

Calculating genuine saving for Kazakhstan

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Abstract: Economic literature (Hamilton and Clemens, 1999; Dasgupta and Maler, 2000; World Bank, 2006) argues that non-negative rates of genuine saving correspond to sustainability of economic development. The values of genuine saving depend on the methods of its estimation particularly for oil-producing countries. By generalizing the methodology, presented in Bolt et al., (2002), we provide two extensions of calculating genuine saving on the basis of the national statistical data of Kazakhstan. Although the results are sometimes contradictory, the economy is apparently on an unsustainable path and therefore, loses its value of welfare with time.

Keywords: *Non-renewable resource, genuine saving, Kazakhstan, economic development, sustainable development*

1. Introduction

Despite that the performance of an economy is measured in terms of GDP or per capita GDP, these indicators can not capture many important aspects of national wealth. It is notably known that depletable resources become an essential factor of GDP growth in oil-producing countries.² Therefore, the perspectives of GDP growth in such economies depend on how natural rents are invested in productive assets.

Dasgupta (2007) argues that economic development may be called sustainable when the productive base does not decline, taking into consideration demographic developments. The productive base is defined as the stock of capital assets and institutions. Capital assets include manufactured capital, human capital and knowledge, and also natural capital. Then, sustainability

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² Despite that natural resources is an “engine” of growth, it is still neglected in models of economic growth (Auty 2007). Moreover, there is evidence countries richly endowed with natural resources have developed less rapidly than countries that are poor in natural resources (Sachs and Warner, 1995).

is viewed as non-declining value of the productive base, any change of which is equal to the value of genuine saving (Hamilton and Clements, 1999). Recently, genuine saving has been adopted as an indicator by the World Bank, under the name of 'adjusted net savings' for measuring sustainability of economic development. Illustrative estimates of genuine savings are provided in World Bank (2006), where countries with a large percentage of mineral and natural rents of GNI (gross national income) typically have negative rates.

The estimations of genuine saving encounter with many difficulties for resource rich countries. First, it concerns the value of depletion of natural resources. The World Bank makes general assumptions that are unique for a whole number of countries. Secondly, the costs associated with pollution damage, including economic and health effects, are often excluded from standard national accounts. Thirdly, due to the lack of data the expenditure on education is unambiguously treated as public, whereas it should also include private schools spending. Fourthly, the income of FDI (Foreign Direct Investment) from mining industry can represent another approach to estimating the depletion of mineral resources.

In this paper we assess genuine saving rates for Kazakhstan on the basis of the national statistical data. Section 2 contains the World Bank estimations of genuine saving for some oil producing countries. Afterwards, we present a new generalization of the methodology of calculating genuine saving. Although the results are sometimes contradictory, we demonstrate that the economy is apparently on an unsustainable path and therefore, loses its value of welfare with time.

2. Sustaining development in resource-based economies

National wealth is traditionally measured by gross saving that does not take into account natural resources depletion, capital depreciation, environmental degradation and damages to human health. Many economists agree now that genuine saving is one of the alternative indicators of GDP, which is narrow but theoretically better founded (Van den Bergh, 2009). In resource based economies the depletion of natural resources is not entirely reflected in the accumulation of capital and hence, in GDP. If physical capital is accumulated during long time, resource depletion, however, occurs at least during a medium term because of its finiteness. A large part of natural rents is accumulated in national funds and saved abroad, and therefore, is not

often reflected in GDP. In addition, in spite of genuine saving GDP neglects also capital depreciation.

Genuine saving measures the true rate of gross saving after taking into account human capital investment, resource depletion and damages caused by pollution and thus, denotes sustainability of economic development (Fereira and Vincent, 2005). By sustainable development we understand an economic process, in which national wealth, constituted by physical, natural, human and social capital, does not decrease with time. In other words, consumption by the present generation might not lead to worsening in the possibilities for the future generations to satisfy their own needs. The World Bank published a concept of genuine saving (World Bank, 2006) and calculates its value for more than 140 countries, including Kazakhstan, based on the following variables (Bolt et al., 2002):

$$GS = \frac{GNS + EE - CFC - DER - DM - NDF - CO_2 - PPD}{GNI} \quad (2.1)$$

where, *GS* - genuine saving;

GNS - gross national saving;

EE - education expenditure;

CFC - consumption of fixed capital;

DER - depletion of energy resources;

DM - depletion of minerals;

NDF - net depletion of forests;

CO₂ - CO₂ damages;

PPD - Particulate pollution damages;

Genuine savings rates are commonly found to be negative for the Middle East and North Africaas well as Sub-Saharan Africa regions, but positive for OECD countries and the East Asia region. Hence, in order to ensure sustainable growth countries should invest their resource rents in other assets such as produced capital, human capital and foreign financial assets so that these assets grow over time.

