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ESTIMATING THE EXTENT OF DOMESTIC ENERGY DEPRIVATION THROUGH HOUSEHOLD EXPENDITURE SURVEYS¹

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Abstract

Domestic energy deprivation, or energy poverty, is a growing problem worldwide, affecting millions, if not billions, of families in developing countries. One of the ways of making the issue more visible to policy makers and the wider public is by devising a common measurement framework that could be applied to different countries and contexts. In this paper, I lay out some of the methods and procedures that could be used to devise such a framework, based on data from a widely accessible source-household expenditure surveys. The framework has been tested on two national samples from such sources. The results of the paper emphasise the need for relying on a multi-layered methodological approach for estimating the size and extent of domestic energy deprivation, which is a complex phenomenon that does not conform to standard poverty lines and measurement methods.

Introduction

Domestic energy deprivation—also known as 'energy poverty'—is a condition where households lack the resources for heating their homes to an adequate level. 'Adequate' in this case can mean that either the average daytime indoor temperature of the dwelling is below a biologically-determined limit necessary to maintain comfort and health, or that the amount of warmth in the home is lower than the subjective minimum which allows an individual to perform his/her everyday life. Energy poverty is a growing problem worldwide, affecting millions, if not billions, of families in developing countries. At the G8 summit in St Petersburg in July 2006, developed-world leaders 'noted the importance of fighting against energy poverty', because 'it is impossible to develop the economy, improve health care and develop education without having access to energy resources' (RIA Novosti, 2006).

One of the regions where domestic energy deprivation is particularly pronounced is Eastern and Central Europe (ECE). Various strands of evidence suggest that increasing numbers of households in the former communist states in this region are suffering from energy poverty (for example see Jones and Revenga, 2000). Many ECE countries have implemented significant energy price increases, with the aim of removing

1) The paper was received for review on 1 October 2006

the old price structure inherited from socialism, where tariffs were set at below-cost-recovery levels, and there were extensive cross-subsidies from industry to the residential sector. The problem that has emerged in the post-socialist transition, however, is that most governments have been unable to develop the necessary social safety net to protect vulnerable households from energy price increases. This leaves many families with no option other than to cut back on their energy purchases. The problem is further aggravated by the cold climates of these countries, and the poor energy efficiency of the building stock.

However, domestic energy deprivation in ECE has remained politically invisible to date, due to the private nature of the problem, and the complex, variable and fragmented character of its temporal and spatial distribution. Also, there has been very little research of energy poverty extending beyond the narrow focus on affordability promoted by international financial institutions. One of the ways of making domestic energy deprivation more visible to policy makers and the wider public is by devising a common measurement framework that could be applied to different countries and contexts. In this paper, I lay out some of the methods and procedures that could be used to devise such a framework, based on data from an universally accessible source—the household expenditure survey. It is hoped that the wider application of this method can lead to a more comprehensive understanding of energy poverty not only in ECE, but also in the developing countries of the global South.

Understandings of poverty

Traditionally, economists have measured welfare using either a commodities- or a utility-based approach. The former originates from the Rawlsian theory of justice, which equates well-being with the possession of commodities and income. The utility approach draws its roots in Jeremy Bentham's 18th century utilitarianism, whereby 'an action is right if it tends to promote happiness, and wrong if it tends to promote the reverse of happiness' (Bentham, 1996). The corresponding poverty-measuring method sees poverty as a function of 'utility', which can be interpreted as the fulfilment of a certain need, desire, happiness, or choice. Both approaches operate with an income-based definition of poverty, in that it is assumed that the loss of either commodities or utility occurs below a certain amount of income, which can be absolute (as in a 'basic needs' subsistence level) or relative (where the most commonly-used principle states that a household is 'poor' if its income does not exceed 2/3 of the median income of the entire population).

The hegemony of these two theories was disrupted by Amartya Sen, who proposed that the space of 'capabilities' is more appropriate for evaluating inequality (Sen, 1980). He argued that the possession of commodity or utility cannot provide proxies for well-being, but rather it is important to concentrate on what the person actually succeeds in doing with the commodity, given its circumstances. As a result, poverty is measured on the basis of variations in the individuals' 'capabilities to function', i.e. 'their ability to have a long and healthy life, to be well-nourished, literate, safe, and so on' (Cornia et al., 1996:161, also see Saith, 2001 for an operationalisation of the capabilities approach). Amartya Sen's theory switches the emphasis of poverty analysis away from the 'means' (income, wealth etc.), and onto the 'ends' (quality and quantity of life), allowing for the incorporation of a wider range of factors. The UNDP's 1996 Human Development Report has concluded that 'while 900 million people in developing countries are income poor, 1.6 billion are capability poor' (UNDP, 1996:2)

The measurement of energy poverty requires a combination of all three approaches, because an energy-poor family is by definition deprived of domestic energy (i.e. the household is suffering from a loss of utility), due to falling real income or inadequate housing stocks (lack of commodities), and the individuals' decreased ability to keep warm (loss of capabilities).

Defining and measuring domestic energy deprivation

In order to develop a measurement framework for domestic energy deprivation, it is first necessary to define the meaning of the terms 'poverty' and 'energy poverty'. The most widespread definition of poverty sees it as 'a lack of access to resources and denial of opportunities' which hampers an individual's ability to participate in the 'lifestyles, customs and activities which define membership of society' (Folwell, 1999:5). This 'relative' definition has now become standard in the literature, although there are other ways of defining poverty (for a wider discussion see Percy-Smith, 2000; Townsend, 1979; Barr, 1998). Conceptualising poverty in a 'relative' way has opened the space for interpreting energy poverty through what Healy (2003:36) terms the 'consensual' approach, which aims to capture the 'wider elements' of domestic energy deprivation, such as 'social exclusion and material deprivation, as opposed to approaches based solely on home-heating expenditure or household temperature'. This framework also benefits over other methods 'in that it is based on the households' actual feelings and statements ... as opposed to being based solely on arbitrary calculations or estimations' (ibid.).

Based on this definition, domestic energy deprivation can be seen as the inability to heat the home up to a socially- and materially-necessitated level. A household is considered energy-poor if the amount of warmth in its home does not allow for participating in the 'lifestyles, customs and activities which define membership of society'. Such a definition comprises both the biologically-determined temperature necessary to maintain comfort and health (Boardman, 1991; but also see Rudge and Nicol, 1999; Healy, 2003), and the subjective minimum below which an individual feels unable to perform his/her everyday life. This means that a household may suffer from energy poverty even if its domestic temperature is above the biologically-determined limit, provided that the temperature in the home is insufficient for performing usual social customs and practices.

The presence of energy poverty can be detected through subjective surveys of well-being or patterns of household expenditure, as direct nationally-representative data about domestic temperature levels is non-existent (Healy, 2003; Rudge and Nicol, 1999; Lewis, 1982; Townsend, 1979). In this paper, I suggest a framework that operates with a combination of analyses based on household expenditure surveys. These methods stipulate that the extent of poverty among a given population can be determined in at least three different ways:

- First, the 'absolute' method—which operates with a commodities-based approach—states that a household can be considered 'poor' if its total earnings fail to reach a pre-determined minimum income. Such a theoretical understanding has a normative equivalent: the 'absolute poverty line' (APL), which is usually calculated by adding up the minimal amounts of money needed to satisfy a given set of pre-defined 'basic needs', for households of different sizes. The resulting monetary amount is then adjusted on a seasonal and annual basis, to reflect consumer price changes.
- Second, in the case of the 'relative' method, the poverty threshold is defined in a relational manner, in line with the 'utility' framework outlined in Chapter 1. In this case, the poverty line is seen a percentage of a higher income level, where deprivation is not supposed to occur. According to the most commonly-used standard, the relative poverty line (RPL) can be set at 50% of the median income of the entire population (Jones and Revenga, 2000).
- Third, the 'subjective' approach attempts to extend beyond the reductionism of income and/or utility criteria, by stressing the 'capabilities' dimension. It determines poverty on the basis on the principle that, basically, an individual is poor if 'he/she considers him/herself poor' (Mateju, 2000). At the heart of this theory is the notion that 'life may be seen as consisting of a set of interrelated functionings, which in turn are composed of beings and doings' (Saith, 2001: 38). The latter may include both physical elements—as in 'being adequately fed and sheltered'—as well as 'more complex social achievements, such as taking part in the life of the community, being able to appear in public without shame, and so on' (ibid: 110).

