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**DEVELOPING A SAFETY NET FOR UKRAINE:
MACROECONOMIC MODELS OF SOCIAL
EXPENDITURES**

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Kyiv, Ukraine, 2006

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Abstract

This paper inspired by recent increases of social benefits in Ukraine. The paper builds two macro-economic simulations models to discover the range of predictions for the social safety net expenditures under different policy option. The paper finds that predictions of the model that incorporates GDP feedback of the social expenditures are significantly higher than the predictions of simpler model. The research draws conclusion that using simple (naïve) model for analysis of increase in social benefits can significantly underestimate the funding, needed to finance the new expenditures. As the result, the policy of increased benefits can jeopardize the macroeconomic stability of the country. The paper also finds that the policy stimulating economic growth though decreased taxes may result in larger reduction of poverty in Ukraine than the increased social benefits.

Acronyms

SSN	Social Safety Net
CEE	Central and Eastern Europe
GDP	Gross Domestic Product
FSU	Former Soviet Union
PAYG	Pay as you go
CIS	Commonwealth of Independent States
PFU	Pension Fund of Ukraine
MinFin	Ministry of Finance of Ukraine
MinEcon	Ministry of Economy of Ukraine

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Chapter I: Introduction

This paper is the second paper inspired by recent increases of social benefits in Ukraine. The paper explores if reducing social security expenditures to stimulate economic growth policy is effective way to combat poverty in country of transition based on case of Ukraine. The paper develops a sequence of increasingly sophisticated macro-level forecasting models to explore fiscal and economic implications of recent increases in social welfare spending in Ukraine.

Around the World the social safety net policy is a fine balance between desire to provide 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 the economies of transition that change the social safety nets simultaneously with combating consequences of economic downturn.

Similar to other FSU countries, Ukraine experienced large decrease in output at the beginning of the process transforming economy from central planning to market-oriented model. After gaining independence (from the Soviet Union) in August 1991 and until 1998 the real GDP fell almost 50%. Although unemployment remained at low level, the economic downturn reduced real income of population. Hyperinflation at the beginning of the period (reaching 10,256% a year in 1993) destroyed private savings, making poor more dependent of the SSN.

Extensive social safety net inherited by Ukraine from the Soviet Union was not able to protect this large fraction of population against poverty. The system involved large, usually not means-tested in-kind transfers, provided by state enterprises. When the government took over the social safety net, 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. Third, it borrowed large amount of money on internal and external markets.

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

Similar to other FSU countries, beginning 1996 Ukrainian government was implementing policies to reduce budget deficit, government expenditures, and taxes. The budget deficit was reduced below 2 percent of GDP; 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%. These reforms stimulated rapid economic growth in the country during the period 1999-2004. The reforms did not change principles of SSN, but resulted in decreasing social benefits to fraction of minimal subsistence level.

Major political change in Ukraine in 2004 (the “orange revolution”, which replaced political forces that managed country during the first decade of independence with more democratic opposition) substantially changed the environment in which the SSN policy is made. The election campaigns of all political forces during 2004 presidential election and 2006 parliamentary election included promises of significant increases in the 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 to be a basic feature of 2010-2011 election cycles.

The analysis below suggests that even currently implemented increases in social benefits are not fiscally sustainable. The increased level of social benefits requires additional financing which would require increase in taxation or budget deficit. The concern is that increased budget pressure will slow economic growth and reduce real income of large proportion of population while failing to provide sufficient protection to the population living below poverty line.

Whether policy makers and politicians understand the fiscal feasibility issues is unclear. Currently no analytic tools exist to help them to understand the implications of alternative policies. This paper develops such tools and uses them to understand the choices facing the Ukraine. Specifically, the paper explores fiscal implications of proposed increased in social welfare spending by creating macro level models to estimate the expenditures of the social safety net. The paper provides a macroeconomic model that allows forecasting fiscal balance of the social safety net given effect of increased payroll taxes on the economic growth. It compares modeling results with the results derived from simpler macroeconomic model that is implicitly used at the moment in Ukraine.

The paper is structures as follows: next chapter shows current development of the social safety nets in Ukraine and establishes background for further analysis. Third chapter provides simple macroeconomic model to estimate costs of the safety net, and discusses the accuracy of such predictions. Fourth chapter extends the macroeconomic model to include effect of increase in taxes to cover safety net expenditures, and compares the forecast with the results of the simple macroeconomic model. Final chapter discusses policy implications of the forecasts, and provides recommendations for the social safety net policy in Ukraine.

Chapter II: Current development of Social Safety Net in Ukraine

In recent EDC working paper (see 56) we discussed that a safety net constantly balances between desires to provide higher benefits to the needy population, financial feasibility of the system, and avoiding discouragement of work the microeconomic level and of economic growth at the macroeconomic level. We also established that there is no ideal social safety net model: social safety net systems with generous benefits risk becoming fiscally unsustainable in a long-run, and the systems with low level of benefits do not provide protection at the level considered standard for developed countries.

The social safety nets in the developed countries of the world have common feature: these nets are functioning in the countries that have strong economies. Employment in this country almost guarantees staying out of poverty. Generous welfare programs allow poor people in these countries to live well without working. This simulates potential beneficiaries to leave job, and increases social expenditures. Therefore, there is constant danger that increasing social net expenditures become a reason for economic depression in the future.

Similar to developed countries, the countries of transition face the same problem of balance in the development of social safety net. However, while developed countries are looking for reform of the safety nets that will prevent future downturns in the economy, countries of transition are reforming the SSNs while recovering from depression. In EDC working paper # 001 (see 56) we show that common distinctive features of the transition economies, especially economies of former Soviet Union countries, are poor conditions of national economy, large extend of poverty, and generous welfare systems. The extensive social safety net successfully reduced poverty only in the countries that could sustain the SSN with the balanced budgets. In the countries that experienced larger economic downturn supporting social safety nets put large burden on economy. It reduces economic growth and does not allow majority of working population get out of poverty. The paper concludes that the policies stimulating economic growth at the expense of reduction in Social Safety Nets can be optimal policy option for such countries.

The development of the social safety nets similar to the SSNs in developed countries is feasible task for the fast-transitioning countries. However, for the slow-transitioning countries of FSU the economic growths may be important factor in reducing poverty than the social safety net. Therefore, reducing speed of economic growth by excessive taxation of successful sectors of economy in order to finance large social safety net might be inappropriate policy in these countries. Even more dangerous policy might be increase in social benefits because of the possible behavioral response of the large proportion of population.

Ukraine started the process of transition to market economy in 1992, which immediately triggered necessity of social safety net reforms. The country received significant international assistance in designing the new social safety net; however most of Ukrainian SSN is not reformed yet. Recent debate about increase in social benefits can significantly change the policy-making around the issue of SSN reform in the country. Understanding of the economic development and poverty profile, as well as current trends and historical development of the SSN are essential for further analysis policy analysis in this paper.

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

Development of current Social Security System in Ukraine

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

Rapid economic decline resulted in increased poverty. It is established that during the Soviet Union only about 6% of population of Ukraine lived below national poverty line of 75 rubles, and this was primarily rural population in depressed western regions. The poverty reached its' maximum during the recession period 1992-1996, when about 30% of population lived below national poverty line. The poverty reduced with the first signs of economic growth, but remained stable at 27% of population below national poverty line from 1999 till 2004. The comparison using international standards reveals that the 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 66), and the latest 2005 study shows that the poverty was only 22.2% in 2003 (see 68).

In order to survive the 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% on 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 68).

As we mentioned earlier, prior to 1992, when the Soviet Union ceased to exist, the republic of Ukraine had social safety net common to all soviet republics. At that time the primary goal of the system were to maintain a certain level of family per-capita income by supplementing wages. The transition forced government to take responsibility over the safety net expenditures that were previously a part of enterprise finances. At the initial years of transformation the Soviet system were converted into 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.

Over the year a number of changes were introduced to the legislation governing the social benefits in Ukraine. These changes intended to reduce the number of benefits, lower the cost of the programs, and change eligibility criteria. Current SSN in Ukraine consists of five major programs: pension, unemployment and disability insurances, support to families with children, support to low income families, and some other smaller programs providing social privileges. Reduction in the cost of the programs and their targeting remain inefficient, and further reform is needed.

It seems likely 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. Transitioning to market economy after independence, the government of Ukraine had established the new tax system in order to finance new social welfare programs. The system consisted of 38% payroll tax to Pension and Social Insurance Fund, 12% payroll tax to Chernobyl fund, and 2% to the unemployment fund. Despite the large taxes, the government did not manage to collect revenues sufficient to finance its obligations, and run large budget deficits until 1998 (see Table II-1). At the same time, the large taxes contributed to reduction of the tax base and increasing shadow economy. The employers had to pay 52% payroll taxes, which made cost of labor 2.5 times higher compare to paying cash to a worker out of the books. Taking into account that the capital gain 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 an interest or through some other scheme. It

was estimated that the shadow economy 1996 was the same size as the official economy (see 41) and the shadow (out of the books) employment was about 40% of total employment the same year (see 55).

The largest social security program in Ukraine is the pension program. It was the most severely hit by the decreasing tax base. Prior to the reform in 2003, the pension system of Ukraine was generous “pay-as-you-go” (PAYG) system. Given macroeconomic and population trends, the pension program could not be sustainable in a long run. In 1993 the pension fund run deficit of 1% of GDP or about 10% of the pension fund expenditures, and had to be taken under the supervision of the Ministry of Finance that financed the deficit out of the state budget. C.Kane from the World Bank in his research in 1995 (see 39) showed that if the current pension system will not be reformed, the constant annual deficit of the system will rise to 3% of GDP (or 30% of expenditures).

Aware about the problem, the government of Ukraine took steps to reform the pension system. In January 2004 it introduced new three-tier pension system. First tier is PAYG system with benefits based on careful accounting of personal contributions to the system instead of average wage and years worked. Second tier is the fully-funded pension investment fund run by the government. The third tier is the system of licensed private pension funds. The sustainability of the new pension system was based on the assumptions of: 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 the 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 supposes to be replaced by 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.

The second largest program that affects large proportion of population in Ukraine is subsidies and social privileges. By the end of 1990th almost 42% of Ukrainian households were entitled to some social privileges because of the entitlement of one household member. They 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 housing prices (see 66). In 1996-1998 the expenditures of the subsidies, 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 program 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 of expenditures, and it was obvious that the generous program can not be sustained in the long run. The in 2000/2001 government decided to strengthen eligibility criteria for the program and to move programs to the local budgets. As the result the amount of beneficiaries was reduced from 40% to about 21% of population (see 68). Accelerating growth allowed increasing the budget for the program in 2003; however programs remained underfinanced in poorer regions, which unable to collect enough resources and have larger number of beneficiaries at the same time.

Other social welfare programs, such as support for families with children and maternity benefits although suffered from 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 for another benefits decreased significantly. For example, benefits of the assistance to families with children programs were from 10 to 19 UAH a month per child (see 66), when 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. The policy makers did not take advantage of favorable financial situation and did not perform the social welfare sector yet.

The main critique to 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 the sluggish management, the programs were ineffective controlling the eligibility for the benefits (see 66).

Current trend towards increase in benefits of the system

The period 2004 – 2005 was politically charged election period that had tremendous effect on the development of Ukrainian social safety net. Ukraine had presidential election November 2004, which resulted with “Orange Revolution” and ended January 2005. As the result of revolution, power to form the government was shifted from the President to Parliament. A year after first post-revolution government was formed, Ukraine had Parliamentary election (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 poor.

The increases in social benefits were implemented de-facto at 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 II-2). Further increases were planned for 2006 (see 52). As the result, the social welfare expenditures (including pensions) increased from 11.9% of GDP in 2003 to 17.4% in 2005. The government also increased minimum wage 40% (about 30% increase in real terms) in 2005, which resulted in the increase of wages paid to the employees in public sector and increased budget expenditures on healthcare, education, and government employees.

