The Micro-Macro Analysis within the Household Sector in Mexico

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Abstract

In recent years the National Institute of Statistics and Geography has participated in the Expert Group on Disparities in the National Accounts Framework organized by the OECD. As part of the developments in this group, the analysis of the data at a micro and macro level has emerged as an alternative to disaggregate the household sector by different groups, based on income and expenditure household surveys available at country level.

This document depicts the experience of Mexico's participation in the treatment of household surveys, during and after its participation in this Expert Group. The exercise of distribution of income, consumption and saving of the household sector developed for this group is the starting point to assess the consistency of the data obtained. Therefore, the identification of the problems resulting from the application of a flat distribution, implicit in this exercise, of the structures of micro data, toward the macro data of National Accounts.

Some of the proposals presented in this document to improve the flat distributions implemented so far are frequency analysis, incorporation of administrative data, depth in the analysis of data from the own national accounts extensions, such as the measurement of the informality. Based on the identification of the patterns of incidence and response that the household survey shows throughout a series comprising eight years.

Keywords: distributional information of households, macro data, micro data, templates.

Content

Acronyms

Concept	English Acronym
Accounts by Institutional Sectors	AIS
Adjusted Disposable Income	ADI
Disposable Income	DI
ECLAC	Economic Commission for Latin America and the Caribbean
Expert Group on Disparities in National Accounts Framework	EG-DNA
Financial Intermediation Services Indirectly Measured	FISIM
National Accounts	NA
National Income-Expenditure Survey	ENIGH, Spanish acronym
National Income-Expenditure Survey-new construction	ENIGH-nc
National Institute of Statistics and Geography	INEGI, Spanish acronym
Non-profit Institutions Serving Households	NPISH
Organization for the Economic Co-operation and Development	OECD
Retirement Saving System	SAR, Spanish acronym
Social Transfers in Kind	STiKs
System of National Accounts 2008	2008 SNA
System of National Accounts of Mexico	SCNM
System of Tax Administration	SAT, Spanish acronym

Introduction

In the framework of the developed tasks to generate distributional measurements of income, consumption and savings of the Households sector in National Accounts, one of the most important phases of the process was the construction of Disparities in National Accounts (DNA) templates that summarizes the distributional information on this institutional sector. Considering that these provide a synthetic and consistent framework with an international dimension, it was a good basis to remain abounding in the work of macro and micro data confrontation of the households. All of this with the intention to generate a solid, replicable and consistent estimation of the household income with an opening for groups for a time series.

The DNA templates arises from the participation of National Institute of Statistics and Geography (INEGI)–Mexico in the Expert Group on Disparities in National Accounts Framework (EG-DNA) convened by the Organization for the Economic Co-operation and Development (OECD). Which main objective was to bring the micro statistics of the household surveys to the macroeconomic aggregates of National Accounts, through an evaluation and comparison of both sources at international level. One of the main results achieved by this Expert Group became a precise alignment of the conceptual schemes of macro and micro data. On the other hand, and under the perspective that this work lets the international comparability of the participant countries, the methodology of data expansion implied making a homogeneous distribution for all income concepts about household structure grouped by income quintiles, type of household and main source of income, which showed certain problems for an immediate application in Mexico. Consequently, the results allowed the identification of inconsistencies because of the household survey in Mexico, as well as the data confrontation methodology, and to the extent that these elements affected directly the quality of the data, the progress of the work required reconsiderations and modifications

In agreement with the already stated, the current document seeks to expose the task progress originated because of the application of the proposed methodology by the EG-DNA to the Mexican case, along with the uses and limitations in the exercise developed. In addition, from this experience we show the applied proposals to enhance the compilations and bring it to another application scenario, correcting the income distribution components of greater impact and to extend the study series presented until now for Mexico.

The first part of the document is oriented to expose the task derived during the elaboration of the DNA templates, with the macro data of National Accounts and the household survey for the years 2008, 2010 and 2012, as part of the EG DNA works. This same chapter mentions the main results of the DNA methodology emphasizing the usage based in the conceptual alignment of the micro and macro data. Because of the evaluation of the outcomes obtained in this task phase, the second chapter of the text discusses the limitations of the methodology and of the data source, both identified when extending the period of study and doing a deeper analysis of the behavior of income variables in the household survey. The third chapter presents the methodological and calculation proposals for the treatment of the inconsistencies mentioned above, within the same, the results of these new developments are also discussed. In the fourth chapter and as a conclusion, there is a brief mention of the elements which application in the present document would provide more dimensions to the analysis and practical uses, especially in the particular context of a national interest in a reliable and consistent calculation of household income and what it represents for economic and social analysis.

I. Application of the DNA-OECD methodology in Mexico from the Accounts by Institutional Sectors and the ENIGH, years 2008, 2010 and 2012

Based on the experience developed inside the National Accounts (NA) in Mexico, the main objective of the application of the DNA templates is to bring a closer look the micro data statistics of household survey, censuses and administrative data to the macroeconomic aggregates of the national accounting. This is in the understanding that both statistics are constructed separately with particular methods for each one and therefore different because it is natural to find disparities at the moment of establish a quantitative comparison. As it will be seen throughout this section, the main utility of the templates is, in first place, to construct an accurate and consistent structure to compare conceptual and numerically the macro and micro data and then to be able to identify those numerically differences and address possible explanations for them.

It is important to note that the DNA methodology aims to generate comparable statistics internationally, and consists in the elaboration of a template to compare and expand the micro data following a synthetic scheme of current accounts. The balance items comprised are Disposable Income (B.6), Adjusted Disposable Income (B.7), Final Consumption (P.3 y P.4) and Saving (B.8), according with the Households sector in the Accounts by Institutional Sectors (AIS). The methodological procedure of the data consists of the following steps: a) classification and grouping the income and consumption data of the National Income-Expenditure Survey in Mexico (ENIGH, Spanish acronym) according with the DNA templates; b) reassigning the NA data of non-resident households expenditure and the consumption of Non Profit Institutions Serving Households (NPISHs); c) imputation of concepts which by nature does not capture the micro-data such as: social transfers in kind (STiK's), employers' actual social contributions and taxes on income or wealth; d) generating clusters of households proposed by Expert Group on Disparities in National Accounts framework (EG DNA) based on the distribution structure recovered in the ENIGH: quintiles of equivalised disposable income, household type and main source of income (see next Box); and, e) expansion of the micro data elaborated with the ENIGH on the basis of the NA totals, by transaction (Benchmark to NA).

