EVALUATING EFFICIENCY OF ACTIVE LABOR MARKET POLICY IMPLEMENTATION IN UKRAINE

by

Ivanna Dmytrotsa

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Approved by _____
Ms.Svitlana Budagovska (Head of the State Examination Committee)

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Abstract

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by Ivanna Dmytrotsa

Head of the State Examination Committee: Ms.Svitlana Budagovska,
Economist, World Bank of Ukraine

This paper aims at the analysis and evaluation of the efficacy and the efficiency of implementation of active labor market policy in Ukraine. For this purpose the notions of matching function is amalgamated with the efficiency estimation techniques. The estimation is based on the aggregated data obtained from the local employment centers for the period spanning from 1996 to 2002. The results of the investigation show that policies, implemented by the employment offices have positive impact on the outflow from the unemployment. Research also shows the dispersion of the efficiency of the centers and points as a caveat that technology employed by the centers worsens with time.

TABLE OF CONTENTS

INTRODUCTION 1
LITERATURE REVIEW 5
ACTIVE LABOR MARKET POLICY CONDUCT IN UKRAINE 12
THEORETICAL BACKGROUND FOR THE EMPIRICAL ESTIMATION 14
EMPIRICAL ANALYSIS 21
4.1 Methodology 21
4.2. Data Description 23
4.3. Empirical Results 26
4.4 Limitations to the Analysis 31
CONCLUSIONS AND POLICY IMPLICATIONS 33

LIST OF FIGURES

Number	*Page*
Figure 1. The Beverage Curve	14
Figure 2. Dynamics of Main Variables	25
Figure 3. Malmquist Index Summary of Annual Means	28
Figure 4. Efficiency Spread Between Regions: Sample 2000-2002	31

LIST OF TABLES

Number	*Page*
Table 1. Summery of Empirical Results on Matching Function	10
Table 2. Decomposition of Registered and Hired People	25
Table 3. Correlation: Policy Measures vs Outflow from Unemployment	26
Table 4. Model1: Efficiency Growth (period 1/1996 – 4/2002)	27
Table 5. Model2: Modelling Inefficiency Effects (period 2/2000 – 4/2002)	29
Table 6. Correlation Coefficients of the Efficiency Estimates	30

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Chapter 1

INTRODUCTION

Transition from the socialism to the market economy together with improvement of economic efficiency brought about job insecurity into the life of people. Mass of workers flowed into the unemployment state due to the contraction and shutdown of enterprises. Newcomers to the labor market also found it difficult to get employment as they were competing with already large pool of unemployed. Furthermore, overall stagnancy of production reduced the outflow of people from the state of inactivity that entailed both loss of earnings, disrespect, and sometimes even health problems.

In this context introduction of sound policy measures other than poor unemployment subsidies became very urgent. Solution was pursued through implementation of active labor market policy (ALMP).

The rationale for active labor market policies was first introduced in the developed market economies. These policies emphasize active participation of unemployed in the process of finding jobs.

Three main underpinnings form the ground for their existence.

First of all, for the welfare state it is rather expensive to support large stock of unemployed with the unemployment benefits. Other reasons for state intervention are various impediments (likewise asymmetric information, capital market imperfections) that introduce frictions into the labor market and prevent it from full employment (issue of efficiency wages put aside). The third reason is suggested by the theory of addiction. People are changed in the face of experience, so the outcome of allocations that exhaust the gains from trade after a

change in attitudes has occurred may not result in the same social welfare as it would if the change could be reversed.

While designing active labor market policy two kind of questions are addressed, namely: who to help and what kind of help to provide.

Layard et al suggest that given that the cost of removing of different individuals from unemployment and the likelihood of their reentering back into unemployment are the same, unemployment is reduced more if policies are directed at cohorts with longer expected remaining duration of unemployment. It is usually the case that longer expected remaining duration of unemployment spell is typical for those who have already been unemployed for some time. Part of the explanation for this is based on the concept of demoralization of workers that went through the continuous rejection. Another possible reason is the stigmatizing behavior of employers: many employers simply do not consider long-term unemployed as potential candidates for employees; again, people that were constantly rejected tend to be less confident even if called for interview. At the same time these are also people that require most costs for being helped out of unemployment.

Instruments employed by ALMP usually comprise consulting services (job-search assistance), training and retraining of unemployed, intervention and public works, loans or grants to support business start-up, measures directed at unemployment of young people, measures for disabled.

The main purpose of training is enhancement of human capital of unemployed and thus, boost of the probability of his employment. Another potential of this policy measure is for combating the mismatch of skills at the labor market. Although real costs of training are large, benefits from training are twofold and can be measured both in terms of higher employment and higher lifetime productivity of trained.

Intervention works or more informative term - employment subsidies – are primarily designed for unemployed with loose labor market attachment. This

policy tool decreases cost of hiring of worker for employer and thus gives him a chance to study employer's professional ability basically for free. Resource costs of subsidies are considered to be small as they essentially represent transfer payments. However, they are usually criticized on three grounds:

they introduce deadweight loss, as many of those that received subsidy would have been hired anyway;

subsidized unemployed are hired at the positions that otherwise would have been filled with other candidates. So, money spent on such people insures them preferential treatment, but not increases total amount of hiring1.

even subsidizing increases number of employees in one firm, this may be done at the expense of jobs in another. This gives rise to the displacement effect.

Public works program consists of creating special jobs for the unemployed under the auspices of a public or non-profit organizations. Jobs are of limited duration, and usually render useful services to the public or special groups. By offering temporary work opportunity to people with limited access to jobs public works refresh and develop their working skills and maintain their working habits. Therefore, they offer moral support to those people and speed their transformation from the state stagnant unemployment into regular employment Primary objection to the public works policy is potential stigmatization of its participants.

Interventions by government usually requires commitment of substantial societal resources that by the law of opportunity costs become unavailable for other purposes of government activity as well as for private sector, from which they were detracted in the first place. This issue is especially

[1] This argument is based on the assumption that labor demand is limited. However, it is evident that feasible demand is bounded by feasible supply. Therefore, increasing supply of the labor force (decreasing its cost) will result in increased number of employed.

hot in the circumstances of transition economy where few or no uncommitted resources are available. Therefore, objective evaluation of effects and costs of public measures is not a mere curiosity, it transmutes into the imperative duty of governors as well as independent researchers.

Thorough welfare analysis of policy measures may not be restricted exclusively to the employment effect. Policy makers are bound to operate in the state of the second-best and most of the measures they introduce to improve situation in the unemployment field introduce another distortions to the market, thus rising issue of their expediency. Gain from unemployment reduction is usually measured in terms of increased output. However, since unemployment is one of the major forces of inequality in modern societies, gain from its reduction pays in terms of more uniform income distribution. Therefore, careful considerations of output benefits as well as social costs and distributional consequences are required.

This paper has a far modest aim than complete evaluation of active labor market policy. It is partially determined by absence of data or limitations to its access. Another reason is serious theoretical and methodological shortage in this respect. So, major focus of the research is on the efficacy and efficiency of local employment centers – main driving force of active labor market policy in Ukraine.

Chapter 2

LITERATURE REVIEW

Evaluation of effectiveness of active labor market program (ALMP) was on a roll for 30 years. Most of the studies have American origin as "the US government has been much more active in promoting evaluations than have other governments" (Hechman at al. (1999)). In the last years an extensive evaluative literature on German labor market policy has evolved.

Two empirical questions stated in the studies of ALMP are (1) whether participants of the program gain from it and (2) whether program constitutes a net gain from the point of view of society. From here originate two distinct approaches in evaluation: microeconomic approach and general-equilibrium one.