The political situation also did not allow government to increase tax rate and even demands decrease in some taxes. For example, current personal income tax law provided 13% flat tax rate for the period of two years that had to be replaced by permanent 15% flat tax rate in 2006. However, due to the political reasons the increase was postponed. Another example is simplified taxation of small businesses. Previous president in 2001 passed a decree established “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 all taxes on their businesses, including the payroll taxes. The decree had to lost power when the new president was elected in 2004; however the life of this decree was extended because of the adverse reaction of the 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 of 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 \$2bln. from privatization of KrivoroZstal, a largest still-producing factory 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, 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 may be sustained. Extending the offers to the voters, politicians in the parliament election campaign not only promised increase in social benefits, but also promised to decrease payroll taxes from 39% up to the level of 25%. They expressed believes that in the short-run the increased social welfare benefits can be financed from other revenues of the state budget, at the same time reduced payroll taxes will stimulate expansion of the tax base for the social insurance funds in the long-run.

However, international experts do not share believe of the Ukrainian politicians that the increased expenditures can be sustained. The recent issue of the Economic Survey of Europe (see 63) 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 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 can trigger 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 EDC Working Paper #001 (see 56). The paper concluded that it is highly possible that 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. It is noted that the transformation of the SSN resulted in the system that provides small benefits to a large number of people. Since 2004, policy-makers in Ukraine are raising concerns for non-effectiveness of small benefits of the system in reducing poverty in the country. There proposals to significantly increase amount of social benefits, and these proposals are partly implemented in 2005-2006. Based on our theoretical model of SSN for countries in transition which we discussed in EDC Working Paper #001 (see 56), we expect that increase in the amount of benefits will influence behavior of significant number of potential benefit recipients. They will change their economic characteristics and work behavior in order to qualify for stricter eligibility criteria. As the result, we expect that the increase in amount of benefits will result in the non-linear increase in SSN expenditures.

Alternative policy is suggested by the same theoretical model. It is the policy stimulating economic growth in the country by cutting amount of taxes collected by the government, with simultaneous decrease in cost of the social safety net. The policy is based on the expectation that resulting strong economic growth will provide employment opportunities in high-paying sectors of economy and, will be more effective to reduce number of people living in poverty than the extensive social safety net. Further in the paper we establish several macroeconomic models in order to estimate and compare abilities t of economic growth and the SSN to combat the poverty in Ukraine in a long run.

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 II-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

Program name	Number of recipients in 2005	Changes in 2005	Changes in 2006
Pension	13.4 mln.	Minimum pension increased 3.6 times Average pension increased 73%	Minimum pension increased 8% Average pension increased 29%
Unemployment	2.9 mln.	Min benefits increased 25%	Min benefit increased 28%
Temporary disability insurance	Around 6 mln. people a year	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	Around 1.5 mln. families	Benefits increased about 3 times	Benefit increased around 28%
Support to low-income families	2.8 mln. families	Benefit increased around 28%	Benefit increased around 30%

Table II-2. Summary of current social welfare programs in Ukraine

Chapter III: Naive static model

We mentioned that EDC Working Paper #001 (see 56) discussed classical economic model of social safety net. This model involved considerations about behavioral response of individuals to the changes (increases) in social benefits and ability of the government to rise funding for new SSN expenditures. 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 simpler (or naïve) model of countries 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 simple model for the 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 for the assumption of the model do not hold and the results to be incorrect.

Estimates with static model

Conversations with policymakers in Ukraine show that they implicitly use 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, 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 can be the model developed by the coordination committee for pension reform that included representatives of MLSP and pension fund (see 46). The model predicts long-term expenditures and deficit of pension fund under different structure of the fund programs. The model takes long-term forecast of real wage, GDP and inflation developed by the Ministry of Economy, long-term demographics forecast 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 at the pension expenditures analysis by C. Kane at the World Bank (see 39).

There is a number of dynamic models of economic indicators for Ukraine developed at the National Bank of Ukraine (see 53), Ministry of Finance, Ministry of Economy, International Center for Policy Studies, Center for Policy and Economic Research – CASE Ukraine (see 20 , 26, and 43), Institute for Economic Research and Policy Consulting (see 33), 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 fixed proportion of GDP as provided by historical data or take estimates from the ministry of finance. Based on the knowledge of the expenditures as share of GDP, they form expert assumptions about the impact of the expenditures or the fiscal imbalance on monetary aggregates and GDP growth, and enter these assumptions in the dynamic models.

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

Model set-up

Assumptions

The model is based on the following assumptions:

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

Second, the nominal social welfare benefits are growing at a single rate. This assumption can be relaxed, and we can 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 single average increase of the total expenditures. In order to do it, we can weight each increase in benefits on the share of the expenditures for this benefit in total welfare expenditures. For simplicity, we assume a single rate in this model.

Third, we assume that the population structure and number of recipients of different welfare programs stays 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 calculated by 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 bases 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 “de-jure” indicator, and assume that it can be lower, higher or equal to the “true” MSL depending on the current government policy. However, in order to receive accurate prediction of proximity to poverty of Ukrainian population in our forecast, we need to estimate “true” MSL. We assume that the MSL for working person published at the 2005 budget law is the “true” MSL, and that the price of the MSL basket closely follows price of the basket used to calculate CPI. Therefore, the inflation will be proper growth rate for the “true” MSL.

Exogenous variables and outcomes

The exogenous variables for the model are the variables which 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 with which the wage and other income (except for social security benefits) are growing. The forecast for the values of W_RATE can come from official forecasts of economic indicators. If there is no forecast for the growth of wage, 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. This is 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. 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 not 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. This ratio shows how dependent is the population of the country on the 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. 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. 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 the payroll tax revenues.
- ◆ Assumed payroll tax rate. This indicator shows what tax payroll rate is needed to finance the expenditures of the social safety net assuming that whole expenditures are financed by payroll taxes and the tax base remains constant share of GDP.

The following are the variables names at the model:

NGDP – nominal GDP in mln. UAH

INF – rate of CPI inflation

RDGP – rate of real GDP growth

NONSS_INCOME – income from sources other than social security benefits

SS_INCOME – income from social security benefits

SS_EXP - total expenditures on social security

ADMIN – share of administrative costs

MSL – “true” minimal subsistence level

SS_GDP – share of social security expenditures in GDP

NONSS_WEIGHT – share of non-social security income in total per-capita income

INC_PC – income per capita

MSL_RATIO – the ratio of per-capita income to the MSL

POP – population

Given the above variables, the model can be outlined as the follows:

$NGDP = NGDP(-1) * (INF + RGDP)$ (if no nominal GDP forecast available)

$NONSS_INCOME = NONSS_INCOME(-1) * W_RATE$

$SS_INCOME = SS_INCOME(-1) * I_RATE$

$SS_EXP = SS_INCOME * (1 + ADMIN)$

$MSL = MSL(-1) * INF$

$SS_GDP = SS_EXP / NGDP$

$NONSS_WEIGHT = NONSS_INCOME / (SS_INCOME + NONSS_INCOME)$

$INC_PC = (SS_INCOME + NONSS_INCOME) / POP$

$MSL_RATIO = INC_PC / MSL$

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 III-1. The initial values were obtained from the web-site of Committee for Statistics of Ukraine¹. 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” at the Committee for Statistics site. This figure is slightly bigger than the figure 73.7 bln. UAH stated in the report of the MLSP and Pension Fund (see 52). The figure reported at the web-site includes social benefits provided from local budgets that are not supervised by the Pension Fund. The share of administrative expenses is calculated based on the report of expenditures of Pension Fund for 2004 (see 51). The deficit of the social safety net is based on the planned deficit of Pension Fund in 2005 (see 51).

Scenarios and values of exogenous variables

As we noted earlier, the values of exogenous variables are obtained from published economic forecasts for Ukrainian economy where possible. Table III-2 present values of the exogenous variables over the forecasting period. The values in bold are forecasts published at the “Consensus Forecast”(see 50), which is regular quarterly publication by the Ministry of Economy of Ukraine under support of the Millennium Development Goals UNDP Project. The publication presents forecasts delivered by 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 the World Bank offices in Ukraine. The consensus forecast is non-weighted average of the all forecasts submitted to the project. Most forecast provide estimates for two-year period, but some of them provide figures for the development trends in 2008-2010. We extended these trends to the end of the forecasting period of our model. Where consensus forecast was not available, such as nominal GDP forecast, we used estimates based on the equations of the model.

In order to demonstrate properties of the model, we designed seven scenarios which differ in the behavior of policy variable I_RATE: the rate of social benefits growth. The values of policy variable for every scenario are presented at Table III-3. All scenarios assume that the 28% increase of social benefits in 2006 is already pre-determined and can not be changed. The scenarios are defined as follows:

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

¹ See www.ukrstat.gov.ua

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 do 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 policy of real increase of social benefits, but the increase becomes smaller every year, and eventually government assumes policy of maintaining 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: 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 than 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 possibility to decrease the taxes that finance the social security system.
3. If both 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 confirm these conclusions. Figure III-1 demonstrates that if the government policy is maintaining already achieved level of social benefits in real terms (scenario 1), then the expenditures of the SSN will gradually decrease over time given positive real GDP growth. If government of Ukraine adopts this policy since 2007, it will be able to decrease the SSN expenditures to the level that considered being deficit-free (17% of GDP, 82% of which 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 will come down to the deficit-free level of expenditures given enough time.

However, if economy of Ukraine will face a downturn in 2007-2015 and real GDP growth will become negative (scenario 6), then the expenditures on the SSN even just supporting the real level

of 2006 benefits will grow to reach 27% of GDP in 2015. Even if the economic downturn will be moderate and will last only two years, the policy maintaining real benefits at the 2006 level will allow reaching the deficit-free level only by 2015 and will mean accumulating larger debt in meanwhile.

Figure III-2 demonstrates that once government adopts policy maintaining real level of SSN benefits at the already reached level, the share of the social security income in total household income start dropping. However, if the government policy becomes to maintain 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 III-5 shows average per-capita income of household as 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. The Ukraine is country with 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 68). The growing numbers of the average per-capita income of household as percent of the minimal subsistence level may suggest that with the time more families could rely on the informal SSN for staying out of poverty because the income of richer families will grow and lower share of income of rich family relatives will have to be transfer to the poorer relatives. The figure also shows that policy of maintaining current real level of social benefits until the expenditures reach deficit-free level, and then gradually increasing benefits (scenario 4) has the same long-term effect on the average per-capita income as policy of continues increase in real benefits (scenario 5). At the same time, the policy in scenario 4 accumulates lower deficit than scenario 5 (see Figure III-4).

Figure III-3 demonstrates that the payroll tax with the rate of 39% alone can not 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 the SSN expenditures. Continuing increase in social benefits will require further increase in the payroll tax rate, while the conservative policies of keeping the real amount of benefits at the same level over the time allow 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 the time expenditures on social security become smaller proportion of the GDP, meaning that their cost decreases. Therefore, if the a policymaker believes that Ukraine is on the road of economic recovery, then any increase in social security benefits is possible if one can find sources for financing the short-term deficit of the SSN.

Second, the policy chosen by a policymaker with the primary goal to demonstrate increase standard of living for people will 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 increase the benefits as much as possible in 2006-2007, arguing that this increase can be sustained in the long-run (see Table III-4).

For the policy makers with the longer perspective (3-5 years) more beneficial will be policy of gradual increase in social benefits or even policy of changing benefits to maintain a stable level of SSN expenditures (scenario 5 and 3 in our analysis). Table III-5 demonstrates that maintaining the level of SSN expenditures provides opportunity to achieve higher per-capita family income at the end of period. The chart at Figure III-4 leads to the conclusion that this option is also less expensive, requires fewer resources at the initial years, and accumulates less debt over the time. In

addition, the maintaining level of SSN expenditures is more robust policy with respect to the change in economic conditions. In case of economic downturn adjusting the level of benefits to maintain steady level of SSN expenditures will put less pressure on the economy and will accumulate less debt compare to other policies.

