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Paper 3.

Measuring non-observed economy in Kazakhstan

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Methods for estimation of non-observed economy in Kazakhstan

The proportion of non-observed sector is significant in Kazakhstan as well as in other transition countries. The term “non-observed economy”, which comprises such concepts as illegal, hidden and informal activity, is used in the country’s statistics that is based on international standards.

The Agency of Statistics of the Republic of Kazakhstan (hereinafter referred to as the Agency) has accumulated a certain experience in calculation of non-observed economy. At that the applied methods on macro- and micro levels satisfy the common rules elaborated by the international organizations. They are as follows:

- calculations should be made in accordance with the definitions of the System of National Accounts: this is necessary for ensuring comparability of obtained results and other indicators of macroeconomic statistics;
- the results obtained have to be taken into consideration when constructing GDP; they should be linked with other indicators and not contradict with them.

At present time the Agency, when calculating macroeconomic indicators, makes estimation at the level of two components of non-observed economy, namely hidden and informal activities.

Methods for estimation of hidden activity

Calculation of aggregated indicators of the development of economic branches in the System of National Accounting is based on the usage of primary data of enterprises. In this connection it becomes more and more urgent to increase the quality of these data, one of the criteria of which is reliability of statistical data. Taking into account the fact that to obtain reliable information from enterprises (especially small ones) is highly problematic, the Agency makes adjustments to primary data of enterprises for non-reliability by comparing and analyzing the interrelated indicators on the basis of reports submitted by them:

- for large and medium-sized enterprises according to the 1-PF form «Report on productive and financial activity of an enterprise (organization)»;
- for small enterprises according to the 2-MP form «Main indicators of the activity of a small enterprise».

The structure of reports allows to determine indicators of the production account (gross output, intermediate consumption, gross value added) at the level of enterprises based on the data from various sections of these forms. While making comparative analysis of the obtained data one can define whether the submitted information is reliable or not and make its necessary adjustment.

An autonomous local primary database is created for making calculations, and in so doing the attributive part of the reports should be completely preserved.

Calculation of gross value added (GVA), intermediate consumption (IC) and volume of production output (GO) is made for enterprises on the basis of data from the 1-PF form’s sections:

- Section I. Production.
- Section II. Material expenses related to an ordinary activity of an enterprise.
- Section III. Income and outcomes of financial and economic activity of an enterprise.
- Section IV. Taxes and other compulsory payments to budget, assessments to pension savings funds.

Calculations of intermediate consumption (IC) and gross value added (GVA) are made identically for all enterprises. Keeping to the priority (steps) of forming of calculated indicators is an indispensable condition for making calculations at the level of enterprises.

Calculation of intermediate consumption

Calculation of intermediate consumption is made on the basis of information presented in the section II with the exception of indicators referred to GVA:

$$III = (M3_{ob} - \Pi_{nc}) + (P_{np} - H - C_{\kappa} - P_{\theta}), \text{ where}$$

$M3_{ob}$ – material expenses related to ordinary activity of an enterprise;

Π_{nc} – payment for use of natural raw materials;

P_{np} – other expenses;

H – taxes and other compulsory payments to budget, total;

C_{κ} – business trip daily allowances;

P_{θ} – remuneration costs.

Material expenses consist of raw materials and supplies, purchased goods and semi-finished products, accessory materials, fuel, energy, productive works and services performed by third-party organizations, other material expenses.

Other expenses include rental payment, non-productive services performed by third-party organizations, other expenses with the exception of interest charges.

Calculation of Gross Value Added (GVA)

GVA is calculated by two methods by means of data from sections I and II of the form.

1. Calculation of GVA by the volume of output (BDC_o). In this case GVA is determined as a difference between the volume of output presented in the section I and intermediate consumption calculated above:

$$BDC_o = BB_o - III, \text{ where}$$

BB_o – volume of production output (goods, works, services) according to data from the section I of the 1-PF report.