At the microeconomic level evaluation is conducted with individual data. Different studies have different objectives as for the outcome measures. Usually effectiveness is defined in terms of improved employment opportunity or increased income of participants of different policies of ALMP or the Program in general. So, the interest of evaluation is in the difference of relevant outcome variables. At this point fundamental evaluation problem arises, as the same individual is never observed in both participation and non-participation states. Therefore, the evaluation challenge is to find a proper comparison group. The recent studies differ with respect to the methods they use to overcome the problem. Hechman at al. (1999) reviews the main identification and estimation strategies. Frolich (2002) in his revision makes particular emphasis on the evaluating policies consisting of multiple treatment programs. Hujer and Caliendo (2000) provide extensive overview of empirical literature on

Germany. Gerfin and Lechne (2000) is the respective study for Switzerland; and Kluve, Lehmann and Schmidt (1998) provide micro-estimations for Poland. In general results differ between studies as well as for different cohorts within studies.

The key assumption of the microeconomic approach is that the no-treatment outcomes within a given policy regime closely approximate the outcomes in a no-program regime. This assumption is necessary to ignore indirect effects that may arise in the form of (1) substitution (jobs created for some category are replaced with jobs for other category due to change in relative wages), (2) deadweight (when the subsidized activity would have occurred without the subsidy) or (3) displacement (when hiring of the treated is made at the cost of firing non-treated) effects. Evaluation at the aggregated (macroeconomic) level is required to test for the validity of this assumption as well as to estimate the net gain from the Program.

Empirical work on the macroeconomic effects of ALMP is rare. Bellman and Jackman relate this to the absence of clear theoretical framework (Hujer and Caliendo (2000)). One of the theoretical models used for macro-evaluation is of the Layard and Nickel (Hujer and Caliendo (2000)). Another attempt to evaluate aggregate effects is done by Davidson and Woodbary (1993) within the layout of Mortensen-Pissarides model. Yet, matching function approach is at the heart of many macroeconomic models of the labor market (Sunde (2002)). A more comprehensive outlook of the literature on the matching function is presented below since this approach is the cornerstone for the evaluation of ALMP in the paper.

Matching function captures the technology that brings unemployed workers and firms together. Classically it relates the rate of matching (m) to the stock of unemployed workers (U) and stock of vacant posts (V). In general-equilibrium models this function represents the source of frictional

unemployment, as it comprehends search and matching frictions. This function may represent additional inefficiencies in the labor market (Stevens (2002)).

There is an agreement in the literature about some basic properties of the matching function, e.g., it should be increasing and concave in both stock of unemployed workers and stock of vacant posts (Stevens (2002)). It is also often imposed that it exhibits constant returns to scale in U and V. In Pissarides's matching function, which is the main building block of the macroeconomic model of equilibrium unemployment, CRS are assumed to ensure the uniqueness of equilibrium along the steady state growth path (Puhani (1999)). Since the existence of multiple equilibria would provide scope for policy interventions, reliable estimates of matching elasticities are therefore of considerable importance. However "some models (for example, the well-known model of Diamond, 1982) use matching functions with increasing returns, resulting in a thin market externality and multiple equilibria" (Stevens (2002)). So, returns to scale are also used as a tool of measuring the direction of the externalities with respect to the size of the labor market. CRS in the matching function mean that increase in the size of the labor market in terms of vacancies and unemployed people would boost the number of matches by the same magnitude. Increasing (decreasing) returns to scale would indicate positive (negative) externalities with respect to the labor market size.

The microeconomic foundation of the matching function is based on the search phenomenon of workers and firms in the world of uncertainty. Diverse functional forms are suggested by different specifications of matching process. Petrongolo and Pissarides (2001) provide a comprehensive survey of matching functions. Some of the matching functions are grounded on the stock-flow matching. Its core is the heterogeneity and mismatch between the existing stocks of unmatched unemployed and vacancies. Others supervene from the statistical aggregation of unemployment and vacancies in a set of micromarkets.

This approach is based on the assumption of constrained mobility of labor and capital. Under assumption of log-normal distribution of vacancy-unemployment ratio, these matching functions exhibit constant elasticity of substitution. The most popular, however, are models that are derived from the 'urn-ball" process. In this process a proportion α of unemployed is placing applications (balls) to the randomly chosen vacancy (urn). The latter is filled by random selection of applicant by employer. Therefore the expected number of matches is $m = V(1-(1-1/V)^{\alpha U})$, which after approximation for large V (stock of vacancies for each period) yields a form: $m = V(1-\exp(-\alpha U/V))$. For a continuous time (worker posts applications at a constant Poisson rate α) it transforms into $m = \alpha U$. Mortensen and Pissarides (1999) extend this model to allow for simultaneous search of both firms and unemployed and provide the symmetric matching technology of the form: $m = \alpha U + \gamma V$.

Stevens (2002) notes that "despite their popularity, matching functions derived from urn-ball models do not have particularly desirable theoretical properties and cannot easily be integrated into standard search models, most of which are continuous time models treating workers and firms symmetrically". She also states that the most successful empirical functional form for matching function is Cobb-Douglas, for which, no theoretical justifications was provided up until recently. So, Stevens makes first steps in this direction. She presents a microfoundation for a simple matching process that satisfies the properties mentioned above. The resulting matching function is CES, and approximately Cobb-Douglas when marginal search costs are approximately constant.

Usually it is distinguished between ordinary and augmented matching function. The latter takes into account the heterogeneity of unemployed. Lehmann (1995) in his formulation of the augmented matching function uses the concept of the search effectiveness stated by Layard, Nickell, and Jackman. The matching function is of the form:

$$h = A(\psi U)^{\beta} V^{\gamma}$$

where ψU states for the search-effective stock of unemployed, and ψ - parameter, representing the search effectiveness of the unemployed people. This parameter is influenced by different factors. ALMP measures are assumed to have a positive impact on the effectiveness of unemployed. Thus, ψ is decomposed as:

$$\psi = \psi_0(1 + kT), T = \sum_{r=1}^{R} w_r T_r, \sum_{r=1}^{R} w_r = 1$$

where T_r represents different ALMP programs (it can be expenditure on the programs, stock or flow of participants, or any combination of the above). So, ψ_0 is the search effectiveness index without ALMP treatment.

Major weakness of the matching function concept is its ignorance of the endogenous but not observable behavior, in particular, the job-to-job transitions. This results in the improper proxy for stocks of work seekers and vacancies. Although Puhani (1999) states on the example of investigations made for Hungary, Czech and Slovak Republics that "many workers move from the public to the private sector without any intervening unemployment spell", Sunde (2002) shows that the failure to incorporate the unobservable behavior is the source of estimation bias in empirical investigations. Therefore, estimated coefficients are hard to interpret.

Fahr and Sunde (2001) incorporate the insight of strategic behavior of firms, which is not captured by the traditional representation of matching function. The strategy implies that firms condition their decision to post vacancies on the opportunity to fill in the vacant position with the worker already employed. However, the indicators that Fahr and Sunde use to test for the presence of endogenous composition or the size of the stocks of workers and vacancies are based on the assumption that only one of the sides (employers or job seekers) is characterized by the endogenous behavior. Sunde (2002b) extends the analysis to incorporate endogeneity from both sides.

Another weakness of the traditional matching function is due to the fact that it allows estimating productivity of different ALMP measures only under assumption of efficiency of the job creation process. That is, given the frictions incorporated into the analysis of matching functions, the maximal number of matches is created. However, integrity of the investigation requires estimation of matching efficiency to complement the analysis of matching elasticities and relative importance of different factors influencing matching process. Inefficiency and its determinants in the matching process would proffer certain policy issues.

One approach to this problem is the application of stochastic matching frontier to the model of matching process. The respective studies are: Ibourk, Maillard, Perelman, and Sneessens (2001), Sunde (2002a). Positive feature of this analysis is that given various disaggregations of the labor market it allows qualifying its most inefficient parts in terms of the matching process.

In conclusion, table below summarizes empirical results obtained from the application of matching function approach to the labor markets of different countries.