Policymaker with long-term perspective (5-10 years) has more policy options and the final choice will depend on the preferences of the policymaker (see Table III-6). However, the policy maintaining steady level of SSN expenditures remains one of the most robust policies. Keeping level of SSN expenditures achieved in 2006 is one of such policies (scenario 3), but this policy lead to accumulating substantial debt over the time or to 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 sustainable deficit-free state before the end of the period.

Current policy solutions expressed in speeches of Ukrainian policymakers are the 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 can be criticized for every assumption it makes: the population of Ukraine is not stable, it is proven that the population is declining (see 46, for example); the number of recipients of the welfare benefits can change (the most frequently used argument is change in demographic structure or eligibility criteria); the welfare policy influences the economic growth and can not be exogenous in the model; and the way of financing the SSN expenditures and the management of the debt can 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 the economic growth is external to social welfare policy. Economic text-books (see 7) argue that transfers from rich to poor stimulate domestic consumption, and, therefore, stimulate economic growth in the country. This argument is often used by the 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 will 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 stable exchange rate policy. With the limited short-term possibility to increase supply of the local goods and stable exchange rate, the extra money received by the poor will be spend on the imported goods and will have no impact on the consumption. Given generally lower quality of the local goods, we can actually expect the opposite effect on GDP: for some portion of population extra welfare benefits will allow to substitute 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 can 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 the 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 can borrow abroad at the interest rate around 4-6%, which is cheaper than 10-14% at the internal market, and it can inject money into the 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 recent history of hyperinflation. Increased inflation in such a country can induce expectations of high inflation, and therefore will have a negative impact on growth.

Even stronger negative effects are 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 the developed market economy such as USA (see 18). In the transition country like Ukraine the main source of employment and productivity growths is associated with private investment in the new sector of the economy (see 68, for example). Financing the social welfare budget deficit by borrowing on the 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 transitions argues that the increasing taxes to finance any government expenditures, including social transfers, will have a negative effect on economic growth. Besides the crowding out of private investment, the increase in taxes stimulates growths of the shadow economy (see 55). The estimates of the model show that keeping the level of social security expenditures at the level reached in 2006 requires increasing the payroll tax rate to 50% level. Recent history of Ukraine demonstrates that during the time when the payroll tax rate was at the level of 52%, the shadow employment was at the level of about 40% (see 39). Increasing the shadow economy will decrease the tax base and, in turn, will decrease the government's ability to collect revenues and finance the SSN expenditures.

Frequently mentioned by the politicians in Ukraine is the possibility to finance the increased SSN expenditures by increased collection of VAT or newly introduced real estate tax. This 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 do not lead to growths of 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 harm GDP growth in the short-run.

The real estate tax will decrease the expected profits from owning real estate. It will decrease the price of the real estate. Highly profitable currently in Ukraine is the construction business, which was a buster of economic growth in Ukraine for several past years (see 14). With lower prices the profitability of construction will go down, and the speed of construction sector growths will decline, reducing the GDP growth in the country. The effect of the link between SSN expenditures and the economic growth and its implications for policy options in Ukraine will be discussed in other chapters of this paper.

Second is the assumption that the number of the welfare recipients will remain stable. We already mentioned a reliable demographic forecast of the change in the composition of the 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 in the models for pension system expenditures in Ukraine, for example the model developed by coordination committee on pension reform (see 46). 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 can not be influenced by the social welfare policy and can be considered exogenous.

Immediate effect on the number of participants and, therefore, the expenditures of the SSN can be achieved by changing eligibility criteria for the social welfare programs. Discussing the policy of further increase of social benefits, the policymakers in Ukraine often mention narrowing eligibility criteria for the programs and introducing means-tested programs in order to keep expenditures at the reasonable level. These changes were successfully introduced at the small-scale welfare programs, but the policymakers require strong political will to reduce eligibility for the large-scale programs. For example, the simple change in the eligibility for pensions – increase in pension age – was not implemented over the past ten years due to the lack of political will (see 6).

Welfare programs that are based on the criteria that might be influenced by the potential recipients, such as income in the means-tested programs, may change number of beneficiaries due to the human response to the increase in benefits. Some potential beneficiaries may alter their behavior, for example, drop out of work, in order to qualify for the 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 67) find that current level of unemployment benefits do 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. Further chapters in the paper 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 III-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 III-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 III-3. Rate of social benefit growth in different scenarios

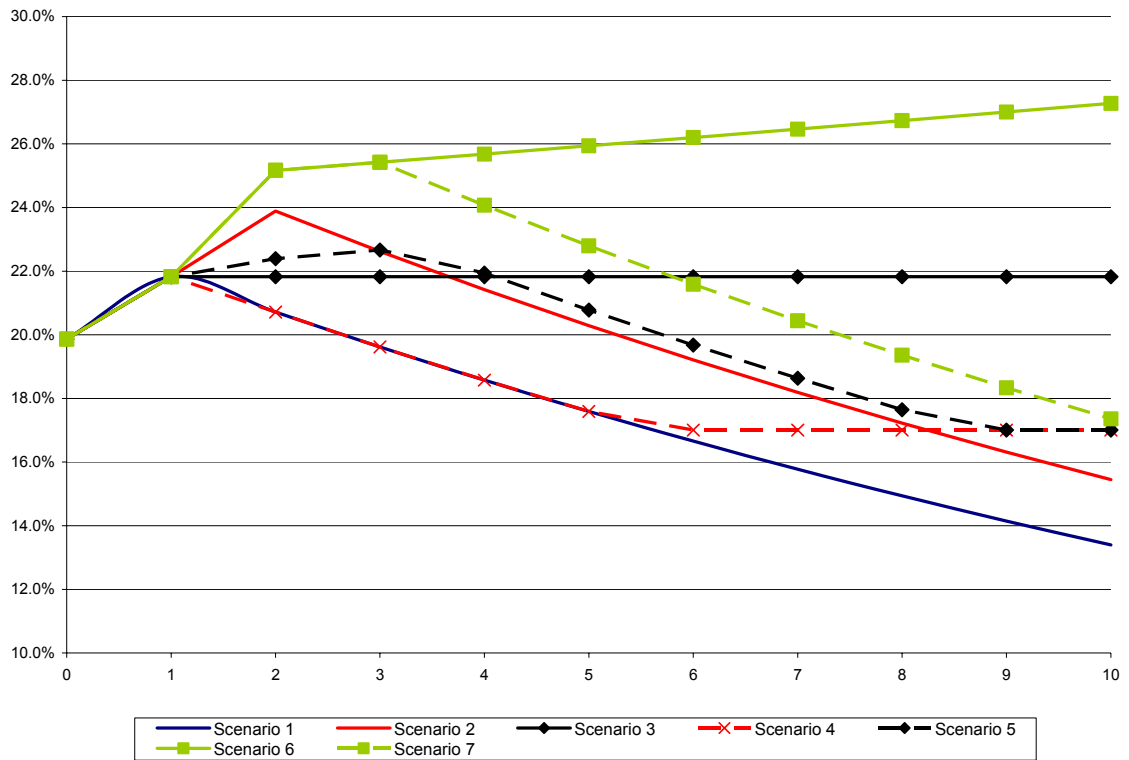


Figure III-1. Results: Social Safety Net expenditures as % of GDP

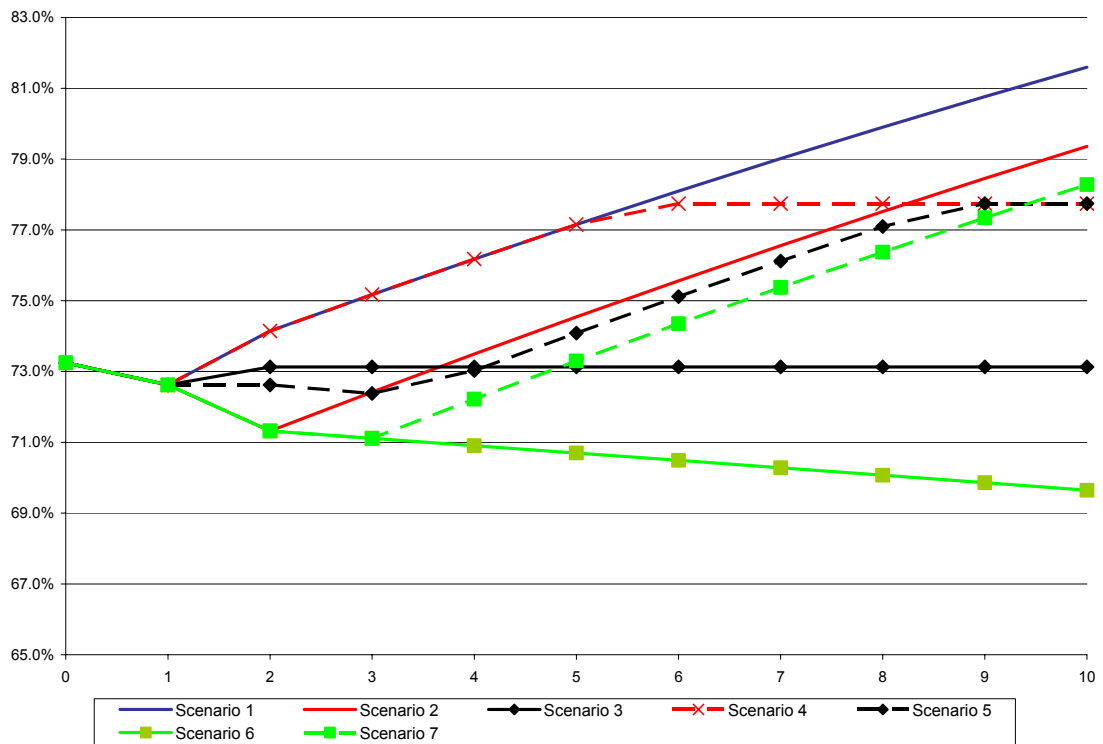


Figure III-2. Results: Share of non-social security income in total household income