I have combined all three approaches in quantifying and qualifying domestic energy deprivation, because absolute, relative, and subjective energy poverty information alike can be extrapolated from published poverty data in household expenditure surveys. However, the key moment in defining and describing energy poverty is the affordability of the final energy service, because, simply, a household is energy-poor if it cannot afford to purchase the necessary amount of warmth in the home.

Thus, aside from secondary sources, the demographic structure of energy poverty in the two countries has been estimated with the aid of the 'compensating variation', which quantifies 'the price a consumer would need to be paid ... to be just as well off after ... a change in prices of products the consumer might buy' (Economics Glossary, 2005). In this paper, the compensating variation expresses the percentage by which a given household's income would have to rise in year *y*, in order for it to be able to purchase the amount of energy that it was buying in a previous year *x*, before energy prices were increased. The higher the compensating variation for a given group of households, the greater its loss of welfare during the period between *x* and *y*. Comparing the compensating variations for different income strata can help estimate of the size and type of populations affected by energy price increases.

Household expenditure surveys in Macedonia and the Czech Republic

In the remainder of this paper, I look at the patterns of domestic energy deprivation in Macedonia and the Czech Republic—two post-socialist states with divergent reform paths in the transition process. Comparing two such different contexts, it is hoped, can shed further insights into the effectiveness of the proposed energy poverty method.

The two countries have different ways of understanding and measuring poverty. The Czech Republic possesses an APL, also known as the 'subsistence minimum', which is calculated via a combination of normative and empirical criteria. It has been devised 'by finding out, with the help of scientific methods, the rational nutritional standards, and on their basis other needs important to be able to maintain a minimum standard of living' (Adam, 1999:162). The resulting monetary amount is 'a socially-recognised and legally-established minimal income boundary under which deprivation occurs' (CSO, 2005). The APL mainly serves as a basis for distributing social benefits and allowances.

However, both Macedonia and the Czech Republic also have RPLs which have been set by the state at, respectively, 70 per cent and 60 per cent of the level of median income established by nationwide surveys of household expenditure. Families whose incomes fall below this figure are considered 'poor' for statistical and social policy purposes. It has a lower level than the RPL: in 2000, 3.4% of Czech households had incomes under the subsistence minimum, as opposed to approximately 7% under the RPL (*ibid.*).

As I have already pointed out before, the inadequate political awareness about energy poverty has resulted in the absence of nationally-representative data about domestic deprivation. Neither Macedonia nor the Czech Republic have undertaken any direct, purpose-made surveys of energy poverty to date. It is thus necessary to rely on proxies, rather than direct information, to estimate the extent of insufficient domestic warmth in both countries. This can be done with the aid of data provided by the Macedonian Household Expenditure Survey (HES) and the Czech Family Budget Survey (FBS).

The HES is executed by the Macedonian State Statistical Office on an annual basis, using a two-staged random sampling frame of 1000 households, which was increased to 4200 in 2004 (SSO, 2005). It divides households into groups according to their principal economic activity: 'agricultural' (families whose entire income originates from commercial or subsistence farming), 'mixed' (part of the earnings are based on agricultural production), and 'non-agricultural' (the family's revenue is generated by activities in industry or services). As for the FBS, it a sampling frame of 3000 households representative of the entire Czech population (CSO, 2005). The Czech Statistical Office has published its results annually throughout the post-socialist

period, with income and expenditure data being disaggregated according to income deciles, quintiles, and quartiles, as well as four key demographic categories (families headed by employed adults, self-employed adults, farmers, and pensioners).

The HES and FBS alike classify households into deciles of income. The statistics for each decile are a weighted mean of all the households in that group: the mean income of the households in a given decile decreases as its number falls, with the tenth decile being the 'richest' and the first the 'poorest'. It is important to note that the two countries allocate households into deciles in different ways:

- In Macedonia, the decile boundaries are determined by dividing the income interval between the maximum and minimum earner into ten equal bands, so that the total number of households in each decile varies but the income intervals for each band are the same;
- The Czech Republic obtains its deciles by splitting the total number of households into ten equal groups according to income, so that the intervals between the top and bottom earner in each decile are different, but the total number of households per decile is equal.

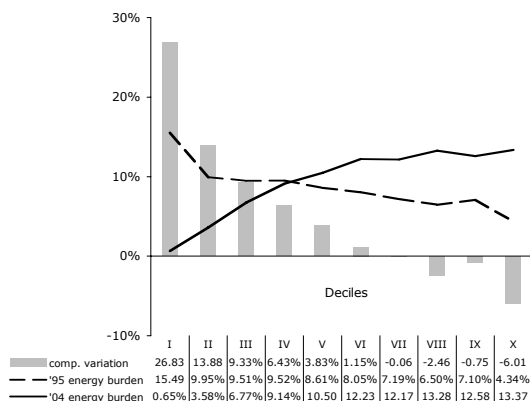
There are two main methods of grouping households into deciles. The first one categorises households depending on their total, or 'aggregate' income. In the second approach, they are divided into income bands according to the equivalent income per household member, which is obtained by dividing total household income with the number of 'equivalent consumption units' in each family, to account for the economies of scale achieved in household consumption. Macedonia and the Czech Republic use different methods for calculating consumption units, although they are both similar to the 'OECD modified' equivalence scale. This system assigns a value of 1 consumption unit to the household head, 0.5 to each additional adult member, and 0.3 to each child (Hagenaars, 1994; Atkinson et al., 1995).

A second set of standardised instruments for judging the extent of domestic energy deprivation in both countries is provided by national surveys of subjective well-being. Such polls are usually undertaken on an annual basis by state statistical agencies in order to assess households' experiences and judgements of deprivation (see CSO, 2005; SSO, 2005). Within this paper, they form an additional basis for assessing and comparing the patterns of energy poverty in the two countries. The HES, FBS, and surveys of subjective well-being are the only nationally-representative and mutually-comparable methods of assessing the demographic extent of energy poverty in the two countries.

Energy expenditure patterns in Macedonia

The change in the 'energy burden'—the share of energy expenditure within the total household budget—during the transition provides interesting insights about the spread of domestic energy deprivation in Macedonia. According to the HES, in 1995, when implicit energy subsidies were still widespread, only the first equivalent income decile had an energy expenditure higher than 10% (this is the 'cut off' point for energy poverty according to the mainstream literature—for example see Boardman, 1991). However, 2004 saw a reversal of the distribution of energy burdens across deciles. The top six deciles had expenditures higher than 10%, while the bottom four actually spent much lower shares of their household incomes on energy (see Figure 1).

Figure 1:
Energy burdens, and compensating variation for energy expenditure per equivalent income decile, Macedonia, 1995-2004 (Author's calculations based on household expenditure data from SSO, 1996; 2005).



This is a paradoxical situation in standard welfare economic terms, as it would be expected that the poor would spend a higher, rather than lower, share of their income on energy. It can be explained by the extensive reliance on illegal fuelwood among the income-poor, who either obtain this resource at a heavily discounted cost by avoiding official channels, or use it through subsistence forestry in the cases of rural settlements in woodland areas. Also, Macedonian households with lower equivalent incomes tend to be large extended families living in overcrowded housing, where the expenditure per household member may be very low. Household with high equivalent energy expenditures and burdens tend to be urban pensioners, who in this case are grouped in the higher income deciles as their pensions are in monetary form, and are part of the formal economy.

For these reasons, it is better to rely on the compensating variation as a means of obtaining a statistical estimate of the size of the population affected by energy deprivation. This can be done by comparing the absolute energy expenditure of all Macedonian households in 2004, to the same figure in 1995. Figure 1 depicts the percentage by which incomes would have to change in 2004, in order for households to be able to retain the same ratio of energy expenditure relative to the national average in 1995. In other words, it shows whether income would have to be given to, or taken from, a household in order for it to retain its energy expenditure level relative to a normative value (in this case, the national average).

It has transpired that the 60 per cent of households with lowest incomes, i.e. those in the first 6 deciles, would have to receive additional funds—ranging between 27 to 1 per cent of total equivalent income—in order for the ratio of their energy expenditure to the national average to remain equal to the 1995 level. At the same time, however, income would have to be 'taken away' from the top 30 per cent in order for their ratios to remain the same. This means that the relative energy expenditures of better-off households have increased in comparison to the 1995 level. Such households have responded to energy price increases by allocating additional income for energy expenditure.

The 60% figure is matched by surveys of subjective well-being. For example, only 38% of all Macedonian households thought that they were able to keep their home 'adequately warm' in 2003, although the same figure stood at 46% only three years earlier (SSO, 2004).

