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External Shocks, Fiscal Policy and Income Distribution

Alternative Scenarios for Moldova

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Abstract

The economy of Moldova, which has one of the lowest levels of gross national income per capita in the World Bank Europe and Central Asia region, is strongly linked to the outside world, especially to the neighboring countries of the European Union and the Commonwealth of Independent States. This paper analyzes a set of scenarios for Moldova up to 2020, defined to shed light on issues related to an alternative future dominated by goods and services exports as opposed to today's reliance on worker remittances. The analysis is based on a Moldovan version of MAMS (Maquette for Millennium Development Goal Simulations), a CGE (Computable General Equilibrium) model for country strategy analysis. In sum, the impact of increased export demand and productivity growth is more positive when these shocks are directed to manufacturing, a sector more heavily linked to

international trade, compared with agriculture. Increased productivity in transport and communications generates faster growth with widely diffused benefits, reaching households in a relatively equitable manner compared with foreign trade-induced growth. A comparison between adverse shocks in two areas, higher energy import prices, and lower remittances, designed to have similar effects on gross domestic product, suggests that a remittance shock leads to less of a poverty increase, related to the fact that remittance-receiving households are not highly vulnerable; among sectors, agriculture is most vulnerable due to heavy energy reliance. Finally, well-targeted transfer schemes may offer an effective tool for diffusing the benefits of economic growth to the whole population, perhaps also contributing to more general acceptance of structural change.

External shocks, fiscal policy and income distribution: Alternative scenarios for Moldova[*]

by

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Contents

1 Introduction[1]

The economy of Moldova is strongly linked to the outside world via worker remittances and trade. As a consequence, it was also strongly affected by the global economic crisis that erupted in 2008. Its future evolution will depend on domestic policies and the timing and extent of resumed growth in the outside world, most importantly Moldova's neighbors in the EU and the CIS, which have absorbed the bulk of the country's worker emigrants and also dominate its foreign trade.

In this paper, we explore how influences from the outside world and domestic policy together may condition the development of Moldova's economy during the period up to 2020. The content of the analysis is informed by discussions of the consequences of changing Moldova's development strategy from reliance on workers' remittances toward reliance on export-oriented goods and service production. To this end, we have developed a Moldovan version of MAMS (Maquette for MDG Simulations), a CGE model for country development strategy analysis developed at the World Bank. More specifically, we will address the impact of alternative scenarios for worker migration and remittances, international prices for Moldova's main exports (in the agro-industrial area) and fuel imports, as well as government transfers aimed at promoting growth and equity. Our analysis covers the impact of these scenarios on indicators related to the macro economy, major production sectors, as well as household welfare and its distribution. We will proceed as follows: Sections 2 and 3 provide background on Moldova's economy and describe MAMS and its Moldovan database. The simulations are presented and their results analyzed in Section 4. Section 5 summarizes our findings. Appendix A describes the construction of the Moldovan database in greater detail while Appendix B provides more detailed simulation results.

2 Background[2]

During the period 2000-2010, Moldova's GDP growth was rapid but quite volatile (see Figure 1), reaching an average annual rate of around 5 percent. Among the components of absorption (i.e. total domestic final demand or gross national expenditure), growth was most rapid for investment (gross fixed capital formation), which grew at close to 9 percent, whereas private and government consumption grew at rates of 6-7 percent. The fact that domestic final demands grew more rapidly than GDP indicates that Moldova was able to finance a growing trade deficit from non-trade foreign exchange sources, most importantly workers' remittances and compensation of employees (workers who during parts of the year work abroad but still are considered residents of Moldova), which have been more important than FDI or transfers to the government (see Figure 2). In terms of volumes

[2] The background section includes data up to and including 2010. In Moldova, fiscal years coincide with calendar years.

(measured in constant 2000 US$), during the period 2000-2010, workers' remittances from abroad grew at an annual rate of close to 17 percent. As a result of this rapid growth, Moldova is one of the top countries in the world in terms of the GDP share of private transfers from abroad and the share of its labor force that has emigrated (World Bank 2011).

Figure 1. GDP growth 2000-2010 (%)
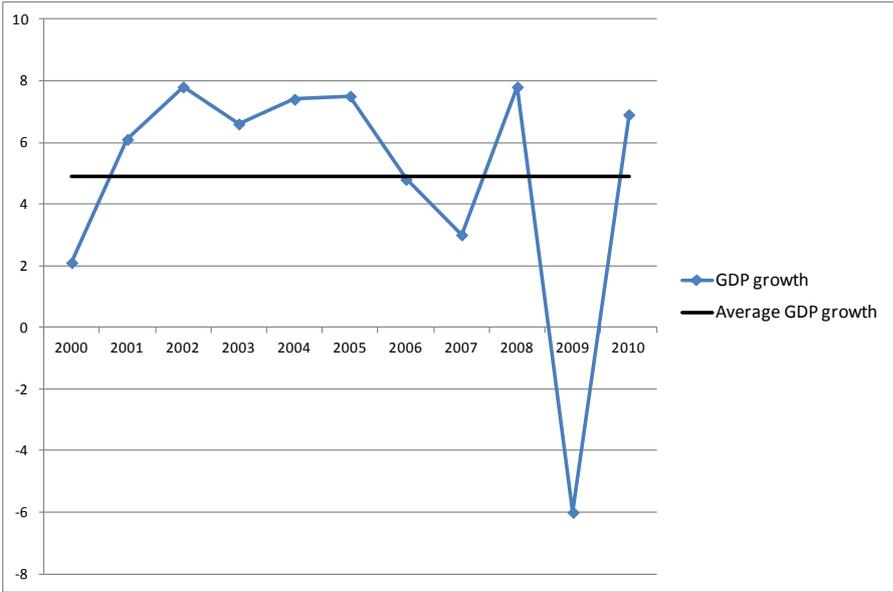
Source: Statistics Moldova.

Figure 2. Balance of payments items, 2000-2010 (% of GDP)
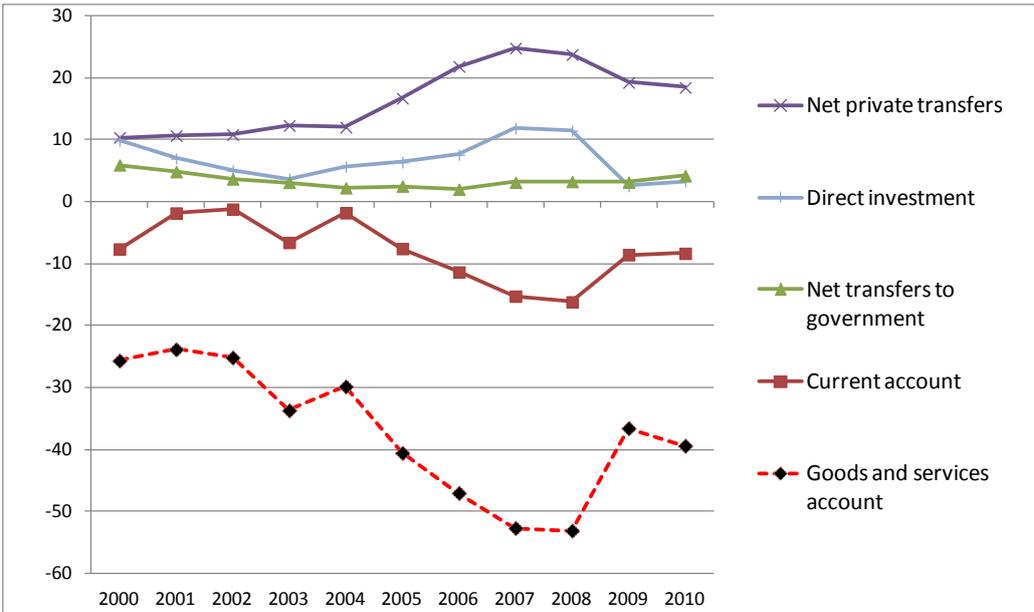
Source: National Bank of Moldova.

The onset of the global financial crisis in 2008 was rapidly reflected in Moldova's growth figures. However, Moldova recovered rapidly from the contraction of its economy in 2009 as GDP growth in 2010 almost exactly made up for the economic downturn in the preceding year. Similarly, as of 2010, other major economic variables, including export volumes, remittances, and private consumption, showed signs of strong recovery. Nevertheless, FDI remained below levels registered in earlier years and the unemployment rate had also risen.

In spite of rapid growth in recent years, Moldova is still far below the per-capita incomes of its Western European neighbors. In terms of PPP current dollars, gross national income (GNI) per capita in 2010 was roughly one-tenth of the EU level (3,370 versus 31,657, respectively; World Bank 2012). In terms of per-capita Gross National Disposable Income (the sum of GNI and net current transfers), Moldova fares better, primarily as a result of high levels of workers' remittances.

Moldova benefits from several development initiatives of the EU and the international development community. The country is a member of the Eastern Partnership within the European Neighbourhood Policy (ENP) of the EU. Most importantly, in 2008, the EU gave unlimited and duty free access to the EU market for all products originating in Moldova, except for certain agricultural products which remain subject to various restrictions (European Commission, 2011). As of 2010, the EU had become the main destination for the country's exports (47 percent of total exports), overtaking Russia and other former Soviet countries (40 percent of the total) (Statistics Moldova, 2011). Also vis-à-vis Russia, market access for Moldova's agricultural has been limited by trade barriers (Oprunenco, 2011). Strong demand for Moldova's exports from its major trading partners could make a significant contribution to its future development.

During the period 1990-2010, Moldova's population has been slowly decreasing, at annual rate of around 0.2 percent. UN Medium variant projections for Moldova foresee that the current population of 3.5 million (2010) will decline to 3.2 million by 2020, i.e. slightly more slowly, at around 0.1 percent per year. The principal reason for the population decline is extensive out-migration.

Primarily as a result of rapid growth in private consumption per capita (which, given the population decline, exceeds the total growth rate for private consumption), poverty has fallen drastically: between 2001 and 2010, the poverty headcount rate at $1.25 (PPP) fell from 26.5 to 0.4 percent, while the rate at $2 a day fell from 54.3 to 4.4. At the higher national poverty line, the decline during the same period was also very strong, from around 55.0 to 21.9 percent. At the same time, the income distribution became more equitable: between 2001 and 2010, the Gini coefficient fell from 38.6 to 33.0 (World Bank, 2012; World Bank 2011, p. 56).

Nevertheless, workers' remittances from abroad are unevenly distributed among the Moldovan households, accruing mainly to households that, according to Moldovan standards and in large part thanks to the remittances, are relatively well-off. This increases the call for the government to resort to transfers and other policies to improve the living conditions of some of those who do not benefit from transfers from abroad. The relatively high energy costs during the last years have added to the demands for such policies, which are particularly important for the retired, the unemployed, and those who are outside the labor market.

However, for those who are part of the domestic labor market, emigration and remittances have had the positive side effect of significantly raising wage growth at home. With low emigration costs –

Moldova is close to other CIS countries and the EU – wages obtained outside Moldova put upward pressure on wages at home both by reducing the supply of labor and by increasing reservation wages (international Monetary Fund 2005; Prohnitchi and Oprunenco 2010). During 2004-2010, real wages increased at an annual rate of 7.8 percent, even though wage increases were much more moderate during the financial crisis (Statistics Moldova; National Bureau of Statistics). Another consequence of labor outmigration is that the employment rate among the population in Moldova is low, at only 38.5 percent in 2010 (Expert Grup, 2011).[3]

As opposed to the situation in many other low- and middle-income countries, emigration from Moldova does not seem to have caused a major brain drain, as the average educational attainment of the population is higher among the general population than among the migrants – most emigrants come from rural areas and many work as construction workers, especially in Russia (Walewski et al., 2008). However, the emigration rate among people with tertiary-level education is nevertheless also high (3.4 percent), among the world top-ten rates (World Bank 2011).

In terms of sector structure, during the period 2000-2010, Moldova's economy became more service-based as private services (including business, information technology and personal services) grew rapidly, while agriculture and other primary sector activities lost in importance. The share of government services increased modestly (see Figure 3).

Figure 3. Sectoral composition of GDP 2000-2010 (%)
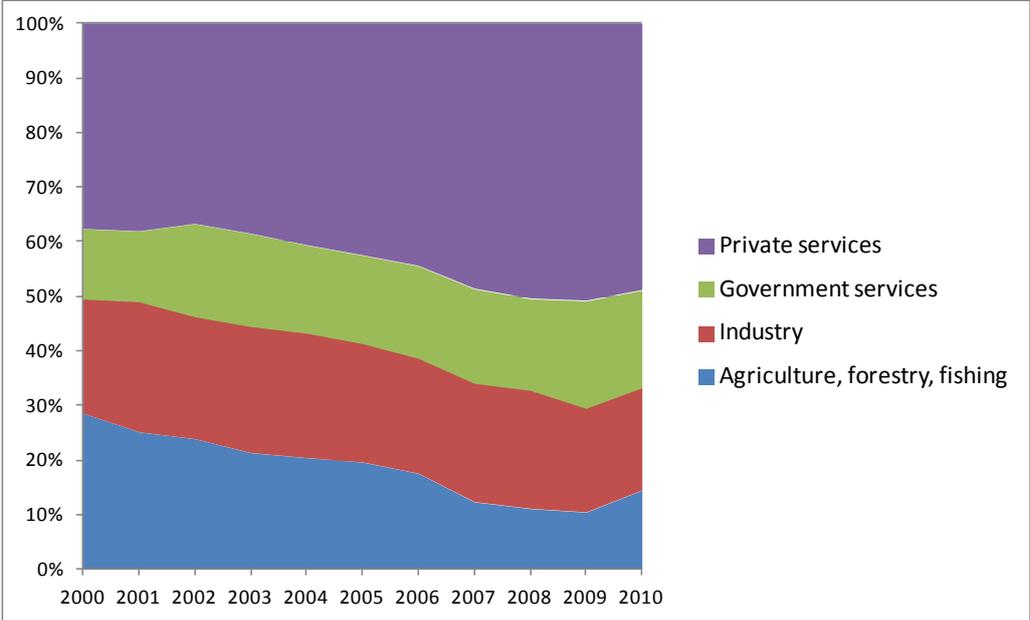
Source: Statistics Moldova.

Within the primary sector, agricultural activities continued to dominate while forestry and fishing (including aquaculture) remained of minor importance. Stagnant growth of the primary sector has a

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[3] The employment figures may suffer from measurement problems due to uncertainties on the number of temporary migrants.

negative impact on the labor market as it still employs a third of the domestic labor force, and provides at least partial subsistence to about half the population (Prohnitchi and Oprunenco, 2010).

Drawing on the MAMS database, the economic structure of the Moldovan economy in 2008 is summarized in Table 1. Primary exports represent only a moderate fraction of the total primary production while a quarter of the domestic demand for primary products is satisfied by imports. Therefore, the bulk of agricultural products are produced for the home market. This has important implications for the impact of changes in the agro-industrial sphere on the broader economy.

Moldova lacks own energy sources and imports all of its supplies of petroleum, coal, and natural gas, largely from Russia. It has been estimated that, by 2020, Moldova will only be able to meet around 10-12 percent of its energy needs from own (renewable) energy sources (Prohnitchi and Oprunenco, 2010). The availability and price of energy is thus a major factor causing uncertainty about the future economic development. In Table 1, fuel is part of an aggregate that also includes chemicals and fuel- and chemical-based products); for this broader sector, 80 percent of domestic demand is satisfied by imports.

