PARDEE RAND GRADUATE SCHOOL

THE ARTS
CHILD POLICY
CIVIL JUSTICE
EDUCATION
ENERGY AND ENVIRONMENT
HEALTH AND HEALTH CARE
INTERNATIONAL AFFAIRS
NATIONAL SECURITY
POPULATION AND AGING
PUBLIC SAFETY
SCIENCE AND TECHNOLOGY
SUBSTANCE ABUSE
TERRORISM AND
HOMELAND SECURITY
TRANSPORTATION AND
INFRASTRUCTURE
WORKFORCE AND WORKPLACE

Support RAND

Browse Books & Publications

Make a charitable contribution

For More Information

Visit RAND at www.rand.org

Explore Pardee RAND Graduate School

View document details

Developing a Safety Net for Ukraine

Oleksandr Rohozynsky

RAND

PARDEE RAND GRADUATE SCHOOL

The Pardee RAND Graduate School dissertation series reproduces dissertations that have been approved by the student's dissertation committee.

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

Abstract

This dissertation explores issues of development of social safety nets in countries in transition, Ukraine in particular. The dissertation explores whether reducing social security expenditures to stimulate economic growth policy is an effective way to combat poverty in a transition country based on the case of Ukraine. The dissertation provides overview of the current development of social safety nets in the Eastern Europe and CIS countries, and discusses in great detail social safety net in Ukraine. The dissertation develops a sequence of increasingly sophisticated forecasting models to explore fiscal and economic implications of recent increases in social welfare spending in Ukraine: a simple (naïve) model macroeconomic model; a macroeconomic model with GDP feedback; and a microsimulation model.

The analysis based on the models suggests that the naïve macroeconomic model may significantly underestimate costs of SSN in Ukraine. More sophisticated models with GDP feedback of social expenditures estimate significantly higher costs of SSN as percent of GDP. The model is based on the parameters, estimated over the sample of developed countries. Because developing countries may be more responsive to the changes in the size of expenditures than developed countries, the size of the effect of reduction in social expenditures may be smaller than the actual effect. However, the model with GDP feedback provides better conservative estimate of the costs of SSN reforms than simple model.

In order to study micro-level effects of the social safety net reforms, the dissertation creates several microsimulation models for Ukraine. Simple micro-level model suggests that it is possible to establish budget-neutral minimal income guaranty policy in Ukraine that significantly reduces number of people living in extreme poverty compare to current policy. However, the budget-neutral policy can not guaranty income at the levels currently established by Ukrainian policy makers.

The dissertation demonstrates that there is sufficient data in Ukraine to create static microsimulation models similar to TRIM model in the United States. This microsimulation model extends simple micro-level model by incorporating behavioral response to increase in social benefits. The model predicts higher costs of SSN reform than the macroeconomic models.

Policy analysis based on the microsimulation model suggests that a policy of increasing social benefits in the current social safety net system would be the least optimal policy within the scope of evaluated policies to reduce number of people in poverty while sustaining economic growth. The dissertation concludes that available SSN financial resources would be more effective in reducing poverty if current social safety net programs were substituted by a minimal subsistence level income guarantee program. The minimal income guaranteed by the program should be substantially

lower than the current minimal subsistence level in Ukraine. The economic growth in the country induced by this policy is estimated to have better long-term poverty-reduction effect than current social safety net.

Acknowledgments

First, I would like to thank my dissertation chair, Prof. Jacob Klerman, for his guidance and support of this work. Without his encouragement and intellectual help this dissertation cold never be completed. I also would like to express my gratitude to all my committee members, Dr. Marek Dabrowski and Dr. Susan Gates. I greatly appreciate their useful comments, critique and suggestions during my dissertation process. I would like to thank Dr. Branko Milanovic for finding time at his busy schedule at the World Bank to read this dissertation and provide his comments.

Second, I would like to thank staff of Pardee RAND Graduate School for their personal care and continues support during the long years at the school. I would also like to thank researchers at Center for Social and Economic Research CASE and CASE Ukraine for their support of this work. My special appreciation goes to Oksana Novoseletskaya and Drytro Boyarchuk from CASE Ukraine for their help obtaining the data for this research.

Third, a very special thank you goes to my family, my father Serhiy, mother Valentina, and sister Natalia for their encouragement and support of my work. I also thank my life long friend Dr. Olga Pavlova for setting and example for me by completing her Ph.D., for the financial support of this work, and for challenging questions and rigorous critiques of my research.

This work was partially funded by the "ING Bank Slaski - CASE Foundation Scholarship" and "PZU S.A. and CASE – Center for Social and Economic Research Scholarship". I would like to thank these organizations, and personally Dr. Barbra Blaszczyk and Dr. Eva Balcerowicz for providing this crucial support.

Finally, I would like to thank Jim Davis for helping me with editing of this dissertation.

Acronyms

CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
EBRD	European Bank for Reconstruction and Development
EU	European Union
FSU	Former Soviet Union
GDP	Gross Domestic Product
ILO	International Labour Organization
IMF	International Monetary Fund
MIG	Minimum Income Guarantee
MinEcon	Ministry of Economy of Ukraine
MinFin	Ministry of Finance of Ukraine
MLSP	Ministry of Labor and Social Policy of Ukraine
MSL	Minimum Subsistence Level
OCDE	Organization for Economic Cooperation and Development (abbreviation from French)
OECD	Organization for Economic Cooperation and Development
PAYG	Pay as you go
PFU	Pension Fund of Ukraine
PSID	Panel Study of Income Dynamics
RLMS	Russian Longitudinal Monitoring Survey
SSN	Social Safety Net
TANF	Temporary Assistance to Needy Families
UAH	Ukrainian Hryvnya
UHES	Ukrainian Household Expenditures Survey
ULMS	Ukrainian Longitudinal Monitoring Survey
UMT	Unverified Means Testing
USAID	United States Agency for International Development
VMT	Verified Means Testing

Table of Contents

Table of Tables

Table of Figures

Chapter I: Introduction

This dissertation explores issues of development of social safety nets in countries in transition, Ukraine in particular. Around the world social safety net (SSN) policy is a fine balance between the desire to provide the highest protection to the poor, maintaining the fiscal and financial feasibility of the system, and ensuring that the system does not discourage employment and economic growth. This balance is especially hard to achieve in transition economies that change their social safety nets simultaneously with combating the consequences of economic downturn.

The dissertation explores whether reducing social security expenditures to stimulate economic growth policy is an effective way to combat poverty in a transition country based on the case of Ukraine. The dissertation develops a sequence of increasingly sophisticated forecasting models to explore fiscal and economic implications of recent increases in social welfare spending in Ukraine.

Similar to other former Soviet Union (FSU) countries, Ukraine experienced a large decrease in output at the beginning of the process of transforming the economy from central planning to a market-oriented model. From the time Ukraine gained independence from the Soviet Union in August 1991 until 1998 the real GDP fell almost 50%. Although unemployment remained at a low level, the economic downturn reduced the real income of the population. Hyperinflation at the beginning of the period (reaching 10,256% a year in 1993) destroyed private savings, reducing ability of population to use savings in order to escape poverty. The number of people with low income significantly increased compare with pre-transition period, and the SSN was the major protection against poverty for the people that could not generate sufficient wage income.

The extensive SSN inherited by Ukraine from the Soviet Union was not able to protect this increased fraction of the population against poverty. The system involved large, usually not means-tested in-kind transfers, provided by state enterprises. When the government took over the SSN, it attempted to finance it in three ways. First, it printed money, resulting in hyperinflation at the beginning of the period. Second, it introduced payroll taxes with total tax rate of 52% of the wage fund, resulting in strong disincentive to increase wages and growth of shadow economy. Third, it borrowed large amounts of money on internal and external markets, increasing future budget expenditures.

The money collected through payroll taxes was not sufficient to finance projected expenditures, and these programs de-facto ran deficits in the form of arrears in payments of social security benefits. The high payroll taxes stimulated growth of the unofficial economy in Ukraine and further reduced the tax base.

Similar to other FSU countries, beginning in 1996 the Ukrainian government began implementing policies to reduce budget deficits, government expenditures, and taxes. The budget deficit was reduced below 2 percent of GDP and consolidated budget expenditures were reduced from 52% of GDP in 1994 to 27% of GDP in 1999. Major taxes were significantly reduced, including reduction of payroll taxes to the level of 39%. The literature suggests that these reforms stimulated rapid economic growth in the country during the period 1999-2004. The reforms did not change principles of SSN: the social benefits are still distributed on categorical bases to a large proportion of population. However, because of lower taxes and stricter budget discipline, the amount of social payments declined. By 2004 most social benefits had been reduced to a fraction of the minimal subsistence level.

The 2004 "orange revolution" substantially changed the environment in which the SSN policy is made. The "revolution" was an extension of the presidential election. Hundreds of thousands of people concerned about significant violations of election laws during the first round of the election organized demonstrations in the major cities of Ukraine. Experts argue that the demonstrations ensured a fair election during a judicially mandated second round. Opposition candidate Victor Yushchenko was elected president in the second election and inaugurated in early 2005.

The election campaigns of all political forces during the 2004 presidential election and 2006 parliamentarian election included promises of significant increases in social security benefits. These promises were partially implemented in 2004 - 2006. As of this writing in late-2006, future promises and increases in SSN benefits are likely to continue in 2007 and become a basic feature of the 2010-2011 election cycles.

However, the analysis below suggests that even currently enacted increases in social benefits are not fiscally sustainable. The increased level of social benefits requires additional financing that would require increases in taxation or increasing budget deficits. The concern is that increased budget pressure would slow economic growth and reduce real income of a large proportion of the population while failing to provide sufficient protection to the population living below the poverty line. Increased social benefits may also provide disincentive to finding better paying job or becoming employed for the individuals with low skills, and, therefore, increase number proportion of population that depends on social benefits.

Whether policy makers and politicians understand the fiscal feasibility issues is unclear. Currently no analytical tools exist to help them understand the implications of alternative policies. This dissertation develops such tools and uses them to understand the choices facing Ukraine. Specifically, the dissertation explores the fiscal implications of proposed increases in social welfare

spending by creating macro and micro-level models to estimate expenditures on the SSN. The research discusses limitations of the assumptions used to build simplistic models for evaluation of the effect of increased social benefits on the budget expenditures. The dissertation provides a set of alternative assumptions that overcome some of these limitations. Based on these assumptions, the dissertation develops macroeconomic model that allows forecasting fiscal balance of the SSN given the effect of increased payroll taxes on economic growth. It compares modeling results with the results derived from a simpler macroeconomic model that is implicitly used at the moment in Ukraine. Further, the dissertation extends the macroeconomic model with the microeconomic model that forecasts expenditures of the SSN at the individual level, and incorporates modern theories of behavioral response to the change in benefits. The model is used to carefully evaluate alternative approaches to modernizing the current SSN in Ukraine, and to provide an evaluation of the costs of promising approaches.

The models accuracy is restricted by the accuracy of the assumptions underlying the model and the model coefficients. Other set of assumptions or coefficients of the models may produce different forecasts of the same variables. Subject to these restrictions, the evaluations of costs provided by this dissertation may be used by policymakers as reference points during the decision-making process.

The dissertation is structured as follows: the next chapter shows current development of SSNs around the world and establishes an analytical model to discuss the properties of the safety net. The third chapter discusses the recent development of the SSN in former Soviet Bloc countries. The fourth chapter discusses the development of the SSN in Ukraine, and provides insight regarding current trends of social sector reforms in the country. The fifth chapter provides simple macroeconomic models to estimate costs of the safety net, and discusses the accuracy of such predictions. The sixth chapter extends the macroeconomic model to include the effect of increases in taxes to cover safety net expenditures, and compares the forecast with the results of the simple macroeconomic model. The seventh chapter explores effects of better targeting for current social benefits. The eighth chapter establishes a microeconomic model for expenditures of the SSN. The ninth chapter presents forecasts of expenditures for several alternative designs of the SSN. The final chapter discusses policy implications of the forecasts, and provides recommendations for SSN policy in Ukraine.

Chapter II: Social safety net as a policy problem

Social welfare programs started to appear as government policies around the world at the end of 19th – beginning of 20th century. Since that time governments have been working to modify their welfare policies to balance between three major objectives: sufficiency of the benefits provided, financial feasibility of the system, and its effect on population behavior towards work.

This chapter describes the development of social safety nets in different parts of the world, lays down general an economic model used to analysis problems of the welfare system, and describes welfare system problems that have emerged around the world.

The social safety nets around the world

Poverty alleviation programs have existed for centuries. For example, British programs date back to 1598, when the first "Poor Law Act" was introduced, and Denmark adopted a "Poor Relief Act" in 1708.   However, the history of modern welfare programs is usually marked from the end of 19th century, when the concept of "welfare state" was first used in discussion about the social insurance system. In response to the challenges of fast industrialization, Otto von Bismarck, famously referred to as Germany's "Iron Chancellor," introduced a system of medical, disability, and old age insurance (see 58). Bismarck's system became the basis for the German welfare system model with the following basic features: coverage is earnings-related, the system is managed through corporate structures like mutual aid associations, and government intervention in the system is minimal (see 118).

Extending the classification discussed by Sapir[1] (see 110), we can distinguish five types of welfare systems in the world: "Socialist", "Nordic", "Continental", "Mediterranean", "Anglo-Saxon", and "Liberal".

A social security system similar to that of Germany was also adopted at end of 19th century in France. The major difference in the French system from the German is the principle of solidarity, which broadened the French system to include people who might be excluded in the German model. This was achieved by a greater involvement of government in management of the system. However, the social welfare programs in both countries are considered to belong to the same model, called the "Continental Model". The Continental model relies on high social insurance contributions as the

---

[1] Which also looks like extension of better known classification by Gosta Esping-Andersen, for example see Esping-Andersen, Gøsta. 1990. *The Three Worlds of Welfare Capitalism*. Princeton, NJ: Princeton University Press.

main source of funding, and strict regulation of the labor market. This model is also used in other Western European countries, like Belgium and Luxemburg.

Even higher social protection is provided to the population in countries that adopted "Nordic" or "Swedish" model of social protection. This model guaranties minimal income or service level to all citizens through government-managed healthcare and social transfer systems. It is based on the recognition of independent persons and commitments of the public sector (see 110); one of the goals of the Nordic welfare system is equalization of incomes. As the result, the income inequality in Sweden, Norway, Denmark, and Finland that all adopted this system is lower than in other developed countries. This model is based on extensive taxation of enterprises and strict regulations of employee – employer relations.

The Nordic model is closest to the "Socialist model" which was unsuccessfully tried in the Soviet Union. This model was based on the government ownership of the means of production, and government involvement in income distribution and equalization at all levels, starting from wage income. The government was also responsible for providing social services (healthcare, education, childcare) to everybody on the basis of need. The system failed to function adequately because of the economic failure of the planned economy on which it was based.

On the other side of the spectrum is the "Mediterranean model" that is similar to the Continental model, but puts more emphasis on old-age pensions and provides less unemployment protection. The model also puts strong restrictions on labor markets, but the unemployed depend more on the informal family safety nets to escape poverty since unemployment insurance is small. The Mediterranean model was adopted in Greece, Spain, and Italy (see 110).

Further on this side of the spectrum is the Anglo-Saxon social protection model, which was adopted in Great Britain. This model is characterized by low labor market regulations and employment protection. The system provides cash transfers as a last resort; however it only guarantees the minimal standards, which allows the system to be relatively inexpensive. All other social services are provided on an institutional basis to the whole population as a part of normal government services (see 110 and 118).

Finally, on the least government-involved side of the spectrum is the "Liberal model" used in the United States; this model had been used in Great Britain prior to adoption of the "Anglo-Saxon" model. This model is based on self-responsibility (see 110). It does not regulate labor markets in order to lower costs of hiring for the firms and create opportunities for employment. It provides social protection only for those unable to find a job and avoid poverty without welfare. Working individuals have a choice of private health and pension insurances to care for them.

All these models rank differently in terms of generosity of protection, cost to society, and effect on long-term economic growth. We will discuss the problems faced by all these systems from the point of view of the modern economic model used to describe the basic properties of social welfare programs.

Economic model for social safety net

In order to continue analysis of social safety nets, we would like to introduce a simple economic model. Let's assume that we have an economy with N individuals, and:

(1) Every individual in the country can consume either goods c or leisure l.

(2) Every individual has the same concave and twice differentiable utility function $U(c,l)$ that this individual tries to maximize.

(3) Every individual has an income i, which consists of government transfers b and the labor income, and is equal to the time the person works multiplied by his/her wage: $i=b+w*(T-l)$.

(4) Each individual maximizes his/her utility given this budget constraint. Assuming there are no savings and the whole income is consumed, the constraint is $c=i$. General solution of this problem is to choose a level of work at the point where marginal rate of substitution is equal to the wage rate. Assuming for simplicity that the utility is linear in consumption, the utility-maximizing amount of work is given by: $\partial U(c,l)/ \partial l = -w$.

In order to introduce a social welfare system into this economy, we have to make at least two critical assumptions about individuals in the country.

(5) The individuals in the country have different abilities. For simplicity, we can assume that λ percent of population has high abilities able to earn wages $w = a_H$ and $(1-\lambda)$ has low abilities and wages $w= a_L$.

(6) The individuals with low ability cannot generate labor income sufficient to bring their consumption to some minimal social standard of consumption (minimal subsistence level) M.

Therefore, the government has to step in and supplement the income of the low-ability individuals with the level Z, developing a simple safety net. Traditionally, researchers assume that Z is equal to M. However, Z can be lower than M if government has no resources to guaranty income at MSL, or higher than M, if government is generous and guaranties income higher than MSL.

Finally, we assume that the government uses the following objective function: is interested to minimize expenditures on the social safety net given the necessity to bring the income of all individuals in the country to the level at or above Z. We also assume that an individual does not consider this government goal when making his/her decision. In this case the total cost of the SSN at separating equilibrium is determined by the government's ability to monitor individual's abilities and earnings.

If the government is able to clearly observe individuals' abilities and earnings, the total expenditures for the social safety net will be minimal at the level $E= N*\lambda*(Z- a_L*(T-l(a_L)))$. Coate and Besley (see 15) show in their article that in such conditions the government will have to pay only $Z- a_L*(T-l(a_L))$ in social benefits to low ability individuals and will not pay any social benefits to the individuals with high abilities.

If government is not able to observe abilities, even if it is able to perfectly observe the level of wage earnings, the theory leads to the conclusion that high-ability individuals may modify their work behavior in order to receive the benefit $Z- a_L*(T-l(a_L))$. Since the high-ability people are more productive, it will take them less time to work for the wage-income generated by low-ability people, (only $a_L*(T-l(a_L))/ a_H$ hours) The high ability people will alter their income if their utility working less with total income at level Z would be higher than utility from higher consumption and higher work $U(Z,[(a_{H-} 1)T+ l(a_L)]/ a_H) \geq U(a_H*(T-l(a_H)), l(a_H))$.

Coate and Besley (see 15) show that in this situation the government has two choices that minimize the expenditures for the welfare system. First is to offer the benefits of $Z- a_L*(T-l(a_L))$ to people with wage income $a_L*(T-l(a_L))$ and smaller benefit B that will satisfy criteria $U(B,[(a_{H-} 1)T+ l(a_L)]/ a_H)= U(a_H*(T-l(a_H)), T-l(a_H))$ to the population with income above Z. The total cost of the welfare system will go up to $E= N*(\lambda* (Z- a_L*(T-l(a_L))) +(1-\lambda)*B)$.

The second possibility is to offer social security benefits only to people who identified themselves as low ability, but require them to work R hours at government organized work in exchange for this benefit. Given this solution to the individual problem, low-ability individuals will lower their work for wages to the level of $T-l(a_L)-R$; therefore the size of the welfare benefit will rise to $Z- a_L*(T-l(a_L)-R)$. However, the R is chosen to so that $U(a_H*(T-l(a_H))\geq U(Z,[(a_{H-} 1)T+ l(a_L)-R]/ a_H)$. In other words, with the work requirement high-ability individuals will not be interested to take this solution, because working R hours in the private market for higher wage will generate more utility for them than participating in the government program. This solution to the failure of social programs due to the behavioral response is called "workfare". Workfare expenditures of $E= N*\lambda* (Z- a_L*(T-l(a_L)-R))$ will be cheaper for the government than the first solution if there is sufficient

difference between the wages of high and low income groups (the difference have to be such that $a_L<(1-\lambda)\ a_H$) (see 15).

Most countries finance their social security programs by payroll taxes or other taxes on wage income. Tax as the source of funding for SSN may be introduced into the model. Under assumptions of the model, it seems logical to tax income of high-ability individuals only, because the social system would have to return to low-ability individuals all the taxes that they paid. It also does not matter if the tax is a payroll tax (tax on enterprise) or income tax (tax on a person), because in any case in the competitive labor market the tax would result in decreased wage income of the workers.

If the government imposes the tax of τ on the income of high ability people, the wage that they receive would become $(1-\tau)\ a_H$. Given the concave utility function, high ability people will work less and their wage income will become $(1-\tau)\ a_H*(T-l((1-\tau)\ a_H))$. According to the model, in this case the total expenditures of the welfare system would increase. If the government is not able to observe individual's abilities, the government will have to implement a more costly system that provides benefits to everyone, but the benefits provided to the high-ability population would rise. If the government considers implementation of the "workfare" system, this task may become impossible if tax is significantly high, because the "workfare" system is possible to implement only if it holds condition $a_L<(1-\lambda)(1-\tau)\ a_H.$. The government would also have to increase the work requirement $R_\tau > R$ since the difference in the cost of leisure for high ability people would be lowered.

If the welfare system is fully financed by the taxes on wages, it faces additional constraint in terms of our model. The total expenditures of the system cannot exceed the total amount of taxes collected $E=N(1-\lambda)\ \tau\ a_H\ (T-l((1-\tau)\ a_H))$, and the tax rate has to be limited so that the condition $U(Z,R)<U(a_H\ (T-l((1-\tau)\ a_H),\ T-l((1-\tau)\ a_H)$ holds, otherwise the high-ability people would exit the labor market. The highest benefit that can be offered to poor people in this case cannot exceed $(1-\lambda)\ \tau\ a_H\ (T-l((1-\tau)\ a_H))/\ \lambda$, and this benefit would not alter behavior of high-ability people when the "workfare" system is used in the country.

Problems with the social safety net system observed around the world

This analysis of the simple economic model of the social safety net leads to the conclusion that any social safety net may experience a number of problems. The first problem would be an increase in the cost of the system due to the changing behavior of the potentially eligible population. We already discussed that should government not be able to observe abilities of an individual perfectly,

individuals with high abilities would be interested to work for the income of a low-ability person, and receive social benefits. This problem comes from the inability of the government to observe the ability level of an individual. We also mentioned that the policy solution that minimizes government expenditures in this situation is to introduce a "workfare" policy.

However, even if the government perfectly observes abilities of the population, the cost of the SSN may grow over time. If the next generations of people would prefer to develop no abilities and receive benefits as the total amount of Z, then the total cost of the welfare program would increase.

Steady increases in the costs of social welfare programs is a problem that may be illustrated by the recent developments in Western Europe and the United States, and the theory presented above is one of the possible explanations of this phenomenon. In his recent review of the European welfare systems and labor markets James Heckman (see 57) notices that there is large empirical evidence that generous welfare systems are responsible for decreased employment in the countries that adopted the Continental or Mediterranean welfare system models.

Another possible factor contributing to the increase of unemployment in these countries is extensive protection of employees that is provided through policies of high minimum wages and strict firing rules. Both policies force firms to reduce employment of low-ability individuals, since for some of such individuals their productivity is less than the minimum wage. Also, there is always a risk that productivity would become lower than a new minimum wage. It was demonstrated by Heckman that the rise in the number of unemployed and in the cost of social protection in continental and southern Europe is likely the result of such restrictions (see 57).

The second problem foreseen by the simple model of SSN may occur if the low-ability populations' ability to generate income is reduced. In order to compensate for a reduction in income, a government would have to increase social benefits. The total cost of the SSN would increase, and may become fiscally unsustainable. Researchers debate that one of the major factors attributing to the reduction of opportunities for low-ability populations in developed countries is economic globalization and outsourcing. Economic changes in China, India, and the Soviet Bloc together with increased world trade resulted in drastic changes in the labor markets of developed countries. Outsourcing and shifting production to the developing countries impacted the job opportunities for low-ability individuals in developed countries, and, therefore, increased the pressure on social welfare systems. According to Heckman (see 57) and Sapir (see 110), globalization strongly impacted on the counties with Continental and Mediterranean models, since strict labor market regulations in these countries did not allow firms to adapt to the new economic conditions. Sapir

(see 110) also argues that countries with these models of welfare systems discouraged increases in ability levels, and further reduce the abilities of low-ability populations to find a well-paying job.

The economic model suggests that one of the responses to decreased income opportunities for low-ability individuals would be a policy aimed at increasing the abilities of the population. This is a possible explanation for the better performance of the United States and Scandinavian countries. Researchers demonstrate that countries adopting the Nordic or Anglo-Saxon model stimulated a greater proportion of the labor force to receive higher education (see 110). A large proportion of the universal institutional welfare benefits in these countries provided smaller discouragement for shifting from low-ability welfare receiver to high-ability working category.

A policy stimulating fast economic restructuring and economic growth is another possibility to increase the income of low-ability individuals and decrease the cost of the system. Karl Aiginger in his recent article (see 124) argues that the American "liberal" welfare system and labor market policies are important factors in the ability of United States to overcome the challenges of globalization and to sustain a higher rate of economic growth than Europe. Flexible labor market policies and easier company registration procedures allowed US firms to restructure. Low costs of the social security system because of comparatively low benefits, and, therefore, low taxes also were considered significant contributors to economic growth. Together with economic growth the welfare system in United States provided sufficient resources to combat poverty in the country.

At the same time, the simple economic model predicts that a large amount of social benefits (*Z)* may create another problem with the social safety net. If a country has a relatively small number of low-ability individuals and the society is tolerant to taxes, the government may introduce a high level of social benefits. We already showed that if the government is not able to observe the abilities of the population perfectly, both low-ability and high-ability population groups will receive benefits. When the proportion of low-ability individuals is relatively small, the relative tax (the difference between taxes paid and benefits collected) on the high-ability population will remain low, and the government can provide a high level of benefits to the low-ability individuals. However, if with time the number of low-ability individuals increases, the government will not be able to keep fiscal balance and provide a high level of benefits to the low-ability population. This is a possible explanation for the situation observed in Scandinavian countries today.

The present welfare system of Scandinavian countries was developed during high economic growth in 1970-1980, and was not designed for the large number of unemployed or other benefit receivers that emerged in the 1990s, when the rate of economic growth started to decline. In order to maintain budget balance, the countries are slowly cutting some parts of the welfare system, nevertheless

trying to keep the welfare model intact. The countries also develop supplementary welfare systems that provide benefits through collective agreements between employee and employers but not the whole population (see 102). The supplementary welfare system is acting as the opposite of the workfare system, providing stimulus to work in order to receive larger benefits.

Cutting the level of benefits is not the only solution to this problem. In our opinion, the Scandinavian countries demonstrated that economic growth can help sustaining social security systems with the large benefits. Aiginger (see 124) shows that despite the largest expenses on the social security system, the countries with the Nordic model welfare system had the best economic performance among European countries. This is largely attributed to the ability of these countries to stimulate education of the labor force. Facing the challenges of the globalizing economy, they revised social welfare policies, putting attention on learning programs, investment in research and education quality. Although these countries had large expenditures, they also had the strictest budget discipline and lowest government debt among European countries, and Sapir (see 110) argues that smaller deficits helped to sustain a higher rate of economic growth in Scandinavian countries.

The role of the social security system and its impact on economic growth is widely discussed in Europe. Currently the EU continues debate on the future development of the social safety net in the countries of the union and on joint social welfare policy. According to the EU agreement, fiscal policy and safety net policy are decided at the national level; therefore, every country will build its own welfare system. However, since the EU has a common labor market, there are strong arguments to harmonize the welfare programs in the countries of the union (see 110). Based on the example of Denmark, Western European countries are developing a new social welfare model, called "flexicurity". The model supposes to provide generous welfare benefits, but abolish labor market regulation to simplify hiring and firing processes, and adopt active labor market policies to help the unemployed qualify for a new job (see 124). Easing restrictions on the labor market would provide flexibility to employ low-ability individuals, and the active labor market policies would allow transferring some low-ability individuals into the high-ability group. Finally, the main purpose of the new policies is to stimulate economic growth, and increase wage incomes of both high and low-ability groups of population.

Although it is outside further discussion in this dissertation, we would like acknowledge another problem with the SSNs that is observed around the World. Due to the demographic changes in the structure of the population, most European countries and the United States are predicting significant problems financing pension systems in the nearest future.

Describing social welfare programs with an economic model we showed that a system financed by taxes on income will significantly suffer from changes in the proportion of working people and beneficiaries. Modern government pension systems in the developed countries are based on the pay as you go principle (PAYG), meaning that current pensions are financed from the contributions of current workers collected in a form of payroll tax. The number of workers significantly exceeded number of pensioners in 1960s-1990s due to the post World War II increase in birthrate, and the PAYG systems were running surpluses or were able to provide generous pensions. However, demographic forecasts suggest that in the next decade with large number of these workers becoming pensioners, there will be significant reductions in the numbers of workers who pay tax, and an increasing number of pension beneficiaries. In order to avoid large deficits in pension systems, countries have to decrease the benefits. For political reasons they choose to gradually increase the pension age instead of lowering the amount of pension payments. Increasing pension age will result in longer contributions by a person, and a shorter period when this person receives benefits, which will help keeping the PAYG systems in balance.

Conclusions

The development of safety nets is an endless process of balancing between desires to provide higher benefits to the needy population, financial feasibility of the system, and avoiding discouragement of work at the microeconomic level and of economic growth at the macroeconomic level.

Experience of developed countries shows that there is no ideal social safety net model. Social safety net systems with generous benefits risk becoming fiscally unsustainable in the long-run. The systems with low level of benefits avoid fiscal constraints, but are not able to provide government protection according to the modern standards for developed countries.

There are different policy levers that allow reducing the risk of becoming fiscally unsustainable: introduction of effective stimuli to work, reduction in the level of benefits, and development of the ability to generate income by the low-ability group of population. However, the policies that support stable economic growth consider the most beneficial solutions those that increase income of all population groups and reduces the cost of the social safety net system.

Chapter III: Specifics of the social safety nets in transition

Despite apparent differences, the social safety nets in developed countries of the world have a common feature: these nets are functioning in countries that have strong economies. The policy problem for these safety nets can be reformulated as follows: how to change the nets so they do not become a reason for economic depression in the future. The majority of the population in developed countries lives above poverty and has the option to work. However, the generous welfare programs allow them to live well without working, creating problems for the system.

Most economies in transition face the opposite problem: they are looking for a social safety net policy that will bring a majority of population out of the poverty induced by economic downturn at the beginning of transitions. We show that common distinctive features of transition economies, especially economies of former Soviet Union countries, are poor conditions of national economy, high levels of poverty, and generous welfare systems. The extensive social safety net successfully reduced poverty only in those countries that could sustain the SSN with balanced budgets. In the countries that experienced larger economic downturns supporting social safety nets with poorly targeted benefits put a large burden on economy. This reduced economic growth, stimulated growth of the informal economy, and did not allow a majority of the working population to get out of poverty. We argue that policies stimulating economic growth at the expense of reduction in Social Safety Nets have advantages in terms of long-term economic growth and sustainability of SSN in such countries.

Brief history of SSNs in transition countries

By the end of the 1980s countries of the "Soviet Bloc" (Eastern European countries and the Soviet Union) had social safety nets (SSN) with very extensive coverage and costs. For example, the social safety net in the United States consists of about 80 means-tested federal programs that provide some cash (TANF program), in-kind (housing and food), healthcare assistance (Medicaid) to low-income individuals and households (see 82), and the government pension program. The total cost of welfare programs in the United States is only about 16% of GDP (see 124). Western Europe has a more generous and expensive social safety net that includes government-funded or obligatory health insurance, higher pension and unemployment benefits, earlier retirement, and government assistance for education. This system is more expensive, and European counties spend about 24% of GDP on the safety net. The SSN of the former Soviet Bloc countries provided free healthcare and education (including higher education) to all citizens, and the cost of other services, such as childcare, vacations, etc. were greatly reduced by the price equalization mechanisms. B. Milanovic

(87) in his recent book showed that social transfer constituted about 19% of personal income in typical socialist economy (see Table III-1), while it accounted for only 14% in a typical market economy. This difference may be even larger in the USSR, because some benefits provided in-kind or through discounts by state enterprises to their workers cannot be captured by such simple comparison. Pensions were generous and the retirement age was around 55 year for females and 60 for males. In addition, retirees received a package of discounted or free services, like housing, phone, and others. Because of full employment, unemployment benefits were small or non-existent in these countries. The cost of the SSN was huge, but was largely carried by the state-owned enterprises and not by state budgets.

At the end of the 1980s and the beginning of 1990s Soviet Bloc countries started transitioning their economies from planned to market economy systems. It was obvious that it would be impossible to make the transition without transforming the SSN since price controls and the heavy SSN burden on enterprises were not compatible with a market economy. However, even when the SSN became government responsibility, it had to be reformed because (1) it did not match new tasks and poverty profiles, and (2) the economic slowdown accompanying the transition put constraints on government expenditures.

Economic downturn and changing poverty in the region

Despite ethnic and cultural differences, the countries of the Soviet Bloc started transition from the same economic model that was characterized by high levels of urbanization, a high wage economy, broad social programs and a large social infrastructure. The economic structure implied above-average social indicators, a low level of inequality and high expectations regarding government protections (see 46). However, we may clearly observe that there are two general paths of transition that allow us to divide transition countries into two categories with different approaches to social safety net reform.

The cultural legacy of Eastern European countries probably predetermined their aggressive approach towards economic reforms. This approach resulted in a shorter period and smaller depth of the recession.

The Central and Eastern European (CEE) countries combated recession by fast restructuring of the economy, which was accompanied by large layoffs of workers, while people who remained employed were able to maintain relatively decent income. Unemployment in CEE countries rose dramatically at the beginning of transition, and even now remains higher than in most of the CIS

countries. For example, the current unemployment rate in Poland is around 19%, which is comparable only to that of Georgia, a country that was a war zone for the last decade.

Labor market transformation in current CIS countries took a path different from transformation in countries of Eastern Europe (current new EU states). Despite massive drops in GDP, unemployment in CIS countries remained at relatively low levels. During the period 1990-1994 the average decline of GDP in the CIS countries was around -11%, while decline in employment was only -1% (compare to the -3% and -4% respectively in CEE countries) (see Table III-3 and also 94). During the periods of 1994-1998 and 1998-2004 the figures were (-0.2%, -0.3%) and (+4.5%,+0.3%) respectively. Only countries that were involved in armed conflicts, such as Armenia, Georgia, and Moldova experienced sharp declines in employment. The adjustment took the form of lower real wages, which dramatically dropped in the CIS region during the transition, and still remain lower than in the pre-transition period (see Table III-4).

Unemployment became one of the new sources of poverty and a target for the social support systems in the CEE countries. Creating strong and extensive unemployment programs helped these countries to fight poverty among unemployed and keep national consensus about the speed of reforms and establishing open –market economic relations. Active labor market policies and "back to work" programs helped populations to get out of poverty once they exited unemployment (see 46).

Because of the reluctance to fire extensive numbers of the labor force during transitions in CIS countries, unemployment was not the major precondition for falling in poverty in these countries. Low-income employees were first to experience the massive delays in paying wages, pension and other benefits in these countries (see 128). By the end of the 1990s, there emerged new social groups prone to poverty: families of officially employed persons on unpaid or partially paid leave, public workers, small farmers and rural business owners (see 1). The working poor accounted for about half of the poor in Russia; about 87% of the poor live in families where one or several members are working (see 96). In Ukraine, about 78% of poor families had at least one working member in 1999 (see 80).

The economic decline during the initial stage of transition sharply affected the more educated social groups (see 1). The World Bank study of poverty in the CIS region in 2000 (see 128) showed that contrary to OECD countries, the competitive advantage of higher education in the CIS was fairly low: not all qualified workers in the CIS could find positions adequate to their qualifications. However, later studies start found that poverty was negatively correlated with education. Buitano

(21) showed that in Ukraine the higher level of education of the head of the household, the less likely the family would be in poverty.

For the CIS region the highest risk of becoming poor was for families with high number of dependents (children, disable and old pensioners), supported by one working member. The World Bank study (see 128) found that children are an especially risky factor for families in Central Asian CIS, and having a child dramatically reduces chances to escape poverty in European CIS.

Despite the common perception, elderly and pensioners are not at higher risk of falling into poverty than the rest of the CIS population. Only pensioners who unable to work and live in a single-person household would almost certainly fall in poverty (see 1). The explanation for this phenomenon is the low pension age remaining in most CIS countries. Pensioners continue to work after retirement, and the pension is a supplementary payment sufficient to bring their income above poverty line. The World Bank found that risk of poverty for working pensioners is only about one third of the average risk in Russia (see 128).

Analyzing implications of the transition by economic model of social safety net

The changing economic environment and poverty profile impacted social safety nets in the countries in transition. Here we would like to discuss the impact of such changes with the simple model of SSN developed in previous chapter.

First, we argue that political changes in a country had to decrease performance of the social safety net and increase its cost because of changes in the government's capacity to observe abilities of the population. This increase should especially affect the countries based on an authoritarian political system. The abilities, work efforts and earnings could be fully observable under an authoritarian central-planned regime, e.g. the one that existed in the Soviet Union. We showed that perfect observation of individual's abilities allows keeping social payments at a low optimal level. This can partly explain the ability of the Soviet Union to support an extensive social safety net. The beginning of economic transition in the countries of CEE and FSU coincided with rebuilding of democratic society. Because of the respect for personal liberties, democratic societies generally do not have instruments to observe working abilities of individuals perfectly. Therefore, according to the model, the countries of transition had to experience an increase in social safety net expenditures from $E= N*\lambda*(Z- a_L*(T-l(a_L))$ to the level $E= N*(\lambda* (Z- a_L*(T-l(a_L))) +(1-\lambda)*B)$, where B is the benefit received by the high-ability population.

Further increases in the costs of social safety nets in the countries in transition comes from decreases in income of population and change in the poverty profile. However, before discussing

these implications, we would like to extend our model to incorporate modern theories of growth into the model.

We incorporate the Lewis model of economic growth in a country as the basic model for economic growth. The Lewis model assumes that an economy consists of two sectors. The first sector is the "traditional" economy with low productivity and an excessive supply of labor. The second sector is the "modern" economy with high productivity of labor. The model assumes that the "modern" sector has higher economic productivity, and there is a significant difference in wages in "traditional" and "modern" economies. The labor force has strong incentives to work in a "modern" sector. Economic growth in the model is achieved by transition of excessive labor from the "traditional" to a "modern" economy.

There are differences in observed patterns of economic transformation and the poverty profile in two groups of countries: fast-changing economies of the CEE and slow-changing economies of the FSU. These differences may be explained in terms of the Lewis model. The faster-changing countries had to develop a larger "modern" sector of economy, while slow-transitioning countries may be characterized as countries with a small "modern" sector and slow transition from the "traditional" to a "modern" sector of economy.

We argue that in the fast-changing countries of CEE the economic transformation created the "modern" economy sector that absorbed a significant part of the high-ability population. The rest of the high-ability population constituted an excessive labor force and was fired. The laid off high-ability population became new users of social security benefits. If there was a significant difference between wages in "traditional" and "modern" economies, and social benefits to unemployed were sufficient to avoid extreme poverty, high-ability individuals would prefer receiving benefits and looking for a job in the "modern" sector to a job in "traditional" sector. At the same time, if the difference in wage income in "traditional" and "modern" sectors of the economy is sufficient to satisfy criteria $U(Z,[(a_{H-} 1)T+ l(a_L)]/ a_H) < U(a_H*(T-l(a_H)), l(a_H))$, the difference in wages should keep the employed high-ability population from altering behavior and applying for social security benefits even if government is not able to observe individual ability levels. Therefore, fast-transitioning countries should be able to discard any categorical benefits provided to all population groups, and keep the cost of the social safety net at the level $E= N*\lambda*(Z- a_L*(T-l(a_L))+ \lambda_u* N*Z$, where λ_u is the proportion of unemployed high-ability individuals.

The model for the social safety net in fast-transitioning countries is not significantly different from the original model of the social safety net discussed in previous chapter. Assumed large difference between wages of high-ability population in the "modern" sector and the level of benefits allows

imposing a tax on employed high-ability individuals in order to finance the SSN. If the tax is the only source for financing the SSN, and the SSN budget is balanced, the affordable level of benefits would remain low until the number of high-level unemployed is higher. This will ensure that working high-ability individuals are not altering their work behavior in order to receive benefits. Finally, the obvious policy to ensure balance of the social safety net is to stimulate employment in the "modern" sector, which simultaneously decreases the number of high-ability individuals who are unemployed and are receiving benefits, and increases the tax base for the financing of the system. As the number of working high-ability individual increases, tax rates may be decreased, stimulating further development of the "modern" sector.

The model for the fast-transforming countries of CEE depended on the assumption that a significant number of high-ability individuals became employed in the "modern" sector of economy, received high wages, and were able to finance the social safety net with the taxes. The assumption of large "modern" sector does not seem plausible in the slow-transforming economies of FSU. As we showed, these countries experienced longer and deeper economic downturns, which should not happen if there is a large "modern" economy in a country. The poverty profile in these countries indicates that unemployment in the countries is low, but employment does not guarantee most of the population staying out of poverty. We propose to extend our model with different assumptions in order to explain these observations.

Let's assume that because of transition, the population of the country may be divided into three categories: low-ability people, who receive wage of a_L; the high-ability people whose abilities are sufficient to work in the "modern" sector of the economy and generate income a_H; and the high-ability people who do not have skills to find employment in the "modern" sector of economy, and are able to work at high-skills jobs of the "traditional" economy, generating wage a_M.

We assume that economic downturn in the slow-transforming countries in transition forced wages of the low-ability population a_L close to zero, and the wage of high-skilled jobs of the "traditional" economy a_M close to minimal subsistence level M (poverty line). The wages of the high-skilled workers in the "modern" economy is high, but proportion of such workers in low compared to the proportion of high-skilled workers in the "traditional" economy. We also assume that this proportion in slow-transforming countries is significantly lower than the proportion of high-skilled workers in the "modern" economy of fast-transforming countries.

These assumptions place significant restrictions on the balance of the social safety net in a slow-transforming country:

(1) Because the difference between labor income of high-skilled labor in the "traditional" sector $a_M*(T-l(a_M))$ and minimal subsistence level M is small, it is almost impossible to impose taxes on these people. The maximum amount of tax that would not put this part of population in poverty $M- a_M*(T-l(a_M))$ would be significantly lower than the tax collected from employees of the "modern" sector of economy. The resistance to this tax would be high, and employees would have a strong incentive to avoid taxation and work in "shadow" economy.

(2) Because the proportion of labor in the "modern" sector is smaller in slow-transforming countries than in fast-transforming countries, the same level of taxation of the "modern" sector would generate smaller revenues and would provide smaller funds to finance SSN.

(3) Because the labor income of low-ability people is close to zero, total expenditures for ensuring income at level Z will be close to $N*\lambda_L*Z$, where λ_L is proportion of low-ability population in the country. These expenditures would be higher than expenditures in a fast-transforming country with the same proportion of low-ability population.

(4) If government finds sources of funding to provide social benefits to the low-ability population at level Z close to the poverty line M, it will not be able to implement this policy. Because high-ability people in the "traditional" economy have work income close to M and they have disutility from working, they would prefer quitting work and receiving income Z. Then the total cost of the social safety net would increase to $N*(\lambda_L+\lambda_M)*Z$, where λ_L is proportional to the low-ability population in the country, and λ_M is proportional to the high-ability people working in the "traditional" economy in the country.

The model presented here suggests that reforms of social safety nets in slow-transforming countries of the FSU would be governed by fiscal feasibility of the system, and would consist of constant cuts in the amount of benefits. The ability to finance the SSN would greatly depend on the development of the "modern" sector of the economy. As we show later, attempts to impose higher taxes on the "modern" economy or on high-ability population in the "traditional" economy would lead to development of a large "shadow" economy.

At the same time, any attempt to increase social benefits for low-ability people would immediately trigger a change in the behavior of other people in the "traditional" economy, increasing the number of beneficiaries that were not considered when the system was designed. In order to keep the cost of SSN low, the government would need to implement sophisticated screening for the benefits or

introduce "workfare" policies. However, since the number of potential beneficiaries of untargeted social transfers is high (equal to $N^*\lambda_M$), there would be significant political pressure to keep the untargeted benefits.

The effect of political "lock-out" of an inefficient social system with high untargeted benefits is not only a phenomenon in transition economies, but may be observed in any democratic country with a large proportion of urban population and developed infrastructure for government social services. Christian Ponce de Leon (see 103) derived this effect from the simple economic model of SSN that we discussed in previous chapter. Instead of a single benefit to the poor low-ability people, he assumed that there are two possible policies. One is to provide benefit B_1 to the poor people whose ability do not allow them to receive enough income; this is usually the benefit provided by special poverty alleviation programs, such as workfare. Another option is to provide benefit B_2 to everyone in the country; the example of such policies may be institutional policies such as universal healthcare and pension benefits. The benefits are financed by taxes, and are subject to budget constraint $(\lambda B_1 + B_2)N = E$, where E is the government expenditures dedicated to these programs.

If the choice between these two policies is made by simple voting, it is easy to see that the high-ability people would always vote in favor of spending all money on the benefit B_2 since we assume no increase in personal utility from providing a benefit to another person. Ponce de Leon shows that low-ability individuals in rural areas would prefer the targeted poverty benefits B_1 program. However, the low-ability people in urban areas, where the infrastructure is more developed, would prefer a mix of targeted poverty benefits B_1 and the universal benefit B_2 with emphasis on the universal benefits (see 103). The researcher also shows that in countries where most of the population lived above the poverty line, voters would select policy B_2. In developing countries where most of the population lives below the poverty line, but the proportion of urban population is large, voters will also select a mix of large universal policies B_2 and small targeted assistance programs B_1. Because most of the transition countries of the Soviet Bloc have a high level of urbanization and developed social infrastructure, we might expect that development of targeted social assistance programs in these countries would be limited for political reasons.

Social safety net reform experience in the transition countries of CIS and Eastern Europe

Development of social safety nets in countries in transition confirms conclusions that we derived with the theoretical model. Transformation of social safety nets in these countries in transition generally lagged behind the economic transformation. These countries tried to follow the experience of developed countries. The success of SSN reforms greatly depended on economic conditions in a

country and the ability to finance SSN. The willingness to reform the SSN was largely predetermined by the speed of economic transformation.