The indicators of genuine saving with the estimated values for Kazakhstan are presented below (Table 1). Gross saving is calculated as the difference between GNI³ and the sum of public and private consumption including net current transfers. Net saving is found by subtracting fixed capital consumption from gross saving. Education expenditure includes only public spending. All figures are taken from WDI (World Development Indicators (World Bank, 2010)) and indicated as percentage of GNI.

Table 1. Genuine savings for Kazakhstan, % of GNI

	1995	1998	2000	2002	2004	2006
Gross saving	18.4	10.6	22.1	24.2	29.2	34.5
Consumption of fixed capital	12.55	13.96	17.25	16.01	11.51	13.12
Net saving	5.82	-3.32	4.89	8.22	17.73	21.35
Education expenditure	4.56	4.41	4.41	4.41	4.41	4.41
Depletion of energy resources	19.23	14.34	50.23	39.47	50.50	52.38
Depletion of minerals	1.47	0.94	3.14	2.15	2.97	4.2
Net depletion of forests	0.00	0.00	0.00	0.00	0.00	0.00
Particulate pollution damage, including CO ₂ damages	4.47	3.20	4.18	4.12	2.85	2.05
Genuine saving	-14.80	-17.39	-48.24	-33.11	-34.16	-32.91

Source: World Bank, 2010.

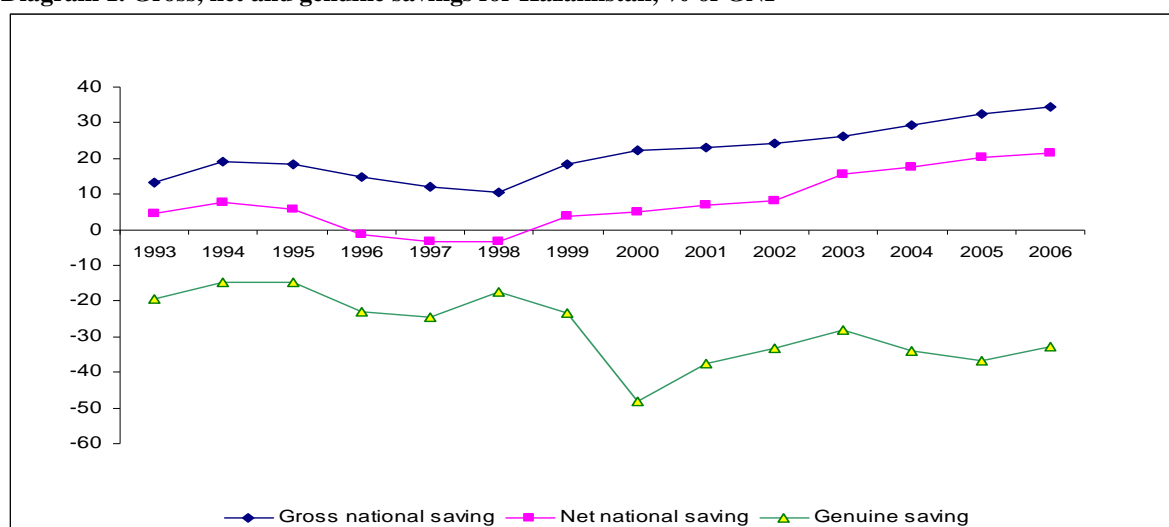
Thus, gross savings increased from 18.4% in 1995 to 34.5% in 2006, whereas the rates of genuine saving significantly remained negative during these years. The significant gap between genuine savings and gross savings is linked, mainly, to the depletion of energy resources (oil, natural gas and coal). Notably, the depletion of energy resources increased from 19.23% in 1995 to 52.38% in 2006. The other variables, namely the depletion of minerals (bauxite, copper, lead, nickel, phosphate, zinc, gold) and the expenditure on education and the CO₂ damages have appeared insignificant.

In the diagram 1 we depict the dynamics of gross, net and genuine savings for the period of 1993-2006. In particular, there is a strong tendency of negative genuine savings despite that gross and net savings increase. This is closely related to the depletion of energy and mineral resources, characterized by insufficient investments of the natural rents in renewing the productive assets and human capital and the protection of environment.

³ GNI is less than GNP on the value of the indirect taxes of non-residents.