The value added and employment shares indicate that private services have the highest level of value added per employee, while the opposite is true for agriculture. This relatively low level of labor productivity of is in part due to the fact that Moldova, despite its fertile soil and favorable climate, has not been able to reach yields that are on par with levels reached in EU or Central and Eastern European (CEE) countries (Prohnitchi and Oprunenco, 2010). Given this, there should be considerable scope for raising agricultural productivity.

Table 1. Structure of production in 2008

	Share of production	Share of value added	Employment share	Share of exports	Exports of output	Share of imports	Imports of demand
Primary	12.2	11.4	31.4	10.7	14.9	8.5	25.1
Industry and manufacturing	36.8	21.4	19.3	61.6	27.4	80.8	51.7
Mining products					13.7		82.8
Food stuffs					21.4		25.5
Beverage and tobacco					55.0		36.8
Textile, clothing, leather					93.6		91.6
Wood and paper, publishing					21.1		52.8
Fuels, chemicals					77.6		80.2
Metal, rubber, plastic prod.					37.0		65.1
Manufacture of machines and equip.					58.6		81.4
Electricity, gas and water supply							26.6
Services	51.0	67.2	49.3	27.8	9.4	10.6	8.5
Government services	7.4	12.5	16.1				
Private services	43.6	54.7	33.2	27.8	11.0	10.6	10.0
Construction services					1.1		1.4
Hotels and restaurants					32.1		38.2
Transport					33.2		26.3
Post and telecommunications					19.7		14.5
Financial intermediation					1.7		4.6
Real estate services							1.4
Renting, IT-services, res. and dev.					10.7		21.1
Other business services					2.1		8.7
Recreational, cultural and sporting act.							2.1
	100.0	100.0	100.0	100.0	16.7	100.0	33.0

Source: Own calculations based on Moldova MAMS SAM 2008.

As a whole, the past decade was buoyant for government revenues as, in the context of rapid economic growth, the share of tax revenues of GDP increased by 3.5 percentage points. In 2010, government revenues and expenses surpassed a third of GDP and concerns have been raised about possible crowding-out effects of increased government share of economy.

However, the tax policy of Moldova has consisted of repeated lowering of income tax rates. Corporate income tax was lowered from 32 percent in 1998 to practically zero in 2008. The personal income tax code was also adjusted, with maximum and minimum tax rates of 18 and 7 percent, respectively. While the role of income taxes has declined, the value-added tax (part of "taxes on goods and services") has become the largest source of tax revenue (Qehaja 2012). In this context, it is important to note that the growth in Moldova's tax revenues is more closely aligned with absorption growth than GDP growth; during the period 2000-2010, taxes measured as a share of absorption increased from 11.7 to 13.1 percent, i.e., less strongly than if expressed as a share of GDP.

On the expenditure side, government subsidies and transfers to firms and households have hovered around 15-20 percent of GDP throughout the 2000-2010 decade. The other major items were compensation of employees and spending on goods and services (excluding capital spending) (see Table 2).

Table 2. Government current finance indicators 2000-2010 (% of GDP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Tax revenue	14,7	12,2	12,9	14,7	16,4	18,5	19,6	20,6	20,4	17,7	18,2
- Taxes on goods and services	12,4	10,3	10,5	12,2	13,9	15,6	17,2	17,6	18,1	15,9	16,4
- Taxes on international trade	1,4	1,2	1,5	1,7	1,5	1,8	1,4	1,7	1,8	1,5	1,5
- Taxes on income, profits and capital gains	0,9	0,6	0,6	0,8	0,9	0,8	0,9	1,2	0,5	0,3	0,3
Social contributions	6,3	6,8	7,3	7,2	7,8	7,8	9,5	9,6	10,5	11,5	10,4
Grants and other revenue	6,4	4,5	4,9	4,9	5,1	6,7	5,3	5,9	5,1	5,6	0,0
Total of revenues	27,4	23,6	25,1	26,7	29,3	33,1	34,3	36,1	36,0	34,5	34,3
Compensation of employees	3,0	3,3	4,6	4,6	4,1	4,1	5,0	4,9	4,7	5,7	4,8
Goods and services	2,9	2,3	3,8	1,8	4,8	5,1	6,0	5,9	6,4	7,3	7,0
Interest payments	6,4	4,2	2,2	2,1	2,4	1,2	1,0	1,1	1,1	1,4	0,8
Subsidies and other transfers	15,9	12,4	12,0	11,6	13,3	15,6	18,0	18,3	18,7	21,5	20,5
Other expenses	0,8	0,0	0,0	2,2	2,7	3,2	1,9	2,2	1,8	2,2	1,9
Total of expenses	28,9	22,3	22,6	22,2	27,3	29,3	31,9	32,4	32,8	38,0	35,0

Sources: World Bank (2012).

Between 2000 and 2004, government annual capital spending was not prioritized, staying in the range of 2-3 percent of GDP. However, during the period 2005-2010 it was significantly higher, at 5-8 percent of GDP (International Monetary Fund 2005, 2008, and 2012). As a result of this relative neglect and spending inefficiencies, Moldova has been left with an "infrastructure deficit", manifested in poor road conditions and limited geographic coverage for the internet. Among the national roads, 58 percent are classified as poor. For local roads the situation is worse, with 75 percent estimated to be in poor condition. Only 10 percent of national roads and about 5 percent of local roads are in good condition. About 400 km of formerly paved roads have lost their pavement and have reverted to unpaved gravel or earth roads (World Bank 2009).

In 2009, only a third of Moldovans were internet users. In many neighboring and nearby countries, diffusion of new communication technologies has been faster than in Moldova. Fixed broadband internet subscribers represented a similar share of population (32 percent), but as the coverage of fixed telephone lines is much lower than that of mobile phones (32 percent vs. 78 percent), the future of increased internet may lie in mobile solutions. In Figures 4 and 5, the latecomer position is

exemplified by the diffusion of internet and mobile phone use in selected countries of the region. However, the situation seems to be rapidly changing in Moldova's favor.

Looking to the future, as noted by the study "Moldova 2020," the prospects for rapid future growth in remittances are limited and uncertain, considering labor demands in the receiving countries and slow labor force growth in Moldova. Given this, rapid future growth may be best assured via a change in the development paradigm toward a model that is based on export-oriented production of goods and services with a focus on industrial sectors, supported by investments in roads and other forms of infrastructure as well as measures that contribute to an equitable distribution (Government of Moldova 2012a, pp. 5-8 and 21).[4]

Figure 4. Internet users per 100 people
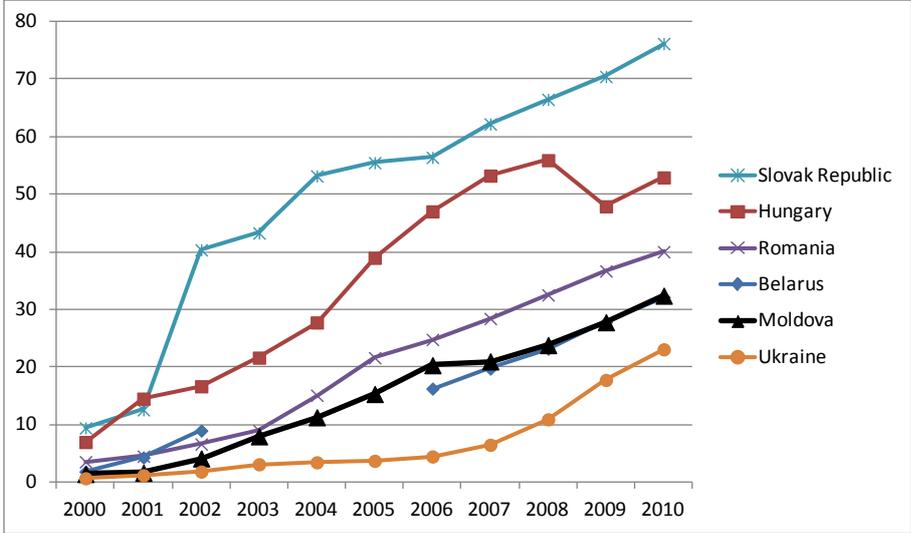
Source: World Bank 2012.

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[4] For a similar policy message, see World Bank (2011).

Figure 5. Mobile cellular connections per 100 people
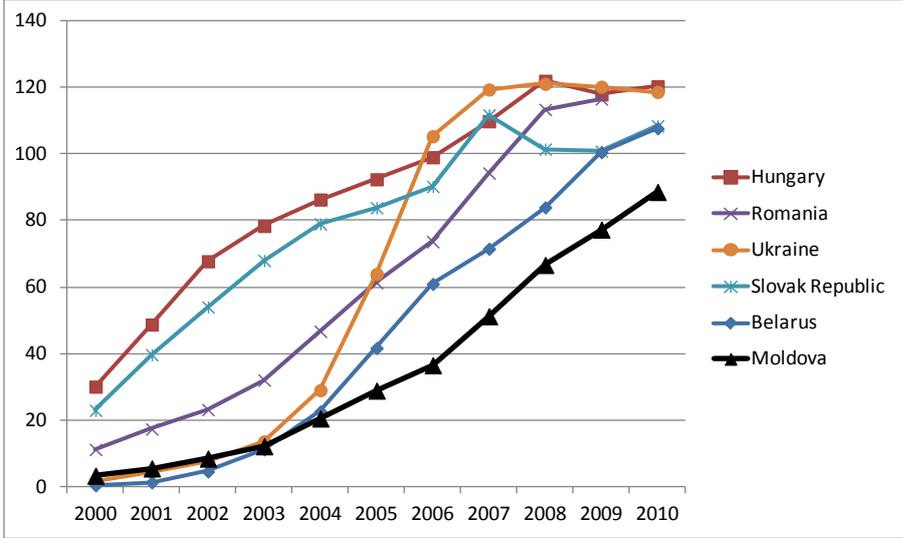
Source: World Bank 2012.

3 MAMS for Moldova

In this section we briefly present the analytical tool used in this analysis, which was developed at the World Bank: MAMS (Maquette for MDG Simulations), a dynamic CGE model for medium- and long-run strategy analysis. The strength of Computable General Equilibrium (CGE) models lies in that they combine theoretically and empirically solid accounts of the behavior of economic agents and institutions, real world data (from national accounts, household surveys and other statistical sources), flexibility in terms of data requirements and analytical focus, as well as the ability to test the impact of shocks (policy changes and/or other exogenous changes that are beyond the control of domestic policy makers) that are relevant to the future of the modeled economy.   CGE models have a comparative advantage relative to partial equilibrium models when the shocks of interest have repercussions throughout the economy, especially if these repercussions also have a significant feedback on the parts of the economy that most directly were impacted by the shock.[5]

This study uses a "core" version of MAMS, a dynamic CGE model developed at the World Bank, designed to analyze strategies for medium- and long-run growth and poverty reduction in developing countries.[6] Given the analytical focus of our study and in order to reduce data needs, it does not cover MDG indicators other than poverty.

The development of MAMS is and has been driven by a strongly felt need for an economy-wide approach to medium- and long-run development strategy analysis that is flexible enough to be linked to country-specific databases that may differ considerably in their characteristics (including disaggregation).

The starting point for MAMS is the static, standard CGE model developed at the International Food Policy Research Institute (IFPRI) (Lofgren et al., 2002). The core version of MAMS is significantly extended in that it (a) is (recursively) dynamic; (b) tracks investments and assets (liabilities) of its different institutions (factor endowments, domestic government debts, and foreign debts); and (c) endogenizes factor productivity (which depends, in the basic specification, on economic openness and government capital stocks).

We here provide a non-technical description of the structure of MAMS, using Figure 6 as our reference point.

The major building blocks of the model may be divided into activities (the entities that carry out production), commodities (activity outputs or, exceptionally, imports without domestic production; linked to markets), factors (also linked to markets), institutions (households, the government, and the rest of the world). In Figure 6, private investment financing also has its own box given the

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[5] To provide an example, a CGE model is typically required to understand the impact on the welfare of remaining household members (as well as on the rest of the economy) from a significant increase in labor emigration and worker remittances. To the extent that the exchange rate, wages, and prices all change, it is misleading to limit the analysis to the initial direct impact (higher remittances). In recent years, other analyses of Moldova's economy have used the IFPRI standard model (e.g. Oprunenco, 2011; Atamanov et al., 2008; ITAQA, 2009).

[6] For a detailed description of MAMS, see Lofgren et al. (2012) or Lofgren and Diaz-Bonilla (2010). Various MAMS-related materials are found at www.worldbank.org/mams.

multiple links that exist between private investment demands and their financing. In any MAMS application (and database), most blocks in Figure 6 are disaggregated – the disaggregation in the Moldova MAMS application is shown in Table 3.

Figure 6. Overview of MAMS
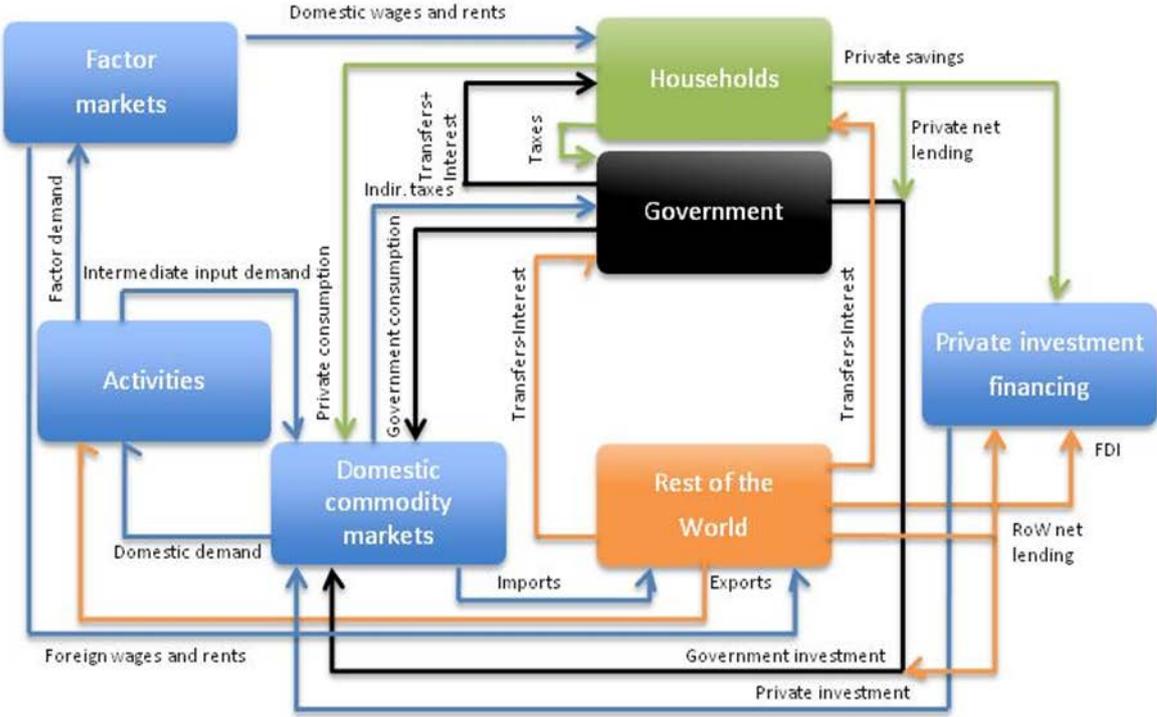
In any year, the MAMS version of Moldova's economy has the following structure. Activities produce, selling their output at home or abroad, and using their revenues to cover their costs (of intermediate inputs, factor hiring and taxes). Their decisions to pursue particular activities with certain levels of factor use are driven by profit maximization. The shares exported and sold domestically depend on the relative prices of their output in world and domestic markets.