Table 1. Summery of the Empirical Results on Matching Function

Country	Study	Data	Results
Germany*	Hagen and Steiner (2000)	1990-1999	Positive effect for subsidized jobs, negative effect for vocational training (East); pure negative effect for West
Czech Republic**	Burda and Lubyova (1995)	1992-1994	Positive effect of ALMP expenditure and participants of ALMP; CRS not rejected
	Stejnar, Terrell, and Munich (1995)	1992-1993	Positive effect of ALMP expenditure per capita
Poland	Puhani (1999)	1992-1995, 1992-1999	No effect of training; no evidence of displacement effects
Slovak Republic**	Burda and Lubyova (1995)	1992-1993	Positive effect of ALMP expenditure; no effect of labor office stuff; CRS not rejected
	Stejnar, Terrell, and Munich (1995)	1992-1993	No effect of ALMP expenditure per capita
Bulgaria**	Lenkova (1997)	1994-1996	No effects of trining, Cobb-Douglas rejected in favour of CES; IRS
Ukraine	Kupets (2000)	1996-1999	Positive effects of policy measures

*source: Hujer and Caliendo (2000);

**source: Puhani (1999).

Chapter 3

ACTIVE LABOR MARKET POLICY CONDUCT IN UKRAINE

The main characters at the stage of the Active Labor Market Policy in Ukraine are employment centers (the main implementers of this policy), unemployed people that compose the supply of labor and employers, that represent the labor demand force.

In Ukraine the network of employment centers was introduced at the end of the year 1990. It was subordinated to the Ministry of Labor and Social Policy in Ukraine. The legislative support of this new institution was mainly provided through the law "On the employment of population". By this law employment centers were empowered to give informational services, provide training, retraining, social support of the temporarily unemployed etc. Informational services (such as information on the available vacancies, the supply of the labor, services of professional orientation) can be used by anyone. However such services as unemployment security, free training and the like are provided only to the people that are officially unemployed. To be considered as unemployed, a person must be at the employable age, s/he must have no earnings due to the absence of job, and must be ready and able to start working at the suitable place at any moment. Where suitable place for work for unemployed is the one that coincides with education, profession, and qualification of the person, is located at the region of his (her) residence; and the salary (or wage) is at the level of the salary at the place of the previous employment of the person.

The unemployed is entitled to the unemployment security and other benefits of the unemployment (the most essential is the subsidy on the housing

payment) only in the case when the center cannot offer him (her) the suitable work. Two denials to accept the suitable job proposition automatically result in the loss of unemployment security. The latter is also lost if the person does not periodically check in at the center's office.

If the employment center has no available suitable vacancies, person may be offered free training or retraining programs. The denial to accept the latter also leads to the dismissal from the state of legal unemployment.

The third character in the Ukrainian setup are employers. According to the law juridical entities of all forms of propriety are obliged to collaborate with the employment centers. Apart from the payment of the unemployment security, their collaboration covers two main aspects. First of all, in case of the firing of the employed due to the restructuring, they have to communicate their decision to the employment center 2 months in advance, and report their motivation, the timing of the firing, amount of fired people, their professions etc. They also have to report the list of dismissed from work 10 days after it was done. Second, according to the Ukrainian legislation juridical entities have to preserve 5 percent of work positions for the people that require social support and fail to compete for job on an equality with other people.

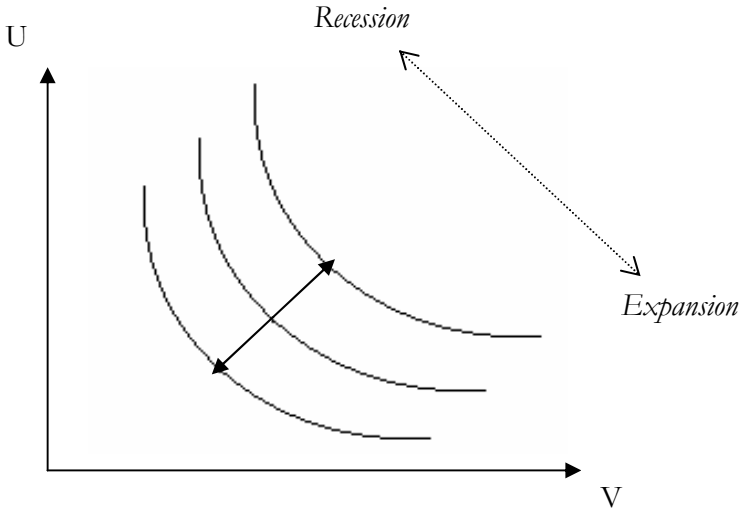
Chapter 3

THEORETICAL BACKGROUND FOR THE EMPIRICAL ESTIMATION

This section consists of two parts. In the first one general theoretical setup is presented. The second part is more specific as it introduces the model that provides the micro-foundation for the function under estimation.

As it already has been noticed, aggregate matching function is the popular tool that is used to capture the influence of frictions on the equilibrium outcomes on the labor market. In this framework steady state with equilibrium levels of unemployment and job vacancies is achieved as the result of the matching effectiveness of the market. This steady state is best described by the Beveridge curve, first introduced by William Beridge in the 1940s.

Figure 1. The Beveridge Curve



This curve may be seen as the isoquant that plots all the combinations of the inputs (vacancies and unemployed) that result in some amount of output (hiring).

Inverse relation between unemployment and amount of vacancies is explained by the cyclical pattern of the labor market: High unemployment is associated with low demand for labor, while low unemployment should come in hand with relatively high vacancy rate and hard times for employers to hire qualified workers.

From this viewpoint, Beverage curve describes the given state of the labor market. Therefore, its shifts may indicate changing matching productivity and efficiency. Hence, this research aims to estimate and compare whether changes in the matching efficiency may contribute to explain Beverage curve differences observed over time and across regions. For this purpose matching process is compared to the production and the production frontier is estimated.

At this stage functional form of the matching process gains its importance. The most frequently used empirical function in this context is of the Cobb-Douglas form. Until recently it had no theoretical justification. The following model of the job search process, introduced by the Margaret Stevenson (2002) resolved the problem.

The goal of the model is to explain worker and job flows on the labor market within the rational forward-looking agent paradigm. The basic idea is the existence of two-sided frictions in the process of matching employers and potential employees and that agents on both sides of the market devote some resources into overcoming them. As the result, job creation flow depends on the volume of the stock of unemployed workers and vacant jobs available and on the intensities with which workers search and employers recruit. This relationship came into existence under the heading of matching function.

Model operates with the mass of homogenous workers and the mass of identical firms. Each firm can employ only one worker[2].

[2] General structure of the model is in the same spirit as Hosios (1990)

Let u - be the stock of unemployed workers and v – the number of vacant jobs. When qualified unemployed worker and a sufficiently attractive vacancy meet, flow productivity y of their match is realized as a variable from some distribution $F(y)$. It remains constant for duration of the match. At the same time, matches are destroyed at exogenous Poisson rate λ. If this happens, both worker and vacancy reenter stocks u and v respectively.

Flow rate of meeting is described by the matching function $m(u,v,\alpha,\gamma)$, where α and γ - search and recruitment intensities which firms and unemployed choose to maximize their expected value of income. It is assumed that cost functions $C_w(\alpha)$ and $C_f(\gamma)$ are convex. It is also suggested that workers are entitled to flow of unemployment benefits z and firms suffer fixed flow cost x for holding open vacancy.

Let also introduce

U - expected income from the state of unemployment;

V - expected value for a firm for open vacancy;

W - worker's valuation of employment (with given match productivity y and wage w);

J - firm's valuation of hiring (with given match productivity y and wage w).