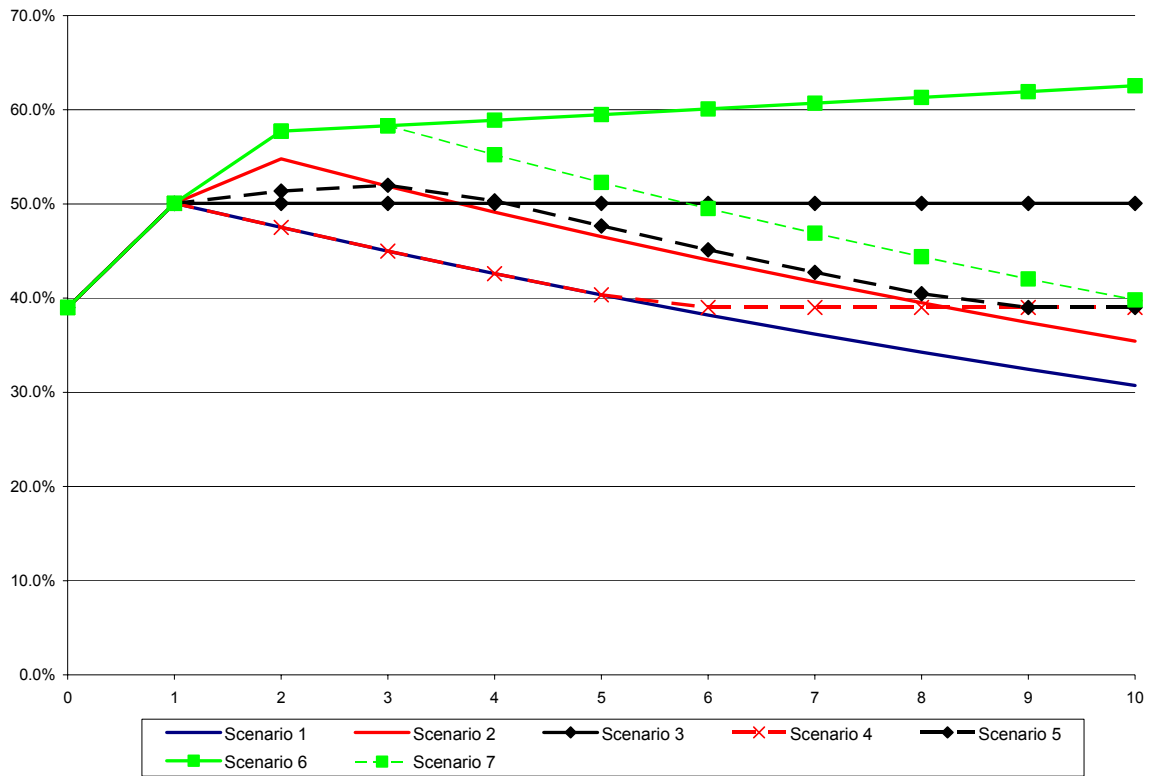


Figure III-3. Results: Expected payroll tax rate

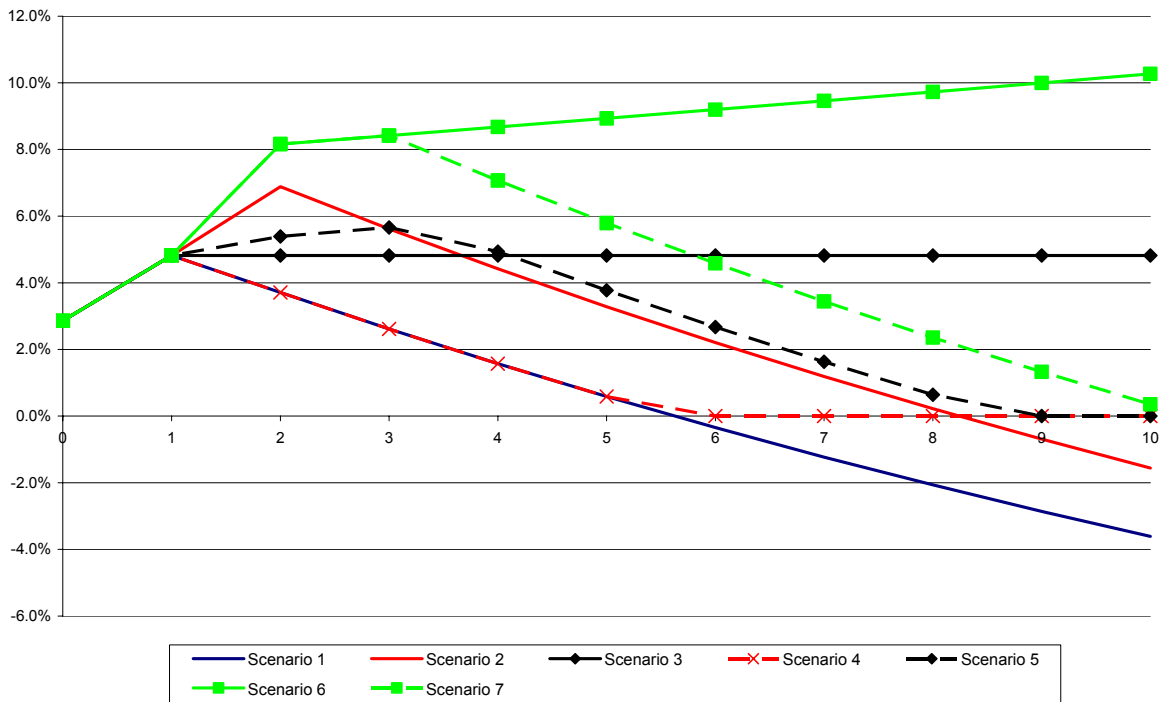


Figure III-4. Results: Additional deficit as % of GDP

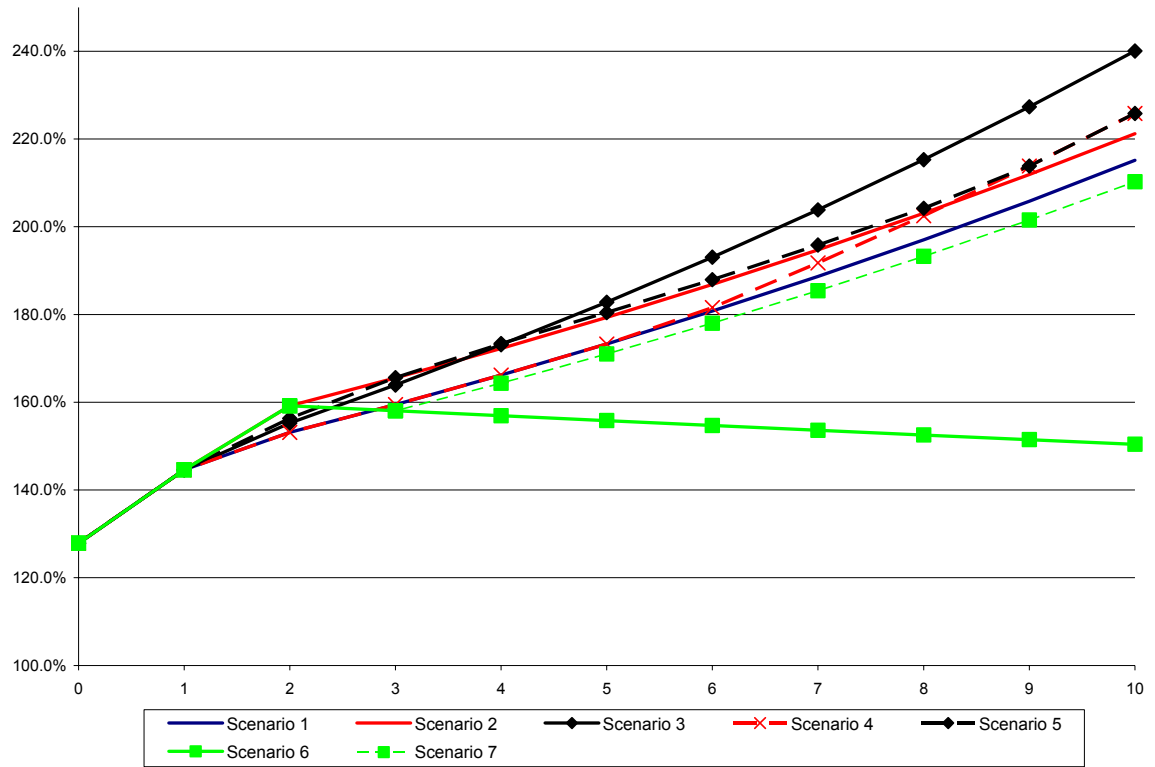


Figure III-5. Results: Average total per-capita household income as % of minimal subsistence level

	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 III-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 III-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 III-6. Results of modeling for year 2015

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

As we pointed earlier, the assumption about independence of macroeconomic variables in our model 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 can expect negative and positive effects of increase in social safety net expenditures on the inflation and GDP growth in the country. These effects will determine government ability to finance the social programs, which in turn will translate in the growth effect in the next period. In extreme cases expending social policies can trigger spiral of economic downturn.

In this chapter we discuss the possible effects of increase 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 positive effect of increase 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 simple microeconomic model to analyze social security problems, we established that increased social benefits generally decrease labor supply of the recipients. We also showed that taxes on labor decreases relative cost of leisure. If utility function of individuals is such that income effect is smaller than substitution effect, then taxation of labor decreases labor supply of individuals. The conclusion from the simple model was that increase in benefits or increase in taxes has to decrease labor supply, or total employment in the economy.

In previous chapters we also established that increased benefits can impact enterprises: increased taxes or government deficit can crowd out investment; increased payroll taxes can decrease labor demand; additional income of poor population can increase demand for some goods, and, given limited supply, cause inflation. There is wide literature about the macroeconomic impact of increase in government spending and social welfare benefits in particular. The empirical evidence in these publications suggests that the negative effect of the increase in social benefits on investment and labor supply outweighs its positive impact on private consumption. The literature discusses three major channels for the impact of benefits on economy: decrease in employment, growth of shadow economy, and direct impact on the GDP growths, 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 EDC Working Paper #001 (see 56). 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 a budget constraint $c=b+(1-\tau)*w*(T-l)$. The model implies that the larger benefit b received by an individual, the less he/she will work, since he/she can afford larger consumption of both goods and leisure. This effect also leads to the change in behavior for some people, who prefer work less (or drop from work) in order to qualify for the benefit. These effects are widely observed on the individual level, and they result in larger cost of welfare programs. However, the effect of the increased benefits on total labor supply is relatively small because only small fraction of the labor force is affected.

Larger effect on the labor supply and employment is observed when government imposes or increases taxes on wage in order to finance the 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 wage 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 person to consume more leisure in order to increase the level of utility. If income effect dominates the substitution effect, the workers will work more after increase in tax rate. However, the imperial estimates suggest that the substitution effect dominates income effect, and the elasticity of labor supply to increase in taxes is negative. Report of the Congressional Budget Office of USA in 1996 (see 15) reviewed a number of studies (see Table IV-1) and concluded that labor supply elasticity to change in wage range from 0 to 0.3 for whole population.

Increase in taxes on wage does not necessarily result in 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, the individual labor preferences are aggregated into labor supply function. Enterprise’s demand for labor is also aggregated into labor demand function. Conventional market economy model suggests that the employment and wage is set by intersection of these two curves (see Figure IV-1). Tax on workers wage shifts labor supply curve (LS) up (to LS(T)) , and market equilibrium shifts from point A to point B. 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 labor demand (LD) curve down (to LD(T)), resulting in lower equilibrium wage, and shifting some portion of tax on 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 29).

Possibility to shift taxes on employees (in form of reduced post-tax wage) depends on the elasticity of labor supply. Less elastic labor supply allows decreasing wages higher without significant loss in hours worked. Perfectly inelastic supply of labor allows shifting payroll taxes to employees. Kugler in his 2003 paper (see 44), and then Gora et al. in 2006 (see 29) 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 the 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 the social security contributions (payroll taxes) are social insurance for the workers, and can be viewed as savings. If workers believe in the system, then they have to treat their payroll taxes as part of the 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 on employees without change in employment (see 27). However, there is little evidence of this intertemporal substitution effect (see 28 and 29).

Instead, a number of studies find significant effect of change in payroll taxes on employment. Kugler estimated that 10% increase of payroll taxes resulted in 4-5% reduction in employment in Columbia (see 44), Gora et al. (see 29) found that same increase will result in 5% reduction of employment in Poland, and Gwartney et al. (see 28) suggest that 10% increase in after-tax wage will result in 3% increase in employment in USA. From the review of results found in the literature (see Table IV-2) we can conclude that the labor tax elasticity of employment in Ukraine can 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 the recent experience of the country. The shadow economy in Ukraine was estimated to be 40% of the official economy in 1996 (see 40) and about 20-39% in 2000 (see 49 and 48).

The shadow economy in a country can 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 the employment (for example, as in the continental social security system model), then the workers in shadow economy are not eligible for this benefits. If the workers trust the social security system to deliver insurance when they need it, then larger 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 36 or 9) 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 effect of increased social security contributions or other taxes that finance the SSN. Taxes are found one of the major causes for unofficial economy by all studies reviewed. Large payroll taxes increase incentive for employers paying their employees of the record. Large personal income tax stimulates employees to agree receiving payments of-the-book. If other taxes are relatively low, large 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 official economy. However, if other taxes are also high, then both workers and enterprises are better off conducting part of the business in shadow economy. First several years of transition most of the FSU countries had payroll taxes at the level around 50%, progressive personal income tax with rates up to 50%, and profit taxes around 30-40%. It resulted in development of massive unofficial economies and shadow employment in these countries (see Table IV-3).

Both tax rates and complexity of tax system are important determinants of the size of shadow economy. Schneider in 2003 (see 59), Johnson et al. in 1999 (see 36) showed that the complexity of the tax system measured by propensity of tax exemptions is more important determinant of the shadow economy size than the tax rates. Similar result was described for Ukraine by U. Tiessen et al. in 2001 (see 49), who showed that the complexity of regulations, including the tax system, is the most important determinant of the shadow economy in Ukraine.