MAMS includes three types of institutions: households, government, and the rest of the world. Households earn incomes from factors, transfers and interest from the government (with the interest due to loans from the households to the government), and transfers from the rest of the world, net of interest on household foreign debt, if any.

Household income is used for direct taxes, savings, and consumption. The savings share depends on per-capita incomes. Their consumption decisions change in response to income and price changes. By construction (and as required by the household budget constraints), the consumption value of the households equals their income net of direct taxes and savings. The government gets its receipts from taxes and transfers from abroad; it uses these for consumption, transfers to households, and investments (providing the capital stocks required for producers of government services), and drawing on domestic and foreign borrowing for supplementary investment funding.

To remain within its budget constraint, it either adjusts some part(s) of its spending on the basis of available receipts or mobilizes additional receipts of one type or more in order to finance its spending plans. In the *base* scenario of the current analysis, additional receipts in the form of domestic taxes are mobilized to finance government spending plans. In the non-*base* simulations, unless otherwise noted, government spending adjusts to fully exhaust available receipts. The rest of the world (which appears in the balance of payments) sends foreign currency to Moldova a in the form of transfers to its government and households (for the government net of interest payments on its foreign debt), FDI, loans, and export payments. Moldova uses these inflows to finance its imports. The balance of payments clears (inflows and outflows are equalized) via adjustments in the real exchange rate (the ratio between the international and domestic price levels) which take place when the balance is in surplus or deficit. Private investment financing is provided from domestic private savings (net of lending to the government) and FDI. Private investment spending adjusts in response to changes in available funding.

In domestic commodity markets, flexible prices ensure balance between demands for domestic output from domestic demanders and supplies to the domestic market from domestic suppliers. The part of domestic demands that is for imports faces exogenous world prices – Moldova is viewed as a small country in world markets without any impact on the import and export prices that it faces. Domestic demanders decide on import and domestic shares in their demands on the basis of the relative prices of commodities from these two sources. Similarly, domestic suppliers (the activities) decide on the shares for exports and domestic supplies on the basis of the relative prices received in these two markets.

Factor markets reach balance between demands and supplies via wage (or rent) adjustments. Across all factors, the factor demand curves are downward-sloping reflecting the responses of production activities to changes in factor wages. On the supply side of the labor markets, unemployment is endogenous – for each labor type, the model includes a wage curve (a supply curve) that is upward-sloping until full employment is reached, at which point it becomes vertical (see Figure 7; its supply curve assumes a minimum unemployment rate of 5 percent). Unemployment is defined more broadly than in official statistics to include un- and under-employment.

In the simulations, a broad definition of unemployment increases the scope for the existing labor force to generate a larger (smaller) amount of effective labor if the incentives to work were to improve (deteriorate); typically, this seems realistic. For non-labor factors, the supply curves and total employment are vertical in any single year.

The above discussion refers to the functioning of model economy in a single year. In MAMS, growth over time is endogenous. The economy grows due to accumulation of capital (determined by investment and depreciation), labor (determined by share of the population in labor force age, the labor force participation rate, and the educational system), other factors (on the basis of exogenous growth data), as well as because of improvements in total factor productivity (TFP). The educational system is important as it drives the evolution of the educational attainments of the labor force, influencing their productivity, but keeps the population who is enrolled in schools away from the labor force. Apart from an exogenous component, TFP depends on the levels of government capital stocks.

Table 3. Disaggregation of Moldova MAMS

Private sectors

a-agr	Agriculture, hunting, forestry and fishing
a-mining	Mining and quarrying
a-food	Food industry
a-bevetob	Beverage and tobacco industry
a-garment	Textile, clothing and leather items
a-woodpap	Wood paper and publishing industry
a-fuel	Manufacture of fuels (coke, petroleum, nuclear) and chemicals and products based on them
a-metplast	Manufacture of metal, rubber and plastic products
a-machequip	Manufacture of machines, equipment electronics etc; recycling
a-enewat	Electricity, gas and water supply
a-constr	Construction
a-trade	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
a-hotrest	Hotels and restaurants
a-transp	Transport
a-posttele	Post and telecommunications
a-finance	Financial intermediation
a-realest	Real estate activities
a-itserv	Renting, IT-services, research and development
a-othbusiserv	Other business services
a-educpriv	Education
a-healthpriv	Health and social work
a-sanipriv	Sewage and refuse disposal, sanitation and similar activities
a-organiz	Activities of membership organizations n.e.c.
a-recrea	Recreational, cultural and sporting activities
a-othperserv	Other service activities, including private households employing domestic staff

Government sectors

a-pubadm	Public administration and defence; compulsory social security
a-educpub	Public education
a-healthpub	Public health and social work
a-sanipub	Public sewage and refuse disposal, sanitation and similar activities

Factors

f-labn	labor - unskilled (< completed secondary; including gymnasium)
f-labs	labor - skilled (completed secondary)
f-labt	labor - high-skilled (completed tertiary)
f-capprv	private capital
f-land	land
	government capital stocks (one per government sector)

Institutions -- current accounts

hhd-soci	Household unemployed and other dependent on social transfers (other than pensions)
hhd-reti	Household retired
hhd-farm	Household farmers
hhd-enter	Household entrepreneurs
hhd-work	Household workers
hhd-remit	Household main remittance receivers
ngo	Non-profit organisations
gov	Government
row	rest of world

Auxiliary institutional accounts

	taxes -- direct, import, other indirect
int-dom	domestic interest -- on domestic government debt
int-row	foreign interest -- on foreign government debt

Institutions -- capital accounts

	One account for every institution with a current account

Investment

inv-prv	private investment
	one investment account for each government service/capital stock
dstk	stock change

Figure 7. Labor market specification in MAMS
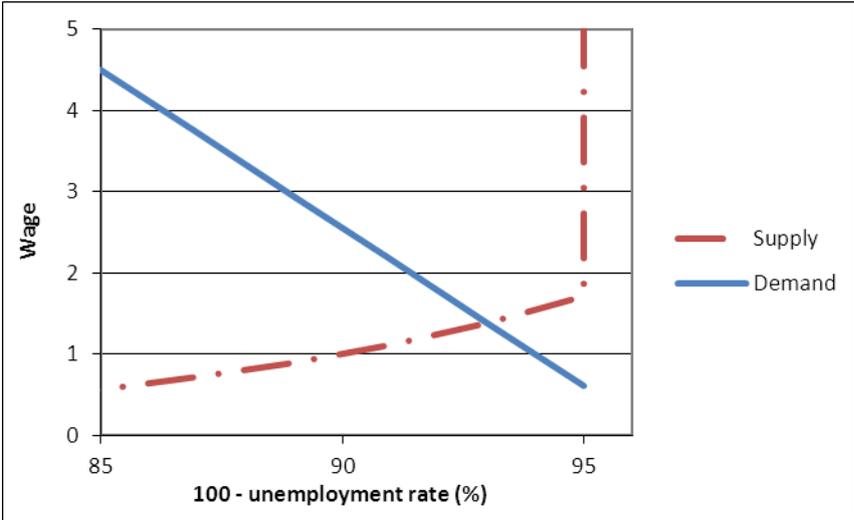
MAMS includes a built-in poverty module, which assumes that the distribution of per-capita consumption follows a lognormal distribution parameterized on the basis of the observed Gini coefficient. This information and data on the national poverty rate (in 2008) are used to compute standard Foster-Green-Thorbecke poverty indicators.

The basic accounting structure and much of the underlying data of MAMS, like other CGE models, are derived from a Social Accounting Matrix (SAM). Most features of a SAM for MAMS are familiar from SAMs used for other models. However, a MAMS SAM has some unconventional features related to the explicit treatment of financial flows (Lofgren – Diaz-Bonilla, 2010).

A SAM is a square matrix in which each account is represented by a row and a column. It provides a comprehensive picture of the economic transactions of an economy during a time period, almost invariably one year. Each cell shows the payment from the account of its column to the account of its row. Thus, the incomes of an account appear along its row and its expenditures along its column. For each account in the SAM, total revenue (row total) should be equal to total expenditure (column total). It should be noted that SAMs almost invariably are limited to flows; additional data or assumptions are needed to define stocks. In most CGE models (including MAMS), the SAM is used to define base-year values for the bulk of the parameters in the equations that generate the corresponding payments in the model (Lofgren and Diaz-Bonilla, 2010).

The Moldova SAM is for 2008; its disaggregation coincides with that of the rest of the model database (see Table 3 above). As is typical for SAMs, it combines information from many sources, including national accounts, household budget surveys, labor force data, and fiscal and trade statistics.

The SAM (and the other parts of the database of Moldova MAMS) disaggregates the private sector into 29 sectors (production activities with a one-to-one mapping to commodities), i.e. in a rather

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disaggregated form. It also includes transaction accounts for domestic sales, imports and export in the same fashion as in the SAMs used by IFPRI Standard Model.[7]

Our 2008 SAM includes six households. The groups were formed on the basis of an application of cluster analysis to Moldovan household budget survey data, with the aim of grouping the households into groups that, in terms of income sources, are as homogeneous as possible internally and as heterogeneous as possible between the groups. Consumption parameters for the six household groups were estimated from the Moldovan 2008 household survey data. The consumption parameter values are presented in the tables of Appendix A[8] .

4 Alternative Scenarios for Moldova to 2020

In this section, we analyze the importance of different factors for the development of Moldovan economy during the period 2012-2020. First, we will present our *base* scenario (Section 4.1). The remaining scenarios are divided into the following groups: In section 4.2 we study the role of productivity growth and increased access to exports markets for agriculture and food industry, as well as for other, non-food industry. We also study the importance of productivity growth within the Moldovan transport sector. In section 4.3 we examine the effects of fuel prices and remittances, as well as the role of government transfers to households. Finally, in section 4.5 we present two summarizing scenarios combining shocks from the earlier scenarios.

The basic idea is to evaluate the likely economy-wide effects of growth impulses in different economic sectors, as well of the likely benefits of achievements in different areas of economic policy. In a similar fashion, we also study the likely effects of potential adverse developments. Table 4 below presents the acronyms and short descriptions of the scenarios. We will define the scenarios in greater detail in the corresponding sections below.

Table 4. Non-base scenarios

Scenario	Description
base	Baseline
agrpweff	Productivity and export prices of agriculture and food industry are gradually raised by 20% above baseline
indupweff	Export prices and productivity of non-food industry gradually raised by 20% above baseline
transeff	Transport sector productivity is gradually raised by 40% above baseline
fuelpwm	Import prices of fuels are permanently raised by 20% in 2013
remitdecr	Remittances to households from RoW are lowered by 20% from baseline from 2013 onwards
trnsfrpoor	20% increase in gov transfers to hhds in 2013; targeted to poor hhds according to base 2012 poverty rates
allgrw	Combination of positive changes: agrpweff + indupweff + transeff
allgrw-tr	Combination of positive changes with higher transfers: agrpweff + indupweff + transeff + trnsfrpoor

[7] Explicit representation of transport and trade margins facilitates analyses of changes in logistic efficiency; given the poor state of Moldova's road infrastructure, simulations addressing the impact of infrastructure investments on such margins may be a fruitful area for future CGE analysis of Moldova.

[8] The SAM itself is available on request.

4.1 The *base* scenario

When setting up the model base, we made use of historical data on GDP growth, FDI, remittances government spending. From 2013 onwards, the growth rates of major macro variables are set to values that are close to their medium-term averages; i.e., the simulations are not geared toward capturing year-to-year volatility but medium- and long-run trends. However, in some areas, we diverge from this general rule. Regarding world market prices, we assume constant export prices from 2013 onwards given that knowledge about how these prices may evolve is extremely limited. During the whole simulation period, we keep import prices unchanged. Until 2012, changes in world market export prices are part of a set of variables used to calibrate the model to available statistics. Regarding FDI, their volatile development is caught in the statistics with its recent downs and ups until 2011, but from year 2012 and onwards, FDI growth, after recovering from the slump of earlier years, declines towards an annual rate of 5 percent at the end of the simulation period, with an average rate of 12.5 percent for the period 2012-2020. Similarly, after the rebound in 2011, annual remittance growth declines gradually to 3 percent by 2020; for remittances, the resulting average rate is 3.1 percent per year for 2012-2020. And as for factor payments from abroad, we assume that they grow at an annual rate of 5 percent 2013-2016, but then at rates that gradually decline to 3 percent by 2020 (see Figure 8). The lowering growth of these variables reflects an expected decline in the domestic population in migration-prone age.

Figure 8. Base assumptions for selected balance-of-payments flows (mn 2008 lei)
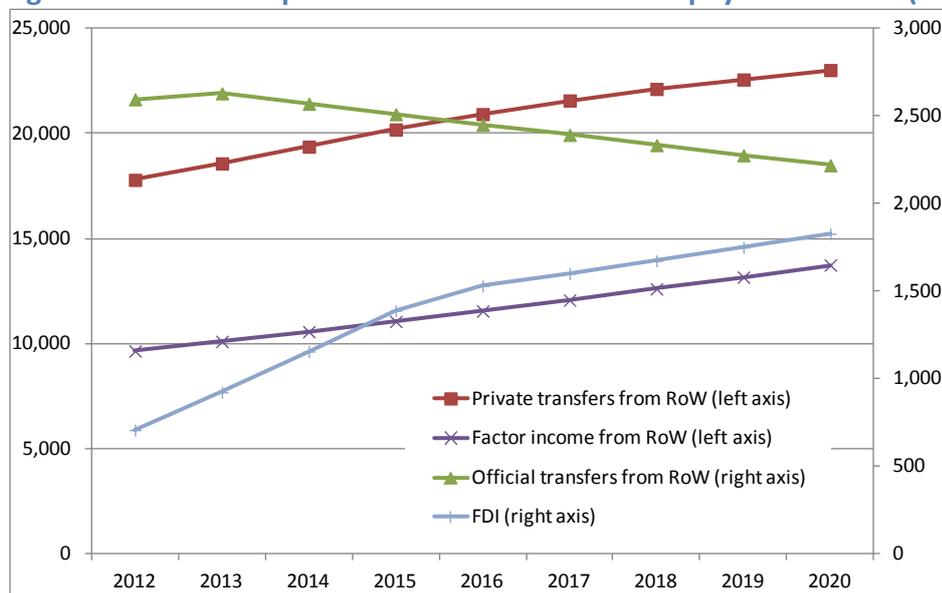
The government of Moldova is assumed to keep its budget (including borrowing on the receipts side) balanced through uniform scaling of its domestic tax rates (direct and indirect). Government transfers to households are set to grow by 5 percent per annum from 2013 onwards. For years 2009-2012, we make use of available statistics and IMF projections for transfer growth (Qehaja 2012). Tax

rates end up showing some minor variations over the simulation period (as do other government budget items) but end up very close to their initial levels at the end of the simulation period.

The share of the government in the economy declines marginally along the base from 39.6 of GDP in 2008 to 37.5 percent in 2020. Low growth in non-trade foreign exchange earnings restricts growth for the trade deficit, as a result of which total final demand (absorption) is forced to grow more slowly than GDP (see Table 4 below). In addition, we assume that continued annual GDP growth of 4.3 percent during 2012-2020 requires continued improvements in public infrastructure (including roads and energy transmission), leading to more rapid growth for investment than for consumption.

As for the savings-investment closure, the initial absorption share of 24.4 percent for household savings (the 2008 share) is allowed to adjust in order to clear the savings-investments balance. The savings rate of households hovers around 20.1 percent of total absorption during 2012-2020 in our base run.

In the labor market, real wages continue to increase rather rapidly, as migration and aging leads to a labor force decline at an annual average rate of 1.6 percent, with the largest decline recorded for those with the lowest educational level. However, we assume that an increasing number of those that are currently only part-time employed will find full-time employment, which enables a small but decreasing growth in employment over the simulation period, as the unemployment rate (which is adjusted to account for underemployment) gradually declines from 11.4 percent in 2012 to 7.3 in 2020.