The fast-growing countries of Eastern Europe experienced economic declines that lasted only 3-4 years, and the cumulative decline was 20-25% of GDP. Most of these countries reached the pre-transition level of output by year 2000. These countries were able to fund government expenditures at the level of 40% of GDP, and spend 15-20% of GDP on social safety net programs. The largest expenditures were on free healthcare and education, followed by unemployment protection and other social benefits. Pension programs accounted for another 7-15% of the GDP in expenditures. In accordance to the conclusions of our theoretical model above, some researchers attribute success in restructuring labor markets and keeping the population out of poverty to the unemployment programs with active-market policies in these countries (see 46). Because of the fast recovery that simulated economic growth and in accordance with the expectations derived from our theoretical model, the CEE countries were able to adopt European models for social safety nets. At the same time, researchers attribute a major role in combating poverty in these countries to sustained economic growth (see 46). The long-term feasibility of further extension of SSNs in these countries remains questionable because as they approach end of the fast-growth transition period, their SSN will face the same financial constraints faced by the developed European countries. However, current continued economic growth creates in these countries pre-conditions for successful further SSN reform in accordance with the new European SSN models that we discussed in previous chapter.

CIS countries took the path of slow reform. They experienced longer (more than 6 years) and deeper (60-80% of GDP cumulative decline) economic depression. Due to this decline, average tax revenues in the CIS countries fell from 28% of GDP in 1992 to 22% of GDP in 1998, and some countries with slower transition like Georgia, Kyrgyzstan, and Tajikistan experienced drops in revenues under 15% of GDP (see 128). Transition to the market economy forced governments to reduce some budget functions such as direct subsidies to the national economy, but SSN systems remained almost unchanged. It seems that FSU countries were caught in a political lock-up that did not allow cutting any social benefits that are provided to the whole population. Most of the countries (except Russia and Kazakhstan, which have significant income from the energy trade) constantly run significant budget deficits in order to finance government obligations (see Table III-5).

Education and healthcare systems constitute a large part of the social safety nets in most CIS countries since traditionally these countries declare the right to free education and healthcare in

their constitutions. These countries spend a large portion of the state budget on these items. However over time the financing for these parts of the social safety net become lower than required to provide the service with adequate quality. Reform of the education and healthcare systems in these countries in transition is an important issue for sustaining SSNs, but it is generally out of scope of this dissertation, and we will not discuss it in further detail.

The largest social welfare item outside the state budget in FSU countries is pensions, accumulating and spending 7-12% of GDP. Despite being the largest expenditure item, in accordance with expectation that we derived from our theoretical model, due to the lack of funding pensions became only a valuable co-payment for working pensioners, and alone did not provide income sufficient to stay out of poverty (see 128). For example, the universal pension in Georgia in 2000 was only 23% of the living wage, and in Ukraine the average pension was only 36% of living wage in 2003. Following the example of CEE countries, CIS countries started pension reform, introducing a multi-tier (mandatory and voluntary funds) pension system. However they are just at the beginning of the process and the new systems are expected to have an impact in 15-20 years.

The social welfare system in CIS countries did not change significantly from the universal social welfare system that was inherited from the USSR. The system remains very poorly oriented towards supporting the poor. The social assistance programs remain aimed at providing services or supplementary payments to certain groups of population (elderly, children, disabled) and putting the task of reducing poverty in last place. Reacting to the dramatic change in the structure of expenditures and in order to retain the Soviet-style system of special rates, the governments of CIS countries introduced large number of subsidies or discounts, often provided in-kind. For example, until 2005 Russia kept 156 types of subsidies and social payments that were directed to 236 different population groups. Almost 70% of the Russian population received welfare benefits (see 29). At the end of the 1990s about 3% of GDP in Moldova was distributed through more than 100 different subsidies and discounts. Armenia and Ukraine had the same situation (see 46). As we derived from our theoretical model, the number of beneficiaries for these assistance programs became enormously high, while the size of the benefits gradually decreased due to the lack of financing. Despite significant expenditures on subsidies and discounts, these programs were very severely underfinanced. It was estimated by researchers of the Center of Strategic Research (Russia) that financing needs for the subsidies established by federal law in Russia exceeded 15% of GDP in 1999. In order to improve monitoring and targeting of these social benefits, Russia monetized the in-kind benefits in 2005 (Federal Law #122). However, monetization of the benefits triggered strong negative social reaction and the government did not begin the reform of social benefits in order to reduce their cost.

Apparently the problem of non-payment of social benefits because of the huge difference between the required expenditures and available revenues was partially resolved by a decrease of the real amounts of the payment because of high inflation. Until the beginning of 21st century, payments were not automatically indexed for inflation, but rather revised on an irregular basis. As a result, by 2003-2004 welfare payments had become symbolic in most of the countries. For example, social benefits in Russia amounted to about 6% of the average wage, in Ukraine and Azerbaijan about 3-4% of the average wage.

Contrary to the fast-transforming countries of the CEE, unemployment insurance in the CIS countries did not play significant role in keeping people out of poverty. At the beginning of transformation period, most CIS countries tried to implement unemployment insurance programs similar to the programs in developed market economies. However, due to difficulties in funding the system, unemployment benefits were rather low and application terms for unemployment payment were harsh. As the result, despite the increase in unemployment the percentage of people registered to receive benefits was low, and the role of the unemployment system in reducing poverty in CIS countries was extremely low (see 106).

In accordance to the theoretical model that we discussed above, the attempt to finance expensive social security system with taxes on employees would stimulate high-ability individuals in the "traditional" economy to shift to the informal economy. This might be one of the reasons why the transition to market economy in CIS countries was characterized by rapid growth of the informal sector, reaching 39% of the economy in Kyrgyzstan, 44- 45% in Armenia and Moldova, 50% in Ukraine, 60% in Azerbaijan and Georgia (see 40). Obviously, employees of the shadow economy were not covered by unemployment insurance. However, they qualified for other social benefits and subsidies, although they did not contribute to the system.

The expensiveness and poor performance of the post-soviet SSN were recognized at the early stages of transition. B. Milanovic in his book in 1997 (see 87) suggested abolishing categorical benefits in SSNs of countries in transition and introducing Minimal Income Guarantee programs, which would provide benefits only for those people whose income is below the guaranteed income, and in an amount only sufficient to reach the minimal guaranteed income. Since that time a number of means-tested programs were introduced in the CEE and CIS countries.

The means tested programs are viewed as policy that may significantly reduce costs of the SSN by cutting benefits to the population that is not in deep poverty. International experience suggests that programs based on Verified Means Testing (VMT), such as used in the United States, are very precise in targeting the poor, but extremely costly to implement. Less expensive are Unverified

Means Testing (UMT) programs, which do not require expensive verification of submitted information. They are proven to be less effective in targeting the poor than VMT, but more effective than categorical benefits. Another inexpensive approach, based on assertion of income from social characteristics, is called Proxy Means Testing (PMT). This approach was successfully used in Chile, Colombia, Costa Rica and Mexico and provides targeting comparable with VMT programs (see 117). Governments of the CIS countries with support of international organizations like the World Bank have implemented such systems at the national level. The pilot projects of the means-tested social programs proved to be successful in targeting the poor, but extent of the projects was negligible. For example, Romania in 2000 provided only 1% of total social assistance through mean-tested programs (see 46).

However, the ability of these programs to substantially reduce poverty at the national level is questionable. One possible explanation of the unsuccessful implementation of the means-tested programs in these countries on a large scale we derived from our model. By design the means-tested programs are supposed to provide relatively large benefits to people with low ability to generate income. However, according to our model, the number of people who will change their behavior in order to receive the larger social benefits (high-ability workers in the "traditional" economy in the model) should be high, and even means-tested programs with large benefits would be very expensive because of the high leakage (situation when the people who are not eligible for the benefits receive benefits) from the system.

Another explanation is that any means-tested welfare program requires extensive monitoring and a system of constantly updating personal and household income statistics. Such systems were not present in the CIS countries in the past and are only under development now. The only successful targeted programs in the CIS countries were programs implementing PMT-type targeting, such as the support to families with children (see 46).

Conclusions

Similar to developed countries, countries in transition face the same problem of balance in development of a social safety net. However, while developed countries are looking for reform of their safety nets that will prevent future downturns in the economy, countries in transition are reforming their SSNs while recovering from depression.

Development of social safety nets similar to the SSNs in developed countries is a feasible task for the fast-transitioning countries. However, for the slow-transitioning countries of the CIS economic growth may be a more important factor in reducing poverty than the social safety net. Therefore,

reducing the speed of economic growth by high taxation of successful sectors of economy in order to finance a large social safety net might be ineffective policy for long-term reduction of poverty in these countries. An even more dangerous policy might be an increase in social benefits because of the possible behavioral response of a large proportion of the population. Since the policy of further increase in social benefits without radical reform of the structure of the benefits in these countries is extremely costly for the economy, it may be preferred policy only if the population has strong preference to reduce poverty in the present and is ready to forego benefits of fast economic growth in order to achieve this goal.

Tables and figures

	Socialist countries	Market countries	Developing countries
Primary income	77	85	90
Labor income	63	64	35
Self-employment income	13	14	48
Property income	1	5	6
Occupational (private) pensions	0	2	0
Social transfers	19	14	3
Pensions	13	12	2
Child benefits	4	1	0
Other cash transfers	2	1	0
Other income	6	1	7
Gross income	100	100	100

Table III-1. Sources of income in socialist countries and market economies

Source: B. MILANOVIC, "Income, Inequality, and Poverty during the Transition from Planned to Market Economy", World Bank 1997

	1989	max 1992-1996	max 1997-1998	1999	2000	2001	average 2002-2004
Armenia	14.3	54.7	53.7	53.7		47.4	42.5
Azerbaijan	33.6	72.2	71.2	54.3	52.3	49.6	
Belarus	3.3	38.6	33.0	46.7	41.9	28.9	25.1
Georgia	13.0	80.0	50.2	51.4	51.4	52.0	52.0
Kazakhstan	15.5	34.6	39.9	34.5	31.8	28.4	24.2
Kyrgyzstan	32.9	51.9	63.6	64.1	62.5	56.4	
Moldova	11.8		61.6	71.1	70.5	62.3	
Russian Federation		33.5	23.3	28.3	28.9	27.3	20.8
Tajikistan	51.2			95.7	83.0		
Ukraine	6.0	29.5	28.5	27.8	26.4	27.2	27.2

Table III-2. Poverty levels in CIS countries (% of people living below national poverty line)

Sources: Ovcharova et al.(1999), Falkingham (2003), and publications of national governments

	1990-1994		1995-1998		1999-2002	
	Employment	GDP	Employment	GDP	Employment	GDP
Armenia	-2.2	-16.2	-2.2	5.8	-0.94	7.9
Azerbaijan	-0.5	-17.0	0.5	1.0	0.12	9.7
Belarus	-2.3	-7.8	-1.5	2.7	-0.40	4.6
Georgia	-10.8	-27.5	-0.3	6.6	-0.65	3.8
Kazakhstan	-4.2	-9.6	-1.8	-2.1	2.30	8.8
Kyrgyzstan	-1.5	-14.4	0.9	3.3	2.06	3.6
Moldova	-5.1	-20.5	-0.6	-4.2	0.00	-1.1
Russia	-2.3	-10.3	-2.0	-2.9	0.69	0.8
Tajikistan	-1.1	-20.1	-0.7	-2.7	0.00	0.9
Turkmenistan	3.5	-9.2	2.5	-5.2	0.00	3.8
Ukraine	-2.4	-14.1	-0.7	-6.9	-0.18	-0.1
Uzbekistan	1.3	-4.9	1.9	1.9	0.35	1.0

Table III-3. Employment and GDP dynamics in the CIS countries, average growth rate

Source: Economic Survey of Europe 2004; EBRD Transition reports; author's calculations

	1989	1991	1993	1995	1997	1999	2001	2002	2003
CEE countries									
Bulgaria	100	64	78	60	39	51	51	51	
Czech Republic	100	69	79	93	103	108	115	120	
Estonia			102	120	132	150	169	183	
Hungary	100	97	98	92	93	99	111		
Latvia		68	49	55	58	63	68	72	
Lithuania	100	78	33	40	48	57	56	57	
Poland			100	104	117	127	131	134	
Romania		85	64	74	64	62	71	72	
Slovakia	100	67	71	76	87	86	82	90	
Slovenia	100	57	62	67	73	76	80	82	
CIS countries									
Armenia	100	51	6	5	7	9	11	14	15
Azerbaijan	100	80	44	14	26	37	50	60	71
Georgia	100	73	15	12	24	31	40	45	
Kazakhstan		83	34	23	25	30	36	43	45
Kyrgyzstan	100	82	28	21	24	24	26	30	33
Moldova	100	96	41	25	28	26	32	39	47
Russia	100	76	33	36	54	34	52	57	63
Tajikistan	100	88	17	5	4	6	7	9	12
Ukraine	100	108	47	44	41	38	46	56	63
Uzbekistan	100	91	100	133	165	240			

Table III-4. Real wages in CEE and CIS countries since 1989

Source: Economic Survey of Europe, 2004; National sources; Authors calculations

	Consolidated general government deficit/surplus						Public debt				
	2000	2001	2002	2003	2004	2005 target	2000	2001	2002	2003	2004
Armenia	-6.4	-3.7	-0.3	-1.1	-1.3	..	..	45.3	46.6	40.9	..
Azerbaijan	-1.3	1.2	-0.4	-2	-1.2	..	..	..	..	..	..
Belarus	-0.2	-1.9	-1.8	-1	-1.5	-1.5	15	..	13.1	10.6	9.4
Georgia	-4.7	-2	-2.2	-1.3	-1.2	-0.5	60.3	57.7	55	54.3	..
Kazakhstan	-0.8	2.7	1.4	3	2.3	1.6	25.5	20.4	17.7	15.5	14.4
Kyrgyzstan	-9.9	-5.5	-6.3	-5.5	-4.7	-4.5	112.4	100.4	103	101.6	..
Republic of Moldova	-2.8	-0.5	-2	0.2	-0.7	-0.5	73.2	60.7	56.9	47.1	39.1
Russian Federation	3.1	2.7	0.6	1.1	3.2	1.5	63.3	50.8	43.2	32.1	28.1
Tajikistan	-0.6	-3.2	-2.4	-1.8	-3.5	..	..	..	..	..	..
Turkmenistan	..	-1.1	-0.7	-0.9	–	–	..	..	..	..	..
Ukraine	-1.3	-1.6	0.5	-0.7	-4.3	-1.3	..	31	29.2	25	23.1
Uzbekistan	..	-1.3	-3	-2.2	-1.1	-1	..	..	..	..	..

Table III-5. Fiscal deficits and public debt in the CIS economies, 2000-2005 (percent GDP)

Source: THE COMMONWEALTH OF INDEPENDENT STATES, Economic Survey of Europe, No. 1, 2005 pp. 59-81

Country	Survey date	Percent living in extreme poverty ($2.15 a day)	Percent living in poverty ($4.30 a day)	Total population extremely poor (thousand)	Total population poor (thousand)
		Central Europe and Baltic states			
Estonia	1998	2.1	19.3	30	280
Latvia	1998	6.6	34.8	162	852
Lithuania	1999	3.1	22.5	115	833
Czech Republic	1996	–	0.8	–	82
Hungary	1997	1.3	15.4	131	1558
Poland	1998	1.2	18.4	464	7114
Slovakia	1997	2.6	8.6	140	464
Slovenia	1997-1998	–	0.7	–	14
		South-east Europe			
Albania	1996	11.5	58.6	383	1952
Bulgaria	1995	3.1	18.2	256	1503
Croatia	1998	0.2	4	9	187
Romania	1998	6.8	44.5	1531	1016
Republic of Macedonia	1996	6.7	43.9	135	882
		CIS			
Armenia	1999	43.5	86.2	1651	3271
Azerbaijan	1999	23.5	64.2	1860	5080
Georgia	1999	18.9	54.2	1020	2926
Kazakhstan	1996	5.7	30.9	860	4664
Kyrgyzstan	1998	49.1	84.1	2291	3925
Tajikistan	1999	68.3	95.8	4133	5798
Turkmenistan	1998	7	34.4	330	1620
Uzbekistan	2000	..	..	2395	11977
Belarus	1999	1	10.4	102	1060
Republic of Moldova	1999	55.4	84.6	2022	3088
Russian Federation	1998	18.8	50.3	27548	73706
Ukraine	1999	3	29.4	1501	14714

Table III-6. Percentage of the population in poverty using international poverty standards

Source: UN ECE (2004): Poverty in Eastern Europe and the CIS, Economic Survey of Europe, No. 1 2004, pp. 163-176

Chapter IV: Analyzing the social safety net in Ukraine

In previous chapters we discussed the development of social safety nets in transition countries in general. In this chapter, we provide specifics of socio-economic environment and SSN development in Ukraine. The country started the process of transition to a market economy in 1992, which immediately triggered the necessity of social safety net reform. Ukraine received significant international assistance in designing the new social safety net; however most of the Ukrainian SSN did not changed the structure of benefits yet. The majority of social benefits are poorly targeted. Consequently, the SSN in Ukraine is costly, and remains inefficient in reducing poverty. Recent debate about increases in social benefits could significantly change the policy-making around the issue of SSN reform in the country. These debates also raised the question of fiscal sustainability of the social safety net that is discussed in this dissertation. Understanding of the economic development and poverty profile, as well as current trends and historical development of the SSN, are essential for further policy analysis in this paper.

This chapter describes the socio-economic situation in Ukraine and SSN development in the country. It provides insight into current trends in development of social programs in Ukraine, and describes the policy problems for the government implementing the changes. This chapter provides background information for further evaluation of SSN costs in Ukraine.

Current social security system in Ukraine

Economic development and poverty profile

Ukraine followed the pattern common for CIS countries. After its independence, Ukraine suffered an economic downturn that continued for 6 years. In 1998 real GDP felt to 41% of the GDP in 1990 (see Table IV-1). GDP began growing in 1999, and by 2004 accelerated to a pace of 12% per year. GDP growth slowed down to 2.6% in 2005, due primarily to political instability and new social and fiscal policy that we will discuss later in this chapter.

Ukraine has experienced massive population decline since independence. Due to an increased death rate, decreased birth rate, and large emigration, the population decreased from 52 million in 1991 to 46.9 million in 2005 (see Table IV-2). Age demographics also changed significantly. Although the proportion of people of working age (considered to be from 15 to 70 years old) did not change, the proportion of younger people decreased. Also, the population became more economically active during the recession because most pensioners able to work had to look for some job to supplement

their pension income. At the same time, the proportion of pensioners in the total population grew from 25% in 1991 to 30% of total population in 2005.

Although the proportion of employed decreased from 47% in 1995 to 42% in 2005, similar to other CIS countries, the economic depression did not result in high unemployment in Ukraine. The highest unemployment since independence was around 12% in 1999-2000, and the unemployment rate decreased after that, partially due to a decrease in the proportion of economically active population from 52% in 1998 to 47% in 2005 (see Table IV-2).

The rapid economic decline resulted in increased poverty. It was established that during the Soviet period only about 6% of the population of Ukraine lived below the national poverty level of 75 rubles, and this was primarily rural population in depressed western regions. Poverty reached its' maximum during the 1992-1996 recession period, when about 30% of the population lived below the national poverty level (see Table III-2). Poverty decreased with the first signs of economic growth, but remained stable at 27% of the population below the national poverty level from 1999 till 2004. The comparison using international standards reveals that poverty was in fact declining: the World Bank study in 1999 found that 29.4% of population lived for less than $4.30 a day (see 129), and the latest 2005 study shows that poverty was only 22.2% in 2003 (see 132).

The World Bank Poverty Assessment in Ukraine in 2005(see 132) found Ukraine's poverty profile similar to most CIS countries. First, there was an increasing poverty gap between rural and urban population. According to official statistics, only 11% of population in large cities lived below the poverty line, while this proportion reached 28% in rural areas. This largely affects the regional distribution of poverty: the rural regions of Western Ukraine and the Black Sea coast line have above average poverty indicators, while the more industrialized North-East of Ukraine and capital city of Kiev have poverty indicators below the average. The coal-mining areas of Donetsk and Lugansk regions are special cases. These are densely populated areas where about 30% of Ukraine's population lives. This industrialized region has a poverty level near the national average, but there are pockets of deep poverty in towns around the mines that were closed during the transition.

Second, poverty is greater in the households with large numbers of dependents. Only 20% of the population lives in households of four people or more. But there are more than 40% of people living in large households among poor. About 42% of the poor are children and youth 24 years old or younger, while youth constitute only 30% of the total population. Large families with larger numbers of children constitute the poorest group of rural population.

Surprisingly, the elderly population constitutes only 11% of all poor. As we mentioned earlier, pensioners able to work supplement their pension income with part-time jobs, and the pensions and

subsidies received by pensioners are sufficient to keep most families with elderly members out of poverty.

Although unemployment is not high in Ukraine, underemployment, defined as number of people who are working fewer hours (and less hours than the standard 40-hour working week) than they desire to work, is considered to be significant. World Bank researchers found that underemployment increased from 8.4% of population in 1999 to 9.2% in 2002. In this self-reporting survey the underemployed are usually easily identified as people who reported to be unemployed and reported some wage income below minimum wage at the same time. Although there are a large number of families that have unemployed or underemployed members, especially women, the risk of poverty is twice higher for the families with unemployed household heads compared to families with employed heads.

In order to survive poverty, the poor population needed some social support from the government. The social welfare system built over the years since independence currently provides about 21% of income for poor families. Another 23% come from self-grown agricultural products, and only 40% of the income in poor families comes from wage income (see 132).

The safety net programs

As we mentioned earlier, prior to 1992, when the Soviet Union ceased to exist, the republic of Ukraine had the social safety net common to all soviet republics. At that time the primary goal of the system was to maintain a certain level of family per-capita income by supplementing wages. Because of the near 100% employment and the supplementary character of the safety net, in most cases its administration was carried out by state enterprises. The safety net relied heavily on in-kind transfers, such as free housing, childcare, reduced food and goods prices, and it was almost universal. Due to the uniformity of income the entire population was eligible for services provided by the system.

The transition forced government to take responsibility for the safety net expenditures that were previously a part of enterprise finances. At the initial years of transformation the Soviet system was converted into a generous social protection system that consisted of social privileges, Chernobyl benefits, housing and utility allowances, and family benefits. More than 20 social privileges to different population groups existed until the beginning of this century; they were introduced by different laws and presidential decrees, and simulated privileges that existed during the Soviet Union. The Law on "State Assistance to Families with Children", adopted in 1993, introduced about 11 types of different family allowances; most of these allowances are distributed on a categorical

bases, and only limited number of the allowances is provided on the income-based means test basis. Chernobyl benefits were introduced in 1991 by the Law "On the Status and Social Protection of Citizens Who Suffered from the Chernobyl Catastrophe", and are provided on a categorical basis to the people that resided close to the site of the disaster. Most benefits were provided in-kind. The government is supposed to provide reimbursement for the free services to the producers of such services, e.g. telecommunication or transportation companies. Despite attempts to fulfill its obligations, the government constantly failed to finance all obligations, increasing debts to service providers and to beneficiaries.

In order to shield families from the impact of the rapidly increasing energy and housing prices the government in 1995 introduced the "Housing and Municipal Services Allowance Program". The program increased government responsibilities and pressure on the budget. The allowances were financed from local budgets, and regions with weak revenue bases rapidly accumulated arrears.

One of the shortcomings of all the above mentioned programs was that they were established to preserve the status-quo of Soviet era privileges, and the Soviet era privileges were costly and did not provide effective protection against poverty in the new market economies. The Government of Ukraine has been aware for a long time that the current safety net system in Ukraine is not aimed at the poorest population. The Decree of the President of Ukraine "On the Strategy to Eradicate Poverty" (Decree #637/2001,August 15, 2001) mentioned that the share of social privileges in the total amount of household incomes of the poorest and the richest 10% of households equaled 5.5% and 8.1%, respectively in 2000.

The main critique on the social safety net in Ukraine is that it is not designed to alleviate poverty. Most programs by design provide larger benefits to the families or individuals with higher income. And because of sluggish management, the programs were ineffective in controlling eligibility for the benefits. For example, according to the World Bank and the Presidential Administration, 88% of people who received the housing subsidy in 2001 were not entitled to it. The same year 71% of families that had right to receive the housing subsidies, eventually did not receive it, and about 90% of families that were entitled to receive support to low-income families were not among its recipients. Leakage lead to problems financing the system and. as the result, to the problem of inadequacy: the payments received by beneficiaries were not sufficient to bring their income above the subsistence level (see 129).

At the same time, joint World Bank and Ministry of Labor and Social Protection (MLSP) research (see 129) showed that in 1999 the state budget already had enough resources to bring all the poor households above the poverty line. For example, in first three quarters of 1999 the amount of money

needed to eradicate poverty was 4.2 billion, while government spent over 4.5 billion UAH over the same period on poverty alleviation programs and did not achieve the goal. Although the assumption that all social benefits are distributed to the poor does not hold in the real economies, and the efficiency of the best means-targeted programs in developed countries is far bellow delivering the hundred percent of the benefits to the poor (see 21), this estimate demonstrates that significant decrease in poverty can be achieved by more effective use of current resources.

Since the abovementioned programs were unable to eradicate poverty because they targeted wide population, in 2000 the Verkhovna Rada adopted the Law on "Targeted Social Assistance to Low Income Families". This law provided families living below the subsistence level with compensating benefits up to 75% of the minimal subsistence level. The beneficiaries were restricted by asset test to people who did not possess a second apartment, a new car and did not make any substantial purchases over the previous 12 months. This was the first law directly aimed at reducing poverty, and attempted to target the benefits to the people in need.

Financial constraints to the SSN

Over the years a number of changes were introduced to the legislation governing the social benefits in Ukraine. These changes were intended to reduce the number of benefits, lower the cost of the programs, and change eligibility criteria. For example, the year 2000 State Budget Law suspended a lot of social privileges, and reduced government liabilities to finance the privileges from UAH 30 billion to UAH 17 billion. However, reduction in the cost of the programs and targeting remain inefficient, and further reform might be needed in order to reduce the cost of the SSN.

It is possible that the current path of SSN reforms results from the fact that the development of the social safety net in Ukraine was not driven by the goal of reducing the poverty, but by the financial constraints on the size of the system. During the Soviet period the government owned enterprises, and did not need an extensive tax system to collect budget revenues. The only tax known to the population at that time was personal income tax, which was a tax on wages with a scale progressing from 0 to 40%. Transitioning to a market economy after independence, the government of Ukraine established a tax system. The core of the system was based on 28% value-added tax, 30% enterprise profit tax, and the above-mentioned progressive personal income tax. In order to finance new social welfare programs, the government introduced a 38% payroll tax to finance the Pension and Social Insurance Fund, a 12% payroll tax to finance the Chernobyl fund, and a 2% tax that went to the unemployment fund. Although only a small portion of these taxes were classed as employee taxes as opposed to taxes on employers, since employers were responsible to collect and report these taxes, effectively the employer taxes on the wage fund (payroll taxes) amounted to 52%

Despite the high taxes, the government did not manage to collect revenues sufficient to finance its obligations, and ran large budget deficits until 1998 (see Table IV-1). At the same time, the high taxes contributed to a reduction of the tax base and escalation of shadow economic activity (see 85). Because of high inflation, the nominal wages of workers constantly appeared at the highest level of the progressive personal income tax scale, and were taxed at a 40% rate. In addition, employers had to pay 52% payroll taxes, which together with the personal income tax made the cost of labor 2.5 times higher compare to paying cash to a worker off the books. Taking into account that capital gains or interest on shares were taxed at about 15%, one of the cheaper schemes was to employ all workers at minimum wage, pay income tax at 0% plus some minimum payroll taxes, and pay the workers cash from the pocket of the owner, who in turn received the cash as interest or through some other scheme. It was estimated that the shadow economy in 1996 was the same size as the official economy (see 70) and shadow (off the books) employment was about 40% of total employment the same year (see 105).

Sustainability and role of the pension system

The pension program is the largest social security program in Ukraine. It was the most severely hit by the decreasing tax base. Prior to reform in 2003, the pension system of Ukraine was "pay-as-you-go" (PAYG) system that provided pensions to current retirees from the money collected from current workers. The pension program provided old-age pensions (about 80% of expenditures), disability pensions, survival, social, and service pensions. The general old-age pensions were provided to women over 55 years old and men 60 years old, and special pensions were provided to workers of certain professions (miners, for example) at an earlier age depending on the number of years they had worked. The standard replacement rate (the pension as a percentage of wage) guaranteed by the system was 55% of average wage before retirement, within the minimum and maximum limits.

Given macroeconomic and population trends, such a generous pension program could not be sustainable in the long run. In 1993 the pension fund ran a deficit of 1% of GDP or about 10% of the pension fund expenditures, and had to be taken under supervision of the Ministry of Finance that financed the deficit out of the state budget. Researchers expressed concerns especially because the system dependence ratio (the ratio of beneficiaries to contributors) where gradually increasing. We can see from Table IV-2 that the while there were approximately 2 workers per every pensioner in 1991, there were only 1.6 workers per pensioner in 1996, and the ratio was declining. In fact, researchers showed that the ratio of contributors to beneficiaries dropped further, reaching 1.15 contributors per pensioner (see 105). C. Kane of the World Bank in his research in 1995 (see 68)

showed that if the current pension system was not reformed, the constant annual deficit of the system would rise to 3% of GDP (or 30% of expenditures). Research recommendations were to increase the pension age above 65 for both males and females, and decrease the replacements ratio.

Another World Bank study by M. Riboud and H. Chu in 1997 (see 105) revealed that the concerns were correct. The dependence of the pension system ratio increased, and in order to maintain some balance in the pension fund, the replacement rate was decreased to about 1/3 of average wage over the years since independence. This was achieved by indexations that lagged the inflation rate (decreasing real pensions) and by narrowing the gap between minimum and maximum old-age pension. The authors showed that the pension system in these conditions could be sustainable only if there was moderate growth achieved for the next decade. Any attempt to increase the replacements ratio (increase pensions) would result in the pension fund deficit from 3% of GDP in 2000 to 7% of GDP in 2010. They also said that pension reform relying on an increase in pension age to 65 years and a reduction of payroll taxes to 23% might create a pension system that would be sustainable in the long run. Finally, the researchers suggested that introduction of a fully-funded multi-tier (mandatory and voluntary) pension system could reduce the economic cost of the pension system in the long-run.

As we mentioned earlier, the pension system in Ukraine played an important role in keeping the elderly population out of poverty. The system provides sizable benefits to over 30% of Ukrainian voters. Therefore the government took the advice of the international community and together with the PADCO/USAID advisory project developed new multi-tier pension system. The system was introduced by law in 2003, and start operating in January 2004. The new system introduced three tiers. The first tier is a PAYG system with benefits based on careful accounting of personal contributions to the system instead of average wage and years worked. The pensions of the beneficiaries of the previous pension system were recalculated to the new system, and most benefits were slightly increased. The second tier is a fully-funded pension investment fund run by the government. The third tier is a system of licensed private pension funds.

The sustainability of the new pension system was based on the following assumptions: maintaining relatively low replacement ratio of the PAYG system; expanding tax base due to the decreasing payroll tax rates; starting the second tier as soon as the capital markets legislation allows creating the state investment fund, and introduction of the third tier by 2010.

Together with introduction of the new pension system, the Ukrainian government took steps to ensure expansion of the tax base. In 2003 it cut the personal income tax to the 13% flat rate (which was supposed to be replaced by a 15% flat rate in 2006); decreased the payroll taxes from 52 to

37% plus 2 % paid by employees; and introduced a cap on the monthly payroll tax for a single employee.

Effectiveness of other programs

Other factors that affect a large proportion of the population in Ukraine are subsidies and social privileges. By the end of the 1990s almost 42% of Ukrainian households were entitled to some social privileges because of the entitlement of one household member. These included up to 50% discounts on housing and communal service, free phone lines, etc. About 25% of households also received targeted subsidies for utilities and rent (see 129). In 1996-1998 expenditures on subsidy, housing allowance and social privileges programs increased from 0.7% to about 1.7% of GDP. However, these expenditures were hard to finance, and in 1999 the programs were financed in the amount of 1.4% of GDP. The cost of subsidies was increasing due to the increase in energy prices and utility costs, but the budget did not have funding to finance the increased costs. The privilege and subsidy programs suffered periodic cuts in expenditures, and it was obvious that the generous program could not be sustained in the long run. In 2000/2001 government decided to strengthen eligibility criteria for the program and to move programs to the local budgets. As the result the numbers of beneficiaries was reduced from 40% to about 21% of population (see 132). Accelerating growth allowed increasing the budget for the program in 2003; however programs remained underfinanced in poorer regions, which were unable to collect enough resources and at the same time have a larger number of beneficiaries.

Other social welfare programs, such as support for families with children and maternity benefits also suffered from the economic downturn, and expenditures on these programs decreased over the period 1996-1999 from 4.6% of GDP to 0.9% of GDP. Some programs were canceled, and in others benefits decreased significantly. For example, benefits in the assistance to families with children programs were from 10 to 19 UAH a month per child (see 129), when the average wage in the country was 126 UAH. The programs started to increase benefits when the economy started to grow in 2000-2004; however, these increases were primarily based on the same program design. Policy makers did not take advantage of the favorable financial situation and have not yet reformed the social welfare sector.

The problem of the inefficient use of available resources, and, in particular, insufficient targeting of the benefits and leakage from the system, remains today despite steps taken by the government in 2002 -2004. The government consolidated benefits in the "Support to families with children program" and introduced an income filter for the recipients. As the result, the share of the program benefits received by the richest 40% of families reduced by 5% of the benefits between 1999 and

2003 (see 132). Joint research of the World Bank and the MLSP in 2005 found that the most successful in targeting was the "Targeted Social Assistance to Low Income Families" program (see Figure IV-1). It provided one of the largest benefits, averaging 70 UAH per month in 2003, and more than 50% of these benefits reached the poorest 20% of population (see 132). However, this is smallest social security program. The extension of this means-tested program depends on the availability of a monitoring and accounting system, with the government of Ukraine together with the World Bank actively developing a computer network with social welfare offices that is supposed to remove this obstacle to development of the program in the nearest future. As a result, there will be an opportunity to make the social welfare system in Ukraine more efficient and fiscally sustainable by moving funds from non-targeted programs to this means-tested program.

Current trend towards increase in benefits of the system

International experts agree that the pace of institutional and structural reforms of the Social Safety Nets in CIS countries slowed down at the beginning of the XXI century and did not make effective use of the opportunities presented by increased economic performance during this period. The analysts agree that sluggish progress of reforms could be the result of the electoral cycles in the countries such as Kazakhstan, Russia and Ukraine (see 123).

The period 2004 – 2005 was a politically charged election period that had tremendous effect on the development of Ukrainian social safety net. Ukraine had a presidential election in November 2004, which resulted in the so-called "Orange Revolution" and ended January 2005. As the result of the revolution, power to form the government was shifted from the president to parliament. A year after the first post-revolution government was formed, Ukraine had parliamentary elections (March 2006). Both elections were dominated by two political forces that had almost identical number of supporters. In order to win extra votes, both political forces began promising increases in social benefits to pensioners and the poor.

Increases in social benefits were implemented *de facto* in the second half of 2004, and then adopted *de jure* in 2005. Minimum benefits of most welfare programs increased 3 to 12 times, and average benefits increased 25-70% (see Table IV-3). Further increases were planned for 2006 (see 92). As the result, social welfare expenditures (including pensions) increased from 11.9% of GDP in 2003 to 17.4% in 2005. The government also increased the minimum wage 40% (about 30% increase in real terms) in 2005, which resulted in increase of wages paid to employees in the public sector and increased budget expenditures on healthcare, education, and government employees.

The political situation also did not allow government to increase tax rates and even demanded a decrease in some taxes. For example, the personal income tax law provided for a 13% flat tax rate for the period of two years that was to have been replaced by a permanent 15% flat tax rate in 2006. However, due to political pressures the increase was postponed. Another example is simplified taxation of small businesses. The previous president in 2001 issued a decree establishing a "simplified taxation for small businesses". Businesses with turnover under $100,000 a year and up to 10 employees may pay a flat tax (only 200 UAH, or $40 a month in 2004-2005) instead of all taxes on their businesses, including the payroll taxes. The decree would have lost effect when the new president was elected in 2004. However, the life of this decree was extended because of the adverse reaction of small business owners. As the result, most employees of the small businesses still do not make sizable contributions to the pension or other social insurance funds. They are protected by some social insurances, but their contributions to the pension fund will not allow providing them anything but minimal pension when they retire.

There is no final report yet, but the deficit in the pension fund was about 5-6% of the GDP in 2005, and was financed from the state budget. However, overall performance of the state budget was not a disaster in 2005. Government managed to attract about $2 billion from privatization of Krivorizhstal, the largest steel-producing plant in Ukraine. It also managed to increased revenues from VAT and enterprise profit tax by eliminating tax exemptions, such as free economic zones, and prosecuting businesses that avoid paying taxes. As the result, because the government viewed privatization as a part of budget revenues, the budget deficit in 2005 was kept under 2% of GDP, and the state debt was decreased.

Good performance of the 2005 budget led policymakers to believe that increasing social welfare benefits might be sustained. Extending the offers to the voters, politicians in the parliamentary election campaign not only promised increases in social benefits, but also promised to decrease payroll taxes from 39% to 25%. They expressed beliefs that in the short-run the increased social welfare benefits could be financed from other revenues of the state budget, at the same time reduced payroll taxes would stimulate expansion of the tax base for the social insurance funds in the long-run.

However, international experts do not share the opinion of Ukrainian politicians that the increased expenditures can be sustained. A recent issue of the Economic Survey of Europe (see 123) noted that "The political cycle in Ukraine led to a significant relaxation of fiscal policy as the presidential elections drew closer. Although this is a widespread phenomenon, some of the populist pre-election moves (such as the large increases in pensions in September and the planned rise in public sector

wages) will have lasting negative fiscal implications as they are equivalent to a general increase in government spending. As a result, the underlying structural fiscal balance is likely to have deteriorated significantly in 2004. As shown by the experience of some east European countries (for example, Hungary) this type of fiscal loosening (involving notable wage increases) can have a lasting and damaging effect on macroeconomic stability. Furthermore, the negative fiscal implications of such moves are very difficult to reverse or offset, especially during a downturn in the growth cycle."

It seems that policymakers in Ukraine underestimate at least two phenomena that may have an effect on the long-term sustainability of the SSN. First, the increased collection of revenues to finance the expanded social budget will have strong negative effect on the tax base even if it is done without increase in tax rates or through taxes other than the payroll tax. Second, the steep increase in the social welfare benefits could trigger a behavioral response of the potential recipients and result in the non-linear increase in the expenditures for the welfare programs.

Conclusion

Ukraine fits the profile of the slow-transitioning economy that we discussed in the previous chapter. The social safety net in the country is constrained in the same way as the systems of other slow transitioning economies. The main drivers for the reform of the SSN in the country were financial constraints resulting from the large decline in the income of population and increase in the number of welfare recipients. The transformation of the SSN resulted in the system that provides small benefits to a large number of people. However, the reforms directed at reduction of the number of beneficiaries are limited by the political resistance to such reform from a large number of voters.

The Ukrainian welfare system has a large potential to reduce costs of welfare by improving targeting and strengthening the eligibility criteria. Means-testing should have an effect while benefits remain small. However, based on our theoretical model of SSN for countries in transition, we expect that increases in the amount of benefits would influence behavior of a significant number of potential benefit recipients. They will change their economic characteristics and work behavior in order to qualify for stricter eligibility criteria. Simultaneous increases in the amount of benefits and strengthening criteria would require expensive screening procedures or limitations of personal freedom that is possible only in an authoritarian regime. Therefore, there is little chance that the social safety net with increased benefits could be established within the current budget.

An alternative fiscally-feasible policy is suggested by the theoretical model. It is the policy stimulating economic growth in the country by cutting the amount of taxes collected by the

government, with a simultaneous decrease in the cost of the social safety net. The policy is based on the expectation that resulting strong economic growth would provide employment opportunities in high-paying sectors of the economy, and would be more effective in reducing the numbers of people living in poverty than the extensive social safety net. Since this policy requires reduction of current social benefits, there may be a number of individuals who are worst-off because of this policy. The policy is a valuable alternative if the society values economic growth more than current well-being of these individuals. Further in this dissertation we attempt to compare long-run abilities of economic growth and the SSN to combat the poverty in Ukraine.

Tables and figures

| Year	Real GDP (1990=100)	Real GDP growth	Consolidated budget as % of GDP*			Pension fund expenditures
			Revenues	Expenditures	Deficit	
1991	91.3	-8.7%				9.5%
1992	82.3	-9.9%	24.4%	38.1%	-13.7%	7.9%
1993	70.6	-14.2%	33.5%	38.6%	-5.1%	8.3%
1994	54.4	-22.9%	43.5%	52.4%	-8.9%	7.4%
1995	47.8	-12.2%	38.0%	44.6%	-6.6%	7.9%
1996	43.0	-10.0%	37.0%	41.9%	-4.9%	9.3%
1997	41.7	-3.0%	30.1%	36.7%	-6.6%	10.2%
1998	40.9	-1.9%	28.2%	30.4%	-2.2%	9.3%
1999	40.8	-0.2%	25.2%	26.7%	-1.5%	9.5%
2000	43.2	5.9%	28.9%	28.3%	0.6%	8.4%
2001	47.2	9.2%	26.9%	27.2%	-0.3%	8.8%
2002	49.7	5.2%	27.4%	26.7%	0.7%	10.1%
2003	54.4	9.6%	28.2%	28.4%	-0.2%	9.1%
2004	61.0	12.1%	26.5%	29.7%	-3.2%	11.4%
2005	62.6	2.6%	31.6%	33.4%	-1.8%	14.6%

Table IV-1. Economic indicators for Ukraine

* Note that the Ukrainian official figures are different from reported in World Bank databases due to the difference in methodologies
Source: Committee for Statistics of Ukraine, www.ukrstat.gov.ua, Bulletins of the Pension Fund, www.pension.kiev.ua

	Population, thousands	Working age (15 to 70 year old) (% of total population)	Economically active (% of total population)	Employed (% of total population)	Unemployed ILO definition (% of economically active)	Unemployed registered with unemployment offices (% of economically active population)	Pensioners (% of total population)	Support ratio (Working/ pensioners)
1991	52,056.60	-	-	48.0%	-	0.0%	25.2%	1.91
1992	52,244.10	-	-	45.9%	-	0.3%	26.0%	1.76
1993	52,114.40	-	-	45.9%	-	0.4%	27.2%	1.69
1994	51,728.40	-	-	44.5%	-	0.4%	28.0%	1.59
1995	51,297.10	73.4%	49.8%	47.0%	5.6%	0.5%	28.3%	1.66
1996	50,818.40	74.1%	51.4%	47.5%	7.6%	1.3%	28.5%	1.66
1997	50,370.80	73.1%	51.8%	47.2%	8.9%	2.4%	28.8%	1.64
1998	49,918.10	73.4%	52.0%	46.1%	11.3%	3.9%	29.0%	1.59
1999	49,429.80	73.4%	45.6%	40.4%	11.6%	5.2%	29.3%	1.38
2000	48,923.20	73.9%	46.7%	41.2%	11.6%	5.1%	29.6%	1.39
2001	48,457.10	74.3%	46.3%	41.2%	10.9%	4.5%	29.7%	1.39
2002	48,003.50	74.8%	46.3%	41.9%	9.6%	4.7%	30.0%	1.40
2003	47,622.50	75.3%	46.6%	42.3%	9.1%	4.5%	30.2%	1.40
2004	47,280.80	75.8%	47.0%	42.9%	8.6%	4.4%	30.2%	1.42
2005	46,929.50	76.4%	47.5%	44.1%	7.2%	4.0%	30.0%	1.47

Table IV-2. Population and social welfare dynamics in Ukraine

Source: Committee for Statistics of Ukraine, www.ukrstat.gov.ua, International Labour Organization www.ilo.org
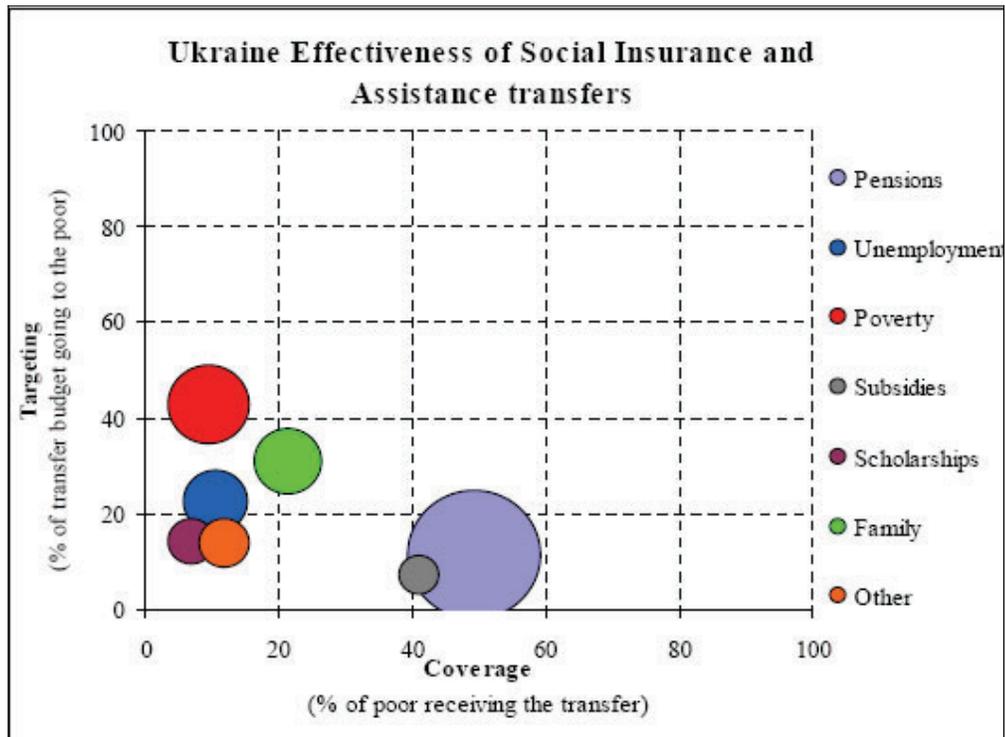
Figure IV-1. Effectiveness of Social Insurance and Assistance programs in Ukraine

Source: "UKRAINE POVERTY ASSESSMENT: Poverty and Inequality in a Growing Economy", The World Bank report # 34631-UA

Program name	Eligibility	Number of recipients in 2005	Expenditures in 2005	Changes in 2005	Changes in 2006
Pension	Old-age: women over 55 and men over 60, special pensions for lower ages disable, survivors	13.4 mln.	61,107 mln. UAH	Minimum pension increased 3.6 times Average pension increased 73%	Minimum pension increased 8% Average pension increased 29%
Unemployment	Unemployed	2.9 mln.	2,525.7 mln. UAH	Min benefits increased 25%	Minimal benefit increased 28%
Temporary disability insurance	Temporary disabled, carrying about seek child, on maternity leave to care about child up to 3 years old, giving birth, funeral costs for workers, healthcare-related vacations	around 6 mln. people a year	5.1mln UAH	Funeral cost reimbursement increased to 1000 UAH One-time birth support increased 10 times	Funeral expenses increased 20% Minimal support for carrying for seek child increased 10%
Support to families with children	Single parents if per-capita monthly family income is lower than 50% of minimum subsistence level during the last 6 months	around 1.5 mln. families	14.1 bln. UAH	Benefits increased about 3 times	Benefit increased around 28%
Support to low-income families	Families living under the minimal subsistence level who do not possess second apartment, car, and did not make large purchases over the last 12 months	2.8 mln. families	11 bln. UAH	Benefit increased around 28%	Benefit increased around 30%

Table IV-3. Summary of current social welfare programs in Ukraine

Chapter V: Naive static model

In preceding chapters we discussed the economic model for analysis of the social safety net in a country. However, forecasting models that are based on the discussed economic theory do not exist in Ukraine at the moment. The opinions expressed in recent speeches of Ukrainian policymakers demonstrate that their expectations about the development of the SSN might be derived from a simpler (or naïve) model of a country's SSN. Since the simple model does not take into consideration behavioral effects that are bases for the modern economic model of SSN, the policy analysis based on the naïve model may be incorrect.