Tax burden, measured either as the tax rates or as 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 IV-4). Studies that made distinctions between different taxes found that indirect taxes are less significant determinant of the size of shadow economy, while direct taxes on wages and profits had significant impact on the size of unofficial activity. In Ukraine, combination of personal income tax and social security contributions found important determinants of the shadow economy size before the personal income tax reform in 2004. U. Tiessen et al. (see 49) 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 it was historically observed.

Ukrainian government recognizes that high taxes cause huge tax evasion and expansion of the shadow economy. In order to reduce distortions caused by the high taxes and following example of Russia, it reduced personal income tax rate to 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 substitute different taxes (including payroll taxes) with a low lump-sum tax or a single flat-rate tax (see 2 for details).

The reduced and simple personal income tax almost illuminated incentives for workers to stay with shadow economy. However, there is no evidence from Russia or Ukraine that low flat income tax

were sufficient to cause reduction in shadow economy. On the other hand, relatively large payroll taxes and simplified taxation create strong incentive for enterprises to stay in shadow economy. It also means that any attempt to increase payroll tax rates or collection will lead to increase in shadow economy. 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 mln. private and legal entities using simplified taxation in Ukraine today (see 2), and they were able efficiently lobby at the Parliament. The Parliament did not support government attempt to collect payroll taxes from these entrepreneurs. If the government succeed in changing the simplified tax legislation to collect payroll taxes from these enterprises, it inevitable forces these enterprises into unofficial economy.

Effect on GDP growth

Social security system and changes in social security benefits can impact the GDP growth through two different channels: one is reduction of income inequality, and another is effect of government expenditures and it's financing. Theoretical and empirical research does provide evidence of both positive and negative impact of these factors on GDP growth; however recent studies at the EU and USA suggest that the negative effect prevails.

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

On the other hand, the traditional economic theory associates economic growth in the country with the ability to save and invest. Empirical evidence suggests that rich have higher propensity to save than the poor, therefore redistribution of income from rich to poor should decrease investment and the rate of growth in closed economy. Social transfers also discourage people from work, reducing employment, output, and consequent investment and growth. Arjona et al. (see 3) 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 the equalization of incomes though social transfers most probably reduces growth in the countries of the union.

We already discussed that financing the social safety net by either taxation or borrowing makes negative effect on the economic growth. Taxation of labor discourages work, while taxation of capital or profits discourages investment and economic activity. Although magnitude of the effect is different for different taxes, and the indirect taxes 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 IV-5).

The budget deficit 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 of social safety net programs can induce economic growths only if it is used to significantly improve quality of low-income labor force. In other cases, the budget deficit would crowd out private investment, and, therefore, reduce rate of economic growth (see 65, for example).

The size of the government and the impact of the government expenditures on the GDP growth came under investigation of researchers in the last decade. Barro in 1990, and later Armeij in 1995 pointed that size of the government can have two effects on the economic growth: first, the

government provisions of core government services, such as property rights protection, rule of law, internal and external security, provides environment stimulating economic growth. However, disincentive effect of large taxes, government borrowing and increasing deficit, and slowing discovery and wealth-creation process depresses the economic activity. Therefore, in the countries where government is small and government services are underdeveloped, increase in government expenditures leads to better business environment, and, therefore, will stimulate economic growth. However, when the government becomes larger, it starts performing services or producing goods that can be produced by market economy. Even if the government production of such goods is as efficient as private production, changes accrue slower in public sector, delaying introduction of new technologies or changing to the new world realities. Therefore, in the countries with the large government further increase in the size of the government decreases rate of economic growth.

Armey argued that the dependence between the size of the government and the rate of economic growth has \cap -shape, and introduced 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 the tax rates. Policy makers often use the Laffer curve to determine the level of taxes that maximize the tax revenue. However, the revenue-maximizing taxes support government that is larger than growth-maximizing level. In his recent work Pevcin (see 54) showed that government expenditures of European countries approximately 19% higher than the Armey-optimal level.

Number of research 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 IV-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 the 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 lay in a certain range, and we will present outcomes for a number of possible values of the parameters. 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 forecasted for the next year on the bases of the current year results. Then the correction for the current real GDP growth will be forecasted 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 the social policy and level of government expenditures.

We would like to create two alternative models with different feedback loops. First, since the Ukrainian policy maker are concerned with effect the increased social security taxes have on the growth of shadow economy, we would like to use simple linear equation for size of shadow economy. We assume shadow economy stays the same proportion of official economy, except when there is additional increase in shadow economy, which is fully achieved by shift from official economy to unofficial economy, and, therefore, increase in shadow economy will constitute

proportional decrease of official economy. The real GDP growth in the official economy will be corrected for this shift. The shadow economy growth equation will be:

$$\Delta SHE = \Delta SHE(-1) + \alpha * \Delta(SS_EXP/E_GDP)$$

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

$$GDP = E_GDP * (1 - \Delta SHE)$$

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

Second model is based on Armeij curve, in the form adopted from Pevcin (see 54). We assume that the government expenditures (excluding the social security benefits) as percent of GDP are at the constant level of 2005. Based on the parameters estimated by Pevcin, the equation for Armeij function for Ukraine takes the following form:

$$ARGDP = \beta_1 + \beta_2 * (GOV + SS_EXP / E_GDP) + \beta_3 * (GOV + SS_EXP / E_GDP)^2$$

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

The model now takes the following form:

$$W_RATE = NGDP$$

$$NONSS_INCOME = NONSS_INCOME(-1) * W_RATE$$

$$SS_INCOME = SS_INCOME(-1) * I_RATE$$

$$SS_EXP = SS_INCOME * (1 + ADMIN)$$

$$MSL = MSL(-1) * INF$$

$$SS_GDP = SS_EXP / NGDP$$

$$NONSS_WEIGHT = NONSS_INCOME / (SS_INCOME + NONSS_INCOME)$$

$$INC_PC = (SS_INCOME + NONSS_INCOME) / POP$$

$$MSL_RATIO = INC_PC / MSL$$

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

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

(1)

$$\Delta SHE = \Delta SHE(-1) + \alpha * \Delta(SS_EXP / E_GDP)$$

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

$$NGDP = E_GDP * (1 - \Delta SHE)$$

$$RGDP = NGDP / NGDP(-1) - INF$$

(2)

$$ARGDP = \beta_1 + \beta_2 * (GOV + SS_EXP_{-1} / NGDP_{-1}) + \beta_3 * (GOV + SS_EXP_{-1} / E_GDP_{-1})^2$$

$$RGDP = ARGDP + NRGDP$$

$$NGDP = NGDP(-1) * (INF + RGDP)$$

The initial conditions for the model are calculated based on the data for year 2005, and they are the same as conditions for 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 policy variable for every scenario are presented at Table IV-7. All scenarios assume that the 28% increase of social benefits in 2006 is already pre-determined and can not be changed. The scenarios are defined as follows:

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

Scenario 2 and 5 assume 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 and 6 assume that after increase in 2006 government maintains the level of social expenditures it reached in 2006, and then attempts to increase social benefits to maintain the expected expenditures at the same level. In order to achieve the goal, the government will index social expenditures with 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 growths, and the results significantly depend on the form of relation that we choose. Figure IV-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 at the simple model. However, than social security expenditures as percent of GDP start decreasing, the feedback based on the shadow economy model allows for the growth rates higher than predicted in 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 the GDP growth determine the differences in other indicators. Under all scenarios the cost of the social safety net (see Figure IV-3) and the additional deficit created by increased social benefits (see Figure IV-6) are higher than predicted by the naïve model in previous chapter (the scenario 7 represents this forecast). The policy maintaining real level of SSN benefits at the level achieved in 2006 requires expenditures similar to 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 percent of GDP, they also result in lower share of non-social security income in total family income (see Figure IV-4). The difference in predicted share of non-social security income between two models for GDP feedback is lower for the scenarios that assume higher level of SSN benefits. It 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 at greater detail.

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

Exploratory analysis

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

We start with the simpler feedback model based on the shadow economy growth. Forecasted values of safety net expenditures and real GDP growth will be contained in the shaded areas at Figure IV-7 and Figure IV-8 respectively. We can see that higher elasticity of shadow economy growth with respect to SSN expenditures leads to higher share of the 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 faster recovery of real GDP and higher growth rates at the end of the period.

The exploration of the Armeij curve feedback equation is more complex because the equation has three coefficients. In order to demonstrate effect of change in different coefficients, the estimates put at the same graphs (see Figure IV-9 and Figure IV-10) with complex system of coding: blue lines represent cases with intercept (β_1) equal to -0.03, and the green 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 yellow 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 Armeij curve are very sensitive to the change in both elasticity of positive reaction on the level of expenditures and the negative reaction on the level of expenditures. 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, small increase in the elasticity of negative response to the level of expenditures (β_3) leads to the negative real GDP growth and forecasted constant increase in cost of 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 IV-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.

Conclusions

Use of the macroeconomic model with GDP feedback can significantly alter the policy decisions based on the evaluation of the cost for the social safety net. Forecast 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 will 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 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 SSN system even more expensive since lower rate of GDP growth increases interest rates at which government can 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 leaving below or close to the poverty line after policy is implemented will be larger than expected when the decision based on 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 bellow poverty line or on the 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.

Tables and figures

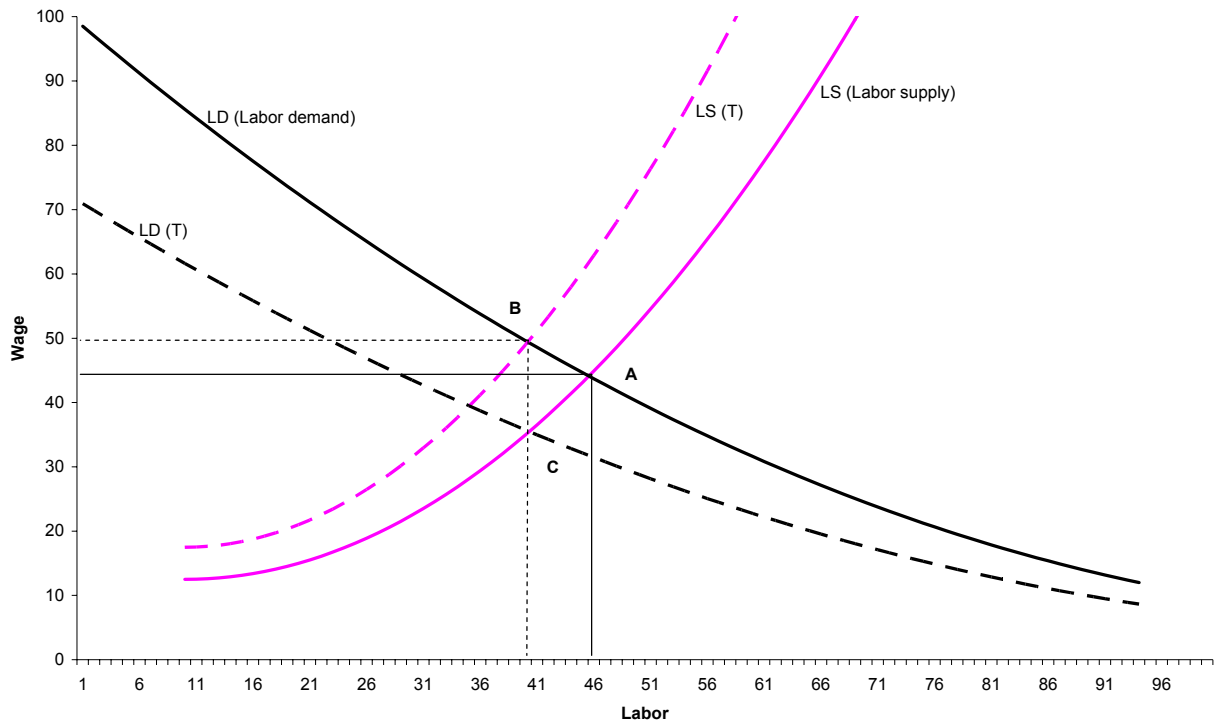


Figure IV-1. Aggregate labor supply and demand

	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 IV-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
		Size of the income tax elasticity of:
		-0.017 employment rate of high-skilled male and -0.53 of low-skilled male
Gora et al. (2006)	New EU states and OECD	-0.53 employment growth rate new EU states and 0.014 old OECD
Gora et al. (2006)	Poland	10% increase in labor tax rate decreases total employment by 7%
		Labour tax rate elasticity of unemployment rate
		0.58 continental model
Daveri and Tabellini (2000)	OECD	0.26 anglo-saxon model
		-0.07 nordic model
		10% increase of payroll taxes
Kugler&Kugler (2003)	Columbia	lead to 1.4%-2.3% decrease in wages and 4% to 5% decrease in employment,
		decrease of payroll taxes did not impact employment, resulted in increased wages
Gruber (1997)	Chili	
Bell et.al. (2002)	Great Britain	no significant impact of change in labor tax rate on employment
		1% increase of labor cost implies increase of 1.5% in the probability of transiting from employment to non-employment
Kramarz and Philippon (1999)	France	
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 al. (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 IV-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 IV-3. Shadow economy in different transition countries

Source: Schneider, Friedrich (2002). "The Size and Development of the Shadow Economies and the Shadow Economy Labor Force: What Do We Really Know?", Working Paper, University of Linz, Austria.