In setting up the demographic variables, we used the UN medium variant projections for total population, population in working age, and migration. The resulting increased scarcity of labor keeps wages increasing at rates that are substantial but still lower than the 7.8 percent of annual growth that, as noted above, was recorded for aggregate labor during the period 2004-2010. Figure 9 shows average wage growth by labor type. We see that wage growth is lower for the most abundant labor type, skilled people (who have secondary level of education), than for the unskilled (with primarily level education, including many of the rural area emigrants).

Figure 9. Base: Annual wage growth (%)
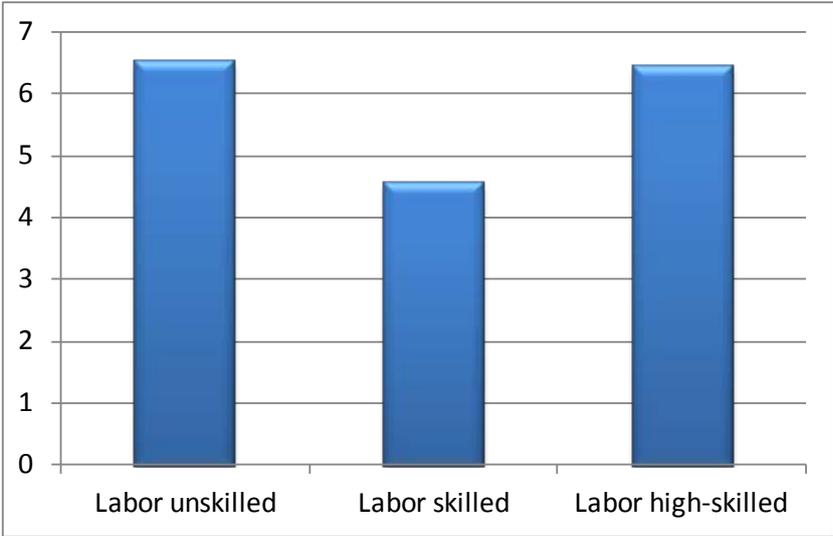
In relative terms, we project faster productivity growth in agriculture than in other activities; this is consistent with long-run international trends and seems very likely given the currently low productivity levels in Moldova's agriculture (cf. Expert Grup, 2010).[9] It is also important to note that the growth that takes place under the *base* scenario is underpinned by substantial and productivity-raising investments in public infrastructure (such as roads and energy transmission) (cf. discussion in World Bank 2011). Table 5 summarizes the year-on-year development of selected macro variables under *base* scenario.

Table 5. Base: Development of selected real macro variables.

	2008	2012	2013	2014	2015	2016	2017	2018	2019	2020	2012-2020
Absorption	97,601	3.8	4.3	4.1	4.1	3.9	3.8	3.7	3.6	3.7	3.9
Consumption - private	58,706	4.1	4.4	4.2	4.2	4.2	4.1	4.1	4.0	4.0	4.2
Consumption - government	13,931	1.1	2.2	2.0	1.9	1.6	1.3	1.2	0.9	0.9	1.5
Fixed investment - private	19,731	4.7	5.3	5.2	5.1	4.4	4.0	3.9	3.9	3.9	4.5
Fixed investment - government	1,924	4.0	4.4	4.3	4.2	4.1	3.9	3.9	3.9	3.9	4.1
Exports	25,005	0.6	3.4	3.6	3.7	4.3	4.8	5.1	5.4	5.3	4.4
Imports	58,474	2.5	3.8	3.7	3.8	3.8	3.8	3.9	4.0	4.0	3.8
GDP at factor cost	53,735	3.3	4.3	4.3	4.3	4.3	4.3	4.4	4.4	4.4	4.3
Total factor employment (index)		3.5	3.1	2.8	2.6	2.4	2.3	2.1	2.0	1.9	2.4
Total factor productivity (index)		-0.1	1.3	1.5	1.7	1.9	2.1	2.3	2.4	2.4	1.9
Real exchange rate (index)		-0.3	0.4	0.4	0.3	0.2	0.1	0.0	-0.1	-0.1	0.2
Headcount poverty rate (%)	27.3	21.4	19.3	17.4	15.7	14.2	12.9	11.6	10.6	9.5	

Note: the column 2008 shows values in million lei; the final column shows the average growth rate for the period 2012-2020; the other columns show annual growth rates (%).

The fact that, for the full simulation period, absorption grows at a slower pace than GDP indicates that exports have to increase more than imports due that non-trade items in the balance of payments does not fully keep up with overall growth. Among the domestic final demand items, growth in private consumption is relatively fast, growth in government consumption relatively slow, while both private and government investment growing at rates similar to those of total absorption. Total factor productivity grows moderately. Our assumption of increased full-time employment is important for reaching the base growth rates. If employment growth would not materialize, it would mean that labor scarcity would be even more severe making additional productivity growth necessary unless a lower rate of GDP growth is imposed. The real exchange rate is almost unchanged, showing that domestic productivity, export and import prices, and non-trade items in the balance of payments together evolve in such a way that additional adjustments in export and import incentives are not needed to maintain external balance.

Over the study period, the shares of industry and services of total production increase marginally at expense of agriculture and other primary activities (see Table 6). The share of government services increases from the base year 2008 to end of the period from 12.5 to 13.8 percent of GDP. The fact that, at the same time, government services increase as a share of GDP but has relatively slow real growth reflects relatively rapid growth in the price index for government services, in its turn due to rapid wage growth and the labor-intensive nature of these services.

For the total government, the *base* scenario generates a small decrease in the GDP share (Table 7). In the beginning of the simulation period, foreign transfers grow a bit faster than GDP, but their share

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[9] Lofgren's (2011) survey of the literature on productivity growth shows that productivity growth tends to be highest within agriculture, followed by manufacturing, with services at the bottom.

declines over the simulation period. On the spending side, the share of consumption declines more than that of investments, while the share of government transfers to households increases somewhat.

Table 6. Base: GDP shares by sector for selected years (%)

	2008	2012	2016	2020
Agriculture	11.4	10.3	9.8	9.4
Industry	21.4	24.3	23.6	23.2
Industry -manufacturing	13.2	16.4	15.4	14.9
Industry -other	8.2	7.9	8.2	8.3
Services	67.2	65.4	66.6	67.4
Non-government services	54.7	53.3	53.6	53.6
Government services	12.5	12.1	13.0	13.8
Total	100.0	100.0	100.0	100.0

Table 7. Base: Government budget for selected years (% of GDP)

		2008	2012	2016	2020
Receipts	**Direct taxes**	11.5	10.2	10.6	11.0
	Import tariffs	1.8	1.7	1.7	1.7
	Other indirect taxes	16.6	14.7	15.3	16.0
	Private transfers	1.4	1.4	1.4	1.4
	Foreign transfers	2.7	3.7	2.9	2.2
	Factor incomes	1.7	1.6	1.7	1.8
	Domestic borrowing	3.7	2.1	2.1	2.1
	Foreign borrowing	0.3	1.2	1.2	1.2
	Total	39.6	36.6	37.0	37.4
Spending	**Consumption**	20.4	18.7	18.7	18.3
	Fixed investment	3.0	2.8	2.8	2.7
	Private transfers	14.8	14.1	14.5	15.3
	Foreign transfers	0.4	0.4	0.4	0.4
	Domestic interest payments	0.6	0.1	0.1	0.2
	Foreign interest payments	0.4	0.5	0.5	0.6
	Total	39.6	36.6	37.0	37.4

Total household incomes increase at a slightly lower rate than GDP, primarily because of a slow-down in remittance growth. However, given negative population growth, per-capita household income and real consumption both increase at a n average rate of 4.2 percent per year, permitting a significant decrease in the national poverty rate, which has fallen to 9.5 by the end of simulation period according to the MAMS poverty module (Figure 10).

Regarding inequality, MAMS produces a picture of slowly increasing Gini coefficient (see Figure 11). Changes in inequality are generated by the evolution of per-capita consumption growth across households; the fact that it is higher for the three households with the highest initial within-group inequality drives up aggregate inequality up in our base scenario. In addition, the growth in consumption by household group is not favoring farmers and entrepreneurs, who have rather low per-capita consumption levels in 2012 (see Figure 12).

Figure 10. Base: Headcount poverty rate by year (%)
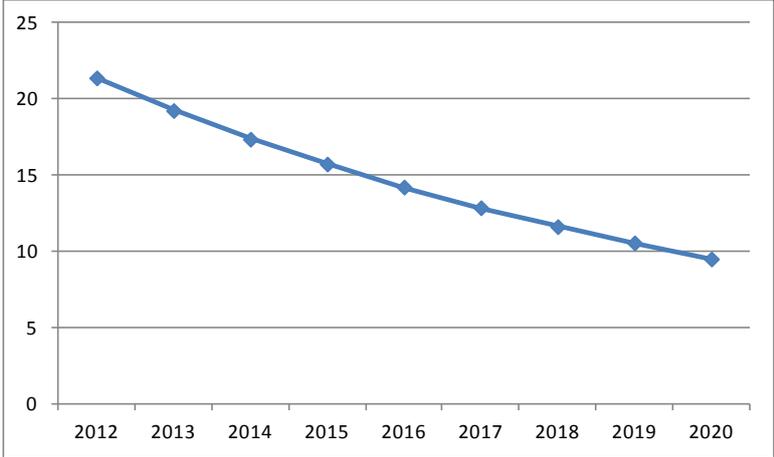
Figure 11. Base: Gini coefficient by year (%)
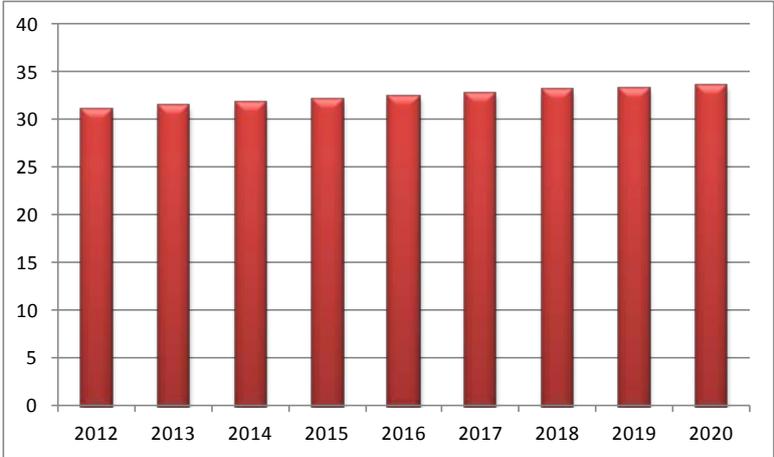
Figure 12. Base: Consumption and inequality by household
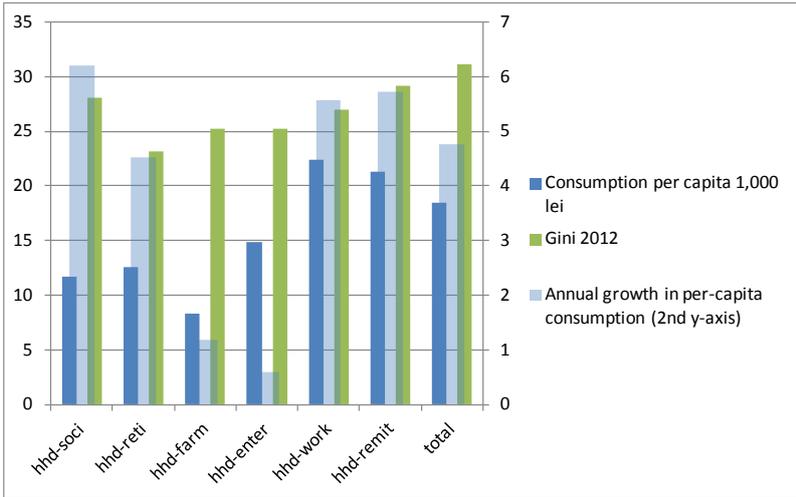
Source for Figures 10-12: MAMS *base* scenario. For notation, see Table 3.

4.2 Export and productivity scenarios

In this section we study the effects of increased productivity and improved access to export markets. Such changes may result from increased trade-related cooperation and development initiatives with the EU and the other members of the aid community, together with the Moldovan government's structural reforms, envisaged in the National Development Strategy *Moldova 2020* (Government of Moldova, 2012b). In addition, we implicitly assume that the EU area overcomes the current economic crisis faster than what is assumed under base scenario.

We analyze here the results for following scenarios:

agpweff   20 percentage-point additional productivity for agriculture (a-agr), food processing (a-food), and beverages and tobacco (a-bevetob), imposed gradually *during 2013-2016.* In other words, as a result of additional productivity growth 2013-2016, the productivity level in 2016 is around 20% higher than for the base. This relative productivity advantage is maintained during the rest of the simulation period. In addition, export prices rise simultaneously gradually by 20% above base prices, reflecting higher export demand and better market access, in practice most importantly to EU markets (which are the outlet for around half of Moldova's exports in the agricultural area; see Luecke et al. 2011). Such an improved access to EU markets would be very important to Moldova while having a negligible impact on the EU given the negligible current and potential market share for Moldova (Prohnitchi, 2011).

indupweff   The same pattern of gradual relative productivity and export price changes during 2013-2016 as under agpweff are introduced for the major industrial sectors (while keeping agricultural prices and productivity the same as under the base): textiles and garments (a-garment), forest and paper (a-woodpap), metal, rubber and plastics (a-metplast) as well as machine and equipment industries (a-machequip). The same motivations as in *agrpweff* apply here.

transeff   Gradual 40 percentage-point increase in productivity during 2013-2019 for transport and post and telecommunications (a-transport and a-posttele). This could be a result of the efforts of the Moldovan Government to rehabilitate the national roads and reduce bureaucratic procedures related trade and communications. If Moldova's transport infrastructure worked more smoothly, the economy would be in a stronger position to benefit from better access to foreign markets and higher export prices. Currently Moldova scores relatively low on the quality of transport infrastructure and customs performance – lower than neighboring countries and other developing countries (World Bank 2011). Reports of much higher inlands transportation cost than in neighboring Romania (World Bank 2011) point to the potential to lower the transaction costs of trade.

Let us consider the above shocks in terms of standard textbook demand and supply curves. The shift in the demand curve to the right, due to higher export demand, tends to increase not only export prices but also domestic prices. On the other hand, increased productivity pushes the supply curve to the right, leading to downward pressure on equilibrium prices. If these shocks take place

simultaneously and are of similar orders of magnitude, they mainly increase the equilibrium volume produced without any major movements in equilibrium prices. This reasoning applies to the *agrpweff* and *indupweff* scenarios, whereas in *transeff* the shock takes place only on the supply side, also in this case shifting the curve to the right. In all the scenarios, the shocks lead to significant increases in GDP growth. In base year 2008, non-food manufacturing exports had a higher share of total exports than food industry (40 percent vs. 31 percent). In addition, as the initial export share of production is highest for non-food industries (see Table 1 above), making it easier for these industries to expand exports, the total exports grow fastest under *indupweff* (see Table 8 and Figure 13). In addition, in contrast to agriculture and food industries (through the input use), non-food industries are not dependent on the inflexible supply of land (factor of production), making the shift of resources to non-food industrial activities smoother. However, when it comes to GDP growth, the *transeff* scenario outpaces the other two due to its higher total productivity growth rate.