2. Calculation of GVA by components ($BDC_{\kappa o m n}$) at the level of enterprises is made in accordance with the controlled conditions for all enterprises:

- a) Condition 1: if financial outcome (income/loss) is higher or equal to zero or financial outcome (income/loss) is less than zero while the corporate income tax actually transferred for the reporting year is equal to zero (blank), then $BDC_{\kappa o m n}$ is defined as follows:

$$BDC_{\kappa o m n} = \Pi_{nc} + I + A + (H - H_c) + P_{\theta} + (OT + H_c + C_{\kappa}) + \Phi, \text{ where}$$

I – deterioration of fixed assets;

A – depreciation of intangible assets;

H_c – social tax;

P_{θ} – remuneration costs;

OT – compensation of employees;

Φ – financial balanced outcome (income/loss).

- b) Condition 2: if financial outcome (income/loss) is less than zero while the corporate income tax actually transferred for the reporting year is above zero, then financial outcome is determined by computation using indicators of prime cost and profitability which is considered to be equal to an average profitability for the corresponding branch or for the whole republic.

$$BDC_{\kappa o m n} = \Pi_{nc} + I + A + (H - H_c) + P_{\theta} + (OT + H_c + C_{\kappa}) + C * Y_{\text{peum}} / 100, \text{ where}$$

- C – prime cost of finished products (goods, works, services) sold;
 Y_{penm} – profitability rate of the corresponding branch.

At the next stage there is determined GVA which will be used in SNA calculations.

3. Calculation of GVA for SNA. GVA is calculated at the level of enterprises. For each enterprise chosen is the highest value among two values of GVA for further calculations. GVA which is used in SNA calculations can be determined by summarizing GVA values of enterprises:

$$BDC_{chc} = \sum BDC_{o(комн)}$$

Calculation of the volume of output

The volume of output for SNA calculations is defined by the formula as follows:

$$BB_{chc} = BDC_{chc} + IIII$$

In so doing the output is adjusted when GVA calculated by components is taken for SNA calculations.

Calculation of percentage ratios

At this stage defined are those adjustments that are necessary to be made while comparing reported data of enterprises and obtained data. Then, in the course of compiling national accounts, imputation will be made for non-coverage and compensation of employees. The below ratios are calculated on the basis of adjusted data:

- calculation of the share of IC in volume of output ($IIII/BB_{chc} * 100$);
- calculation of the share of GVA (for SNA) in volume of output ($BDC_{chc}/BB_{chc} * 100$);
- ratio of GVA (for SNA) and GVA (by volume of output) ($BDC_{chc}/BDC_o * 100$);
- ratio of GVA (for SNA) and GVA (by components) ($BDC_{chc}/BDC_{комн} * 100$).

	Material costs	Deterioration of fixed assets	Depreciation of intangible assets	Compensation of employees	Other expenses	Taxes and other payments to budget (excl. corporate income tax, excises, VAT)
1-PF form's row	STR200	STR210	STR220	STR240	STR250	STR251
Enterprise 1	92 907	19 218	0	1 080	5 713	4 720
Enterprise 2	186 761	320 846	22 212	1 396 718	1 951 862	199 927
Enterprise 3	233 382	15 692	239	102 798	30 493	17 225

	Business trip daily allowances	Main activity expenses	Volume of production (goods, works, services)	Prime cost of finished products sold	Main activity financial outcome	Corporate income tax
1-PF form's row	STR252	STR265	STR100	STR120	STR300	STR501
Enterprise 1	0	18 727	93 329	125 660	-17 111	155
Enterprise 2	23 618	934 971	3 057 607	3 057 607	757 503	182 610
Enterprise 3	1 563	78 597	278 341	304 007	-5 640	8 465

	Profitability branch rate	GVA component s + financial outcome	GVA component s + C*УПЕНТ.	GVA by component s obtained from rows	GVA by volume (row 100)	Intermediate consumption	GVA for SNA	Output for SNA
Data calculation	STR870	STR8101	STR8102	STR8100	STR830	STR8000	STR840	STR850
Enterprise 1	9,1	0	17 726	17 726	-571	93 900	17 726	111 626
Enterprise 2	34,8	1 785 853	0	1 785 853	1 142 539	1 915 068	1 785 853	37 921
Enterprise 3	14,9	0	104 217	104 217	33 254	245 087	104 217	349 304

In the first two tables given are the data from the rows 200, 210, 220, 240, 250, 251, 252, 265, 100, 120, 300, 501 of the 1-PF form «Report on productive and financial activity of enterprises (organizations)», on the basis of which the imputation is made by GVA and gross output.