In this chapter we present a simple model for expenditures of the Ukrainian social safety net. We outline the assumptions of a simple model that might be used by politicians; show results drawn from the model; policy conclusions that can be made based on these results; and provide reasons that the assumptions of the model do not hold and show the incorrect results.

Estimates with static model

Conversations with policymakers in Ukraine show that they implicitly use a naïve static model when estimating consequences of the change in social welfare policy in Ukraine. The model is based on the assumption of economic development, tax revenues and demographics being external to the model. Basic accounting rules about the number of beneficiaries of different social benefits and average benefit paid to each category of beneficiaries are used in order to estimate the cost of the system and possible funding deficit.

An example of such approach could be the model developed by the coordination committee for pension reform that included representatives of MLSP and pension fund (see 81). The model predicts long-term expenditures and deficits of a pension fund under different structures of fund programs. The model takes long-term forecasting of real wage, GDP and inflation developed by the Ministry of Economy, long-term demographics forecasts by the National Academy of Science, and carefully forecasts revenues and expenditures of the pension fund under different assumptions about tax rates, benefit structure, pension ages, etc. Another example of such simple approach can be found in the pension expenditures analysis by C. Kane at the World Bank (see 68).

There are a number of dynamic models of economic indicators for Ukraine developed by the National Bank of Ukraine (see 93), Ministry of Finance, Ministry of Economy, International Center for Policy Studies, Center for Policy and Economic Research – CASE Ukraine (see 37 , 48, and 74), Institute for Economic Research and Policy Consulting (see 59), and other government and non-government institutions in Ukraine. However, these models do not estimate government

expenditures (or expenditures on welfare programs) directly. They assume such expenditures to be a fixed proportion of GDP as provided by historical data or take estimates from the ministry of finance. Based on knowledge of expenditures as a share of GDP, they form expert assumptions about the impact of expenditures or the fiscal imbalance on monetary aggregates and GDP growth, and enter these assumptions in the dynamic models.

Therefore, we may conclude that only a simple model of the SSN expenditures is generally accessible to Ukrainian policymakers. Below we lay out assumptions and build out such a model. Then we discuss properties of the model and show what results it could produce for Ukraine.

Model set-up

In order to construct the naïve model, we make four basic assumptions, described bellow. Then we formalize the model in form of equations based on these assumptions, and program it into Excel spreadsheet. Finally, we derive the initial conditions for the model based on the current statistics for Ukraine. In order to make forecasts over ten-year period, we define values of external variables over the whole forecasting period. Once the values of external variables are defined, the model should produce values of our variables of interest: amount of social security expenditures and family per-capita income.

Assumptions

First, we assume that GDP and inflation forecasts are external to the model, and do not depend on fiscal imbalances or the size of the welfare expenditures. The forecast of economic variables is obtained from the published forecasts of government or non-government institutions.

Second, the nominal growth of social welfare benefits is shown as a single rate. This assumption could be relaxed, and we could assume different growth/increase rates for each category of social security benefits. However, we assume no dynamic relations between the different categories of welfare benefits; we can always recalculate the different increases for each category into a single average increase of total expenditures. In order to do this, we may weight each increase in benefits on the share of expenditures for this benefit in total welfare expenditures. For simplicity, we assume a single rate in this model.

Third, we assume that population structure and the number of recipients of different welfare programs stay unchanged over time. We also assume that the administrative expenditures of all welfare programs take approximately the same fraction of the budget and this fraction stays unchanged over time.

Four, we assume that the minimal subsistence level increases with the rate of inflation. Here we have to distinguish between "true" minimal subsistence level (MSL) and "*de jure*" minimal subsistence level. The minimal subsistence level is defined as the cost of food, goods and services needed in Ukraine to satisfy basic body and spiritual needs, including need for proper nutrition, closing, education, healthcare, housing, etc. The minimal subsistence level is usually recalculated by the Committee for Statistics of Ukraine for different categories of population (retired, working, children, and disabled) as frequently as the Committee surveys prices for the CPI (consumer price index). We assume this indicator to be "true" MSL indicator. However, the MSL is imbedded in Ukrainian welfare legislation as the basis for calculating minimum pensions and other benefits, and for eligibility criteria in the means-testing programs. For this purposes the values of the MSL for a given year are determined by the Budget Law. We consider this MSL indicator a "*de jure*" indicator, and assume that it could be lower, higher or equal to the "true" MSL, depending on the current government policy. However, in order to receive an accurate prediction of proximity to poverty of Ukrainian population in our forecast, we need to estimate a "true" MSL. We assume that the MSL for a working person published in the 2005 budget law is the "true" MSL, and that the price of the MSL basket closely follows the price of the basket used to calculate CPI. Therefore, inflation would be the proper growth rate for the "true" MSL.

Exogenous variables and outcomes

The exogenous variables for the model are the variables whose values are taken from outside sources or are assumptions for the whole forecasting period (10 years for our model). The exogenous variables for our simple models are the following:

- ❖ Nominal GDP (NGDP), inflation (INF) and rate of real GDP growth (RGDP) are economic variables taken from published forecasts.

- ❖ Rate of growth of non-social security income (W_RATE) is the rate at which the wage and other income (except for social security benefits) are growing. The forecast for the values of W_RATE may come from official forecasts of economic indicators. If there is no forecast for wage growth, then we assume that the W_RATE is equal to the rate of nominal GDP growth.

- ❖ Rate of growth of social benefits (I_RATE) is the rate at which social benefits are growing. This is a policy variable in our model and the values of this variable will determine the government policy of increasing or decreasing the social benefits over time. We assume that if there is no specific increase or decrease policy, the policy is to keep real value of the

social benefits at the level they reached in previous year, and the I_RATE is equal to the rate of inflation in this case.

The outcomes of the model have to present information about the success of the social safety net in keeping population out of poverty and indicate cost and sustainability of the social safety net in the future. We defined the following outcomes for the model:

♦ Total monthly per-capita income (INC_PC). This is the sum of social security income and non-social security incomes divided by number of people.

♦ Ratio of the total per-capita income to the minimal subsistence level (MSL_RATIO)[2]. If this ratio is lower than one, it means that even if the total income of families in Ukraine equally distributed among the whole population, there is no enough income to bring every person above the poverty (MSL) line. In other words, if the ratio is lower than one, there are definitely people in Ukraine living below the MSL line.

♦ Share of non-social security income in the total per-capita income (NONSS_WEIGHT). This ratio shows how dependent the population of the country is on social welfare benefits. The larger in that share of the non-social security benefits in total benefits, the less dependent the population is on the social security transfers.

♦ Social security expenditures as percent of GDP (SS_EXP/NGDP). This indicator shows what amount of GDP has to be collected in government revenues in order to support the social security system.

♦ Additional deficit or surplus of the SSN (ADD_SS_GDP). This indicator shows how much more or less the government will spend on the social security system compare to the level it could finance in 2005 with payroll tax revenues (SS_GDP_2005).

♦ Assumed payroll tax rate (TAX). This indicator shows what tax payroll rate is needed to finance the expenditures of the social safety net assuming that the whole of expenditures are financed by payroll taxes and the tax base remains a constant share of GDP. The required tax is determined by the amount of social expenditures that the tax has to finance. We

---

[2] This is not a perfect indicator of the level of poverty in the country. Ideally, we would like to know that number of people living bellow certain poverty line (for example, the MSL) in the country. However, it is impossible to estimate the number of people living bellow poverty with macroeconomic model. This indicator will be forecasted by the microsimulation models discussed further in the dissertation. We use the ratio of per-capita indicator to the MSL in our macrosimulation mode as a proxy for the number of people living in poverty. If the distribution (structure) of SSN benefits does not change, there should be direct relations between number of people living bellow MSL line and ratio of per-capita income and MSL.

assume that the proportion of tax rate to the amount of social expenditures as percent of GDP remains constant and equal to the proportion in 2005.

We set up the model in the form of an Excel spreadsheet. Because the policy variables such as rate of growth of social security benefits are usually determined in nominal terms, we also outline the model in nominal terms. We add following intermediate variables in order to simplify representation of the model:

NONSS_INCOME – income from sources other than social security benefits. It is a sum of non-social security incomes of all individuals in population.

SS_INCOME – income from social security benefits. It is a sum of social security incomes of all individuals in population.

SS_EXP - total expenditures on social security.

ADMIN – constant share of administrative costs in the social security expenditures

POP – population of Ukraine

Given the above variables, the model may be outlined by the following set of equations:

$$NGDP = NGDP(-1)*(INF+RGDP) \text{ (if no nominal GDP forecast available)} \tag{1}$$

$$NONSS\_INCOME = NONSS\_INCOME(-1)*W\_RATE \tag{2}$$
$$SS\_INCOME = SS\_INCOME(-1)*I\_RATE \tag{3}$$
$$SS\_EXP = SS\_INCOME * (1+ADMIN) \tag{4}$$
$$MSL = MSL(-1)*INF \tag{5}$$

$$SS\_GDP = SS\_EXP/NGDP \tag{6}$$
$$NONSS\_WEIGHT = NONSS\_INCOME/(SS\_INCOME+NONSS\_INCOME) \tag{7}$$
$$INC\_PC = (SS\_INCOME+NONSS\_INCOME)/POP \tag{8}$$
$$MSL\_RATIO = INC\_PC/MSL \tag{9}$$
$$ADD\_SS\_GDP = SS\_GDP-SS\_GDP\_2005 \tag{10}$$
$$TAX = SS\_GDP/SS\_GDP\_2005*TAX\_2005 \tag{11}$$

The initial conditions for the model are calculated based on the data for year 2005. The initial conditions for each of the variables are outlined in Table V-1. The initial values were obtained from the web-site of Committee for Statistics of Ukraine[3]. The non-social security income includes wage income, property income and profits received by Ukrainians in 2005. The social security income includes social welfare benefits as reported in the table "Income and Expenditures of Population of Ukraine" on the Committee for Statistics site. This figure is slightly larger than the figure 73.7 bln. UAH stated in the report of the MLSP and Pension Fund (see 92). The figure reported on the web-site includes social benefits provided from local budgets that are not supervised by the Pension

---

[3] See www.ukrstat.gov.ua

Fund. The share of administrative expenses is calculated based on the report of expenditures of the Pension Fund for 2004 (see 91). The deficit of the social safety net is based on the planed deficit of Pension Fund in 2005 (see 91).

Scenarios and values of exogenous variables

In order to demonstrate properties of the model, we designed seven scenarios that differ in the behavior of policy variable I_RATE: the rate of social benefits growth. All other exogenous variable are constant across scenarios, except few scenarios designed to demonstrate the effect of different values for exogenous variable. There we specifically describe how the values of exogenous variables differ from the basic assumptions.

As we noted earlier, the basic values of exogenous variables are obtained from published economic forecasts for the Ukrainian economy where possible. Table V-2 presents values of the exogenous variables over the forecasting period. The values in bold are forecasts published on the "Consensus Forecast" (see 88), which is regular quarterly publication by the Ministry of Economy of Ukraine with support of the Millennium Development Goals UNDP Project. The publication presents forecasts delivered by the Ministry of Economy of Ukraine, Ministry of Finance of Ukraine, Economic Forecasting Institute of the National Academy of Sciences of Ukraine, and nine non-government organizations, including the IMF and World Bank offices in Ukraine. The consensus forecast is a non-weighted average of the all forecasts submitted to the project. Most forecast provide estimates for a two-year period, but some of them provide figures for development trends in 2008-2010. We extended these trends to the end of the forecasting period of our model. Where a consensus forecast was not available, such as nominal GDP forecast, we used estimates based on the equations of the model.

The values of policy variables for every scenario are presented in Table V-3. All scenarios assume that the 28% increase of social benefits in 2006 is already predetermined and cannot be changed. The scenarios are defined as follows:

Scenario 1: Assumes that after 2006 government policy is in maintaining the real level of social welfare benefits on the level they reached in 2006.

Scenario 2: Assumes that the policy of 28% nominal increase in social benefits continues in 2007, and only after that the government adopts a policy to maintain the real level of social benefits, and index social benefits with inflation.

Scenario 3: Assumes that after the increase in 2006 government maintains the level of social expenditures it reached in 2006 and sets the social benefits to maintain this level of expenditures as percent of GDP in every other year.

Scenario 4: Assumes that after the increase in 2006 government maintains real benefits at the achieved level (increasing the amount of benefits only by the rate of inflation). When the total expenditures reach the level of 2004, the government increases the social benefits to maintain this level of expenditures as percent of GDP.

Scenario 5: Assumes that government continues its policy of real increase of social benefits over the period of 2007-2009, but the increase becomes smaller every year (20, 15, and 10% every year). Starting 2010 the government changes policy to maintaining achieved real level of social benefits, increasing the benefits by the rate of inflation.

Scenario 6: In order to demonstrate properties of the model, this scenario assumes that the government policy matches policy of scenario 1 (social benefits increase 28% in 2006 and the increase is equal to the rate of inflation after that), but the real GDP growth is equal to 0% in 2007 and negative (-1%) real GDP growth after that.

Scenario 7: Again, in order to demonstrate properties of the model, this scenario assumes that the government policy matches policy of scenario 1, but the real GDP growth reaches 0 % in 2007 and -1% in 2008; after that the real GDP growth resumes with the rate 5.6% as mentioned in consensus forecast.

Model results

The scenarios above are designed primarily for demonstration purposes. The naïve model has simple mathematical representation, and it is possible to note the following properties of this model without making actual numerical forecast:

1. As long as social security benefits are indexed at the rate lower then the rate of the growth of non-social security income (I_RATE<W_RATE), the weight of non-social security income in the household total income (NONSS_INCOME/(SS_INCOME+NONSS_INCOME))will go up.

2. As long as the rate of indexing of social security benefits is lower than the rate of nominal GDP growth (I_RATE< INF+RGDP), the total social security expenditures as % of GDP will go down, leading to the possibility to decrease the taxes that finance the social security system.

3. If both the rate of other income growth and the rate of indexing of social benefits are higher than the rate of inflation (W_RATE> INF and I_RATE>INF), the ratio of the per-capita household income to minimal subsistence level will grow.

The results of the simulation illustrate these conclusions. Figure V-1 demonstrates that if government policy is maintaining the already achieved level of social benefits in real terms (scenario 1), then the expenditures on the SSN will gradually decrease over time, given positive real GDP growth. If the government of Ukraine adopts this policy beginning in 2007, it would be able to decrease SSN expenditures to the level of 2004 that we assume being deficit-free (17% of GDP, 82% of which is financed by payroll taxes) by 2010. Even if the policy of increasing social benefits in real terms continues for longer period of time (scenario 2 and 5), the amount of expenditures would come down to the deficit-free level of expenditures, given enough time.

However, if the economy of Ukraine would face a downturn in 2007-2015 and real GDP growth becomes negative (scenario 6), then expenditures on the SSN, even just supporting the real level of 2006 benefits, would grow to reach 27% of GDP in 2015. Even if the economic downturn would be moderate and would last only two years, the policy maintaining real benefits at the 2006 level would allow reaching the deficit-free level only by 2015 and would mean accumulating larger debt in the meanwhile.

Figure V-2 demonstrates that once government adopts policy maintaining the real level of SSN benefits at the already reached level, the share of social security income in total household income starts dropping. However, if government policy becomes to maintaining a certain level of SSN expenditures (scenario 3 and 4), then, according to the model, the share of social security income in total household income becomes stable.

Figure V-5 shows average per-capita income of a household as a percent of the minimal subsistence level. The figure demonstrates that the average per-capita income of households in Ukraine is higher than the minimal subsistence level (MSL), and will remain higher than MSL under any of the scenarios discussed. Ukraine is a country with a large informal social safety net. Private transfers between families were 10% of the overall family income in 2003, and it is possible that they could be higher in the absence of the official welfare redistribution (see 132). The growing numbers of the average per-capita income of a household as percent of the minimal subsistence level might suggest that with time more families could rely on the informal SSN for staying out of poverty because the income of richer families would grow and a lower share of the income of rich family relatives would have to be transferred to poorer relatives. The figure also shows that the policy of maintaining current real level of social benefits until expenditures reach the deficit-free level, and

then gradually increasing benefits (scenario 4) has the same long-term effect on the average per-capita income as the policy of continued increase in real benefits (scenario 5). At the same time, the policy in scenario 4 accumulates lower deficits than scenario 5 (see Figure V-4).

Figure V-3 demonstrates that the payroll tax with the rate of 39% alone cannot finance the SSN expenditures after the 28% increase in 2006. The model shows that in 2006 it would require a payroll tax rate at 50% in order to finance SSN expenditures. Continuing increases in social benefits would require further increases in payroll tax rates, while the conservative policies of keeping the real amount of benefits at the same level over the time allows decreasing the tax rate in the future. However, even the most conservative policy (scenario 1) allows decreasing tax from the current level of 39% only in 2011.

Policy conclusions

The naïve model brings simple policy conclusions

First, if economy grows, then with time expenditures on social security become a smaller proportion of GDP, meaning that their cost decreases. Therefore, if a policymaker believes that Ukraine is on the road of economic growth, then in accordance with the model any increase in social security benefits is sustainable in a long-run, and the major fiscal concern of the policymaker will be to find sources to finance the short-term deficit of the SSN.

Second, if we assume a policymaker is interested to maximize probability of re-election, and this probability increases with the demonstrated increase in standard of living for people during the time of the re-election[4], then the policy chosen by a policymaker would depend on the time this policymaker expects to remain in power (or when he/she needs to demonstrate the results for re-election). The policymaker with the one-two years perspective has no better choice than to increase benefits as much as possible in 2006-2007, arguing that this increase could be sustained in the long-run (see Table V-4).

Policy makers who have a longer perspective (3-5 years) and care about economic growth during this time could prefer the policy of gradual increase in social benefits or even a policy of changing benefits to maintain a stable level of SSN expenditures (scenario 5 and 3 in our analysis). Table V-5 demonstrates that small but steady real growth of the level of SSN expenditures provides opportunity to achieve higher per-capita family income at the end of period than the policies that

---

[4] This is over-simplistic assumption about the utility function of policymaker is made to demonstrate the basic properties of the model. In general, the utility function of the policymaker may include preferences to increased social protection, to speed up economic growth, to balance the budget, or some other preferences over the range of parameters estimated by the model. Depending on the set of preferences and the time constraints, facing the policy maker, he/she will prefer different policies.

assume single large increase in social expenditures at the beginning of the period and no real growth of social benefits after that. The chart in Figure V-4 leads to the conclusion that this option is also less expensive, requires fewer resources in the initial years, and accumulates less debt over time. In addition, maintaining the level of SSN expenditures is more robust policy with respect to the change in economic conditions. In case of an economic downturn adjusting the level of benefits to maintain a steady level of SSN expenditures would put less pressure on the economy and would accumulate less debt, compared to other policies.

A policymaker with long-term perspective (5-10 years) has more policy options and the final choice would depend on the preferences of the policymaker and the public he represents (see Table V-6). However, the policy maintaining steady level of SSN expenditures remains one of the most robust policies. Keeping the level of SSN expenditures achieved in 2006 is one of such policies (scenario3), but this policy leads to accumulating substantial debt over time or finding additional resources to finance SSN, for example, increasing payroll tax rate to 50%. The cheaper policy is to maintain the real level of social benefits achieved in 2006 until the SSN expenditures achieve the deficit-free level, and then maintain this level of expenditures (scenario 4). According to the model, the long-term effect of this policy on the level of total per-capita family income is comparable with the effect of several consecutive increases of benefits at the beginning of the period (scenario 5) and is just little smaller than the effect of scenario 3 policies. However, the cost of the scenario 4 policy is substantially smaller both at the beginning and at the end of the period, and the SSN reaches a sustainable deficit-free state before the end of the period.

Current policy solutions discussed by Ukrainian policymakers that we described in previous chapter are most consistent with the policy options for the short-term oriented solutions. While the model developed in this chapter allows for such solutions to be consistent over time, there are shortcomings of the naïve model that may invalidate the forecasts of the sustainability of the expended social benefits over time.

Short-comings of the static model

The naïve model discussed in this chapter may be criticized for every assumption it makes: the population of Ukraine is not stable, it is proven that the population is declining (see 81, for example); the number of recipients of welfare benefits may change (the most frequently used argument is change in demographic structure or eligibility criteria); the welfare policy influences economic growth and cannot be exogenous in the model; and the way of financing SSN expenditures and the management of the debt may influence the sustainability of the system. We

would like to discuss here possible implications of relaxing two of the major assumptions of the model.

First is the assumption that economic growth is external to social welfare policy. Economic text-books (see 12) argue that transfers from rich to poor stimulate domestic consumption, and, therefore, stimulate economic growth in the country. This argument is often used by proponents of the increase in social benefits in Ukraine to justify sustainability of the proposed increases: if increased transfers induce GDP growth, the share of SSN expenditures in GDP will grow slower than in the simple model and the SSN will be sustainable. According to this theory, the additional money provided to the poor would allow them to consume more food and cheap non-luxury items that are locally produced. If this money remains with the rich, they can spend them on luxury imported items.

However, this argument may not hold in the open economy like Ukraine, especially if the National Bank continues a stable exchange rate policy. With the limited short-term possibility to increase the supply of local goods and a stable exchange rate, the extra money received by the poor would be spend on imported goods and would have no impact on the consumption. Given the generally lower quality of local goods, we may actually expect the opposite effect on GDP: for some portion of population extra welfare benefits would allow substitution of low-quality local goods with higher quality imported goods, resulting in decreased demand for local goods and GDP decline.

Most arguments about the link between economic growth and increased social benefits come from the discussion of sources to finance the increased expenditures, and most of these arguments are negative. The government may finance the increased SSN expenditures by relocating money from other expenditures, increasing taxes, or borrowing on the internal or external markets.

Often the positive effect of increased social benefits on economic development in Ukraine is argued to be possible if the government borrows money to finance the increase by external borrowing. The argument is that government may borrow abroad at the interest rate around 4-6%, while it is cheaper than 10-14% in the internal market, and it can inject money into economy of Ukraine through social benefits. The increased money supply according to the text-books should induce economic growth. However, the increased money supply will also increase inflation. Ukraine has relatively high (10% in the last year) inflation and a recent history of hyperinflation. Increased inflation in such a country can induce expectations of high inflation, and therefore would have a negative impact on growth.

Even stronger negative effects may be expected if the additional expenditures are financed from domestic sources. Financing the government budget deficit created by the increased social transfers

through internal borrowing is considered harmful even in a developed market economy such as the United States. (see 32). In a transition country like Ukraine the main source of employment and productivity growth is associated with private investment in the new sector of economy (see 132, for example). Financing the social welfare budget deficit by borrowing on internal markets will crowd out this private investment, and, therefore, decrease the rate of economic growth compared to the current forecasts.

The largest body of literature on economic transition argues that increasing taxes to finance any government expenditures, including social transfers, will have negative effect on economic growth. Further, by crowding out private investment, the increase in taxes stimulates growth of the shadow economy (see 105). The estimates of the model show that keeping the level of social security expenditures at the level reached in 2006 requires increasing payroll tax rate to the 50% level. Literature argues that there is a relation between the payroll tax rate of 52% and the shadow employment at the level of about 40% that was observed in the recent history of Ukraine (see 68). Increasing the shadow economy will decrease the tax base and, in turn, will decrease government's ability to collect revenues and finance SSN expenditures.

The frequently mentioned possibility to finance increased SSN expenditures by increased collection of VAT or newly introduced real estate tax would also have an investment crowding out effect. Due to the nature of VAT that stimulates taxpayers to uncover all the business partners in the chain of production, the increased collection of the tax due to the liquidation of tax exemptions (like special investment zones) may not lead to growth in the shadow economy in the short run. However, liquidation of tax exemptions may halt investment for the time while businessmen estimate the profitability of investment under new conditions, and may harm GDP growth in a short-run.

The real estate tax would decrease expected profits from owning real estate. It would decrease price of real estate. Ukraine's construction business, highly profitable currently, was a buster of economic growth in Ukraine for several past years (see 20). With lower prices the profitability of construction will go down, and the speed of construction sector growth will decline, reducing GDP growth in the country. The effect of the link between SSN expenditures and economic growth and its implications for policy options in Ukraine will be discussed in other chapters of this dissertation.

Second is the assumption that the number of the welfare recipients will remain stable. We already mentioned reliable demographic forecasts of the change in the composition of population in Ukraine. The forecast determines that the number of people of pension age will increase in the country, and the number of working age people will decrease over the next two decades. This demographic forecast was successfully incorporated into the models for pension system

expenditures in Ukraine; for example, in the model developed by the coordination committee on pension reform (see 81). It is relatively easy to incorporate the demographic changes into the naïve model because the demographic changes over the ten-fifteen year period of forecast cannot be influenced by the social welfare policy and can be considered exogenous.

Immediate effect of the number of participants and, therefore, the expenditures on SSN can be achieved by changing eligibility criteria for social welfare programs. Discussing the policy of further increases in social benefits, policymakers in Ukraine often mention narrowing eligibility criteria for the programs and introducing means-tested programs in order to keep expenditures at a reasonable level. These changes were successfully introduced in the small-scale welfare programs, but the policymakers require strong political will to reduce eligibility for the large-scale programs. For example, a simple change in the eligibility for pensions – an increase in pension age – was not implemented over the past ten years due to the lack of political will (see 9).

Welfare programs that are based on the criteria that might be influenced by the potential recipients, such as income in means-tested programs, may change the number of beneficiaries due to the human response to the increase in benefits. Some potential beneficiaries may alter their behavior, for example, by dropping out of work, in order to qualify for social welfare benefits if the amount of benefits is sufficiently large. Behavioral response may result in prolonged use of the social benefits, such as longer duration of unemployment or early retirement. Recent studies (see 131) find that the current level of unemployment benefits does not induce longer periods of unemployment in Ukraine. However, the international experience suggests that there is strong behavioral response of current and potential recipients once social benefits become large (see 15, for example). Further chapters in this dissertation will incorporate the behavioral response in the model for SSN expenditures in Ukraine and discuss this question in greater detail.

Tables and figures

Inflation (INF)	10.3%
Nominal GDP growth	21%
Min subsistence level (MSL)	423
Population (POP)	46,929,500
Real GDP growth rate	2.60%
Nominal GDP (NGDP)	418,590,000,000
Nominal GDP growth	21%
Total non-ss income household income (NONSS_INCOME)	223,123,000,000
Average per-capita income (NONSS_INCOME/POP)	396.20
Average per-capita household income (INC_PC)	540.91
Total safety net expenditures (SS_INCOME)	83,154,000,000
Social security (payroll) taxes rate	39.0%
additional deficit as % of GDP	2.86%
Share of administrative expenditures	2%

Table V-1. Initial parameters of the model

Years	Inflation (INF)	Population (POP) thnd. people	Real GDP growth rate	Nominal GDP (NGDP), mln. UAH	Indexation of social payments (I_RATE)	Non-social security income growth rate (W_RATE)
2006	*10.6%*	46,930	*2.60%*	*487,672*	*28.0%*	*24%*
2007	*11.0%*	46,930	*4.20%*	*570,318*	28.0%	*20%*
2008	*7.6%*	46,930	*5.60%*	648,027	7.6%	13%
2009	*7.6%*	46,930	*5.60%*	736,325	7.6%	13%
2010	*7.6%*	46,930	*5.60%*	836,654	7.6%	13%
2011	*7.6%*	46,930	*5.60%*	950,653	7.6%	13%
2012	*7.6%*	46,930	*5.60%*	1,080,185	7.6%	13%
2013	*7.6%*	46,930	*5.60%*	1,227,366	7.6%	13%
2014	*7.6%*	46,930	*5.60%*	1,394,602	7.6%	13%
2015	*7.6%*	46,930	*5.60%*	1,584,625	7.6%	13%

Table V-2. Values of the exogenous variables

Source: Consensus forecast, authors calculations
*Note: only figures in bold are obtained from consensus forecast. All other figures are authors' estimates and assumptions

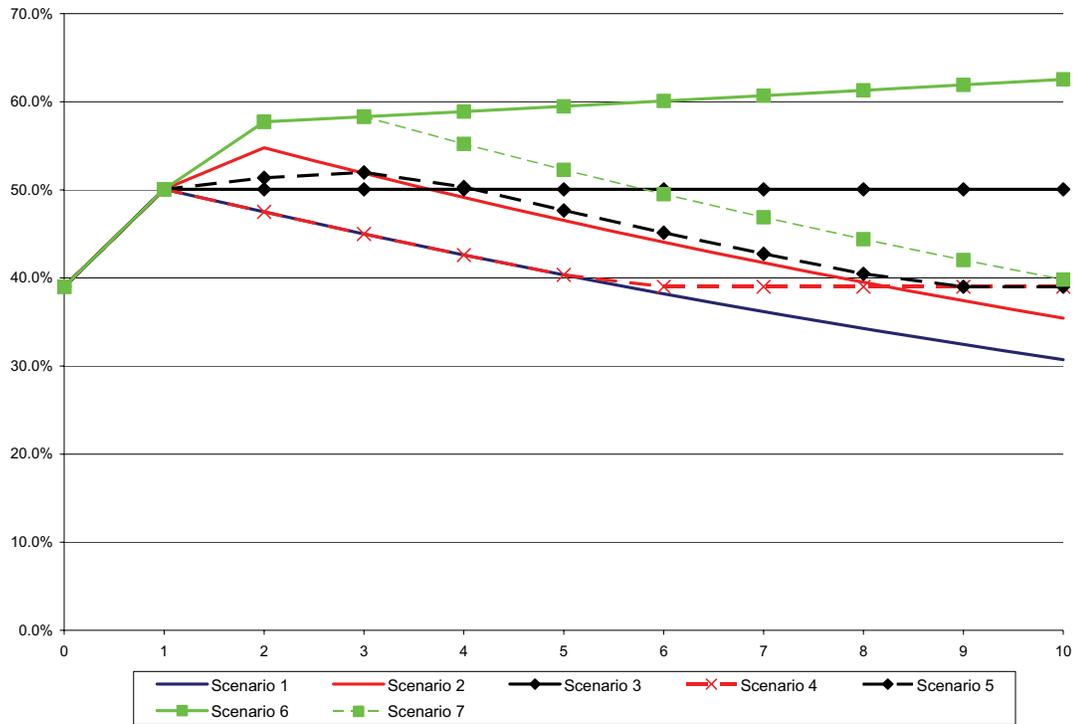| Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
2006	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
2007	11.0%	28.0%	16.9%	11.0%	20.0%	28.0%	28.0%
2008	7.6%	7.6%	13.6%	7.6%	15.0%	7.6%	7.6%
2009	7.6%	7.6%	13.6%	7.6%	10.0%	7.6%	7.6%
2010	7.6%	7.6%	13.6%	7.6%	7.6%	7.6%	7.6%
2011	7.6%	7.6%	13.6%	9.7%	7.6%	7.6%	7.6%
2012	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%
2013	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%
2014	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%

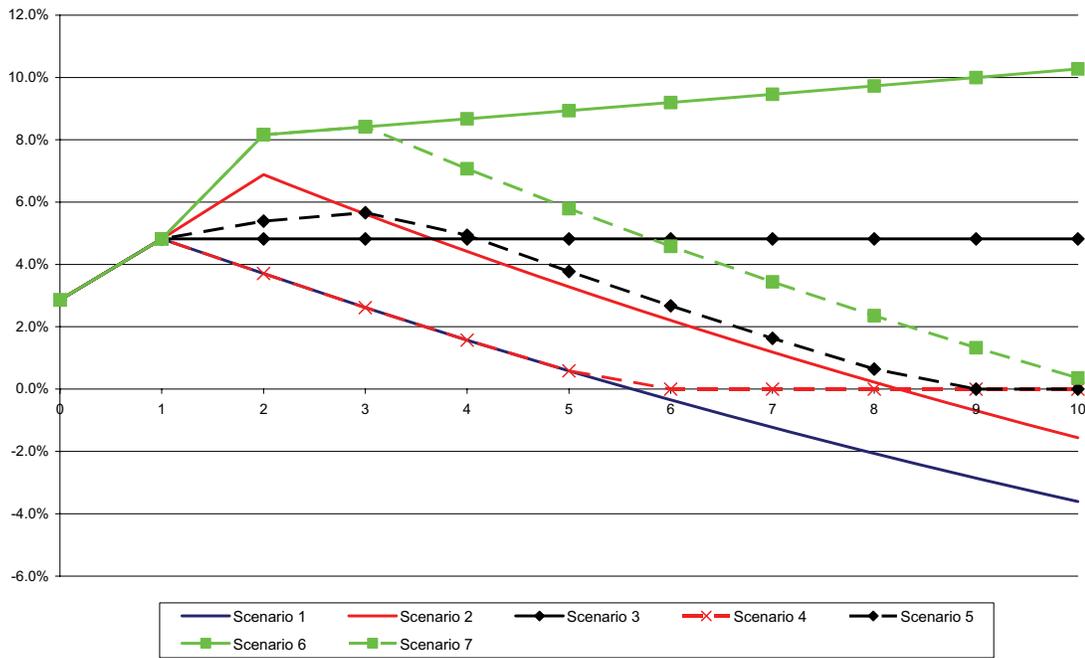**Table V-3. Rate of social benefit growth in different scenarios**
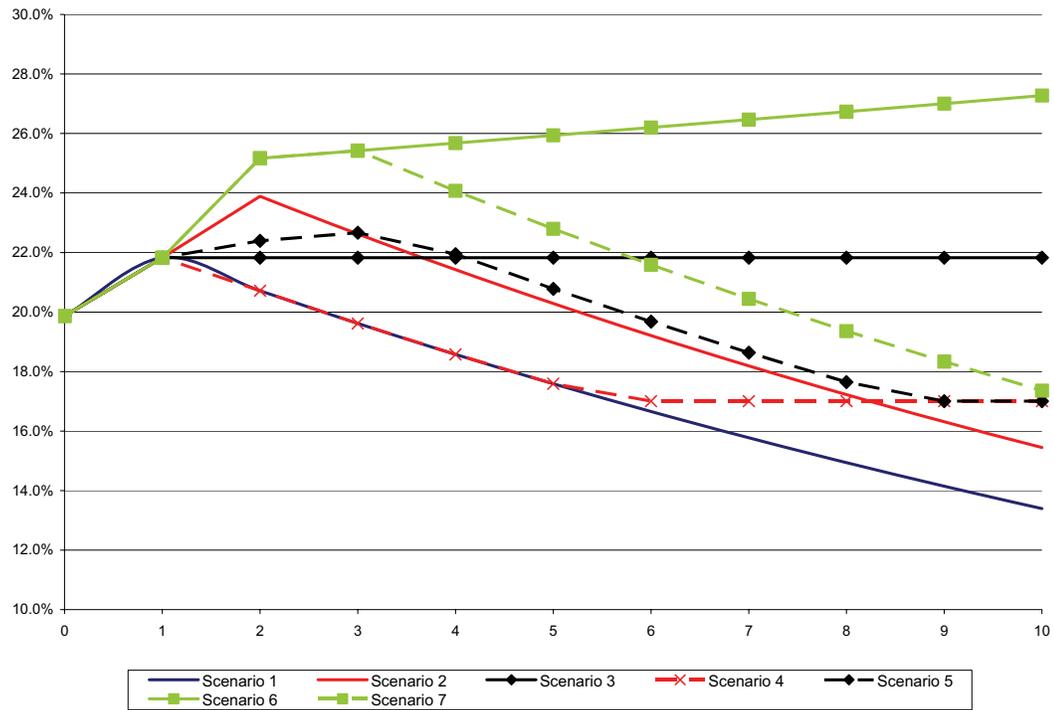
Figure V-1. Results: Social Safety Net expenditures as % of GDP
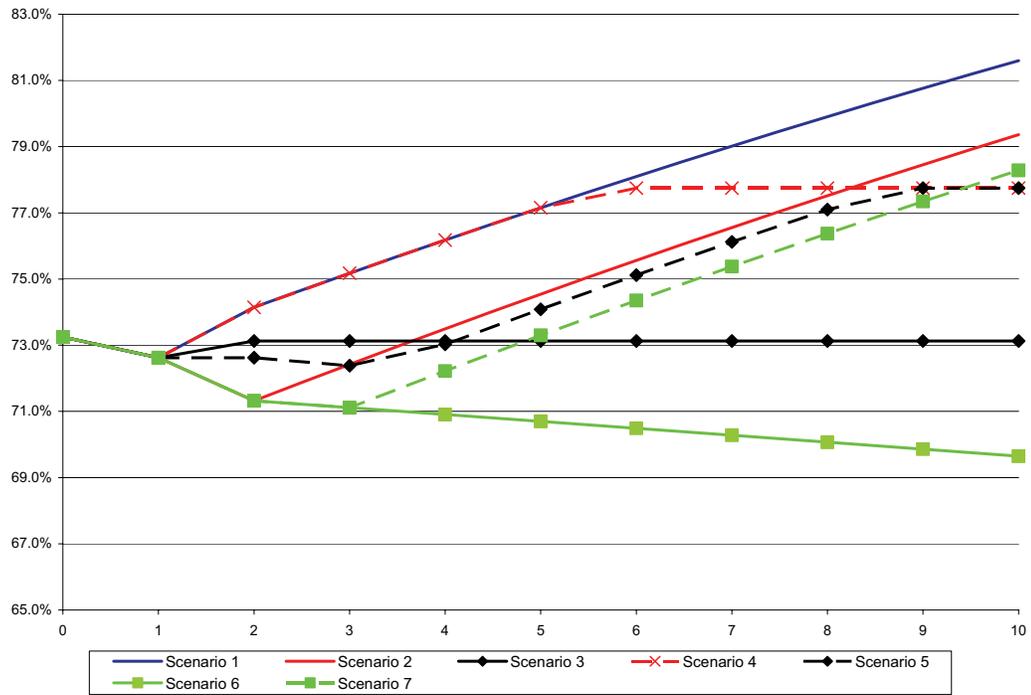
Figure V-2. Results: Share of non-social security income in total household income

Figure V-3. Results: Expected payroll tax rate

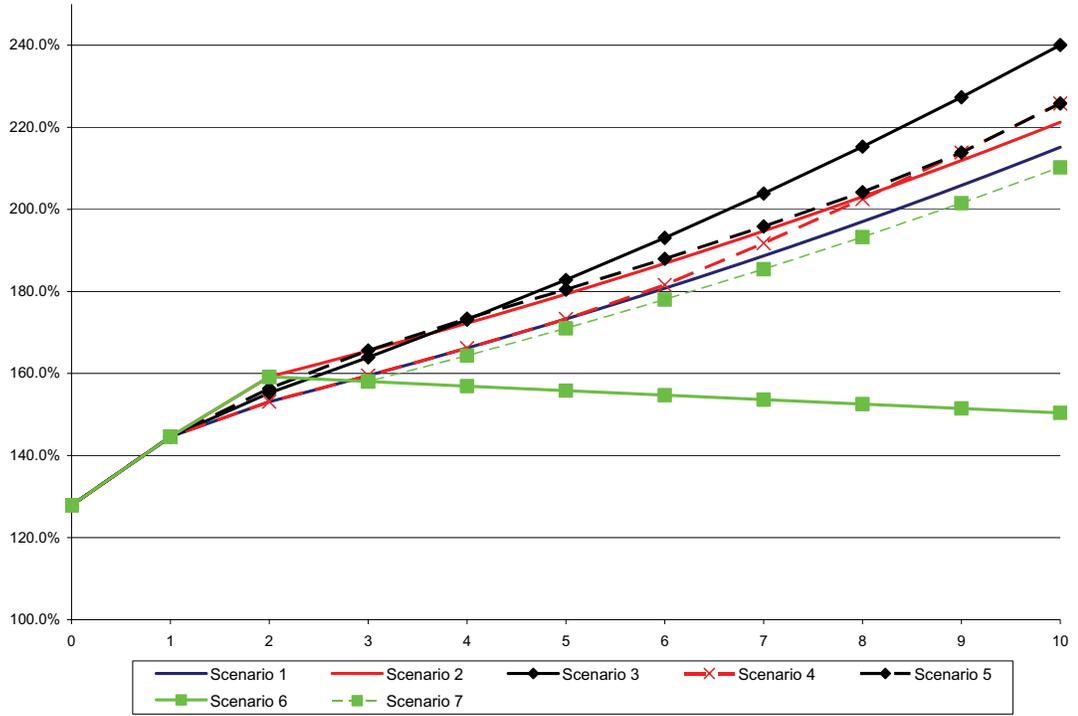**Figure V-4. Results: Additional deficit as % of GDP**

Figure V-5. Results: Average total per-capita household income as % of MSL

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Assumptions							
Inflation (INF)	11%	11%	11%	11%	11%	11%	11%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Real GDP growth rate	4.20%	4.20%	4.20%	4.20%	4.20%	0.00%	0.00%
Nominal GDP (NGDP)	570,318	570,318	570,318	570,318	570,318	541,316	541,316
Indexation of social payments (I_RATE)	11%	28%	17%	11%	20%	28%	28%
Non-social security income growth rate (W_RATE)	20%	20%	20%	20%	20%	20%	20%
Results							
Min subsistence level (MSL)	519	519	519	519	519	519	519
Nominal GDP growth	17%	17%	17%	17%	17%	11%	11%
Total household income (NONSS_INCOME)	332,007	332,007	332,007	332,007	332,007	332,007	332,007
Average per-capita income (NONSS_INCOME/POP)	590	590	590	590	590	590	590
Average per-capita household income (INC_PC)	795	827	806	795	812	827	827
Total safety net expenditures (SS_INCOME)	118,145	136,240	124,475	118,145	127,725	136,240	136,240
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	21%	24%	22%	21%	22%	25%	25%
Non-social security income as % of total income NONSS_INOCOME/(SS_INCOME+NONSS_INCOME)	74%	71%	73%	74%	73%	71%	71%
Per-capita income as % of subsistence level (INC_PC/MSL)	153%	159%	155%	153%	156%	159%	159%
Social security (payroll) taxes rate	48%	55%	50%	48%	51%	58%	58%
additional deficit as % of GDP	3.71%	6.88%	4.82%	3.71%	5.39%	8.16%	8.16%

Table V-4. Results of modeling for year 2007

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Assumptions							
Inflation (INF)	8%	8%	8%	8%	8%	8%	8%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Real GDP growth rate	5.60%	5.60%	5.60%	5.60%	5.60%	-1.00%	5.60%
Nominal GDP (NGDP)	836,654	836,654	836,654	836,654	836,654	654,325	744,476
Indexation of social payments (I_RATE)	8%	8%	14%	8%	8%	8%	8%
Non-social security income growth rate (W_RATE)	14%	14%	14%	14%	14%	7%	14%
Results							
Min subsistence level (MSL)	647	647	647	647	647	647	647
Nominal GDP growth	14%	14%	14%	14%	14%	7%	14%
Total household income (NONSS_INCOME)	487,053	487,053	487,053	487,053	487,053	401,319	456,612
Average per-capita income (NONSS_INCOME/POP)	865	865	865	865	865	713	811
Average per-capita household income (INC_PC)	1,121	1,160	1,183	1,121	1,167	1,008	1,106
Total safety net expenditures (SS_INCOME)	147,181	169,723	182,604	147,181	173,851	169,723	169,723
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	18%	20%	22%	18%	21%	26%	23%
Non-social security income as % of total income NONSS_INCOME/(SS_INCOME+NONSS_INCOME)	77%	75%	73%	77%	74%	71%	73%
Per-capita income as % of subsistence level (INC_PC/MSL)	173%	179%	183%	173%	180%	156%	171%
Social security (payroll) taxes rate	40%	47%	50%	40%	48%	59%	52%
additional deficit as % of GDP	0.59%	3.28%	4.82%	0.59%	3.77%	8.93%	5.79%

Table V-5. Results of modeling for year 2010

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Assumptions							
Inflation (INF)	8%	8%	8%	8%	8%	8%	8%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Real GDP growth rate	5.60%	5.60%	5.60%	5.60%	5.60%	-1.00%	5.60%
Nominal GDP (NGDP)	1,584,625	1,584,625	1,584,625	1,584,625	1,584,625	897,492	1,410,041
Indexation of social payments (I_RATE)	8%	8%	14%	14%	14%	8%	8%
Non-social security income growth rate (W_RATE)	14%	14%	14%	14%	14%	7%	14%
Results							
Min subsistence level (MSL)	933	933	933	933	933	933	933
Nominal GDP growth	14%	14%	14%	14%	14%	7%	14%
Total household income (NONSS_INCOME)	922,480	922,480	922,480	922,480	922,480	550,462	864,825
Average per-capita income (NONSS_INCOME/POP)	1,638	1,638	1,638	1,638	1,638	977	1,536
Average per-capita household income (INC_PC)	2,007	2,064	2,240	2,107	2,107	1,403	1,962
Total safety net expenditures (SS_INCOME)	212,283	244,794	345,853	269,470	269,470	244,794	244,794
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	13%	15%	22%	17%	17%	27%	17%
Non-social security income as % of total income NONSS_INCOME/(SS_INCOME+NONSS_INCOME)	82%	79%	73%	78%	78%	70%	78%
Per-capita income as % of subsistence level (INC_PC/MSL)	215%	221%	240%	226%	226%	150%	210%
Social security (payroll) taxes rate	31%	35%	50%	39%	39%	63%	40%
additional deficit as % of GDP	-3.61%	-1.56%	4.82%	0.00%	0.00%	10.27%	0.36%

Table V-6. Results of modeling for year 2015

Chapter VI: Economic feedback of the increase in social security benefits

As we pointed out earlier, the assumption about the independence of macroeconomic variables in our simple model does not hold in the real economy. Economic theories and international studies show that economic growth depends on the level of public spending and social security net policy. If the assumption does not hold, we may expect negative and positive effects of increases in social safety net expenditures on inflation and GDP growth in the country. These effects will determine government ability to finance social programs, which in turn would translate in a growth effect in the next period. In extreme cases expanding social policies could trigger a spiral into economic downturn.