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Diagram 1. Gross, net and genuine savings for Kazakhstan, % of GNI



Source: World Bank, 2010.

Now, we regroup the oil-producing countries following their rates of genuine saving (Table 2). First of all, we notice that except for Norway, a decline in the value of genuine saving is observed for all countries. Such tendency can certainly be explained by the growth of world prices for energy resources, especially for oil since 2002. As we see, Norway, Malaysia and Indonesia keep positive genuine savings during the period. On the other side, genuine savings for Azerbaijan, Nigeria and Kazakhstan are significantly negative.

Table 2. Calculated genuine savings by World Bank, % of GNI

	1995	1997	1999	2001	2003	2005	2006
Algeria	-3.84	-1.25	0.08	-0.92	3.39	-5.50	n.a.
Azerbaijan	-43.16	-32.08	-24.94	-35.22	-26.16	-35.10	-38.56
Indonesia	17.35	18.22	2.77	12.31	12.70	2.77	2.85
Iran	-4.32	-8.28	-15.99	-35.33	-4.74	-15.51	-22.45
Kazakhstan	-14.80	-24.69	-23.53	-37.53	-27.97	-36.93	-32.91
Malaysia	19.00	22.25	22.00	13.71	16.19	5.15	3.39
Nigeria	-33.32	-25.32	-18.58	-19.17	-28.34	-36.41	-28.87
Norway	6.90	8.49	10.06	10.93	8.48	9.54	9.35
Russia	1.15	-5.08	-9.27	-11.23	-8.35	-11/07	-13.50
Venezuela	-6.21	0.88	7.15	2.73	-7.38	-11.46	-9.49

Source: World Bank, 2010.

In the next section we provide two extensions of the calculations of genuine saving for Kazakhstan based on the standard national accounts.

3. Two extensions of calculating genuine saving

We reexamine cautiously the methodology of genuine saving and propose two ways of its calculating, based on the data sources of Republic of ARKS (Kazakhstan Agency of for Statistics, 2008a, b) and the NBK (National Bank of Kazakhstan, 2008). In the first case we use the ARKS statistical bulletin “National accounts of the Republic of Kazakhstan for 2003-2007” and the forms of statistics “Use of goods and services at purchasing prices”. These sources contain the data on net savings, output and expenditures on extraction of energy and mineral resources and expenditures on education for each year from 20005 to 2007.

The first difference concerns the value of depletion of natural resources. The World Bank makes the general assumptions particularly for oil producing countries. In our case the rent for each type of energy and mineral resources is calculated by subtracting the expenditures of its extraction from the cost of resource output. However, unlike the energy resources, the available data on extraction of the mineral resources is aggregated as the extraction of iron ores, ores of nonferrous metals and other branches of mining industry. As it concerns the expenditures on natural resources extraction they include intermediate consumption or all forms of services and intermediate goods which were used by extractive industries (including import of goods) at purchasing prices⁴ as well as the payment for labor and the consumption of fixed assets. Therefore, the sum of the rents of each type represents the depletion of energy resources. The results of the aggregated rent from energy and mineral resources are represented in the Annex (Table 1).

For example, the cost of oil production in 2006 is calculated as \$44.42 per barrel, based on the production of oil (65 mln. ton) and the expenditure of its extraction (21163 mln.\$), while the extraction costs of big oil companies "KazMunaiGaz" (KMG) and «TengizChevrOil» vary indeed between \$15-18 and \$10-12 per barrel including transport expenses for oil delivery to the international ports.⁵

Due to the lack of data the expenditure on education is unambiguously treated by World Bank as public, whereas it should also include private schools spending. Therefore, we take into account not only budget expenditures, but also expenditures of private sector in the sphere of

⁴ Consumer price is understood as the sum paid by consumer for the delivery of goods and service, which consists of the price of goods and service, commercial transportation price increases and taxes on goods.

⁵ <http://www.reuters.com/article/rbssEnergyNews/idUSLS12407420090728>

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education. For this purpose, we use the data on education expenses from the national accounts, reflected in intermediate consumption, payment of labor and consumption of fixed capital by educational institutions with the various forms of ownership. Similarly with the World Bank approach, the depletion of forests is supposed to be zero for each year of the period because the territory of Kazakhstan has no greater forest covers.

The costs associated with pollution damage, including economic and health effects, are often uncertain and excluded standard national accounts. The damages of CO₂ emissions were calculated on the basis of ASRK data on the volumes of emissions of liquid and gaseous substances.⁶ Similarly to the World Bank approach the price of CO₂ emissions is put \$20 per ton at 1995 prices, adjusted by the deflator of USA GDP for 2007. The calculated losses from CO₂ emissions are considerably lower than the corresponding estimation by the World Bank.