Breakdowns performed in the EG DNA

1) Quintiles of Equivalised Disposable Income
2) Household type:
    a. ngle less 65 year old
    b. Single 65 and older
    c. Single with children living at home
    d. Two adults less than 65, no child living at home
    e. Two adults at least one 65 or older, no child living at home
    f. Two adults with less than 3 children living at home
    g. Others
3) Main source of income:
    a. Wages and salaries
    b. Income from self-employment
    c. Net property income
    d. Current transfers received

In this context, the particular task of the DNA templates for its presentation at the EG DNA took as reference the ENIGH-new construction (ENIGH-nc) with the Accounts by Institutional Sectors for the years 2008, 2010 and 2012[1]. In particular, that one of the most important principles of this exercise is that the reliability of the comparison depends on a great extent in the stringency of the conceptual alignment, given that only through this can have full confidence that the comparison of data shares similarity of content in the measurement. Because of this, the conceptual structure of income of the ENIGH is discussed in detail, since its fundamental importance for National Accounts, and therefore where the mayor discrepancy between the two statistics is observed. This with particular emphasis on the degree of alignment or discrepancy of the National Accounts concepts by comparing the DNA template.

National Income-Expenditure Survey (ENIGH)

The ENIGH aims to provide a statistical overview of the performance of the incomes and expenditures of households in their amount, origin and distribution; additionally it provides information on occupational and socio demographic characteristics of the household members, as well as the characteristics of the infrastructure of dwellings and household equipment. It is published every two years, while their target population is the domestic or foreign households that ordinarily have residence in the private dwellings within the country.

The sampling scheme is probabilistic, two-stage and by conglomerate, where the selected unit is the dwelling and the observation unit is the household. The rising period is quarterly and is carried out from August 11 to November 18 of the survey years. This period is divided into ten tens, in each one of them the information is collected for seven consecutive days.

This survey is available since 1984 and since 1992 it is done every two years, except 2005 because it was an extraordinary exercise. The surveys used in this document are from 2002 to 2014. The table below shows the most relevant data.

Sample ratio/population for the ENIGH in México	2002	2004	2005	2006	2008	2010	2012	2014
Sample/Households	17,167	22,595	23,174	20,875	29,468	27,655	9,002	19,476
Sample/Persons	72,602	91,738	94,308	100,791	118,927	107,781	33,726	73,592
Households (millions)	24.6502	25.8451	25.7103	27.4454	27.8746	29.5568	31.5594	31.6710
Population (millions)	101.8557	104.4290	104.1789	108.8009	111.7606	114.7008	117.4496	120.0736
Sample Households/Total Households	0.0696%	0.0954%	0.0901%	0.0761%	0.1057%	0.0936%	0.0285%	0.0615%
Population sample/total population	0.0713%	0.0878%	0.0905%	0.0926%	0.1064%	0.0940%	0.0287%	0.0613%
Sample Households/population	0.0169%	0.0236%	0.0222%	0.0192%	0.0264%	0.0241%	0.0077%	0.0162%

Source: INEGI and proper elaborations.

[1] In a complementary way to the traditional ENIGH, from the survey event of 2008, the INEGI publishes the results of the new construction of variables, which have been prepared and presented in accordance with the UN recommendations, specifically those issued at the 17th International Conference of Labour Statisticians and the Canberra Group Report http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/regulares/enigh/pre/presentacion_nueva.aspx).

I.1 Conceptual alignment of the ENIGH to NA from the DNA scheme

The income collected by the ENIGH consist of an aggregate of current income, which must meet the requirements of been received or performed with a defined frequency, of immediate availability. That is, the transactions made with this income or expenditure should contribute immediately to the satisfaction of the primary needs of households, in addition, they cannot cause changes in the equity of the household. Within the ENIGH the current income, both monetary and non-monetary, is divided in five major types of income: 1) Labour Income; 2) Property Income; 3) Transfers; 4) Estimate of imputed rental of owner-occupied dwelling; and, 5) Other current income. Each one of them disaggregated in their specific components (see Table 1, Annex).

According to the ENIGH, **Labour Income** is defined as "what is received by household members as a result of their participation in any activity in an institutional economic unit and the purpose of which is to produce for the market, consumption or the generation of public goods and services, that is, activities that are within the same production boundary of the System of National Accounts" (INEGI, 2009, pág. 9). Hence, this category of income also incorporates self-employment income and derivatives other forms of employment that from the perspective of national accounting they do not correspond directly with the remuneration for regular employment. In this regard, it should be noted that the definition given in the ENIGH on Self-employment Income significantly coincides with the definition of Mixed Income of National Accounts: "it is an economic activity within their own household economic unit and does not depend on a boss or superior that produces goods and services for the market, consumption or barter .... and cannot distinguish the remuneration of persons employed in the quality of business and quality of owners" (INEGI, 2009, pág. 11). It observes that Mixed Income by NA is present: the inability to distinguish between income derived from the subordinate work performed within the unit, and income attributable to the household in terms of business owner. Other important elements of labour income of the ENIGH is that through them the employers' actual social contributions (D.12) cannot be inferred directly because they are not perceived by households as part of its current monetary income. The valuation of income reported by the ENIGH is closer to the definition "cash basis"[2], while NA measurements are presented in accrual terms.

The **Property income,** as the transactions in this same segment of NA, incorporates in household survey the income received by household members as a result of the possession or ownership of financial or non-financial assets, or resources that are available to other institutional units. These include interest, investment withdrawals, dividends or rental income of assets. In the ENIGH these concepts includes the entire segment intended to Property income. And some others that are scattered in other sections of the survey: such as interest paid in the form of expenditures, other interest received and earnings from cooperatives or establishments that operate as corporations, which are part of the Distributed Income of Corporations (D.42), and more specifically, as

[2] 2008 SNA par. 3.164 Cash accounting records only cash payments and records them at the times these payments occur. Par. 3.166 Accrual accounting records flows at the time economic value is created, transformed, exchanged, transferred or extinguished.

Withdrawals from income of quasi-corporations, but that ENIGH encloses as part of income from self-employment.

