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Abstract

The study is focused on estimating the informal economy in Romania based on survey in households. Moreover, some specific dynamic models to simulate complicated types of household's behaviour (regimes) relating to participation in informal economy are presented.

Keywords: informal economy, subsistence criterion, enterprise criterion, behavioural regimes
JEL Classification: C51, C81, D13, D31, E26, H31, O17

CHAPTER 10

Use of Households Survey Data to Estimate the Size of the Informal Economy in Romania

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Introduction

Generally, there are three methods frequently used to estimate the size of the informal economy: time-series analysis based on cash demand; method of discrepancy between total incomes and total expenditures at the aggregate level; and discrepancies between income and expenditure at the microeconomic level. The lack of some reliable historical data before transition and the existence of a structural break between pre- and post-transition suggest that the time-series method is not feasible. So, a remaining alternative is to analyze individual household data. Moreover, the results from the analysis on the basis of micro-data might provide more significant information for policy-making because they, unlike those using aggregate data, can highlight the main participants in the informal sector and the effects on welfare/behaviour of households.

The study focuses on data and methodological problems trying in the same time to outline few behavioural aspects by using only simple simulation models. In the last section of this paper, we introduce certain more sophisticated dynamic models, which could simulate very complicated types of households' behaviour relaying to participation in secondary activities and in informal economy.

Data and Methodological Aspects

The so called Integrated Household Survey (IHS), comprising a sample of approximately 36,000 observation units from about 500 urban and rural research areas, provides the main source of information in order to study households' behaviour. In September 1996 a Supplementary Survey on Household Informal Economy Activities was conducted in Romania (Duchene et al., 1998). The Supplementary Survey, which used a sample size of around 2,600 households, focused on informal economy activities carried out by households. The survey was divided into 21 sub-sections containing indirectly formulated, but detailed, questions on the informal economy. It was essential for our work to correlate the two sources of data. The survey asked about the ratio between income from main activity and that from secondary activity. Using the information, we obtained an absolute measure of households' income from secondary activity.

Based on answers provided by the question in which all members of household compared their two incomes (from main activity and from declared secondary activity), we computed a composite coefficient (ks) for every household in the sample, in order to characterize the share of the two types of activity.

$$Vs = ks \cdot V \tag{1}$$

where Vs is income from second activity, ks – the share of income from declared secondary activities in total declared income, and V – total declared income.

Also, the income corresponding to the main activity (Vb) was obtained as following:

$$Vb = V - Vs \tag{2}$$

Using (1) and (2), we rewrote the shares of the two components in total declared income of a household:

$$ks = Vs / (Vs + Vb) \tag{3}$$

and respectively

$$kb = Vb / (Vs + Vb) \tag{3'}$$

where kb is the share of income from the main job in total declared income.

One important result was also obtained by comparing the so-called decent (or desired) income with the actual size of income. So, in order to capture the size of informal

(or hidden) economy we computed the difference between the two types of income:

$$Va = H - V \qquad (4)$$

where Va is hidden (informal) income, H is decent income (or the maximum level of desired income) and V is actual total declared income (V = Vs + Vb).

The computing outputs obtained by grouping data conforming to the last criterion are presented synthetically in Table 1, where the desired level of income, H, was replaced by H*, which means that data were adjusted in order to solve some logical incoherence existing in initial answering data (for instance, in case when a qualitative answer relaying to the report between actual income and desired income was V<H, but from other answers on the precise levels of actual income and respectively desired income resulted an opposite situation, V>H, the respective household was moved into this last group, denoting the new obtained classification by H*). As we can see from computed data, indeed in case of the richest group (V>H*), where the average of declared actual income is 311.8 thousands Lei/person, there is no informal activity. A different situation is registered in the case of the poorest group of households (V<H*), where the difference between the considered decent income and actual declared income is huge. We could interpret this difference as a measure of "potential supply of informal activity" (it may be interpreted as the desired level of informal activity supplied by people). However, this "supply" is more than likely covered in a smaller proportion by a corresponding demand coming from the real economy. To capture the real size of this proportion in case of the poorest group (V<H) continues to be a challenge for economists and statisticians from everywhere.

TABLE 1: HOUSEHOLD INCOME GROUPED BY RATIO BETWEEN V AND H, IN 1996
Thousand Lei/person

| | Number of households | Declared income | | Desired income | Potential informal activity |
		Main activity Vb	Second activity Vs	H*	H* - (Vb + Vs)
V<H*	2181	127.0	9.8	368.2	231.5
V=H*	288	263.6	20.1	384.3	100.6
V>H*	92	258.0	53.8	311.8	0.0
Total sample	2561	146.6	12.6	367.7	208.5

Estimation of the Hidden Economy in the Case of the 288-Sample

In order to capture the size of hidden income, we computed the differences between the two levels of income in the case of households declaring that they are the same, so the

group V=H (the 288-sample). However, a problem, which was also solved when we computed the adjusted data, was in the case when the desired (decent) income in the Supplementary Survey declared by a household was smaller than the same indicator reported in IHS. So, in Table 2 there are presented data in case of both corresponding situations: initial data and respectively adjusted data (when the difference between declared decent income and actual income was negative, it was replaced by zero, considering that in case of the 288-sample the decent income must be at least equal to actual declared income in IHS).