Table 8. Export and productivity scenarios: Annual macro growth (%)

Indicator	2012	Final year			
		base	agrpweff	indupweff	transeff
Absorption	99,595	3.9	5.5	6.1	4.6
Consumption - private	65,095	4.2	5.7	6.3	4.9
Consumption - government	13,307	1.5	1.5	1.5	1.5
Fixed investment - private	19,224	4.5	6.8	7.7	5.6
Fixed investment - government	1,969	4.1	6.1	7.4	4.8
Exports	35,280	4.4	7.1	10.7	5.7
Imports	63,874	3.8	6.7	9.1	4.5
GDP at factor cost	59,315	4.3	5.6	5.7	5.9
Total factor employment (index)	n.a.	2.4	2.9	3.1	2.6
Total factor productivity (index)	n.a.	1.9	2.6	2.6	3.3
Real exchange rate (index)	n.a.	0.2	-2.9	-4.2	-0.2
Headcount poverty rate (%)	21.4	9.5	5.7	5.0	8.0

Note: Columns other than 2012 show results for 2020. Figures in first column are in million lei. Poverty rate figures in simulation columns show final-year rates.

Figure 13. Export and productivity scenarios: Total real exports (mn 2008 lei)
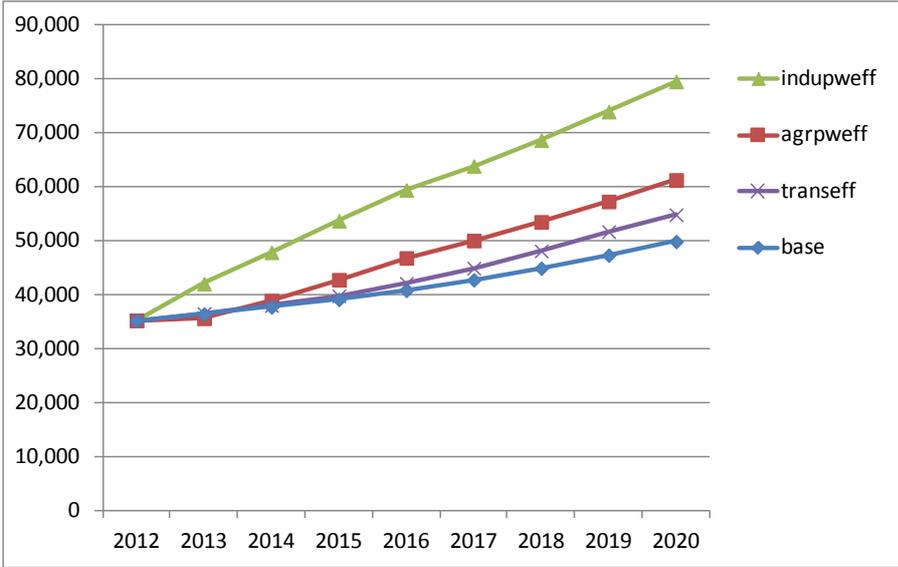
Figure 14. Export and productivity scenarios: Real exchange rate (2008=1)
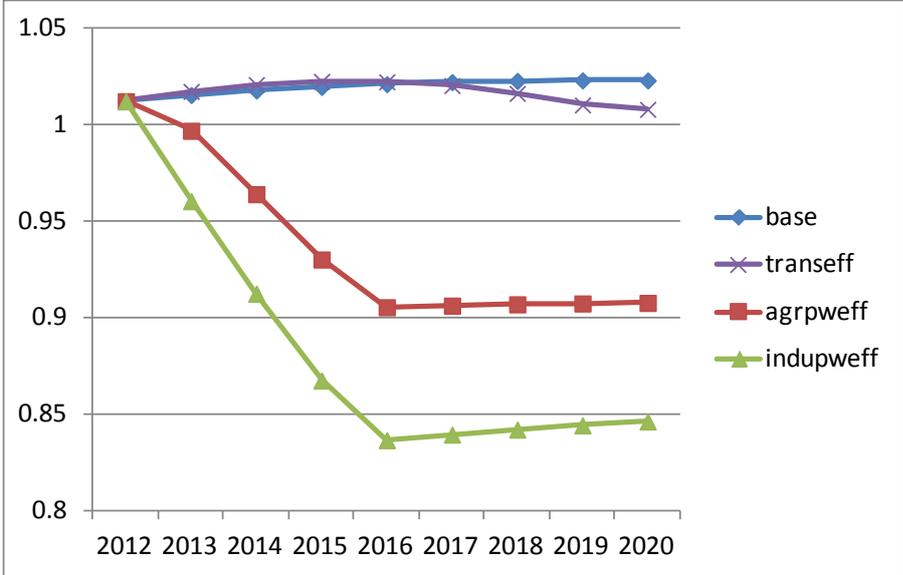
Figure 14 shows that the real appreciation of the exchange rate is larger under *indupweff* than under *agrpweff*. This reflects that, ceteris paribus and for indicated reasons, for *indupweff*, the combined price and productivity shock leads to a larger, export driven initial balance of payments surplus, the elimination of which requires a larger appreciation, mitigating the export increase and encouraging higher imports. All in all, these changes tend to discourage production of non-targeted tradables. By contrast, the exchange rate change (slight appreciation) is very moderate for *transeff*.

In Table 9 we show that the GDP shares of different activities change by the end of simulation period. It is evident that *indupweff* would lead to largest structural changes, whereas *agrpweff* would cause the smallest shifts from base development, leaving *transeff* in the middle. The share of non-manufacturing industries (energy and water services, construction) is not changing much, as the

productivity and price shocks are not targeted to these industries in our scenarios. In addition, demand for these activities is almost exclusively domestic.

Table 9. Export and productivity scenarios: GDP shares by sector (%)

	2012	base	agrpweff	indupweff	transeff
Agriculture and other primary	10.3	9.4	11.6	6.7	8.0
Industry	24.3	23.2	24.3	32.5	20.7
Industry -manufacturing	16.4	14.9	15.8	24.0	11.7
Industry -other	7.9	8.3	8.6	8.5	8.9
Services	65.4	67.4	64.0	60.9	71.3
Services - private	53.3	53.6	50.4	46.7	58.2
Services - government	12.1	13.8	13.7	14.1	13.2
Total	100.0	100.0	100.0	100.0	100.0

Note: Columns other than 2012 show results for 2020.

The share of government receipts and spending merits a comment. As direct and indirect taxes are adjusted through uniform scaling to balance the government accounts, whereas real government consumption is held constant between the scenarios, the GDP share of government is lower the faster economy grows. In other words, in the environment of fast growth, government uses the fiscal space to reduce the tax burden and its share of economy shrinks. In consequence, we see that the government's share of GDP is at its lowest under *indupweff* (Table 10).

Table 10. Export and productivity scenarios: Government receipts and spending (% of GDP)

Indicator		2012	Final year			
			base	agrpweff	indupweff	transeff
Receipts	Direct taxes	10.2	11.0	9.9	9.6	10.5
	Import tariffs	1.7	1.7	1.4	1.5	1.5
	Other indirect taxes	14.7	16.0	13.6	12.9	14.7
	Private transfers	1.4	1.4	1.3	1.3	1.3
	Foreign transfers	3.7	2.2	1.5	1.3	2.0
	Factor income	1.6	1.8	1.9	1.9	1.8
	Domestic borrowing	2.1	2.1	1.6	1.5	1.9
	Foreign borrowing	1.2	1.2	0.8	0.7	1.1
	Total	36.6	37.4	31.9	30.7	34.9
Spending	Consumption	18.7	18.3	17.1	17.0	17.3
	Fixed investment	2.8	2.7	2.5	2.4	2.6
	Private transfers	14.1	15.3	11.6	10.6	13.9
	Foreign transfers	0.4	0.4	0.3	0.2	0.3
	Domestic interests	0.1	0.2	0.2	0.1	0.2
	Foreign interests	0.5	0.6	0.4	0.3	0.5
	Total	36.6	37.4	31.9	30.7	34.9

Note: Columns other than 2012 show results for 2020.

Given the labor market situation of Moldova, increases in productivity, exports, and GDP translate into higher wages, as we can see from Figure 15. The changes in wage growth are quite uniform across the different labor types: all types of labor benefit from improved efficiency and export demand in agriculture and food industry and even more strongly from higher efficiency and demand for industrial non-food exports. The only noteworthy difference is that the least educated labor type, primary labor, benefits most strongly from higher agricultural export prices (*agrpweff)* whereas high-

skilled labor with tertiary education benefits most strongly from increased productivity within transport and communications (*transeff*). Skilled labor with secondary level qualifications is the most abundant type of labor during the final years of all the scenarios (measured by unemployment rate), thus receiving the lowest wage increases.

Figure 15. Export and productivity scenarios: Annual wage growth by labor type (%)
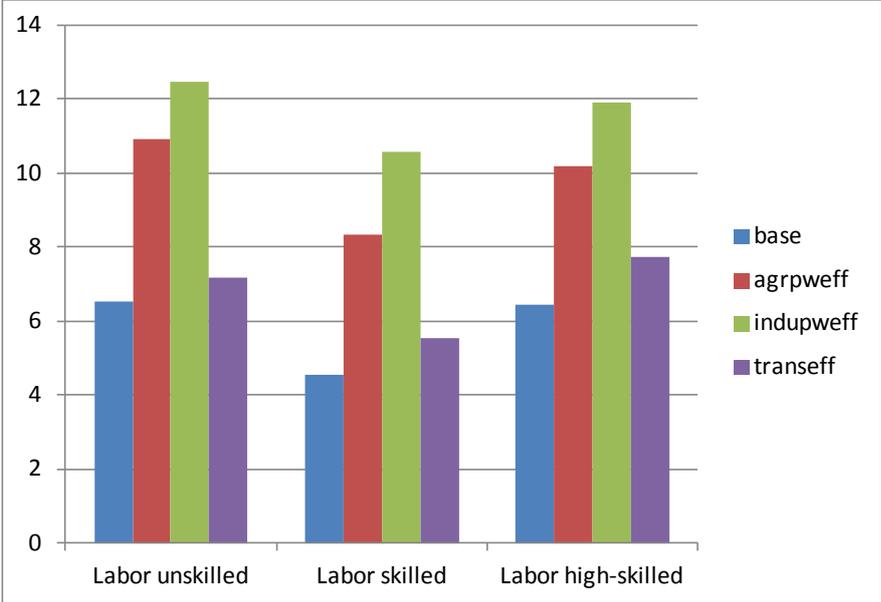
We see from Figure 16 that the *transeff* scenario, which is driven by a productivity increases for commodities used by all the households (for the consumption structure of households, see appendix A.2), produces the most evenly-spread consumption growth of the three scenarios. The two other scenarios with positive demand-side shocks benefit mostly the households with high capital and labor income shares (for more on income structure, see appendix A.1). In general, the gains are relatively small or non-existent for those dependent on transfers, the retired and those with high remittance income (hhd-soci, hhd-reti, and hhd-remit). The reason is that these households, more than others, depend on government transfers (the real growth rates of which do not change across scenarios) and/or transfers from the rest of the world (the growth rates of which are fixed in foreign currency but decline if the exchange rate appreciates).

Figure 16. Export and productivity scenarios: Real per-capita annual consumption growth by household type (%-age point deviation from base)
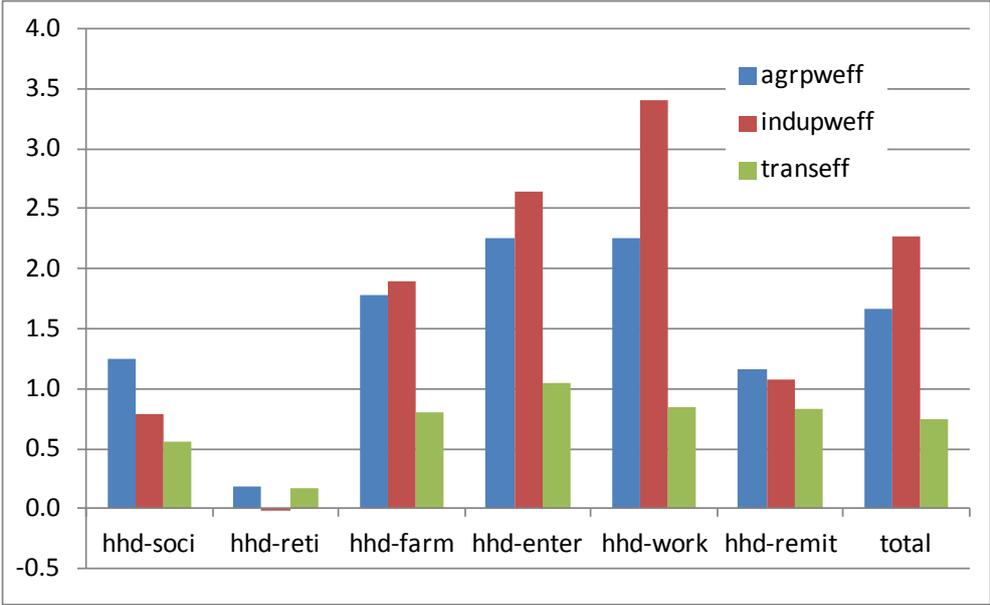
Note: For notation, see Table 3.

In Figure 17 we see the results generated by the MAMS poverty module for changes in the national poverty rate, the poverty gap, and the Gini coefficient from *base* scenario in 2020. We see that although poverty rate and poverty gap[10] decrease, the inequality grows marginally in all the scenarios, indicating that these market-based shocks tend to have relatively positive impact on households that initially are somewhat better off. The *indupweff* scenario, which has the greatest poverty-decreasing potential, is the one leading to the highest inequality increase. Clearly, if more equitable income growth is on the agenda of the Moldovan government, market-driven reforms should be completed by a transfer component to assure a more even diffusion of the benefits. (Two of the following simulations address this issue.)

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[10] The poverty gap index (P1) measures the extent to which individuals fall below the poverty line as a proportion of the poverty line.
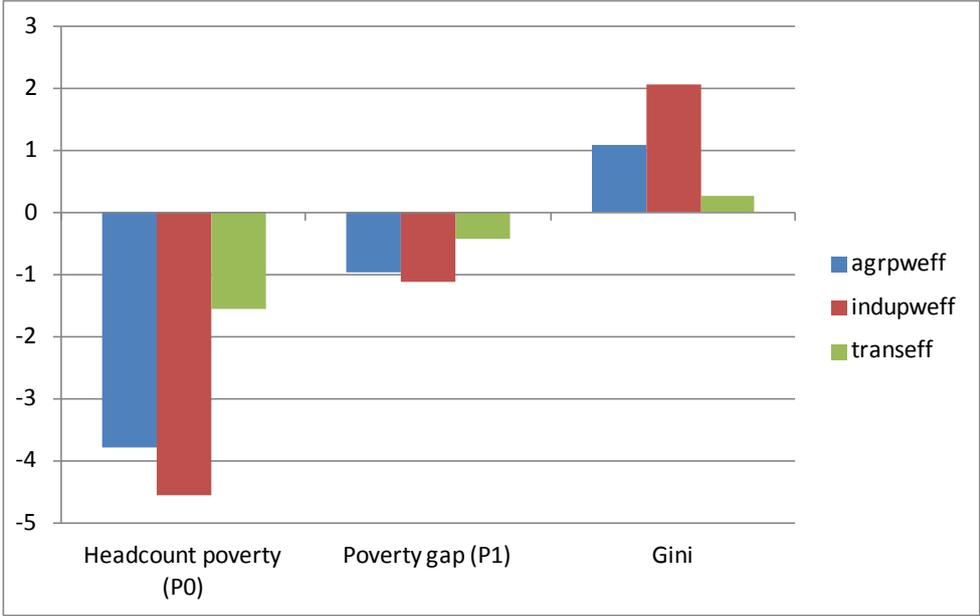
Note: The three indicators are scaled to the range 0-100. The figure depicts the changes (not the relative changes) for the indicators. (For example for the poverty rate, the change is measured in percentage points of poverty rate).