On the other hand, the **Current Transfers** that can be monetary and non-monetary, and means those incomes received by the household without any counterpart. As in NA, they may come from the Government, NPISHs like Non-governmental organizations, from other households inside the country, of non-resident households (remittances) and the social security system of the same country (which are identified as transfers coming from mixed schemes as pension contributions). The distinction of the origin of transfers is very important in the survey, since it is not present throughout the series studied (only in the New Construction), as they can fully identify those from other households. In terms of the NA work, this is very important because the administrative data sources do not have the ability to capture this concept with the necessary precision, therefore the ENIGH could contribute significantly in this regard.

The last but one component of current income of the ENIGH is the **Estimate of imputed rental of owner-occupied dwellings.** Variable incorporated as part of the international recommendations and precisely because of this, the definition matches with the NA. Since it pretends to recover the market value of rental of dwelling and introduce it as part of current income of households that live in their own dwellings, as part of the production boundary of the NA, on the logic that if they had no home of their own part of their current income would be destined to pay rent. The implicit assumption is that in NA the households are treated as unincorporated enterprise producing housing services, so the imputed rent is recorded in the Gross Operating Surplus and Final Consumption Expenditure of Households. Lastly, the segment **Other current incomes** is a remainder of concepts obtained in the survey but have all the quality to be perceived under the principle of regularity and are fully individually identifiable and therefore classifiable within one of the categories listed above.

Considering the previous review, it becomes clear that the conceptual differences between the ENIGH and NA arise especially in concepts that are not part of current income received by households normally. In general, it can distinguish three types of concepts according to how conceptually are compared with NA. First, there are the concepts that meet immediately in any current account. Second, there are the concepts that meet in its definition in both sources and therefore in the information that is collected, but are contained in different sub groups in one and another source. Third are the concepts, which by their nature are not captured in the ENIGH (see Table 2, Annex). The concepts that are part of the first group are the ones captured in the block of incomes by labour, corresponding to the concept of Wages and Salaries (D.11). Those captured in the group of property income, income from monetary and non-monetary transfers and the estimate of imputed rental of own dwellings, all of them are classified directly in the block of transactions involving property income, current transfers and gross operating surplus, respectively.

The concepts whose grouping in the ENIGH are different from NA, but keep a match in definition are three small groups of items: 1) self-employment income that the ENIGH classifies as labour

income, but as already stated above should be part of the mixed income of households; 2) paid and received property incomes (interest and withdrawals from unincorporated enterprises) that the survey classifies in financial perceptions and expenses and have to be incorporated as property incomes to the extent that these items are part of the primary income of the households, in the same way that the revenues earned by profits from cooperative enterprises, companies and establishments that operate as corporations, since the survey accounts as labour income but in terms of NA correspond to property income; and lastly, 3) the income coming from pure renting of buildings, structures and other properties which the survey classifies as income from property income but should be accounted as gross operating surplus of households.

Lastly, there are the revenues whose nature does not allow them to be captured by a household survey. In this group are found the employers' actual social contributions (D.12), their counterpart in the secondary distribution account registered as net social contributions (paid, D.61), the current taxes on income, wealth, etc. (paid, D.5) and the STiKs (D.63). All of them share the characteristic of not being part of the current income of households in the surveys. That is, the households do not perceive them as part of the current monetary income. Another feature of these concepts is that they can only be accounted from the administrative record, and therefore, the alternative of measurement is based on NA. Since tax authorities report their magnitudes, or social security systems, retirement funds, or even in the government public account, through the determination of the total current expenditure exercised in the form of transfers and subsidies to households.

In this way is defined the conceptual alignment that allows to identify the concepts described above with their equal in the DNA templates, which are those coming from National Accounts (see Table 2 of Annex). Simultaneously, this comparison is the basis for separating the concepts that ENIGH reports directly and that in the NA scheme are imputed transactions. A specific case i the employers' actual social contributions, which are divided into pension and non-pension. These items are derived from the differentiation of the wages and salaries of the employees and subordinate workers raised in the survey, in formal employment status and with benefits of both access to retirement saving system and to funds granting credit for housing and medical care. The other case of these transactions are the STiKs (D.63), which cannot be counted by the ENIGH, and therefore they are calculated with measurements coming from the government, based on the administrative record provided to compile the NA. It is possible to perform this imputation by means of the qualitative information contained in the survey and that concerns access to health care services in public institutions, or access to public education by level; being these the two concepts identified as such transfers. An important consideration is that, since the ENIGH surveys for 2008, 2010 and 2012 are conceptually homogeneous, the homologation presented in Table 2 applies for the three years.

I.2 Development and Main Results

As mentioned before, the process of generating the called DNA templates follows several steps. Once the first step is concluded (conceptual alienation), the next task is to construct the variables and the treatment of the data sources to extract the totals for each transaction in the micro data, and to compare the totals of the macro data, with a prior treatment. The overall process is the following:

a) First, it proceeds with the clustering of the items of survey based on the described conceptual alignment between each source, the income and expenditure items within each survey concept are summarized to build the variables according to the DNA scheme. As part of this process the sample values of each variable are also expanded to national totals per transaction, with the expansion factors defined in the survey.

b) Second, the current accounts of the households sector are adapted to the DNA scheme, in this case are deducted the purchases of non-residents in the domestic territory and the final consumption of the NPISHs, the last one incorporated as final consumption expenditure of households. These two corrections are necessary to bring the NA data to borderline of the consumer concepts presented by the ENIGH.

c) Third, once the income and expenditure coming from the ENIGH are grouped and the same with the NA totals, it proceeds to construct imputed vectors. As already stated, such transactions consist of the actual employers' actual social contributions (D.12), STiKs (D.63) and the current taxes on income (D.5). Social contributions are divided in the sub groups, pension and non-pension. Because they derive from the existence of a social security systems applying only to employees and paid in formal condition, the parameters for the allocation of this transaction are defined by the existence or not existence of formal employment and associated benefits within the survey frequencies.

   The ENIGH also retrieves information on the condition of occupation and employment characteristics of the survey population. So it is possible to identify the above factors by the following items: a) existence of a written contract associated with an income for paid work and subordinated; b) observe the provision of access to a retirement saving system for the allocation of actual social contributions of pensions (D.1211); and c) observed frequencies of access to health care or access to mortgages granted by housing funds, with them are allocated the non-pensions actual social contributions (D.1212).