Corresponding to the two considered hypotheses (initial data and respectively adjusted data), as it is shown in Table 2, at the level of whole 288-sample, the share of probable informal (hidden) activity, Va/H, was around 20.4 percent and respectively 26.2 percent, on average. In other words, the composition of total income, H, by sources was, in 1996, in case of initial data: 74.0 percent main activity, 5.6 percent second declared activity, and 20.4 percent informal activity. In case of adjusted data, the structure of total households income, H*, was: 68.6 percent main activity, 5.2 percent second activity, and 26.2 percent informal activity. More analytic conclusions were provided by a deeper analysis in which the two conventional sectors, SI (households operating only in one activity, main or basic activity), and SII (households operating in more than one activity, main activity and secondary activities), were compared.

TABLE 2: ESTIMATED SHARES OF HIDDEN INCOME BASED ON THE 288-SAMPLE

	Initial data				Adjusted data			
	Declared Income		Hidden Income	Total	Declared Income		Hidden Income	Total
	Main activity Vb	Second activity Vs	Va	H	Main activity Vb	Second activity Vs	Va	H*
SI	162.9	-	35.9	198.8	162.9	-	52.6	215.5
Average	340.1	-	74.9	415.0	340.1	-	109.8	449.9
SII	44.3	15.8	21.1	81.2	44.3	15.8	26.5	86.6
Average	144.3	51.5	68.8	264.6	144.3	51.5	86.2	282.0
Total (SI+SII)	207.2	15.8	57.0	280.0	207.2	15.8	79.1	302.1
Average	263.6	20.1	72.5	356.2	263.6	20.1	100.6	384.3

SI – households operating only in one activity (main or basic activity, conforming to the definitions included in the Supplementary Survey questionnaire)
SII - households operating in more than one activity (main activity and secondary activities, conforming to the same definitions comprised in Supplementary Survey)
The first and second rows in each category refer to total households' income of the sample (in million Lei) and respectively to the average level of income per person (in thousand Lei).

So, the last estimated level of informal activity, 26.2 percent of total income, H*, may be used as a first estimation in order to obtain parameters in a more general regression equation and to capture the behaviour of the household under consideration.

A very severe restriction, which occurs when we wish to extrapolate some conclusions in order to capture the general households' behaviour, is coming from the asymmetry between the 288-sample and the whole sample including more than 2500 households. The best general fitting function to estimate the household's behaviour seems to be one expressing a complex inverse relation between the average level of income provided by main activity and participation rate in informal activity.

However, the 288-sample may confirm that, at an average level of income provided by the main activity of 263,600 lei/person, some people are forced to work in a secondary job and also in the informal sector in order to obtain supplementary income for their family (20,100 lei/person from secondary job and respectively 72,500 lei/person from informal activity). Moreover, at an average monthly income of only 144,300 lei/person, people are forced to be relatively more involved both in secondary activities and in informal activities (in order to add supplementary incomes of 51,500 lei/person and 68,800 lei/person respectively). In the last case, the structure of the final income is: 51.2 percent main activity, 18.3 percent secondary declared activities and 30.6 percent informal activities. However, the situation is quite different when the basic income rises. For instance, at an income obtained from the main activity of 340,100 lei/person (average level for SI in Table 2), there were supplementary opportunities for people to work in the informal sector in a smaller proportion, 24.4 percent, of their total income.

Indeed, aside the level of income provided by their main activity, the households' informal activities are probably affected by occupation, region, age, education and many other factors. However, at this stage of our investigation, a few conclusions could be outlined:

- Taxation is perceived by people as the main cause of underground activity.
- Separating the main motivations of operating in the informal sector in two groups – "subsistence" one and "enterprise" one – the Supplementary Survey suggests that, at least for 1996, the subsistence represented a relevant reason for the households' decision to operate in informal economy, including its underground segment.
- Informal activities supplied a "safety valve" within the surviving strategies adopted by the poorest households.
- Participation in the informal economy seems to not be simply correlated with poverty: in the informal economy are involved poor people (having probably a small level of instruction) as well as relatively reach persons. But their motivations are quite different. The former are practically "forced" to operate in the informal economy ("subsistence" criterion), but the latter are "invited" to participate in it ("enterprise" criterion). In both cases, at least during the last stages of transition, the environment was propitious due to legislative incoherence, feeble penalty system in cases of fraudulent activities, and the existence of some accompanying elements of informal activity proper, such as

corruption, bureaucracy, etc. Nevertheless, the behaviour relating to the informal economy is sometimes fundamentally different for the two groups of population. This is why we consider that deeper investigations focused on the behavioural aspects of different groups of population will continue to be needed in the future.

Empirical Analysis

In order to study systematically the households' behaviour, as a first stage of research, we consider some simple empirical analyses. So, to identify the type of diverse relationships between components of total income, it may be useful to see the simple graphical representations of such relations based on brute registered data.