Such figures are significant in three ways. First, they demonstrate that energy poverty has a much wider demographic extent than statistically-defined income poverty, which does not include households above the third decile. This points to the inadequacy of the RPL defined by the state, which, it appears, has failed to include at least half of the households suffering from energy poverty. Second, the compensating variation shows that energy expenditures have become more polarised, because the top 30 per cent of households with highest incomes now have a greater energy expenditure compared to the 1995 level, while the bottom 60 per cent have been forced to cut back on their energy purchases. This leads to the third finding: that res-

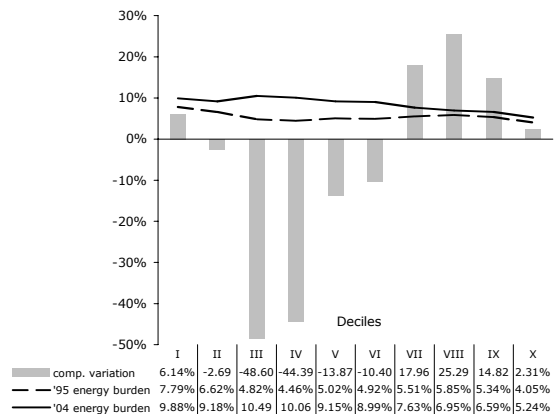
idential energy efficiency improvements have yet to be felt among the wealthiest parts of the population. In normal circumstances, their energy expenditures would be expected to decrease as a result of more efficient building installations and/or fuel switching.

Energy expenditure patterns in the Czech Republic

In the Czech Republic, energy burdens have increased across all deciles between 1995 and 2004. The greatest rises were in the third and fourth income deciles, whose energy burdens increased beyond the 10% mark. However, the first and second deciles also began to approach this level. Their lower energy burdens may be explained, once again, by the greater size of the unofficial economy among this group.

The values of the compensating variation for the period 1995-2004 (Figure 2) indicate that Czech households have responded to energy price increases in one of three ways. First, the bottom decile has decreased its energy expenditure by 6 per cent of monetary income, a sign of energy poverty. This drop in energy expenditure among the poorest Czech decile probably reflects a real decrease in energy consumption because nearly all forms of energy in the Czech Republic necessitate monetary payment: the fact that these households fall under the poverty line means that they have very low incomes, which are insufficient to cover energy costs. Second, deciles 2-6 have seen a relative rise in their energy expenditure, reaching as much as 49 per cent in the third decile. Although this increase is probably related to the rapid growth of energy prices since 1995, the negative value of the compensating variation also signifies that such households have allocated additional income for energy. The fact that such figures are significantly higher than the maximum value of the compensating variation in the Macedonian case (27%) attests to the growing inequality of energy expenditures in the Czech Republic. This is because the reference value for the compensating variation is the 1995 national average for each country.

Figure 2:
Energy burdens, and compensating variation for energy expenditure per equivalent income decile, Czech Republic, 1995-2004 (Author's calculations based on household expenditure data from CSO, 2005).



However, there is also a third, relatively unexpected trend: the energy expenditures of the top four deciles have actually fallen since 1995. This expenditure decrease is unlikely to have been associated with a drop in energy consumption, because the incomes of such households have increased at a greater rate than those in the lower deciles. Instead, it is more probable that the availability of cheaper and/or more efficient fuels, coupled with the improved technical quality of the residential stock, have helped reduce the energy bills of the richest 40 per cent of the population.

The concentration of energy poverty in the lowest income decile is verified by the surveys of well-being within the FBS, which have established that 8.2% of households are not satisfied with the level of heating in their homes. This is slightly higher than the 4 per cent and 7 per cent of households estimated to be living

under the APL and RPL, respectively (CSO, 2005). However, 37% of households interviewed within the FBS well-being survey stated that housing costs represent a 'significant financial burden' on their family budget, while 11.7% thought that they couldn't afford an 'adequate' amount of heating in the home.

Conclusion

This paper investigated the extent of energy poverty among the populations of Macedonia and the Czech Republic with the aid of household expenditure survey data. Several theoretical approaches were embodied into the design of the compensating variation method and energy burden comparisons, which were supplemented with subjective evidence about the state of domestic warmth.

The reviewed evidence points to the existence of a direct link between domestic energy deprivation, on the one hand, and increasing energy prices and falling real incomes, on the other. Both Macedonia and the Czech Republic have experienced changes in household energy consumption and expenditure, following the abolishment of universal socialist-era subsidies of energy tariffs, and the drop in mean real incomes due to transition-related poverty and unemployment. But this is where the similarities end, as the socio-economic features of domestic energy poverty are strikingly different in the case of each country.

In Macedonia, the population living in inadequately heated homes is clearly much bigger than the cca. 30% of households considered 'poor' according to the RPL set by the state, and may even include 60% of all households. Energy poverty in this country has thus assumed both a low- and middle-income character, because it extends beyond the boundaries of relative and absolute poverty lines. In other words, relative income poverty in Macedonia is a subset of energy poverty. Conversely, domestic energy deprivation in the Czech Republic is a socially-marginal phenomenon, because it exists between the APL and RPL. The rate of energy poverty can range between 4 and 11 percent of households, depending on the way in which the problem is being defined and measured.

Domestic energy deprivation in both countries has been triggered by a common predicament: the decreased affordability of energy in post-socialism. Households have responded to this situation in three ways. Some families have continued to consume energy as before, because they have been able to afford it. Others have switched towards more efficient or cheaper fuels, because they have disposed of either the capital stock, or the necessary funds to make such a move. For a third group of households, however, most (or all) forms of energy have become unaffordable post-1990, even when they have been able to substitute fuels. These families have been forced to decrease their energy purchases, in some cases below the biologically-acceptable limit, which means that they have been pushed into energy poverty.

Clearly, domestic energy deprivation is a complex phenomenon that does not conform to standard poverty lines and measurement methods. Estimating its size and extent requires a combination of methods and conceptual approaches. Yet a clear statistical figure about the extent of domestic energy deprivation may lead to an increased political awareness about the problem, as it will imprint an obvious and unavoidable number into the minds of the public and policy-makers alike. It may thus be useful to work towards a common methodology for energy poverty measurement in the East European context, extending beyond affordability. This framework would help estimate the size and extent of populations affected by energy poverty by interpolating a number of different indicators, including actual consumption, expenditure, demographic structure, and the state of the dwelling. Considering that most of these indicators are already included in household expenditure surveys, it could be devised by extending the extent of such surveys to include a slightly wider set of datapoints. However, data gathering personnel would also have to be trained to collect this information, which isn't always straightforward and simple.

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TAX HARMONIZATION IN THE EUROPEAN UNION - DENOTATION AND POSSIBILITIES²

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Abstract

Different tax systems distort trade and factor movements between the member states of a single market. Abolition of trade barriers among the members of the customs union does not necessarily mean that a common, perfectly competitive market has been completed. Impediments to the smooth functioning of the competitive markets for commodities, services and factors of production are still many. Differences between the tax systems of the members of the single market are one of the most important of these impediments and one of the most difficult to alleviate. Tax harmonization is one aspect of the drive to a single market within the EU, removing distortions to trade between its members. Therefore, during market integration it becomes necessary to introduce policies aiming at tax coordination and harmonization. The European Union never had the intention to apply overall tax harmonization. Tax sovereignty is one of the basic components of national sovereignty, and the difficulties in the field of tax harmonization are compounded by deep-rooted differences in economic and social structures, different perceptions on the role of taxation, difference in the acceptability of various taxes, the technical complexity of tax harmonization, and the complications arising from the enlargement of the Community; thus calling for mutual recognition and equivalence as the starting point. However, a high degree of harmonization is desirable in the indirect tax field because indirect taxes may create obstacles to the free movement of goods and services within the single market.

Key words: European Union, Single market, Tax harmonization, Tax systems, Tax policy

I From Common Market to Single Market

The 1957 Treaty of Rome, which set up the European Economic Community, provided for the establishment of common market, through promotion and coordination of economic activities, providing economic stability, economic growth and better standard of living. The establishment of the common market meant realization of four freedoms (free movement of goods, services, capital and labor). The idea was to establish custom union with abolition of tariff barriers in the inter-trade of member-states of the Community; setting of common external tariffs; abolition of quantitative restrictions (quotas) and measures with equivalent effect, all of these in light of providing free movement of goods, services, labor and to some extent of capital. Up to the beginning of the seventies, some level of accelerated integration was achieved. The custom union was accomplished until 1968 (18 months earlier than envisaged), the quotas were abolished, free movement of workers was provided and some level of harmonization of indirect taxes was achieved (with the introduction of value added tax). All of these meant partial realization of the common market. The events in the seventies (oil crises and the collapse of Bretton-Woods monetary system) slowed down the integration process.