   The determination of the formality of the worker becomes to the fact that presenting the existence of a contract and any of the three aforementioned benefits. At this point it is also important to mention that based on the definition of the amount of formal wages in the survey, it is also possible to allocate the amount of tax on income, wealth, etc. (D.5) corresponding to such income. In Mexico, this amount and rates are defined in the provisions applicable on the income tax applicable to employees. For purposes of this calculation it was determined multiplying the percentage of withholding income tax and

defined by the range of wages concerned, by the amount of income by salary, for the case of all formal workers previously identified in the survey.

Lastly, in the allocation of both types of contributions the starting point is the level of gross monetary gross wages (before taxes) and then assign an amount of the contribution whose values correspond to 5% and 8%, for contributions to funds granting mortgages and access to health care, respectively. The sum of these two benefits makes up the total amount of employers' actual non-pension contributions (D.1212). The employers' actual pension contributions (D.1211) are obtained by multiplying the gross wage of those observed have retirement saving system as a job benefit, for a provision rate of 8% (OECD, 2013).

The STiKs (D.63) are specifically addressed in two sub types: social transfers in education and social transfers in health. In the calculation of the first, it is taken the number of individuals enrolled in a public educational institution and the level of education attend, then assign the per capita quarterly expenditure by education level indicated that government carries out every year, divided by four to get a quarterly amount. In the case of STiKs in education from NPISHs, it is subtracted from the ENIGH the education expenditure by the households or individuals who present assistance to private educational institutions, and then adding that amount to the variable D.63, in the item education.

The measurement of STiKs in health implies the identification within the ENIGH of the number of individuals with access to public health services. In addition, sort them into age groups to assign finally them a per capita health expenditure by multiplying the quarterly GDP per capita for the year in question, by a determined rate of health expenditure proposed by the OECD methodology and indicated in Table 3.

d) The next step in the generation of DNA templates is the elaboration of the sequence of accounts of SNA and with it the balance items contained in the templates. Regarding the income includes: compensation of employees (D.1), as the sum of gross wages and salaries (D.11) determined above, plus the actual and imputed contributions (D.12); net property income which is the sum interest not adjusted for FISIM (D.41_c), distributed income of corporations (D.42_c), investment income disbursements (D.44_c), rent (D.5), a net income conformed by the interest not adjustment for FISIM (D.41_p) and rent (D. 45_p), both paid. This accounting succession let to have the balance items Primary income (B.5), Disposable income (B.6) and the Adjusted disposable income (B.7).

The final consumption (P.3 Final consumption expenditure and P.4 Actual final consumption) is presented with a the classification by purpose, with two and three digits in some cases, these ENIGH information is analyzed in the same way that income; micro data and macro data aligned conceptually and numerically. In this case, the conceptual differences between the two statistics only touch the treatment of purchases of non-resident in domestic territory and the final consumption of the NPISHs. It refers that, as

the ENIGH is quarterly, taking it to annual terms was done by multiplying the quarter by four.

The balance item Saving (B.8) is determined based on the Disposable Income or the Adjusted Disposable Income and the Final consumption expenditure. This step is important because beyond determining the magnitude of the transactions set out in the template, one of the intentions of these templates is conforming the income and expenditure components, as well as their incidence in the saving, for the clusters of households proposed.

e) Lastly, the emerged discrepancies between NA transactions and the totals reported by the ENIGH are assigned. Such allocation is done by the following principle: once defined the magnitude of the discrepancy the resulting amount is allocated proportionally to each quintile or group of households (according the proposed groupings) depending on the participation of the group to the total, by type of income or expenditure. It is important to add that considering is a general methodology, the allocation of the discrepancy is made by groups of income, but not at the household level, which severely influences the balance items.

After obtaining the results of the exercise, it observes that the methodology in general let to identify the overall behavior of the variables through the micro data but also has some shortcomings for specific treatments. Because under the DNA-OECD scheme, the Benchmarking or adjustment to NA, is performed on the basis of a unitary adjust, what means that the identified discrepancy between the macro data and micro data is assigned to all households in the survey without any distinction of their income level or particular characteristics. This adjustment origins certain issues such as the prevalence of negative savings or exacerbation of some inconsistencies both in NA and the ENIGH, which will be presented in chapter two. However, the work done for the elaboration of templates let to identify behaviors within the ENIGH and in the NA balance items and transactions. Issues that can be improved with a more refined and specific proposal for the case of Mexico, where the problems on income distribution could show a more pronounced trend than in other countries, and therefore it is always relevant to deepen their study.

II. Advances from DNA scenario: enlargement of the work done and limitations

Before exposing the inconsistencies and problems identified in the results of the templates, we must say that the great step forward from the DNA task was the careful alignment described before. The value of this exercise lies precisely in the fact that it allows the identification with good precision of the numerical discrepancies between both data sources (ENIGH and NA), as was mentioned, without a consistent alignment, no degree of certainty can be expected in the numerical comparison.

One of the major premises that require reflection is that even with the alignment achieved none of the concepts of NA is covered with the ENIGH at 100%. In this regard, it highlights that this was one of the evidences showed by the results of international comparison of EG DNA, for both income and consumption in most of the countries. However, as it deepens into the records of the survey it is possible to explain such discrepancies more precisely, that in the case of absence of a proper conceptual alignment.

The second step of the task based on the participation in the EG DNA takes as analytical basis the conceptual alignment defined in this scheme, and is the one that will be exposed in this chapter. In many cases, it was necessary to create a greater degree of breakdown, but always considering the elements of the ENIGH shown in Table 2, even in the cases of different years as 2008, 2010 or 2012, as the ENIGH subsequent events to 2002 are built with the same conceptual elements considered in the construction of DNA templates.

The work of DNA templates yielded results which implications allow us to infer the inherent issues in the survey and its characteristics, the same ones that could have been exacerbated by the methodology applied as well as unclear aspects in NA. The first significant result is the persistent of a dissaving in the first four quintiles (see Graph1 in the Annex). In this regard, it is necessary to say that the problem is not that the development template based on a unitary adjustment shed negative savings for the 80% of households, but also the fact that the same situation remains throughout the three years analyzed. This behavior is hard to explain empirically and theoretically, assuming a year of crisis is likely that a large portion of households of any economy could present negative savings, but the fact that such a pattern covers the 80% of households and remains for more than one year requires a detailed study.