First, considering only the average levels, we identified the general types of demand-curves and supply-curves in cases of secondary activities and informal activities respectively, as they are shown in Figures 1 and 2 (on the abscise axis the levels are in thousand Lei/person and on the ordinate axis they are in thousand Lei but using a logarithmic scale). The samples that we used were obtained from the entire SII-sample (within the total sample of 2,561 households there are 931 households operating in SII) sub-grouped by criterion of ratio between V and H*. In figures, the notations represent: CY and CZD – total demand for Vs and total desired demand for Va respectively (it is the already mentioned "potential informal activity", in Table 1); Y=Vs, X=Vb, and Z=Va; OY and OZ - supply for Vs and Va respectively. Also, we mention that on abscise, X may be interpreted as a level of qualification, function of which the demand of real economy is established. So, it must be noted that in case of informal activity the demand is only that desired by people but not the demand coming from the real economy. On the graphs of Figures 1b and 2b, the solid lines are the demand curves, the doted lines – the real supply curves, and their corresponding intersection points – the registered (empirical) data. Also, on the graphs the average levels per person in case of the 931-sample (Vm and ZDm) and the total effectively registered demand for the entire 931 households (CYt and CZDt) respectively are marked.

The empirical distribution-maps for the shares of income components (x=Vb/H*, y=Vs/H*, and z=Va/H*) against the level of income supplied by main activity (X=Vb) in case of the 288-sample suggest the existence of certain inverse correlations y-X and z-X and of a direct correlation x-X. In Figure 3 an equivalent graph of such correlations in 3-D space is shown. In the next section of the study, we shall analyze in greater detail the relationships between y and X, and between z and X respectively by using certain linear and hyperbolic descriptive functions.
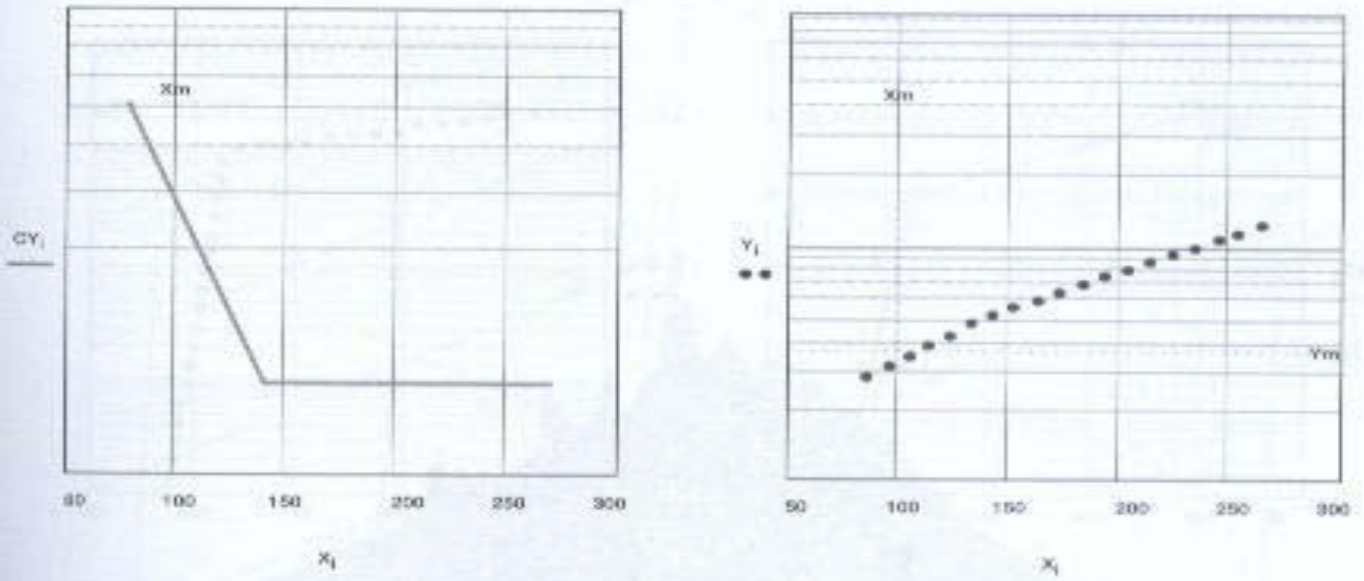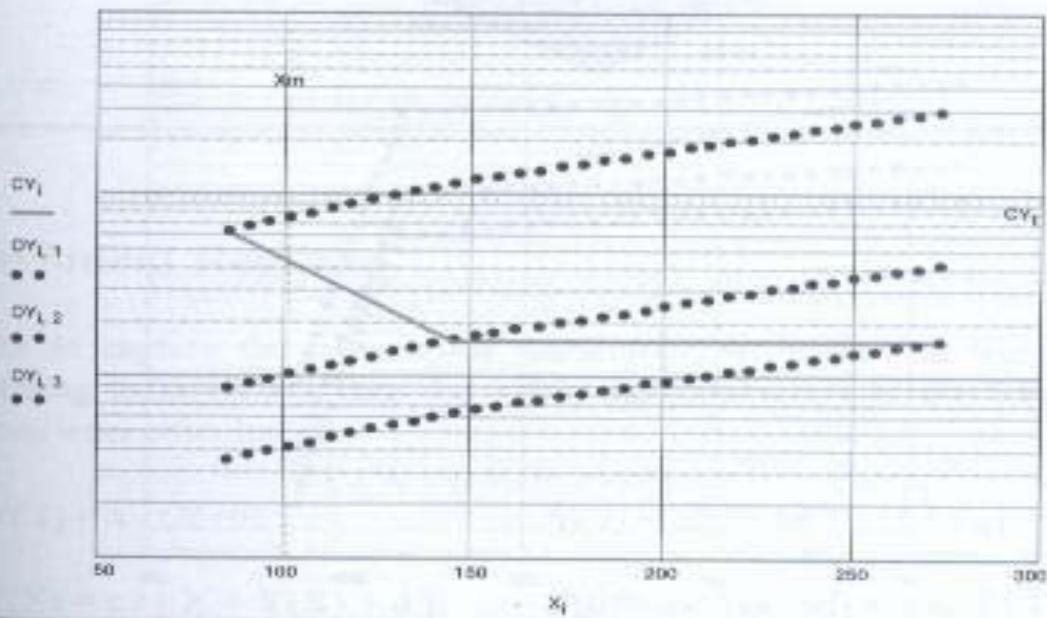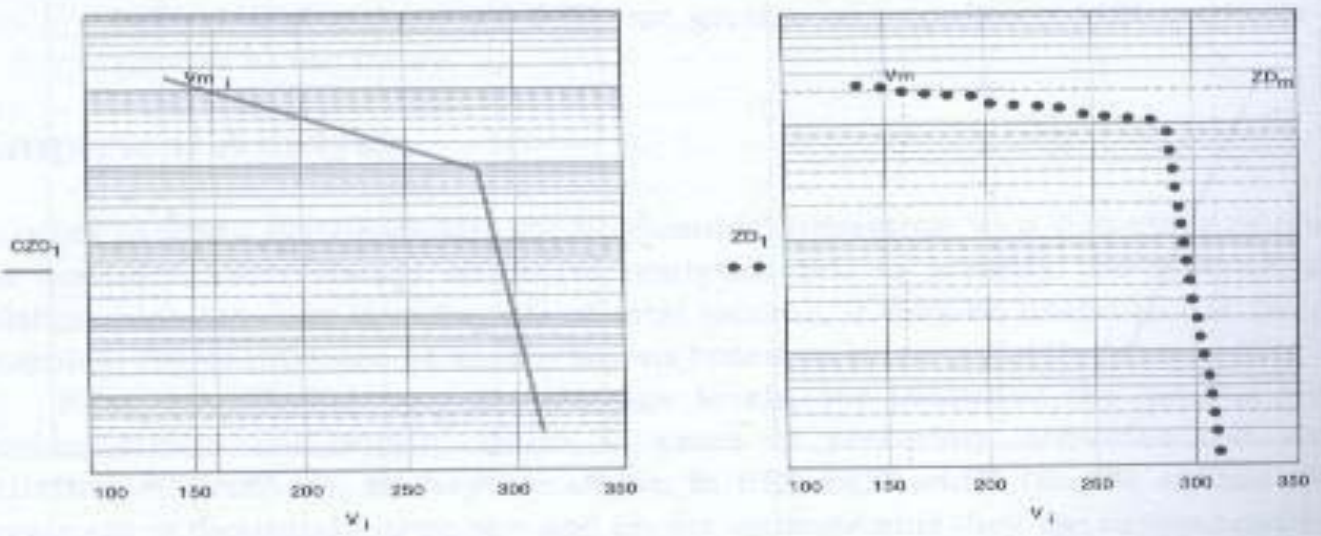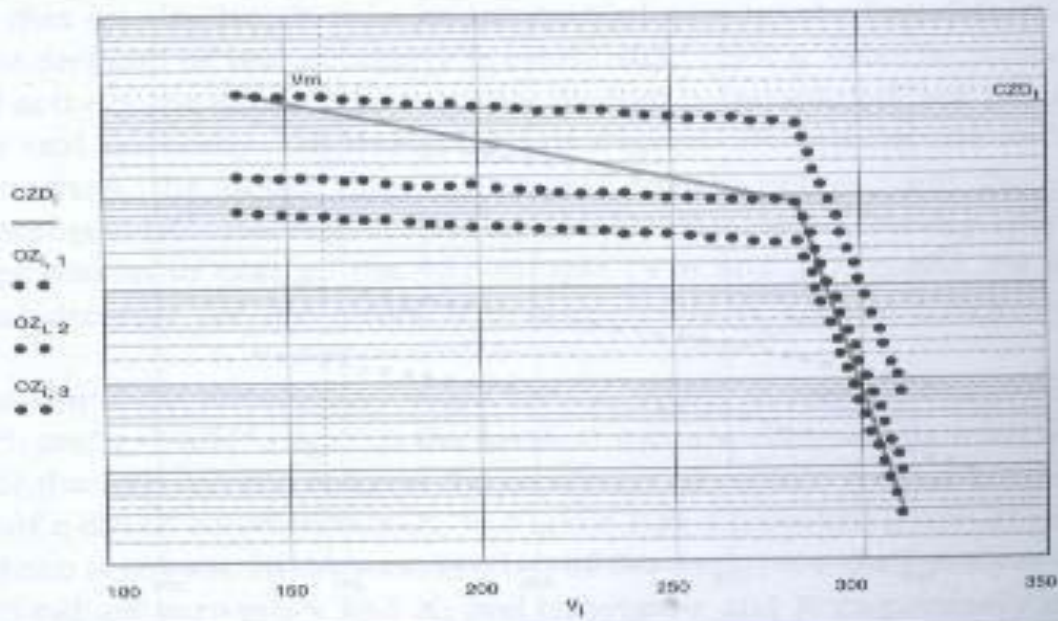
FIGURE 1a
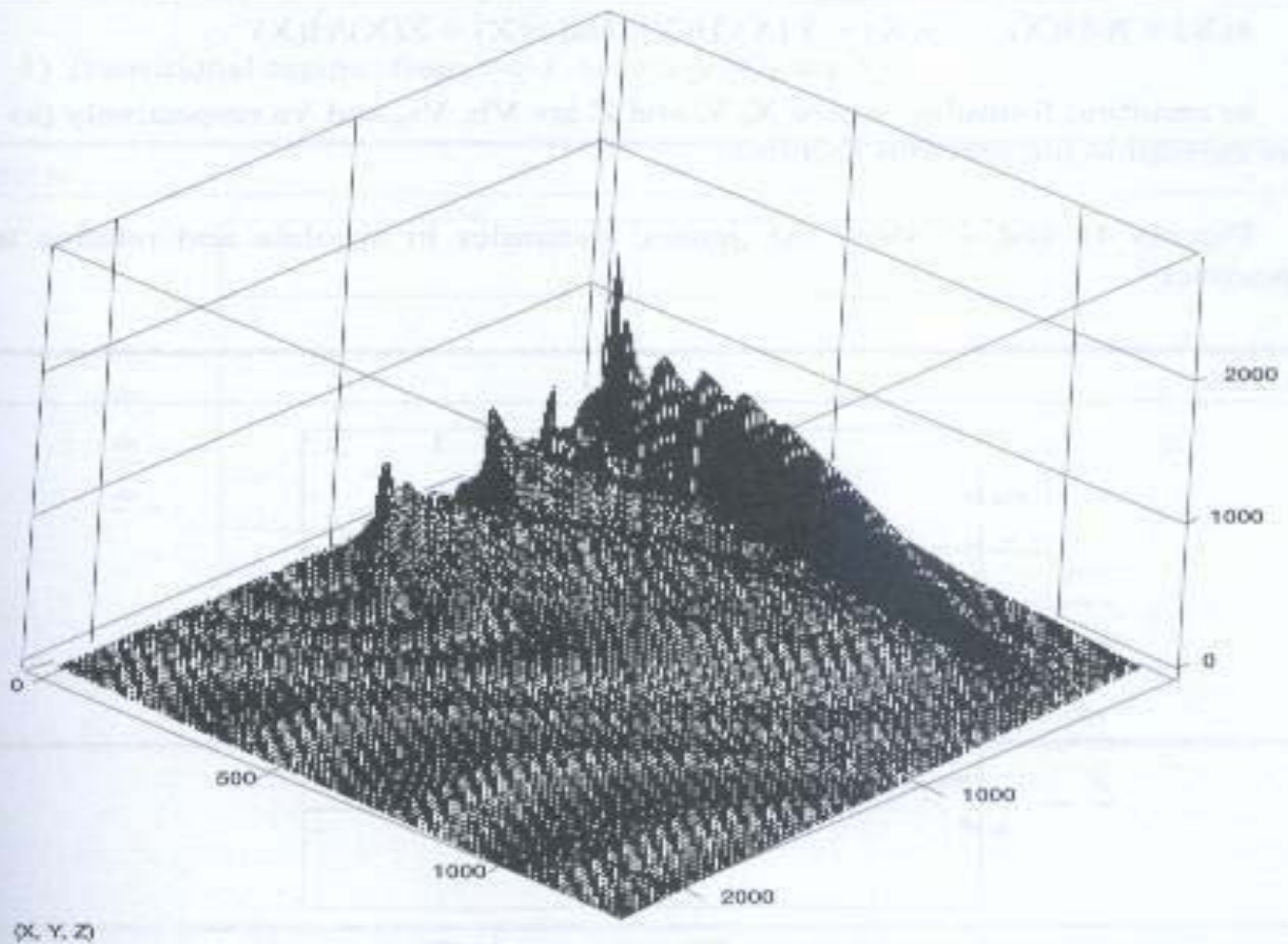