2) This paper was received for review on 27 August 2006

This period is known as period of Eurosclerosis. Up to mid eighties, it was obvious that further development is not possible, if there is no way how once more to place in focus elimination of internal frontiers. The respond to these need was the print of the White Paper titled as "Completing the Internal Market", by the European Commission. The White Paper included approximately 300 directives that have to be implemented with deadline 31 December 1992 (that is why this process is known as Europe 1992). The aim was to eliminate all obstacles in completing the internal market.

"Unifying this market (of 320 million) presupposes that member-states will agree on the abolition of barriers of all kinds, harmonization of rules, approximation of legislation and tax structures, strengthening of monetary cooperation and the necessary flanking measures to encourage European firms to work together. It is a goal that is well within our reach provided we draw the lessons from the setbacks and delays of the past. The Commission will be asking the European Council to pledge itself to completion of a fully unified internal market by 1992 and to approve the necessary programme together with a realistic and binding timetable".³

The goal to realize the single market was implemented in the Single European Act from 1986, which was addition of the Treaty of Rome. It says:

"The Community shall adopt measures with the aim of progressively establishing the internal market over a period expiring on 31 December 1992... The internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured in accordance with the provisions of EEC Treaty (Treaty of Rome)".⁴

The aim of White Paper was to give new focus, dynamism and impetus of the goals set with Rome Treaty.

With regard to the complexity of the market of European Community, the single market program included three major chapters, which list the measures necessary to create the single market. One of the major chapters is devoted to taxation.

The measures envisaged in this chapter relate solely to indirect taxation, since this is an area, which gives rise to checks at frontiers between member-states. One of the principal reasons for frontier checks is the need to levy or monitor value added tax and excise duties. The abolition of tax frontiers, which plague both firms and individuals, is key element on the moves to complete single market.

Direct taxation does not necessitate frontier checks. Nevertheless, national provisions exist which raise invisible frontiers that hamper cooperation between firms from different member-states. For instance, there is double taxation, which impedes mergers between firms established in different member-states. Elimination of such double taxation is therefore an integral part of the program for completing the single market.

Up to 1993, some progress in realization of single market was achieved. However, there is no complete realization of the ultimate goal. The idea for establishment of complete single market was not accomplished. There are still many barriers that impede the free movement of factors. There are still policies where nations have discretion in making decisions. One of the fields where limited success is achieved is the field of taxation.

Taxation is an important and, at the same time, difficult aspect of the program for completing the single market. It is important because without proper rules governing the tax treatment of cross-frontier transactions, tax barriers would remain in place, and difficult because any decision relating to taxation has immedi-

3) Commission of the European Communities: Completing the Internal Market, White Paper from the Commission to the European Council, Brussels, 1985, p.6

4) Nugent, N.: The Government and Politics of the European Union, Duke University Press, Durham, 2003, p.298

ate repercussion for national budgets. The unanimity required in the Council of European Union compounds the difficulties.⁵

II Tax System in Economic Integration

The economies of member-states of an economic integration are highly integrated because of the free movement of goods, services, capital and labour across national borders. National governments have discretion right to rule the tax policy, i.e. over a wide range of tax types, subject to any tax harmonization that may be in effect. The implications of ruling individual tax policies, is that these actions may have spillover effects that can affect the well-being of other member-states.

To see the importance of the tax policy in an economic integration it is useful to distinguish between income taxes and consumption taxes.

In an economic integration, redistributive policies are responsibility of individual member-states, there is no central authority. This implies, given the mobility of skilled persons and firms that the extent of redistribution is subject to inter-nation competition that is called "race to the bottom". However, the fiscal spillover effects not only affect the redistributive goal. There are also likely to be consequences for the efficiency of the economic union, as well for the integrity of national tax systems. The mobility of skilled persons gives possibility of a misallocation of resources among nations (but here we should mention that the tax factor is not the only which has effect on the persons mobility - cultural and language differences also have an effect on this mobility).

There will be difficulties also in taxation of the income of firms, working in more than one country. Nations will have an incentive to use not only their rate structures but also elements of their base to attract capital. Here the harmonization is viewed as a possibility, which will mitigate the problems. The harmonization is a necessary process in the light of introduction of the single currency and realization of the economic integration, taking into consideration that one of the factors that have influence on investment decisions, the exchange rate adjusting, in these terms is eliminated. The harmonization would be essential, if tax factor is the only factor that influences investment decisions. However, in practice prevails tax competition that per se will lead to tax harmonization.

The functioning of different tax systems, from the aspect of the consumption taxes, has its implications in the free movement of goods and services. That is why the convergence of these taxes is crucial in an economic integration, where there is no risk of exchange rate adjusting, where the comparison of prices of one product is much easier and where the transaction costs are eliminated.

In the theory there are two approaches dealing with the consideration of the importance of the tax system in an economic integration, i.e. whether the tax policy should be governed at the national or supranational level.

If we have in mind the externalities that can be caused with the functioning of the different tax systems (spillover effects) it would be better to govern the tax policy at unions' level. The other argument is that some policies are more efficient when carried out on a large scale. The acceptance of this approach would mean to give up sovereignty and delegate a task to a supranational institution.

The other approach is to retain the national competences in this field. The arguments here are the existence of heterogeneity of preferences and information asymmetries. Heterogeneity of preferences and information asymmetries imply that it would be inefficient to share competence at a supranational level.⁶

5) European Commission: Taxation in the Single market, Office for Official Publications of the European Communities, Luxembourg, 1990
6) Baldwin, Richard and Wyplosz, Charles: The Economics of European Integration, Mc Graw-Hill education, UK, 2004, p. 389

III Definition of the Harmonization

1. Abstract of the Harmonization

The analysis of tax systems of the member-states of the Union gives opportunity to conclude that there are no states:

1. Between which there are no differences in the structure of tax incomes,
2. In which there is equal number of tax incentives and reliefs and
3. In which there is equal number and level of tax rates.

The convergence of tax systems because of legislative acts at a Community level is defined as harmonization. Here we differentiate complete harmonization, which means same tax bases, rates, systems etc. and partial harmonization or approximation, which for example includes setting of minimum or maximum tax rates, elimination of double taxation etc.

The process of tax harmonization is a process of elimination of fiscal barriers and differences between tax systems of the separate member-states of the Union. Tax harmonization is the process by which the tax systems are aligned with each other so that tax considerations do not influence the movement of factors of production. Tax harmonization is required when there are fiscal externalities between member-states where-by one state's decision affects other states. Tax harmonization attempts to internalize these effects by making different tax systems more compatible with each other and with the objectives to establish economic union.

2. Objectives of the Harmonization

Considering all the tax types, the Treaty of Rome generally identifies the need to harmonize the indirect taxes. It specifies that "the harmonization of legislation concerning turnover taxes, excise duties and other forms of indirect taxation" is a principal objective of the Community. The Treaty of Rome does not explicitly calls for harmonization of direct taxes, but provides base to approximate the laws, regulations or administrative provisions of member-states, which directly affect the functioning of the common market.

The general aim of tax harmonization is fiscal neutrality, defined as equal treatment for domestic production and imports from member-states. The Commission clarifies that tax harmonization is not an attempt to design an ideal fiscal system for the Community but a blueprint for abolition of fiscal barriers.

Tax harmonization in the European Union has aimed two objectives:⁷

1. Competition on equal terms among the EU partners, implying abolition of tax frontiers and
2. Acceleration of the process of integration and unification of the market.

In practice, tax harmonization has proved more difficult than envisaged. The sovereignty of member-states in making the tax decisions, which is one of the fundamental components of national sovereignty, means limited results that are achieved at a slow pace.