So, we come up with the Bellman equations:

$$rW = w + \lambda(U - W) \qquad (1)$$

$$rJ = y - w + \lambda(V - J) \qquad (2)$$

Hence, $W - U = \frac{w - rU}{r + \lambda}$ (3) and $J - V = \frac{y - w - rV}{r + \lambda}$ (4) are net surpluses of workers and firms.

Match is accepted in case these are jointly at least as high as reservation value defined as $y^* \equiv r(U+V)$ (5) (r – is some positive discount rate (agents are assumed to be risk neutral)).

In case match is accepted, wage is determined according to a generalized Nash bargain: $w = rU + \beta(y - y^*)$, where $\beta \in (0,1)$ - bargain power of the worker over the share of the surplus from the match.

Therefore, $W - U = \frac{\beta(y-y^*)}{r+\lambda}$ (6) and $J - V = \frac{(1-\beta)(y-y^*)}{r+\lambda}$ (7).

Agents' expected gains from contract are respectively βS and $(1-\beta)S$, where S - expected total surplus:

$$S = \frac{1}{r+\lambda} E[y - y^* \mid y \geq y^*] \Pr[y \geq y^*] = \int_{y^*} \frac{y - y^*}{r+\lambda} dF(y) \quad (8).$$

Let us consider a worker sending applications at the current rate α_i during the time interval dt and at the rate α in the future. Probability that an application makes contact with the firm is $(m/\alpha u)dt$, so his valuation of unemployment is:

$$U(\alpha_i) = (z - C_w(\alpha_i))dt + (1 - rdt)\left(U(\alpha) + \frac{\alpha_i m}{\alpha u} dt \beta S\right) \quad (9)$$

After maximization with respect to α_i, setting $\alpha_i = \alpha$, we get first-order conditions for equilibrium search intensity as follows: $C_w^{'}(\alpha) = \frac{m}{\alpha u}\beta S$ (10).

Letting $dt \to 0$ yields the equikibrium valuation of unemployment:

$$rU = z - C_w(\alpha) + \frac{m}{u}\beta S \quad (11).$$

In the similar pattern for the firm the following expressions are derived:

$$C_f'(\gamma)=\frac{m}{\gamma v}(1-\beta)S \quad (12) \text{ and } \quad rV=-x-C_f(\gamma)+\frac{m}{v}(1-\beta)S \quad (13).$$

Finally, adding (11), (13), using (8) into (5) ve arrive at the equilibrium reservation productivity y^*.

To complete the determination of equilibrium, steady-state condition of the equality of inflow to jobs and outflow from unemployment is imposed together with the entry conditions for firms and workers.

At this stage model for the matching technology has to be established. For our final purpose technology is based on the classic idea of "telephone line" Poisson queuing process3. According to this idea workers randomly send their applications to firms with vacancies at the Poisson rate α, and firms respond to their applications at the Poisson rate γ. In other words, workers send applications at the exponentially destributed time intervals with expectaion $1/\alpha$ and firms require exponentially distributed time length intervals with expectation $1/\gamma$ to consider an application. This is the time required to guaranty the productivity of the match. The similarity with the "telephone line" comes through the fact that if the worker makes a call to particular vacancy and the firm is already bussy with processing application from another candidate, the "call results nonunswered" meaning that applicaion is not accepted. This assumption on the technology of matching captures the problems of congestion and coordination.

So, let from the total number of vacancies v, v_o be the number of those that are open for further applications. If u is the stock of nemployed workers, than total number of applications sent out per unit of time is αu. So,

[3] Cox and Millner, 1965

$\alpha u / v$ is the arrival rate of applications at each vacancy, and $\alpha u v_o / v$ is the number of applications entering the processing system.

In the steady state this must be equal to the inflow into employment (number of successful matches): $\gamma(v - v_0)$.

Therefore, $\frac{v_0}{v} = \frac{\gamma v}{\alpha u + \gamma v}$ (14).

Since this expression represents the probability of the application to be considered, total number of successful meetings, or matches per unit of time is equal to: $m(u, v, \alpha, \gamma) = \frac{\alpha u \gamma v}{\alpha u + \gamma v}$ (15).

As required, this matching function is:

increasing in u and v as well as in job search intensity α and recruitment intensity γ;

concave in u, v, α, λ;

3) $m \to 0$ as $u \to 0$ or $v \to 0$;

4) $m \to \alpha u$ (rate of applications) as $v \to \infty$;

5) it is CES function with elasticity of substitution between unemployment and vacancies equal to half.

6) Elasticity of matching with respect to unemployment is $\eta \equiv \frac{\partial \log m}{\partial \log u} = \frac{\gamma v}{\alpha u + \gamma v} = \frac{m}{\alpha u}$ (16), which as well is the probability that an applicant will be descried. It is also the proportion of total search efforts exerted by firms. Therefore, higher elasticity of matching with respect to stock of unemployed is associated with the lower congestion facing applicants.

Potential constraint of this model for the empirical utilization is that both search intensities of workers and recruitment intensities of employers are

not observed. Therefore, further extension of the model is performed through introduction of endogeneity of search and recruitment intensity.

First order conditions (10) and (12) suggest that both are functions of u and v: $\alpha = \alpha^*(u,v)$, $\gamma = \gamma^*(u,v)$.

Introducing them into (15) yields unconditional matching function:

$$m^*(u,v) \equiv m(u,v,\alpha^*(u,v),\gamma^*(u,v)) \quad (17)$$

Relationship between (15) and (17) depends on the cost and recruitment cost functions. Introducing the latter as $C_w(\alpha) = \frac{c_w}{k}\alpha^k$ and $C_f(\gamma) = \frac{c_f}{k}\gamma^k$ where k >1, and c_w, c_f >0, after some rearrangements we get the following definition of matching function:

$$m^*(u,v) = (mS)^{1/k} \frac{uv\left(\frac{\beta}{c_w u}\right)^{1/k}\left(\frac{1-\beta}{c_f v}\right)^{1/k}}{u\left(\frac{\beta}{c_w u}\right)^{1/k} + v\left(\frac{1-\beta}{c_f v}\right)^{1/k}} \qquad (18).$$

Defining $\rho \equiv 1 - \frac{1}{k}$, $\bar{\eta} \equiv \frac{c_w/\beta}{c_w/\beta + c_f/(1-\beta)}$, $\bar{S} \equiv \frac{S}{c_w/\beta + c_f/(1-\beta)}$ and substituting them into (18), after little manipulation the following CES functional form for the matching process is achieved:

$$m^*(u,v) = S^{\frac{1-\rho}{\rho}}\left(\frac{1}{\bar{\eta}^{1-\rho}u^{-\rho} + (1-\bar{\eta})^{1-\rho}v^{-\rho}}\right)^{\frac{1}{\rho}}$$

For $\rho = 0$ this formula transforms into the expected Cobb-Douglas form.

Chapter 4

EMPIRICAL ANALYSIS

4.1 Methodology

For the purpose of estimation of efficiency of ALMP implementation by Employment Centers conventional matching function has to be augmented to include ALMP measures4.

So, let $H_{it} = f(V_{it}(-1), U_{it}(-1)) \cdot e_{it}$ (1) - ordinary matching function ($f_v, f_u > 0$),

H_{it} - number of unemployed, hired in regular jobs (flow variable);

V_{it} - stock of registered vacancies;

U_{it} - stock of registered unemployed.

Let $(\tau \cdot U)$ presents search effective stock of unemployed ($\tau \in [0,1]$ in order to have economic meaning).

$$\tau = c(1 + \alpha P), \qquad \text{where} \qquad P = \sum_{j=1}^{n} \beta_j P_j, \qquad \sum_{j=1}^{n} \beta_j = 1, \quad (2)$$

P_j - policy instruments (j=1…n);

c – index of search effectiveness in absence of policy measures, $c \in [0,1]$.