In this chapter we discuss the possible effects of increases in social security benefits on inflation and GDP growth. Then we extend our simple model to include these effects, and compare the results of the forecast with the forecast in the previous chapter. Finally, we explore the results of our model under different assumptions about the elasticity of the effect within the range of possible values, and show that forecasts based on underestimating the positive effect of increases in social security benefits leads to more robust social policy than based on overestimating this effect.

Effect of increased social benefits on GDP and inflation

Using the simple microeconomic model to analyze social security problems, we provided arguments that increased social benefits generally decrease labor supply by the recipients. We also showed that taxes on labor decreases the relative cost of leisure. If the utility function of individuals is such that the income effect is smaller than the substitution effect, then taxation of labor decreases labor supply by individuals. The conclusion from the simple model was that increases in benefits or increases in taxes have to decrease labor supply, or total employment in the economy.

In previous chapters we also provided arguments that increased benefits may impact enterprises: increased taxes or government deficit may crowd out investment; increased payroll taxes can decrease labor demand; additional income of the poor population can increase demand for some goods, and, given limited supply, cause inflation. There is substantial literature about the macroeconomic impact of increases in government spending and social welfare benefits in particular. The empirical evidence in these publications suggests that the negative effect of increases in social benefits on investment and labor supply likely outweighs its positive impact on private consumption. The literature discusses three major channels for the impact of benefits on the economy: decrease in employment, growth of the shadow economy, and direct impact on GDP

growth, which combines all factors together. Below we discuss the empirical findings and the estimates for size of the effect for all these channels.

Effect on employment

We recall the microeconomic model of personal behavior that we discussed in earlier chapters. The model assumes that every individual in the country can consume either goods *c* or leisure *l*. The simplest models assume that every individual has the same concave and twice differentiable utility function *U(c,l)* that this individual tries to maximize, subject to budget constraint *c=b+(1-τ)*w*(T-l)*. The model implies that the larger benefit *b* received by an individual, the less he/she will work, since he/she can afford higher consumption of both goods and leisure. This effect also leads to a change in behavior for some people, who prefer to work less (or drop out of work) in order to qualify for the benefit. These effects are widely observed on the individual level, and they result in higher cost of welfare programs. However, the effect of the increased benefits on total labor supply is relatively small because only a small fraction of the labor force is affected.

Greater effect on the labor supply and employment is observed when government imposes or increases taxes on wage in order to finance social benefits. Since the tax is imposed on all workers, the effect is easier to observe at macroeconomic level.

The microeconomic model implies that decrease in wages as the result of tax will have two effects: it will decrease income of the person, and stimulate him/her to work more in order to achieve pre-tax consumption level; and it will decrease the "price of leisure", causing a person to consume more leisure in order to increase the level of utility. If income effect dominates the substitution effect, workers will work more after an increase in the tax rate. However, the empirical estimates suggest that the substitution effect likely dominates income effect, and the elasticity of labor supply to increase in taxes is negative. A report by the Congressional Budget Office of the United States in 1996 (see 24) reviewed a number of studies (see Table VI-1) and concluded that labor supply elasticity is in range from 0 to 0.3 for whole population.

An increase in taxes on wage does not necessarily result in a change of net-of-tax wage or is not fully translated into such change. The effect of taxes on wage is better observed at the macroeconomic level. For macroeconomic analysis, individual labor preferences are aggregated into labor supply function. Enterprise's demand for labor is also aggregated into labor demand function. The conventional market economy model suggests that the employment and wage is set by intersection of these two curves (see Figure VI-1). Tax on workers wage shifts the labor supply curve (LS) up (to LS(T)) , and the market equilibrium shifts from point A to point B. The new wage is larger than at the previous equilibrium, meaning that some portion of the tax shifted to the

enterprise. If the tax is imposed on enterprise, it shifts the labor demand (LD) curve down (to LD(T)), resulting in lower equilibrium wage, and shifting some portion of tax to workers. In the simple framework shift of the labor demand and labor supply curve as the result of the same tax produce equivalent result on the labor supply (see 52).

The possibility to shift taxes to employees (in the form of reduced post-tax wage) depends on the elasticity of labor supply. Less elastic labor supply allows decreasing wages more without significant loss in hours worked. Perfectly inelastic supply of labor allows shifting payroll taxes to employees. Kugler in his 2003 paper (see 75), and then Gora et alt. in 2006 (see 52) argued that blue-collar (low-income) workers have higher elasticity of wage than the white-collar (high-income) workers, and show empirical evidence that payroll tax decrease caused larger employment gain for low-paid workers than for high-paid workers. The high elasticity of labor supply of the low-paid workers in the country where this effect was studied was attributed by the authors to the high and binding minimum wages.

By design social security contributions (payroll taxes) are social insurance for the workers, and may be viewed as savings. If workers believe in the system, then they have to treat their payroll taxes as part of their income (may be with some discount), and be indifferent between packages of higher wage and no-taxes, and lower wage with payroll taxes. In this case any change in payroll taxes could be passed through to employees without change in employment (see 49). However, there is little evidence of this intertemporal substitution effect (see 51 and 52).

Instead, a number of studies find a significant effect of change in payroll taxes on employment. Kugler estimated that a 10% increase in payroll taxes resulted in 4-5% reduction in employment in Colombia (see 75), Gora et alt. (see 52) found that same increase would result in 5% reduction of employment in Poland, and Gwartney et alt. (see 51) suggest that a 10% increase in after-tax wage would result in a 3% increase in employment in the United States. From a review of results found in the literature (see Table VI-2) we may conclude that the labor tax elasticity of employment in Ukraine could be between 0 and 0.5.

Effect on shadow economy

The effect of welfare programs on the shadow economy drew a lot of attention in Ukraine because of the large shadow economies in the countries of the region and because of recent experience of the country. The shadow economy in Ukraine was estimated to be 40% of the official economy in 1996 (see 69) and about 20-39% in 2000 (see 86 and 85).

The shadow economy in a country may be influenced by the social security net in two ways. If the social security benefits, such as pensions, unemployment insurance, or health insurance, are linked

to employment (for example, as in the continental social security system model), then workers in shadow economy are not eligible for these benefits. If workers trust the social security system to deliver insurance when they need it, then higher amounts of possible benefits will stimulate workers to find official employment or to put pressure on enterprises to hire them officially. There is evidence (see 65 or 14) that larger government expenditures are associated with reduction of shadow economy.

However, the positive effect of increased social security benefits on shadow economy is only observable if separated from the effect of increased social security contributions or other taxes that finance the SSN. Taxes are found to be one of the major causes for unofficial economy by all studies reviewed. Large payroll taxes increase incentives for employers paying their employees off the record. High personal income tax stimulates employees to agree receiving payments off-the-book. If other taxes are relatively low, high taxes on labor may result in hiding full salaries, which lowers tax base for labor taxes but does not necessarily result in shadow economy because all the output remains in the official economy. However, if other taxes are also high, then both workers and enterprises are better off conducting part of their business in the shadow economy. During the first several years of transition most of the FSU countries had payroll taxes at a level around 50%, progressive personal income tax with rates up to 50%, and profit taxes around 30-40%. This resulted in development of massive unofficial economies and shadow employment in these countries (see Table VI-3).

Both tax rates and complexity of the tax system are important determinants of the size of the shadow economy. Schneider in 2003 (see 112), Johnson et alt. in 1999 (see 65) showed that the complexity of the tax system measured by propensity for tax exemptions is a more important determinant of the shadow economy size than tax rates. A similar result was described in Ukraine by U. Tiessen et alt. in 2001 (see 86), who showed that the complexity of regulations, including the tax system, is the most important determinant of the shadow economy in Ukraine.

The tax burden, measured either as the tax rates or as the tax revenues share of GDP is the most commonly discussed cause of the shadow economy. Different studies show that additional 1 % of government tax revenues could result in 0.3-0.9% increase of share of shadow economy (see Table VI-4). Studies that made distinctions between different taxes found that indirect taxes are a less significant determinant of the size of shadow economy, while direct taxes on wages and profits had a significant impact on the size of unofficial activity. In Ukraine, the combination of personal income tax and social security contributions were found to be important determinants of the shadow economy size before the personal income tax reform in 2004. U. Tiessen et alt. (see 86) estimated

that if the taxes in Ukraine remained at the level of 1993-1994, the share of shadow economy in 2000 would be about 20% higher than was historically observed.

The Ukrainian government recognizes that high taxes cause huge tax evasion and expansion of the shadow economy. In order to reduce distortions caused by high taxes and following the example of Russia, it reduced personal income tax rate to a 13% flat rate and payroll taxes to 39% in 2004. In order to reduce the cost of compliance, the government introduced simplified taxation for small enterprises and private entrepreneurs, which allows substitution of different taxes (including payroll taxes) with a low lump-sum tax or a single flat-rate tax (see 4 for details).

The reduced and simple personal income tax almost eliminated incentives for workers to stay in the shadow economy. However, there is no evidence from Russia or Ukraine that low flat income taxes were sufficient to cause reduction in the shadow economy. On the other hand, relatively high payroll taxes and simplified taxation create a strong incentive for enterprises to stay in the shadow economy. It also means that any attempt to increase payroll tax rates or collection will lead to increase in shadow economy. The Ukrainian government tried to collect payroll taxes from private individuals and enterprises subject to simplified taxation in 2005 in order to provide unemployment and pension insurance for their employees. However, there are about 1.5 million private and legal entities using simplified taxation in Ukraine today (see 4), and they were able to efficiently lobby the Parliament. The Parliament did not support government attempt to collect payroll taxes from these entrepreneurs. If the government succeeds in changing the simplified tax legislation to collect payroll taxes from these enterprises, it might to force these enterprises into the unofficial economy.

Effect on GDP growth

Social security system and changes in social security benefits may impact GDP growth through two different channels: one is reduction of income inequality, and another is effect on government expenditures and their financing. Theoretical and empirical research does provide evidence of both positive and negative impact of these factors on GDP growth; however recent studies in the EU and the United States suggest that the negative effect is likely to prevail.

Inequality is considered to have a negative impact on growth in the countries where imperfect financial markets limit ability of poor to borrow. In these conditions the social safety net provides a poor opportunity to increase human capital though access to education and healthcare; this also provides insurance against risks associated with change of work, entrepreneurship, etc., hence enhancing the labor force quality of the poor. Social transfers that decrease inequality also may increase cohesion of public opinion and support economic reforms in countries in transitions. As a result, social transfers that increase equality will increase opportunities for economic growth.

On the other hand, traditional economic theory associates economic growth in the country with the ability to save and invest. Some empirical evidence confirms that the rich have a higher propensity to save than the poor; therefore redistribution of income from rich to poor should decrease investment and the rate of growth in a closed economy. Social transfers also discourage people from work, reduce employment, output, and consequent investment and growth. Arjona et alt. (see 5) provides extensive discussion of recent findings on the link between inequality and growth. Recent discussion in the European Union suggest that at the current level equalization of incomes through social transfers most probably reduces growth in the countries of the union.

We already stated that financing the social safety net by either taxation or borrowing has a negative effect on economic growth. Taxation of labor discourages work, while taxation of capital or profits discourages investment and economic activity. Although the magnitude of the effect is different for different taxes, and the indirect taxes were found to influence economic growth less than direct taxes, the impact of taxation on economic growth is sizable. In their paper Leibfritz, Thornton and Bibbee estimate using European QUEST model that 1% of GDP decrease in tax revenue would increase GDP in European countries from 0.5 to 5% (see Table VI-5).

A budget deficit is considered to induce economic growth in the Keynesian macroeconomic theory. However, Keynesian theory assumes that the deficit increases government consumption of goods and services, or finances development of critical infrastructure. The deficit in social safety net programs can induce economic growth only if it is used to significantly improve the quality of the low-income labor force. In other cases, a budget deficit would crowd out private investment, and, therefore, reduce the rate of economic growth (see 127, for example).

The size of government and the impact of government expenditures on GDP growth came under investigation of researchers in the last decade. Barro in 1990, and later Armey in 1995 pointed out that size of government may have two effects on economic growth: first, the government provision of core government services, such as property rights protection, rule of law, internal and external security, provides environment stimulating economic growth. However, the disincentive effect of high taxes, government borrowing and increasing deficit, and slowing discovery and wealth-creation processes depress economic activity. Therefore, in countries where government is small and government services are underdeveloped, increases in government expenditures lead to a better business environment, and, therefore, will stimulate economic growth. However, when the government becomes larger, it starts performing services or producing goods that could be produced by the market economy. Even if the government production of such goods is as efficient as private production, changes accrue slower in the public sector, delaying introduction of new technologies

or changing to new world realities. Therefore, in the countries with large governments further increases in the size of the government decreases the rate of economic growth.

Armey argued that the dependence between the size of the government and the rate of economic growth has ∩-shape, and introduced the notion of the Armey-curve into the economic literature. Policy makers in Europe, and in Ukraine in particular, are more familiar with another curve that has similar shape: the Laffer curve. The Laffer curve depicts relations between the amount of tax revenue and tax rates. Policy makers often use the Laffer curve to determine the level of taxes that maximize tax revenue. However, revenue-maximizing taxes support government that is larger than growth-maximizing level. In his recent work Pevcin (see 101) showed that government expenditures of European countries are approximately 19% higher than the Armey-optimal level.

A number of research activities proposed different estimates for the relations between the size of the government, rate of the GDP growth, tax rates, and other economic variables (see Table VI-6). These estimates allow us to extend the simple model for the SSN expenditures in Ukraine with the GDP feedback.

Introducing the GDP feedback in the model

We use the simple model discussed in previous chapter, and augment it with equations representing the feedback on GDP. Based on the reviewed research, it seems reasonable to add equations that represent impact on GDP growth rather than GDP or employment level, since the growth is measured in universal units and the equations estimated for other countries could explain the situation in Ukraine without re-estimation of the constants.

The elasticity parameters of the feedback equation will be assumed to lie in a certain range, and we will present outcomes for a number of possible values of the parameters. The main results for comparison with previous estimates will be based on the estimates achieved with the values of parameters originally estimated for other countries.

Model setup

In order to enable forecasting, we assume that the level of social security taxes or the level of expenditures is forecast for the next year on the basis of the current year results. Then the correction for the current real GDP growth will be forecast based on the expected taxes and level of expenditures. Finally, the forecast of GDP will be made based on the corrected real GDP growth rate. The model assumes that the rates of inflation do not depend on social policy and the level of government expenditures.

70

We would like to create two alternative models with different feedback loops. First, since Ukrainian policy makers are concerned with the effect increased social security taxes have on the growth of shadow economy, we would like to use a simple linear equation for the size of the shadow economy. We assume that the shadow economy stays at the same percent of official economy, unless there is a policy that stimulates additional increase in the shadow economy. We also assume that this increase is achieved by a shift from the official economy to unofficial economy, and, therefore, increases in the shadow economy would constitute a proportional decrease of the official economy. The real GDP growth in the official economy will be corrected for this shift. The shadow economy growth equation will be:

$$\Delta SHE = \Delta SHE(-1) + \alpha * \Delta(SS\_EXP/E\_GDP) \qquad (1)$$

$$SHE = SHE(-1) + \Delta SHE \qquad (2)$$

$$GDP = E\_GDP * (1 - \Delta SHE) \qquad (3)$$

where elasticity α take values in the range of 0.6 – 0.9 based on international estimates.

The second model is based on Armey curve, in the form adopted from Pevcin (see 101). We assume that government expenditures (excluding social security benefits) as percent of GDP are at the constant level of 2005. Based on the parameters estimated by Pevcin, the equation for Armey function for Ukraine takes the following form:

$$ARGDP = \beta_1 + \beta_2 *(GOV+SS\_EXP /E\_GDP) + \beta_3 *(GOV+SS\_EXP/E\_GDP)^2 \qquad (4)$$

where β_1 takes values from -0.03 to -0.04, β_2 takes values from 0.003 to 0.004, and β_3 takes values from -0.000045 to -0.000055

The ARGDP is the level of GDP growth predicted by Armey curve. This level of real GDP growth is different from predictions and historic values in Ukraine due to the factors that are not captured by Armey curve, for example, structural changes in economy. We assume that the difference between the currently predicted level of GDP growth in 2005 and the Armey curve estimate of the GDP growth same year is the "natural" growth rate of GDP in Ukraine. Consequently, the forecast growth of real GDP will be sum of two components, Armey growth rate and the "natural" growth rate: RGDP = ARGDP + NRGDP. $\qquad (5)$

The model now takes the following form:

$$W\_RATE = NGDP \qquad (6)$$
$$NONSS\_INCOME = NONSS\_INCOME(-1)*W\_RATE \qquad (7)$$
$$SS\_INCOME = SS\_INCOME(-1)*I\_RATE \qquad (8)$$
$$SS\_EXP = SS\_INCOME * (1+ADMIN) \qquad (9)$$
$$MSL = MSL(-1)*INF \qquad (10)$$

$$SS\_GDP = SS\_EXP/NGDP \qquad (11)$$
$$NONSS\_WEIGHT = NONSS\_INCOME/(SS\_INCOME+NONSS\_INCOME) \qquad (12)$$
$$INC\_PC = (SS\_INCOME+NONSS\_INCOME)/POP \qquad (13)$$

MSL_RATIO=INC_PC/MSL $\qquad$ (14)

E_GDP = NGDP(-1)*(INF+ E_RGDP) $\qquad$ (15)

Depending on the choice of the feedback, two sets of equations are used:

(A)

ΔSHE = ΔSHE(-1) + α * Δ(SS_EXP/E_GDP) $\qquad$ (16)
SHE = SHE (-1) + ΔSHE $\qquad$ (17)
NGDP = E_GDP* (1-ΔSHE) $\qquad$ (18)
RGDP=NGDP/NGDP(-1) – INF $\qquad$ (19)

(B)

ARGDP = β_1+ β_2*(GOV+SS_EXP$_{-1}$ /NGDP$_{-1}$) + β_3*(GOV+SS_EXP$_{-1}$/E_GDP$_{-1}$)^2 $\qquad$ (20)
RGDP = ARGDP + NRGDP $\qquad$ (21)
NGDP = NGDP(-1)*(INF+ RGDP) $\qquad$ (22)

The initial conditions for the model are calculated based on the data for year 2005, and they are the same as conditions for the simple model.

Scenarios

In order to demonstrate properties of the model, we designed seven scenarios similar to the previous chapter, which differ in the behavior of policy variable I_RATE: the rate of social benefits growth and the type of GDP feedback used in the model. The values of the policy variable for every scenario are presented in Table VI-7. All scenarios assume that the 28% increase of social benefits in 2006 is already pre-determined and cannot be changed. The scenarios are defined as follows:

Scenarios 1, 4 and 7 assume that after 2006 government policy is in maintaining the real level of social welfare benefits on the level they reached in 2006. The scenarios differ with the type of GDP feedback; scenario 7 is the baseline scenario that assumes no GDP feedback.

Scenarios 2 and 5 assume that the policy of 28% nominal increase in social benefits continues in 2007, and only after that the government adopts a policy to maintain the real level of social benefits, and index social benefits with inflation.

Scenarios 3 and 6 assume that after the increase in 2006 government maintains the level of social expenditures reached in 2006, and then attempts to increases social benefits to maintain the expected expenditures at the same level. In order to achieve the goal, the government will index social expenditures with the expected rate of GDP growth, which is equal to the rate of real GDP growth in previous year plus inflation.

Model results

The main feature of the model is the feedback on GDP growth, and the results significantly depend on the form of relation that we choose. Figure VI-2 shows that in the first two years while social security expenditures grow in real terms, the model with feedback predicts lower GDP growth than assumed in the simple model. However, when social security expenditures as a percent of GDP start decreasing, feedback based on the shadow economy model allows for growth rates higher than predicted in the simple model. At the same time, because the Armey curve model depends not only on the difference in social expenditures, but also on the level of expenditures, it forecasts much slower recovery of GDP growth rates. The GDP growth rate does not reach the level of the simple model assumptions over the whole forecasting period.

Differences in GDP growth determine the differences in other indicators. Under all scenarios the cost of the social safety net (see Figure VI-3) and the additional deficit created by increased social benefits (see Figure VI-6) are higher than predicted by the naïve model in the previous chapter (scenario 7 represents this forecast). The policy maintaining the real level of SSN benefits at the level achieved in 2006 requires expenditures similar to those predicted by the naïve model, and the difference in forecasts based on two different feedback models are minimal.

Since all scenarios predict higher social expenditures as a percent of GDP, they also result in a lower share of non-social security income in total family income (see Figure VI-4). The difference in predicted share of non-social security income between two models for GDP feedback is lower for the scenarios that assume a higher level of SSN benefits. This is possibly happening because of the different elasticity of the feedback modes to small changes in the SSN expenditures. This question will be studied with the exploratory analysis in greater detail.

Finally, despite differences in social security policies and the GDP feedback, the difference between income levels as a percent of minimal subsistence level is relatively small in the long-run (see Figure VI-5). We may conclude that an expansionary social policy does not bring any long-run advantages, but creates high long-run costs.

Exploratory analysis

With the exploratory analysis we would like to see how changes in the parameters of the feedback equations would influence the main variables of interest, real GDP growth and SSN expenditures as a percent of GDP. The analysis will be conducted with the policy described at scenarios 2 and 5.

We start with the simpler feedback model based on shadow economy growth. Forecast values of safety net expenditures and real GDP growth will be contained in the shaded areas at Figure VI-7

and Figure VI-8 respectively. We can see that higher elasticity of the shadow economy growth with respect to SSN expenditures leads to a higher share of SSN expenditures under the same social policy. At the same time, if social expenditures start decreasing, higher elasticity of the shadow economy to the expenditures means a faster recovery of real GDP and higher growth rates at the end of the period.

The exploration of the Armey curve feedback equation is more complex because the equation has three coefficients. In order to demonstrate the effect of change in different coefficients, the estimates put in the same graphs (see Figure VI-9 and Figure VI-10) with a complex system of coding: darker lines represent cases with intercept (β_1) equal to -0.03, and the lighter lines represent intercept equal to -0.04; dashed lines represent higher positive elasticity to expenditure level ($\beta_2 = 0.004$), and straight lines represent lower elasticity ($\beta_2 = 0.003$); finally, the squares mark higher negative elasticity to the expenditures level ($\beta_3 = -0.00055$), and lines without marks have lower negative elasticity ($\beta_3 = -0.00045$).

The figures shows that the estimates based on the Armey curve are very sensitive to changes in both elasticity of positive reaction on the level of expenditures and the negative reaction on the level of expenditures. A small increase in the positive response elasticity (β_2) keeping all other elasticity constant leads to the forecast of higher GDP growth than in the base scenario, and to slightly lower estimated expenditures. At the same time, a small increase in the elasticity of negative response to the level of expenditures (β_3) leads to negative real GDP growth and forecasts constant increase in cost of the social safety net. Finally, if all coefficients take their lower or upper boundary values, the forecasts are located relatively close, which means that the balance between negative and positive response elasticity is more important than the values of the elasticity.

Figure VI-9 also leads to another important conclusion: if the model is over-pessimistic (meaning it is based on lower elasticity of positive response to the level of expenditures), it only slightly overestimates the cost of the social safety net. However, if the model is over-optimistic (if it assumes smaller negative effect of the level of expenditures), it significantly underestimates the cost of social safety net. Therefore, the policies based on the pessimistic model will be more robust than the policies based on the optimistic model of the economic impact of increased SSN expenditures. At the same time, since the pessimistic model overestimates the cost of SSN, the policies based on its forecasts may provide smaller benefits than fiscally possible given the assumptions of a particular scenario. However, a policymaker with strong preferences of providing maximum level of social benefits in the present would prefer more precise estimates of the costs, and might prefer using other models or averaging results of pessimistic and optimistic models to determine amount of social benefits and the cost of SSN in their policy.

Conclusions

Use of the macroeconomic model with GDP feedback can significantly alter policy decisions based on evaluation of the cost for the social safety net. Forecasts of medium and long-term costs of the social safety net for Ukraine made with the model that includes GDP feedback are significantly higher than the forecasts made with the naïve model. For example, if government decides to increase social benefits 28% in 2006 and 2007, and then keep them constant in real terms after that, the total SSN expenditures in 2007 are predicted by both models at the same level of 24%. However, by 2010 the naïve model predicts that the SSN expenditures would drop to 20% of GDP, while the model with GDP feedback estimates them to be 1-2% of GDP higher. This 1-2% of GDP difference in estimates is kept until the end of the period, meaning that in 2007 accumulated deficit of the SSN is 8-16% of GDP higher then predicted by the naïve model. The difference in predicted costs becomes larger if the high level of government expenditures on social safety net remains higher for a longer period of time.

In addition, the real GDP growth rate is also estimated to be about 1-1.6% a year lower in the model with GDP feedback compare to the naïve model. This factor makes additional deficit of the SSN system even more expensive since a lower rate of GDP growth increases interest rates at which government may finance the deficit. The GDP feedback model also predicts that average household income at the end of the period will be about 60-170 UAH per month lower than predicted by the naïve model. This may indicate that the number of people living below or close to the poverty line after the policy is implemented would be larger than expected when the decision is based on the naïve model is made. However, the macroeconomic model does not provide necessary detail to evaluate the impact of the policy on the number of people below the poverty line or on individual income. We need to construct a micro-level model to obtain this information and test the hypothesis that the low-benefits pro-income policies are successful in reducing poverty.
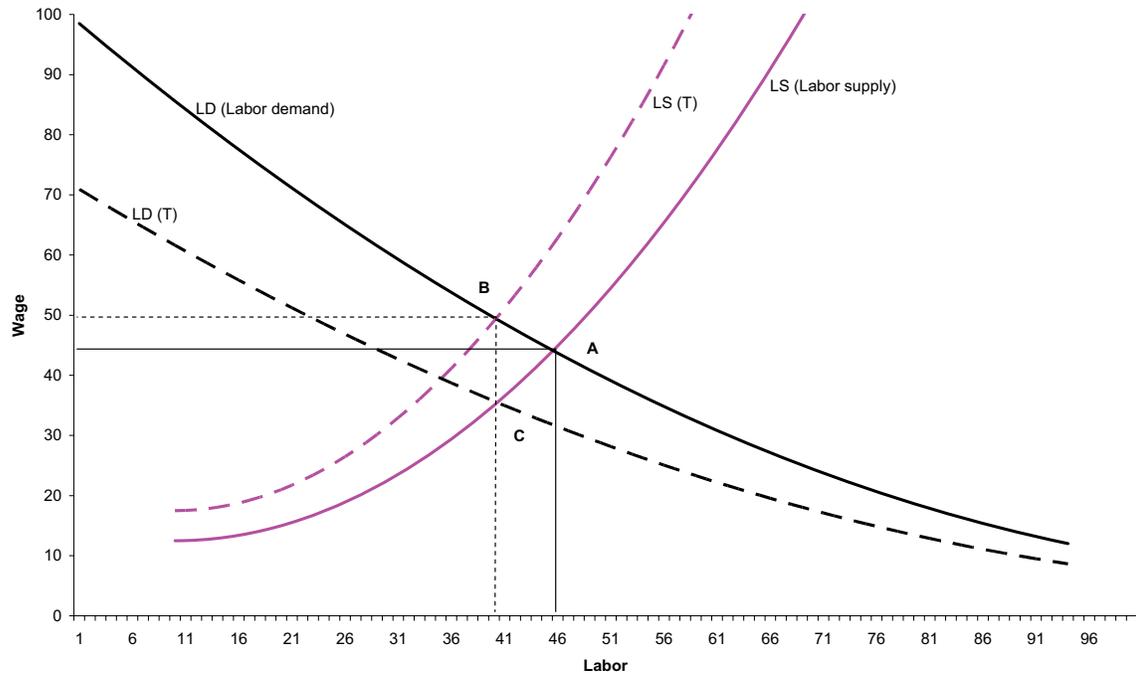
Figure VI-1. Aggregate labor supply and demand

	Country	Uncompensated Wage elasticity (overall effect)	Compensated wage elasticity (substitution effect)	Income Elasticity (income effect)
A. Married women's labour supply				
Rosen (1976a)	US	2.3	n.a	n.a
Hannoch (1980)	US	1.4	2.3	-0.9
Schultz (1980)	US	1	1	0
Cogan (1981)	US	0.65	0.68	-0.03
Hausman (1981)	US	0.45	0.9	-0.45
Blundell and Walker (1982)	UK	0.43	0.65	-0.22
Arrufat and Zabalza (1986)	US	0.62	0.68	-0.06
Triest (1990)	US	1.2	1.5	-0.3
Strom and Wagenhals (1991)	Germany	0.96	1.02	-0.06
Kaiser, van Essen and Spahn (1992)	Germany	1.04	1.22	-0.18
Blundell, Duncan and Meghir (1992)	UK	0.42	0.61	-0.19
Eissa (1995)	US	0.8	n.a	n.a
B. Men's labour supply				
Boskin (1973)	US	-0.1	0	-0.1
Hausman (1981)	US	-0.03	0.95	-0.98
Ashworth and Ulph (1981)	UK	-0.33	0.29	-0.62
Blundell and Walker (1982)	UK	-0.23	0.13	-0.36
Juhn, Murphy and Topel (1991)	US	-0.2	n.a	n.a
Kaiser, van Essen and Spahn (1992)	Germany	-0.004	0.28	-0.28
Zabel (1995)	US	0	0	0
C. Lone mothers' labour supply				
Hausman (1980)	US	0.47	0.65	-0.18
Bingley, Symons and Walker (1992)	UK	0.76	1.28	-0.52
Jenkins (1992)	UK	1.44	1.68	-0.24

Table VI-1. Elasticity of hours worked to the change in wage

Sources: OECD (1995) and Congressional Budget Office (1996)
As published in Willi Leibfritz, John Thornton and Alexandra Bibbee, "Taxation and Economic Performance",
economics department working papers no. 176, OCDE 1997

Study	Country	Estimated effect
Gora et alt. (2006)	New EU states and OECD	Size of the income tax elasticity of: -0.017 employment rate of high-skilled male and -0.53 of low-skilled male -0.53 employment growth rate new EU states and 0.014 old OECD
Gora et alt. (2006)	Poland	10% increase in labor tax rate decreases total employment by 7%
Daveri and Tabellini (2000)	OECD	Labour tax rate elasticity of unemployment rate 0.58 continental model 0.26 anglo-saxon model -0.07 nordic model
Kugler&Kugler (2003)	Columbia	10% increase of payroll taxes lead to 1.4%-2.3% decrease in wages and 4% to 5% decrease in employment,
Gruber (1997)	Chili	decrease of payroll taxes did not impact employment, resulted in increased wages
Bell et.al. (2002)	Great Britain	no significant impact of change in labor tax rate on employment
Kramarz and Philippon (1999)	France	1% increase of labor cost implies increase of 1.5% in the probability of transiting from employment to non-employment
Di Matteo and Shannon (1995)	Canada	one percent increase in average payroll tax resulting in a 0.32% decline in employment
Bean, Layard and Nickell (1986)	Multi-country	one percent increase in average payroll tax resulting in a 0.2% decline in employment
Akhmed Akhmedov et alt. (2004)	Russia	wage labor demand elasticity is equal to –0.40 implying that a 10% increase in real wage would diminish labor demand for 4%

Table VI-2. Elasticity of employment to taxes on labor in different studies

Country	Share of official GDP	Shadow employment as % of working-age population
Armenia	45.3	40.3
Azerbaijan	60.1	50.7
Belarus	47.1	40.9
Bulgaria	36.4	30.4
Croatia	32.4	27.4
Czech Republic	18.4	12.6
Estonia	39.1	33.4
Georgia	66.1	53.2
Hungary	24.4	20.9
Kazakhstan	42.2	33.6
Kyrgyzstan	39.4	29.4
Latvia	39.6	29.6
Lithuania	29.4	20.3
Macedonia	45.1	35.1
Moldavia	44.1	35.1
Poland	27.4	20.9
Romania	33.4	24.3
Russia	45.1	40.9
Serbia	34.5	34.6
Slovakia	18.3	16.3
Slovenia	26.7	21.6
Ukraine	51.2	41.2
Uzbekistan	33.4	33.2

Table VI-3. Shadow economy in different transition countries

78

Study	Country	Estimated effect
Mel'pya, Tiessen, and Vakhnenko (2001)	Ukraine	presented forecast implies that 1% of GDP higher budget tax revenues causes about .67% increase in shadow economy
Davis and Henrekson (2004)	Multi-country	10 percentage point increase in the tax burden would cause the underground economy to rise by 3% of GDP
Ihrig and Moe (2001)	USA	0.7 percent increase in the tax rate leads to a 1.5 percent rise in underground activity
Schneider (2003)	OECD	A one-point increase of the labor market regulation index (ranging from 1 to 5, with 5 = the most regulation in a country), ceteris paribus, is associated with an 8.1 percentage point increase in the share of the shadow economy when controlled for GDP per capita
Johnson, Kaufmann, and Zoido (1999)	Latin America, Transition Econs., OECD	1% higher Gov. revenue as % of GDP associated with 0.82% lower ratio of shadow to official economy; complexity of tax system significantly increases shadow economy
Lippert and Walker (1997)	Mediterranean countries	the underground economy rises roughly 0.25 percentage points for each percent of increase in labor taxes
Dell'Anno, Gómez, and Pardo (2004)	Grees, Spain, and France	Social Security contributions are not significant determinants of shadow economy is France and Grees, however 1% increase in share of SSC in GDP in results in 0.72-0.9 % increase in share of shadow economy in Spain
Schneider (2000)	OECD	1% of government Total Tax and Soc. Security burden as % of GDP is associated with 0.62-.74% of shadow economy
G. de Menil, Najman, Jirniy and Rohozynsky (1998)	Ukraine	payroll tax of 52% shifted 0.4% of labor force shifts into the unofficial economy each month

Table VI-4. Tax on labor elasticity of shadow economy

	Reduction in corporate tax rate			Reduction in labour tax rate			Reduction in consumption tax		
	GDP	Employment	Wages	GDP	Employment	Wages	GDP	Employment	Wages
United States	5.28	2.79	2.44	3.67	3.42	0.02	2.72	2.53	0.03
Japan	2.85	0.38	2.52	0.72	0.58	0.12	0.55	0.44	0.1
European Union	3.09	1.06	2.18	2.08	1.83	0.06	1.46	1.28	0.06
Germany	3.16	1.13	2.12	2.4	2.1	0.11	1.64	1.41	0.1
France	2.92	1	2.1	2.29	2.01	0.03	1.51	1.3	0.04
Italy	2.74	0.78	2.15	1.69	1.47	0.06	1.22	1.05	0.06
United Kingdom	4.3	1.81	2.54	2.39	2.26	-0.02	1.92	1.82	-0.02
Austria	2.27	0.56	1.89	1.23	1.06	0.07	0.87	0.74	0.06
Belgium	2.57	0.53	2.23	1.53	1.32	0.1	0.92	0.77	0.09
Denmark	2.98	0.89	2.42	1.91	1.59	0.08	1.36	1.12	0.07
Finland	3.83	1.22	2.83	2.34	1.99	0.08	1.7	1.44	0.07
Greece	2.58	0.98	1.67	1.59	1.48	-0.02	1.23	1.14	-0.01
Ireland	3.94	1.99	1.94	3.24	2.89	0.09	2.51	2.22	0.09
Netherlands	2.94	0.95	2.1	2.38	2.14	0.05	1.45	1.29	0.06
Portugal	2.64	1.04	1.74	1.71	1.55	-0.07	1.38	1.26	-0.06
Spain	2.02	0.39	1.8	0.91	0.76	0.07	0.66	0.54	0.07
Sweden	3.9	0.99	3.34	2.23	1.85	0.13	1.56	1.27	0.12
MAX	5.28	2.79	3.34	3.67	3.42	0.13	2.72	2.53	0.12
MIN	2.02	0.38	1.67	0.72	0.58	-0.07	0.55	0.44	-0.06

Table VI-5. Economic effects of tax changes: results of with QUEST model

Percentage points deviation from baseline levels in response to the 1% of GDP reduction in tax revenue
Source: Willi Leibfritz, John Thornton and Alexandra Bibbee, "Taxation and Economic Performance", economics department working papers no. 176, OCDE 1997

| Study	Country	Estimated effect
Cashin (1995)	OECD	1% of GDP increase in tax revenue lowers output per worker by 2%
Engen and Skinner (1996)	US and OECD	2.5% increase in tax/GDP ratio reduces GDP growth by 0.2-0.3%
Leibfritz, Thornton, and Bibbe (1997)	OECD	10% increase in tax/GDP reduces GDP growth by 0.5-1%
OECD (1997) additional model simulations	OECD, UK	1% of GDP increase in labor taxes reduces UK GDP by 2.4%
Bleaney, Gemmell and Kneller (1999)	OECD	1% of GDP increase in distortionary tax revenue reduces GDP growth by 0.4%
Folster and Henrekson (2001)	rich OECD and non-OECD countries	10% point increase in tax/GDP ratio reduces per capita output levels by 0.3-0.6%
PricewaterhouseCoopers (2003)	OECD	1% of GDP rise in distortionary taxation reduces GDP growth by 0.2-.04%
Leibfritz, Thornton and Bibbee (1997)	OECD	Based on QUEST model as result of 1% of GDP reduction in tax revenue, difference in GDP level from base scenario: Reduction in corporate tax rate: 2.0 - 5.3% Reduction in labour tax rate: 0.7 - 3.7% Reduction in consumption tax: 0.5 -2.7%
Arjona, Ladaique and Pearson (2002)	OECD	1% of GDP increase in gov. spending would reduce GDP in the long term by 0.7% 0.1% of GDP increase in "passive" social spending (total social security minus active programs) would reduce long run GDP by 0.2 % rate of GDP growth have -1% elasticity with respect to the share of government in GDP (including SSN):RGDP = -0.01*G + 0.07
Luc van Braekel (2005)	OECD	GDP per capita growth = -206.3ln(G) + 954.66 GDP per capita growth = -55.293 ln(wage tax rate)+350.44
Pevcin (2004)	OECD	estimates effect of gov. expenditures(as % of GDP) on GDP growth(RGDP)and change of GDP growth (DRGDP) RGDP = 7.94 - 0.108*EXP RGDP = 8.64 - 0.116*EXP - 0.068*D(EXP) DEGDP = 0.179-0.1438 D(EXP)
Gwartney, Lawson, Holcombe (1998)	multicountry	Elasticity of annual rate of GDP growth to the: gov. expenditures as % of GDP is -0.04 to -0.62 change in gov. exp. as % of GDP is -0.4 to -1.17
Vreymans and Verhulst (2004)	OECD	Log (real GDP growth) has -0.006 to -0.007 elasticity to gov. expenditures as % of GDP and -0.001 to -0.002 elasticity to the share of social expenditures as % of GDP

Table VI-6. Taxation effect on economic growth

Note: Part of this table is adopted from GRAEME LEACH (2003) "The negative impact of taxation on economic growth", http://www.reform.co.uk/filestore/pdf/negativeimpact.pdf

| Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Policy variable: indexing of social security benefits							
2006	28.00%	28.00%	28.00%	28.00%	28.00%	28.00%	28.00%
2007	11.00%	28.00%	16.90%	11.00%	28.00%	16.90%	11.00%
2008	7.60%	7.60%	Equal to the rate of nominal GDP growth determined by the model	7.60%	7.60%	Equal to the rate of nominal GDP growth determined by the model	7.60%
2009	7.60%	7.60%		7.60%	7.60%		7.60%
2010	7.60%	7.60%		7.60%	7.60%		7.60%
2011	7.60%	7.60%		7.60%	7.60%		7.60%
2012	7.60%	7.60%		7.60%	7.60%		7.60%
2013	7.60%	7.60%		7.60%	7.60%		7.60%
2014	7.60%	7.60%		7.60%	7.60%		7.60%
GDP feedback model							
	Shadow economy			Armey curve			No feedback

Table VI-7. Model scenarios
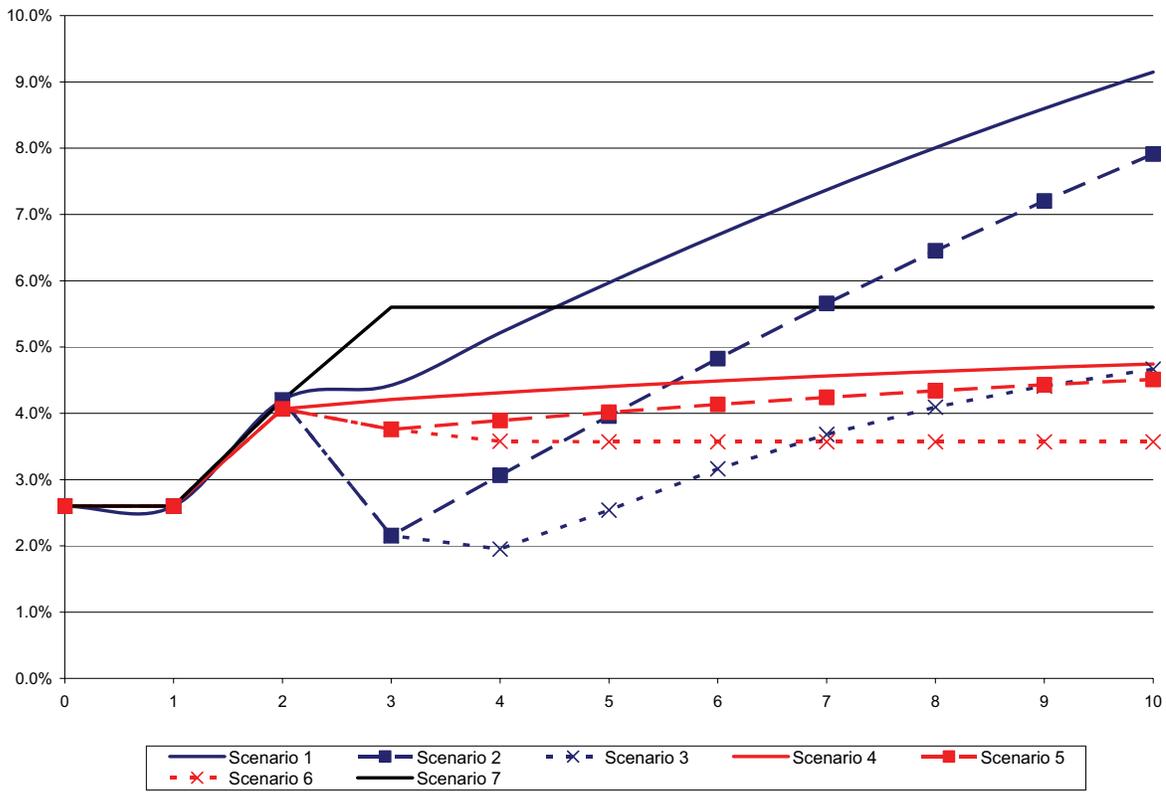
Figure VI-2. Model estimate: real GDP growth rates
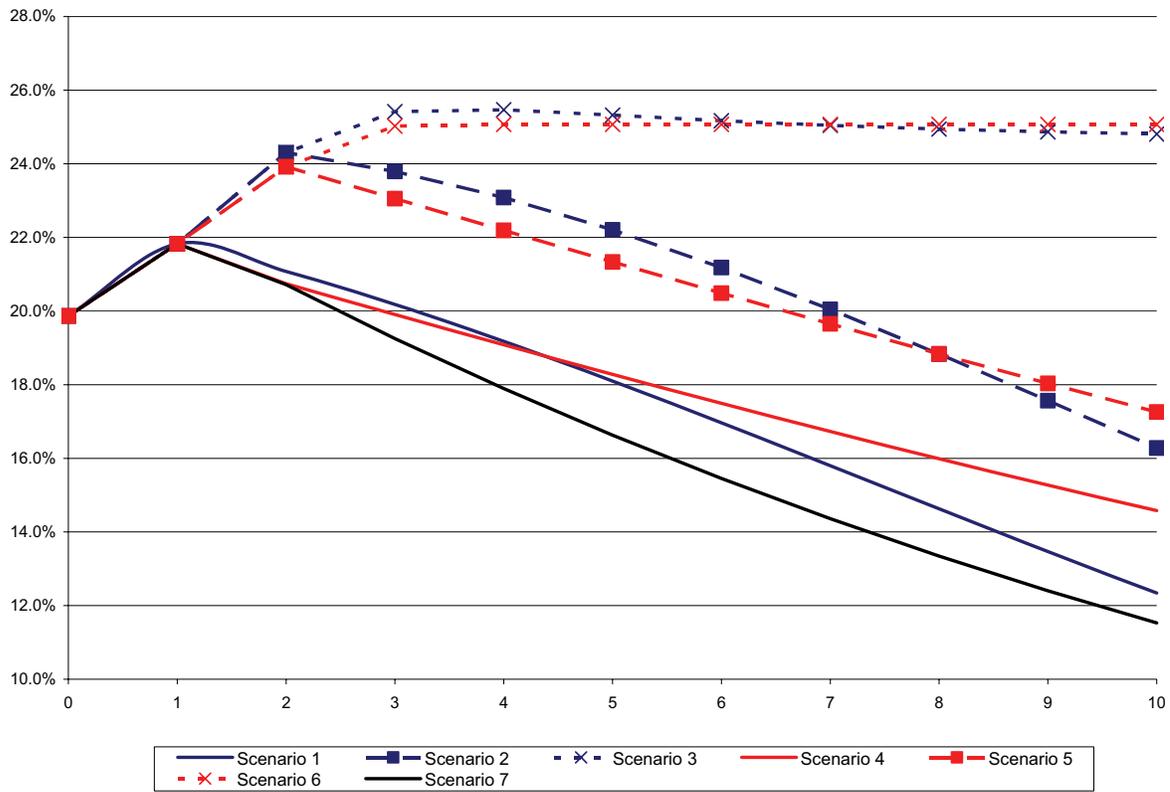
Figure VI-3. Model estimates: share of SSN expenditures in GDP
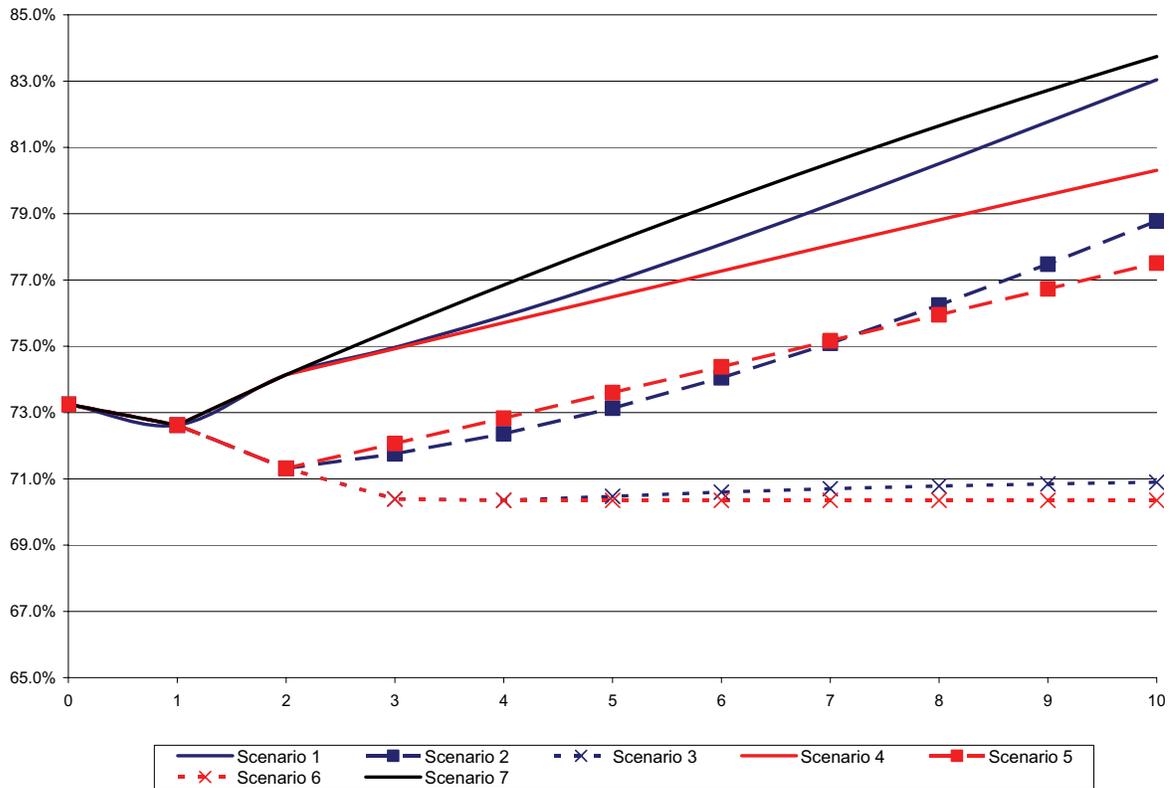
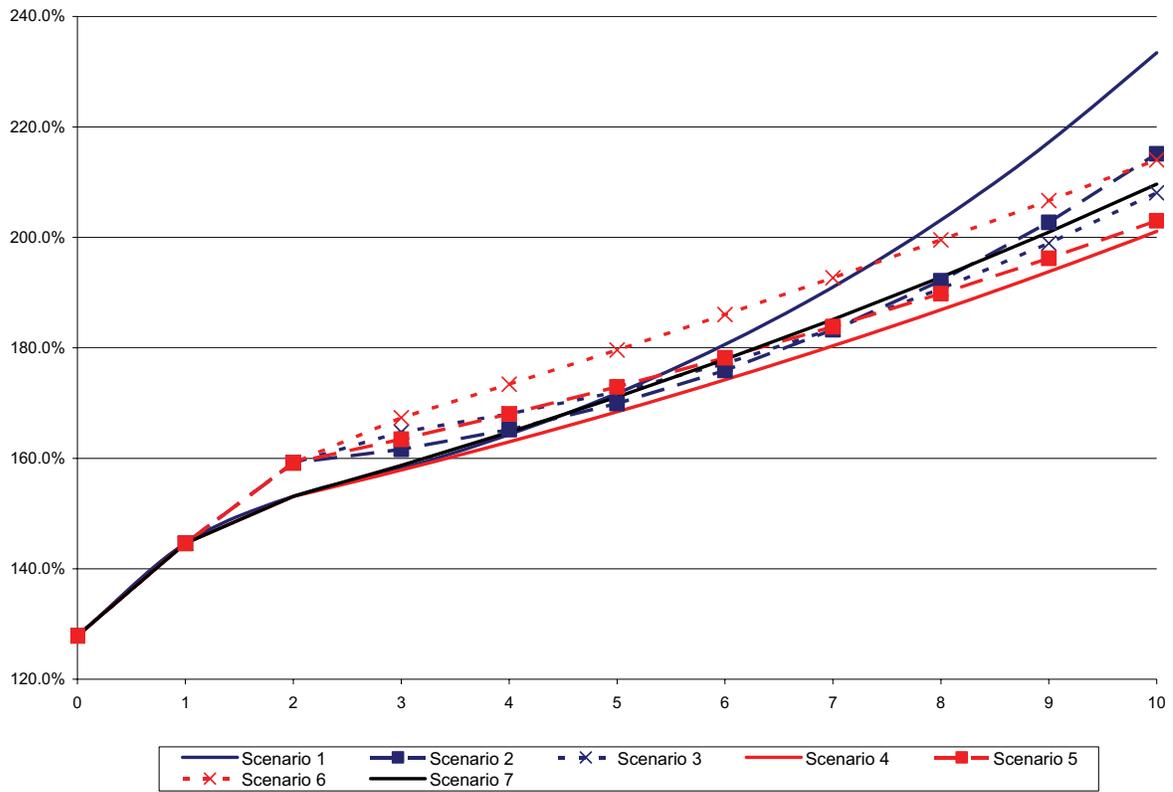**Figure VI-4. Model estimates: share of non-social security income in total income**