The second approach to genuine saving estimation is presented by analyzing the balances of payment to replace the gross rent from energy and mineral resources. The income of FDI from mining industry has been ignored in the World Bank approach. For example, the balance of payment for 2008 contains the income of FDI with the negative signs that characterizes the outflows of capital. In turn, the balance of payment for 2006 includes the structure of FDI incomes for each sector with the aggregated amount of 6454 mln.\$. This roughly corresponds to 85% of the gross income from FDI.

Therefore, in order to replace high extracting costs, as ARKS indicated, the depletion of energy and mineral resources is found as a sum of the FDI income from mining industry, the net income of the national company KMG and the revenues of direct taxes from enterprises of the oil and gas sector at National Fund of the Republic of Kazakhstan (NFK).

Table 3. Income of the Kazakhstan's mining industry, mln. \$

	2005	2006	2007	2008
1) Income of FDI including mining industry	4633	7644 6454	11304 9545*	16567 13988*
2) Net income of KMG	na	972	1282	2000
3) Direct taxes of extractive industries at NFK	na	5330	8463	14135
4) Total, (1)+(2)+(3)	na	12756	19289	30123
5) ARKS aggregated rent	7307	10500	12738	na
Difference (5)-(4)	na	-2257	-6551	na

*it is assumed that the share 0.85 remains as for 2006.

Sources: Author's own elaboration based on National Bank of Kazakhstan (2008), Kazakhstan Agency for Statistics (2008 a, b), World Bank (2010).

⁶ It has to be noted that ARKS gives in the aggregated form while the specialists of the World Bank separately calculate losses from the emissions of CO₂ and particular matter.

The Table 3 compares the total sum with the aggregated rent, calculated by using the sources of ARKS data. The value, obtained from the sum of FDI income in mining, net income of KMG and the direct taxes from extractive industries at NFK is considerably higher than the gross rents during 2006-2008 years. As a result, the difference between the total income and the aggregated rent increases considerably in absolute terms from year to year. The present comparison clearly demonstrates an excessive overestimation of expenditures on extracting natural resources in ARKS statistical data.

Furthermore, we estimated the rates of genuine savings by using the total income from mining industry instead of the aggregated rent. The results of the calculations are designated as A and B due to two different methods (Table 4). In both cases we use GNI, calculated earlier by RAKURS Center of Economic Analysis. Therefore, all cost values are recalculated in percentage of GNI that does not coincide with WDI.

Table 4 . Calculating genuine saving by two methods, % of GNI

	2005		2006		2007	
	A	B	A	B	A	B
Net national savings	16.61	16.61	19.28	19.28	19.12	19.12
Expenditures on education	3.69	3.69	2.96	2.96	4.35	4.35
Depletion of energy resources	13.21	na	13.66	17.84	12.94	21.02
Depletion of minerals	1.00		1.02		0.94	
Net depletion of forests	0.00	0.00	0.00	0.00	0.00	0.00
Particulate pollution damage, including CO ₂ damages	0.12	0.12	0.09	0.09	0.07	0.07
Genuine Savings	5.97	na	7.47	4.31	9.51	2.27

Source: Author's own elaboration based on Kazakhstan Agency for Statistics (2008 a, b), World Bank (2010).

In the first case the rates of genuine saving are positive and moreover, they increase from 5.97% to 9.51% during the period. However, in the second case, the genuine saving values remain also positive, but they decrease from 4.31% in 2006 to 2.27% by the end of the period. The differences between the indicators of ASRK and World Bank are presented in the Annex (Table 2). Therefore, both cases are explained by the different estimations of the depletion of energy and mineral resources, CO₂ damages and GNI. With these methods we present a new generalization of the methodology on calculating genuine saving. Although, the results are sometimes contradictory the economy is apparently on an unsustainable path and therefore, loses its value of welfare with time.

4. Concluding remarks

Dasgupta (2010) argues that GDP is both inadequate and misleading. Although GDP measures the wealth of nations, it leaves out natural capital which is a vital part of national wealth. GDP is misleading as because of degrading natural resources and environment nations can themselves be becoming poorer without progress.⁷ Therefore, as an alternative measure of GDP we use genuine saving which is narrow but theoretically better founded (Van den Bergh, 2009). In addition, genuine saving has been adopted by the World Bank as an indicator for measuring sustainability of economic development. Illustrative estimates of genuine savings are provided in World Bank (2006), where countries with a large percentage of mineral and natural rents of GNI typically have negative rates. It is notably shown that there is a strong tendency of negative genuine saving rates for Kazakhstan.