Therefore, augmented matching function can be written:

---

[4] This is done in accord with Lehmann (1995).

$$H_{ti} = f(V_{it}(-1), \tau_{it} U_{it}(-1)) \cdot e_{it}$$

(3)

Using Cobb-Douglas functional form for f and log-linearizing it, the following is obtained:

$$\ln H_{ti} = \ln \varphi_0 + \varphi_1 \ln V_{it}(-1) + \varphi_2 \ln \tau_{it} U_{it}(-1)$$

(4)

which for small values of $\alpha_i P_i$ transforms into:

$$\ln H_{it} = \gamma_0 + \gamma_1 \ln U_{it}(-1) + \gamma_2 \ln V_{it}(-1) + \gamma_3 \ln c + P_{it}(-1)\gamma_4 + \ln e_{it}$$

(5)

which is equal to

$$\ln H_{it} = \delta_0 + \delta_1 \ln U_{it}(-1) + \delta_2 \ln V_{it}(-1) + \delta_3 P_{1it}(-1) + \delta_4 P_{2it}(-1) + ... + \delta_{n+2} P_{nit}(-1) + \ln e_{it} \quad (6)$$

The matching process is usually compared to the production process. Therefore, to enable extensive estimation of its efficiency, empirical function (6) can be written as a stochastic production frontier model:

$$\ln H_{it} = (\delta_0 + \delta_1 \ln U_{it}(-1) + \delta_2 \ln V_{it}(-1) + \delta_3 P_{1it}(-1) + \delta_4 P_{2it}(-1) + ... + \delta_{n+2} P_{nit}(-1) + v_{it}) + \ln e_{it} \quad (7)$$

v_{it} - random term, assumed to be $iidN(0, \sigma_v^2)$;

e_{it} - efficiency parameter, constrained to be smaller than or equal to one. It varies both over time and across regions as a function of observed characteristics of stock of unemployed at time t in region i (Z_{it}). So, model takes the form:

$$\ln H_{it} = (\delta_0 + \delta_1 \ln U_{it}(-1) + \delta_2 \ln V_{it}(-1) + \delta_3 P_{1it}(-1) + \delta_4 P_{2it}(-1) + ... + \delta_{n+2} P_{nit}(-1) + v_{it}) + Z_{it}\delta + \varepsilon_{it} \quad (8)$$

Condition $\varepsilon_{it} \leq -Z_{it}\delta$ is imposed to truncate normal distribution of ε_{it} at the point $(-Z_{it}\delta)$ and thus, guarantee e_{it} is smaller or equal to one.

The parameters of the stochastic frontier and of the efficiency effects can be jointly estimated by Maximum Likelihood method.

4.2. Data Description

In this study quarterly administrative data on 24 oblasts employment, Crimea and Kyiv centers spanning 2000-2002 years from Ukrainian National Employment Center is used.

Main variables are:

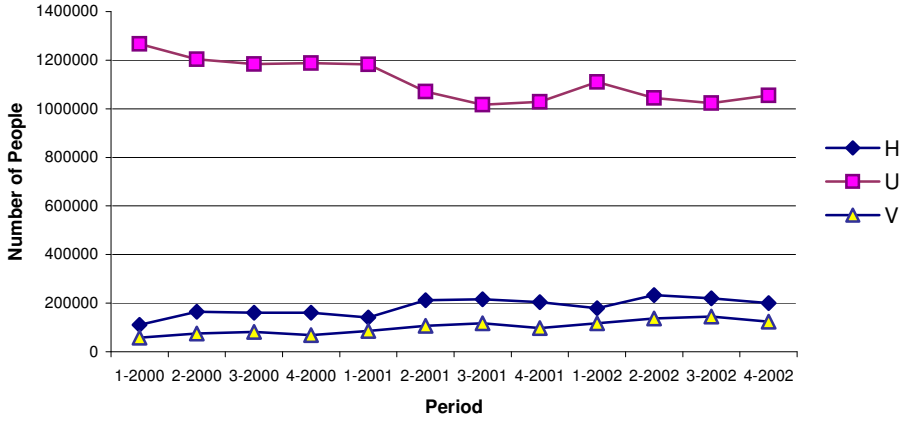
H - outflows from unemployment to job during the quarter in a local center;

U - stock of workers registered at the local employment center at the end of the quarter;

Data on these two variables can be sliced to account for women (HW, UW), young people (<28) (HY, UY), unemployed for less than 1 year (HSU, USU), unemployed for more than 1 year (HLU, ULU), at the edge of retirement (HR, UR), and variables characterizing different level of eduation.

V - the stock of unfilled vacancies reported to the regional employment centers at the end of the quarter.

Figure 2. **Dynamics of Main Variables**



correl(H,U)-0,943 correl(H,V) 0,869

Table 2. Decomposition of registered and hired people[5]

		Women	Young People (<28)	Unem for less than 1 year	Unem for more than 1 year	Highs grad	Coll grad	Univ grad	Total grad	Edge of retire
H	min	0,46	0,32	0,71	0,25	0,01	0,01	0,01	0,04	0,01
	max	0,52	0,42	0,75	0,38	0,02	0,04	0,04	0,10	0,02
	avr	0,48	0,37	0,73	0,28	0,02	0,02	0,02	0,06	0,02
U	min	0,61	0,24	0,75	0,19	0,01	0,01	0,01	0,03	0,03
	max	0,64	0,31	0,81	0,25	0,01	0,02	0,02	0,06	0,05
	avr	0,63	0,27	0,78	0,22	0,01	0,02	0,02	0,04	0,04

So, while women represent more than half of registered at the employment offices they compose only half of those who were employed. Long-term unemployed (more than 1 year) file about one thirds of registered at the offices. And number of newcomers to the labor market (graduates) that register at the centers is on average 2%.

[5] Analysis is made for total data for 12 time periods

Another peace of information that can be read from the table above is that in general composition of registered and hired coincides.

Variables of ALMP measures:

Tr (FTr, ReTr, AgTr) - number of registered unemployed placed in training courses (in particular, trained for the first time, retrained, undertook aggrandizement of qualification) during the quarter in local center;

PW (PWH, PWE) - number of registered unemployed placed in public works during the quarter in local center (number of worker-hours spent in public works, expenditure on public works);

S (SI, SC, SP) – amount of the centers' informational services provided at the end of period (data allows to discriminate between professional information, professional consultation and professional selection services).

Table 3. Correlation: Policy Measures vs Outflow from Unemployment

Centers' informational services	0,24
Stock of unemployed placed in public works	0,56
Amount of worker-hours spent on public works	0,57
Expenditure on publick work organization	0,62
Stock of unemployed placed in training	0,55
Trained for the first time	0,11
Retrained	0,31
Aggrandizement of qualification	0,74

Listed above correlation coefficients convey some tentative information on the effects of policy measurements on the employment of people. All coefficients are positive (suggesting positive impact of policy variables) and some of them reach as high as 0.5.

4.3. Empirical Results

The first model was estimated by Stata 8.0 program for the whole 1996-2002 sample. Its purpose is the assessment of the dynamics of the efficiency of employment centers and estimation of the direction and the strength of influence on unemployment outflow of such policy measures as public training and public works. Inefficiency decomposition is not performed in this model because of the data restriction for the first part of the sample. To introduce some sort of the sensitivity analysis, model was estimated in two specifications: Model 1a uses the logarithms of the amount of people engaged in training and public works, while Model 1b takes just amount of people. Complete estimation output is placed to the Appendix 1. Condensed estimation output is presented in the table below.

Table 4. Model 1: Efficiency Growth (period 1/1996 – 4/2002).

		Model 1a		**Model1b**
		coef		coef
Time trend (linear)		**0.051**		**0.062**
Constant		**-1.285**		**-0.642**
Unemployed	log	**0.577**	log	**0.575**
Vacancies		**0.306**		**0.282**
Public works	log	**0.021**	val	0.000
Training[6]		**0.073**		**0.000**
p-value (Wald)		0.000		0.000

Both models present robust estimates of coefficients of main variables of matching function (logarithms of stock of vacancies and unemployed). As sum of these coefficients is lower that 1, models exhibit decreasing returns to scale in terms of vacancies and registered unemployed.