Taxation in European Union is based on the principles of:⁸

1. National competence, whereby policy is exclusively a matter for member-states if the Community does not have competence under the treaty;

2. Subsidiarity, whereby action should only be taken at Community level where the objectives cannot be sufficiently achieved by member-states and can be better achieved by Community;

3. Unanimity, whereby EU-wide taxation matters can only be adopted by a unanimous vote of member-states.

IV The Importance of Tax Harmonization for Realization of the Single European Market

Tax harmonization is one of the aspects that are essential for realization of the single market. Different tax systems are impediments of the free movement of factors of production. They can distort the economic behavior of consumers, workers and investors, in a way that affects the functioning of the single market. Different tax systems on personal income tax and social contributions are one of the factors that influence the decisions for residency and location of work. Tax competition may lead to inefficient allocation of resources. The movement of the mobile factors (capital and investments) from one to another state may lead to decrease of tax incomes, through decrease of tax rates. The decrease of corporate tax rates confirms the shift of the tax burden from mobile to immobile factors, i.e. an increase of the tax burden of the labor. High taxes on labor tend to increase unemployment if trade unions manage to shift the tax burden forward onto employers via higher gross wages. The employers may try to pass the cost increase on to consumers. But in a globalized economy, the scope for price increases is limited. Therefore, they reduce the demand for labor instead. Unemployment increases. High tax rates on labor are also considered as a major factor behind the shadow economy, particularly for labor-intensive industries. In order to solve these problems, the European Commission suggested in 1994, and the European Council agreed the same year at its summit in Essen, that the tax burden on labor should be reduced by at least one or two percentage points of GDP. This requires coordinated action to eliminate tax competition, which so far has not been forthcoming.⁹

The single market program, which is not yet completed, includes in itself provisions related to harmonization of indirect taxation of goods and services, especially harmonization of the value added tax.

The found of harmonization of indirect taxes, as it is mentioned before, is in the Treaty of Rome. It says: The Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament and the Economic and Social Committee, issue directives for the approximation of such laws, regulations or administrative provisions of the Member States as directly affect the establishment or functioning of the common market¹⁰. The aim is to harmonize and not to standardize the national systems of indirect taxation. It is important not just to make more compatible tax systems with each other but also to ensure that they are in accordance with the objectives of the Treaty of Rome.

8) Ibid.

9) Genchel, Philipp: Globalization, Tax Competition, and the Fiscal Viability of the Welfare State, MPIfG Working Paper 01/1, May 2001

10) Consolidated version of the Treaty establishing The European Community, Article 94, www.europa.eu.int

The first step toward harmonization of indirect taxes was the introduction of value added tax in the late sixties. Since then there are a lot of directives and proposals concerning not just the value added tax, but also, excise duties. However, only a partial harmonization is achieved. The appliance of the unanimity principle in the Council of ministers for decisions in the field of tax policy is identified as core reason for the limited results. These results affect not just the slow realization of the single market, but also have a negative effect on the problem of unemployment and encourage the erosion of tax base. Under the circumstances, the Commission in a communication dated 20 March 1996, identified the three main challenges that would be the key elements of the European Union's tax policy in the years ahead:¹¹

1. The stabilization of Member States' tax receipts;
2. The smooth functioning of the single market;
3. The promotion of employment.

The intend is to find appropriate solutions to these problems that are consistent with the principle of subsidiarity.

The progress achieved in the field of harmonization is slow, a lot of differences stay, but the variations in the VAT systems from the mid eighties tend to reduce. One of the first and long-term aims of the general tax policy of the Community was to eliminate differences in tax rates and on the whole indirect tax systems, which distort the competition in the single market and the functioning of the market.

The results that are achieved in the field of direct taxation are also limited, and in addition, the number of initiatives and proposals is limited. As we mentioned, there is no provision in the Treaty of Rome that explicitly calls for harmonization of direct taxes. The unanimity decision making in the Council of the European Union in the field of tax policy, gives opportunity the resistance of member-states to impede the harmonization of direct taxes.

The single market program did not directly point out the need to reduce the differences between corporate tax systems, but gave some indirect directions in this field, through promotion of cross-border investments.

The harmonization of direct taxes is generally based on two aims: elimination of tax evasion and elimination of double taxation. In order to prevent the distortion of the competition, especially in the field of investment decisions it is important to achieve some level of harmonization of direct taxation.

Single market realization, as well as the introduction of the single currency leads to new initiatives in the field of taxation, at Community level.

The matter of taxes continues to be one of the most important fields, that are impediment in realization of the ultimate aim, i.e. smooth functioning of the single market. Beside the need to achieve some level of tax harmonization, national governments of member-states of the Union resist making higher steps in direction of its realization.

In 2000, at the Lisbon Summit, was set new strategic goal for economic development of the Union that should be accomplished by the end of the decade. European leaders pledged to make EU by most competitive and dynamic knowledge based economy in the world, capable of sustaining economic growth with more and better jobs and greater social cohesion.

The European Commission has adopted a comprehensive plan of EU-wide taxation and customs measures that would help the EU to achieve its Lisbon objectives. The measures proposed are not intended to change the structure of Member States' tax systems or to impinge on their national fiscal sovereignty. Instead, they are simply aimed at reducing the negative effects, which co-existing national tax systems can have on market integration.

Table 1: Lisbon Strategy: Key Taxation and Custom Policy Measures

Making Europe a more attractive place to invest and work	Knowledge and innovation for growth
<p>1. Extending and deepening the internal market</p> <ul style="list-style-type: none"> - A Common Consolidated Corporate Tax Base for EU businesses (2008); - Simplifying the tax environment and creating a level playing field; - VAT compliance obligation: one stop shop (2004); home state taxation (2005); - VAT rules international services and financial services (2005), (2006); VAT public bodies, (2006); - Targeted measures to remove cross-border tax barriers faced by EU businesses: cross-border loss relief, (2006); transfer pricing, (2005); capital duty, (2006); - A new strategy for car taxation (2005); - Reducing distortions created through tax fraud and tax evasion (2006) 	<p>1. Increasing and improving investment in R&D</p> <ul style="list-style-type: none"> - A Communication providing guidance on R&D tax incentives (2006)
<p>2. Ensuring open and competitive markets inside and outside Europe</p> <ul style="list-style-type: none"> - A strategy against counterfeiting (2005); - Improving customs legislation with a view to promoting e-Customs (2005) <p>3. Improving European and national legislation</p> <ul style="list-style-type: none"> - Modernising VAT rules (2005) 	<p>2. Facilitating the sustainable use of resources</p> <ul style="list-style-type: none"> - Energy, transport and Environment-related taxes: taxation of commercial diesel, (2005); energy taxation, (2006); car taxation, (2005)

Source: Taxation and Customs: Commission sets out actions to boost European competitiveness, www.europa.eu.int

Concluding Remarks

The 1957 Treaty of Rome, which set up the European Economic Community, provided for the establishment of common market. The establishment of the common market meant realization of four freedoms (free movement of goods, services, capital and labor). The need to realize the four freedoms was supported as well with the print of the White Paper titled as "Completing the Internal Market", by the European Commission. The White Paper included approximately 300 directives that have to be implemented with deadline 31 December 1992 (that is why this process is known as Europe 1992). The aim was to eliminate all obstacles in completing the internal market.

With regard to the complexity of the market of European Community, the single market program included three major categories of barriers that had to be eliminated to complete the single market. One of those categories of barriers were fiscal barriers.

Fiscal barriers distort the terms of competition and the free movement of factors of production. Different tax burdens may influence and change the costs related to the product in a way that can reduce the competitive advantage of the product. In interest of the single market development, it was important to take over some measures to eliminate these barriers, principally to make changes in the system of indirect taxation (to harmonize tax rates).

The functioning of different tax systems, from the aspect of the consumption taxes, has its implications in the free movement of goods and services. That is why the convergence of these taxes is crucial in an eco-

conomic integration, where there is no risk of exchange rate adjusting, where the comparison of prices of one product is much easier and where the transaction costs are eliminated.

The aim is to harmonize and not to standardize the national systems of indirect taxation. It is important not just to make more compatible tax systems with each other but also to ensure that they are in accordance with the objectives of the Treaty of Rome.

The single market program did not directly point out the need to harmonize the direct taxes. However, liberalization of capital flow seeks out harmonization in this field. National provisions concerning direct taxation create barriers in the cooperation between firms from different member-states of the Union.

Different tax systems impede the free movement of factors of production between member-states of the common markets. That is why tax harmonization is needed. European Union never had the intention to apply overall tax harmonization. Tax policy is symbol of national sovereignty and part of economic policy. Taxation in European Union is based on the principles of subsidiarity, national competence and unanimity. Tax policy in the Union is a matter of responsibility of member-states. However, some level of tax harmonization is needed, in particular in field of indirect taxation, as indirect taxes slow down realization of free movement of goods and services in the single market area.

Single market realization, as well as the introduction of the single currency leads to new initiatives in the field of taxation, at Community level.