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)	Greece, Spain, and France	Social Security contributions are not significant determinants of shadow economy is France and Greece, 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 IV-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 IV-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% 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%
Leibfritz, Thornton and Bibbee (1997)	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 %
Arjona,Ladaique and Pearson (2002)	OECD	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	$GDP \text{ per capita growth} = -206.3 \ln(G) + 954.66$ $GDP \text{ per capita growth} = -55.293 \ln(\text{wage tax rate}) + 350.44$
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 IV-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 IV-7. Model scenarios

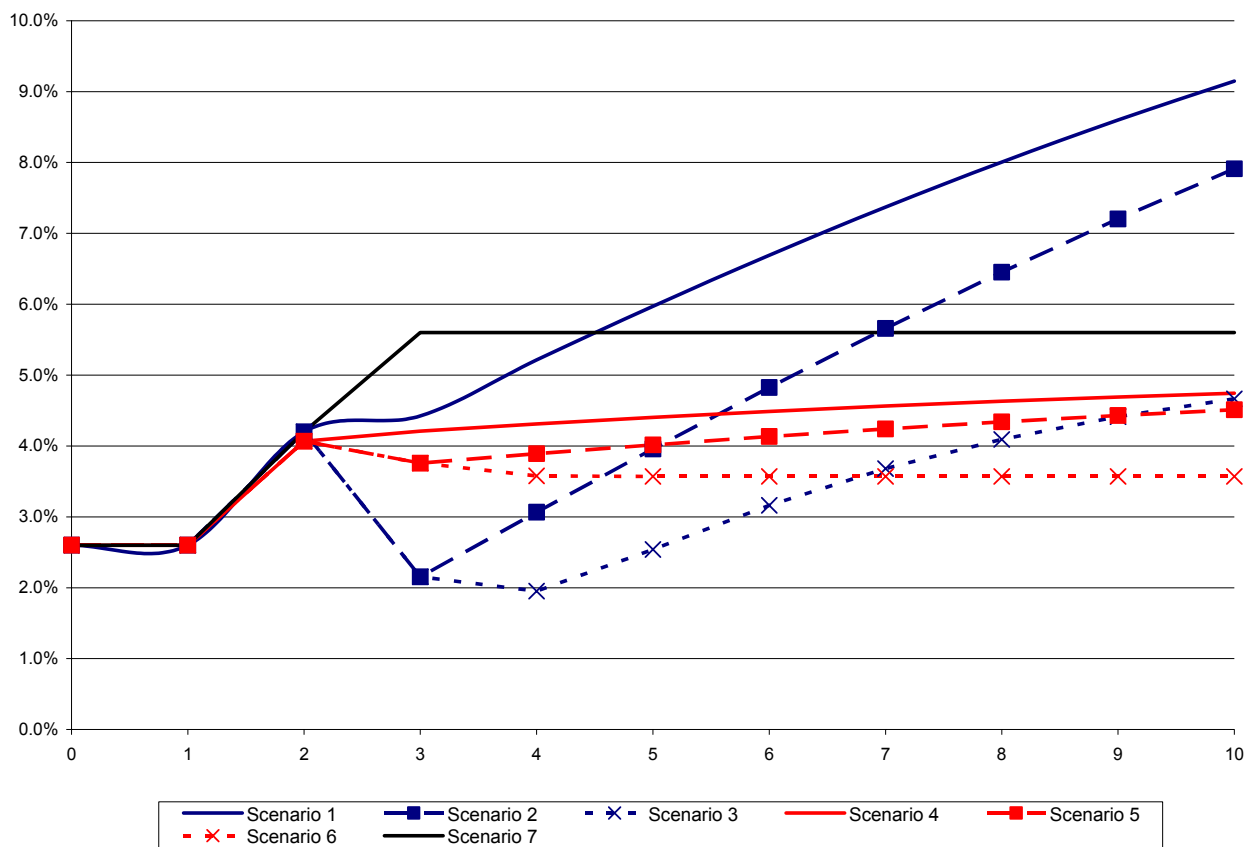


Figure IV-2. Model estimate: real GDP growth rates

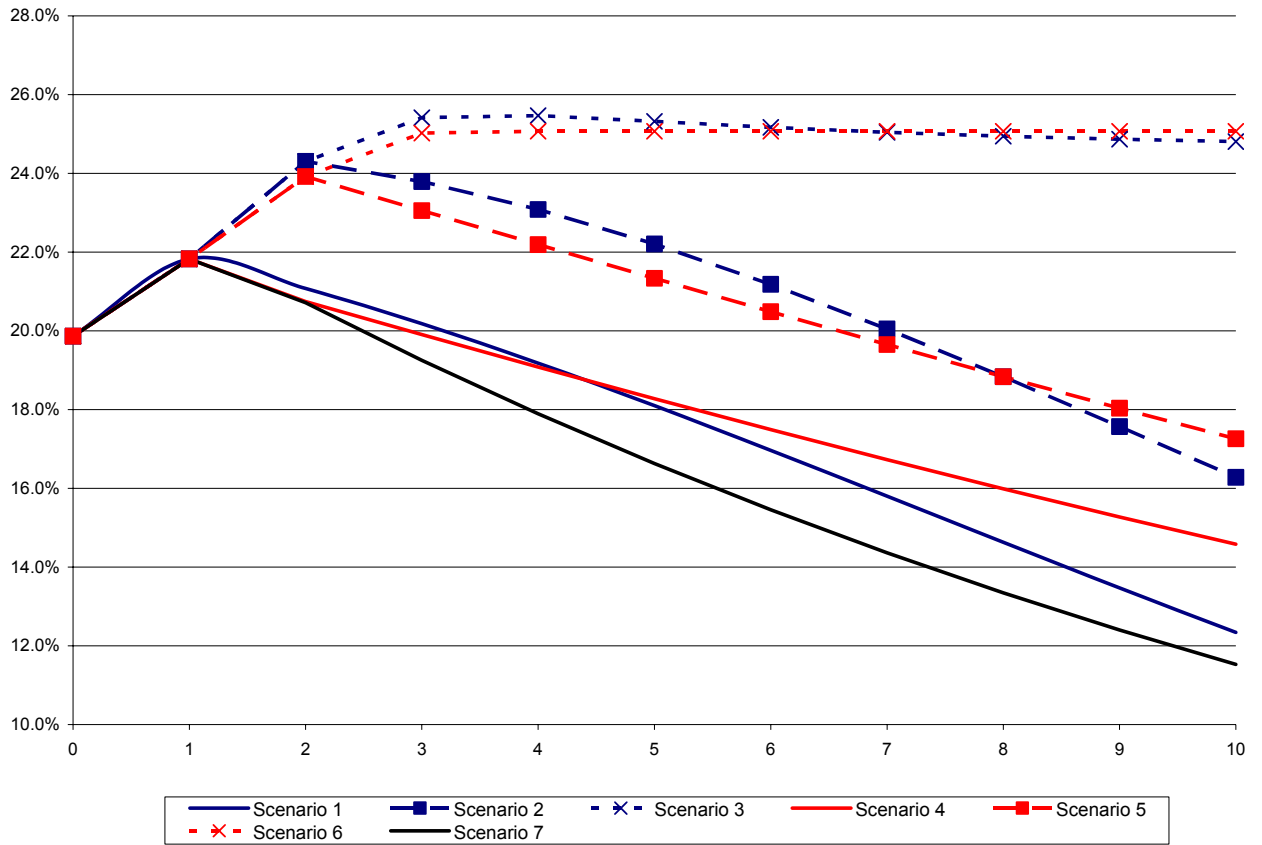


Figure IV-3. Model estimates: share of SSN expenditures in GDP

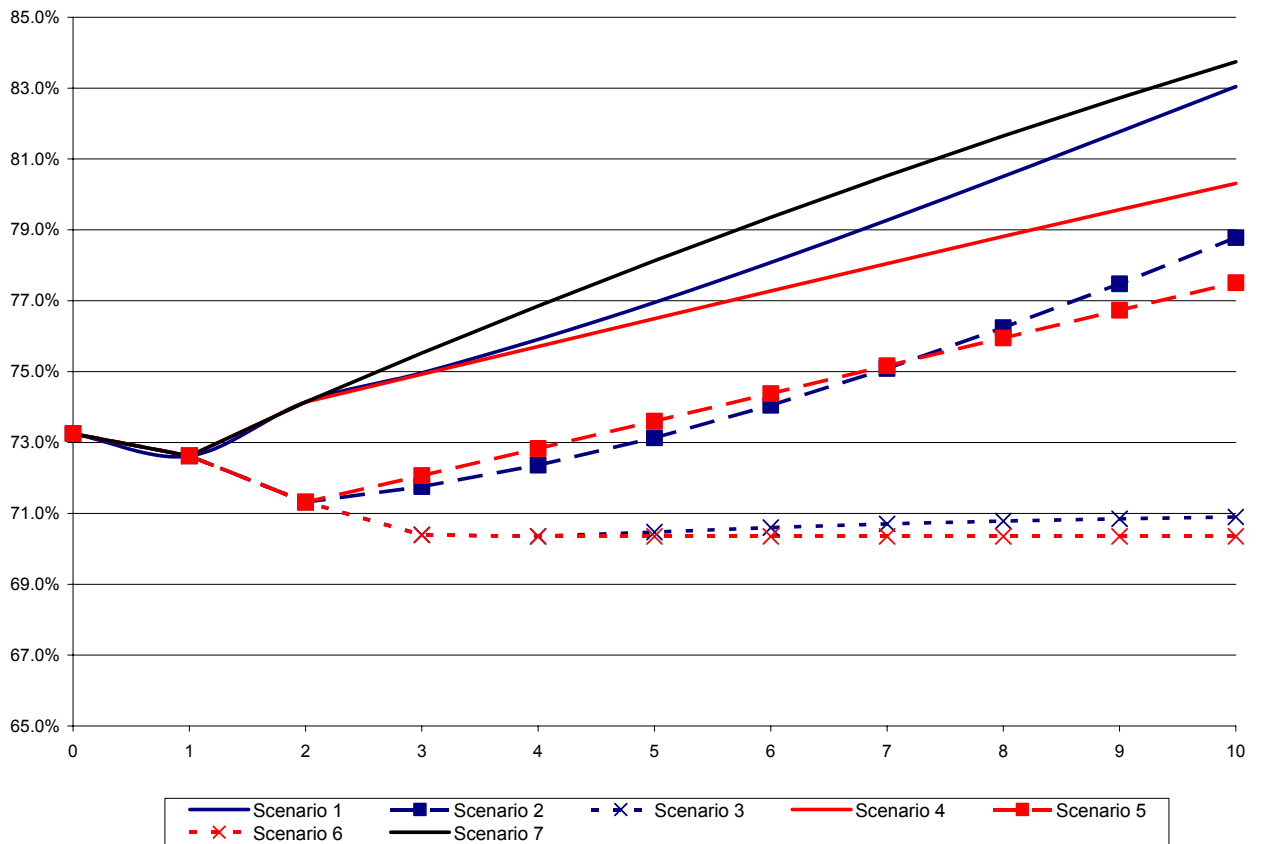


Figure IV-4. Model estimates: share of non-social security income in total income