Figure VI-5. Model estimates: per-capita income as percent of minimal subsistence level
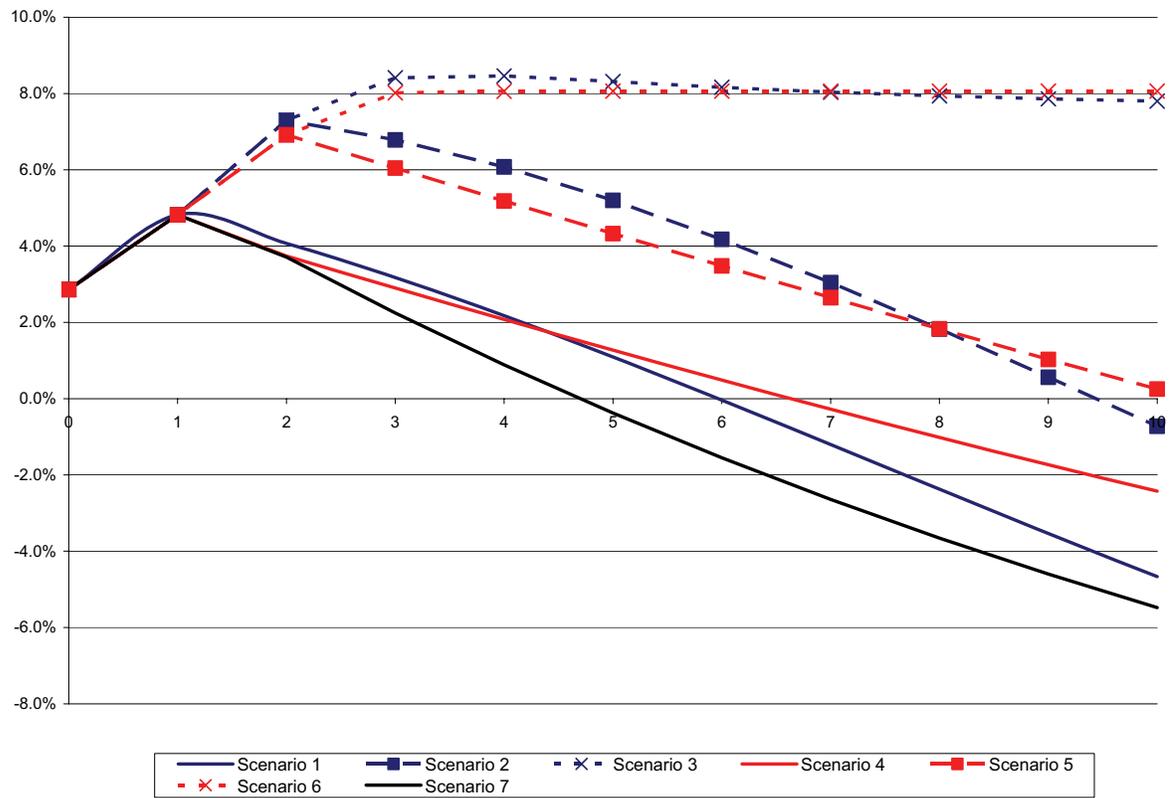

Figure VI-6. Model estimates: additional deficit as percent of GDP

	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5	Scenario6	Scenario7
Assumptions							
Inflation (INF)	11%	11%	11%	11%	11%	11%	11%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Nominal GDP (NGDP)	560,602	560,602	560,602	569,590	569,590	569,590	570,318
Indexation of social payments (I_RATE)	11%	28%	28%	11%	28%	28%	11%
Non-social security income growth rate (W_RATE)	20%	20%	20%	20%	20%	20%	20%
Results							
Min subsistence level (MSL)	519	519	519	519	519	519	519
Nominal GDP growth	15%	15%	15%	17%	17%	17%	17%
Total household income (NONSS_INCOME)	332,007	332,007	332,007	332,007	332,007	332,007	332,007
Average per-capita income (NONSS_INCOME/POP)	590	590	590	590	590	590	590
Average per-capita household income (INC_PC)	795	827	827	795	827	827	795
Total safety net expenditures (SS_INCOME)	118,145	136,240	136,240	118,145	136,240	136,240	118,145
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	21%	24%	24%	21%	24%	24%	21%
Non-social security income as % of total income NONSS_INCOME/(SS_INCOME+NONSS_INCOME)	74%	71%	71%	74%	71%	71%	74%
Per-capita income as % of subsistence level (INC_PC/MSL)	153%	159%	159%	153%	159%	159%	153%
Social security (payroll) taxes rate	48%	56%	56%	48%	55%	55%	48%
additional deficit as % of GDP	4.07%	7.30%	7.30%	3.74%	6.91%	6.91%	3.71%
Real GDP growth rate	4.20%	4.20%	4.20%	4.07%	4.07%	4.07%	4.20%

Table VI-8. Results of modeling year 2007

	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5	Scenario6	Scenario7
Assumptions							
Inflation (INF)	8%	8%	8%	8%	8%	8%	8%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Nominal GDP (NGDP)	813,116	764,396	745,823	805,287	795,621	789,813	836,654
Indexation of social payments (I_RATE)	8%	8%	10%	8%	8%	11%	6%
Non-social security income growth rate (W_RATE)	14%	12%	10%	12%	12%	11%	14%
Results							
Min subsistence level (MSL)	647	647	647	647	647	647	647
Nominal GDP growth	14%	12%	10%	12%	12%	11%	14%
Total household income (NONSS_INCOME)	481,554	452,700	441,701	469,392	463,757	460,372	487,053
Average per-capita income (NONSS_INCOME/POP)	855	804	784	834	824	817	865
Average per-capita household income (INC_PC)	1,111	1,099	1,113	1,090	1,119	1,162	1,107
Total safety net expenditures (SS_INCOME)	147,181	169,723	188,846	147,181	169,723	197,994	139,126
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	18%	22%	25%	18%	21%	25%	17%
Non-social security income as % of total income NONSS_INCOME/(SS_INCOME+NONSS_INCOME)	77%	73%	70%	76%	74%	70%	78%
Per-capita income as % of subsistence level (INC_PC/MSL)	172%	170%	172%	168%	173%	180%	171%
Social security (payroll) taxes rate	42%	51%	58%	42%	49%	57%	38%
additional deficit as % of GDP	1.10%	5.20%	8.32%	1.27%	4.33%	8.06%	-0.38%
Real GDP growth rate	5.97%	3.96%	2.54%	4.40%	4.02%	3.57%	5.60%

Table VI-9. Results of modeling year 2010

	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5	Scenario6	Scenario7
Assumptions							
Inflation (INF)	8%	8%	8%	8%	8%	8%	8%
Population (POP)	46,930	46,930	46,930	46,930	46,930	46,930	46,930
Nominal GDP (NGDP)	1,719,979	1,503,737	1,308,876	1,455,999	1,418,532	1,357,548	1,584,625
Indexation of social payments (I_RATE)	8%	8%	12%	8%	8%	11%	6%
Non-social security income growth rate (W_RATE)	17%	16%	13%	13%	12%	11%	14%
Results							
Min subsistence level (MSL)	933	933	933	933	933	933	933
Nominal GDP growth	17%	16%	13%	13%	12%	11%	14%
Total household income (NONSS_INCOME)	1,018,628	890,563	775,159	848,684	826,845	791,298	922,480
Average per-capita income (NONSS_INCOME/POP)	1,809	1,581	1,376	1,507	1,468	1,405	1,638
Average per-capita household income (INC_PC)	2,178	2,007	1,941	1,876	1,894	1,997	1,956
Total safety net expenditures (SS_INCOME)	212,283	244,794	324,680	212,283	244,794	340,318	182,695
Total safety net expenditures as % of GDP (SS_INCOME/NGDP)	12%	16%	25%	15%	17%	25%	12%
Non-social security income as % of total income NONSS_INCOME/(SS_INCOME+NONSS_INCOME)	83%	79%	71%	80%	78%	70%	84%
Per-capita income as % of subsistence level (INC_PC/MSL)	233%	215%	208%	201%	203%	214%	210%
Social security (payroll) taxes rate	28%	37%	57%	33%	40%	57%	26%
additional deficit as % of GDP	-4.66%	-0.73%	7.80%	-2.43%	0.25%	8.06%	-5.48%
Real GDP growth rate	9.15%	7.91%	4.67%	4.74%	4.51%	3.57%	5.60%

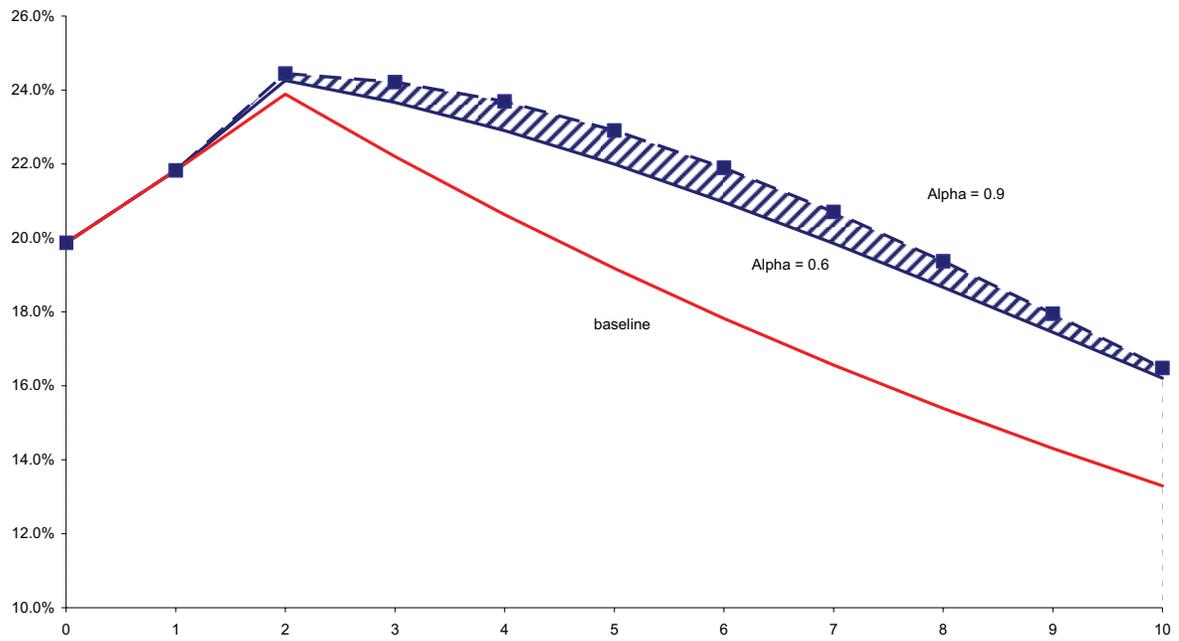**Table VI-10. Results of modeling year 2015**

Figure VI-7. SSN expenditures for different elasticity in shadow economy model
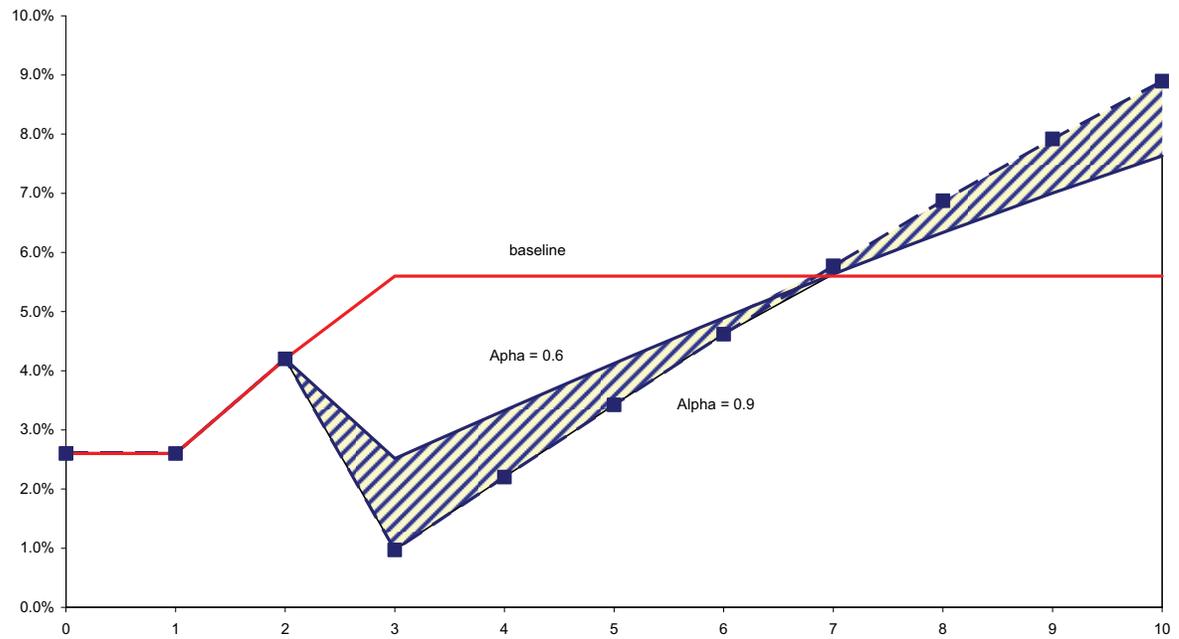

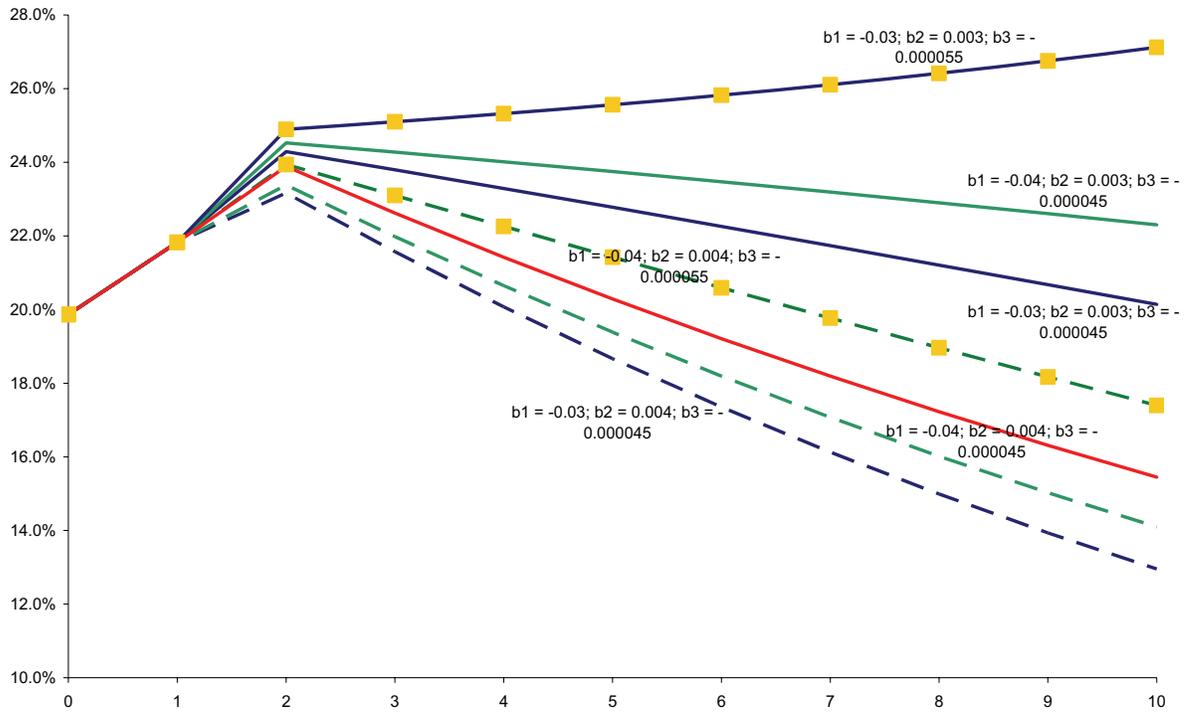**Figure VI-8. Real GDP growth for different elasticity in shadow economy model**

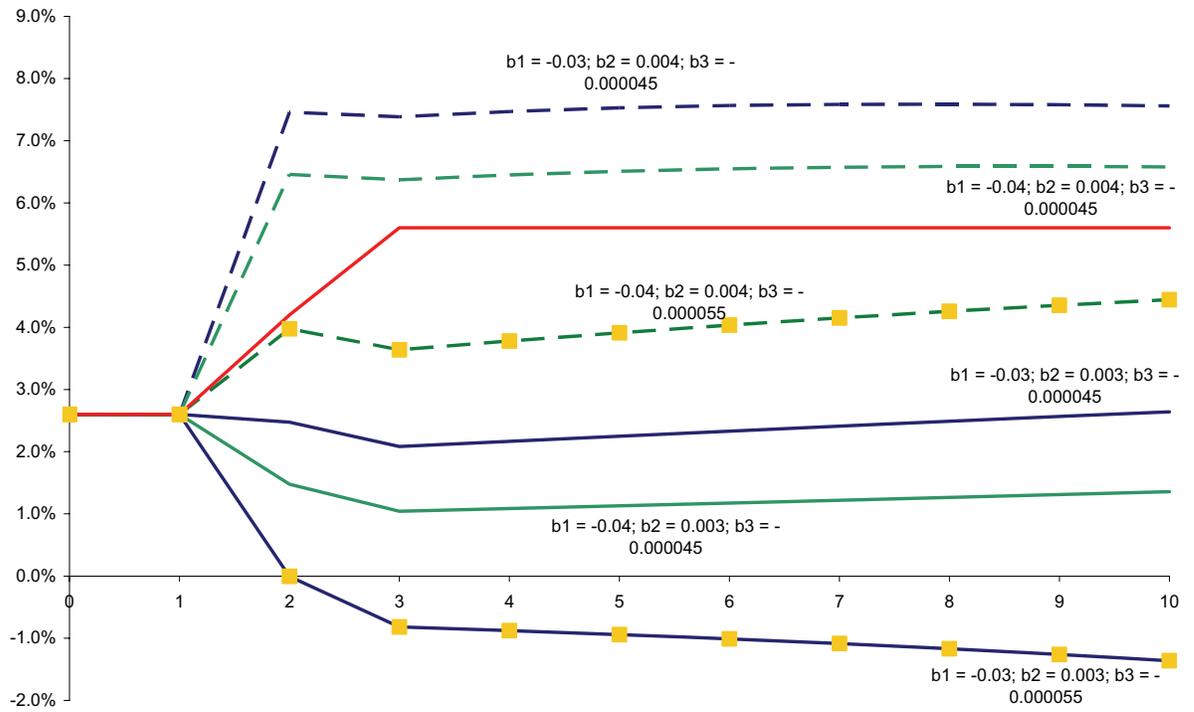**Figure VI-9. SSN expenditures with different elasticity in Armey equation**

Figure VI-10. Real GDP growth with different elasticity in Armey equation

Chapter VII: Better targeting of social benefits

In previous chapters we discussed the proposition that increasing social expenditures in order to increase current benefits may be dangerous for the long-term macroeconomic stability of Ukraine. At the same time, numerous researches suggested that better targeting of existing social expenditures may be an alternative way to reduce poverty without creating additional pressure on the economy (see 46, 87, 132, 129). In order to investigate this alternative, we have to look at the SSN at the individual or family level instead of the macro-level discussed in previous chapters.

In this chapter we explore micro-level data available for Ukraine. We discuss current the distribution of social benefits observed in the data, create a simple model for distribution of social benefits, and estimate the effect of alternative social programs on the number of people living below the minimal subsistence level.

Micro-level estimation for SSN

We mentioned earlier in the dissertation that there are some aspects of the SSN reform that cannot be adequately captured by a macro-level model, but can be analyzed with a micro-level model. First, a micro-level model provides detail about the income of every individual in population, and allows calculating the number of the people with income bellow certain income line (usually, it is poverty line). It also allows calculating a payment necessary to bring particular person (or family) above the poverty line, which is known as poverty gap. Second, if a micro-model provides information about personal characteristics that are used to determine eligibility for social security benefits, it can be used to simulate the effect of changing the eligibility rules. Finally, if the micro-model simulates behavior of individuals, it can estimate the effect of the behavioral response to the changes in the level of the social benefits available to a person.

We develop the microsimulation model that explores all these advantages of the micro-models further in the dissertation. This chapter develops simpler micro-level model that allows to analyze distribution of income, but does not provide information about personal characteristics and behavior of the SSN participants.

Despite the limited capabilities, this model allows to demonstrate the effects of increased social benefits on individual level, calculate the poverty gap, and the minimal cost of perfectly-targeted social security system. We already mentioned that the World Bank study in 1999 (see 129) showed that resources in the 1999 country budget allocated to SSN expenditures were 7% higher than the funds needed to bring all households with per-capita income bellow poverty line above this line if all the money goes only to the needy families. The assumption that all social benefits are perfectly targeted does not withstand the reality check; because even best means-targeted programs in

developed countries are able to deliver only 1/3 of the benefits to the target group (see 21). Although, the study do not allow to conclude that funds in the budget are sufficient to bring every needy family above poverty line through SSN, it provides important reference point for policymaking. The model used in the study estimated poverty gap for every individual, and sum of the poverty gaps for all people estimates minimum funds necessary to bring all SSN beneficiaries above poverty line. Therefore, any SSN that has funding bellow is estimate will not be able to bring every individual in the country above the poverty line.

In this chapter we develop the model similar to the model developed in the abovementioned World Bank study. This model is used to estimate the minimum cost of SSN that required to implement the policies currently discussed by Ukrainian policymakers.

The data

The analysis became possible since Ukraine developed in recent years several sources of reliable micro-level data that allows conducting micro-level analysis of social security expenditures. Among the data are: Labor Force Survey, Ukrainian Longitudinal Monitoring Survey, and Ukrainian Household Expenditures Survey.

The Labor Force Survey was established with assistance of international organizations, such as ILO, and presents information about work, personal characteristics, and wages of worker. Because the survey has been limited to working people, it cannot be used for the micro-level analysis of social transfer programs.

The Ukrainian Longitudinal Monitoring Survey (ULMS) is a household panel of about 8600 respondents surveyed twice a year since 2003. The survey sample and questioner resemble the Russian Longitudinal Monitoring Survey (RLMS) and American Panel Study of Income Dynamics (PSID) (see 131). The survey presents opportunities for analyzing the dynamics of social security expenditures at the micro-level. Unfortunately, at the moment of this study the data collected during the survey was not available to the public.

The Ukrainian Household Expenditures Survey (UHES) is a household expenditures survey implemented by Committee on Statistics of Ukraine with the assistance of the World Bank. The survey is conducted on a quarterly basis. It has a short panel, with individuals and households staying in a sample for one year. The sample includes about nine thousand households in every round, and 25 percent of sample changes every quarter. The first round of the survey was conducted in the fourth quarter of 1999, and it operates on an ongoing bases. In addition to household data, the survey collects data on individual members of a household, and provides information about employment status, income, unemployment and other benefits collected by an individual (see Table

VII-1). The high-frequency changes in the sample make it difficult to use the UHES for a dynamic micro simulation model. At the same time, since the data has detailed information on income from current welfare programs, the data is suitable for a static microeconomic model. Latest data available for this research was collected in the first quarter 2005, which contains 26780 observations for individuals in 10584 households. It has already been used to establish the Ukrainian poverty profile and determine factors of labor force participation (see 132). This data is also widely used by State Committee on Statistics of Ukraine to establish household income and expenditures profiles. It has also been used, together with the reports of social insurance funds, to establish a broad range of social security utilization statistics in Ukraine.

There are several distinct features of the UHES data that affect our analysis. The first is that only some selection criteria for social security programs are clearly observed in the data because the family and individual characteristics in the survey are recorded with less detail than used to identify recipients of most social welfare programs in Ukraine. This is possibly the result of the fact that recording such characteristics was not a primary goal of the survey. Second, we are not able to clearly observe hourly or monthly income in the survey data. The UHES reports the amount of income received from each source during a three month period, and we estimated monthly income, dividing the figure reported in the survey by three.

These features of the survey led to a situation in which we may interpret observation in several ways. For example, Table VIII-1 and Table VIII-2 for each source of individual and household income provide a description of individuals and households receiving the income from this source. There we can observe that some people receiving unemployment benefits, pension, or stipends also report income from a main job. This might be due to the features of this survey discussed above. For example, if a person was working one month, and was unemployed another two months, we will observe both unemployment benefits and the income from the main job of this person. At the same time, we were not able to distinguish this situation from a situation in which a person cheats the system and receives social benefits and work income at the same time. For example, there are numerous reports that in Ukraine people work while being officially unemployed or retired, and this employment may be reported in the UHES (see 132).

Another phenomenon of the data is the fact that it significantly underestimates values of the variables compared to the official statistics. The population of Ukraine was about 46.9 million in 2005; however the available UHES data estimates the population about 45.8 million. According to the official data used for initial values in our 'naïve' model, the average per-capita non-social security income in Ukraine was 396 UAH, while the UHES data estimates it at the level of 213 UAH. The difference may be due to the seasonal fluctuations in the data (since the survey presented

here is for the first quarter of 2005, and the official statistics is based on the whole year), the high non-response rate of the high-income population in the sample (that is later corrected by the statistics office), or some other statistical discrepancies in the data. Since we did not collect any of this data, we can not determine which data is more accurate. However, for this study we assume that the official statistics data is more accurate then the particular survey data because the official statistics goes through multiple cross-checks with other data sources, and we can expect that the cross-check allows eliminating some data decreases.

Additional reason to adjust our data to the official data comes from one of the goals of this dissertation. We would like to demonstrate to the policymakers the value added provided by using the micro-level model. Currently, the policymakers in Ukraine relay on official statistics for decision-making. In order to avoid argument that our results do not match the estimates of official institutions because of the differences in the data, we have to adjust our data so macro-level statistics obtained from micro-level data in 2005 are identical to the official statistics.

For the analysis in this chapter we will rely on the social security expenditures and non-social security incomes observed in the dataset. Where possible, we will present relative figures that should be more accurate if there is common to all observations a scaling factor that brings observed incomes to the official level. We will adjust the data in further chapters to make the results of the aggregated results of micro-level analysis comparable to results of macro-level models.

Social security utilization in the data

There are 17 sources of individual and household income identified in the UHES data (see Table VII-4). Seven sources may be considered income received from the social safety net: unemployment benefits, pension, support for families with children, support to the family with low income, other social support payments, subsidies and discounts.

As we discussed in previous chapters, we recognize that pensions are the largest benefit and the largest expenditures of the social safety net. However, due to the complexity of the changes of pension benefits, and because by the nature of pension as substitute for income from a main job for elderly, for the analysis in this chapter we assume that distribution of pensions remains the same as in the original survey results, and is not effected by the social policies. As a result, we identify non-social security income of a family as the sum of incomes of individual family members and family income from non-social security sources. For individual family members such income includes: income from main and other places of work, from entrepreneurship, from self-employment, stipends, and other income. Family income from non-social security sources consists of: income

from dividends on shares and interest on bank accounts, income from renting owned real estate and land, and alimonies received.

According to the data, current minimal subsistence level (MSL) of 423 UAH divides households in Ukraine into two almost equal groups (see Figure VII-1). About 30% of the households in the dataset have per-capita income in the range of 300-400 UAH, which is slightly bellow MSL level. And about 10% of the households have per-capita income in the range 400-500 UAH, which is around MSL level.

Table VII-5 presents average per-capita income from different sources received by the two types of households. We may observe that from the families of the second type average per-capita income of the household remains below MSL with non-social security income despite the social assistance programs. We may also observe that households of the first type receive social security benefits, and the amount of some benefits comparable to the amount received by the families of the second type. The amounts of benefits and the proportion of the households receiving benefits are almost identical for both types of households if we consider such benefits as subsidies and discounts, and "other social benefits". This finding is consistent with observations of researchers who claimed huge leakages from Ukrainian social security programs (see 129).

Estimating costs of bringing household income above MSL

The World Bank study of poverty and social security programs in Ukraine in 2001 (see 129) showed that the amount of social expenditures in Ukraine in 1999 was sufficient to bring every person above the poverty line of 134.4 UAH. This was possible to achieve if social security system targeted all expenditures towards people living below the poverty line. Bellow we create similar model and we estimate if the same conclusion could be reached today.

In order to estimate the expenditures needed to bring every person above the poverty line, we set-up simple model in Stata. The model calculates per-capita social security income, per-capita non-social security income, and difference between MSL and per-capita non-social security income for every household in the UHES sample. Then it multiplies per-capita incomes by the total number of household members. And, finally, the model multiplies the household income numbers by the household weight in the survey. The weight is equal to the number of households represented by the particular observation in the survey, and is provided as a part of the UHES data.

Table VII-6 presents the results of estimation. According to the survey, the total amount of social benefits received by Ukrainian households a month during the first quarter of 2005 is about 1,022 mln. UAH. This estimate is larger then the total monthly SSN expenditures of Ukrainian budget (995 mln. UH). However, we do not have sufficient data to investigate the reason for the difference,

and will assume that the figure calculated from our data is accurate. Since further in the paper we are comparing this estimate with other estimates obtained using the same methodology on the same dataset, we assume that the mismatch between official SSN expenditures and the expenditures estimated by this simple model would not significantly influence policy conclusions of this research.

The monthly SSN expenditures needed to bring ever person above MSL level of 423 UAH are estimated to be almost four times higher than the actual monthly SSN expenditures in 2005 (estimated 3.9 bln. UAH a month compare to 1.02 bln. UAH a month actual expenditures). Therefore, we can conclude that no SSN can achieve the goal of bringing every person above the MSL level with the funds allocated in 2005 budget. This conclusion is different from the findings of the World Bank study referenced earlier, however it does necessarily contradicts the early findings. There are at least three possible explanations of the differences between the two results. First, the SSN funding in real terms in 2005 is lower than in 1999. Second, the distribution of income among poor is different, and larger SSN benefits required to bring the income to the target level. Finally, the poverty line is changed, and in larger in real terms in 2005 than in 1999.

According to the official statistics, the funding for the SSN (excluding pensions) in 1999 was 4.5 bln. UAH (or about 660 mln. UAH a month in 2005 prices). The amount of the SSN expenditures funded by the 2005 budget, corrected for inflation, are equivalent to the 6.7 bln. UAH in 1999 prices. Therefore, the decrease in funding is not an explanation for the observed difference in results. Since we do not have the detailed data for 1999, we can not compare the distribution of non-social security income in the country, and can not exclude it from the possible explanations of the difference in the two results.

However, the most important explanation seems to be the difference between the SSN targets in 199 and 2005. The study (see 129) claimed that Ukrainian budget had sufficient resources to put every person above poverty line, which was established at 134 UAH in the study. Taking inflation into account, this figure is equivalent of 236 UAH in 2005. The MSL in 1999 was set at the 90.7 UAH. Corrected for inflation, it is equivalent to 160 UAH in 2005. The estimation shows that the government would need about 12.8 bln. UAH in 2005 to bring income of every person to the level of 236 UAH if it had SSN with perfect targeting, and the actual SSN expenditures in this year were 12 bln. UAH. These results are much closer to the results of the 1999 study, however the World Bank report found that Ukrainian budget in 1999 had 7% more funds then needed to fund such ideal SSN, while our results for 2005 suggest that the budget allocated 7% less funds that are necessary to fund the ideal SSN that brings incomes above the MSL of 1999 in real terms. This difference in

estimates also suggests that total non-social security income of people with per-capita income bellow the equivalent of 1999 MSL decreased by 2005.

The distribution of social payments needed to bring income of every person above 423 UAH is skewed towards smaller benefits (see Figure VII-2). The relative number of social benefits above 220 UAH significantly decreases. Therefore, it is possible that in 2005 the Ukrainian government still had the budget to bring all families to the level just bellow the MSL level of 1999 in real terms.

In order to find the income level that government could guarantee within the budget in 2005, we set up a simple model in Excel. The model is based on the distribution of non-social security income among people with income below MSL. For a certain level of government income, the model calculates payments that individuals in each income group have to receive in order to reach the guaranteed income. For simplicity, the model assumes that all individuals have the same income, equal to the lower level of the income bracket. Then the model multiplies the payments by the number of individuals in each group. Since actual distribution of income inside the brackets is not concentrated at the lower end of the bracket, there should be individuals inside every bracket that require lower payments than calculated by the model. Therefore, this simple model overestimates total expenditures needed to bring income of all people within the bracket to the guaranteed income.

Table VII-7 presents the results of the modeling for guarantied incomes from 200 to 230 UAH. We can see that the model predicts that providing income guarantee of 230 UAH to every person was possible within the total social security budget in 2005.

There are other possibilities to distribute available funds. In order to demonstrate such possible allocations, we return to the model in Stata that we used at the begging of the chapter. Since this model has information about personal and family characteristics, we can find allocation rules that are based on these characteristics instead of income. For example, we estimate that if social benefits were directed to bring above the MSL per-capita income of families with children only, the government would require a monthly budget higher than available in 2005 (see Table VII-6). Finally, if the social payments were to be provided only to families with elderly members, the amount of required expenditures is compatible with the figures in the budget of 2005.

Conclusions

The micro-level analysis in this chapter extended macro-level analysis of the previous chapters by looking at the effects of better allocation of the currently available resource on number of people living in poverty. The models developed in this chapter estimated cost of ideal SSN with perfect targeting and benefits that are precisely equal to the amount needed to bring particular person above

poverty line. This cost is the minimum amount of government expenditures required to establish the system that guaranties every person in the country income above the target.

We showed that the funds in 2005 budget were not sufficient to design a social security program that would guarantee income at the minimal subsistence level of 423 UAH. This result is different from the results of similar estimate done by the World Bank for the 1999 budget (see 129). However, we showed that if the real values of minimal subsistence level or the poverty line remain at the level of 1999, then it is possible to design social assistance program that would guarantee either of these levels without significant change to the 2005 budget. Such ideal program would require abandoning all existing social security programs and creating a new program that targets available budget to the families with per-capita income below the minimal guarantee.

However, if the target of such program rises above the real level of MSL in 1999, such program will require increase in budget expenditures on SSN. In addition, if the minimal subsistence level continues to rise, and social security programs continue to guarantee income above MSL, it might lead to severe income distribution problems created by the social security system. The government with its current budget is not able to guarantee current MSL to all families with low income. Therefore, it is possible that the government would provide an income guarantee to a limited number of families, and would leave significant number of other very-low-income families without social support.

We also should note that minimal income guarantee programs discussed in this chapter assumed that the government of Ukraine is able to create effective means tested targeting. Therefore, the results of the analysis should be considered with precaution. We already mentioned earlier that even the most developed targeting programs in the world are not able to ensure hundred percent efficiency of the programs. In addition, recent studies of poverty and social security in Ukraine (see 132) suggest that the administrative capacities in Ukraine are not sufficient to establish successful means tested program yet.

Finally, we showed in previous chapters that a means tested social assistance program might create a behavioral response from people who are not covered by the program. These people might decrease their work income in order to receive social benefits. Since non-social security per-capita income of around 41% of Ukrainian households falls around the possible income guarantee targets of 200-400 UAH (see Figure VII-1), the behavioral response might be exhibited by a large number of families and significantly increase required SSN budgets. We will explore this problem in further chapters of this dissertation.

Tables and figures

PERSONAL CHARACTERISTICS

AGE	Age
SEX	Gender
FAM_ST	Marital status
FAM_REL	Relations with the head of the household
L_EDUC_M	Level of education
PTU	Do you have technical high school education?
FIELEDUC	Field of higher education
POSTGRAD	Years of education (total)
WORKER	Did you ever work?
YEARSWOR	Years worked
SES_MEM	Socio-economic status at the time of interview (employed, unemployed, student, pensioner, etc)
FORMBUSY	Type of employment at the main place of work
FORMPROP	Ownership of the main place of work
BRANCH	Field of functioning of the main place of work
INDWORK	Type of the self-employment
PENSION	Type of pension

PERSONAL INCOME VARIABLES

PPINC1	Personal Wage at the main place of work
PPINC2	Personal Co-payments, compensations, etc. at the main place of work
PPINC2_1	Personal Dividends at the main place of work
PPINC3	Personal In-kind payments at the main place of work
PPINC4	Personal Other wages in-kind or in cash form
PPINC4_1	Personal Dividends from other places
PPINC5	Personal Income from entrepreneurship
PPINC6	Personal Income from self-employment
PPINC7	Personal Wage at the temporary jobs
PPINC8	Personal Pension
PPINC8_1	Personal Pensions from non-state pension funds
PPINC9	Personal Stipends (scholarships, etc.)
PPINC10	Personal Unemployment benefits
PPINC11	Personal Payments related to loosing the job
PPINC12	Personal Other income
PPINC13	Personal Payments of wage arrears at the current job
PPINC14	Personal Payments of wage arrears at previous jobs
PPINC15	Personal Payments of pension arrears
PPINC16	Personal Payments of stipend arrears
PPINC17	Personal Payments of the arrears in social support
SPORT	Does do any sport at least once a week?
WEIGHT	Weight
HEIGHT	Height

CHARACTERISTICS OF THE HOUSEHOLD

	Type of the town (city, town, village)
	Region
HSIZE	Number of people in the household
TYPE_DOM	Type of the household with children
H_CH	Number of children in the household
CH0_2	Number of children less than 3 years old
CH3_6	Number of children 3-6 years old
CH7_13	Number of children 7-13 years old
CH14_15	Number of children 14-15 years old
CH16_17	Number of children 16-17 years old
H_CHDOR	Number of adults
H_ELDER	Number of people over the working age (women over 55, and men over 60)

H_DOR1	Type of the single-person households without children
H_DOR2	Type of households without children consisting of two or more person
H_WORK	Number of working people in the household
AGE_HEAD	Age of the head of household
SEX_HEAD	Gender of the head of household
L_EDUC	Education level of the head of household
SES_HEAD	Socio-economic status of the head of the household

CHARACTERISTICS OF THE HOUSEHOLD INCOME

INC1_1	Household Wage at the main job
INC1_2	Household Wage at the other jobs
INC1_3	Household Repay of wage arrears at the main job
INC1_4	Household Repay of wage arrears at previous jobs
INC2	Household Income from entrepreneurship and self-employment
INC3_1	Household Income from sale of self-grown vegetables
INC3_2	Household Income from sale of self-harvested food
INC3_3	Household Income from sale of self-grown birds
INC3_4	Household Income from sale of self-produced plotter
INC4	Household income from dividends on shares and interest on bank accounts
INC5	Household Income from renting owned real estate (except land)
INC5_1	Household Income from renting owned land
INC6	Household income from Pensions
INC6_1	Household income Re-payment of pension arrears
INC7	Household income from Stipends
INC7_1	Household income from Re-payment of stipend arrears
INC8	Household income from Unemployment support
INC9	Household income from Child support
INC10	Household Support to the family with low income
INC11	Household Other social support payments
INC11_1	Household Re-payment of the arrears on social support
INC12_1	Household Support from other family members
INC13	Household Alimonies received
INC14	Household Income from sale of personal belongings
INC15	Household Income from sale of real estate
INC16	Household Other cash income
INC17	Household Used savings
INC18	Household Return of debts
INKIND	Household Cost of self-grown food
CASHINC	Household Cash income
TOTALINC	Household Total income
TOTALRES	Household Total resources
CONSUM	Household Consumer expenditures in cash
CASHEXP	Household Cash expenditures
TOTALEXP	Household Total expenditures
RESURS	Household Total prevent resources of the household

SOME CHARACTERISTICS OF THE HOUSEHOLD WELLBEING

HOUSE	Household Type of housing
OWNHOUSE	Household Type of the housing ownership
STOTAL	Household Total footage of the housing
SLIV	Household Living footage of the housing
ROOMS	Household Number of rooms
TIMEHOUS	Date of construction of the housing
TIME_REP	Date of the latest rebuilding of the housing
HEATING	Presence of central heating
HEATIND	Presence of personal heating unit
RUNWATER	Presence of centralized water
SEVERAGE	Presence of sewage system

HOTWATER   Presence of centralized hot water
GASKOL   Presence of gas heater
GASCENTR   Presence of centralized gas service
GASBAL   Presence of gas in cans
ELEKTRPL   Presence of electric stove
BATH   Presence of bath
HTELEPH   Presence of phone
LANDPLOT   Have land plots
NUMLP   Number of land plots
USELP1   Type of use for the first land plot
SLP1   Footage of the first land plot
USELP2   Type of use for the second land plot
SLP2   Footage of the second land plot
USELP3   Type of use for the third land plot
SLP3   Footage of the third land plot
USELP4   Type of use for the fourth and other land plots
SLP4   Footage of the fourth and other land plots
POULTRY   Have cows, bees, etc.