Nevertheless, beside all these aspects, in practice, tax harmonization has proved more difficult than envisaged. The matter of taxation continues to be one of the most important fields that are obstacles in realization of the ultimate aim, smooth functioning of the single market. The sovereignty of member-states in making the tax decisions, which is one of the fundamental components of national sovereignty, means limited results that are achieved at a slow pace.

Beside all of the efforts in the field of tax harmonization, the achieved level is just partial. As main impede in realization of higher level of tax harmonization (beside the sovereignty of member-states in making the tax decisions), we exactly identify the appliance of the unanimity principle in the process of making decision in the tax field, in the Council of ministers. Those results are not just an impede in the realization of the single market, but have a negative influence on the unemployment problem and also encourage the tax base erosion.

The tax field remains as one of the most important fields, which are obstacle in achieving the ultimate goal. Next to the need of achieving some level of tax harmonization, national governments of the member-states of the Union refuse to give in to making higher steps in its realization.

This resistance of the national governments would means not just slow realization of the single market, but also, what is more important, it makes difficult the process of full economic integration in the Union i.e. achieving on the next stage of the integration process - complete economic union (which in the same time is the final stage of economic integration). After complete economic integration, the integrated units have no or negligible control of economic policy, including full monetary union and complete or near-complete fiscal policy harmonization.

Regarding these aspects of the European economic integration process and the limits of overall realization of an economic union one of the arguments surrounding economic integration is consideration: regionalism versus nationalism, which would set the question: what concept prevails? Is it the concept of intergovernmentalism or the concept of supranationalism that prevails? Could the European Union reach the phase of full economic union or the achieved level is the apex?

These processes of the European economic integration are not just interested in its' self but also from the aspect of Macedonian aspirations to become part of these processes. That's why the field of taxation (as one of the chapters of *acquis communautaire*) is one of the considerations that are highly discussed today.

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UDK 373.24.014.552:311.2 (497.7) “2005” MEASURING PERFORMANCE OF KINDERGARTENS IN MACEDONIA WITH DATA ENVELOPMENT ANALYSIS-DEA¹²

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Abstract

The process of decentralization in Macedonia started on July 1st 2005. One year is not enough to do an all-encompassing evaluation of the process but a low cost monitoring can follow the changes, lower the cost of future evaluation and give some insights related to performance measurement of the transferred competencies to LGU level, fiscal gap, vertical and horizontal equalization etc. We consider the child care transfers of competency from central to local level and try to measure the efficiency and productivity of this public sector by using the nonparametric DEA method.¹³

Key words: Decentralization, performance measurement, kindergartens, intergovernmental transfers, benchmarking.

Introduction

The process of decentralization in Macedonia started on the 1st of July 2005 with the provisions of the Law on financing Local Self-Government-LSG being on power. The Law on LSG also regulates the competencies of the local governments in Macedonia. A wide range of responsibilities are listed in the provisions of Article 22 of the Law on LSG, one of which is the protection of children - Kindergartens as transferred responsibility from the Ministry of Labor and Social Policy to the LSG level.

Related to the protection of children, the following were transferred to LSG level: decision-making authority, right of ownership, staff, equipment, archives and documentations. In the first phase of the process of decentralization the financing was through the instrument of earmarked grants to cover the operational expenditures such as communal services, heating, transport, communication, materials and repair tools, and maintenance. Salaries and capital expenditures are still at central level responsibility.

In this paper we are interested to analyze the efficiency of the Macedonian kindergartens in spending the earmarked grants given the output they produce and to provide intra-industry and intra-LSG benchmarking. Of course that the measurement and data problems are evident but we put attempt to provide a cross kindergartens and cross LSG comparison with this microeconomic exercise. The main purpose of this paper is two fold. One is to promote and motivate introduction of a performance measurement system in general and two to serve as an invitation for a debate about possible performance measurement system at the LSG level for the child protection competency.

The paper is organized as follows. First, we describe the kindergartens and the possible performance measurement system and then the data for the estimation. The discussion follows after the results from the non parametric estimation are illustrated. In the annex we introduce the methodology DEA for estimating the productivity and efficiency in spending the earmarked grants across kindergartens and across LSG.

12) This paper was received for review on 28 September 2006.

13) I am using the DEA Computer Program Version 2.1 developed by Tim Coelli in 1996.

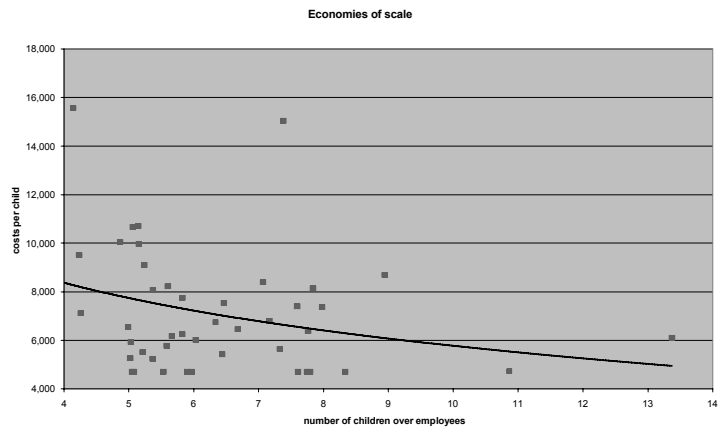
Kindergartens in Macedonia

In Macedonia, 40 municipalities have 51 public kindergartens with 20,236 registered children as of September 2005.

Box. Discussion about the kindergartens as a public production sector

Related to the input/output distinction of the production sector (see Annex 1), when there are constant returns to scale it doesn't matter if the research is input or output orientated, but it matters when there are variable returns to scale. The discussion can be extended with our problem observation of the kindergartens. Namely, there are indications of the possible returns to scale in this public sector (see the next Figure 4) and second, since it is a public sector it can be analyzed within the framework of an input oriented efficiency measure. This is because the number of children served is determined by the demand side and not from the operator side of this public sector. Because of that, the operator is constrained to look forward for improved efficiency in utilization of input quantities.

Figure 4
Efficiency at
kindergartens



The data analyses show that there is no correlation between costs per employee and cost per child. However, there does seem to be some connection between the number of children per employee and the total cost per child. Kindergartens with most children per employee tend to have the lowest unit costs. Figure 4 shows that the cost per child decreases the higher the number of children per employee which might be evidence of returns to scale in this industry. In other words, differences in efficiency seem to be the most important factor in explaining cost variations between kindergartens in Macedonia.

Performance measurement at kindergartens

The implicit assumption of the process of decentralization is providing better services to the citizens. The meaning of 'better' is defined with the standards stipulated in the legislation. A performance measurement system provides decision-makers with information, which can be used to make better decisions for better services and thus, provide feedback for potential improvements in the standards i.e. improvements in the legislation.

Performance measurement can lead to important outcomes:

- Improving allocative efficiency (by guiding decision-makers in providing funds for sectors of specific local importance or selecting that mix of inputs which produce a given quantity of output at minimum cost)
- Improving technical efficiency (by helping to ensure that allocated resources translate into efficient delivery of public goods and services or producing the maximum output attainable from the given set of inputs)
- Improving transparency and accountability (by regularly informing the public on the spending of public funds and through measurement of the achieved results)
- Improving the scope of work for public staff through its citizen focus (by concentrating and directing the work of the public staff on specific objectives)

Performance measurement is based on indicators that provide quantitative and qualitative details to objectives and must be statements about the situation that should prevail when an objective is reached. The following types of indicators can be used in the kindergartens within a perfect statistical information system:

Input indicators:

- Number of children - based on age, gender and ethnicity
- Size of kindergarten (m²/child)
- Number of support staff (non-teachers) to teachers (%)
- Teachers' qualification/educational background
- Average age of buildings
- Average age of (specified) equipment
- Total funding - based on sources
- Funding per child - for each source
- Cost per class
- Cost per child per week
- Maintenance costs per square meter

Process indicators:

- Average number of children per class/group
- Occupancy rate (actual number of children relative to capacity)
- Children-teacher/staff ratio
- Opening period (number of weeks per year)
- Opening time (number of hours per day)
- Number of accidents among children
- Number of formal complaints
- Number of staff-parent meetings

Output indicators:

- Waiting time
- Children who stayed all year

Impact indicators:

- Success at primary school

The data

It takes time to establish a firm performance measurement system and a one doesn't exist yet in Macedonia for monitoring and possible evaluation of the kindergartens sector and that is why for our research purposes the following data are considered for the DEA analyses:

Inputs:

- Earmarked grants (for 2006) per employees (as of 2004)

Outputs:

- Earmarked grants (for 2006) per number of children (as of 2005 September)

No data were available
for employees at:

LSG	Kindergarten
Butel	11 Oktomvri
Mak Brod	7 September
Sveti Nikole	Rahilka Goneva
Kavadarci	Rada Poceva

We use the variable returns to scale because of economies of scale indication related to the number of employees as it was shown in the figure 4.