[6] All variables are lagged

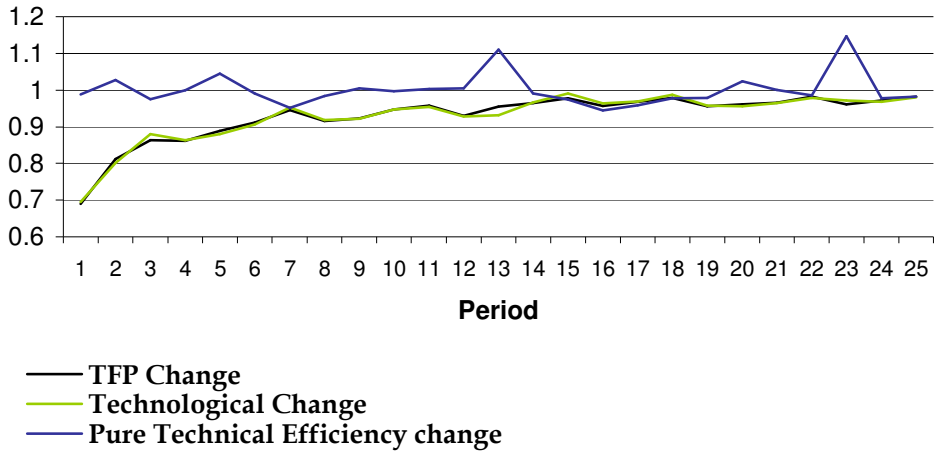
Coefficients on the ALMP measures are positive in both specifications, but in Model 2b their estimates are extremely low.

So, in general for the sample 1996-2002 we received only slight evidence on the positive effect of public training and public works policies on the outflow from unemployment.

Figure in Appendix 2 displays efficiency dynamics in time for all regions under investigation[7]. The distinct feature of the result is parallel trend of efficiency growth for all regions. Apart from the trend, efficiency estimates do not show any substantial time variation.

So, the next step of the estimation is the decomposition of Malmquist total factor productivity index (performed by the means of DEAP program). This decomposition allows discriminating between different contributors to the overall total factor productivity and apportion the influence of technological change and pure technical efficiency change. For this purpose Data Envelopment Technique is used.

Figure 2. Malmquist Index Summary of Annual Means:



[7] Efficiencies are estimated by Model 1a

So, as clear from the figure above, total factor productivity of employment process of the centers is decreasing from year to year at the decreasing rate (its line is below "1"). Its change is mainly determined by the change in the technology. So, every second period offices employ less effective technology.

Efficiency of the Employment centers is rather volatile: it grows in some periods and falls in others. Its impact on the overall total factor productivity is minor.

The second model was estimated for the sample spanning years 2000 through 2002. Its main purpose is the revelation of the inefficiency determinants. Sensitivity analysis of the functional form of the model was performed by estimation of 4 different specifications of both policy measure variables and variables that explain the efficiency of employment centers. The complete output is summarized in the table below:

Table 5. Model 2: Modeling Inefficiency Effects (period 2/2000 – 4/2002).

	Mode 2a		**Model 2b**		**Model 2c**		**Model 2d**	
	coef		coef		coef		coef	
Constant	**1.201**		**1.610**		**6.587**		**3.930**	
Unemployed	**0.397**		**0.382**		0.099		**0.409**	
Vacancies	log **0.224**		log **0.255**		log **0.317**		log **0.237**	
Informational services	0.063		0.046		0.000		0.000	
Public works	**0.093**		**0.105**		0.000		0.000	
Training	log **0.209**		log **0.157**		val 0.000		val 0.000	
Trend	-35.048		0.124		2.733		**1.027**	
Women	**-0.016**		**-0.005**		**-0.003**		**-0.003**	
Young	***18.039***		**0.000**		**2.095**		**0.000**	
Old	***-10.935***		**0.000**		**-1.653**		**0.000**	
Long term unemployed	**-3.002**		**0.000**		-0.440		**0.000**	
At the adge of retirement	log -3.150		val **-0.001**		log -0.545		val **-0.001**	
sigma-squared	***3.964***		0.941		0.531		0.567	
gamma	0.996		0.986		0.963		0.968	
log likel fun	-167.897		-166.473		-187.525		-189.512	
LR test (one-sided err)	136.614		139.788		104.095		100.121	
Mean effic	0.649		0.633		0.559		0.568	

LR test statistic of one-sided error of all four models is significant, thus testifying against the traditional average function for the frontier estimation. Again, decreasing returns to scale are observed. The coefficients of the policy measures (except for the informational services) are positive everywhere, but they are statistically significant only in case the corresponding variables are taken in logarithms. Coefficient on the informational services are statistically insignificant regardless the specification of functional form of the model.

Comparing the estimates of this model to the model that covers period 1996-2002 we have to highlight that for log specification of the models, estimates of the efficacy of both policy measures are higher for the sample 2000-2002. This may be the indication of the fact that policies become more effective with time.

Concerning the part of the model that explains inefficiency it has to be noted that only the number of women registered at the centers explain the performance of the centers: he higher the fraction of women, the higher the efficiency of the local employment center. The conclusion that higher fraction of young results in the lower efficiency and higher fractions of old, unemployed for the long period of time and people at the edge of retirement increase the efficiency of the offices are rather contradictive both in a formal sense and from the point of view of intuition. So, these findings should be taken with a grain of salt.

Correlation coefficients of the efficiency estimated by different model specification (see table below) are very high. So, it is rather safe to analyze efficiencies estimated by any specification of the model.

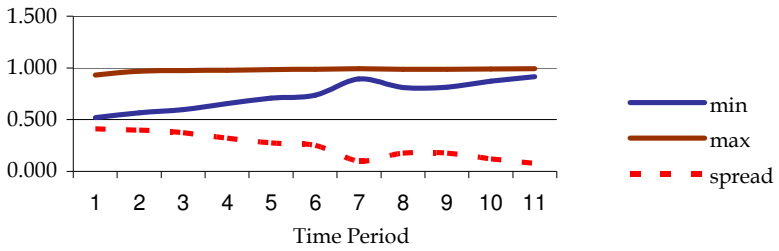
Table 6. Correlation coefficients of the efficiency estimates

	Model 2a	Model 2b	Model 2c	Model 2d
Model 2a	1			
Model 2b	0.996	1		
Model 2c	0.83	0.86	1	
Model 2d	0.90	0.92	0.95	1

Comparison of the efficiency estimates for different regions over the time (see graph of the efficiency dynamics in Appendix 3) reveals the fact that efficiency of the employment centers have positive trend and it converges with time to the index of the most efficient center.

Another way to see this is to compare the dynamics of the efficiency spread between regions.

Figure 4. Efficiency Spread Between Regions: Sample 2000-2002



It is evident, that both minimum and maximum efficiency of the Employment Centres are rising. The efficiency of the least efficient offices is rising at the higher pace than the efficiency of the leaders. As the result, inefficiency spread is diminishing.

4.4 Limitations to the Analysis

The first and foremost limitation of the current analysis is that people registered at the local employment centers constitute only part of the unemployed population in Ukraine. This is very convincingly reflected in the fact that official unemployment in Ukraine (measure, calculated at the basis of the employment centers' statistic) is much higher than the actual level of the unemployment.

Another problem that should be mentioned in this regard is that people may register at the centers for reasons other then finding a job. They may be driven by attractive subsidies on housing payments as well as unemployment insurance. Many such "unemployed" actually work in small businesses or are employed at their own[8]. Therefore, they resist center's proposition' for employment opportunity as long as possible. In the estimates of my type this may result in the underestimation of the centers productivity and efficiency in matching employers with potential employees. However conclusions and policy implication should be different then in the case if there were no such problem. Namely, centers' productivity may be increased through the detection of such people. And it is not necessarily true that current centers' policies are not effective or not efficient.