4.3 Effects of adverse external shocks and increased government transfers

In this section we address Moldova's vulnerability to external adverse shocks, as well as the potential role of government transfers in assuring a broader, more equitable diffusion of welfare gains. We scrutinize three scenarios:

fuelpwm   Import prices of fuels rise by 20 percent in 2013, staying at this higher level to the end of the simulation period.

remitdecr   Remittances to households are 20 percent below the baseline levels in each year starting from 2013.

trnsfrpoor   Government transfers to households are 20 percent above the baseline levels in each year starting from 2013.

As we noted in the introduction, Moldova imports practically all of its energy. As this leaves Moldova vulnerable to shocks in the price and availability of energy, it is important to try to understand how the economy would be affected by changes in fuel prices. In the scenario *fuelpwm*, we assume that import price of fuels increase by 20 percent in 2013, staying at this higher level to 2020; under the baseline (and all other scenarios), the import price of fuels is kept unchanged (in real foreign currency) throughout the simulation period.

Under *remitdecr*, the remittances are 20 percent below their baseline values from 2013 onwards. This development could be result of a lengthy recession in the EU due to difficulties in tackling the ongoing financial and fiscal crisis.

Under the scenario *trnsfrpoor,* the Moldovan government introduces additional transfers targeted to poor households from 2013 and onwards, keeping total transfers 20 percent above the baseline levels. This increase is allocated across households on the basis of their poverty rates in 2012 under the *base* scenario. It is worth stressing that it is financed by an increase in domestic taxes. Figure 18 depicts the transfer increase for each household type.

Figure 18. Transfer scenario: Government transfers by household type (% increase from base)
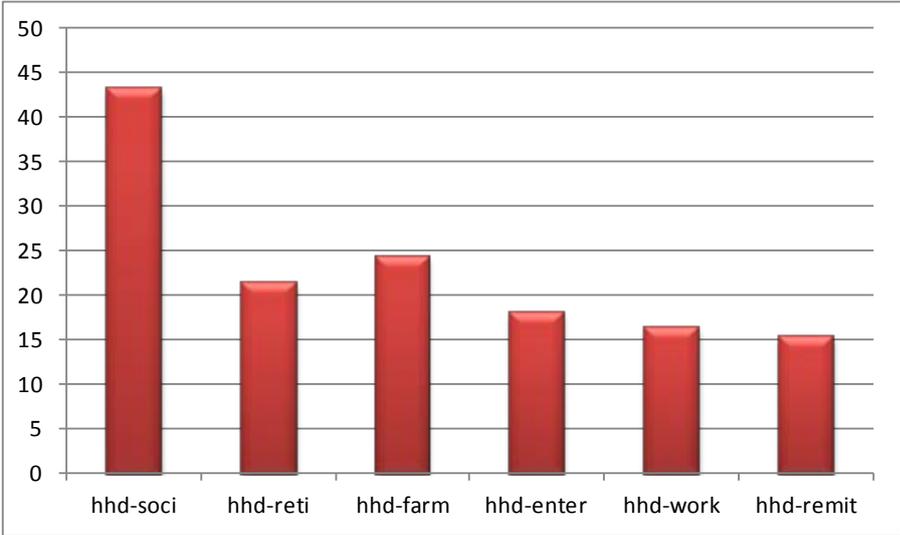
Note: For notation, see Table 3.

From Table 11, which shows macro growth rates by scenario, we see that the annual GDP growth rate in 2013-2020 would decline by 0.2-0.3 percentage points if fuel import prices rise or remittances decline by 20 percent. In contrast, an increase in government transfers to households would lead to very marginal changes in the macro variables. However, the change in poverty rate is also rather marginal. However, there are more noticeable changes in the poverty of different households. In particular, the poverty rate of transfer-dependent households decreases (see appendix B, table B.3). The remittance decrease would lead to a marginally larger economic decline but from poverty point of view, rising fuel prices would be more harmful. Again, the explanation for these results can be sought from the structure of households' income and consumption. Below, we will return to the situation of different household groups.

Table 12 shows that increasing fuel prices would be particularly harmful for the agriculture. Resources are shifted away from agriculture to manufacturing which is more tradable (exportable and a substitute for imports) and encouraged by the depreciation of the real exchange rate that the fuel price increase brings about. The fact that our aggregate commodity *c-fuel* includes chemical products like fertilizers explains in part why agriculture is more negatively influenced than most

manufacturing activities: agriculture has a higher input coefficient for *c-fuel* than most of the manufacturing activities. However, this aggregation is not misleading since production of fertilizers is energy-intensive and, accordingly, fertilizer prices tend to be highly correlated with energy prices (see e.g. Huang, 2009).

Table 11. External shock and transfer scenarios: Annual macro growth (%)

Indicator	2012	Final year			
		base	fuelpwm	remitdecr	trnsfrpoor
Absorption	99,595	3.9	3.4	3.2	3.8
Consumption - private	65,095	4.2	3.7	3.6	4.1
Consumption - government	13,307	1.5	1.5	1.5	1.5
Fixed investment - private	19,224	4.5	3.5	2.9	4.3
Fixed investment - government	1,969	4.1	3.6	3.3	3.9
Exports	35,280	4.4	4.6	4.6	4.1
Imports	63,874	3.8	3.4	3.3	3.7
GDP at factor cost	59,315	4.3	4.1	4.0	4.3
Total factor employment (index	n.a.	2.4	2.1	2.1	2.3
Total factor productivity (index)	n.a.	1.9	2.0	1.9	1.9
Real exchange rate (index)	n.a.	0.2	0.3	0.2	0.3
Headcount poverty rate (%)	21.4	9.5	12.3	10.7	9.2

Note: Columns other than 2012 show results for 2020.

Table 12. External shock and transfer scenarios: GDP shares by sector (%)

	2012	base	fuelpwm	remitdecr	trnsfrpoor
Agriculture and other primary	10.3	9.4	8.6	9.5	9.4
Industry	24.3	23.2	23.9	23.3	22.8
Industry -manufacturing	16.4	14.9	15.8	15.3	14.5
Industry -other	7.9	8.3	8.1	7.9	8.3
Services	65.4	67.4	67.6	67.2	67.8
Services - private	53.3	53.6	53.6	53.4	54.0
Services - government	12.1	13.8	13.9	13.8	13.8
Total	100.0	100.0	100.0	100.0	100.0

Note: Columns other than 2012 show results for 2020.

As the shocks in this section are assumed unchanged growth in real government consumption and investment at the same time as GDP growth contracts and, for one of the scenarios, the government raises spending in one areas (transfers), we see that the share of government of GDP rises in all of them (see table 13). However, it is noteworthy that, even though our transfers rise substantially under *trnsfrpoor* – from 15.3 to 18.5 percent of GPD, the economic growth is not hurt particularly much.

Figure 19 in turn shows that the increase in transfers clearly benefits the retired and those dependent on social benefits – and marginally even farmers - while the consumption growth of the other households is marginally dented. When fuel prices rise and the economy slows down,

government transfers are kept unchanged, which to leads to such changes in relative prices that the retired as the sole household category (with the highest share of income coming from government transfers) would marginally benefit from it. However, this would not hold if the government would decide to cut the transfers instead of raising taxes.

Table 13. External shock and transfer scenarios: Government receipts and spending (% of GDP)

Indicator			Final year			
		2012	base	fuelpwm	remitdecr	trnsfrpoor
Receipts	Direct taxes	10.2	11.0	11.5	11.3	12.2
	Import tariffs	1.7	1.7	1.8	1.6	1.6
	Other indirect taxes	14.7	16.0	17.4	16.3	17.9
	Private transfers	1.4	1.4	1.4	1.4	1.3
	Foreign transfers	3.7	2.2	2.3	2.3	2.2
	Factor income	1.6	1.8	1.8	1.8	1.8
	Domestic borrowing	2.1	2.1	2.4	2.2	2.2
	Foreign borrowing	1.2	1.2	1.3	1.2	1.2
	Total	36.6	37.4	39.8	38.2	40.5
Spending	Consumption	18.7	18.3	18.7	18.6	18.1
	Fixed investment	2.8	2.7	2.7	2.6	2.7
	Private transfers	14.1	15.3	17.2	15.8	18.5
	Foreign transfers	0.4	0.4	0.4	0.4	0.4
	Domestic interest payments	0.1	0.2	0.2	0.2	0.2
	Foreign interest payments	0.5	0.6	0.6	0.6	0.6
	Total	36.6	37.4	39.8	38.2	40.5

Note: Columns other than 2012 show results for 2020.

Figure 19. External shock and transfer scenarios: Annual consumption growth by household type (%-age point deviation from base)
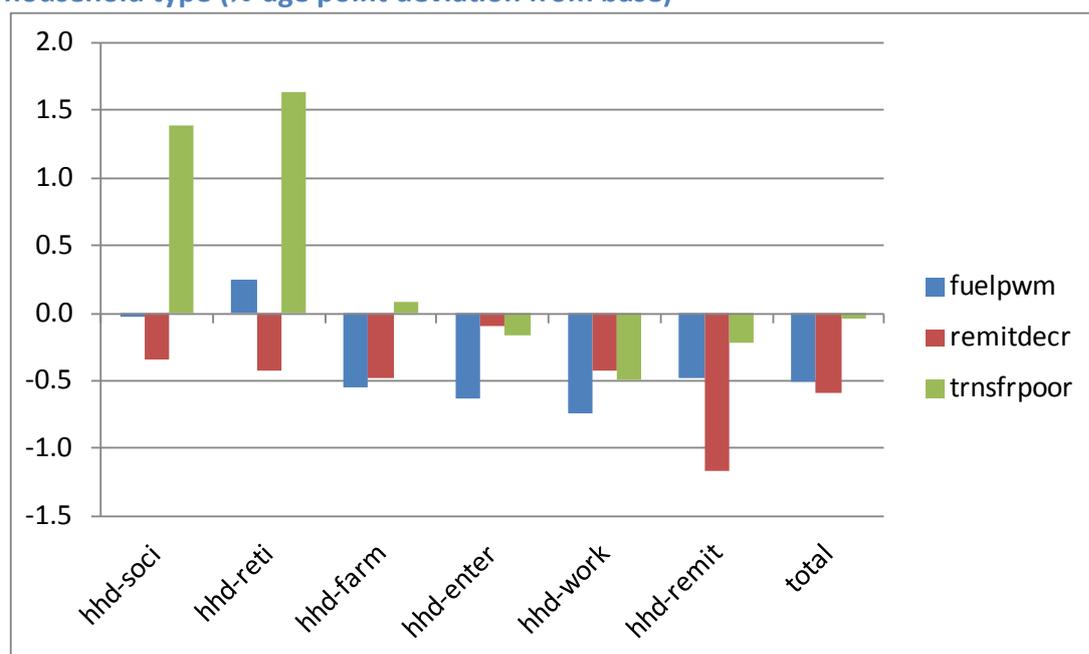
Note: For notation, see Table 3.

Figure 20 confirms that rising fuel prices would be detrimental to the fight against poverty, while the decrease in remittances would not cause as high an increase in poverty, as a considerable share of remittance-receiving households are relatively well-off. In addition, given the manner in which the transfers are financed under the scenario *trnsfrpoor*, the aggregate poverty rate and the poverty gap do not decrease by much. However, our scenario fares considerably better in terms of reducing income inequality. (Therefore the main message of the *trnsfrpoor* scenario is clear: without sacrificing much in terms of growth, it is feasible to increase the welfare of poorer households.

Figure 20. External shock and transfer scenarios: Poverty and inequality in 2010 (%-age point deviation from *base*)
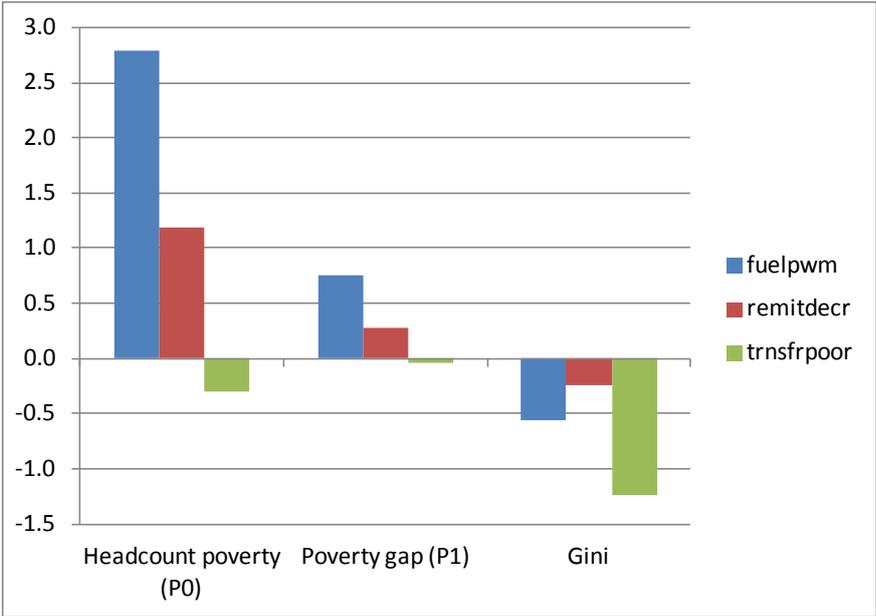
4.4 Combination of scenarios with and without additional transfers

The final two scenarios are combinations of changes included in the scenarios discussed above. The scenario *allgrw* is a combination of *agrpweff*, *indupweff* and *transeff*. Thus, productivity is enhanced across most of the economy – the only exceptions are the public sector and part of private services -- and almost all goods (agricultural and industrial) export prices are higher than under *base*.

Lastly, *allgrw-tr* scenario is identical to *allgrw* except for one addition: government transfers increase according to the specifications of the *trnsfrpoor* scenario.

Table 14 confirms that the combination of shocks that *allgrw* represents would bring about greater prosperity and significantly lower poverty rate than under *base* scenario. What is more, we see that the increase in transfers under rapid growth conditions does not dent the growth rate more than under more moderate growth conditions of the preceding section. Figure 21 verifies that the GDP growth paths of the two scenarios are almost identical. What about the feasibility of the growth rates given the past development of Moldova? As the main long-run driving force of economic

growth is productivity growth, the central question is whether the Moldovan economy could reach an annual TFP growth of 3.2-3.3 percent? And, if so, what types of policy steps would the government need to take in order to bring this about? In fact, during the period 1996-2009, TFP contributed 3-4 percentage points to GDP growth (IMF 2010, p. 65), suggesting that the simulated results are within the range of what is feasible.

Table 15 shows that, when our positive shocks are combined, agriculture and services would contract, while industry would expand. These changes are accompanied by changes in the relative well-being of different household types, as we will see below.

Table 14. Combined scenarios: Annual macro growth (%)

Indicator	2012	Final year		
		base	allgrw	allgrw-tr
Absorption	99,595	3.9	6.7	6.7
Consumption - private	65,095	4.2	7.0	7.0
Consumption - government	13,307	1.5	1.5	1.5
Fixed investment - private	19,224	4.5	8.5	8.3
Fixed investment - government	1,969	4.1	7.7	7.6
Exports	35,280	4.4	10.8	10.6
Imports	63,874	3.8	9.2	9.1
GDP at factor cost	59,315	4.3	6.6	6.5
Total factor employment (index)	n.a.	2.4	3.3	3.2
Total factor productivity (index)	n.a.	1.9	3.3	3.3
Real exchange rate (index)	n.a.	0.2	-3.9	-3.8
Headcount poverty rate (%)	21.4	9.5	4.3	3.7

Note: Columns other than 2012 show results for 2020.