- Row 870 «Profitability branch rate» is calculated for each economic activity: $\text{row 300 (column 1 - column 2)} / (\text{row 120 column 1} + \text{row 263 column 1} * 100)\%$;
- Row 8101 «GVA components + financial outcome from main activity» is calculated as: $\text{row 210 column 1} + \text{row 220 column 1} + \text{row 240 column 1} + \text{row 252 column 1} + \text{row 251 column} - \text{row 265 column 6} + \text{row 300 (column 1 - column 2)}$;
- Row 8102 «GVA components + prime cost multiplied by profitability branch rate»: $\text{row 210 column 1} + \text{row 220 column 1} + \text{row 240 column 1} + \text{row 252 column 1} + \text{row 251 column 1} - \text{row 265 column 6} + (\text{row 120 column 1} * \text{row 870})$
- Row 8100 «GVA by components» (obtained from rows 8101 or 8102, which is higher): row 8101 or 8102;
- Row 830 «GVA by volume»: $\text{row 100 column 1} - \text{row 8000}$;
- Row 8000 «Intermediate consumption»: $\text{row 200 column 1} + (\text{row 250 column 1} - \text{row 251 column 1} - \text{row 252 column 1})$;
- Row 840 «GVA for SNA»: if $\text{row 830} > \text{row 8100}$, then $\text{row 840} = \text{row 830}$, if $\text{row 830} < \text{row 8100}$, then $\text{row 840} = \text{row 8100}$;
- Row 850 «Output for SNA»: $\text{row 840} + \text{row 8000}$.

Adjustments that are made on the basis of the population employment survey

At present time there are three sources of employment data:

- survey of enterprises: number of persons employed at all enterprises included in the Business Register;
- data of the Tax Committee: number of individual entrepreneurs registered with tax authorities;
- population employment survey: questionnaire for sample employment survey.

Two assumptions are made while using this method:

- difference between the number of persons employed obtained from the population employment survey data on the one hand and data received from the survey of enterprises plus data of the tax authorities on the other hand is an imputation for the non-observed economy.
- values of Gross output and Gross value added per person engaged in non-observed economy are the same as values of Gross output and Gross value added per person employed at enterprises.

This procedure is applied to economic activities as follows:

- Construction;
- Trade; repair of motor vehicles, household and personal goods;
- Hotels and restaurants;
- Transport;
- Public, social and personal service activities.

Calculations are made as follows. First of all, the number of persons employed at complementary job in a full-time equivalent is calculated according to the population employment survey data (table 1). This allows to define a total number of employees working at main and complementary jobs. Then, on the basis of the survey of enterprises there are determined an output and gross value added per employee (table 2). On the next stage of calculations obtained is a number of persons employed in non-observed economy by subtracting the number of employees, defined when summing up the data of the survey of enterprises and the Tax Committee, from the total number of persons employed obtained from the population employment survey (table 3). Further, determined are values of gross output and value added produced by persons employed in non-observed economy (table 4). Calculations of GDP indicators related to individual entrepreneurs are presented in table 5. Below given are calculations according to a described above scheme.

Table 1 – Population employment survey

Economic activity	Number of persons employed at main job	Number of man-hours worked out by employees at complementary job, hours	Normal (established) duration of a working week, hours	Conversion into full-time equivalent of employment at complementary job, persons	Number of employees at main and complementary job, persons
1	2	3	4	5=3/4	6=2+5
Construction	415 503	221 458	40,0	5 536,4	421 039,4
Trade, repair of motor vehicles, household and personal goods	1 038 465,0	2 329 236,0	40,0	58 230,9	1 096 695,9
Hotels and restaurants	87 214,0	559 540,8	40,0	13 988,5	101 202,5
Public, social and personal service activities	202 972,0	2 137 262,4	40,0	53 431,6	256 403,6