However, there are many difficulties with estimating genuine saving. The first one is calculating the depletion of energy and mineral resources. Instead of the methodology proposed in Bolt et al. (2002), we provided two extensions of genuine saving calculations, based on the national statistical data of Kazakhstan. The first method was used to calculate the rates of genuine saving on the basis of the national statistical data from ARKS. However, the aggregate rent was smaller as compared to the total income, composed by the net income of national oil company, the FDI income from mining industry, and the direct taxes of extractive industries at NFK. Therefore, in the second method we replaced the aggregate rent by the total income.

Besides, due to the lack of data expenditure on education was unambiguously treated by World Bank as public, whereas we included not only budget expenditure but also private sector spending on education. The other indicators were insignificant and therefore, with small changes we recalculated all cost values in GNI that does not coincide with WDI.

We presented a new generalization of the methodology on calculating genuine saving. Although the results are sometimes contradictory the Kazakhstan's economy is apparently on an unsustainable path and therefore, loses its value of welfare with time.

⁷ The United Nations Environment Programme produces now a world wealth report every two years. As Dasgupta (2010) argues, this is the first time it has been tried to value natural capital on a global scale.

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Annex

Table 1. Estimating the depletion of energy and mineral resources

	2005				2006				2007			
	Energy resources			Mineral and other resources	Energy resources			Mineral and other resources	Energy resources			Mineral and other resources
	oil	Natural gas	coal		oil	Natural gas	coal		oil	Natural gas	coal	
Production, mln. ton (natural gas in mln. cub. meter)	61.5	26998	63.5		65.0	26382	96.2		67.1	29562	98.4	
Brent price, \$ per ton	391.35				471.23				521.28			
Output, mln. \$	20804	1289	617	3232	30451	2309	1125	4236	32819	2379	1227	4417
Expenditures on extraction, mln. \$	14568	905	444	2717	21163	2035	919	3504	21425	2148	974	3557
Rents, mln. \$	6236	384	173	515	9288	274	206	732	11394	231	253	861
Total rents, mln. \$	6793			515	9768			732	11878			861
As % of GNI	13.21			1.00	13.66			1.02	12.94			0.94
Net income, net mixed incomes, mln.\$	3989			424	6054			608	7113			719

Source: Author's own elaboration based on Kazakhstan Agency for Statistics (2008 a, b).

Table 2. Data differences in calculating genuine savings, mln. \$

	2005			2006			2007		
	ARKS	WB	Ratio	ARKS	WB	Ratio	ARKS	WB	Ratio
Net national savings	8540	9125	0.94	13785	12631	1.09	17542	na	
Expenditure on education	1898	1969	0.96	2120	2612	0.81	3987	na	
Depletion of energy resources	6793	25180	0.27	9768	30995	0.32	11878	na	
Depletion of minerals	515	1268	0.41	732	2504	0.29	861	na	
CO ₂ damages	55	1253	0.05	56	1396	0.05	57	na	
GNI*	51427	44604	1.15	71512	59175	1.21	91767	78281	1.17

*Data calculated by RAKURS Center of Economic Analysis.

Source: Author's own elaboration based on Kazakhstan Agency for Statistics (2008 a, b), World Bank (2010).

Szacowanie faktycznych oszczędności w Kazachstanie

Streszczenie

Zgodnie ze stwierdzeniami zawartymi w literaturze ekonomicznej (Hamilton and Clemens, 1999; Dasgupta and Maler, 2000; World Bank, 2006) nieujemne stopy faktycznych oszczędności odnoszą się do zrównoważonego rozwoju gospodarczego. Z tego względu wartość faktycznych oszczędności zależy od metod ich szacowania, zwłaszcza w przypadku państw wydobywających ropę naftową. Uogólniając metodologię, zawartą w Bolt et al. (2002), w niniejszym artykule zaprezentowano dwa rozszerzenia dotyczące obliczania faktycznych oszczędności w oparciu o narodowe dane statystyczne Kazachstanu. Mimo że wyniki są niekiedy sprzeczne, gospodarka kazachska znajduje się najwidoczniej na ścieżce niezrównoważonego rozwoju i z tego powodu z upływem czasu traci swą wartość dobrobytu.

Słowa kluczowe: zasoby nieodnawialne, faktyczne oszczędności, Kazachstan.