This is perhaps one of the most vulnerable results achieved with the templates and the implicit adjustment, which is not observed in the survey for the same level of clusters (see Graph 2 in the Annex). Even when a household omits any effective amount of their income, its level always keeps proportionality with the level of consumption, defining in this way the saving. Under these considerations is necessary to verify these trends, deepening into the structure of the ENIGH and expanding the series of study prepared for the EG DNA.

Another element that draws attention are the coverage ratios by transaction, which differs significantly in transversal manner in the survey variables, which generates reasonable doubts about the quality of the information changing from one variable to another. In turn, this variability causes that the adjustment factors by transaction are very different. Not being necessarily an avoidable aspect in the surveys, because it may reflect a natural sensitivity of households to certain questions in the survey (consumption of alcoholic beverages and tobacco, the strongest example). In the distribution of the discrepancies from the micro to the macro data based on the most disaggregated level for each transaction, automatically the major transactions of the sequence of accounts are adjusted, namely: Compensation of employees as the sum of wages and salaries adjusted plus the employers actual and imputed social contributions, the net Property income as the sum of the received investment incomes less the interest paid. After this, the

expanding balance items, as Disposable income and Adjusted disposable income, is made from the parameters observed in the survey. This is a very valuable element for continuity of this work, however, it is necessary to assess and explain the variation in the ranges of coverage when changing from one transaction to another. In addition, on this basis, find the causes of their variation determine the degree of statistical representativeness of each variable and thus, propose mechanisms to manage the data that generates better results when confronting the micro and macro data.

On the other hand, significant variations are observed in the coverage ratios of some variables but along the same series. At this point, beyond the problems associated with the methodology, there are identified inconsistencies in the survey, whose causes are related more to the characteristics of this data source and with one matter that many researchers define as the problem of the underreport of incomes in the households survey, in general.

Additionally, at reviewing all the set of data, it is possible to identify that the way to distribute the discrepancy, although it is performed on each transaction, it affects the same manner and to the same extent to all groups of households, regardless of the quintile to which they belong. In this regard, is important understand that the magnitude of the missing amount of income in any of the five quintiles is exactly the same proportion to the total discrepancy. It means to say that wealthier households hide the same proportion of income that poorest households, which could be an unsustainable premise, mainly in a scenario in which a wide range of social inequality is recognized. Hence, it requires an analysis indicating patterns on the underreporting of income, variable by variable, to look into it elements to let overcoming this limitation (the unitary adjustment). Since in fact, is not discarded the possibility that sustained dissaving arising in this treatment of the data, not on the survey data themselves.

Thus, and accordingly with the above, to solve the limitations mentioned there were raised mainly two mechanisms of analysis and evaluation of the results: the extension of the time series analyzed, from 2002 to 2014, on the other hand, searching within the ENIGH statistical inconsistencies in the captured variables which help explain the erratic behavior mentioned before. The intention is to isolate the inconsistencies in the data caused by the methodology applied, trends and erratic behaviors actually contained in the survey, to be able to develop proposals and solve these and other weaknesses in the survey.

II.1 Expansion of the series and analysis of coverage ratios

Based on these considerations, the first element to strengthen the task developed under the DNA scenario is the extension of the time series analysis. Considering that the analytical and conceptual basis to develop the work was established, it is important that an extension in the timeline is maintained. In this sense, the attention point is located more in the ENIGH than in NA, because the NA series are updated annually under the same methodologies. The ENIGH, however, has changed its composition and structure during this period.

> *The problem of underreport in the Households Surveys: the specific case of the ENIGH*
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> One of the most noticeable and complex problems of the households surveys is the lack of representativeness of the capture of income, compared with the income reported in NA. Among the researchers who address the issue, one of the most widespread explanations for this discrepancy is that the surveys capture improperly or that there is an underreporting in the income level of the households interviewed. There are different hypotheses about the causes of the underreporting, the most widely accepted concern on the lack of incentives of households to declare their full income in surveys or even voluntary concealment as it comes from activities that do not pay taxes, illegal or conditional social transfers, which is identified as the voluntary underreporting (Altimir, 1987). Another possibility offered is that families do not have their actual income present at the moment of being interviewed, which is called involuntary underreporting. Whatever the origin of the underreporting is, the most important consequence to consider it as the source of the discrepancy is that it cannot expect that all households hide the highest proportion of their income precisely because not all households depend on same type of income and the underreporting is highly correlated with the type of income concerned.
>
> In contrast, there are other explanations that rely more on the characteristics of the surveys: the way in which interviews are conducted, the lack of precision of the items or the lack of items that capture new sources of income of significant amounts (Leyva, 2004). In the case of the ENIGH, it shows that there are income groups whose margin of discrepancy far exceeds the average discrepancy of all you survey. This problem is exacerbated depending on the types of income; specifically the incomes associated with the property income are the groups with the most under representativeness, which has led some researchers as Fernando Cortes (2001), Gerardo Leyva-Parra (2004) and Miguel Székeley (1999) to link the gap with the truncation of the survey, rather than the underreporting. The problem of the called truncation comes from the statistical characteristics of sample design, and the fact that, being a representative sample of the national population and its characteristics, considering the scenario observed of inequality in income distribution, is consistent that a small group of households that concentrate much income but are statistically unrepresentative are left out of the sample, and therefore of the income of the survey. However, the proposals that these same authors address to solve the problem of truncation involve modifying the expansion factors of the sample or even introduce external observations of the same, both exercises of sensitive application, mainly considering the case of a survey whose behavior is not very stable through all its conductions.

On this basis, it has been found that the surveys between 2002 and 2014 saved the conceptual and methodological correspondence necessary to treat them all as part of the same time series. At this point is convenient to notice that even when there has been a change in the construction of the ENIGH, which may mean larger openings, or changes in their transactions in the new construction applied from 2008, derived from the implementation of more precise instruments in measuring indicators of poverty. These changes not affect significantly the concepts used in templates, but on the other hand, they allow a further opening and therefore a higher degree of

accuracy in the comparison of transactions. In such a way that the differences between the new and traditional construction do not limit the extension of the time series.

Once is solved the conceptual alignment and the items of income and consumption, the ENIGH's data is expanded obtaining the coverage of representativeness for each one of the components of income and consumption for the series. The evaluation of these ratios of representativeness is of first importance because, as was mentioned, is through these that endogenous problems of the survey are identified, such as variability in the statistical representativeness of transactions, losing trends of representativeness or increasing of representativeness in the trends for some variables in the series progresses. This information is important as it allows to determine whether the behavior of each type of input is consistent and statistically stable, and consequently, how such data that can be managed at the time of allocation of the discrepancy. It refers that this work focused by now on income, the consumption remains with the unitary expansion and it is working on the identification of components that require better treatment.