FIGURE 1b

FIGURE 2a

FIGURE 2b

FIGURE 3

(X, Y, Z)

Behavioural Regimes

In order to capture the households' behaviour, we used data from the 288-sample. Conforming to empirical data for 1996, the parameters of the following estimation functions were calculated:

$$Y(X) = a / (X+b), \qquad Y(0) = a/b = 48.7 \cdot 10^3 \text{ Lei} \qquad (5)$$

$$Z(X) = c / [X + Y(X) + d], \qquad Z(0) = bc / (a+bd) = 140.7 \cdot 10^3 \text{ Lei} \qquad (6)$$
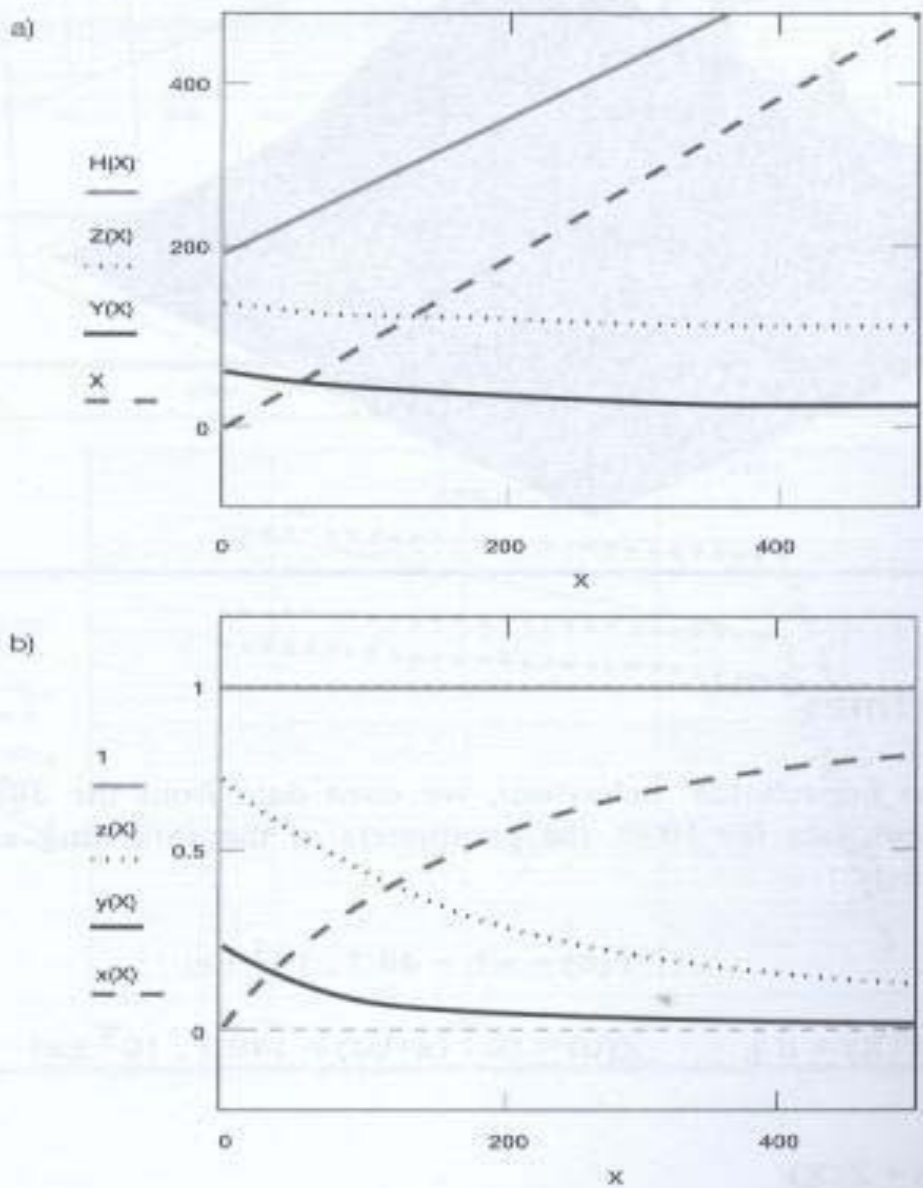
Then
$$H(X) = X + Y(X) + Z(X) \qquad (7)$$

was used as a constraining relation and

$$x(X) = X/H(X), \quad y(X) = Y(X)/H(X), \text{ and } z(X) = Z(X)/H(X) \tag{8}$$

as resulting formulas, where X, Y, and Z are Vb, Vs, and Va respectively (as they were defined in the previous section).

Figures 4a and 4b show the general dynamics in absolute and relative terms respectively.