Table VII-1. Variables surveyed by the UHES

		Income			Age		Family		
	Number of people	Wage income main place of work	Income from other places of work	Per-capita family income	Min	Max	Average size	Average num. of children	Average num. of elderly
Total Population	45,830,379	182.08	8.01	213.48	0	97	3.28	0.77	0.56
receiving:									
Wage and other payments at the main place of work	16,669,901	500.58	5.31	330.31	17	84	3.29	0.67	0.33
Payments at other places of work	1,820,718	110.75	201.69	223.07	16	81	3.18	0.75	0.36
Income from entrepreneurship	206,165	6.24	0.00	686.61	20	61	3.23	0.76	0.17
Income from self-employment	854,621	16.65	0.00	382.26	18	69	3.50	0.88	0.24
Stipends (scholarships, etc.)	826,825	17.63	5.22	268.45	16	29	3.40	0.73	0.23
Pension	13,124,616	50.51	3.33	98.10	16	97	2.50	0.26	1.31
Unemployment benefits	685,376	2.35	10.97	95.10	17	59	3.59	0.85	0.33
Payments related to loosing the job	21,824	60.94	23.48	94.90	25	81	2.59	0.47	0.86
Other income	68,618	144.52	1.12	151.27	20	94	2.52	0.30	0.83

Table VII-2. Characteristic of individual receiving income, by source

	Number of households	Average total household income				Max per-capita non-social security	Household		
		Main job	Pensions	Child support	Support to low income family		Size	Number of children	Number of elderly
Total households	17,539,345	475.77	237.01	6.64	2.00	6173.92	2.61	0.51	0.62
receiving:									
Household income from dividends on shares and interest on bank accounts	59,123	1008.68	288.89	23.15	0.00	6173.92	2.87	0.54	0.58
Household Income from renting owned real estate (except land)	41,323	404.97	266.49	0.20	0.00	1127.78	2.09	0.39	0.81
Household Income from renting owned land	143,587	256.21	226.78	1.28	3.47	893.33	2.55	0.43	0.67
Household income from Child support payments	1,189,546	548.69	103.63	97.97	16.94	1546.67	4.04	1.47	0.22
Support to the family with low income	205,665	167.44	107.75	54.64	170.66	371.11	4.25	1.98	0.17
Other social support payments	794,325	399.69	323.09	11.47	2.39	1800.00	2.77	0.54	0.71
Alimonies	308,988	535.33	137.26	10.08	1.36	1791.67	3.30	1.32	0.31
Subsidies and discounts received by the family	6,552,004	343.74	386.71	3.32	1.45	2917.45	2.35	0.32	1.02

Table VII-3. Characteristics of households receiving income, by source

Income sources of individual	Income sources of households
Wage and other payments at the main place of work (PI_1)	Household income from dividends on shares and interest on bank accounts (HHI_10)
Payments at other places of work (PI_2)	Household Income from renting owned real estate (except land) (HHI_11)
Income from entrepreneurship (PI_3)	Household Income from renting owned land (HHI_12)
Income from self-employment (PI_4)	Household income from Child support (HHI_13)
Stipends (scholarships, etc.) (PI_5)	Household Support to the family with low income (HHI_14)
Pension (PI_6)	Household Other social support payments (HHI_15)
Unemployment benefits (PI_7)	Household Alimonies received (HHI_16)
Payments related to loosing the job (PI_8)	Total amount of subsidies and discounts received by the family (HHI_17)
Other income (PI_9)	

Table VII-4. Sources of income identified in UHES data

	Households with per-capita income over 423 UAH		Households with per-capita income less than 423 UAH	
	Average monthly income (among all households)	% families receiving income from this source	Average monthly income (among all households)	% families receiving income from this source
Total per-capita income of a family	900.78		326.25	
including:				
Wage and other payments at the main place of work	457.65	77.6%	98.53	46.5%
Payments at other places of work	15.94	8.7%	8.65	9.7%
Income from entrepreneurship	57.94	2.4%	-	0.0%
Income from self-employment	119.81	8.6%	1.47	0.6%
Stipends (scholarships, etc.)	12.84	6.6%	3.64	2.6%
Pension	168.54	49.3%	185.35	59.2%
Unemployment benefits	1.27	1.2%	5.76	5.6%
Payments related to loosing the job	0.71	0.1%	0.20	0.1%
Other income	3.87	0.6%	0.84	0.2%
Household income from dividends on shares and interest on bank accounts	17.60	0.7%	0.01	0.0%
Household Income from renting owned real estate (except land)	11.39	0.5%	-	0.0%
Household Income from renting owned land	16.30	1.5%	0.42	0.3%
Household income from Child support payments	1.25	3.4%	3.76	9.6%
Support to the family with low income	0.03	0.0%	1.30	2.1%
Other social support payments	2.76	3.7%	3.01	5.2%
Alimonies	1.47	1.7%	1.13	1.8%
Subsidies and discounts received by the family	11.40	38.2%	12.18	36.7%
# of households	7,956,969		9,582,376	

Table VII-5. Average per-capita income of households from different sources
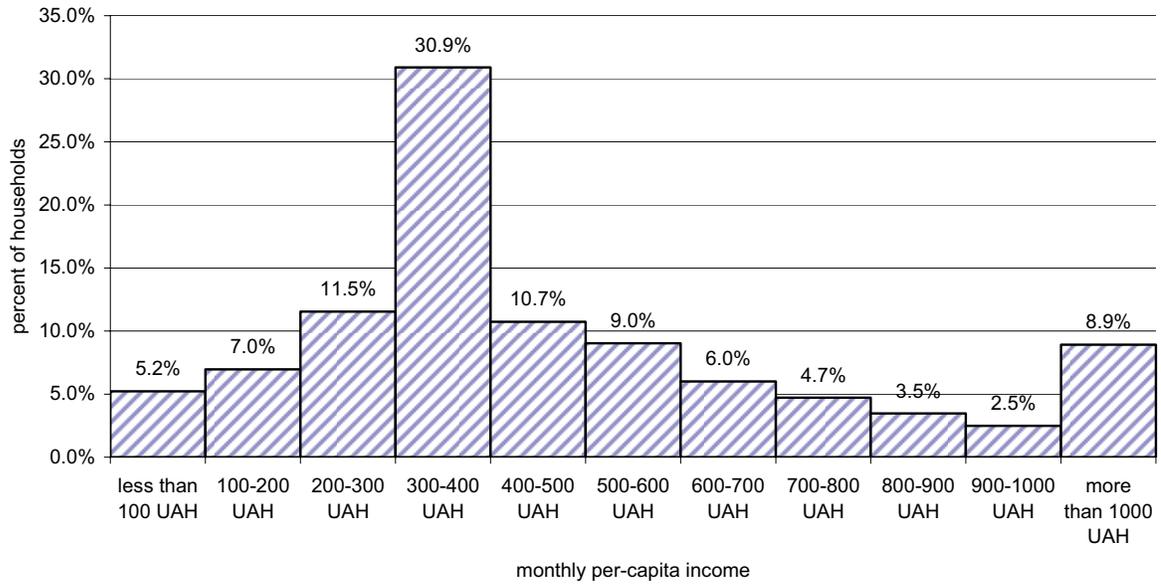
Figure VII-1. Distribution of non-social security income among households in Ukraine
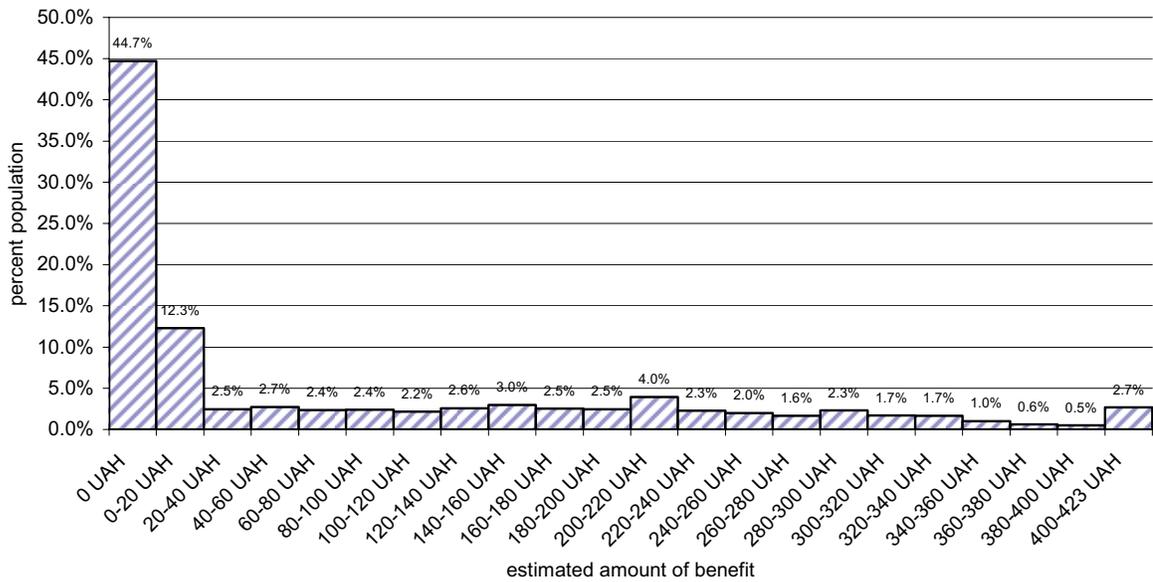
Figure VII-2. Distribution of social payments needed to bring income of families above MSL

Category	Total monthly expenditures, UAH
Current SSN expenditures	1,022,213,788
Expenditures to bring everybody to the MSL	3,900,175,559
Expenditures to bring every family with children to MSL	3,041,395,058
Expenditures to bring every family with elderly to MSL	1,054,322,205

Table VII-6. Estimated total monthly SSN expenditures to bring needy families to MSL level

Non-social security income, UAH	Number of people	Total expenditures given per-capita income guarantee, UAH				Income after max social benefit, UAH
		200	210	220	230	
403 - 423	5,645,987	-	-	-	-	403
383 - 403	1,128,346	-	-	-	-	383
363 - 383	1,238,229	-	-	-	-	363
343 - 363	1,083,990	-	-	-	-	343
323 - 343	1,086,967	-	-	-	-	323
303 - 323	986,970	-	-	-	-	303
283 - 303	1,173,611	-	-	-	-	283
263 - 283	1,353,349	-	-	-	-	263
243 - 263	1,168,199	-	-	-	-	243
223 - 243	1,124,219	-	-	-	7,869,533	230
203 - 223	1,814,456	-	12,701,192	30,845,752	48,990,312	230
183 - 203	1,045,854	17,779,518	28,238,058	38,696,598	49,155,138	230
163 - 183	916,706	33,918,122	43,085,182	52,252,242	61,419,302	230
143 - 163	755,257	43,049,649	50,602,219	58,154,789	65,707,359	230
123 - 143	1,053,980	81,156,460	91,696,260	102,236,060	112,775,860	230
103 - 123	781,626	75,817,722	83,633,982	91,450,242	99,266,502	230
83 - 103	762,446	89,206,182	96,830,642	104,455,102	112,079,562	230
63 - 83	468,616	64,200,392	68,886,552	73,572,712	78,258,872	230
43 - 63	287,624	45,156,968	48,033,208	50,909,448	53,785,688	230
23 - 43	234,860	41,570,220	43,918,820	46,267,420	48,616,020	230
0 - 23	1,225,855	245,171,000	257,429,550	269,688,100	281,946,650	230
Total expenditures		737,026,233	825,055,665	918,528,465	1,019,870,798	
Funding left		285,187,555	197,158,123	103,685,323	2,342,990	

Table VII-7. Simple model of expenditures for different levels of social guarantee

Chapter VIII: Microsimulation model of the social safety net

In previous chapters we established the microeconomic model of labor supply based on behavior of an individual. We also showed that individual behavior may be aggregated (for example, into a labor supply curve), and used for modeling the social safety net in a country. However, the aggregated model is usually limited in the range of conditions for which it may be used. If we would like to forecast expenditures of a social safety net for a variety of social programs that are targeted to different population groups, we ideally would like to model the behavior of every individual in the group of interest. Recent progress in computers made possible modeling individual characteristics of a large number of subjects, giving birth to microsimulation forecasting. Developed countries have created a number of microsimulation models that allow forecasting different parameters of the social safety net.

In this chapter we discuss socio-economic microsimulation models used to forecast expenditures of social safety nets in the world. Then we describe approaches to create a microsimulation model for Ukraine, and lay out equations for the simple static microsimulation model of SSN expenditures in the country. We estimate parameters of this model, and use the microsimulation model to extend the macro-level model developed in the previous chapter. Finally, we explore the results of our model under different assumptions about the elasticity of the effect within a range of possible values and scenarios.

Socio-economic microsimulation models

Socio-economic microsimulation models are models that simulate actions of large number of individual economic units (individual, firm, or household), and then aggregate them to generate macroeconomic outcomes. The idea to use microsimulation techniques to evaluate socio-economic problems was expressed at the end of 1950s by Guy Orcutt (see 95). However, the lack of computing power made such simulations very expensive until recent progress in computers allowed running simulations for thousands of units on relatively inexpensive servers or even personal computers. Governments of most industrialized countries are using microsimulation models now to evaluate the impact of different economic policies.

Microsimulation models may be either static or dynamic. Static models forecast the state of the units (usually, representative set of individuals or households) under the new policy, assuming that there is instant response of the units to the change in policy. These models were widely used over the last two decades to evaluate different changes in eligibility rules or to show gains or losses resulting from policy changes. Establishing a static model requires a cross-section of units

(individuals, households) at given period of time, and estimation of rules that determine the state of the units in this period of time.

Dynamic models are based on the rules for transitions of the units between states, and allow modeling progress of the units over time and change of trends that accrue due to the new policy. Dynamic models usually progress units over time starting at one point, and use probabilities of different transitions to determine the next state of the unit; the same unit may pass through a different sequence of states in different runs of simulation. Dynamic microsimulation models are usually used to project composition of the population in the future, and to evaluate how different economic policies impact this composition. Creating a dynamic model usually requires sophisticated longitudinal data that allows observing units progress over time, and constructing transition rules.

International experience

According to the international microsimulation association, there are at least 22 population –based microsimulation models used in the world (see 61). The best-known socio-economic microsimulation models used for analysis of social transfer systems are EUROMOD (developed for European Union), CORSIM and TRIM (developed for the United States), STINMOD (developed for Australia), DYNACAN (developed for Canada), and PENSIM (developed for Britain). Below we provide a short description of each model.

EUROMOD is a static microsimulation model, developed for the European Commission by the Microsimulation Unit at the University of Essex, UK. The model provided estimates of the impact of changes in social security and tax policy on 15 pre-enlargement countries of the European Union. The aim of the model is to explore the impact of prospective policy changes on poverty, income distribution, assessment of the cost of reforms, financing mechanisms, and the incentives provided by new policies at the individual and household levels (see 116). The model is based on household-level data, and provides estimates for household income based on the earned incomes reported in the survey, and taxes and social transfers simulated by the model. EUROMOD is available for public use, and is widely used by European researchers to evaluate proposed policy changes at the national or EU level (see 63, for example). Together with the EUROMOD, the microsimulation unit at Essex hosts POLIMOD, a similar static microsimulation model for Britain that was originally developed at the University of Cambridge.

TRIM is static tax-benefits microsimulation model developed by the Urban Institute in order to simulate results of major tax, social transfer, and healthcare policies in the United States. The model is based on the data of the annual Current Population Survey, and works in the following way:

according to the rules of the social program that is tested the model determines eligibility of a unit (either a person or household); then it calculates the amount of benefit provided to the unit according to the transfer program. Finally, it randomly selects eligible units to participate in the program (if selection is necessary), and calculates aggregated characteristics of the program[5]. TRIM is used to extend and evaluate accuracy of the Current Population Survey with respect to social transfer programs. It is also used to evaluate costs and participation in social transfer programs that use different rules.

 CORSIM is dynamic microsimulation model developed at Cornell University that was transferred to the U.S. government (POLISIM), and adopted for Canada (DYNACAN), Sweden, and China[6]. The model is based on longitudinal data, and provides longitudinal (long-term) estimates. A representative sample of individuals is evaluated by the model over time. At each step the model estimates probabilities for every individual to change the state (make a decision or transition), and changes the state of the individual according to the probabilities. The model is useful to analyze life-time evolution of individuals or households and the impacts of government policies on the life cycle of people at both individual and aggregated levels. The model has dedicated Social Security, Pension, Earnings and Employment modules. The modules simulate individual work history, social security contributions, eligibility for social security programs, amount of benefits and utilization of the programs by every individual (see 125). The model allows estimating the cost and participation rates for each social safety net program.

STINMOD is a static microsimulation model developed in Australia by the National Center for Social and Economic Modeling. The model is based on information collected by the Australian Income Survey and the Australian Household expenditure Survey. It has modules that describe all existing social security programs in Australia, and provides the possibility to assess the impact of the programs on an individual, family, or household level. The social security section of the model operates similar to the TRIM model, assessing eligibility, determining size of benefits, and simulating participation in the social programs (see 76).

All the above-mentioned simulation models depend on the quality of the sources of statistical data at the individual level. Currently, although computing power does not limit development of microsimulation models, there are limits based on the availability of data, especially longitudinal data for the dynamic models. In order to develop a similar microsimulation model for Ukraine, we would need to have adequate individual or household level information in the country.

---

[5] From TRIM3 project website, trim3.urban.org, downloaded on Aug 19, 2006 See website for further details (http://trim.urban.org/documentation/Steps%20in%20Simulating%20Tax%20and%20Transfer%20Programs.html#Computing%20the%20Benefit%20or%20Tax)

[6] See CORSIM web-site http://www.strategicforecasting.com/corsim/index.html

Does the data allow building a microsimulation model for Ukraine?

During recent years Ukraine has developed several sources of reliable micro-level data that potentially may be used for microsimulation modeling. In the previous chapter we discussed the following possible sources of data for microeconomic analysis and modeling of SSN in Ukraine: Labor Force Survey, Ukrainian Longitudinal Monitoring Survey, and Ukrainian Household Expenditures Survey.

We established that the Labor Force Survey cannot be used for microsimulation of social transfer programs because it does not provide information for non-working individuals. The Ukrainian Longitudinal Monitoring Survey (ULMS) by design is a good source of data for creating a dynamic microsimulation model of Ukrainian SSN. However, this data was not available for this study.

Finally, the Ukrainian Household Expenditures Survey (UHES) provides information about employment status, income, unemployment and other benefits collected by an individual and household. Short panel of the data it difficult to use the UHES for a dynamic microsimulation model. At the same time, the data has detailed information on income from current welfare programs; the data is suitable for a static microsimulation model.

In order to use the UHES data for the microsimulation model, we will have to take into account the unique features of the survey that we established in a previous chapter. First, the data do not provide monthly income information. Instead, they provide quarterly income. When monthly income is needed for microsimulation, we have to use simple estimate of the monthly income equal to the quarterly income divided by three.

Second, the data underestimate values of the variables compare to official statistics. The UHES data estimates the population of Ukraine of about 45.8 million people, while official statistics indicate that population of Ukraine was about 46.9 million in 2005. According to the official data the average per-capita non-social security income in Ukraine was 396 UAH, while the UHES data estimates it at the level of 213 UAH. In order to make the microsimulation results comparable with the results of the models established in previous chapters, we will have to correct these differences.

Model set-up

We showed that Ukraine has the necessary data to create a microsimulation model for the social safety net. The data provide information about thirteen sources of personal and family income and about a large number of assets possessed by households. A full-size model based on these data will require estimating effects of changes in all these variables, and will consist of large number of equations. Designing a full-scale microsimulation model requires efforts extending beyond the

scope of this work. However, most of these variables are not effected by the policy options that are discussed in this dissertation. It allows us to build a simpler model with a smaller number of equations. In order to build such model, we have to make a number of assumptions about the behavior of different variables in the model. Below we discuss the requirements of and outline assumptions for the model, and provide estimates for the simulation equations.

Assumptions and requirements

First requirement is that the outcomes for the microsimulation model are compatible to with the outputs of the macro-level model. We assume that for each individual, the value of income from each specific source is underestimated by the same percentage. We corrected the values of income variables by multiplying them by the scale factor in order to match the official statistics. The scale factor is equal to the proportion of total value of income from a source estimated by UHES data to the value of total income from this source according to official statistics.

Second requirement is to determine a minimal scope of the microsimulation model that would allow forecasting variables necessary for decision-making based on the feasibility of the social transfer policies. We already explained in previous chapters that the main outputs of interest for our analysis are: total monthly per-capita income, ratio of the total per-capita income to the minimal subsistence level, the share of non-social security income in the total per-capita income, and social security expenditures as a percent of GDP. The microsimulation model has to be able to measure these outputs under different benefit levels of the current social safety net, and provide information about the number of recipients and costs of alternative social transfer programs. In previous chapters of this dissertation, we described the seven social transfers identified in the UHES data: unemployment benefits, pension, support for families with children, support to the family with low income, other social support payments, subsidies and discounts. The simulation model should be able to calculate costs and participation of every individual in the set. It also presents an opportunity to add another social transfer into consideration, providing expenditures and participation estimates for this new program.

In order to simplify the model, we divide social assistance programs in Ukraine in two broad groups. We assume that the first group of programs is unconditional on employment status and almost unconditional on family income. Current SSN provides these expenditures on the bases of age, participation in one of the privileged groups, and other social characteristics of person or household. This group contains pensions, subsidies and discounts, and other social payments[7]. We

---

[7] We also include income from the second job as an income from the first group. We assume that the income from a second job is supplementary income that does not depend in size on income from main job or other income. We also assume that hours worked on the second job do not count in the decision to work at the main job.

assume that the income source in the second group either require the person to be unemployed or conditions benefits on the total family income. This group includes unemployment benefits, support for families with children program, and support to low income families program. For the purpose of this analysis we assume that the social programs of the first group are assigned to people for a lifetime as observed in current data and these programs can only change the amount of benefits. We assume that an individual may make a decision to work or to apply for social security programs of the second group if he/she qualifies otherwise.

Finally, we assume that only individuals of working age (16-70 years old) make the employment decisions. If the data indicates that individuals of other ages have income from any source, this income is included in the total family income, but the individual does not make any active decisions about changing sources of income.

Model outline

The microsimulation model relies on the following theoretical model: We assume that there are N_i individuals in the economy, living in N_h households. Every individual maximizes utility function $U(c,l,d)$, where c is consumption of goods, l is leisure time and d is personal dislike or cost of using social security programs, subject to the budget constraints: $l=24-t$, where $t = 8$ if an individual works, and 0 otherwise[8]; and $c= i_{hi}$, where, i_{hi} individual share of household income; finally, $i_{hi} = \{\sum(w_it_i +b_i)+b_h\}/n_h$, where w_it_i is individual members of household income from work, b_i is social transfers received by the individuals and b_h are the social transfers received by household, n_h is number of people in the household. Each individual maximizes his/her utility by choosing the time to work, given expectation that other members of the family will not change their behavior.

For the simulation we assume that an individual will be observed to work if his/her utility from working given family per-capita income when he/she is working is higher than the utility when he/she is not working, given expected family per-capita income in this case. The family income consists of the non-work income of the family members, work income of all family members, and the social security income received by the members and the family. We will observe family income from specific social transfer programs only if family or family members qualify for the programs, and the dislike or cost of participation is lower than the benefit received from the program.

Since we do not observe the utility function of every individual, we can not determine discrete decision rule for every individual in our model. Instead, we assume that there is probability of working associated with every individual in our model. This probability is conditional on

---

[8] The assumption about discrete amount of work (the individual can either work 8 hours or do not work at all) was made because the data we used does not identify actual hours worked by an individual. Given the demand-driven labor market in Ukraine, it is safe to assume that a person either works maximum required hours, or does not work at all.

opportunities to receive social security benefits and the expected amount of income from other sources. The model assumes that the individual is working, if his/her estimated probability to work is higher than a random number drawn from uniform distribution. We assume that he/she collects all available social benefits otherwise.

The microsimulation model is based on the observation for all individuals and households in the UHES sample for the first quarter 2005. The algorithm for the microsimulation model is the following:

First, we make assumptions about rates of social security and wage income growth. These assumptions are the basic policy tools in our model.

Second, for individuals 16-70 years old we estimate wage and social security benefits based on the rate of growth and the equations for expected wage, support for families with children, support to low income families, and unemployment benefits.

Third, we evaluate the probability to choose work or unemployment for every individual based on the estimated per-capita income in case of working and not working. Then we randomly draw a number from zero to one from uniform distribution. If the estimated probability of work is higher than the random number, we assume that this person choose to work, and assume that he/she becomes unemployed otherwise.

Finally, for every family we evaluate if the family qualifies for child support or low income family benefits given the decision made by the members of household, and calculate family income from different sources. Then we multiply the income of the families on the weight of the family in the sample to estimate total population income from different sources, and calculate annual social security expenditures.

Parameters of equations

In order to construct the model we use the UHES data to estimate the parameters of the equations that estimate income from wage, social insurance, and the probability to work (choice of employment) equation as a function of the observable personal characteristics in the survey.

In order to estimate the probability to work (choice of employment) equation, we have to know expected wage and expected amount of benefits (or expected per-capita household income when non-working) for each individual in our dataset. However, the wage income is not observable for individuals who do not work, and the social-security income is not observable for people who qualify but do not use social security. Therefore, first we have to estimate expected values of income from different sources for all individuals, and then estimate a probability of employment

equation based on the estimated values of wage income and per-capita income in case of employment and unemployment.

Wage equation

We follow classical theory forecasting individual wage income. We assume that wage income is observed only for individuals self-selected to work. Following the Heckman procedure, we first estimate the selection equation $P(w>w^*) = f(household\ size,\ \#children,\ sex,\ age,\ education,\ per$-$capita\ family\ income\ without\ the\ wage\ income)$, and then estimate the wage determining equation as function of $ln(W)=\theta(age,\ age^2,\ education,\ tenure,\ location\ dummies,\ \lambda)$. The estimation is done on the sample limited to the people of working age, from 16 to 70 years old. The results of regressions is presented in Table VIII-3. Coefficients of the participation equation are consistent in size and significance with the employment choice equations estimated on the data for 1999-2002 by the World Bank researchers (see 132). The wage of a person is significantly determined by age, gender, and education of the person. However, only two professions - law and technology - are found to be significant determinants of the additional increase in wage on the Ukrainian market.

Unemployment benefits

The amount of the unemployment benefits in Ukraine depends on the history of employment and wage, which is not observable with the data we have. Therefore, we have to estimate the amount of the benefit based on individual characteristics of a person. Since the benefit depends on the wage of the person, we can assume that the amount of the benefit is determined by the same factors at wage. With unemployment benefits we also experience the problem of self-selection similar to the problem for wage. We observe unemployment benefits only for those unemployed who choose to apply for the benefits. In our model (above) we assumed that there is an unobservable social cost associated with receiving benefits, and we observe the unemployment benefit only for people whose unemployment benefit is higher than the social cost of applying for the benefit. Similar to the wage equation, we may use the Heckman procedure to estimate the unemployment benefits: first estimate selection equation $P(un>d^*) = f(household\ size,\ \#children,\ sex,\ age,\ education,\ per$-$capita\ family\ income\ without\ the\ unemployment\ benefit)$, and then estimate the amount of benefit $ln(un)=\theta(age,\ age^2,\ education,\ tenure,\ location\ dummies,\ \lambda)$.

Specification of the unemployment benefits equation is the same as specifications for the wage equation. We run the equation for all people 16 to 70 years old who do not receive income from a main job, pension or stipend. Part of these people received unemployment benefits; most of them do not receive the benefits. Table VIII-4 presents the estimation results. Surprisingly, we found that the determinants of choice to work are also significant determinants of choice to receive unemployment

benefits. However, the factors that determine wage on the job market are not strong determinants of size of unemployment benefits. However, the literature does not present better estimates for individual unemployment benefits, and we will use this equation for our modeling purposes.

Size of the support for families with children benefit

Ukrainian law stipulates that qualifying low income families, single mothers, and other categories of caregivers may apply for financial support for caring for a child. These families can receive a benefit in the amount equal to the difference between 50% of the minimal subsistence level for a child and average per-capita income in the family. The minimal benefit is 10% of the minimal subsistence level. However, when the expected benefit is calculated using this formula, it does not match the amounts of benefits observed in the data. Assuming that people base their expectations about the benefits from the program on the experiences of people around rather than the law, we consider that the expected amounts of benefit are better predicted from actual observations than by law.

We assume that qualified are all families who have at least one child and per-capita income without the child support benefit below 362 UAH, which was the smallest minimal subsistence level for children in 2005, and all actual beneficiaries fit into this category. In order to predict expected benefits, we also use the Heckman procedure because not all qualified families are receiving the benefit. The selection equation has a form similar to unemployment benefits: $P(cb>d^*) = f(household\ size,\ \#children,\ gender\ of\ the\ head\ of\ household,\ per\text{-}capita\ family\ income\ without\ the\ child\ support\ benefit,\ amount\ of\ pension\ and\ unemployment\ benefits\ received)$. Most of the repressors are eligibility criteria for the child support benefit. However, we also assume that a female heads of the household may have a different social cost of applying for the benefit, and the families that already receive some pensions or unemployment benefits have significantly lower social cost to apply for other social benefits.

The amount of the support for families with children is differentiated depending on the age of the child, and therefore the main repressors in the equation determining the size of the benefit are numbers of children of different ages. By law the benefit is higher for families that do not receive alimonies, and therefore we include the total amount of the alimonies in the regression. In other specifications we also included our estimate of the per-capita size of the benefit with the difference between 50% of the minimal subsistence level for a child (assumed to be 181 UAH) and average per-capita income in the family. However, this estimate of the benefits was a statistically insignificant determinant of the amount of benefit, and we do not include it in our final specification.

The results of the estimation are presented in Table VIII-5. Number of children, family per-capita income without the benefit, income from other social programs, and gender of the head of the household are significant determinants of applying for child support benefits. At the same time, the amount of received alimonies is not a significant determinant of the application. We also found that people in different parts of the country do not behave significantly different with respect to this benefit, end even location in town or rural area do not significantly impact the decision.

Confirming our initial observation, the law-based estimate of the amount of the child support benefit is an insignificant determinant of the amount of the received benefit. The only significant determinant of the size of the benefit is number of children of different ages.

Support to low income families

Support to low income families in Ukraine is a new program that provides benefits to families with per-capita income lower than the minimal subsistence level determined by law. The amount of the benefit is the difference between the minimal subsistence level and per-capita family income; however the maximum amount of the benefit is subject to funds availability. The maximum amount of benefit is determined by budget law, and in first quarter 2005 it was between 80 and 130 UAH. However, when the benefit is calculated according to the law, the amounts do not match the actual amounts of support to low income families income reported in UHES data. Following the same logic as for the support to families with children benefits, we would like to estimate the expected amount of the benefit.

Estimation is done for the group of eligible families with per-capita income without the benefit under 423 UAH. The selection equation has form: *P(lib>d*) = f(household size, # elderly, gender of the head of household, per-capita family income without support to low income families benefit, amount of pension and unemployment benefits received).* The equation for the amount of benefit includes the number of children and the number of elderly and the expected benefit, calculated on the basis of the law. We also include geographical dummies because part of the variation in actual level of the benefit may come from arrears in payments run by regional offices. The results of the estimation are presented in Table VIII-6.

Estimating choice between employment and benefits

In order to estimate how the expected amount of social benefits and wage income affect personal employment choice, we first estimated the expected amount of benefits and expected wage for every person age 16-70 based on the equations estimated above. The family per-capita income in case a person is not working includes the expected unemployment benefits of this person; it includes expected support to families with children benefit if the family qualified to benefit without

the wage income of this particular person; and it includes expected support to low income families benefit if the family qualified for the benefit without the wage income of this person. The expected per-capita family benefit in case the person works excluded the unemployment benefit of this person, and excluded support to low income families or support to families with children benefit if the family did not qualify for the benefit given the expected wage income of this person.

We estimate the choice between employment and benefits as a simple Probit regression. The probability of work depends on the expected per-capita family income in case the person works and expected per-capita income if the person does not work. The equation also including the personal characteristics found significant determinants of the choice to work in our previous regression.

The results of the regression are presented in Table VIII-7. We can see that the expected per-capita income in two cases is a significant determinant of choice to work. The coefficients for expected per-capita income in case of working and non-working have the expected signs: the higher the expected per-capita income in case of working leads to higher probability of working, and the higher expected income incase of non-working leads to the higher probability of leaving work.

The microsimulation model

Based on the estimated equations and the algorithm discussed above, we program the microsimulation model in Stata. The model at the individual level is presented by the following set of equations:

$$PI\_1 = PI\_1 * W\_RATE \tag{1}$$
$$PI\_2 = PI\_2 * W\_RATE \tag{2}$$
$$PI\_3 = PI\_3 * W\_RATE \tag{3}$$
$$PI\_4 = PI\_4 * W\_RATE \tag{4}$$
$$PI\_5 = PI\_5 * W\_RATE \tag{5}$$
$$PI\_6 = PI\_6 * I\_RATE \tag{6}$$
$$PI\_7 = PI\_7 * I\_RATE \tag{7}$$
$$PI\_8 = PI\_8 * W\_RATE \tag{8}$$
$$PI\_9 = PI\_9 * W\_RATE \tag{9}$$
$$HHI\_10 = HHI\_10 * W\_RATE \tag{10}$$
$$HHI\_11 = HHI\_11 * W\_RATE \tag{11}$$
$$HHI\_12 = HHI\_12 * W\_RATE \tag{12}$$
$$HHI\_13 = HHI\_13 * I\_RATE \tag{13}$$
$$HHI\_14 = HHI\_14 * I\_RATE \tag{14}$$
$$HHI\_15 = HHI\_15 * I\_RATE \tag{15}$$
$$HHI\_16 = HHI\_16 * W\_RATE \tag{16}$$
$$HHI\_17 = HHI\_17 * I\_RATE \tag{17}$$
IF H_CH>0   (18)
$$E\_HHI\_13 = I\_RATE * f\,(CH0\_2, CH3\_6, CH7\_13, CH14\_15, HHI\_16, REGION) \tag{19}$$
$$THI\_14 = (TOT\_HHI - HHI\_14 - HHI\_13 - HHI\_15)/HSIZE \tag{20}$$
IF THI_14 < MIN_14:   (21)
$$B\_14 = H\_ELDER * MIN(130 * I\_RATE, \ MIN\_14 - THI\_14) + H\_CH * MIN(100 * I\_RATE, \ MIN\_14 - THI\_14) + (HSIZE - H\_ELDER - H\_CH) * MIN(80 * I\_RATE, MIN\_14 - THI\_14) \tag{22}$$

114

E_HHI_14 = f(BEN_14, HSIZE, H_CH, LOCATION, REGION)   (23)

E_PI_1 = W_RATE * f(AGE, AGE2, SEX, YEARSWOR, LOCATION, REGION, EDUCATION) if 16-70 y. old   (24)

E_PI_7 = W_RATE * f(AGE, SEX, YEARSWOR, LOCATION, REGION, EDUCATION) if 16-70 y. old   (25)

Q_B13 = 1 IF H_CH >0 & (TOT_HHI-HHI_13-PI_1)/HSIZE<MIN_13   (26)
Q_B14 = 1 IF (TOT_HHI-HHI_14-PI_1)/HSIZE<MIN_14   (27)
E_TI_WORK = (TOT_HHI-PI_1-PI_7+E_PI_1)/HSIZE   (28)

E_TI_BEN = (TOT_HHI-PI_1-PI_7 - HHI_13 - HHI_14 +E_PI_7 + Q_B13*E_HHI_13+ Q_B14*E_HHI_14)/HSIZE   (29)

P_EMPL = 1-NORM(-f(E_TI_WORK,E_TI_BEN,AGE,AGE2, SEX, DIVORCED, HSIZE, H_CH, H_ELDER, EDUCATION, LOCATION, REGION))   (30)

IF P_EMPL < UNIFORM() THEN PI_1=E_PI_1, PI_7=0, HHI_13=0, HHI_14 =0, ELSE PI_1=0, PI_7=E_PI_7, HHI_13=E_ HHI_13, HHI_14 = E_HHI_14   (31)

where:

I_RATE is rate of change of social benefits. It is the main policy variable in our model.

W_RATE is rate of growth of wage income

PI_1 … PI_9 is personal income from different sources, defined in Table VII-4

HHI_10 … HHI_17 is household income from different sources, defined in Table VII-4

TOT_HHI is total household income

THI_14 is household per-capita income without social benefits, used to determine eligibility for support to low-income family benefits

E_HHI_13, E_HHI_14, E_PI_1, and E_PI_7 are estimated expected incomes from sources HHI_13, HHI_14, PI_1, and PI_7

All other variables are characteristics of individuals and households defined in the UHES data, see Table VII-1

Equation 20 is equation for the support to families with children benefits, with the coefficients represented in Table VIII-5

Equation 23 is equation for the support to low income family benefits, with the coefficients represented in Table VIII-6

Equation 24 is equation for the wage income, with the coefficients represented in Table VIII-3

115

Equation 25 is equation for income from unemployment benefits, with the coefficients represented in Table VIII-4

Equation 30 is equation for the probability to be employed, with the coefficients represented in Table VIII-7

After running the individual level model in Stata for every individual in the UHES sample, we sum all incomes at the family level. Then families' incomes from different sources are multiplied by the UHES survey weight for that family. The weight is equal to the number of families which are represented by the individual observation in the survey. Finally, for every source of income we sum the weighted outcomes in order to calculate the total income received by Ukrainian households from different sources. Then these results are transferred in to Excel, where final macro-level outcomes such as total social expenditures as percent of GDP, total income, etc. are calculated using simple accounting relations between the results and the outputs of the individual level Stata model.

Exploratory analysis

Below we conduct an exploratory analysis to learn the properties of the model and to compare the forecasts derived from the model with the forecasts described in previous chapters. First, we establish the quality of forecasts provided by the model by testing properties of the model and dependence of these properties on the parameters of the model equations. Then we run the model for the number of scenarios established in previous chapters and explore the differences in policy conclusion derived from the microsimulation model and models in previous chapters.

Reaction to changes in the estimated model parameters

First, we acknowledge that decisions in our microsimulation model are pseudo-random, and, therefore, the states of the model determined at different runs of the model may be different. In order to test how forecasts derived from the model differ between runs of the model, we conduct an experiment. The model is run 10 times under the same policy scenario, so the difference in the results of the runs is only due to the random decisions with regard to work. For this experiment we choose the policy scenario 2 established for the 'naïve' model: the government increases social security benefits 28% in 2006 and 2007, and keeps amount of terms constant in real terms for years after that.

Results of the experiment are presented in Table VIII-8. The difference in values for all variables forecast by the model do not exceed 3.6% of value, and for most indicators the difference is below 2%. The difference in results of the runs increases by the end of simulation period, when the difference between estimated benefits and wage income becomes greater. We may consider the

difference between runs insignificant, because this difference would have negligible effect on policy choice compared to the uncertainty of the macroeconomic assumptions put at the bases of the forecast.

Second, we acknowledge that estimated parameters of the model do not necessarily precisely match the "true" value of the parameters. With large probability "true" parameters of the model lay in the confidence interval of our predicted parameters. We conducted an experiment to see what influence changes in the main parameters - marginal effects of expected per-capita incomes - had on the output of the model. For the experiment we ran our model 10 times, increasing values of the coefficients before E_TI_WORK and E_TI_BEN variables in the probability of working equation 10% of value to cover whole confidence interval.

Results of the experiment are reported in Table VIII-9. Variations in the forecasts range from 10% of the share of non-social security benefits in total income to 72% for the additional deficit as the share of GDP. However, all forecasts of the experiment consistently lay above the forecasts of the 'naïve' model (see Figure VIII-1). Therefore, independent of the parameters of the probability to work equation, costs of the social security system would be higher in the microsimulation model and might lead to different decision than the results of the 'naïve' model.

Results for different policies

Similar to previous chapters, we ran the microsimulation model for a number of scenarios that depict different policy options. Inflation and GDP growth are considered to be independent of the social security expenditures and have the same values except in scenario 6. First six scenarios are the same as the scenarios for the 'naïve' model (see Table VIII-10):

Scenario 1: Assumes that after 2006 the government policy is maintaining the real level of social welfare benefits on the level they reached in 2006.

Scenario 2: Assumes that the policy of 28% nominal increase in social benefits continues in 2007, and only after that the government adopts policy to maintain the real level of social benefits, and index social benefits with inflation.

Scenario 3: Assumes that after increase in 2006 government maintains the level of social expenditures it reached in 2006 and increases social benefits as much as the level of expenditures allows.

Scenario 4: Assumes that after increase in 2006 government maintains the real benefits at the achieved level until the "additional deficit" of the system does not reach zero level, and then increases the social benefits as much as possible, keeping the deficit of SSN at the zero level.

Scenario 5: Assumes that government continues a policy of real increase of social benefits, but the increase becomes smaller every year, and eventually government assumes a policy of maintaining the achieved real level of social benefits.

Scenario 6: In order to demonstrate properties of the model, this scenario assumes that the government policy matches policy of scenario 1 (social benefits increase 28% in 2006 and the increase is equal to the rate of inflation after that), but the real GDP growth is equal to 0% in 2007 and negative (-1%) real GDP growth after that.

Scenario 7 represents the results of forecasting using naïve model under scenario 1. This scenario is used as a reference point.

The results of the modeling are presented in Figure VIII-2, Figure VIII-3, Figure VIII-4 and Figure VIII-5. We can see that the microsimulation model forecasts larger social security expenditures and deficit compare to the naïve model. In general, the microsimulation demonstrated that macroeconomics outcomes (cost of the social safety net) in 2005 do not correspond to the steady state of the model. The microsimulation model predicts slightly higher social safety net expenditures in 2005, meaning that given the possibility, more people would prefer to collect social benefits than was actually observed. This difference is not observable on the graphs because we forced a solution in 2005 to match actual data. However, starting in 2006 we see that the model predicts higher social security expenditures, a higher corresponding deficit, and a lower share of non-social security income in total family income. Due to the larger deficits, the model predicts that Ukraine may reach a deficit –free SSN budget at least a year later, compared to the estimate of the simple model.

Results of introducing the GDP feedback

Results of the microsimulation model presented above are based on the assumption that macroeconomic indicators do not depend on social security expenditures. However, we already argued that this assumption is not correct and proposed models that establish a link between social safely net expenditures and economic growth. We introduced the Armey curve based GDP feedback constructed in a previous chapter in our microsimulation model. We ran the model for the policies described in scenarios 1, 2 and 5, and compared the results with the results the model without GDP feedback.

The results of modeling are presented in Figure VIII-6 and Figure VIII-7. Similar to the results of the macro-model with GDP feedback, the results of the microsimulation model with GDP feedback are significantly different from the results of the model that assumes no feedback. If we assume that increasing social safety net expenditures decreases GDP growth, the microsimulation model

predicts that the social safety net in Ukraine would not reach a deficit-free level of expenditures even if it follows a very cautious policy of keeping benefits steady in real terms starting in 2007.

Conclusions

The microsimulation model developed in this chapter extends the previous analysis with the macro-level models in three dimensions. First, it allows estimating the effects of change in wage and social security income of every individual in the country, and calculates poverty gap (the amount of additional income required to bring this individual above poverty line). Second, it is a tool that allows estimating costs of programs with different eligibility criteria that did not exist in the country yet. Finally, it takes into account behavioral response of individuals to change in the amount of social benefits, and allows to estimate additional costs of the SSN resulting from this response.

The results of the microsimulation model are consistent with the results derived from other models. However, the microsimulation model generally predicts higher social safety net expenditures than other models developed in this study. It may be used for policy analysis to provide a conservative forecast of the costs of the social safety net.

Although the microsimulation model presented here provides significant additional insights to the process of decision making on the issue of social security benefits in Ukraine, it has limitations resulting from the simple design of the model.

First, the model is not a full-scale model. The model ignores some important characteristics as household assets, educational opportunities, access to medical treatment, and other, which are important factors in determining family's ability to combat poverty. As we discussed earlier in the dissertation, the current model also intentionally left out modeling of possible pension reform. At the same time, the pension is the biggest social insurance in Ukraine, and a change in the amount of pension payments can significantly change household income and number of people living in poverty. At the same time, the pension reform can also present an opportunity to reduce taxes, and provide larger effects on poverty through the economic growth than any effects estimated by current microsimulation model.

Second, in order to estimate the parameters of the model, we made an assumption that the parameter estimated for the first quarter of 2005 (our current UHES data) will not change over the forecasting period of the model. This assumption was necessary, but is hard to justify. The Ukraine is fast transitioning country that is characterized by fast change of economic and social relations. Therefore, it is reasonable to assume that the coefficients of expected wage and social security income equations, as well as the coefficients of the choice to work equation will significantly change over time. This increases forecasting error of the model, particularly towards the end of the

forecasting period. However, our exploratory analysis suggests that changing parameters of current model within the 95% confidence interval for the parameter estimates does not influence the policy conclusions derived from the model. This means that if we believe the ability of the model accurately predict the outcomes, the structural equations, and the methodologies for estimating the parameters of this model, then there is less than 5% chance that the "true" cost of SSN will be less than estimated by the "naïve" model when the microsimulation model predicts that the cost will be higher than estimated by "naïve" model. Therefore, although change in the parameters of the model may affect the precision of the forecast, the model still represents a dramatic improvement over the naive models that are currently used and is therefore useful for policy analysis.

Third, the discussion in previous chapters assumed that the tax burden changes with changes in social expenditures. Therefore, it changes cost of labor for enterprises, and effects labor demand. Current microsimulation model captures only the labor supply reaction to the change in the social policy. The labor demand effect is partially captured in the microsimulation model with GDP feedback. However, the change in the labor demand should have significant effect on the expected wage of individual, and, therefore, should significantly influence his/her decision to work. This effect can be explored by extending the microsimulation model with the simulation of firm's reaction to changes in taxes associated with financing of the social safety net.

Finally, the UHES data was not designed for analysis and modeling of the social safety net in Ukraine. Although the data contains detailed information for households and individuals, the level of detail is not sufficient to model current social safety programs precisely. The data lack information about individual characteristics that are currently used to determine eligibility for social benefits (for example, medical status of an individual). As the result, the current microsimulation model has limited capacity to estimate costs of alternative welfare programs with detailed participation criteria. This data problem can be resolved only by conducting specialized survey that captures the personal and family characteristics in greater detail.

