of Poland and other Central Europe countries. In Poland, practically all sectors show a growing share of the imported value added. The cases analyzed confirm the thesis that the high technology sectors foster fragmentation. In the case of technologically less-advanced sectors and short-value chains, benefits of fragmentation are limited. The progressing fragmentation and, as a consequence, a growing share of the imported value added made the gross export value (which is commonly used in statistics) of little use for the analysis of the economic role and competitive position of sectors. However, thanks to new projects based on I-O matrices of the global economy, it is possible to decompose gross exports into respective domestic and foreign value-added streams.

Robert Rogowski: Markets in catholic social teaching • Managerial Economics 2015, vol. 16, no. 2

*JEL Classification: A11, A12

*Keywords: Catholic social teaching, markets, business ethics

An aim of this article is to present the Catholic social teaching in regard to one basic institutions of economic life that is the market. The analysis starting point is an Encyclical of Pope Leo XIII, Rerum novarum, who initiated Catholic social teaching. All the social encyclicals were studied, which directly or indirectly refer to the market category. In the final part of the article, a synthesis of teaching the Catholic Church in market terms was carried out.

Rafal Warzala: Specialization and business cycles fluctuations of Polish regions • Managerial Economics 2015, vol. 16, no. 2

*JEL Classification: E3

*Keywords: region, business cycle, specialization, economic structure

The aim of this article is to investigate the relationship between the cyclical fluctuations in Poland on a regional perspective and the level of specialization of regional economies. To do this, the correlation between the morphology features of regional business cycles and the level of their specialization was made. The morphology features were represented by such parameters: cycle length, phase length, standard deviation ratio, coefficient of variation ratio and average amplitude of upward and downward phases. The evolution of economic structures was measured by the Krugman specialization index. Assessing the GDP cyclical fluctuations in the Polish regions during 1996–2013, it can be concluded that the regions have different sensitivity to economy “shocks,” both positive and negative. The results of the regional specialization measuring are ambiguous. Most of them appear falling specialization, and the others show stable specialization levels. Despite a few exceptions, a correlation between the level of regional specialization and the degree of sensitivity to economic disturbances can be observed. Regions that are less specialized and have more-diversified production structures show greater resistance to economic fluctuations. This is confirmed by the analysis of the morphology of cycles on a regional basis.
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