FIGURE 4

The following three behavioural regimes, defined by the hierarchy of components, in relative terms represent the output of the simulation:

1) Transitional regime from z-y-x to z-x-y (Figure 5)
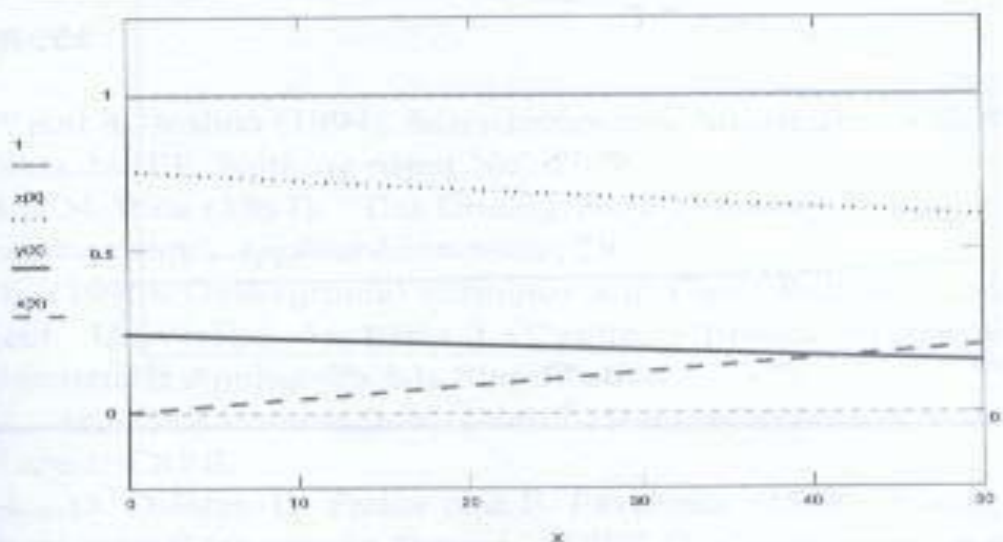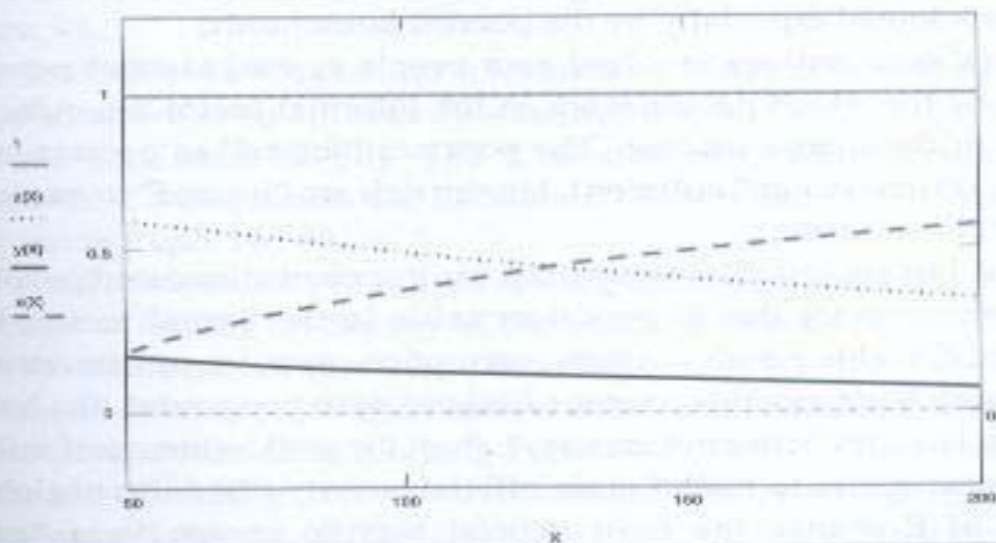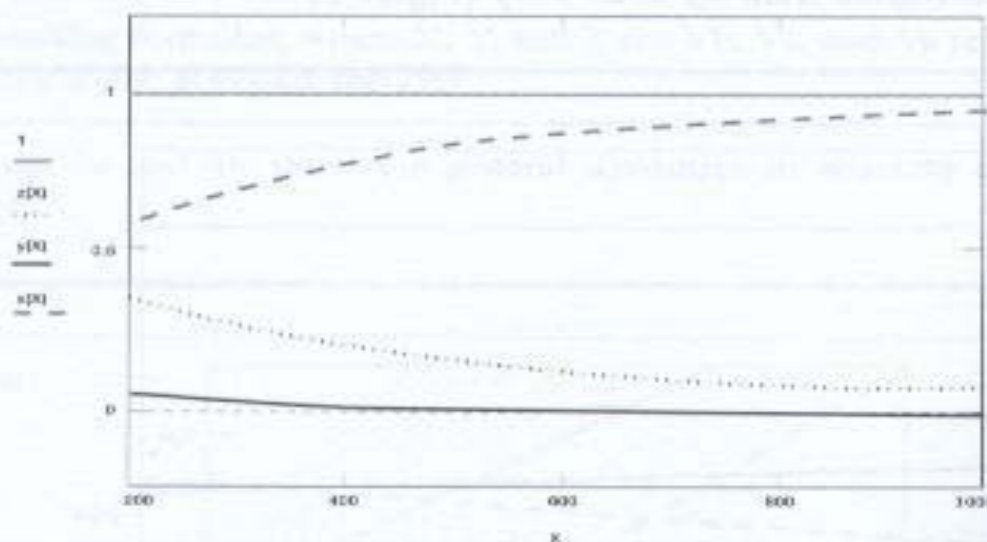
3) Stability regime x-z-y, with z and y drawing near zero (Figure 7)