Results from the DEA Computer Program Version 2.1

We analyze the intra-industry efficiency and intra-LSG efficiency by looking at the efficiency scores from running the DEA software. In the next Table 1 and Table 2 the efficiency scores are illustrated for the DMU kindergartens and DMU-LSG respectively. We look at the constant technical returns to scale-CRS, variable technical returns to scale-VRS and pure scale efficiency-SCALE. After that we will try to compare the pure scale efficiency with the defined input (input orientation as discussed in Box 1).

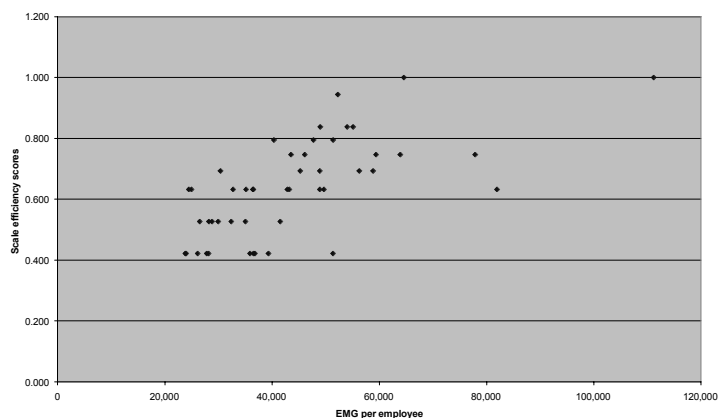
Table 1. Intra-industry efficiency benchmarking (efficiency increase from 0 to 1; irs-increasing returns to scale and drs-decreasing returns to scale)

		CRS	VRS	SCALE	
Kindergarten	DMU	CRS	VRS	SCALE	
Dimce Mircev	1	0.041	0.066	0.632	irs
Detska Radost	2	0.043	0.068	0.632	irs
Olga Miceska	3	0.095	0.100	0.944	irs
2 September	4	0.086	0.086	1.000	-
Gonca Tufa	5	0.058	0.073	0.795	irs
Femo Kulakov	6	0.195	0.282	0.693	irs
Veseli Cvetovi	7	0.583	0.696	0.838	irs
EO Mara	8	0.036	0.057	0.632	irs
Rosica	9	0.061	0.115	0.527	irs
23 August	10	0.017	0.033	0.527	irs
Aco Karamanov	11	0.018	0.044	0.422	irs
Mladost	12	0.049	0.059	0.838	irs
Breshia	13	0.018	0.044	0.422	irs
Kalinka	14	0.046	0.055	0.838	irs
VC Trena	15	0.031	0.039	0.795	irs
Goce Delcev	16	0.031	0.060	0.527	irs
11 September	17	0.280	0.352	0.795	irs
R J Korcagin	18	0.065	0.123	0.527	irs
Carka Andreevska	19	0.284	0.380	0.747	irs
Majski Cvet	20	0.018	0.044	0.422	irs
Bambi Mak	21	0.021	0.039	0.527	irs
Raspeana Mladost	22	0.119	0.159	0.747	irs
13 November	23	0.101	0.160	0.632	irs
Koco Racin	24	0.077	0.122	0.632	irs
Majski	25	0.030	0.044	0.693	irs
Buba Mara	26	0.018	0.044	0.422	irs
Angel Sajce	27	0.018	0.044	0.422	irs
Goce Delcev	28	0.632	1.000	0.632	irs
8 March	29	0.026	0.041	0.632	irs
Detska Radost	30	0.038	0.072	0.527	irs
7 September	31	0.041	0.060	0.693	irs
Jasna Risteska	32	0.043	0.068	0.632	irs
Snezana	33	0.067	0.089	0.747	irs
Veseli Cvetovi	34	0.024	0.038	0.632	irs
Nasa Idnina	35	0.025	0.047	0.527	irs
8 Mart	36	1.000	1.000	1.000	-
Pavlina Veljanova	37	0.057	0.082	0.693	irs
Detska Radost	38	0.018	0.044	0.422	irs
25 Maj	39	0.018	0.044	0.422	irs
Astibo	40	0.050	0.079	0.632	irs
Orce Nikolov	41	0.018	0.044	0.422	irs
Detska Radost	42	0.181	0.243	0.747	irs
Bratstvo-Edinstvo	43	0.062	0.089	0.693	irs
IR Lola	44	0.018	0.044	0.422	irs
K Pop-Ristov Delcev	45	0.037	0.050	0.747	irs
Smicka	46	0.018	0.043	0.422	irs
Prolet	47	0.158	0.250	0.632	irs
Industry scores	mean	0.106	0.145	0.636	

Source: DEA scores from running the DEA software. Instruction file defined by the author.

In the next Figure 5 we illustrate the dependence of the scale efficiency of the input defined as EMG per employees in the sector.

Figure 5
Returns to scale not exhausted yet in the kindergartens sector



From Figure 5 we can see that there is some correlation between the scale efficiency and the inputs measured as EMG per employee in the sector.

Similar discussion and findings are illustrated for the LSG level as well and presented in the next Table 2 and Figure 6.

Table 2. Intra-LSG efficiency benchmarking (efficiency increase from 0 to 1; irs-increasing returns to scale and drs-decreasing returns to scale)

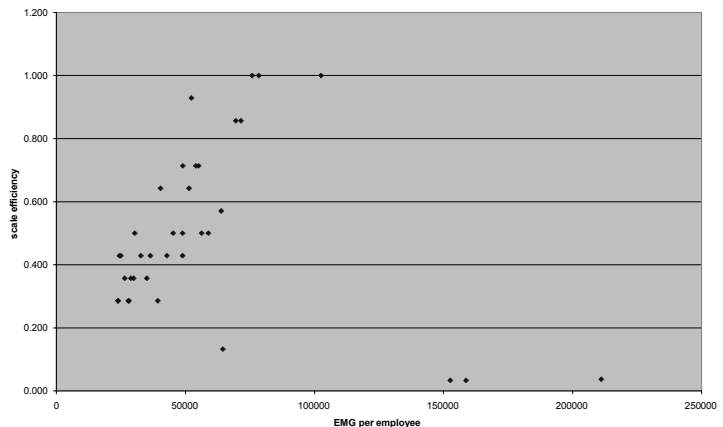
LSG	DMU	CRS	VRS	SCALE	
Veles	1	0.011	0.025	0.429	irs
Gostivar	2	0.011	0.026	0.429	irs
Kicevo	3	0.025	0.027	0.929	irs
Demir Hisar	4	0.022	0.169	0.133	drs
Krusevo	5	0.015	0.024	0.643	irs
Negotino	6	0.051	0.103	0.500	irs
Kisela Voda	7	0.153	0.214	0.714	irs
Bitola	8	0.009	0.022	0.429	irs
Gorce Petrov	9	0.016	0.045	0.357	irs
Berovo	10	0.005	0.013	0.357	irs
Radovis	11	0.005	0.017	0.286	irs
Tetovo	12	0.013	0.018	0.714	irs
Debar	13	0.005	0.017	0.286	irs
Valandovo	14	0.012	0.017	0.714	irs
Stip	15	0.008	0.013	0.643	irs
Vinica	16	0.008	0.023	0.357	irs
Resen	17	0.034	0.034	1.000	-
Kratovo	18	0.013	0.015	0.857	irs
Mak Kamanica	19	1.000	1.000	1.000	-
Centar	20	0.023	0.027	0.857	irs
Karpos	21	0.008	0.016	0.500	irs
Aerodrom	22	0.005	0.017	0.286	irs
Kumanovo	23	0.005	0.017	0.286	irs
Probistip	24	0.166	0.387	0.429	irs
Struga	25	0.007	0.016	0.429	irs

Sturmica	26	0.010	0.028	0.357	irs
Pehcevo	27	0.011	0.022	0.500	irs
Ohrid	28	0.014	0.014	1.000	-
Delcevo	29	0.006	0.015	0.429	irs
Prilep	30	0.024	0.736	0.033	drs
Kocani	31	0.015	0.030	0.500	irs
Gevgelija	32	0.033	1.000	0.033	drs
Gazi Baba	33	0.048	0.083	0.571	irs
Cair	34	0.016	0.033	0.500	irs
Kriva Palanka	35	0.005	0.017	0.286	irs
Bogdanci	36	0.030	0.797	0.037	drs
	mean	0.051	0.141	0.495	

Source: DEA scores from running the DEA software. Instruction file defined by the author.