Table 2 – Survey of enterprises

Economic activity	Gross output, mln. tenge	Gross value added, mln. tenge	Number of employees from the survey of enterprises, persons	Gross output per employee, thsd.tenge/person	GVA per employee, thsd. tenge/person
1	2	3	4	5=2/4*1000	6=3/4*1000
Construction	1 250 481,3	612 735,8	352 461,0	3 547,9	1 738,5
Trade, repair of motor vehicles, household and personal goods	671 659,2	433 891,8	310 922,0	2 160,2	1 395,5
Hotels and restaurants	47 903,9	29 413,0	32 403,0	1 478,4	907,7
Public, social and personal service activities	62 426,8	37 206,4	102 967,0	606,3	361,3

Table 3 – Calculation of the number of persons employed in NOE

Economic activity	Number of employees from the survey of enterprises, persons (column 4 table 2)	Number of employees working with individual entrepreneurs registered at the Tax Committee, persons	Total number of persons employed	Number of persons employed at main and complementary job from the population employment survey (column 6 table 1)	Number of persons employed in NOE
1	2	3	4=2+3	5	6=5-4
Construction	352 461,0	3 704,0	356 165,0	421 039,4	64 874,4
Trade, repair of motor vehicles, household and personal goods	310 922,0	226 158,0	537 080,0	1 096 695,9	559 615,9
Hotels and restaurants	32 403,0	15 526,0	47 929,0	101 202,5	53 273,5
Public, social and personal service activities	102 967,0	61 516,0	164 483,0	256 403,6	91 920,6

Table 4 – Calculation of Gross output and GVA in NOE

Economic activity	Number of persons employed in NOE (column 6 table 3)	Gross output per employee according to the Survey of enterprises, thsd.tenge/person (column 5 table 2)	GVA per employee according to the Survey of enterprises, thsd.tenge/person (column 6 table 2)	Gross output in NOE according to the population employment survey, thsd. tenge	GVA NOE according to the population employment survey, thsd. tenge
1	2	3	4	5=2*3/1000	6=2*4/1000
Construction	64 874,4	3 547,9	1 738,5	230 165,2	112 781,0
Trade, repair of motor vehicles, household and personal goods	559 615,9	2 160,2	1 395,5	1 208 892,2	780 944,3
Hotels and restaurants	53 273,5	1 478,4	907,7	78 758,4	48 357,7
Public, social and personal service activities	91 920,6	606,3	361,3	55 729,6	33 214,8

Table 5 – Calculation of total Output and GVA

Economic activity	Gross output produced by individual entrepreneurs, mln. tenge	GVA produced by individual entrepreneurs, mln. tenge	Total gross output, mln. tenge	Total GVA, mln. tenge
1	2 = tab.3 column 3 * tab.4 column 3 / 1000	3 = tab.3 column 3 * tab.4 column 4 / 1000	4 = tab.2 column 2 + tab.5 column 2 + tab. 4 column 5	5 = tab.2 column 3 + tab.5 column 3 + tab.4 column 6
Construction	13 141,3	6 439,2	1 493 787,8	731 956,0
Trade, repair of motor vehicles, household and personal goods	488 550,5	315 603,6	2 369 101,9	1 530 439,8
Hotels and restaurants	22 953,3	14 093,3	149 615,6	91 864,0
Public, social and personal service activities	37 295,9	22 228,4	155 452,3	92 649,6

Data adjustments in the informal sector

The informal sector includes the hidden activity of unincorporated enterprises of households. The following problems exist in this area, namely:

- submission of understated information by registered unincorporated enterprises;
- existence of a large number of unregistered enterprises;
- existence of unregistered employees in the unincorporated sector.

Taking into consideration the fact that volumes produced by unincorporated enterprises of households are imputed at branch level by using data of household budget survey (special module for reflection of household production) and Tax Committee, then at the level of national accounts the adjustments are made only for compensation of employees working with individual entrepreneurs and mixed income of self-employed persons. Data on the number of these categories are taken from the sample population employment survey and are multiplied by average wages and salaries per employee obtained from the survey of small enterprises.

For calculation of compensation of employees within the framework of SNA the following information is used:

- 1. Reports on number of employees and wages and salaries fund by economic activities (the Agency);
- 2. Reports of banks on income and losses (the National Bank and secondary banks);
- 3. Reports of insurance companies, pension funds.
- 4. Reports on execution of the state budget (ministry of Finance);
- 5. Reports on activity of small enterprises (the Agency);
- 6. Main indicators of labor market in the Republic of Kazakhstan.