Figure 21. Combined scenarios: GDP growth by year 2013-2020 (%)
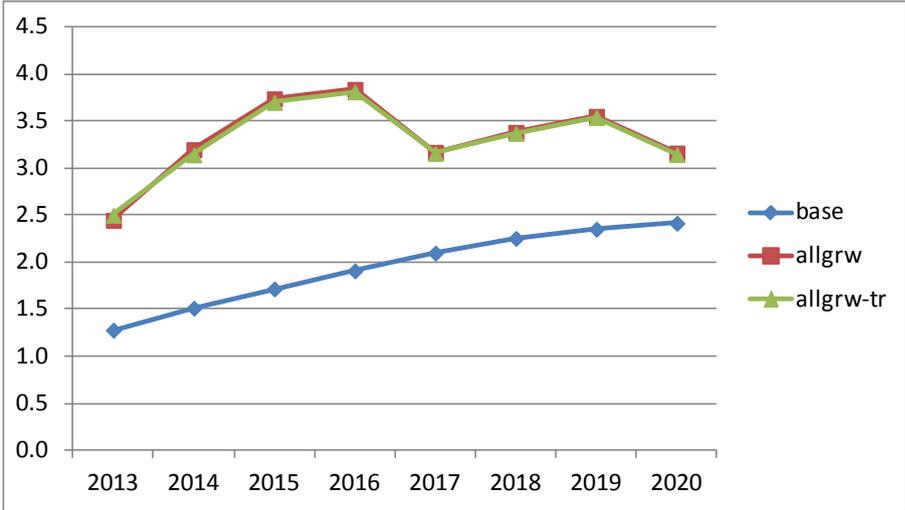
Table 15. Combined scenarios: GDP shares by sector (%)

	2012	base	allgrw	allgrw-tr
Agriculture and other primary	10.3	9.4	8.1	8.1
Industry	24.3	23.2	30.1	29.8
Industry -manufacturing	16.4	14.9	21.1	20.9
Industry -other	7.9	8.3	8.9	8.9
Services	65.4	67.4	61.9	62.0
Services - private	53.3	53.6	47.8	48.0
Services - government	12.1	13.8	14.1	14.1
Total	100.0	100.0	100.0	100.0

Note: Columns other than 2012 show results for 2020.

**Figure 22. Combined scenarios: Annual consumption growth by household type (%-age point deviation from base)**
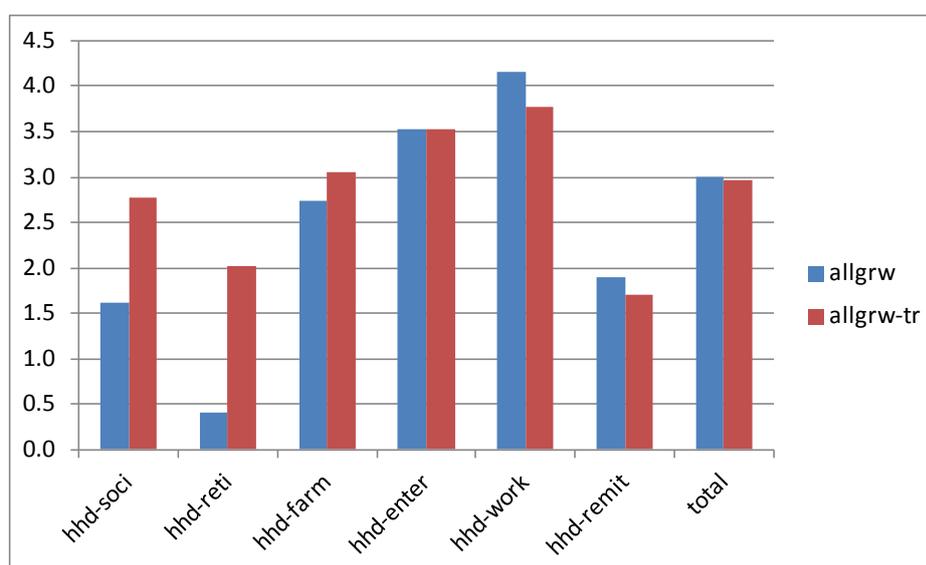
Note: For notation, see Table 3.

Figure 22 shows that the combination of the growth scenario with increased transfers clearly evens out the growth rates of consumption between the household types. Furthermore, as shown by Figure 23, the increase in income inequality is more mitigated while the reductions in the headcount poverty rate and the poverty gaps both are stronger.

Figure 23. Combined scenarios: Poverty and inequality in 2020 (%-age point deviations from *base*)
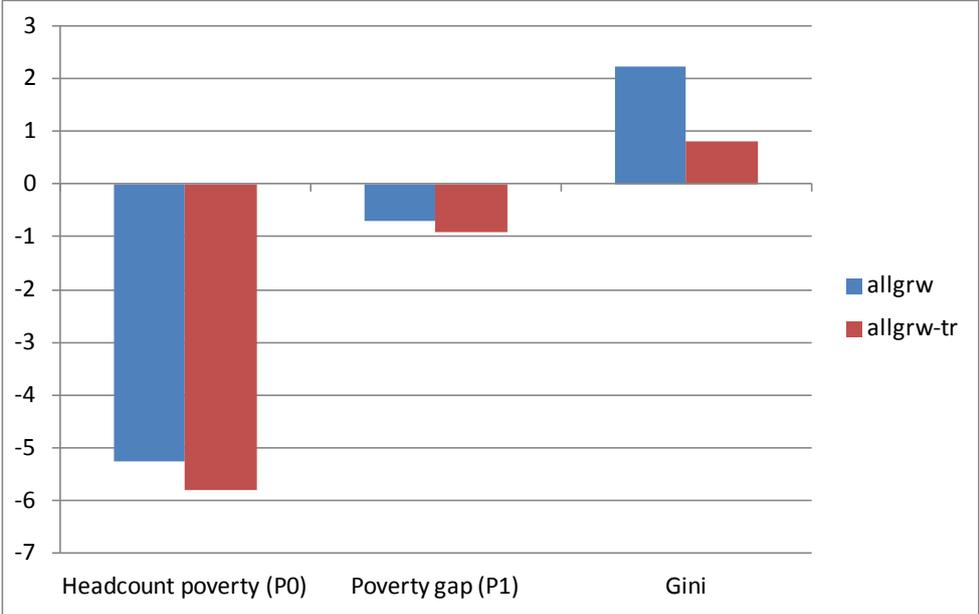
5 Final remarks

In this study, we have explored the impact on the evolution of the Moldovan economy until 2020 from a set of external and domestic shocks and policy changes, defined in light of the change toward an export-oriented strategy that is envisaged by the government. First, we studied the potential effects of increased export demand, coupled with faster productivity growth within agriculture or manufacturing. The payoffs are more positive when these shocks are directed to manufacturing as this sector is more export-oriented than agriculture, for which a considerable share of production is part of subsistence farming.

The role of improvements in road maintenance, trade facilitation and the regulatory environment is simulated by increasing the productivity of transports and communications. The results suggest that this may offer an important avenue for faster growth with benefits that are widely diffused, reaching all household categories in a relatively equitable manner compared to foreign trade-induced growth impulses.

As expected, adverse shocks in form of higher prices for energy imports and a decline in remittances from household members working abroad result in slower growth. Although their impact on GDP is of the same order of magnitude, their effects differ notably in other respects. While the decrease in remittances would hurt growth more than rising energy prices, the resulting poverty increase is higher for the increase in fuel prices. In addition, agriculture seems particularly vulnerable to rising energy prices through its direct and indirect use of energy in form of fertilizers. The households

receiving remittances are not the ones most vulnerable to poverty, which explains why a decrease for these would not result in a major increase in poverty.

In addition, we have studied the economy-wide consequences of increasing government transfers to the households that are less well off. It seems that well-targeted transfer schemes could be an effective tool for diffusing the benefits of economic growth to the whole population, which would also increase the general acceptance of structural change and policy reforms. The cost of substantially higher transfers in form of lost growth and aggregate consumption were rather marginal in our model setting.

In our simulation, the positive shocks were costless, providing an upper limit on what can be gained. Implicitly, we assume that improvements in government efficiency (allocative and productive) and streamlined regulations (reducing the costs of doing business) would be able to pave the way for these improvements in access to export markets and productivity, and permit the government to administer expanded transfer programs. In fact, some credence is lent to these assumptions by recent analyses, which indicate that there should be considerable room for reforms raising government efficiency.[11] Furthermore, government policy documents indicate that such reforms are at the top of the government agenda. Nevertheless, if the budgetary costs of bringing about these changes can be assessed, then this information could be incorporated into a future expanded version of this analysis.

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[11] For example, according to World Bank (2011, pp. xi) "Moldova's large, inefficient Government, structural policy distortions, over-regulation, and under-investment in productive infrastructure and economic services are blocking its development potential". The same report (p. 30) proposes that it would be possible to reduce spending in education by optimizing the school system, reduce staff in public service, and raise the efficiency of public investment by increasing the share spent on productive infrastructure. Similarly, Government of Moldova (2012b, pp. C.32-C.33) note that the spending in the sectors that receive the bulk of public resources (education, health, and social protection) is far from optimal while the Moldova-UN partnership framework for 2013-2017 (pp. 6-8) has increased efficiency of central and local public authorities as part of its first pillar.

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Appendix A.1 Income structure of Moldovan MAMS households, percent

	Labor			Capital	Land	Gov transfers	Transfers from abroad	Domestic interest payments	Total
	less than secondary level	less than tertiary level	tertiary level						
hhd-soci	2.0	1.2	0.0	13.4	0.1	47.3	30.8	5.3	100.0
hhd-reti	1.7	6.4	3.2	7.9	0.7	58.7	20.8	0.7	100.0
hhd-farm	2.1	10.6	0.7	62.9	2.4	7.8	13.5	0.1	100.0
hhd-enter	1.6	10.6	4.1	74.4	0.2	5.9	2.1	1.1	100.0
hhd-work	6.6	44.0	28.9	7.6	0.2	5.1	7.1	0.4	100.0
hhd-remit	0.7	3.4	1.4	37.2	0.2	3.6	53.3	0.2	100.0

Source: calculations based on MAMS Moldova SAM 2008. For notation, see Table 3.

Appendix A.2 Consumption structure of Moldovan MAMS households

	hhd-soci	hhd-reti	hhd-farm	hhd-enter	hhd-work	hhd-remit
c-agr	16.1	16.1	10.0	10.9	10.9	10.4
c-mining	2.2	2.2	2.4	2.1	2.4	2.4
c-food	21.5	23.8	19.4	16.0	16.1	16.4
c-bevetob	14.2	8.1	8.1	10.7	9.3	8.7
c-garment	1.5	3.8	4.4	2.2	2.6	4.2
c-woodpap	0.5	0.6	0.8	0.7	0.8	1.0
c-fuel	10.5	10.6	11.2	10.0	11.2	11.2
c-metplast	3.2	1.3	2.8	2.0	2.0	3.1
c-machequip	6.7	3.1	6.7	10.2	6.2	5.8
c-enewat	3.0	4.3	3.6	2.3	2.4	3.1
c-constr	0.2	0.9	4.1	0.7	1.0	2.7
c-trade	0.1	0.1	0.1	0.1	0.1	0.1
c-hotrest	1.3	0.7	0.4	3.0	3.1	1.8
c-transp	2.9	2.5	3.7	6.4	5.1	3.4
c-posttele	5.6	4.1	6.7	6.0	5.9	7.3
c-finance	0.0	1.5	1.4	7.0	7.2	2.9
c-realest	4.1	6.4	8.1	3.5	4.0	6.3
c-itserv	0.3	0.2	0.3	0.3	0.3	0.4
c-othbusiserv	1.8	3.1	2.4	0.8	1.1	1.6
c-pubadm	0.0	2.7	1.3	2.1	1.7	2.8
c-educpriv	0.0	0.1	0.2	0.4	1.1	0.6
c-educpub	0.0	0.1	0.2	0.5	1.3	0.7
c-healthpriv	1.0	1.3	0.9	0.5	0.6	0.8
c-recrea	2.4	1.7	0.8	1.2	2.6	1.6
c-othperserv	1.0	0.4	0.2	0.5	1.0	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: calculations based on MAMS Moldova SAM 2008. For notation, see Table 3.

Appendix A.3 Consumption parameters of model households

Frisch parameters of households

hhd-soci	hhd-reti	hhd-farm	hhd-enter	hhd-work	hhd-remit	ngo
-2.09	-4.73	-3.15	-4.43	-2.05	-3.81	-3

Source: own estimation from Moldovan household survey data. For notation, see Table 3

Expenditure elasticities of the households' LES demand system

	hhd-soci	hhd-reti	hhd-farm	hhd-enter	hhd-work	hhd-remit	ngo
c-agr	1.148	0.582	1.041	0.908	0.855	0.739	
c-mining	0.765	0.875	1.212	0.867	0.964	0.787	
c-food	1.148	0.582	1.041	0.908	0.855	0.739	
c-bevetob	1.129	0.657	1.256	0.889	0.951	0.861	
c-garment	0.678	1.216	1.363	0.896	1.007	0.708	
c-woodpap	0.717	1.169	1.466	1.613	0.803	0.977	
c-fuel	0.765	0.875	1.212	0.867	0.964	0.787	
c-metplast	0.765	0.875	1.212	0.867	0.964	0.787	
c-machequip	0.509	3.146	0.585	0.664	0.916	2.423	
c-enewat	0.646	1.152	0.766	0.778	0.792	0.522	
c-constr	0.988	4.700	0.432	0.717	1.834	3.733	
c-trade	0.988	2.086	1.053	0.982	0.962	1.224	
c-hotrest	0.988	0.350	2.319	2.176	1.112	0.785	
c-transp	1.217	1.326	1.803	0.891	1.069	0.807	
c-posttele	0.502	0.657	0.992	1.020	0.813	0.584	
c-finance	0.000	3.339	0.013	2.121	1.516	0.448	
c-realest	0.663	1.774	0.590	0.763	1.103	2.035	
c-itserv	1.217	1.326	1.803	0.891	1.069	0.807	
c-othbusiserv	1.807	2.086	0.316	1.508	0.640	0.152	
c-pubadm	0.000	0.569	0.227	0.843	1.540	1.224	
c-educpriv	0.000	0.097	1.023	1.102	0.798	0.441	1
c-educpub	0.000	0.097	1.023	1.102	0.798	0.441	1
c-healthpriv	1.079	1.011	0.880	0.602	0.937	0.996	1
c-organiz							1
c-recrea	1.926	1.076	1.680	0.898	1.550	0.708	1
c-othperserv	2.069	0.525	2.252	0.549	1.087	0.811	

Source: own estimation based on Moldovan household survey data. For more details on the estimation procedure, please contact the authors. For notation, see Table 3.