Tables and figures

	Number of people	Income			Age		Family		
		Wage income main place of work	Income from other places of work	Per-capita family income	Min	Max	Average size	Average num. of children	Average num. of elderly
Total Population receiving:	45,830,379	182.08	8.01	213.48	0	97	3.28	0.77	0.56
Wage and other payments at the main place of work	16,669,901	500.58	5.31	330.31	17	84	3.29	0.67	0.33
Payments at other places of work	1,820,718	110.75	201.69	223.07	16	81	3.18	0.75	0.36
Income from entrepreneurship	206,165	6.24	0.00	686.61	20	61	3.23	0.76	0.17
Income from self-employment	854,621	16.65	0.00	382.26	18	69	3.50	0.88	0.24
Stipends (scholarships, etc.)	826,825	17.63	5.22	268.45	16	29	3.40	0.73	0.23
Pension	13,124,616	50.51	3.33	98.10	16	97	2.50	0.26	1.31
Unemployment benefits	685,376	2.35	10.97	95.10	17	59	3.59	0.85	0.33
Payments related to loosing the job	21,824	60.94	23.48	94.90	25	81	2.59	0.47	0.86
Other income	68,618	144.52	1.12	151.27	20	94	2.52	0.30	0.83

Table VIII-1. Characteristic of individual receiving income, by source

		Average total household income				Max per-capita non-social security	Household		
	Number of households	Main job	Pensions	Child support	Support to low income family		Size	Number of children	Number of elderly
Total households	17,539,345	475.77	237.01	6.64	2.00	6173.92	2.61	0.51	0.62
receiving:									
Household income from dividends on shares and interest on bank accounts	59,123	1008.68	288.89	23.15	0.00	6173.92	2.87	0.54	0.58
Household Income from renting owned real estate (except land)	41,323	404.97	266.49	0.20	0.00	1127.78	2.09	0.39	0.81
Household Income from renting owned land	143,587	256.21	226.78	1.28	3.47	893.33	2.55	0.43	0.67
Household income from Child support payments	1,189,546	548.69	103.63	97.97	16.94	1546.67	4.04	1.47	0.22
Support to the family with low income	205,665	167.44	107.75	54.64	170.66	371.11	4.25	1.98	0.17
Other social support payments	794,325	399.69	323.09	11.47	2.39	1800.00	2.77	0.54	0.71
Alimonies	308,988	535.33	137.26	10.08	1.36	1791.67	3.30	1.32	0.31
Subsidies and discounts received by the family	6,552,004	343.74	386.71	3.32	1.45	2917.45	2.35	0.32	1.02

Table VIII-2. Characteristics of households receiving income, by source

	Coef.	Std. Err	z	P>|z|	[95% Conf. interval]	
Dependent variable: log personal monthly income from main job							
age	0.051945	0.004767	10.9	0.000	0.04260	0.06129
age sqr.	-0.000791	0.000061	-13.02	0.000	-0.00091	-0.00067
male	0.310608	0.013381	23.21	0.000	0.28438	0.33683
years worked	0.008898	0.001620	5.49	0.000	0.00572	0.01207
rural	-0.559937	0.017833	-31.4	0.000	-0.59489	-0.52499
town	-0.237131	0.015322	-15.48	0.000	-0.26716	-0.20710
have higher education	0.378936	0.018910	20.04	0.000	0.34187	0.41600
have incomplete higher education	0.125538	0.054107	2.32	0.020	0.01949	0.23159
have college education	0.084472	0.018317	4.61	0.000	0.04857	0.12037
Grad. degree in law	0.124487	0.055120	2.26	0.024	0.01645	0.23252
Grad. degree in technology	0.110127	0.018327	6.01	0.000	0.07421	0.14605
Region: west	0.027557	0.016280	1.69	0.091	-0.00435	0.05947
Region: north	-0.046501	0.019655	-2.37	0.018	-0.08503	-0.00798
Region: east	0.058100	0.015125	3.84	0.000	0.02845	0.08775
Constant	4.905212	0.101401	48.37	0.000	4.70647	5.10396
Selection equation							
town	-0.303969	0.026550	-11.45	0.000	-0.3560	-0.2519
rural	-0.631093	0.026533	-23.78	0.000	-0.6831	-0.5791
age	0.144637	0.005590	25.88	0.000	0.1337	0.1556
age sqr.	-0.001983	0.000067	-29.48	0.000	-0.0021	-0.0019
male	0.209748	0.021557	9.73	0.000	0.1675	0.2520
widowed	-0.080493	0.046927	-1.72	0.086	-0.1725	0.0115
household size	0.081831	0.011144	7.34	0.000	0.0600	0.1037
n. children in household	-0.269040	0.017809	-15.11	0.000	-0.3039	-0.2341
n. elderly in household	-0.122262	0.018291	-6.68	0.000	-0.1581	-0.0864
have higher education	0.640003	0.029977	21.35	0.000	0.5812	0.6988
have college education	0.348597	0.026303	13.25	0.000	0.2970	0.4001
worked ever before	1.208337	0.044698	27.03	0.000	1.1207	1.2959
household per-capita income without wage income of this person	-0.001442	0.000063	-23.08	0.000	-0.0016	-0.0013
Constant	-2.967232	0.102549	-28.93	0.000	-3.168225	-2.76624
Mills ratio							
lambda	0.173639	0.027712	6.27	0.000	0.1193	0.2280
rho	0.300950					
sigma	0.576964					
lambda	0.173639	0.027712				

Table VIII-3. Wage estimation, Heckman regression all persons age 16-70

	Coef.	Std. Err	z	P>|z|	[95% Conf. interval]	
Dependent variable: log monthly income from unemployment benefits						
age	-0.006244	0.006615	-0.94	0.345	-0.0192	0.0067
male	0.158884	0.058359	2.72	0.006	0.0445	0.2733
years worked	0.008080	0.006474	1.25	0.212	-0.0046	0.0208
rural	-0.195226	0.118601	-1.65	0.100	-0.4277	0.0372
town	-0.022748	0.124518	-0.18	0.855	-0.2668	0.2213
have higher education	0.144043	0.111280	1.29	0.196	-0.0741	0.3621
have incomplete higher education	-0.173411	0.363938	-0.48	0.634	-0.8867	0.5399
have college education	-0.217623	0.082036	-2.65	0.008	-0.3784	-0.0568
Grad. degree in law	0.606112	0.527161	1.15	0.250	-0.4271	1.6393
Grad. degree in technology	0.166203	0.101932	1.63	0.103	-0.0336	0.3660
Region: west	0.007543	0.061465	0.12	0.902	-0.1129	0.1280
Region: north	0.044526	0.083805	0.53	0.595	-0.1197	0.2088
Region: east	0.030599	0.073109	0.42	0.676	-0.1127	0.1739
Constant	5.279035	0.447905	11.79	0.000	4.4012	6.1569
Selection equation						
town	0.500994	0.090967	5.51	0.000	0.3227	0.6793
rural	0.372838	0.090748	4.11	0.000	0.1950	0.5507
age	0.072038	0.020487	3.52	0.000	0.0319	0.1122
age sqr.	-0.000810	0.000270	-3.01	0.003	-0.0013	-0.0003
male	-0.124192	0.058202	-2.13	0.033	-0.2383	-0.0101
widowed	0.274357	0.147197	1.86	0.062	-0.0141	0.5629
household size	0.060071	0.028977	2.07	0.038	0.0033	0.1169
n. children in household	-0.141418	0.044364	-3.19	0.001	-0.2284	-0.0545
n. elderly in household	-0.034795	0.051386	-0.68	0.498	-0.1355	0.0659
have higher education	0.070128	0.106556	0.66	0.510	-0.1387	0.2790
have college education	0.090260	0.073848	1.22	0.222	-0.0545	0.2350
worked ever before	0.340327	0.104753	3.25	0.001	0.1350	0.5456
household per-capita income without unemployment benefits	-0.001315	0.000270	-4.88	0.000	-0.0018	-0.0008
Constant	-3.228224	0.343693	-9.39	0.000	-3.9019	-2.5546
Mills ratio						
lambda	-0.303292	0.157765	-1.92	0.055	-0.6125	0.0059
rho	-0.526890					
sigma	0.575631					
lambda	-0.303292	0.157765				

Table VIII-4. Unemployment benefits, Heckman estimation, all persons age 16-70 who did not have wage income from main job

	Coef.	Std. Err	z	P>|z|	[95% Conf. interval]	
Dependent variable: monthly amount of income received from support to families with children						
# of children 0-2 y.o.	0.533219	0.054280	9.82	0.000	0.4268	0.6396
# of children 3- 6 y.o.	0.068669	0.045531	1.51	0.132	-0.0206	0.1579
# of children 7- 13 y.o.	0.113063	0.035511	3.18	0.001	0.0435	0.1827
# of children 14-15 y.o.	0.209941	0.077759	2.7	0.007	0.0575	0.3623
Total amount of alimonies	-0.000594	0.000772	-0.77	0.441	-0.0021	0.0009
Region: west	0.071383	0.056731	1.26	0.208	-0.0398	0.1826
Region: east	-0.097097	0.061603	-1.58	0.115	-0.2178	0.0236
Region: north	-0.075681	0.079279	-0.95	0.340	-0.2311	0.0797
Region: south	-0.121690	0.069786	-1.74	0.081	-0.2585	0.0151
Constant	3.790814	0.156266	24.26	0.000	3.4845	4.0971
Selection equation						
Household size	0.304560	0.031270	9.74	0.000	0.2433	0.3658
# of children	-0.133888	0.049941	-2.68	0.007	-0.2318	-0.0360
Household per-capita income without support to families with children	-0.002984	0.000347	-8.59	0.000	-0.0037	-0.0023
Family has income from unemployment	-0.506480	0.119513	-4.24	0.000	-0.7407	-0.2722
Family has pension income	-0.244624	0.065817	-3.72	0.000	-0.3736	-0.1156
town	-0.190751	0.071384	-2.67	0.008	-0.3307	-0.0508
rural	-0.406477	0.072789	-5.58	0.000	-0.5491	-0.2638
Head of the household - female	0.045153	0.056163	0.8	0.421	-0.0649	0.1552
Constant	-1.058369	0.128194	-8.26	0.000	-1.3096	-0.8071
Mills ratio						
lambda	0.112796	0.086673	1.3	0.193	-0.0571	0.2827
rho	0.219590					
sigma	0.513674					
lambda	0.112795	0.086673				

Table VIII-5. Estimation of the support to families with children benefits, families with children and per-capita income less than 362 UAH

	Coef.	Std. Err	z	P>|z|	[95% Conf. interval]	
Dependent variable: log household support to low income families benefit							
Estimated benefit per person	0.186243	0.391494	0.48	0.634	-0.5811	0.9536
# of children in household	-24.152620	37.735890	-0.64	0.522	-98.1136	49.8084
town	61.342210	15.324640	4	0.000	31.3065	91.3780
Region: south	45.471640	20.883000	2.18	0.029	4.5417	86.4016
Region: west	53.484980	28.364720	1.89	0.059	-2.1088	109.0788
Region: east	15.520730	22.461510	0.69	0.490	-28.5030	59.5445
Region: north	-34.334530	27.036600	-1.27	0.204	-87.3253	18.6562
Region: Crimea	-18.762600	37.051200	-0.51	0.613	-91.3816	53.8564
Constant	128.702900	77.273210	1.67	0.096	-22.7498	280.1556
Selection equation							
Household size	0.266124	0.029108	9.14	0.000	0.2091	0.3232
# of elderly in household	-0.286362	0.114424	-2.5	0.012	-0.5106	-0.0621
Household has pension income	0.299398	0.122925	2.44	0.015	0.0585	0.5403
Household per-capita income without the benefit	-0.005669	0.000542	-10.47	0.000	-0.0067	-0.0046
Age of the head of the household	-0.009080	0.003960	-2.29	0.022	-0.0168	-0.0013
Head of household - female	0.262951	0.084073	3.13	0.002	0.0982	0.4277
Constant	-1.802464	0.198617	-9.08	0.000	-2.1917	-1.4132
Mills ratio							
lambda	-36.286890	26.108440	-1.39	0.165	-87.4585	14.8847
rho	-0.346770					
sigma	104.643160					
lambda	-36.286889	26.108440				

Table VIII-6. Support to low income families benefit, all households with per-capita income lower than 423 UAH

	Coef.	Std. Err	z	P>|z|	[95% Conf. interval]	
Dependent variable: probability to work							
Estimated per-capita income if working	0.004427	0.000186	23.79	0.000	0.0041	0.0048
Estimated per-capita income if not working and collect benefits	-0.006202	0.000218	-28.46	0.000	-0.0066	-0.0058
Age	0.117556	0.006190	18.99	0.000	0.1054	0.1297
Age sqr.	-0.001607	0.000072	-22.26	0.000	-0.0017	-0.0015
Male dummy	0.112155	0.022195	5.05	0.000	0.0687	0.1557
Single	0.035999	0.039903	0.9	0.367	-0.0422	0.1142
Divorced	0.112477	0.039162	2.87	0.004	0.0357	0.1892
Household size	0.012634	0.011738	1.08	0.282	-0.0104	0.0356
# of children in household	-0.153994	0.018498	-8.32	0.000	-0.1903	-0.1177
# of elderly in household	-0.088940	0.018619	-4.78	0.000	-0.1254	-0.0524
have higher education	0.491622	0.031187	15.76	0.000	0.4305	0.5527
have college education	0.232009	0.027003	8.59	0.000	0.1791	0.2849
worked ever before	1.183372	0.045959	25.75	0.000	1.0933	1.2735
Town	-0.073381	0.028464	-2.58	0.010	-0.1292	-0.0176
Rural	-0.412669	0.028949	-14.25	0.000	-0.4694	-0.3559
Region: east	0.001362	0.030619	0.04	0.965	-0.0587	0.0614
Region: west	-0.040315	0.030596	-1.32	0.188	-0.1003	0.0197
Region: north	0.128998	0.037114	3.48	0.001	0.0563	0.2017
Region: south	0.117824	0.035322	3.34	0.001	0.0486	0.1871
Constant	-2.261003	0.132837	-17.02	0.000	-2.5214	-2.0006

Table VIII-7. Probability to choose work regression

Years	Total safety net expenditures as % of GDP			Non-social security income as % of total income			Additional deficit as % of GDP			Social security (payroll) taxes rate		
	Max	Min	Diff.	Max	Min	Diff.	Max	Min	Diff.	Max	Min	Diff.
2005	19.9%	19.9%	0.0%	73.2%	73.2%	0.0%	2.9%	2.9%	0.0%	39.0%	39.0%	0.0%
2006	28.2%	28.0%	0.2%	65.9%	65.5%	0.4%	11.2%	11.0%	0.2%	64.7%	64.2%	0.5%
2007	30.0%	29.8%	0.2%	65.0%	64.7%	0.4%	13.0%	12.8%	0.2%	68.8%	68.3%	0.5%
2008	28.5%	28.4%	0.1%	66.1%	65.9%	0.2%	11.5%	11.4%	0.1%	65.3%	65.0%	0.3%
2009	27.2%	27.0%	0.2%	67.2%	66.9%	0.3%	10.2%	10.0%	0.2%	62.4%	61.9%	0.5%
2010	25.9%	25.8%	0.1%	68.1%	67.9%	0.3%	8.9%	8.8%	0.1%	59.4%	59.1%	0.3%
2011	24.8%	24.6%	0.2%	69.1%	68.7%	0.4%	7.8%	7.6%	0.2%	57.0%	56.5%	0.5%
2012	23.8%	23.6%	0.2%	70.0%	69.6%	0.4%	6.8%	6.6%	0.2%	54.6%	54.1%	0.5%
2013	22.9%	22.7%	0.1%	70.6%	70.4%	0.2%	5.9%	5.7%	0.1%	52.4%	52.1%	0.3%
2014	22.0%	21.9%	0.1%	71.3%	71.0%	0.2%	5.0%	4.9%	0.1%	50.5%	50.2%	0.3%
2015	21.2%	21.1%	0.1%	71.9%	71.7%	0.2%	4.2%	4.1%	0.1%	48.7%	48.4%	0.3%

Table VIII-8. Range of values in experiment 1

Years	Total safety net expenditures as % of GDP			Non-social security income as % of total income			Additional deficit as % of GDP			Social security (payroll) taxes rate		
	Max	Min	Diff.	Max	Min	Diff.	Max	Min	Diff.	Max	Min	Diff.
2005	19.9%	19.9%	0.0%	73.2%	73.2%	0.0%	2.9%	2.9%	0.0%	39.0%	39.0%	0.0%
2006	29.4%	26.2%	3.1%	68.9%	63.4%	5.4%	12.4%	9.2%	3.1%	67.3%	60.2%	7.2%
2007	31.3%	27.9%	3.3%	68.1%	62.3%	5.8%	14.3%	10.9%	3.3%	71.7%	64.1%	7.7%
2008	29.8%	26.3%	3.5%	69.5%	63.3%	6.2%	12.8%	9.3%	3.5%	68.4%	60.4%	8.0%
2009	28.5%	25.0%	3.5%	70.7%	64.2%	6.5%	11.5%	8.0%	3.5%	65.4%	57.2%	8.1%
2010	27.3%	23.6%	3.6%	71.9%	65.1%	6.8%	10.3%	6.6%	3.6%	62.5%	54.2%	8.3%
2011	26.2%	22.5%	3.7%	72.9%	65.9%	7.0%	9.2%	5.5%	3.7%	60.0%	51.6%	8.4%
2012	25.2%	21.4%	3.8%	73.9%	66.5%	7.3%	8.2%	4.4%	3.8%	57.8%	49.1%	8.7%
2013	24.3%	20.4%	3.9%	74.8%	67.2%	7.7%	7.3%	3.4%	3.9%	55.7%	46.7%	9.0%
2014	23.5%	19.5%	4.0%	75.7%	67.7%	7.9%	6.5%	2.5%	4.0%	53.9%	44.7%	9.2%
2015	22.8%	18.6%	4.1%	76.5%	68.2%	8.2%	5.8%	1.6%	4.1%	52.2%	42.7%	9.5%

Table VIII-9. Range of values in experiment 2

Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
2006	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
2007	11.0%	28.0%	16.9%	11.0%	20.0%	28.0%	11.0%
2008	7.6%	7.6%	13.6%	7.6%	15.0%	7.6%	7.6%
2009	7.6%	7.6%	13.6%	7.6%	10.0%	7.6%	7.6%
2010	7.6%	7.6%	13.6%	7.6%	7.6%	7.6%	7.6%
2011	7.6%	7.6%	13.6%	9.7%	7.6%	7.6%	7.6%
2012	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%
2013	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%
2014	7.6%	7.6%	13.6%	13.6%	7.6%	7.6%	7.6%

Table VIII-10. Rate of social benefit growth in different scenarios
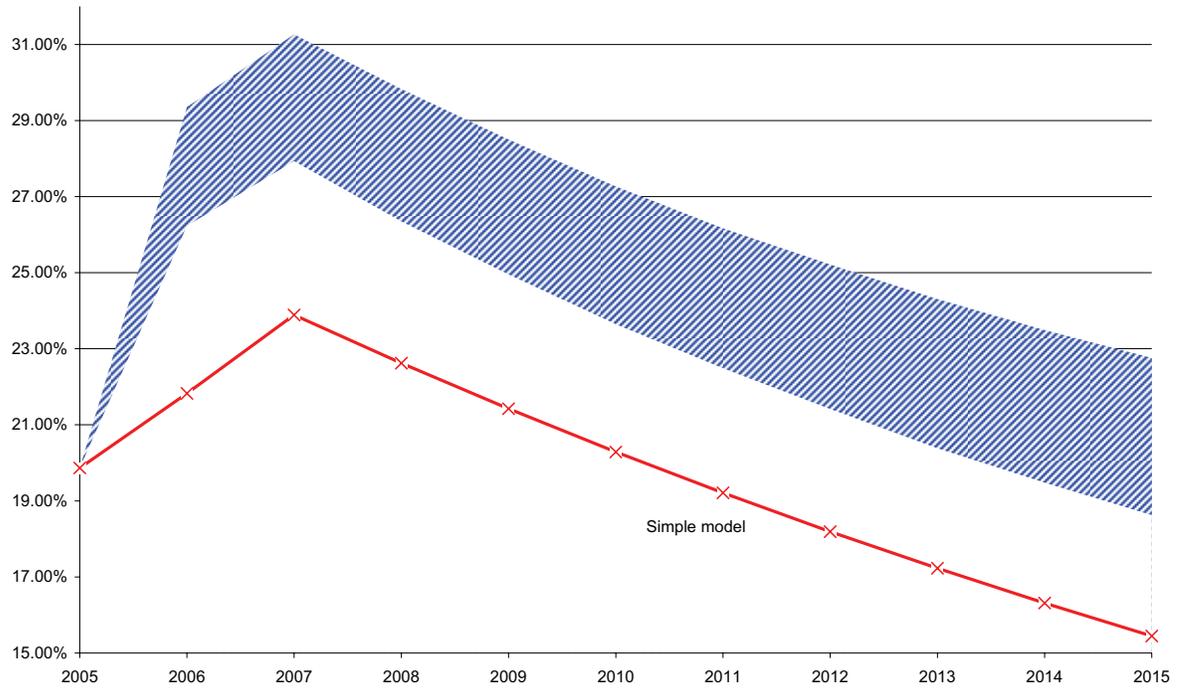
Figure VIII-1. Range of social security expenditures as % of GDP in experiment 2 and forecast of simple model for the same policy
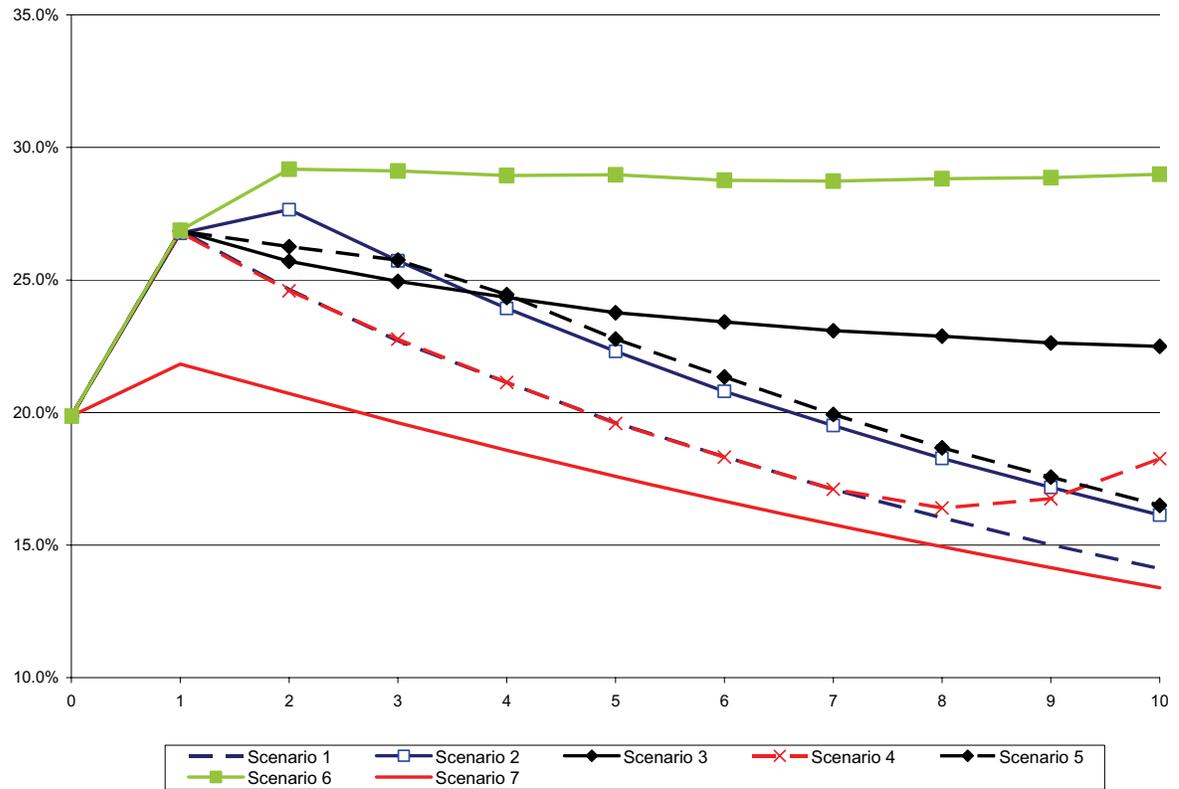
Figure VIII-2. Results: Social safety net expenditures as percent of GDP
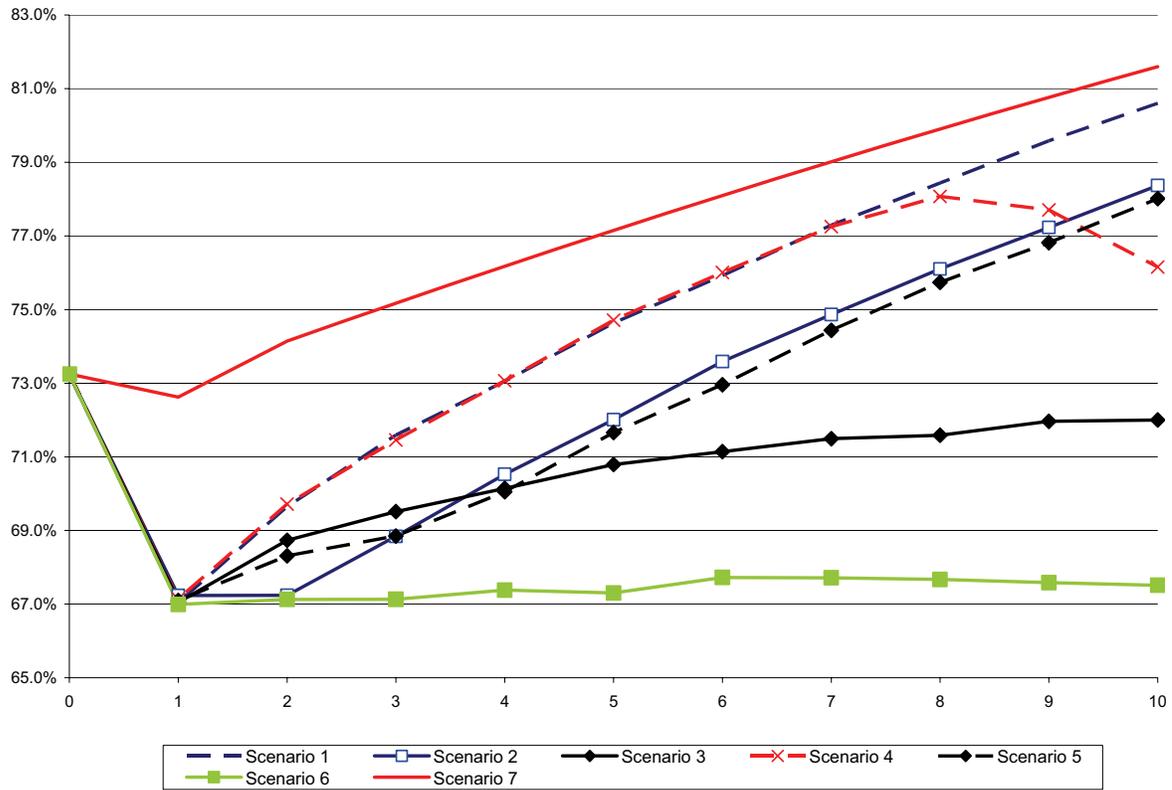
Figure VIII-3. Results: Share of non-social security income in total household income
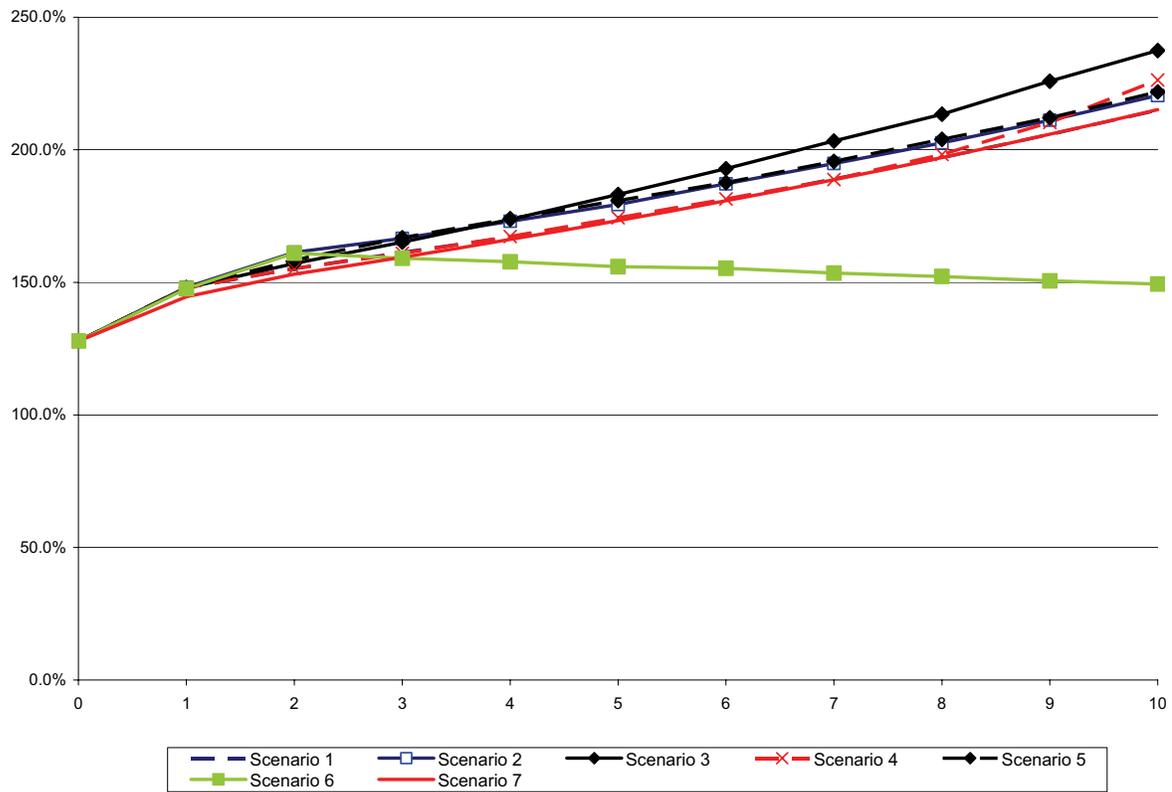
Figure VIII-4. Results: Average total per-capita household income as % of minimal subsistence level
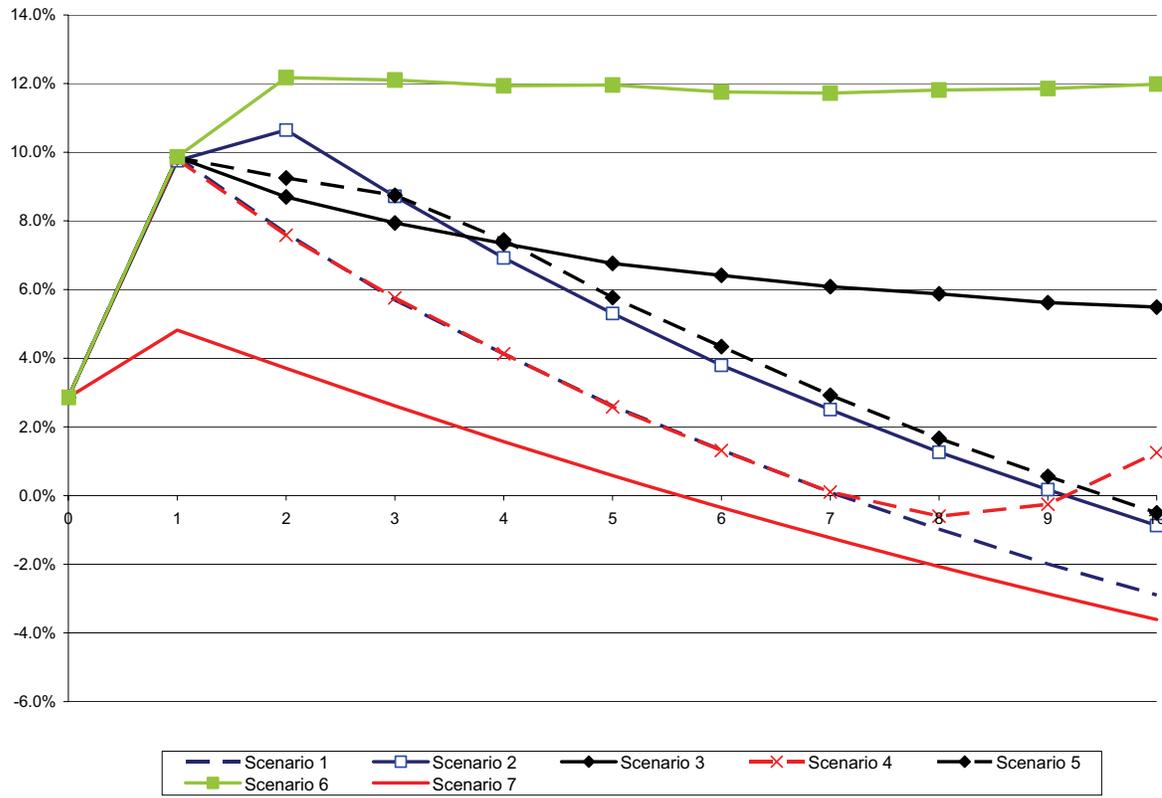
Figure VIII-5. Results: Additional deficit as % of GDP
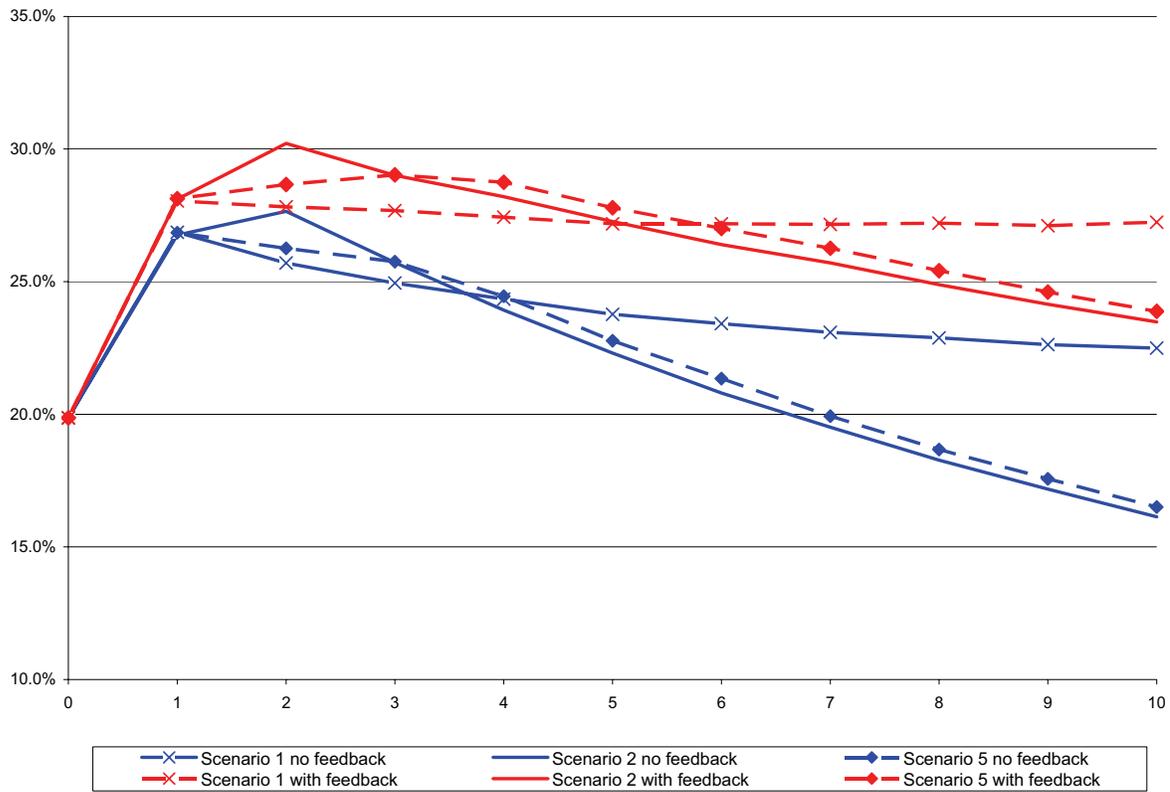
Figure VIII-6. Model with GDP feedback results: SSN expenditures as % of GDP
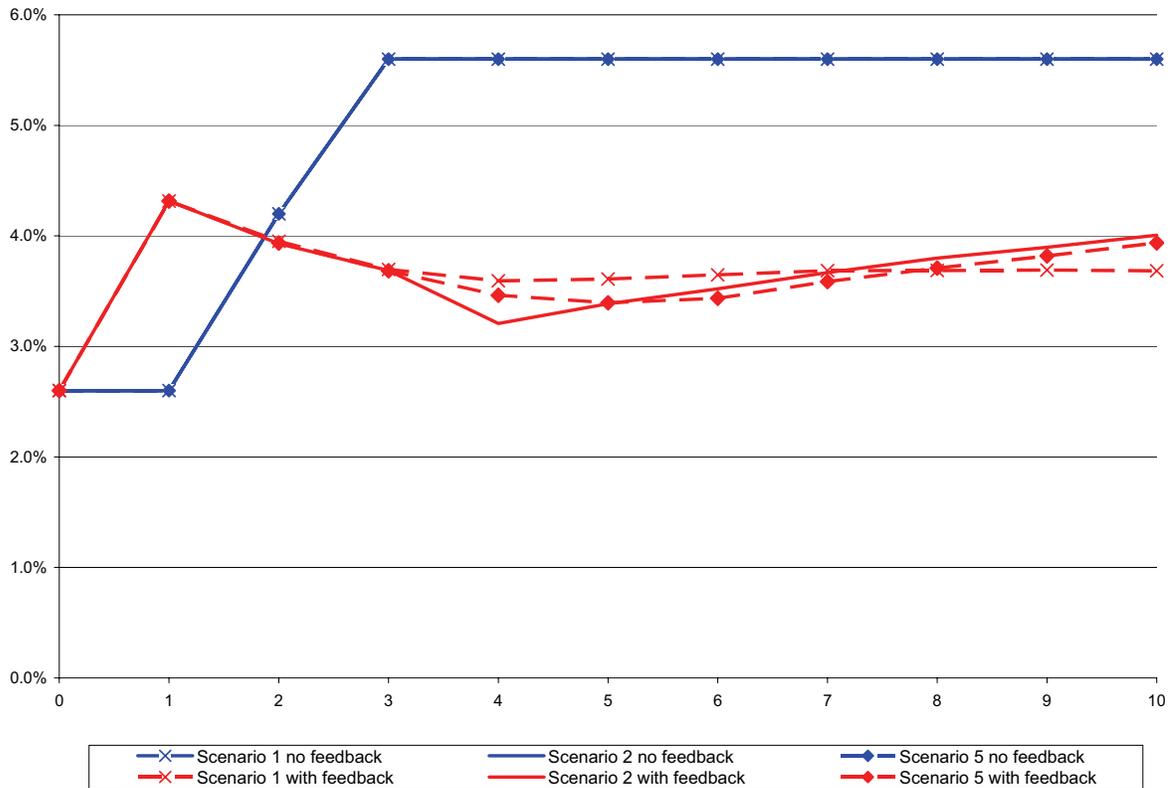
Figure VIII-7. Model with GDP feedback results: real GDP growth rates

131

Chapter IX: Evaluating social safety net policy reform options for Ukraine

In previous chapters we developed several tools to evaluate the costs of the social safety net in Ukraine. The purpose of the tools was to assist Ukrainian policymakers in estimating macroeconomic consequences of alternative social policies. A long-term forecast was used to evaluate policy options for the country at different points in time, and to derive recommendations for the government.

In this chapter we describe four social safety net policies discussed by the government of Ukraine or proposed by policy analysts for the country, and determine the most promising options. Then we discuss the criteria to evaluate these policy options in order to find the optimal policy. Finally, we use the models developed above to provide evaluation of the costs, compare the policies, and provide our recommendations about the optimal social safety net policy for Ukraine.

Policy options

Although there is ongoing debate about social support programs and benefits in Ukraine, there is no document that clearly identifies the social policy options debated by the policymakers. In order to provide policy analysis and aid to policymakers, here we define a set of policy options that are most plausible to be implemented in Ukraine. These policies are either defined on the basis of various documents and speeches produced by Ukrainian government and politicians or are based on recommendations by international policy experts for the developing countries of the region. We select only policies that are politically feasible given current political situation in the country. These policy options are defined in Table IX-1 and discussed below.

Policy options discussed by the government

We already mentioned in previous chapters that at the moment Ukrainian government does not have any comprehensive program of reforms of the social safety net. Most government documents consist of declarations of direction for the reform, but specific parameters of social safety net policy are defined only in budget law. Also, due to the fast turnover of governments[9], published government programs may provide an idea of only one possible course of the reforms, and we have to study programs of all major policymakers to determine the range of alternatives.

We mentioned in previous chapters that the Cabinet of Ministers established after presidential election in 2004 introduced a new direction for the social safety net policies. Government

---

[9] Ukraine changed Cabinet of Ministers twice in 2005 and once before end of summer 2006

announced a program "Towards the people" (see 25). The program specified that the goals of the government are enhancing administration of social benefits in order to increase targeting and to bring the level of social benefits high enough to ensure income above the minimal subsistence level for every individual in the country. The realization of the program started immediately with significant increases in social benefits in 2005 and work to improve administration of the social safety net. The ministry of labor and social policy together with the World Bank started a three-year "Social Assistance System Modernization" project that develops capacities of the ministry and local social assistance offices to target the poor population by installing computers, developing software, simplifying application for benefits and collection of payroll tax. We assume that work on this project insures that government policy during the next several years will include the improvement of social security administration and will not depend on the persons composing the government. At the same time, both the governments elected in 2005 were implementing the "Towards the people" program by increasing social benefits about 28% in 2006 and planning to continue increases in benefits in 2007 (see 89 and 91). Although the government program called for further increases of benefits after 2007, it seems that such increases will be hard to finance, and starting 2008 the only feasible policy for the government will be to support the benefits at the same level in real terms.

Based on these observations, we conclude that the government may seriously consider the policy that consists of increases of social benefits 28% in 2006 and 2007, and support of the real level of the benefits after that. The structure of the benefits or eligibility criteria would not significantly change under this policy.

After the parliamentary election in 2006 Ukraine got a new government that was brought by the political force that is in opposition to the political forces that created two previous governments. In his speech to the parliament in 2006 (see 26) the new prime minister articulated that if social benefits are growing faster than GDP it only leads to inflation and increase of the poor's income that is unsustainable. He announced that his government was working on a new action program that would insure reduction of taxes and reduction of government expenditures to the level of 30% of GDP. This strategy may be realized though two policies that we consider politically feasible: the first one is starting in 2007 to keep social benefits in real terms at the level it reached at the end of 2006 and to wait until the level of government expenditures naturally decreases to 30% of GDP; the second one would be starting in 2007 to keep social benefits in real terms at the level it reached by the end of 2006, but to decrease taxes immediately to the level of 30% of GDP, and finance the resulting deficit by external borrowing. Also, the second policy seems unnecessarily complicated compared to the first one, but it is more in line with previous proposals by the president of Ukraine

to decrease payroll taxes in the nearest future (see 133). None of the policies assumes significant changes in eligibility criteria or the rules of social transfer programs.

Alternative options for SSN reform

The above-mentioned social safety net policies currently discussed in Ukraine are based on simple changes in the size of the benefits without significant change in social safety net programs. Such policies are considered politically feasible because they do not seriously harm any significant group of current SSN beneficiaries. At the same time, we discussed in previous chapters that international experts recommend that Ukraine and other countries in transition change most of the social safety net programs in order to simplify the system and make it better targeted towards the poor. Here we would like to consider a policy that is based on these recommendations as an alternative to currently discussed options. This alternative policy seems politically unfeasible in Ukraine because it may decrease amounts of benefits received by a significant number of voters. However, if we find that this alternative generates higher income in the short and medium run, then it may become politically attractive to the current policy makers.

The simple alternative policy is the Minimal Income Guaranty (MIG) described by B. Milanovic in his book in 1997 (see 87). The MIG was implemented in a number of post-Soviet countries in a form of pilot project. The "Support to low income families" program in Ukraine may be considered one of the implementations of the MIG program. For the purposes of this research we would like to propose the following policy based on the MIG idea. We already provided rough estimates of the cost of MIG program in Ukraine with guaranteed income at the level of MSL. However, here we provide estimates based on a microsimulation model that has to take into account possible behavioral changes on the part of program recipients.

Similar to the analysis in the previous chapter, we assume that the government substitutes all social programs (except pension) with a program that provides benefits equal to the difference between average household per-capita income and minimal subsistence level to all individuals living in households with per-capita income lower than the minimal subsistence level. For the purpose of this study we assume that modernization of the social security administration would allow observing household income and administering such program at no additional cost compared to other programs. We also assume that this program could be enacted starting in 2007.

Evaluation of the policy options

In order to simplify the decision-making process, policymaker often prefer to see a singe measure (a score) associated with each of the discussed policies. The score allows ranking the policies, and

choosing the policies that have highest ranking. Here we develop a simple ranking for the policy options described above in order to demonstrate how our models can be used in the decision-making process.

Below we discuss the evaluation approach and criteria, and then present the results of the evaluation.

Methods and criteria

Score for the SSN reform policies has at lest two dimensions: first is the measures of success (outcomes) for the SSN and economy of Ukraine at particular point of time; second is the measure of these outcomes across the time. In order to incorporate these two dimensions, we will first compute a score for a policy at each year, and then combine annual scores into single score for the policy. For simplicity of this demonstration, we choose three points in time: year 2007, 2010, and 2015. The first year presents outcomes immediately following the current election, and represents the short-term effect of elected policymaker. The year 2011 is the year of the next parliamentarian election, and the performance of SSN and economy in 2010 will be referenced by most policymakers in the election campaign. Finally, the long-term horizon, which extends to the end of the forecasting period of our model, is presented by year 2015.

For simplicity of the presentation we also restrict our evaluation to five outcome measures that are frequently quoted by the president and the prime minister (see 25, 26, and 133), and that are forecasted by our models. There outcome measures include: real GDP growth rate, total government expenditures as a percent of GDP, monthly per-capita income, number of people living below the minimal subsistence level, and accumulated debt. The outcomes will be forecast using our microsimulation model with GDP feedback, and the policies will be evaluated based on the forecast values.

All outcomes are measured at different scales, and we cannot combine them directly into a single score for each policy. Instead, we will normalize values of all outcomes, measuring the highest forecast value for the particular outcome as a 100. In order to emphasize the negative impact of the cost variables, such as government expenditures and debt, we will assign them value equal to 100 minus the normalized value of the outcome. Then we assume that all outcomes have the some weight in the utility of a policymaker, and construct the final score for a particular year for a particular policy as a weighted sum of normalized values. The weight can be any set of positive real numbers. The weights are not normalized in this analysis; as result, only scores calculated on the same set of weights can be compared directly.

The annual score significantly depends on the weights of the outcomes. A person with strong preferences towards economic growth and lesser preferences for social protection would place higher weight on the measures of economic success, such as real GDP growth rate, government expenditures, and accumulated debt. A person with stronger preferences towards social protection will place higher weight on the measures of SSN success, such as the number of people living bellow MSL. Often policy analysts identify preferences of the policy-makers, and the weights that they place on the outcomes though surveys of policy-makers. Due to the time limitations of this research, we did not conduct such survey. Instead, we present and compare the ranking for three imaginary policy-makers. First (decision-maker 1) puts emphases on economic growth, and since three of five our measures are measures of economic success, we assume this policymaker puts equal weight on all four outcomes. Second (decision-maker 2) puts equal emphases on eradication of poverty and economic growth, and, we assume that in order to correct out choice of the outcomes this policymaker puts weight of two on the number of people living bellow MSL, and weight of one on all other outcomes. Finally, third (decision-maker 3) put strong emphases on eradication of poverty, and, we assume this policymaker puts weight of ten on the number of people living bellow MSL, and weight of one on all other outcomes.