Our indication of scale economies (returns to scale) are confirmed with the results from Table 2 as well. Namely, in the next Figure 6 we can see that the more EMG per employee the more efficient the DEA scores for the LSG units (except for the few outliers).

Figure 6
Returns to scale not exhausted yet in the kindergartens sector at LSG level



There is thus, increasing returns to scale indication in this sector (except for Prilep, Gevgelija and Bogdanci that are with decreasing economies of scale) and the scale economies are not yet exhausted if we measure the efficiency from the input side as EMG per employee. Of course that we must look at the structure of employees and all other categories of variables in order to check the robustness of our results, but we hope that this work can trigger a new way of thinking at LSG and central government about performance measurement within the process of decentralization with no ambition at this stage to provide an all encompassing study.

Conclusion

As a conclusion we can say that it is important to emphasize that decentralization is a process that will take time to complete. Such a complex operation will require monitoring and evaluation at many stages. These tools can and must be used for gaining insights into whether the goals and objectives are achieved

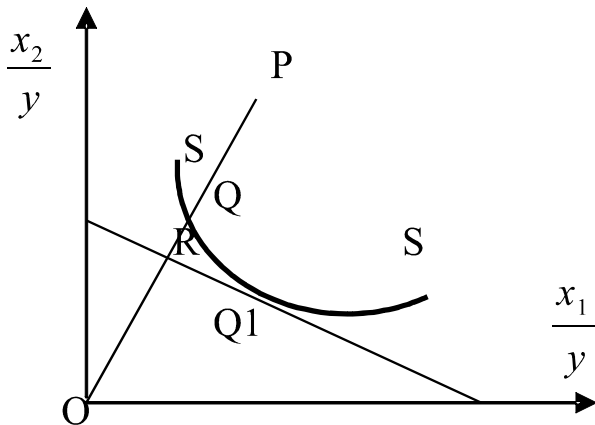
and how efficient are the resources used in the process. Of course that in order to achieve that a statistical information system in place is required, know how and willpower to conduct a complex performance reviewing. The final goal of such an operation should be a satisfied citizen and improved services at LSG level.

The goal of this paper is to motivate a debate about the decentralization process and how it can be monitored and evaluated. A possible measurement system is presented by utilizing the microeconomic theory and its application. Benchmarking provided by the DEA scores can be a powerful tool for motivating LSG administration on one side and on the other side a transparent tool for the citizen to ask for more efficiency at their yard by comparing the performance with other LSG. We illustrate some indication of possible increasing returns to scale at kindergarten industry in Macedonia but the robustness of the results should be checked in future. The methodology used is universal and can be extended to other LSG competencies as well as to other industries.

Annex 1. DEA methodology

As efficiency measurement we will use frontiers¹⁴ or more precisely the mathematical programming frontier. The mathematical programming frontier i.e. the non-parametric method is the Data Envelopment Analysis-DEA method¹⁵. We'll only look at some concepts that are of substantial value for understanding the mechanism of the estimations provided in this paper. For more thorough explanation we provide references. Farrell (1957) proposed that the efficiency of a firm¹⁶ consist of two components, the technical and the allocative efficiency. These two measures combined will provide the measure of the economic (total) efficiency. What we can see from Figure 1 is a DMU that uses two inputs x_1 , x_2 and produces one output- y . The isoquant S-S in Figure 1 is of a fully efficient DMU. There is a production frontier that corresponds with this isoquant and is for fully efficient firms only. But, in practice we don't know the production frontier and it must be estimated from observations on a sample of firms. The estimation can be by parametric or non-parametric methods.

Figure 1



So, if the firm is operating inefficiently, say in the point-P from Figure 1, the measure of technical inefficiency could be represented by the distance-QP. This distance is representing the amount by which the inputs can be reduced without reducing the output. The percentage term by which all inputs need to be reduced to achieve technical efficient production is represented by QP/OP ratio. The technical efficiency from

14) A production function is a frontier as well. The difference is that the assumption of efficient firms in the production function method operating on frontier is relaxed with the DEA method.

15) For more in depth rationale of the method see [1], [2], and [3].

16) In a frontier analyses literature usually the firms, operators etc. are named as a Decision Making Units-DMU.

Figure 1 is thus:

$$TE = OQ / OP = 1 - QP / OP \quad (1)$$

It is obvious that-TE will take value between 0 and 1 and can be indicator for the degree of technical inefficiency of a DMU. For example, a DMU that operates at point-Q is fully efficient and the proper TE takes value 1. The allocative efficiency of a DMU that operates at point-P is:

$$AE = OR / OQ \quad (2)$$

What we can see as well from Figure 1 and from Equation 2 is that the point Q is technically efficient but allocatively inefficient. It takes the DMU to reduce its production costs to be operational at the totally efficient point- . Thus, the allocative efficiency is:

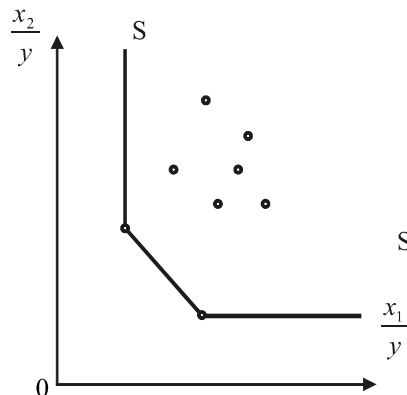
$$AE = OR / OQ \quad (3)$$

The distance-RQ represents the reduction in the production costs that would occur if the production were performing at the technically and allocatively efficient point instead at the technically efficient but allocatively inefficient point Q. Thus, the total economic efficiency will be:

$$EE = OR / OP = TE \cdot AE = OQ / OP \cdot OR / OQ \quad (4)$$

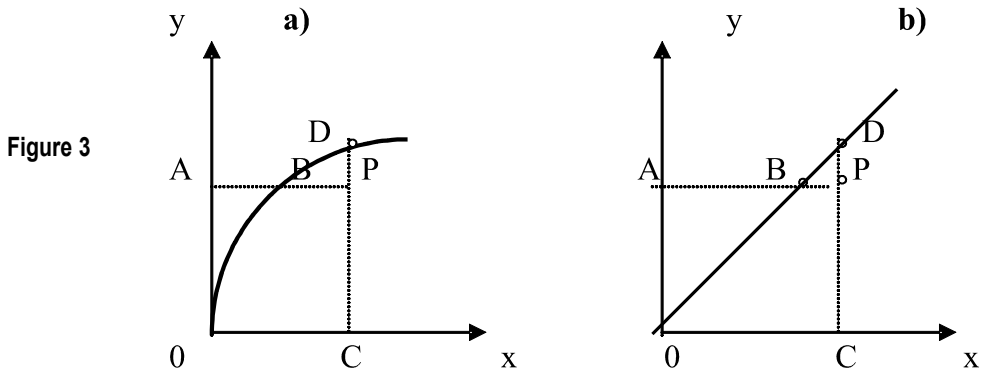
As we said previously, the production function and the proper isoquant should be estimated, because we don't know them in practice. Farrell (1957) suggested an estimation of linear convex isoquant such that no point from the observed data lies to the left or below it. As an illustration for a linear convex isoquant see the next Figure 2. Later, in 1978, Charnes Cooper and Rhodes used the Farrell method and the term DEA was first used by them. A mathematical programming model was used to estimate the linear convex isoquant as in Figure 2.¹⁷

Figure 2



17) More on the construction of the DEA models see [1] and [2].

The returns to scale in connection to the input/output orientation are illustrated in the next Figure 3.



From Figure 3-graph a) we can see the decreasing returns to scale case and the constant returns to scale on the graph b). If we ask by how much the input quantities can be proportionally reduced so the output will be the same then this is the movement from P to B in both graphs. That is the input orientated efficiency measure. Now, if we ask by how much the output can be proportionally expanded by using the same input quantities, then this will be the movement from P to D in both graphs. What is different in both graphs is that the input/output distinction matters only in the graph a), because the BP distance is not the same as the distance PD as it is the case in the graph b).

When a technology is analyzed as variable returns to scale and constant returns to scale separately then the technical efficiency can be decomposed on scale efficiency and pure technical efficiency (see Coelli 1996):

$$TE = SE \cdot PE \quad (5)$$

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