The coverage of representativeness is interpreted as the number of times the micro data is represented in the macro-data, that is, how many times the micro data is multiplied to achieve NA data. Thus, the larger the coverage ratio, the smaller the micro data is compared to its counterpart. In this regard, is necessary to refer that a decrease or significant increase in the coverage ratio year to year, could only be explained by two elements: a phenomenon of economic reality or an inconsistency of the survey.

In this regard, the Graph 3 shows that there are elements whose ratio of representativeness is high and constant over time, however, other factors such as received interests (D41_R) or dividends (D42_R) whose representative does not show a clear behavior or trend, additional it departs from the macro data. Thus, we identified three groups of variables based on their observed behavior versus NA, the first are stable variables and with good coverage: wages and salaries is the case. The second group of variables are those that have a constant behavior, but with insufficient levels of coverage: mixed income, even though towards the end of the series it seems to lose representativeness; and net current transfers, which have a coverage level very close to 1 in 2010, but in 2012 and 2008 are losing representativeness. In the third group are the variables that do not reach good levels of coverage with respect to CN, nor observe normal behavior, example is the interest received and dividends, which lack a clear trend over the three years.

Because of these results, it follows that those variables belonging to the first group do not present major problems when compared the micro and the macro data. However, when considering the variables of the other two groups becomes a complex process of expansion of micro data, as it is risky to assign a wide discrepancy unitarily, as the results of comparisons and trends that reflect the expanded data could be affected significantly. In this regard, it can say that there are basically three explanations to these behaviors: 1) trends correspond to economic phenomena that do not capture the NA calculations but it does by the ENIGH; 2) it is about income trends captured in the households interviewed derived from the sample design, and may not reflect those of all

households in the country; 3) when resizing the sample in the series the households that reports different patterns of income are left in or left out.

The first explanation is discarded at the time when considering the nature of the types of income with erratic trends. Since they are variables that in NA are built with solid statistics mainly from administrative record, its incidence on the economy is low and therefore it can be expected that their representation in the ENIGH is also low, while their behavior is unstable or inaccurate. On the other hand, the second explanation implies that they are very sensitive variables to the characteristics of the households interviewed and still managing to keep within the survey the same number of households that reports such income it is difficult for these households to report the same amount of one survey to another. The third explanation is about an even more serious problem in the survey, which is that, the number of households reporting the type of income in question is highly variable from year to year, precisely for purposes of the sample design. Result of these behaviors observed in the survey was assessed a mechanism to verify the trends, being the number of responses (frequencies) of each variable the item that would help to find explanations and from there propose alternative solutions.

II.2 Transaction frequency analysis throughout the series: the representativeness of the ENIGH

Much of the response to the proposed explanations is derived from the analysis of the behavior of the survey within it. Based on the certainty that the concepts being compared are the same, and isolating the effects of the methodological treatment and its implications, the only source that can be described as the origin of the observed problems is the survey itself.

The frequency analysis is understood as the analysis of the composition of households that make up the sample. That is, what number of them presents one or another feature and thus reports one or other income. Therefore, it can show trends on the types of income and its representation in response number over the sample, which would provide elements to support or reject the second presented explanation that refers the number of households reporting each type of income, has remained constant throughout the sample. When such consideration is incorporated, it should be noted that, for example, if the number of households (in relative terms compared to the size of the sample) who report income property is not maintained, it is natural that the coverage ratio of this group of income decreases. In addition, if it is at the same manner at which lowers the portion of households that answered affirmatively in this income group, then there is an additional implication. If the trend how the participation of those answers descends in the sample is similar to the trend shown by the decline in the coverage ratio, then it follows that the loss or gain of degree of coverage is due only to the modification of the composition of the sample. Because if the number of households reporting these types of income vary and the amount of total income reported in the same direction varies proportionally, then the income reported by households remains constant. If, however, the ratio or the sense of change in the level of coverage is not related to the behavior of the responses captured by the survey, then there is a

change also in the average income gathered by the households that answered affirmatively in the types of income with erratic trends.

Another way of understanding these behaviors of the survey comes from the comparison with the trends observed in national accounts. If the variables with irregularities are calculated consistently in NA, then is given by certain the trend of NA and assumed that the ENIGH presents a process of degeneration in the level of representativeness of particular group of households related to the type of income analyzed. Or in a more extreme case, there is a variation in the average income of the surveyed households, whose representativeness is low in the survey sample, but still causes erratic trends in the expanded data.

In Graph 4 (see Annex) it can be observed the share of positive responses for each type of income compared to the total size of each exercise of ENIGH[3]. If the behavior of all the variables of the survey was consistent with the data from NA, it could be expected that the share of each type of income in the total frequencies per year are fairly constant, or even show a tendency to increase or decrease as income household changes in reality. However, there are some behaviors observed that break with that expectation.

In first instance, the behavior of the frequency shows a clear break in 2008, before and after that year the representativeness of the types of income is similar but when compared every year two lines are observed, especially for net property income and wages, albeit inversely. Secondly, it is observed that the years 2002, 2004, 2005 and 2012 have very erratic behavior in the frequencies, especially for net transfers, the property income and the compensation to employees. Lastly, when analyzing the series as a whole is evident a systematic loss of the frequencies of property income and mixed income; that is consistent with the results of the analysis of coverage ratios, while these variables had coverage ratios noticeably erratic.

An immediate consequence of the observations described above, it is that there is a positive correlation between the loss of coverage identified in the income of property income and mixed income, and decreased frequency in the survey, in addition, the trends observed in both elements are very similar. This holds even if the frequencies decrease and the income reported increases, so it could be understood that the fewer households collected in the survey report an income level that increases each year, as indicated by the NA trend.