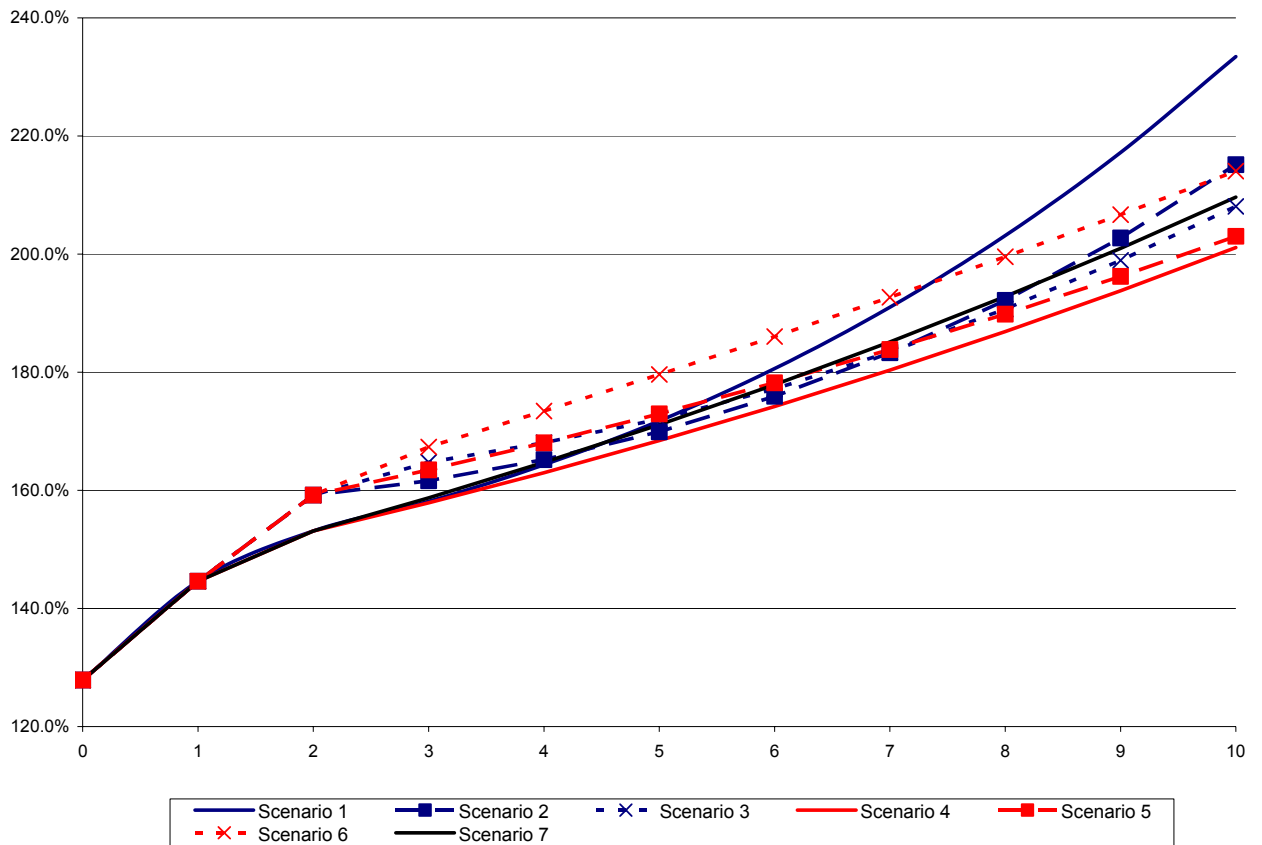


Figure IV-5. Model estimates: per-capita income as percent of minimal subsistence level

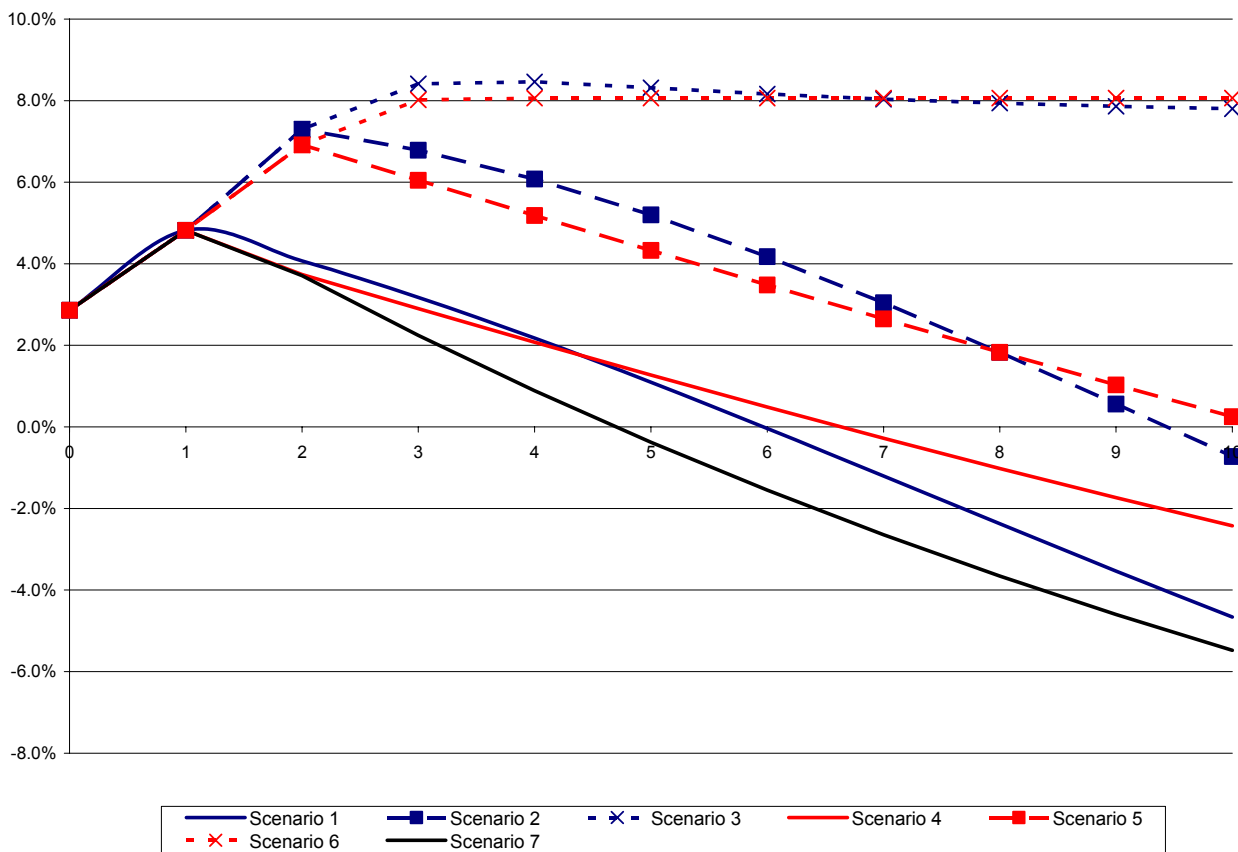


Figure IV-6. Model estimates: additional deficit as percent of GDP

	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 IV-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 IV-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 IV-10. Results of modeling year 2015