Another shortage of the analysis is that according to the law, services that are supplied by public employment centers may be provided by other nongovernmental agencies upon the obtaining of the license. Currently there exist recruiting agencies that provide support in matching employers with potential employees. Such agencies exist in most oblast and rayon centers. They are especially abundant in large cities. Although their services are provided at some price and this differentiate them from public centers, their activity may influence

[8] This is although rather systematic, personal observation and thus, may be not taken seriously.

the decisions of the unemployed to register at the public employment centers. Thus, it must be taken into account in the analysis of ALMP implementation.

Yet even more destructive to the results obtained by this research is that aggregated data reported by the employment centers hides some facts about how the initial (individual) data was collected. For example, in the individual records of one employment center[9] there were entries for individuals that had taken part in the training program and in some time they were dismissed from records on the bases that they did not check in at the center as it is required by policy regulation. However the reason for not coming into the office may be well the employment, which in its turn may have been the result of undergone training course. If proportion of such people is large enough analysis of the kind used in this research will produce underestimated results.

Therefore, although the influence of problems mentioned above requires more careful assessment, the results of the given empirical estimation should be treated with a grain of salt. And especially conclusions should be made very carefully about the scope of the overall investigation.

[9]Unfortunately, the author was rejected the right to use that data and was asked not to mention the name of the centre.

Chapter 5

CONCLUSIONS AND POLICY IMPLICATIONS

The major goal of this paper was the analysis of the efficacy and the efficiency of active labor market policy implementation in Ukraine. For this purpose the notions of matching function was amalgamated with the efficiency estimation techniques.

Empirical estimates showed that those people that were engaged in the public works and/or undergone the training programs have increased their chances of employment. What is more, some evidence suggests that effectiveness of these policies is increasing with time.

Another important finding is that efficiency of the major riding horses of ALMP – local employment centers is not uniform across time and space. The good news is that efficiency is rising and inefficiency spread is decreasing.

To spot the factors that contribute to the inefficiency of the local employment centers, registered unemployed were decomposed by different categories. The empirical estimates in this direction convincingly showed that women are more active in searching for job since higher fraction of registered women results in higher efficiency of the employment office.

The bad news of the investigation says that total factor productivity of the offices is decreasing albeit at the decreasing rate. The main reason for this is that "technology", employed by Centers becomes less and less effective with time.

Therefore, the following policy implications and directions of further research are put forward:

First of all, the seemingly positive result that public training increases the employment opportunities of people has the alarming note in a sense that if retraining of people is needed than why is initial training. So, research should be directed into finding what kind of initial education requires the most of retraining.

Second, the decreasing total factor productivity of the technology of the employment centers stresses the need for the revision of the way how the work is organized in these centers. And as noted in the part that describes the limitations of the given analysis, the efforts might be governed onto detection of the people that register at the centers for reasons other than employment.

And finally, some sources should be guided for the improvement of statistics of the employment centers. Because any research that claims to produce convincing results requires good data in the first place

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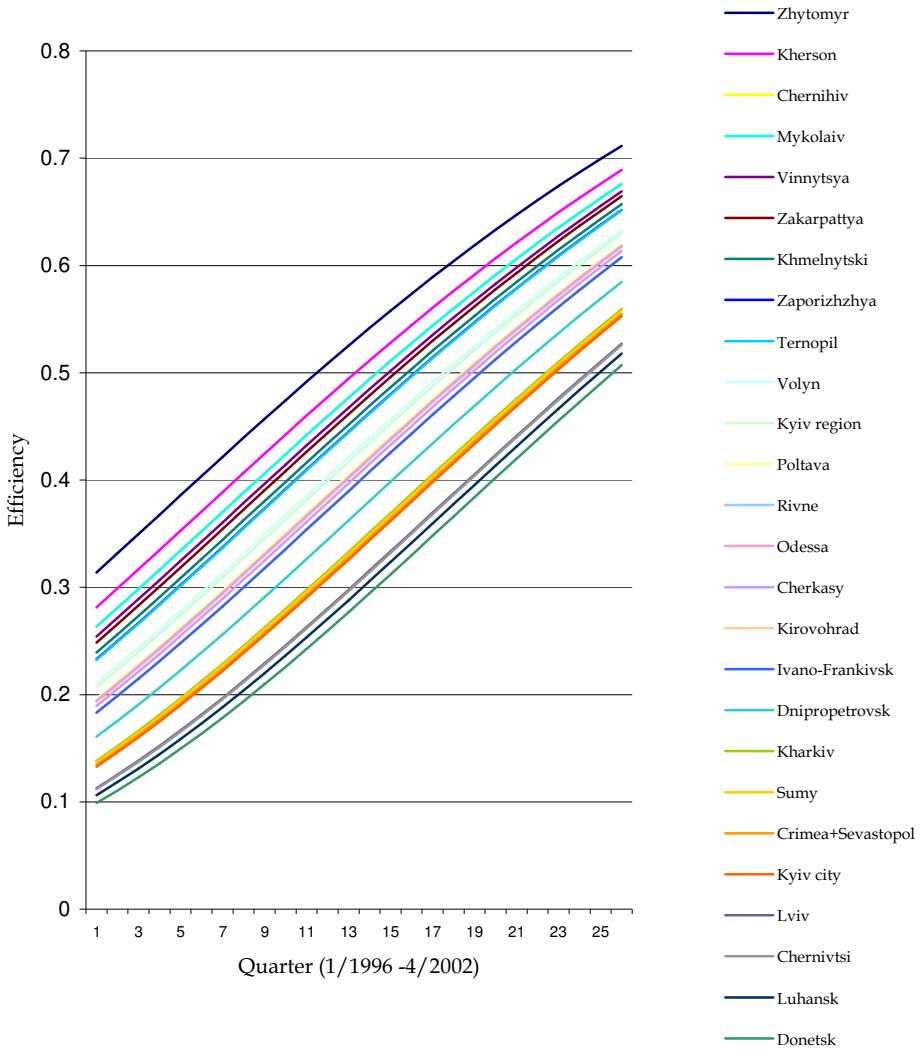
Appendix 1
Estimation output of Model1 (sample 1996-2000)

```
Iteration 0:   log likelihood = -108.19443  (not concave)
Iteration 1:   log likelihood = -107.83973
Iteration 2:   log likelihood = -107.80035
Iteration 3:   log likelihood = -107.79969
Iteration 4:   log likelihood = -107.79969

Time-invariant inefficiency model               Number of obs      =       676
Group variable (i): region                      Number of groups   =        26

Time variable (t): time                         Obs per group: min =        26
                                                               avg =        26
                                                               max =        26

                                                Wald chi2(5)       =  12237.50
Log likelihood  = -107.79969                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
        lnof |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       trend |   .0513104   .0024535    20.91   0.000     .0465016    .0561191
    lnun_lag |    .577092   .0192353    30.00   0.000     .5393916    .6147925
     lnv_lag |   .3061067   .0164572    18.60   0.000     .2738512    .3383621
     lnt_lag |   .0730371   .0181456     4.03   0.000     .0374723    .1086019
     lnp_lag |   .0213936    .012986     1.65   0.099    -.0040585    .0468457
       _cons |  -1.285057   .1293875    -9.93   0.000    -1.538652   -1.031462
-------------+----------------------------------------------------------------
         /mu |   .1014633   .2272468     0.45   0.655    -.3439321    .5468588
   /lnsigma2 |  -1.956106   .3692931    -5.30   0.000    -2.679907   -1.232305
  /ilgtgamma |  -.0797778   .7702373    -0.10   0.918    -1.589415     1.42986
-------------+----------------------------------------------------------------
      sigma2 |    .141408    .052221                      .0685695    .2916197
       gamma |   .4800661   .1922533                      .1694662    .8068794
    sigma_u2 |   .0678852   .0521087                      -.034246    .1700164
    sigma_v2 |   .0735228   .0040759                      .0655343    .0815113
------------------------------------------------------------------------------

. xtfrontier lnof trend lnun_lag lnv_lag t_lag p_lag, ti

Iteration 0:   log likelihood = -107.55872  (not concave)
Iteration 1:   log likelihood = -107.54849
Iteration 2:   log likelihood = -107.44934
Iteration 3:   log likelihood = -107.32526
Iteration 4:   log likelihood = -107.32499
Iteration 5:   log likelihood = -107.32499

Time-invariant inefficiency model               Number of obs      =       676
Group variable (i): region                      Number of groups   =        26

Time variable (t): time                         Obs per group: min =        26
                                                               avg =        26
                                                               max =        26

                                                Wald chi2(5)       =  12271.06
Log likelihood  = -107.32499                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
        lnof |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       trend |   .0619694   .0021702    28.56   0.000      .057716    .0662229
    lnun_lag |   .5752641    .020323    28.31   0.000     .5354318    .6150963
```

```
     lnv_lag |   .2824123   .0192637    14.66   0.000     .2446562    .3201684
       t_lag |   3.28e-06   7.34e-07     4.47   0.000     1.84e-06    4.72e-06
       p_lag |  -1.00e-07   8.70e-08    -1.15   0.248    -2.71e-07    7.01e-08
       _cons |  -.6418435   .2240601    -2.86   0.004    -1.080993   -.2026938
-------------+----------------------------------------------------------------
         /mu |   .0890331    .254284     0.35   0.726    -.4093543    .5874206
   /lnsigma2 |   -1.91874   .4004229    -4.79   0.000    -2.703554   -1.133925
  /ilgtgamma |   .0016544   .8007021     0.00   0.998    -1.567693    1.571002
-------------+----------------------------------------------------------------
      sigma2 |   .1467918   .0587788                      .0669671    .3217678
       gamma |   .5004136   .2001754                      .1725456    .8279264
    sigma_u2 |   .0734566    .058657                     -.0415089    .1884222
    sigma_v2 |   .0733352   .0040641                      .0653697    .0813007
------------------------------------------------------------------------------
```