Different policymakers can also put different value on the scores in different periods of time, or have different discount rate. Some policymakers have high discount rate, and value high only immediate costs and benefits of the policy. Another have low discount rate or put emphases on mind-term pre-election outcomes. Finally, there may be policymakers who are concerned with the long-term outcomes. We will produce three final scores for each of the policies; each score will be calculated as a weighted average of annual scores with different weights for each type of policymaker. The weights will equal one for the year that particular type of policymaker emphasizes and 0.5 for other years.

Evaluations

Table IX-2, Table IX-3, and Table IX-4 present estimated values of the outcomes in 2007, 2010, and 2015 respectively. First, it can be noticed that despite increases in social benefits in policies 1 and 4, there are a large number of people with per-capita income below the minimal subsistence level after receiving the benefits. Even with a single benefit that is targeted to supplement income of every person to the minimal subsistence level, there are from 2 to 3 million people expected to live below the minimal subsistence level. There are a number of people whose cost of applying for social benefit is higher than the expected benefit, and these people together with their family members live below minimal subsistence level.

With time the policies that stimulate economic growth decrease the number of people with income below the minimal subsistence level faster than the policies providing higher benefits. For example, policy 4, which consists of providing everybody with a guaranteed income at the minimal subsistence level, has a high cost and decreases real GDP growth so that the number of people living below minimal subsistence level in the long run is higher than when the policy was introduced.

Based on these values, we constructed score and rankings for polices for different types of policymakers (see Table IX-5, Table IX-6, Table IX-7, and Table IX-8). These rankings are summarized at the Table IX-9.

We can notice that policies 1, which is current policy of increasing social benefits in 2007 without restructuring SSN, is not ranked first choice by the decision-makers that we are considering here. This policy may be second choice of a policymaker with strong preferences towards social protection (decision-maker 3), and large discount rate. However, this policy is ranked third or forth by all considered policymakers if they are long-term oriented.

Policy 2 (the policy of preserving the current SSN and keeping the social benefits at the level of 2006 in real terms) is the least preferred policies by decision-makers with strong preferences towards social protection because this policy does not provide additional social protection compare to the level of 2006. At the same time, the policy-maker with strong preferences towards economic growth ranks this policy at the top two independent of he/her discount rate. Finally, even though the policy 2 is ranked third by the policymaker with equal preferences towards economic and social outcomes (decision-maker 2), the Table IX-7 reveals that this policymaker will rank the long-term outcomes of this policy right after the long-term outcomes of policy 3.

Policy 3 (that assumes that SSN expenditures are kept at the level of 2006 in real terms and the government borrows money on external market to reduce the taxation) is among top two choices for long-term oriented policymakers with all sets of preferences that we considered for this analysis. The policy receives low rank by social policy oriented decision-makers with high discount rate because the economic growth does not provide immediate benefits for poor. However, with the time the income gain because of economic growth is able to compensate to the small income from social security, and achieve significant reduction in poverty.

Finally, policy 4 (that assumes providing benefits equal to the difference between wage income and MLS) is ranked first by decision-makers with strong preferences for social protection because it provides immediate reduction in number of people living bellow MSL. At the same time, this policy is ranked last by policymaker with strong preferences for economic growth since this policy has

huge cost, rapidly increases budget deficit and reduces economic growth. We also have to note that the long-term outcomes of this policy are ranked among worst even by the decision-maker 2, (see Table IX-7).

The results demonstrate that the ranks of the policies significantly depend on the weights that policymakers put on different outcome measures. The difference is especially noticeable at the rankings of short-term outcomes. However, we also demonstrated that the policies that have strong economic growth component may be ranked high even by decision-makers with strong preference towards social protection if these decision-makers have low discount rate and compare long-term policy outcomes.

Conclusions

In this chapter we analyzed four policies that are currently discussed in Ukraine and are politically feasible to implement. The rankings of the policies that we presented in the chapter significantly depend on the set of outcomes and their weights. We compared ranks of the policies using three different sets of weights, and three different assumptions about the intertemporal discount rate of the policymakers.

The policy of continued increase in social benefits that was discussed in Ukraine since the end of 2004 is among inferior choices for all policymakers considered in this analysis. From the point of view of growth-oriented policy maker, the most robust policy is to limit growth of social benefits to the rate of inflation. Given the availability of external funding, best results may be achieved if current social expenditures are not increased in real terms and partially funded by external borrowing accompanied by a decrease in payroll taxes. The amount of deficit accumulated with this policy is comparable to the amount of deficit accumulated if social benefits continue to increase in 2007; however, the advantage of this policy is in a significantly increased rate of economic growth. Increased economic growth makes repayment of the accumulated debt more realistic, and should lower borrowers' risks, and, therefore, lower interest rates for external borrowings.

If a dramatic decrease in the number of people living below the subsistence level is a primary goal of a policy maker, the preferred policy will be significant increase of the benefits and combined with better targeting. We demonstrated that according to our models, the rapid decrease of the number of people living in poverty would outweight the negative income on the economy for a policymaker with strong preferences towards providing social benefits. However, if this preference is not overwhelmingly strong and the policymaker is long-term oriented, the policies stimulating economic growth may be ranked second by such policymaker.

In addition, if the reduction of the number of people living bellow poverty line is the strongest goal of policymaker, the money needed to finance additional increases of social benefits in 2007 and then support these increased benefits could be spent more effectively to archive this goal. For example, if social program provides MSL guaranteed income program to families with children below 13 years old and families with elderly, it will significantly reduce the number of people living bellow MSL and keep the cost of the system low (see Table IX-10).

Finally, SSN policies that stimulate economic growth can be ranked high even by the policymakers with strong preference towards social protection because of the economic growth has strong positive effect on people living in poverty in the long run. As an extreme example, if we consider a policy (probably not politically feasible) that eliminates all social benefits except pension. Under this policy, the number of people living below MSL is in the long-run almost equal to results for the policy of keeping social benefits at the current level in real terms. This convergence in number of people living below MSL is the result of the increased economic growth and wage income in the extreme policy. This modeling result is consistent with the international experience described in previous chapters. However, such policies should be considered carefully, and would not be ranked high by the policymakers who prefer providing strong social protection immediately. It takes almost a decade for the economic growth to bring income of the same number of people above MSL compared to the policy of providing social benefits. Social consequences for the people living below minimal subsistence level now, especially families with children, could be devastating if the policy of no social benefits were to be implemented.

Tables and figures

Policy 1	The structure of social benefits does not change. Nominal benefits increase 28% in 2006 and 2007, and then increase with the rate of inflation in 2008-2015
Policy 2	The structure of social benefits does not change. Nominal benefits increase 28% in 2006, and then increase with the rate of inflation in 2007-2015
Policy 3	The structure of social benefits does not change. Nominal benefits increase 28% in 2006, and then increase with the rate of inflation in 2007-2015. The total budget expenditures financed by internal sources (either taxes or borrowing) are reduced to 30% of GDP, and the rest is financed exclusively through external borrowing
Policy 4	Since 2007 new social benefits is introduced instead of all social benefits except pension. The new benefit provides difference between per-capita family income and minimal subsistence level for every individual with per-capita family income lower then MSL. Benefits in 2006 increase 28%, after that pension payments increase every year with the rate of inflation

Table IX-1. Policy options

	Policy 1	Policy 2	Policy 3	Policy 4
Real GDP growth rate	3.3%	3.3%	3.3%	3.3%
Average per-capita household income	800.64	765.55	764.57	790.31
Total safety net expenditures as % of GDP	30.8%	26.8%	26.9%	38.8%
Number of people bellow minimal subsistence level	13,574,574	15,221,450	15,395,751	2,620,964
Accumulated debt as % of GDP	13.8%	9.8%	14.9%	21.8%

Table IX-2. Forecasted outputs by policy in 2007

	Policy 1	Policy 2	Policy 3	Policy 4
Real GDP growth rate	3.2%	3.9%	4.9%	1.7%
Average per-capita household income	1,063.76	1,027.91	1,052.13	1,010.74
Total safety net expenditures as % of GDP	28.5%	24.6%	24.0%	35.9%
Number of people bellow minimal subsistence level	12,034,170	13,318,035	12,818,733	2,638,374
Accumulated debt as % of GDP	43.3%	29.3%	44.6%	69.9%

Table IX-3. Forecasted outputs by policy in 2010

	Policy 1	Policy 2	Policy 3	Policy 4
Real GDP growth rate	3.8%	4.3%	4.9%	2.5%
Average per-capita household income	1,723.62	1,711.69	1,810.42	1,531.16
Total safety net expenditures as % of GDP	25.1%	21.4%	20.2%	31.8%
Number of people bellow minimal subsistence level	9,719,637	10,193,533	8,948,230	3,354,569
Accumulated debt as % of GDP	63.1%	38.6%	61.9%	111.7%

Table IX-4. Forecasted outputs by policy in 2015

	Total scores for individual years			Policy total score for different policy makers		
	2007	2010	2015	Short-term oriented	Next-election oriented	Long-term oriented
Policy 1	268.91	233.19	241.51	506.26	488.40	492.56
Policy 2	282.48	264.62	280.04	554.81	545.88	553.59
Policy 3	257.92	272.27	293.15	540.63	547.80	558.24
Policy 4	281.69	209.33	202.50	487.60	451.42	448.01

Table IX-5. Scores of policy choices (decision-maker 1)

	Total scores for individual years			Policy total score for different policy makers		
	2007	2010	2015	Short-term oriented	Next-election oriented	Long-term oriented
Policy 1	3	3	3	3	3	3
Policy 2	1	2	2	1	2	2
Policy 3	4	1	1	2	1	1
Policy 4	2	4	4	4	4	4

Table IX-6. Ranks of policy choices for decision-maker 1

	Total scores for individual years			Policy total score for different policy makers		
	2007	2010	2015	Short-term oriented	Next-election oriented	Long-term oriented
Policy 1	3	4	4	4	4	4
Policy 2	2	3	2	2	3	3
Policy 3	4	2	1	3	2	2
Policy 4	1	1	3	1	1	1

Table IX-7. Ranks of policy choices for decision-maker 2

	Total scores for individual years			Policy total score for different policy makers		
	2007	2010	2015	Short-term oriented	Next-election oriented	Long-term oriented
Policy 1	2	2	3	2	2	3
Policy 2	3	4	4	4	4	4
Policy 3	4	3	2	3	3	2
Policy 4	1	1	1	1	1	1

Table IX-8. Ranks of policy choices for decision-maker 3

	Temporal preferences of policymaker		
	Short-term oriented	Next-election oriented	Long-term oriented
Policy 1			
Decision-maker 1	3	3	3
Decision-maker 2	4	4	4
Decision-maker 3	2	2	3
Policy 2			
Decision-maker 1	1	2	2
Decision-maker 2	2	3	3
Decision-maker 3	4	4	4
Policy 3			
Decision-maker 1	2	1	1
Decision-maker 2	3	2	2
Decision-maker 3	3	3	2
Policy 4			
Decision-maker 1	4	4	4
Decision-maker 2	1	1	1
Decision-maker 3	1	1	1

Table IX-9. Rankings of policies by policymakers with different preferences

	Policy 1: Increase in existing social benefits 28% in 2007 and increase equal to inflation after that			Providing minimal subsistence level guaranty to families with children before 13 years old and families with elderly			Providing no unemployment insurance, subsidies, support to families with children or low income families social benefits		
	2007	2010	2015	2007	2010	2015	2007	2010	2015
Real GDP growth rate	3.3%	3.2%	3.8%	3.3%	3.0%	3.9%	3.3%	4.8%	4.9%
Average per-capita household income	800.64	1,063.76	1,723.62	776.19	1,018.19	1,635.78	720.89	991.36	1,729.48
Total safety net expenditures as % of GDP	30.8%	28.5%	25.1%	32.6%	29.2%	23.7%	17.5%	15.4%	12.2%
Number of people bellow minimal subsistence level	13,574,574	12,034,170	9,719,637	6,126,857	5,409,884	4,905,993	17,261,099	15,027,235	10,863,820
Accumulated debt as % of GDP	13.8%	43.3%	63.1%	15.6%	47.2%	63.1%	0.5%	-2.0%	-16.0%

Table IX-10. Additional illustrative policy simulations

Chapter X: Conclusion

The goal of this dissertation was to evaluate macroeconomic implications of changes in social welfare policy in Ukraine and to help policymakers identify the best and most robust solutions. For this purpose we created three models for social safety net expenditure forecasting, explored their properties and derived policy conclusions from the models. Finally, we determined four most feasible social safety net policies in Ukraine and ranked these policies according to the values of economic outcomes derived from our models.

Both GDP feedback and microsimulation models developed in this dissertation present unique tools that were never used for the policy analysis of social programs in Ukraine before. The novelty of the work consists in applying latest macro and microeconomic modeling techniques to the specifics of Ukraine and in introduction of human behavioral responses into the discussions about the effects of social security reform in Ukraine. Researchers of the country measured the effects of social benefits on the duration of unemployment in the country, but it was never incorporated into forecasting models and used for policy analysis before this work. The dissertation also broke the government's monopoly on micro-level forecasting of the expenditures for different types of social programs, which were available only to government institutions before the development of the models in this dissertation.

This chapter concludes the dissertation and summarizes main findings about evaluation methodology and policy options for social safety net reform in Ukraine. Based on the findings of the dissertation, we provide conclusions about further research and development of the tools for evaluation of the social system in Ukraine.

Policy evaluation tools

The dissertation developed and discussed three models for forecasting costs of the social safety net in Ukraine: a simple (naïve) model macroeconomic model; a macroeconomic model with GDP feedback; and a microsimulation model. We showed that the naïve macroeconomic model that is currently used by Ukrainian policymakers to analyze costs of SSN reform significantly underestimates these costs. The underestimation of the costs could lead to policy decisions that are unfeasible and could ruin the economy of the country.

GDP feedback introduced into the model also showed that the naïve model overestimates social expenditures as a percent of GDP in the case when reduction of total government expenditures stimulates economic growth. The models with GDP feedback of government expenditures on GDP are known in Ukraine and are used by the government. However, the parameters for the models

currently used in Ukraine were estimated over a short period of time for which statistics are available, and over a period of economic transition. The estimates of model parameters over this period are unreliable, consequently, the current models rely more on experts' opinions than on the model forecast.

We used two models for GDP feedback: a model based on the effect of the tax burden on growth of shadow economy and model based on the Armey curve. The advantage of this work is that parameters of the models were obtained from international research based on samples of OECD countries. Both models demonstrated similar results, and the results were stable under a wide range of parameter estimates around the values described in the literature.

The models accuracy is restricted by the accuracy of the assumptions underlying the model and the model coefficients. Other set of assumptions or coefficients of the models may produce different forecasts of the same variables. Subject to these restrictions, the models provide solid conservative estimates of the effects on growth that allows selecting social policy that is feasible under a wide range of circumstances.

The macrosimulation models had significant limitations of the outcomes that they were able to forecast, and policies that they were able to analyze. First, because the macro level models did not estimate the wage and social security income for every individual in the country, they were unable to estimate poverty gap and number of individuals living bellow poverty line. Second, the models were not able to estimate costs of programs with different illegibility criteria. Third, the macromodels did not consider effect of behavioral response of individuals to change in the amount of social benefits on cost of the SSN. We extended macrosimulation models with microsimulation models which allowed to include these considerations into our analysis.

The dissertation also demonstrated that there is sufficient data in Ukraine to create static microsimulation models similar to TRIM model in the United States. For the values of parameters within the confidence interval of the estimated coefficients of the main equations of the microsimulation model the model predicts higher costs of SSN reform than the naïve model. The microsimulation model also demonstrates that for the last two years social security expenditures in Ukraine were lower than the equilibrium predicted by the model. We conclude that there is a possible hidden deficit of the social safety net in Ukraine, and given funding more people would have used the current social security system in 2006.

The microsimulation model developed in the dissertation proved to be valuable tool for policy analysis for SSN reforms in the country. It allows estimating costs and outcomes of radical reforms that were not possible to estimate using the macro-level models. These capacities of the

144

microsimulation model would significantly extend capabilities of the non-government sector of Ukraine to analyze consequences of government reform proposals since current models used by Ukrainian NGOs rely only on government estimates of social safety net expenditures.

Policy conclusions and recommendations

Based on the international experience overviewed in the dissertation and the evaluation of policies with the models developed in the dissertation, we concluded that that cost of any increase in SSN benefits will be significantly higher than predicted by naïve model. We also showed that in 2005 did not provide sufficient resources to bring income of every person in Ukraine above target of MSL even if the SSN had efficiency of hundred percent. Any further increase in the target to income guaranty will require significant further increases in funding. Finally, the economic growth may be able to bring more people above the poverty line in medium and long-run than current SSN in Ukraine. These conclusions should be considered when choosing course of SSN reform in Ukraine.

The analysis of policy options presented in this dissertation significantly depends on the set of outcomes and their assumed weigh in the evaluation of the policies. The policies preferred by a person with strong preferences towards economic growth and lesser preferences for social protection would be different from that of a person with stronger preferences towards social protection, especially if these people have large intertemporal discount rate. We demonstrated rankings of several policy options by people with both types of preferences. The most important result is that the policies inducing economic growth by cutting current social benefits may be ranked high even by a policymaker with strong preferences towards social protection, if such policymaker is forward-looking and has strong concern about the long-term policy outcomes.

An important result is that the policy of increasing social benefits in the current social safety net system currently discussed in Ukraine was ranked among least optimal policy by all considered types of policymakers. Policies that keep social benefits on the current level in real terms, and, therefore, put lower financial pressure on economy, would be preferred to the current policy by everybody except policymakers with strong preferences toward social security and large discount rate. This strong result is partly due to our assumptions which imply strong (negative) feedback from government expenditures to economic growth.

Available SSN financial resources would be more effective in reducing poverty if current social safety net programs were substituted by a minimal subsistence level income guarantee program. Introduction of such a program for all qualified families would require resources larger than those resources required for current policies of increase in social benefits. We showed that it is possible to

design an ideal budget-neutral program that brings incomes of all people to the level equal to half of the current MSL. Since the best social programs are less efficient than the ideal program, the policymakers should note that implementing a MIG program that guaranties income at or above real MSL level of 1999 will require significant increase in budget expenditures. However, the MIG program with the guaranteed income at the current MSL level program would reduce the number of people living below MSL two-three times compared to the number of people living below MSL if the government simply increases social benefits of current programs as discussed by policy-makers in Ukraine. Such program would definitely be preferred by the policymakers with strong preferences towards social security. However, such program would be less favored program for the decision-makers with preferences for economic growth because of the large cost of SSN.

Finally, economic growth in the country is estimated to have long-term poverty-reduction effects similar to the current social safety net (meaning that number of people living below MSL in case all social transfer programs are terminated today in ten years would be comparable to the number of people below MSL achieved if social transfer programs continue the current structure and amount of funds). Although social reform in Ukraine that relies on economic growth and active policies that stimulate growth (such as education, assistance in job search, legal support of employees, help in relocation, etc.) would not be the top choice for some policymakers, it would be among top choices even for the socially-oriented policymakers who is concerned with the long-term outcomes. Such policy could be better consensus policy than the simple increases in the amounts of benefits policy implemented in Ukraine in 2005-2007.

Suggestions for further research

Although this dissertation made significant steps in developing modern policy evaluation tools for Ukrainian policymakers, advances in information technology and economic theory allow further extension and revision of these tools.

First, international experience suggests that in developed economies social policies are likely to affect the dynamics of the social safety net more than the state of the system. When Ukraine accomplishes radical reforms of its economy and social safety net, it will require dynamic microsimulation models to assess outcomes of social policies. The data required for development of such models is already collected, and it might be possible to construct dynamic microsimulation models within the next three – five years.

Second, the current Ukrainian labor market is characterized by oversupply of labor in some regions and professions. It is important to know how demand for labor would change as the result of new social or economic policies. The experience of developed countries suggests that larger

microsimulation models that include both individuals (families) and enterprises as units of simulation are useful tools for evaluating such effects. The Ukrainian government collects the data necessary for creation of such model; however, this data is not available for independent researchers at the moment. Change of the government policies with respect to the enterprise-level data collected by the Committee on Statistics of Ukraine could enable development of such microsimulation models in a nearest future.

Third, the policy recommendations of this dissertation support the view of other researchers that active market policies could play an important role in reducing poverty in Ukraine. The Ministry of Labor and Social Policy of Ukraine effectively developed and provided active market policies in the country for several years. It is important to study the effectiveness of such policies in Ukraine, since international research does not provide conclusive evidence of the effectiveness of the policies. Effect of the policies in Ukraine may be different than in other countries of the region.

References

1. ACKLAND, R., FALKINGHAM, J. (1997): "A Profile of Poverty in Kyrgyzstan" in *Household Welfare in Central Asia*, ed. by F. J. e. al. Basingstoke: Macmillan Press

2. AIGINGER, K. (2004): "The Economic Agenda: A View from Europe," *Review of International Economics*, Vol. 12:2

3. AKHMED AKHMEDOV, EVGENIA BESSONOVA, IVAN CHERKASHIN, IRINA DENISOVA, ELENA GRISHINA, DENIS NEKIPELOV (2004): "Adjustment Costs of Trade Liberalization: Estimations for the Russian Labor Market", CEFIR, www.cefir.ru/download.php?id=82

4. ALM, J., SAAVEDRA, P. (2006): "How Should Individuals Be Taxed? Designing Income Taxes, Payroll Taxes, and 'Simplified' Taxes in Ukraine", Presentation at the conference "Alternative Methods for Taxing Individuals", Georgia State University

5. ARJONA, R., MAXIME LADAIQUE AND MARK PEARSON (2002): "Social Protection and Growth", Economic Studies No. 35, OECD

6. ARRUFAT, J. L., ZABALZA, A. (1986): "Female Labour Supply with Taxation, Random Preferences and Optimisation Errors," *Econometrica*, Vol. 54

7. ASAD ALAM, MAMTA MURTHI, RUSLAN YEMTSOV, EDMUNDO MURRUGARRA, NORA DUDWICK, ELLEN HAMILTON, AND ERWIN TIONGSON (2005): "Growth, Poverty, and Inequality in Eastern Europe and the Former Soviet Union": World Bank, http://siteresources.worldbank.org/INTECA/Resources/complete-eca-poverty.pdf.

8. ASHWORTH, J., AND D. ULPH (1981): "Estimating Labour Supply with Piece-Wise Linear Budget Constraints" in *Taxation and Labour Supply*, ed. by C. V. Brown. London: Allen and Unwin

9. ÅSLUND, A., PASKHAVER, O., ET ALT., (2005): "Proposals for the President: A New Wave of Reform", Blue Ribbob Comission Report, UNDP

10. BASSANINI, A., AND SCARPETTA, S. (2001): "The Driving Forces of Economic Growth: Panel Data Evidence for the Oecd Countries", Economic Studies No. 33, OECD

11. BASU, N., PRYOR, R. J., AND T. QUINT, AND T. ARNOLD (1996): "Aspen: A Microsimulation Model of the Economy", Sandia National Laboratories, http://www.cs.sandia.gov/web1433/pubsagent/Aspen_Paper2.pdf

12. BAUMOL, W. J., BLINDER, A.S., (1985): *Economics: Principles and Policy*. Orlando: Harcourt Brace Jovanovich Inc.

13. BEAN, C., R. LAYARD, AND S. NICKELL (1986): "The Rise in Unemployment: A Multicountry Study," *Economica*, Vol. 53

14. BELEV, B. (2003): *The Informal Economy in the Eu Accession Countries: Size, Scope, Trends and Challenges to the Process of Eu Enlargement*. Center for

the Study of Democracy, http://www.csd.bg/publications/infeconseeaccession/PART01.pdf.

15. BESLEY, T., COATE, S. (1992): "Workfare Versus Welfare: Incentive Arguments for Work Requirements in Poverty Alleviation Programs," *American Economic Review*, Vol. 82:1, 249-26

16. BINGLEY, P., E. SYMONS AND I. WALKER (1992): "The Labour Supply of Uk Lone Mothers: The Effects of Maintenance and the Welfare System", Fiscal Incentives and Labour Supply Conference, Institute for Fiscal Studies

17. BLUNDELL, R. W., A.S. DUNCAN AND C.H.D. MEGHIR (1992): "Robust Estimation of Labour Supply Responses in the Presence of Taxes", Fiscal Incentives and Labour Supply Conference, Institute for Fiscal Studie

18. BLUNDELL, R. W., AND I. WALKER (1982): "Modelling the Joint Determination of Household Labour Supply and Commodity Demands," *Economic Journal*, Vol. 32

19. BOSKIN, M. J. (1973): "The Economics of Labour Supply" in *Income Maintenance and Labour Supply*, ed. by G. G. C. a. H. W. Watts. Chicago: Mark-ham Press

20. BOYARCHUK, D., (ED.) (2006): "Ukrainian Economic Outlook", Quarterly Publication, CASE Ukraine, http://www.case-ukraine.com.ua/main.php?action=prj-full-desc&type=current&id=9&lang=en

21. BRAITHWAITE, J., GROOTAERT, C., MILANOVIC, B. (1999): *Poverty and Social Assistance in Transition Countries*, St Martin's Press, New York, NY

22. BUITANO, M. (2000): "Note on Poverty in Ukraine", CAS Background Notes, World Bank, http://wbln0018.worldbank.org/ECA/ECC11/UkraineCAS/AR/DocLib.nsf/0/

23. CASHIN, P. (1995): "Government Spending, Taxes, and Economic Growth", IMF Staff Papers, 42(2), International Monetary Fund

24. CBO (1996): "Labor Supply and Taxes", C. B. office

25. CMU (2005): "Action Program of the Government 'Towards the People'", Cabinet of Ministers of Ukraine

26. CMU (2006): "Speech of Prime-Minister Victor Yanukovich at Meeting of Verhovna Rada Ukrainy", Cabinet of Ministers of Ukraine, http://www.kmu.gov.ua/control/uk/publish/printable_article?art_id=46891722

27. CNSA (2006): "The Lifepaths Microsimulation Model", Canadian National Statistical Agency, http://www.statcan.ca/english/spsd/

28. COGAN, J. F. (1981): "Fixed Costs and Labour Supply," *Econometrica*, Vol. 49:4

29. CSR (2000): "Osnovnye Napravleniya Sotsial'no-Ekonomicheskoi Politiki Pravitel'stva Rossiiskoi Federatsii Na Dolgosrochnuyu Perspektivu ", Center of Strategic Research, http://www.csr.ru/about-publications/plan2010.html

30. CSU (2002): *Pratcia V Ukrayini: Statistichniy Zbirnik (Labor in Ukraine: Statistical Book)*. Kiev: State Committee for Statistics of Ukraine

31. CSU (2002): Statistical Yearbook of Ukraine for 2001. Kiev: State Committee for Statistics of Ukraine

32. CULLINAN, P. (2003): "The Long-Term Budget Outlook", C. B. Office, http://www.cbo.gov/showdoc.cfm?index=4916&sequence=0

33. DAVE COADY, REBECCA LEE HARRIS (2001): "Evaluating Transfer Programs within a General Equilibrium Framework", Discussion paper, International Food Policy Research Institute, http://www.ifpri.org/divs/fcnd/dp/papers/fcndp110.pdf

34. DAVERI, F., TABELLINI, G. (2000): "Unemployment and Taxes: Do Taxes Affect the Rate of Unemployment," *Economic Policy*, Vol. 15:30

35. DAVIS, S. J., AND MAGNUS HENREKSON (2004): "Tax Effects on Work Activity, Industry Mix and Shadow Economy Size: Evidence from Rich-Country Comparisons", Working Paper No. 10509, NBER

36. DE HAAN, J., STURM, J-E., VOLKERINK, B. (2003): "How to Measure the Tax Burden on Labour at the Macro-Level", Working Paper No. 963, CESifo

37. DE MENIL, G., NAJMAN, B., JIRNIY, A. AND ROHOZYNSKY, O. (1998): "A Model of Ukrainian Macroeconomic Indicators", Studies and Analysis #126, CASE

38. DELL'ANNO, R., MIGUEL GÓMEZ, ÁNGEL ALAÑÓN PARDO (2004): "Shadow Economy in Three Very Different Mediterranean Countries: France, Spain and Greece. A Mimic Approach", CRISS, http://www.unisi.it/criss/download/meeting2004/papers/dellanno.pdf

39. DI MATTEO, L., AND MICHAEL SHANNON (1995): "Payroll Taxation in Canada: An Overview," *Canadian Business Economics*, Vol. 3:4

40. DJANKOV, S., MURRELL, P. (2002): "Enterprise Restructuring Transition: A Quantitative Survey", Discussion Paper, Centre for Economic Policy Research (CEPR)

41. EISSA, N. (1995): "Taxation and Labour Supply of Married Women: The Tax Reform Act of 1986 as a Natural Experiment", Working Paper, No. 5023, NBER

42. ENGEN, E. M., SKINNER. J., (1996): "Taxation and Economic Growth", Working Papers #5826, NBER

43. ESPING-ANDERSON, G. (1990): *The Three Worlds of Welfare Capitalism*. New Jersey: Princeton University Press

44. FALKINGHAM, J. (2003): "Inequality & Poverty in the Cis7, 1989-2002", Conference of the CIS-7 Initiative, Lucerne

45. FÖLSTER, S., HENREKSON, M. (2001): "Growth Effects of Government Expenditure and Taxation in Rich Countries," *European Economic Review*, Vol. 45(8), 1501-1520

46. Fox, L. (2003): "Safety Nets in Transition Economies: A Primer ", The World Bank Social Protection Discussion Paper Series, World Bank

47. Griffen, K. (1998): "Economic Policy During the Transition to a Market Oriented Economy", Mimeo paper, Department of Economics, University of California Riverside

48. Gronicki, M., Piêtka, K. (1999): "Macroeconomic Model for Ukraine", Studies and Analysis #190, CASE

49. Gruber, J. (1997): "The Incidence of Payroll Taxation: Evidence from Chile," *Journal of Labour Economics*, Vol. 15:3

50. Guo, J.-T., Harrison, Sharon G. (2005): "Useful Government Spending and Macroeconomic (in)Stability under Balanced-Budget Rules"

51. Gwartney, J., Robert Lawson, Randall Holcombe (1998): "The Size and Functions of Government and Economic Growth", Report to US Joint Economic Committee

52. Gyra, M., Radziwiii, A., Sowa, A., and Walewski, M. (2006): "Tax Wedge and Skills: Case of Poland in International Perspective", CASE Reports #64/2006, CASE, www.case.com.pl

53. HANNOCH, G. (1980): "A Multivariate Model of Labour Supply: Methodology and Estimation" in *Female Labour Supply: Theory and Estimation*, ed. by J. P. Smith. Princeton, N.J: Princeton University Press

54. Harding, A. (1996): *Microsimulation and Public Policy*. Amsterdam: North Holland

55. HAUSMAN, J. A. (1980): "The Effect of Wages, Taxes and Fixed Costs on Women's Labour Force Participation," *Journal of Public Economics*, Vol. 14

56. HAUSMAN, J. A. (1981): "Labour Supply" in How Taxes Affect Economic Behavior, ed. by H. J. Aaron, and J.A. Pechman. Washington D.C.: The Brookings Institution

57. Heckman, J. J. (2002): "Flexibility, Job Creation and Globalization: The Case of Italy", University of Chicago and The American Bar Foundation, http://new.istiseo.org/ita/dwl.php?NF=heckman.pdf

58. Hitomi MIYAMOTO, Takeshi MATSUISHI (2006): "Society and Economy of Welfare State (Wohlfahrtsstaat)": Yokohama National University, http://www.matsuishi-lab.org/socialwelfareandeconomysystemsummaryJ_E.htm.

59. IER (2006): "Macroeconomic Forecast Ukraine", Institute for Economic Research and Policy Consulting, http://www.ier.kiev.ua/English/mfu_eng.cgi

60. Ihrig, J., and Karina S. Moe (2001): "Lurking in the Shadows: The Informal Sector and Government Policy", Board of Governors of the Federal Reserve System

61. IMA (2006): "International Microsimulation Association Web-Site", http://www.microsimulation.org/.

62. IMF (2004): "Russian Federation: Selected Issues", Country Report No. 04/316, International Monetary Fund

63. IMMERVOLL, H., HENRIK JACOBSEN KLEVEN, CLAUS THUSTRUP KREINER AND EMMANUEL SAEZ (2005): "Welfare Reform in European Countries: A Microsimulation Analysis", SOCIAL, EMPLOYMENT AND MIGRATION WORKING PAPER # 28, OECD, www.oecd.org/els/workingpapers

64. JENKINS, S. P. (1992): "Lone Mothers, Employment and Full-Time Work Probabilities," *Economic Journal*, Vol. 102

65. JOHNSON, S. H., KAUFMANN, DANIEL AND ZOIDO, PABLO (1999): "Corruption, Public Finances, and the Unofficial Economy", Policy Research Working Paper No. 2169, World Bank, http://ssrn.com/abstract=192569

66. JUHN, C., K.M. MURPHY AND R.H. TOPEL (1991): "Why Has the Natural Rate of Unemployment Increased over Time?" *Brookings Papers on Economic Activity*, Vol.:2

67. KAISER, H., U. VAN ESSEN AND P.B. SPAHN (1992): "Income Taxation and the Supply of Labour in West Germany," *Jahrbücher für Nationalökonomie und Statistik*, Vol. 209:1-2

68. KANE, C. T. (1996): "Ukraine: Reforming the Pension System", PSP Discussion Paper #17365, World Bank

69. KAUFMANN, D., KALIBERDA, A. (1997): "Integrating the Unofficial Economy into the Dynamics of Post-Socialist Economies: A Framework of Analysis and Evidence", Policy Research Working Paper No. 1691, World Bank, http://ssrn.com/abstract=620508

70. KAUFMANN, D., KALIBERDA, A. (1998): "Integrating the Unofficial into the Dynamics of Post-Socialist Economies" in *Economic Transition in the Newly Independent States*, ed. by B. K. (ed). Armonk, NY: M.E. Sharpe Press

71. KEANE, M. P., ESWAR S. PRASAD (2001): "Poland: Inequality, Transfers, and Growth in Transition", Yele University, http://cowles.econ.yale.edu/news/keane/keane-010100.htm

72. KNELLER, R., BLEANEY, M.F., GEMMELL, N. (1999): "Fiscal Policy and Growth: Evidence from Oecd Countries," *Journal of Public Economics*, Vol. 74, 171-190

73. KRAMARZ, F., AND PHILIPPON, T. (2001): "The Impact of Differential Payroll Tax Subsidies on Minimum Wage Employment", Discussion paper # 219, IZA, ftp://repec.iza.org/RePEc/Discussionpaper/dp219.pdf

74. KUDINA, A. (2000): "An Approach to Forecasting Ukrainian Gdp from the Supply Side", Studies and Analysis #196, CASE

75. KUGLER, A., KUGLER, M. (2003): "The Labor Market Effects of Payroll Taxes in a Middle-Income Country: Evidence from Columbia", Discussion paper No. 852, IZA

76. LAMBERT, S., RICHARD PERCIVAL, DEBORAH SCHOFIELD AND SUSAN PAUL (1994): "An

Introduction to Stinmod: A Static Microsimulation Model", STINMOD Technical Paper No. 1, National Centre for Social and Economic Modelling, http://www.natsem.canberra.edu.au/publicationsByType.jsp?type=TP

77. LEACH, G. (2003): "The Negative Impact of Taxation on Economic Growth", Institute of Directors, UK, http://www.reform.co.uk/filestore/pdf/negativeimpact.pdf

78. LEIBFRITZ, W., JOHN THORNTON AND ALEXANDRA BIBBEE (1997): "Taxation and Economic Performance", Economics department working papers no. 176, OECD

79. LEIBFRITZ, W., ROSEVEARE, D., VAN DEN NOORD, P. (1994): "Fiscal Policy, Government Debt and Economic Performance", Economics department working papers no. 144, OECD

80. LIBANOVA, E. (2001): "Bednost' V Ukraine: Diagnoz Postavlen — Budem Lechit'?" *Zerkalo nedeli*, Vol. 337, http://www.zerkalo-nedeli.com/ie/archiv/337/.

81. LIBANOVA, E., ET ALT. (2003): "Model' Financivogo Zabezpechen'a Zagal'noobov'yazkovogo Derzavnogo Pensiynogo Strahuvanya ("Model of Financing Mandatory State Pension Insurance")", Coordination committee for pension reform, www.pension.kiev.ua

82. LINDERT, K. (2005): "Implementing Means-Tested Welfare Systems in the United States", Discussion paper, World Bank

83. LIPPERT, O., WALKER, M. (EDS.) (1997): *The Underground Economy: Global Evidences of Its Size and Impact*. Vancouver, B.C.: The Frazer Institute

84. MARTYNENKO, N., REMIGA, O. (2004): "Bringing Personal Incomes out of the Shadows", International Center for Policy Studies, www.icps.kiev.ua

85. MEL'OTA, I., GREGORY, P. (2001): "New Insights into Ukrainian Shadow Economy: Has It Already Been Counted?" Institute for Economic Research and Policy Consulting, http://www.ier.kiev.ua/

86. MEL'OTA, I., TIESSEN,U., VAKHNENKO, T. (2001): "Fiscal and Regulatory Causes of Shadow Economies in Transition Countries: Case of Ukraine", Institute for Economic Research and Policy Consulting, http://www.ier.kiev.ua/

87. MILANOVIC, B. (1997): *Income, Inequality, and Poverty During the Transition from Planned to Market Economy*. World Bank

88. MINECON (2006): "Consensus Forecast", quarterly publication of "Millennium Development Goals project", UNDP/Ministry of Economics of Ukraine, http://me.kmu.gov.ua/control/uk/publish/category/main?cat_id=73499

89. MINFIN (2005): "Main Directions of Budget Policy for 2006", Ministry of Finance of Ukraine, http://minfin.kmu.gov.ua/control/uk/publish/printable_article?art_id=55133

90. MLSP, PFU (2004): "Zagal'noobov'zzkove Derzavne Social'ne Strahuvan'a Ta Pensiyne Zabeppechenya U Chifrah Ta Factah Za 2003 ("Mandatory State

Social Insurance and Pension in Figures and Facts in 2003")),"

91. MLSP, PFU (2005): "Zagal'noobov'zzkove Derzavne Social'ne Strahuvan'a Ta Pensiyne Zabeppechenya U Chifrah Ta Factah V 2005, ("Mandatory State Social Insurance and Pension in Figures and Facts in 2005")),"

92. MLSP, PFU (2005): "Zagal'noobov'zzkove Derzavne Social'ne Strahuvan'a Ta Pensiyne Zabeppechenya U Chifrah Ta Factah V 2006, ("Mandatory State Social Insurance and Pension in Figures and Facts in 2006")),"

93. NBU (2006): "Quarterly Projection Model for Ukraine", The international seminar at National Bank of Poland, Warsaw

94. NESPOROVA, A. (2002): "Unemployment in the Transition Economies," *Economic Survey of Europe*, Vol. 2

95. ORCUTT, G. (1957): "A New Type of Socio-Economic System," *Review of Economics and Statistics*, Vol. 39(2)

96. OVCHAROVA, L. (2002): "Bednost' V Stranakh S Perekhodnoi Ekonomikoi", Regional conference "Sotsial'naya politika realii XXI veka: regional'nyi aspekt", Barnaul

97. PADCO (1998): "Poverty among Households Receiving Targeted Social Assistance", Policy Report #27, USAID/PADCO Social Sector Reform Program in Ukraine

98. PADCO (1999): "How to Insure Targeted Social Assistance in Ukraine", Policy Report #31, USAID/PADCO Social Sector Reform Program in Ukraine

99. PADCO (1999): "Program for Guaranteed Minimal Income in Ukraine: Design and Implementation", Policy Report #29, USAID/PADCO Social Sector Reform Program in Ukraine

100. PADCO (2000): "A Comprehensive Plan for Social Sector Reform in Ukraine", Policy Report, USAID/PADCO Social Sector Reform Program in Ukraine

101. PEVCIN, P. (2005): "Does Optimal Size of Government Spending Exist?" University of Ljubljana

102. PLOUG, N. (2006): "The Scandinavian Welfare Model" in the "Denmark - Conditions of Life", Web article, http://www.um.dk/Publikationer/UM/English/Denmark/kap3/3-1.asp

103. PONCE DE LEON, C. (2005): "Political Feasibility of Poverty Alleviation Programs in Developing Countries", The University of Chicago, http://cas.uchicago.edu/workshops/cpolit/papers/ponce.pdf.

104. RAY, D. (1998): "Chapter 10: Rural and Urban" in *Development Economics*: Princeton University Press

105. RIBOUD, M., CHU, H. (1997): "Pension Reform, Growth, and the Labor Market in Ukraine", Policy Research Working Paper #1731, World Bank

106. RINGOLD, D. (2002): "Bednost' V Stranakh Tsve I Srednei Azii," *Quarterly publication of the Local Government and Public Service Reform Initiative*, http://lgi.osi.hu/publications/2002/103/ru/summer2002ru_page0.html.

107. ROEGER, W., IN 'T VELD, JAN (2005): "Shifting the Burden of Taxation from Labour Taxes to Indirect Taxes", Presentation for European Comission, DG ECFIN

108. ROHALY, J., ADAM CARASSO, MOHAMMED ADEEL SALEEM (2005): "The Urban-Brookings Tax Policy Center Microsimulation Model: Documentation and Methodology for Version 0304", Urban Institute

109. ROSEN, H. (1976): "Taxes in a Labour Supply Model with Joint Wage-Hours Determination," *Econometrica*, Vol. 44

110. SAPIR, A. (2005): "Globalisation and the Reform of European Social Models", ECOFIN Informal Meeting, Manchester, http://www.bruegel.org/Repositories/Documents/publications/working_papers/SapirPaper080905.pdf

111. SCHNEIDER, F. (2000): "The Increase of the Size of the Shadow Economy of 18 Oecd Countries: Some Preliminary Explanations", Working Paper #306, CESifo, http://www.cesifo.de/pls/guestci/download/CESifo%20Working%20Papers%202000/CESifo%20Working%20Papers%20June%202000/cesifo_wp306.pdf

112. SCHNEIDER, F. (2003): "The Size and Development of the Shadow Economies and Shadow Economy Labor Force of 22 Transition and 21 Oecd Countries: What Do We Really Know?" in The Informal Economy in the Eu Accession Countries: Size, Scope, Trends and Challenges to the Process of Eu Enlargement, ed. by B. Belev: Center for the Study of Democracy, http://www.csd.bg/publications/infeconseeaccession/PART01.pdf.

113. SCHULTZ, T. P. (1980): "Estimating Labour Supply Functions for Married Women" in *Female Labour Supply: Theory and Estimation*, ed. by J. P. Smith. Princeton, N.J.: Princeton University Press

114. SPOOR, M. (2003): "Inequality, Rural Poverty and Conflict in Transition Economies", International Conference of the Faculty of Economics Sarajevo (ICES) 'From Transition to Development: Globalisation and the Political Economy of Development of Transition Economies', Sarajevo

115. STROM, S., AND G. WAGENHALS (1991): "Female Labour Supply in the Federal Republic," *Jahrbücher für Nationalökonomie und Statistik*, Vol. 208

116. SUTHERLAND, H. (2001): "Euromod: An Integrated European Benefit-Tax Model", Working Paper No. EM9/01, EUROMOD, http://www.iser.essex.ac.uk/msu/emod/emodconstr.php

117. TARSICIO CASTAÑEDA, KATHY LINDERT, WITH BÉNÉDICTE DE LA BRIÈRE, LUISA FERNANDEZ, CELIA HUBERT, OSVALDO LARRAÑAGA, MÓNICA OROZCO, AND ROXANA VIQUEZ (2005): "Designing and Implementing Household Targeting Systems: Lessons from Latin American and the United States", Discussion paper, Wolrd bank

118. THE ROBERT GORDON UNIVERSITY (2006): "Public Policy at the Robert Gordon University": The Robert Gordon University, http://www2.rgu.ac.uk/publicpolicy/introduction/wstate.htm.

119. TRIEST, R. K. (1990): "The Effect of Income Taxation on Labour Supply in the United States," *Journal of Human Resources*, Vol. 25:3

120. UEPLAC (1997-2002): "Ukrainian Economic Trends,"

121. UNECE (2003): "Changes in Unemployment Benefit Systems in Eastern Europe and the Cis," *Economic Survey of Europe*, Vol.:1, 191-198

122. UNECE (2004): "Poverty in Eastern Europe and the Cis," Economic Survey of Europe, Vol.:1, 163-176

123. UNECE (2005): "The Commonwealth of Independent States," Economic Survey of Europe, Vol.:1, 59-81

124. UNECE (2005): "Towards a New European Model of a Reformed Welfare State: An Alternative to the United States Model," Economic Survey of Europe, Vol.:1, 105-114

125. URBAN INSTITUTE (2006): "Polisim Documentation", Social Security Administration/Urban Institute Polisim project, http://polisim.urban.org/

126. VAN BRAEKEL, L. (2005): "Frequently Asked Questions:Interview with Eric Verhulst, Paul Vreymans and Willy De Wit", WorkForAll, www.workforall.org

127. VREYMANS, P., AND ERIC VERHULST (2004): "Growth Differentials in Europe: An Investigation into the Causes. - Growth Stimulating Policies", WorkForAll, www.workforall.org

128. WORLD BANK (2000): "Making Transition Work for Everyone: Poverty and Inequality in Europe and Central Asia," The World Bank

129. WORLD BANK (2001): "Ukraine: Social Safety Nets and Poverty Vol. 1", Report # 22677, The World Bank

130. WORLD BANK (2001): "Ukraine: Social Safety Nets and Poverty Vol. 2", Report # 22677, The World Bank

131. WORLD BANK (2005): "Ukraine Jobs Study: Fostering Productivity and Job Creation", Report # 32721-UA, The World Bank

132. WORLD BANK (2005): "Ukraine: Poverty Assessment, Poverty and Inequality in a Growing Economy", Report # 34631-UA, The World Bank

133. YUSCHENKO, V. (2006): "Address of the President of Ukraine to Verkhovna Rada of Ukraine About Report of President of Ukraine to Verkhovna Rada of Ukraine on 'Internal and External Situation for Ukraine in 2005'", Secretariat of the President of Ukraine, http://www.president.gov.ua/news/data/11_6001.html

134. ZABEL, J. E. (1995): "Estimating Wage Elasticities for Life-Cycle Models of Labour Supply Behaviour", Department of Economics, Tufts University