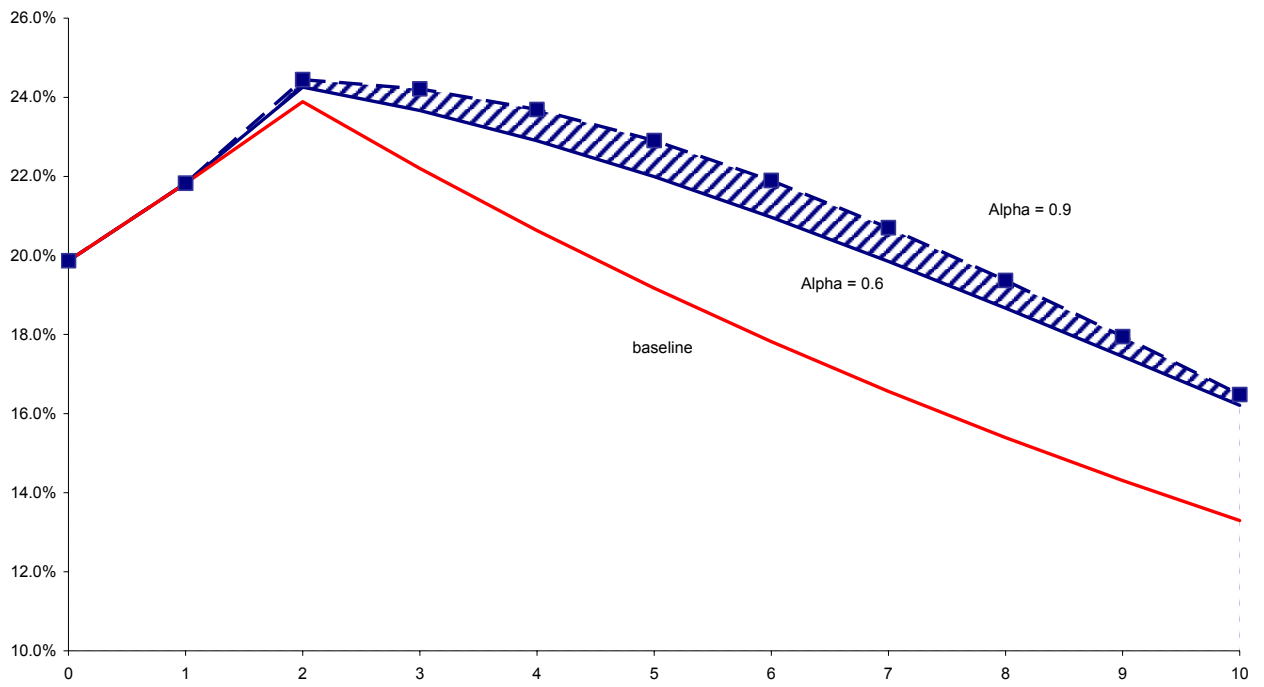


Figure IV-7. SSN expenditures for different elasticity in shadow economy model

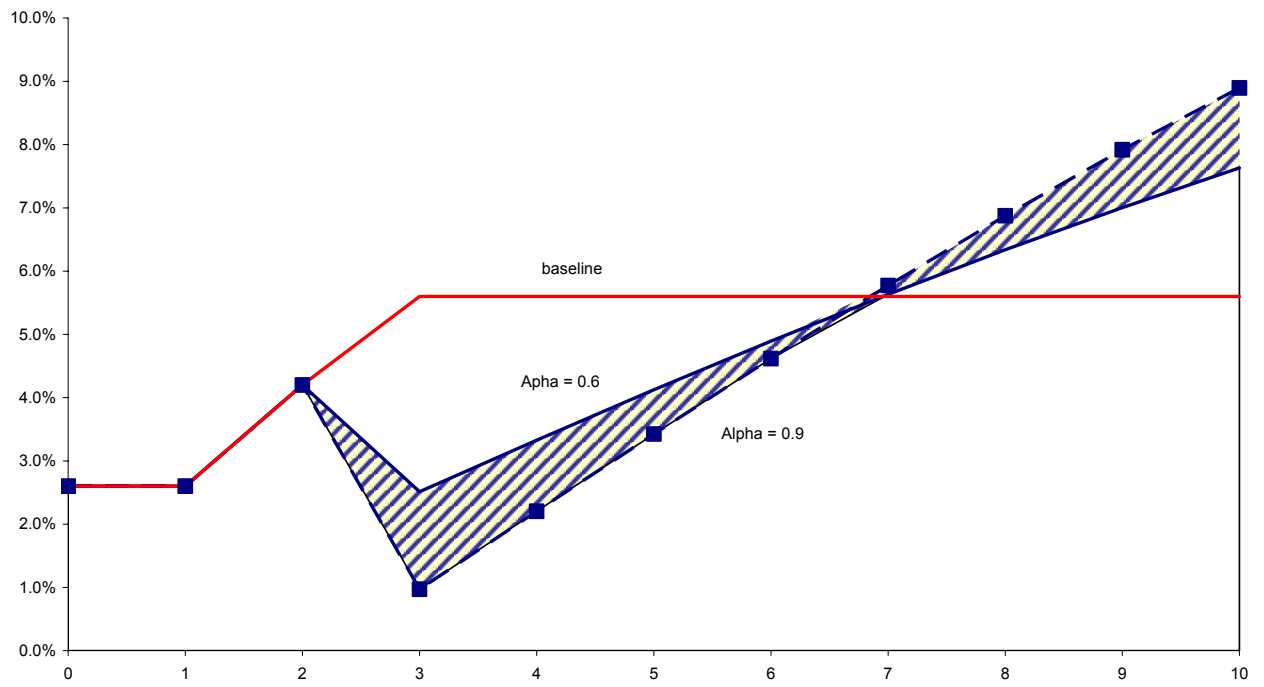


Figure IV-8. Real GDP growth for different elasticity in shadow economy model

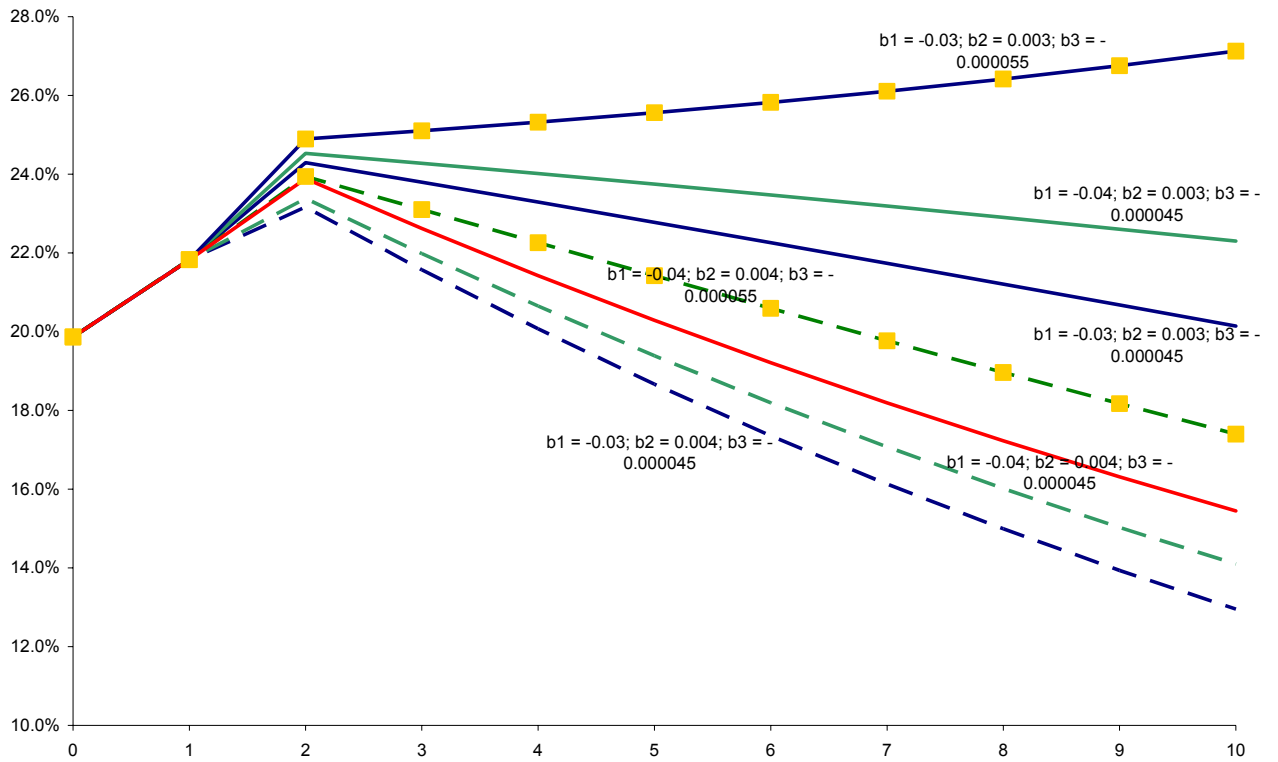


Figure IV-9. SSN expenditures with different elasticity in Army equation

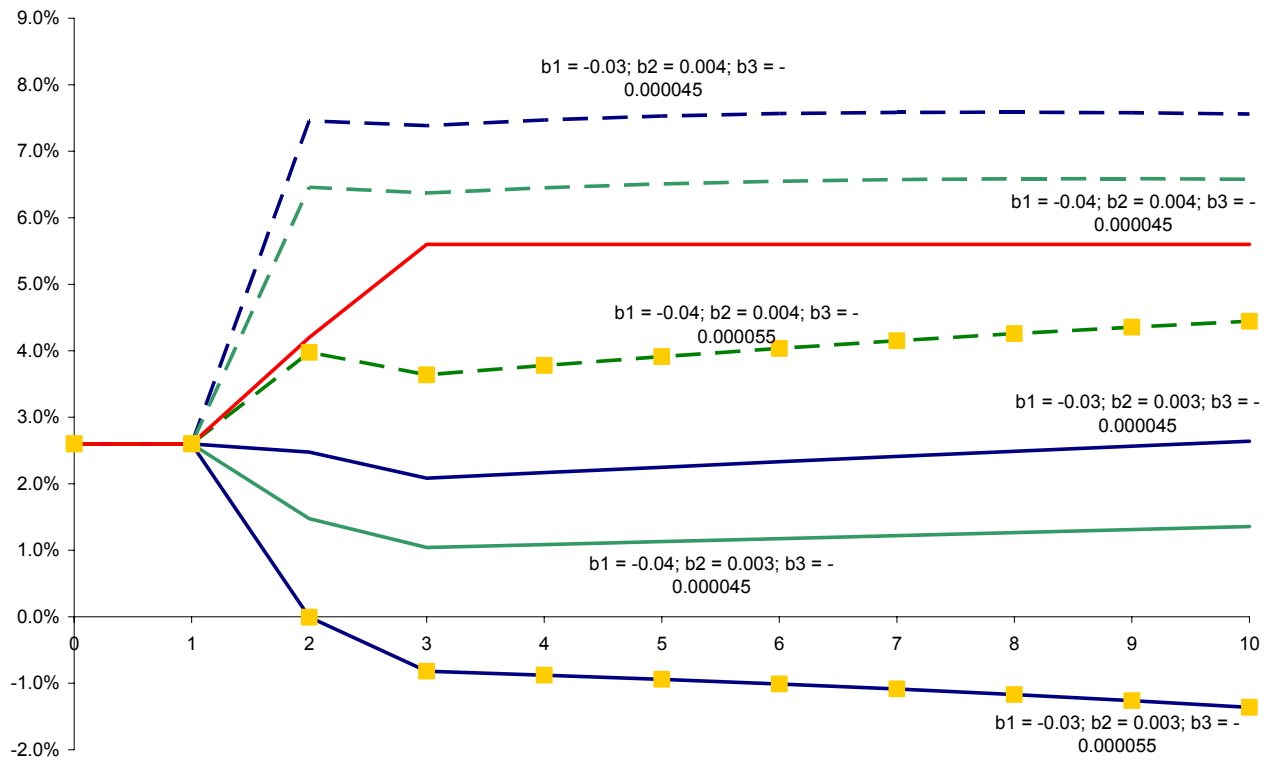


Figure IV-10. Real GDP growth with different elasticity in Army equation

Chapter V: Conclusion

The goal of the paper was to evaluate macroeconomic implications of changes in social welfare policy in Ukraine and to help policymakers identifying the best and most robust solutions. We created two macroeconomic models that allow forecasting social safety net expenditures over time, and obtained estimates for several plausible social policies.

The models that assume GDP feedback of increase in social expenditures (developed in this paper) 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-modeling techniques to the specifics of Ukraine and in introduction of human behavioral response into discussion about the effect of social security reform in Ukraine. Researchers of the country measured effect of social benefits on duration of unemployment in the country, but it was never incorporated in forecasting model and used for policy analysis before this work. This chapter concludes the paper and summarizes main findings about evaluation methodology and policy options for social safety net reform in Ukraine. Based on the findings of the paper, we provide conclusions about further research and development of the tools for evaluation of social system in Ukraine.

Policy evaluation tools

The paper developed and discussed two models for forecasting costs of the social safety net in Ukraine: a simple (naïve) model macroeconomic model and a macroeconomic model with GDP feedback from social expenditures. We showed that naïve macroeconomic model that is currently implicitly used by Ukrainian policymakers to analyze costs of SSN reform significantly underestimates these costs. The underestimation of the costs could lead to policy decision that are infeasible and can ruin economics of the country.

GDP feedback introduced into model also showed that naïve model overestimates social expenditures as percent of GDP in case when reduction of total government expenditures stimulates economic growths. 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 short period of time for which statistics is available, and over a period of economic transition. The estimates of model parameters over this period is unreliable, consequently, the current models rely more on experts' opinion than on the model forecast.

We used two models for the GDP feedback: model based on the effect of tax burden on growth of shadow economy and model based on Armey curve. The advantage of this work is that parameters of the models were obtained from international research based on sample of OECD countries. Both model demonstrated similar results, and the results were stable under wide range of parameter estimates around the values described in the literature. We found that models estimated on a sample of developed countries may underestimate positive effect of reduction in taxes on economic growth in country because they do not take into account structural changes in economy. However, these models provide solid conservative estimate of the effects on growth which allows selecting social policy that is feasible under wide range of circumstances.

Policy conclusions and recommendations

The paper generally confirms the findings of the previous EDC Working Paper (see 56) on this issue:

Policies of increasing social benefits of the current social safety net system are the least optimal policy within the scope of polices available to Ukrainian policymakers. The policies that stimulate economic growths by delaying increase in social benefits are generally fiscally sustainable, and are more effective in fighting poverty in the long-run.

Economic growth in the country estimated to have long-term poverty-reduction effect 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 will be comparable with the number of people below MSL achieved if social transfer programs have current structure and amount of funds). Therefore, successful social reform in Ukraine have rely more on economic growth and active policies that stimulate these growth (such as education, assistance in job search, legal support of employees, help in relocation, etc.) than on simple increases in the amounts of benefits.

Suggestions for further research

Although this paper 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. However, the macro-level research has limited ability to analyze the consequences of the social safety net reforms. There are a number of possible policies that are budget neutral, but are very different on the micro-level. One of the policies that we discussed in previous EDC Working Paper (see 56) was minimum income guarantee policy.

In order to analyze the consequences of such policies, there is a need to have micro-level forecasting model. At the moment the government of Ukraine has monopoly on such model, and most macroeconomic models in the country rely on the government estimates of total expenditures of the social security system rather than produce their own results.

Braking government monopoly on micro-level forecasting of the expenditures for different types of social programs will provide public a unique tool to better understand and control government policies in the area of social safety net. Our observations demonstrated that there is sufficient data in Ukraine to create static microsimulation models similar to TRIM model in the USA.

Second, the macro-level model can probably be broken into regional models even without establishing the full-scale microsimulation model. Current Ukrainian labor market is characterized by oversupply of labor in some regions and profession. If the social safety net in the regions is funded by the taxes on labor, it is important to estimate the labor mobility between the regions and related drops in funding and demand to the social security in the future. Ukrainian government collects the data necessary for creation of such model; however, this data is rarely available for independent researchers at the moment. For example, change of the government policies with respect to the enterprise-level data collected by the Committee for Statistics of Ukraine could enable development of simulation models that incorporate regional labor demand into forecast.

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