Additionally, if the ENIGH presents a loss of representativeness in some income groups, a logical consequence would be to think that this loss is offset by an increase in the weighting factors that determine the magnitude of these groups at the national level. Alternatively, that these weights distort the relative weighting on each observation, maximizing the information inaccurately declared by those surveyed households. However, contrary to this, the survey maintains the internal consistency throughout the series for those weights that are linked to groups of

[3] It was necessary to raise this analysis in relative terms (based on the total sample or the households in the country) to the extent that both change in each period ENIGH. In this way, a comparison between the different portions of sample of households and the total population presenting each type of income is arise, to determine whether the relative number of affirmative responses of each type of income remains constant throughout the period analyzed.

households whose representativeness decreases throughout the series. As it maintains stable and in some cases are lower than weights average by observations, classified by types of income, this is clearly seen in Graph 5, which shows weights average by each transaction throughout the entire series. These weights were calculated as the sum of the expanded households, or total households nationwide, observing the type of income in question, divided by the number of households in the sample with the same type of income. Thus, it is observed that the weights are consistent with each other, it means, there is not a group of variables within the survey that show a greater weight than other. In fact, the extremes observed in the trends of all income groups are due to the significant decrease in the size of the sample for the years 2012 and 2014.

II.3 Limitations of the DNA methodology: problematic income groups and the unitary income adjustment

In general, the analysis of frequency and coverage ratios indicate that the ENIGH has problems of representativeness in some income groups, affecting any treatment applied to these data. This conclusion is achieved by the fact that when the level of response in each exercise of the ENIGH is evaluated, is observed a clear relationship between the decrease in the level of coverage with the loss of responses observed, as the exercise moves forward both follow the same trend. Furthermore, the increase in income within the ENIGH, which is moderately sensitive in some cases, follows the trend of NA, which in turn is reflected in the individual weights of the households grouped according transactions, to the extent that they do not exacerbate significantly the characteristics of those households whose low level of representation could evidence inconsistencies. Because of this, subsequent work was developed on the premise that the biggest problems of ENIGH are concentrated in these income groups: mixed Income, property income, some items of other net current transfers and the employers' social contributions, to the extent that they are not in the survey. Given this scenario, it becomes necessary to consider analyzing a more comprehensive behavior of these variables to propose a solution.

One of the principles that guided the work process presented here and started with the development of DNA templates, was the fact that the generation of more accurate results is based on a deeper comparison and analysis and thorough in terms of level of disaggregation. One way to generate a greater approach to the causes of erratic behavior of these variables is examined in detail within the survey. As shown in Graph 6, we can confirm the arguments presented since the absolute frequencies associated with the property income have a tendency to lose representativeness.

After determining the cause of the problems observed in the first stage of work with the DNA templates, it becomes possible to balance of the limitations and elements of the methodology that enabled enrich and strengthen the work. In this regard, it must refer that to the extent that was detected a reduction in incidences of households reporting mixed income and property income

was detected, the plane adjustment applied within the DNA methodology catalyzes the problem, since it forces impute the content of such transactions to households that should not receive it.

However, it is also necessary to establish the fact that the assessment of the performance of data both within the survey and within its treatment in the template, allowed confirming feasibility of applications such as the allocation of STiKs (D63) or the Employers' social contributions (D12) from the information contained in the ENIGH. This due to two factors, first that the ENIGH being a survey designed with population parameters captures very consistent socio-demographic characteristics of households, and secondly, that the methodology used to obtain the imputed data is consistent with the obtained data. Therefore, the construction of these applied transactions in the initial templates remains as the method of calculation to confront the macro and micro data in the following exercises.

III. Proposals to solve the problem of the ENIGH's underreport and the expansion method to NA

Initially, the DNA templates for the years 2008, 2010 and 2012, were developed with the intention to serve as a basis for comparison of NA data and ENIGH, and on this basis to build a structure of expansion with micro data that would bring the statistics survey to NA. However, the results of these years led to an exhaustive review of the achieved expansions and distributions. So from a comprehensive review throughout the entire series, both the behavior of the survey and the implications that the methodology applied had in the data, was possible to test out a problem of representativeness of the ENIGH samples affecting the magnitude of income which is mainly associated with the property income and the mixed income.

Even though one of the most important results of the previous review is the identification of the trend of ENIGH to lose representativeness of frequencies associated to D.4 Property income and B.3 Mixed income, other variables were also identified, whose behavior distorts the expansion of micro-data. In summary, these variables and their particular problems are as follows:

a) Property income: a loss of representation in both, the number of frequencies and the magnitude of income captured is observed. At the same time, the net balance of property incomes (D.4_netas) as the average income by household, maintains an overtime growing tendency, which keeps consistency with the tendency denoted in NA even it did not grow at the same rate.
b) Mixed income: as in the block of property income, a clear tendency to lose representativeness in both, the frequency and the amount of income captured is observed. Likewise, a growth of the total income is observed, so it follows that over all the series it grew even faster than the average income by household derived from this transaction.
c) Employers' social contributions: although the behavior of this variable is stable throughout the series, it has a ratio of representativeness quite low, in comparison with the income by

wages and salaries, which behave properly and reach a significant ratio of representativeness. This behavior is explained by the fact that these items are not captured by the survey since it reports cash base incomes.

d) Other current transfers: this set of transactions only makes evident the problems in the number of frequencies over all the series. The coverage ratios behave consistently, but, in some years the number of frequencies increases significantly (see Graph 3, Annex) without increasing in the same proportion the coverage ratio, it is feasible to think that there are changes in the average income by households from one year to another, especially if it belongs to an income group with heterogeneous concepts.

Another observation derived from the analysis presented in the previous sections, is the fact that the methodology to expand the micro data besides revealed issues in a proper comparison of both data sources, also catalyzed the own inconsistencies in the ENIGH.

The method in which the household surveys capture the income and the nature of the sample, may largely condition the effects on the expansion achieved for the DNA templates exercise in the OECD Expert Group. Modifying the survey in order to correct its identified inconsistencies is not an achievable option for this exercise, and may not be the most feasible for the specific objectives of the survey. In addition to the fact that the size of the sample differs from one event to another, therefore the impact of a change in the characteristics or in the number of individual observations would be less predictable and controllable.

In this situation, a proposal to improve the results of the expansion is to apply a different methodology to expand the micro data different from the unitary adjustment proposed by the OECD-DNA methodology, initially testing the variables with major complications referred in the previous paragraph. This is due to the fact that the methodology to adjust, proposed for the templates has simple considerations on the allocation of the discrepancy on income and consumption and the problems that both can present in households surveys, so it is expected that this methodology will not consider issues such as the ones identified in the ENIGH.