Appendix A.4 Trade elasticities

	sigmaq	sigmat	rhoe
c-agr	1.35	3.375	-7.5
c-mining	1.35	3.375	-7.5
c-food	1.35	3.375	-7.5
c-bevetob	1.35	3.375	-7.5
c-garment	1.35	3.375	-7.5
c-woodpap	1.35	3.375	-7.5
c-fuel	1.35	3.375	-7.5
c-metplast	1.35	3.375	-7.5
c-machequip	1.35	3.375	-7.5
c-enewat	1.35	3.375	-7.5
c-constr	1.35	3.375	-7.5
c-hotrest	1.35	3.375	-7.5
c-transp	1.35	3.375	-7.5
c-posttele	1.35	3.375	-7.5
c-finance	1.35	3.375	-7.5
c-realest	1.35		
c-itserv	1.35	3.375	-7.5
c-othbusiserv	1.35	3.375	-7.5
c-recrea	1.35	3.375	-7.5
c-othperserv	1.35	3.375	-7.5

Note: sigmaq = Armington-elasticity of substitution between imports and domestic output in domestic demand; sigmat = CET-elasticity of transformation for domestic marketed output between exports and domestic supplies; rhoe = constant price elasticity of export demand. For sector (commodity) notation, see Table 3. For a survey of elasticity values, see Annabi, Cockburn and Decaluwé (2006).

Appendix B. Detailed scenario results

Table B1. All scenarios: Macro indicators (% of GDP)

| Indicator | 2012 | Final year | | | | | | | | |
		base	agrpweff	indupweff	transeff	fuelpwm	remitdecr	trnsfrpoor	allgrw	allgrw-tr
Absorption	140.3	136.9	124.1	120.2	132.8	139.0	133.8	137.2	119.6	119.8
Consumption - private	91.7	88.6	79.2	77.0	85.5	91.0	87.6	89.3	76.1	76.5
Consumption - government	18.7	18.3	17.1	17.0	17.3	18.7	18.6	18.1	16.8	16.7
Investment - private	27.1	27.3	25.3	23.8	27.3	26.6	25.0	27.1	24.4	24.3
Investment - government	2.8	2.7	2.5	2.4	2.6	2.7	2.6	2.7	2.4	2.4
Stock change	Eps	Eps	Eps	Eps	Eps	Eps	Eps	Eps	Eps	Eps
Exports	49.7	50.4	49.1	54.3	49.8	54.0	52.6	49.5	53.4	53.0
Imports	-90.0	-87.3	-73.1	-74.5	-82.6	-92.9	-86.4	-86.7	-73.0	-72.8
GDP at market prices	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Net indirect taxes	16.5	17.6	15.0	14.4	16.3	19.2	18.0	19.6	14.0	15.2
GDP at factor cost	83.5	82.4	85.0	85.6	83.7	80.8	82.0	80.4	86.0	84.8
Foreign savings	2.2	3.0	2.0	1.7	2.7	3.2	3.1	3.1	1.7	1.7
Gross national savings	27.7	26.9	25.8	24.4	27.2	26.1	24.5	26.8	25.1	24.9
Gross domestic savings	-10.4	-6.9	3.7	5.9	-2.8	-9.6	-6.1	-7.3	7.2	6.9
Foreign government debt	17.5	20.8	14.1	12.0	18.7	22.0	21.5	21.0	11.6	11.7
Domestic government debt	0.6	2.3	1.8	1.6	2.1	2.6	2.4	2.4	1.5	1.5

Note: Columns other than 2012 show results for 2020.

Table B2. All scenarios: Decomposition of growth in GDP at factor cost by sector and simulation 2012-2020 (%)

	base	agrpweff	indupweff	transeff	fuelpwm	remitdecr	trnsfrpoor	allgrw	allgrw-tr
a-agr	0.64	1.51	0.36	0.42	0.46	0.60	0.62	0.84	0.84
a-mining	0.02	0.01	0.00	0.02	0.02	0.02	0.02	0.01	0.01
a-food	0.17	0.31	0.05	0.14	0.14	0.15	0.16	0.15	0.15
a-bevetob	0.25	1.17	-0.18	0.05	0.19	0.27	0.23	0.01	0.01
a-garment	-0.33	-0.82	2.52	-0.58	-0.07	-0.27	-0.38	1.71	1.66
a-woodpap	0.04	0.02	0.02	0.03	0.04	0.04	0.04	0.03	0.03
a-fuel	0.02	-0.01	-0.02	0.01	0.01	0.02	0.02	-0.01	-0.01
a-metplast	0.15	0.03	0.13	0.15	0.12	0.13	0.15	0.15	0.15
a-machequip	0.09	-0.04	0.05	0.08	0.10	0.08	0.09	0.06	0.06
a-enewat	0.11	0.08	0.07	0.18	0.11	0.10	0.11	0.09	0.09
a-constr	0.26	0.40	0.39	0.36	0.22	0.19	0.26	0.46	0.45
a-trade	0.65	1.09	0.88	0.71	0.57	0.57	0.62	1.09	1.08
a-hotrest	0.09	0.02	0.01	0.08	0.09	0.08	0.09	0.02	0.02
a-transp	0.39	0.21	0.03	0.67	0.30	0.36	0.38	0.19	0.18
a-posttele	0.56	0.17	0.11	2.07	0.65	0.52	0.60	0.30	0.31
a-finance	0.39	0.46	0.42	0.48	0.37	0.35	0.39	0.49	0.49
a-realest	0.30	0.35	0.36	0.36	0.28	0.26	0.31	0.40	0.41
a-itserv	0.05	0.04	0.06	0.07	0.05	0.04	0.05	0.06	0.06
a-othbusiserv	0.13	0.16	0.10	0.16	0.12	0.11	0.13	0.13	0.14
a-pubadm	0.08	0.09	0.08	0.09	0.08	0.07	0.08	0.09	0.09
a-educpriv	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
a-educpub	0.04	0.05	0.04	0.05	0.04	0.04	0.04	0.04	0.04
a-healthpriv	0.08	0.09	0.08	0.09	0.08	0.08	0.09	0.08	0.08
a-healthpub	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
a-sanipriv	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
a-sanipub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
a-organiz	0.02	0.00	-0.01	0.02	0.02	0.02	0.02	-0.01	-0.01
a-recrea	0.08	0.09	0.09	0.09	0.07	0.07	0.08	0.10	0.10
a-othperserv	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03
total	4.35	5.55	5.74	5.86	4.11	3.97	4.27	6.57	6.51

Note: For activity (sector) notation, see Table 3.

Table B3. All scenarios: Structure of GDP at factor cost in final year (%)

	2012	base	agrpweff	indupweff	transeff	fuelpwm	remitdecr	trnsfrpoor	allgrw	allgrw-tr
a-agr	9.80	8.88	11.22	6.31	7.50	8.05	9.02	8.87	7.71	7.75
a-mining	0.52	0.53	0.41	0.35	0.50	0.51	0.52	0.53	0.37	0.37
a-food	3.63	3.77	3.88	2.84	3.42	3.62	3.77	3.76	3.00	3.01
a-bevetob	2.90	4.03	8.06	1.06	2.56	3.67	4.22	3.88	1.99	1.97
a-garment	4.41	1.32	0.14	16.08	0.45	2.90	1.68	1.07	11.93	11.71
a-woodpap	0.81	0.83	0.68	0.56	0.75	0.83	0.83	0.82	0.60	0.60
a-fuel	0.25	0.31	0.10	0.07	0.21	0.22	0.32	0.29	0.08	0.08
a-metplast	2.78	2.90	2.04	2.21	2.76	2.72	2.82	2.88	2.32	2.32
a-machequip	1.62	1.75	0.88	1.19	1.59	1.82	1.71	1.76	1.22	1.23
a-enewat	2.60	3.09	2.84	2.82	3.35	3.10	3.05	3.12	2.94	2.97
a-constr	5.32	5.22	5.74	5.66	5.57	5.00	4.90	5.19	5.99	5.96
a-trade	14.73	14.28	16.07	14.86	14.15	13.99	14.16	14.20	15.94	15.91
a-hotrest	1.51	1.60	1.12	1.00	1.47	1.63	1.60	1.61	1.06	1.05
a-transp	6.82	7.18	5.75	4.50	6.60	6.73	7.20	7.15	4.04	4.04
a-posttele	7.00	7.45	4.87	4.24	12.38	8.14	7.46	7.76	3.99	4.03
a-finance	7.05	6.69	6.56	6.30	7.03	6.68	6.69	6.71	6.60	6.61
a-realest	5.24	4.61	4.52	4.43	4.84	4.62	4.55	4.70	4.59	4.66
a-itserv	1.60	1.84	1.70	1.93	1.84	1.84	1.77	1.83	1.93	1.93
a-othbusiserv	2.54	2.85	2.92	2.65	2.95	2.85	2.81	2.91	2.81	2.86
a-pubadm	4.96	5.90	5.84	6.05	5.65	5.94	5.87	5.91	6.03	6.03
a-educpriv	0.64	0.61	0.60	0.59	0.63	0.61	0.61	0.61	0.60	0.60
a-educpub	5.71	6.33	6.27	6.48	6.04	6.40	6.36	6.33	6.44	6.44
a-healthpriv	3.27	3.53	3.46	3.46	3.37	3.57	3.56	3.56	3.46	3.48
a-healthpub	1.05	1.20	1.20	1.23	1.13	1.22	1.21	1.21	1.22	1.22
a-sanipriv	0.21	0.19	0.19	0.18	0.20	0.19	0.19	0.19	0.19	0.19
a-sanipub	0.34	0.36	0.36	0.37	0.34	0.36	0.36	0.36	0.36	0.36
a-organiz	0.78	0.79	0.61	0.56	0.73	0.81	0.81	0.80	0.55	0.55
a-recrea	1.42	1.54	1.56	1.59	1.55	1.54	1.54	1.55	1.61	1.62
a-othperserv	0.48	0.43	0.43	0.43	0.44	0.42	0.43	0.43	0.44	0.44
total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: For activity (sector) notation, see Table 3.

Table B4. All scenarios: Foster-Greer-Thorbecke (FGT) poverty indicators 2012 and in final report year

		2012	base	agrpweff	indupweff	transeff	fuelpwm	remitdecr	trnsfrpoor	allgrw	allgrw-tr
P0	hhd-soci	49.6	18.3	12.9	12.0	15.8	21.3	19.8	13.7	10.8	8.1
P0	hhd-reti	26.4	7.5	5.8	5.3	6.7	8.9	8.8	4.3	4.8	2.6
P0	hhd-farm	46.4	39.8	25.9	23.7	34.7	48.2	43.2	39.8	20.5	19.3
P0	hhd-enter	34.9	32.3	17.3	14.0	26.1	41.0	33.1	33.9	11.7	11.9
P0	hhd-work	13.1	2.4	0.8	0.4	1.8	4.1	2.9	3.0	0.3	0.4
P0	hhd-remit	17.1	3.9	2.2	2.1	3.0	5.7	5.6	4.3	1.7	1.8
P0	total	21.4	9.5	5.7	5.0	8.0	12.3	10.7	9.2	4.3	3.7
P1	hhd-soci	15.1	4.1	2.7	2.5	3.4	4.9	4.5	2.9	2.2	1.5
P1	hhd-reti	5.5	1.2	0.9	0.8	1.1	1.5	1.4	0.6	0.7	0.4
P1	hhd-farm	12.6	10.2	5.8	5.2	8.4	13.3	11.4	10.2	4.3	4.0
P1	hhd-enter	8.5	7.7	3.5	2.7	5.8	10.6	7.9	8.2	2.2	2.2
P1	hhd-work	2.6	0.4	0.1	0.1	0.3	0.7	0.5	0.5	0.0	0.0
P1	hhd-remit	3.9	0.7	0.4	0.3	0.5	1.1	1.0	0.8	0.3	0.3
P1	total	4.8	2.1	1.1	0.9	1.6	2.8	2.3	2.0	0.8	0.7
P2	hhd-soci	6.3	1.4	0.9	0.8	1.1	1.7	1.5	0.9	0.7	0.5
P2	hhd-reti	1.7	0.3	0.2	0.2	0.3	0.4	0.4	0.2	0.2	0.1
P2	hhd-farm	4.8	3.7	1.9	1.7	3.0	5.1	4.2	3.7	1.4	1.3
P2	hhd-enter	3.0	2.7	1.1	0.8	1.9	3.9	2.8	2.9	0.6	0.6
P2	hhd-work	0.8	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.0	0.0
P2	hhd-remit	1.3	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.1
P2	total	1.6	0.7	0.3	0.3	0.5	1.0	0.8	0.7	0.2	0.2

Units: % for P0; scaled by 100 for P1 and P2 (to generate same scale)

Note: P2 stands for the squared poverty gap index.

Note: For household notation, see Table 3.

Table B5. All scenarios: Real household consumption by commodity - annual growth 2012-2020 (%)

	2012	base	agrpweff	indupweff	transeff	fuelpwm	remitdecr	trnsfrpoor	allgrw	allgrw-tr
c-agr	6531.88	4.20	6.16	6.00	4.55	3.52	3.68	4.22	7.23	7.25
c-mining	1230.96	3.58	5.97	7.23	4.32	3.18	3.05	3.52	7.61	7.56
c-food	7345.65	3.30	4.85	5.18	3.82	2.92	2.84	3.27	5.92	5.91
c-bevetob	3085.48	3.67	6.01	5.03	4.04	3.14	3.15	3.32	6.36	6.10
c-garment	1264.63	3.71	5.95	7.56	4.36	3.40	3.14	3.72	7.98	8.02
c-woodpap	344.64	3.64	5.54	6.83	4.35	3.26	3.02	3.52	7.26	7.18
c-fuel	743.61	3.56	5.87	7.10	4.32	2.17	3.01	3.39	7.51	7.38
c-metplast	1024.16	3.40	5.28	6.58	4.10	2.95	2.82	3.24	6.98	6.86
c-machequip	2084.42	5.17	7.72	9.01	6.10	4.74	4.30	5.15	9.55	9.54
c-enewat	1733.04	2.94	3.94	4.41	3.39	2.77	2.55	3.24	4.65	4.92
c-constr	1158.79	8.99	10.92	11.92	10.02	8.43	7.57	9.05	12.55	12.63
c-trade	55.57	4.88	5.31	5.80	5.28	4.66	4.20	5.03	6.09	6.21
c-hotrest	1466.75	4.05	5.92	7.05	4.64	3.53	3.56	3.71	7.50	7.24
c-transp	2750.90	3.96	5.44	6.56	5.62	3.34	3.45	3.83	7.83	7.73
c-posttele	3662.10	3.87	4.23	4.97	6.72	3.73	3.35	3.84	6.78	6.72
c-finance	3455.81	6.05	7.31	8.55	6.48	5.69	5.51	5.93	8.81	8.73
c-realest	3446.10	7.16	7.98	8.68	7.58	6.94	6.19	7.48	9.03	9.29
c-itserv	178.40	2.78	3.63	3.95	3.30	2.58	2.35	2.81	4.25	4.28
c-othbusiserv	906.29	3.96	4.12	4.11	4.17	4.11	3.59	4.99	4.39	5.26
c-pubadm	1357.48	2.70	2.82	2.67	3.13	2.54	2.26	2.70	2.92	2.92
c-educpriv	480.06	2.39	2.66	3.09	2.56	2.20	2.09	2.20	3.19	3.05
c-educpub	564.13	0.87	0.89	0.90	1.13	0.75	0.70	0.75	1.00	0.91
c-healthpriv	501.20	3.02	2.85	2.75	3.25	2.95	2.63	3.36	2.90	3.16
c-organiz	1120.85	2.66	-0.13	-1.08	2.13	2.76	2.75	2.76	-1.35	-1.25
c-recrea	1390.54	5.10	6.19	7.13	5.58	4.76	4.61	5.06	7.40	7.37
c-othperserv	515.07	5.01	5.99	7.08	5.30	4.55	4.44	4.80	7.23	7.06
total	65095.22	4.17	5.75	6.33	4.88	3.68	3.60	4.14	7.05	7.02

Note: For activity (sector) notation, see Table 3.