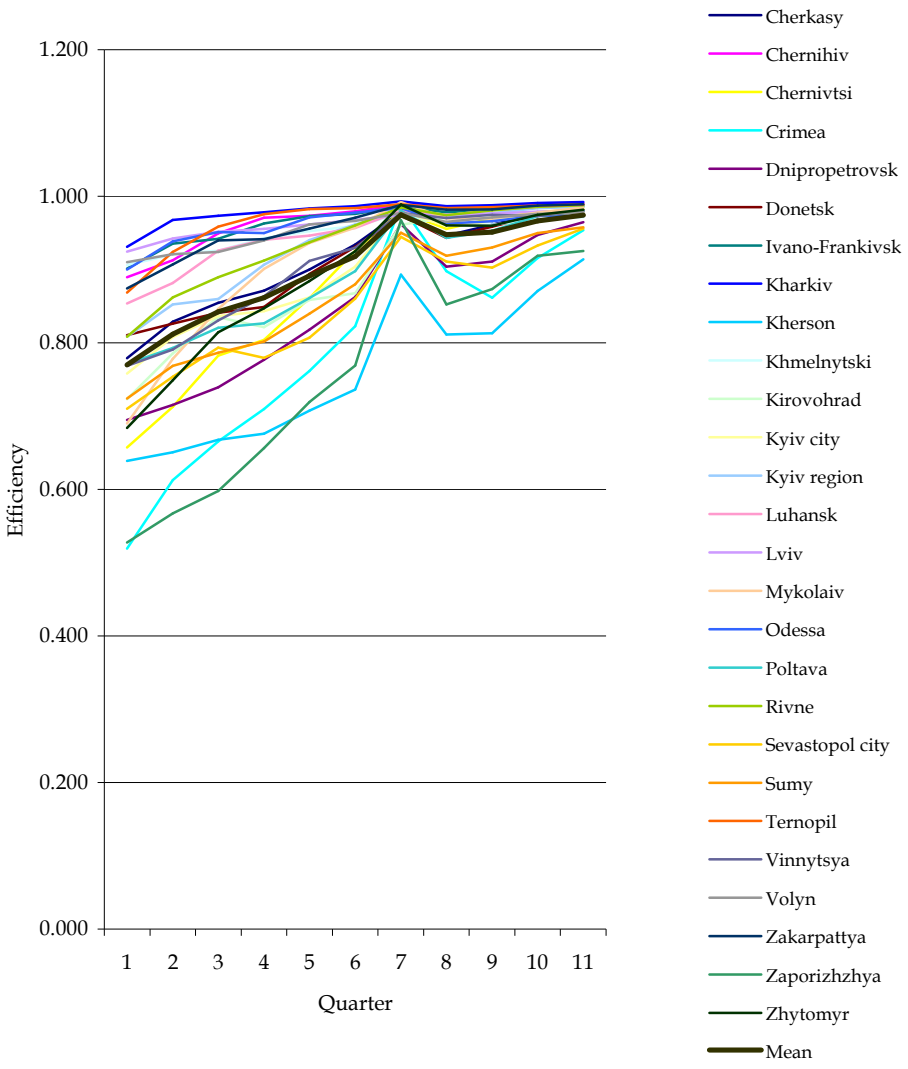
Appendix 2

Model 1a: Efficiency Dynamics (period 2/1996 – 4/2002)



Appendix 3

Model 2a: Efficiency dynamics (period 2/2000 – 4/2002)



Appendix 4

Model 2: Mean efficiency estimates for time periods and regions

Quarters	MeanEffic For Time		Regions	MeanEffic For Region	
	Model 1a	Model 2a		Model1 a	Model 2a
2/1996	0.193		*Cherkasy*	0.381	0.908
3/1996	0.208		*Chernihiv*	0.462	0.964
4/1996	0.224		*Chernivtsi*	0.281	0.866
1/1997	0.240		*Dnipropetrovsk*	0.347	0.839
2/1997	0.257		*Donetsk*	0.262	0.905
3/1997	0.274		*Ivano-Frankivsk*	0.374	0.964
4/1997	0.291		*Kharkiv*	0.318	0.979
1/1998	0.308		*Kherson*	0.480	0.756
2/1998	0.326		*Khmelnytski*	0.437	0.949
3/1998	0.343		*Kirovohrad*	0.374	0.882
4/1998	0.361		*Kyiv region*	0.402	0.928
1/1999	0.379		*Luhansk*	0.273	0.946
2/1999	0.396		*Lviv*	0.283	0.962
3/1999	0.414		*Mykolaiv*	0.462	0.904
4/1999	0.432		*Odessa*	0.386	0.959
2/2000	0.449	0.770	*Poltava*	0.390	0.888
3/2000	0.466	0.812	*Rivne*	0.387	0.933
4/2000	0.484	0.842	*Sumy*	0.316	0.860
1/2001	0.500	0.862	*Ternopil*	0.429	0.965
2/2001	0.517	0.891	*Vinnytsya*	0.452	0.903
3/2001	0.533	0.918	*Volyn*	0.406	0.953
4/2001	0.550	0.975	*Zakarpattya*	0.446	0.955
1/2002	0.565	0.948	*Zaporizhzhya*	0.430	0.746
2/2002	0.581	0.951	*Zhytomyr*	0.511	0.882
3/2002	0.596	0.966	*Kyiv city*	0.310	0.894
4/2002	0.611	0.974	*Crimea+Sevastopol*	0.313	
			Crimea		0.778
			Sevastopol city		0.846