Here it is proposed that data of the Ministry of Finance and National Bank are reliable, i.e. all adjustments are made for non-financial sector.

	Total compensation of employees according to reported data, mln.tenge	Imputation for the number of employees non-covered by 2-MP form, mln.tenge	Imputation for non-covered number of employees working with individual persons + private farms of individual persons	Imputation for hidden compensation of employees according to the share of the compensation of employees in GVA, mln.tenge	Total compensation of employees, mln.tenge	Share of imputation in the total compensation of employees, %
	1	2	3	4	5	6
Total economy	1 624 357,0	108 227,9	172 909,7	599 157,1	2 504 651,9	35,1
Agriculture, hunting and forestry	40 908,1	4 438,8	36 252,0	6 720,1	88 319,0	53,7
Fishing, fish-breeding	580,8	159,9	402,5	159,3	1 302,5	55,4
Mining	172 669,6	8 182,0	0,0	54 233,8	235 085,4	26,6
Manufacturing	224 079,8	4 503,9	17 492,1	78 982,4	325 058,2	31,1
Production and distribution of electricity, gas and water	58 063,4	7 610,8	0,0	2 774,3	68 448,5	15,2
Construction	165 156,0	16 225,0	19 881,3	33 727,7	234 990,0	29,7

Trade; repair of motor vehicles, household and personal goods	8 650,4	20 372,4	72 170,7	223 484,2	402 531,3	78,5
Hotels and restaurants	15 045,0	2 339,3	1 550,8	9 943,6	28 878,7	47,9
Transport and communication	185 242,6	30 472,0	24 491,1	84 330,1	324 535,8	42,9
Financial activity	61 786,2				61 786,2	0,0
Real estate activities, lease and services rendered to consumers	175 084,1	12 145,1	669,2	81 400,4	269 298,8	35,0
Public administration	119 205,7				119 205,7	0,0
Education	187 593,0				187 593,0	0,0
Health care	72 676,8			12 127,4	84 804,2	14,3
Other public, social and personal services	59 762,1	1 778,7		11 273,8	72 814,6	17,9

Share of non-observed economy in Gross domestic product

in percent

	1998	1999	2000	2001	2002	2003	2004	2005
Agriculture, hunting and forestry	0,00	0,00	0,00	0,00	0,00	4,58	4,38	4,17
Fishing, fish-breeding	0,00	0,00	0,00	0,00	0,00	0,05	0,07	0,06
Mining	0,00	0,00	0,00	0,09	0,20	0,11	0,07	0,20
Manufacturing	0,00	0,00	0,00	3,03	2,60	2,34	2,25	1,83
Production and distribution of electricity, gas and water	0,00	0,00	0,00	0,10	0,20	0,04	0,03	0,05
Construction	0,70	1,50	1,63	1,84	1,80	2,27	2,46	2,22
Trade; repair of motor vehicles, household and personal goods	6,00	4,10	3,86	3,23	3,30	3,72	3,08	2,79
Hotels and restaurants	0,11	0,24	0,27	0,32	0,40	0,25	0,27	0,33
Transport and communication	3,20	2,90	2,72	1,97	2,30	2,30	1,91	1,52
Financial activity	0,00	0,00	0,00	0,00	0,00	0,00	0,07	0,32
Real estate activities, lease and services rendered to consumers	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Agriculture, hunting and forestry	7,60	6,00	4,05	4,08	4,00	3,56	3,94	4,65
Public administration and defense; compulsory social security	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Education	1,10	1,50	1,24	1,34	0,70	0,55	0,45	0,54
Health care and social service activities	0,50	0,50	0,94	1,09	0,90	0,79	0,71	0,37
Public, social and personal service activities	1,50	1,80	1,13	1,26	1,10	0,89	0,83	1,02
Activity of private households hiring servants and producing goods and services for own consumption	0,00	0,00	0,00	0,28	0,30	0,14	0,16	0,14
total	30,38	27,64	24,64	23,92	22,60	21,59	20,68	20,21