Conclusions

Among the most significant results of the study based on household survey, the following could be mentioned:

- informal activities are responsible for 20.4 – 26.2 percent in the structure of total households' income, representing a "safety valve" within the surviving strategies adopted especially by the poorest households;
- in informal economy are involved poor people as well as reach persons;
- the reasons for which people work in the informal sector are quite different, function of their basic income. The poor are "forced" to operate in informal economy ("subsistence" criterion), but the rich are "invited" to participate in it ("enterprise" criterion);
- during the last stages of transition, the environment stimulated people to enter the informal sector due to persistent crisis in the formal sector, legislative incoherence, feeble penalty system, corruption, over-bureaucratization, etc.;
- varying with their monthly average basic income per person, the households' behaviour changes between "regimes", from the predominance of informal and secondary activities to that of main official activity ("stability regime").

In the case of Romania, the most general way to escape from "transitional regimes" and enter "stability regime" for an increasing number of households is, at macroeconomic level, to achieve a high growth rate and a durable development process

by a mix of policy measures, such as: improving reforms, legislation, and institutional reconstruction; extending the privatization process; stimulating domestic saving and attracting foreign investments; increasing volume of export and its efficiency; implementing new measures in the field of social security, pension system, poverty alleviation, etc.

References

Agenor, P. and A. Joshua (1994). Macroeconomic Adjustment with Segmented Labour Markets. NBER Working paper No. 4769.

Ahn, N. and N. Rica (1997). "The Underground Economy in Spain: An Alternative to Unemployment", *Applied Economics*, 29.

Albu, L.-L. (1995). Underground Economy and Fiscal Policies Modeling. ACE-Phare Project. Université de Paris I, Centre d'Études Prospectives d'Économie Mathématique Appliquées à la Planification.

Albu, L.-L. and C. Târhoacă (eds) (2001). *Study of Informal Economy in Romania*. Bucharest: CRPE.

Albu, L.-L., D. Daianu, B. Pauna and F. Pavelescu (1998). Endogenous Cycles and Underground Economy in Europe. MEET-IV Conference on the East European Economies in Transition, University of Leicester – CEES, Leicester.

Allingham, M.G. and A. Sandmo (1972). "Income Tax Evasion: A Theoretical Analysis", *Journal of Public Economics*, 1/3-4.

Daianu, D. and L.-L. Albu (1997). Institutions, Strain and the Underground Economy. International Conference on the Importance of the Underground Economy in Economic Transition, University of Zagreb. The Davidson Institute Working Paper Series, 98.

Duchene, G. (1999). "Les revenues informels en Roumanie. Estimation par enquete", *Revue d'etudes comparatives Est-Ouest*, 30/4.

Eilat, Y. and C. Zinnes (2000). The Evolution of Shadow Economy in Transition Countries: Consequences for Economic Growth and Donor Assistance. CAER II Discussion Paper Nr. 83.

Enste, D. and F. Schneider (1998). Increasing Shadow Economies All Over the World – Fiction or Reality? A Survey of the Global Evidence of Their Impact from 1970 to 1995. Discussion Paper 26, IZA, Bonn.

Enste, D. and F. Schneider (2000). Shadow Economies Around the World: Size, Causes, and Consequences. IMF Working Paper, WP/00/26.

Gibson, B. and B. Kelley (1994). "A Classical Theory of the Informal Sector", *The Manchester School*, LXII/1.

Jung, Y.H., A. Snow, and G.A. Trandel (1994). "The Evolution and the Size of the Underground Economy", *Journal of Public Economics*, 54.

Kaufman, D. and A. Kaliberda (1996). An Unofficial Analysis of Economies in Transition: An Empirical Framework and Lessons for Policy. Development Discussion Paper 558, Harvard Institute for International Development, Harvard University.

Kim, B. Y. (1996). Soviet Household Saving Function. Research Memorandum ACE Project, No. 96/14, CEEES, Leicester University.

Lemieux, T., B. Fortin, and P. Fréchette (1994). "The Effect of Taxes on Labor Supply in the Underground Economy", The American Economic Review, 84/1.

Schneider, F. and R. Neck (1992). The Development of the Shadow Economy under Changing Tax Systems and Structures: Some (Tentative) Empirical Results for Austria. International Seminar in Public Economics, Escorial (Madrid), June 11-12.

Tanzi, V. and H. R. Davoodi (2000). Corruption, Growth, and Public Finance. IMF Working Paper, WP/00/182.

Thomas, J. (1992). Informal Economic Activity. London: Harvester Wheatsheaf.

Yaniv, G. (1994). "Tax Evasion and the Income Tax Rate: A Theoretical Reexamination", Public Finance, 49.