Thus, according to the need of changing the unitary adjustment, it also requires a review of the methods to allocate the discrepancies that give the possibility to try another way to expand the micro data, addressing the problems identified in the ENIGH and at the same time allowing the generation of a reliable comparative structure.

III.1 Adjusting household surveys to NA: the discussion for the case of Mexico

Since the eighties, the discussion of issues related to income distribution became very relevant within the framework of national statistics; the use of household surveys has also acquired considerable importance for the construction of such statistics. However, this exercise is still controversial because the discrepancy of income reported in both sources is significant; also, the

problems that have been detected and exposed throughout this work are common to all households' surveys, in a greater or lesser extent. Within this framework, a set of proposed adjustments from both sources to resolve this discrepancy has been generated. This section exposes the main proposals, their most relevant implications and useful elements.

The most important factor in determining the methodology of adjustment is the way in which the discrepancy of income among micro data is distributed, so luckily there are proposals that, like the OECD methodology, seeks to allocate the discrepancy of all the income to the total of households and depending on the level of income that each one reports. However, this methodology has limitations that directly affect the results, and there are income variables whose behavior is very particular compared to the others. Because of this, other proposals different to the principle of unitary allocation[4] are presented.

Ifigenia Martínez generated one of the pioneer works in the discussion of adjustment, and was the first for the specific case of Mexico. Although her goal was to show that, there was a relationship of dependency between income distribution and economic development, which had to generate statistics on income distribution in Mexico in the fifties. Her methodology was to revisit the amount of income of the Census of Population and Housing from 1950 and the Household Income Survey from 1956, then contrast this information with the amount of personal income calculated from the Input-Output Matrix. The adjustment between surveys and NA started from the central hypothesis that households as a whole had to show an income-expenditure balance, as maintained by the National Accounts methodology. In this way the author determined that households that showed an income-expenditure balance declared their income correctly; households with less spending income have not declared transfers, and households with savings capability sub declared their income. Lastly, in the case of households in a deficit situation, an amount of discrepancy corresponding to the magnitude of its deficit is allocated, and allocating that amount only to income in kind and transfers, unlike households with higher incomes to their expenses, which capture most of the discrepancy, while households in equilibrium were not subject to correction (Martinez, 1970).

While this proposal is valuable insofar as it was the first to propose the setting as a tool for economic analysis, it also has considerations. Even when a unitary income elasticity-discrepancy is not taken for granted, it only maintains the assumption of macroeconomic balance of the household sector without differentiating the main sources of income for them. On the other hand, it is a breakthrough to recognize the type of income that could perceive the families of the lowest deciles and are not properly declared in the survey, but not so with households with higher income as the allocation of discrepancy was established on the total income and not on a specific type of income.

[4] It is about the relationship between the amounts of discrepancy assigned to a home based on the same income level. When it is unitary, it reference to the ratio between discrepancy and income is constant across all households, that is: that households in all deciles are assigned the same percentage of the discrepancy as a proportion of their income. An assignment like this reproduces as the distribution structure that evidences the survey, but with the proviso that the remaining distributed income is proportionally equal for all households in the survey.

The proposal of Oscar Altimir and ECLAC

Without any doubt, the setting with greater application has been proposed by Oscar Altimir diffused and implemented by ECLAC[5]. His approach aims to increase the validity and reliability of the collection of household income and thereby achieve a better measurement of poverty and inequality in income distribution in Latin America (Altimir, 1987). Which implies that the adjustment should serve to increase conceptual comparability of measured resources by reducing instability in the measurement of income, derived by methodological changes of household surveys[6] and therefore minimize bias arising from underreporting of income.

All his methodology is based on three main assumptions: 1) the information in NA is more reliable than the information in household surveys, because it reconciles with different sources, which endogenously corrects any deviation from them; so it follows that: 2) the amount of income reported in NA will be, the most of the times, greater than household surveys, and in all of them the amount of accounts would be true, except in cases where the ENIGH is greater it will be given for valid[7]. From the first two cases becomes the third: 3) the consideration that underreporting is the only source of income discrepancy. Altimir introduces a one more precision to the third assumption, which refers to the way in which the discrepancy is allocated. In this case and unlike the methodology of Ifigenia Martínez, in its proposal the voluntary underreport of income is distinguished (with the intention to conceal the true magnitude of wealth family) from the involuntary one, which is more associated with the lack of an accounting record or infrequently and stability in income and the amount received. In this way, a different setting arises depending on the type of sub report concerned: the involuntary underreport is associated with types of income such as cash transfers, in-kind or self-consumption, while the voluntary underreport is mainly located in the income of the highest deciles, that is, income by property income. An important implication of these assumptions in the distribution of property income is that they are distributed only among households in the highest quintile.

Although the proportion in which the discrepancy is allocated, it remains a unitary elasticity related to an income level (except in the case of property income, in which only matters the income level if it is greater than 80% of households). The consideration that each type of income is distributed differently is very important, because it implies that two households will have different settings if their income is of different type, although the amount is exactly the same. A problem

5 In Altimir (1987) document, the methodology that was later applied in Chile and Argentina, with the intention of creating greater openness in the household accounts is exposed.

6 This is an issue also addressed by other authors of adjustment in Mexico. It refers to the variability in the proportion of income accounts representing household surveys in each lift. This proportion varies considerably depending on the methodological changes to the survey, as well as changes in the size or the sample representativeness of it. No identification of the extent to which the income variation is explained due to a decrease or increase in the income gathered by the survey and not to an increase or decrease of income of the general population.

7 This is precisely the most controversial and perhaps most important assumption in the Altimir methodology. Since, as Gerardo Leyva-Parra (2004) stated, it rests on a range of acceptability that himself (Altimir) recognizes that will eventually be violated. That range of acceptability raises two versions of the assumption. The first, that in general the NA information is more reliable than the household survey, and second, that the information on NA is at least as reliable as microdata information. Once in various countries was discussed and agreed that the national accounting had inconsistencies Altimir put to rest the validity of this assumption above the weak version: accepting that NA is equally valid that the microdata. This change has implications especially in the event that any data from the ENIGH is greater than NA.

with this approach is that all types of income, including property income, are allocated in proportion to the level of household income, that is, although each type of income is distributed among households differentially, that reallocation represents the same percentage for households within each group. Altimir accepted that this was a difficult assumption to sustain, because it implied that households in decile 8 conceal the same proportion of their income that households in decile 10 (Altimir, 1987). However, allocating the total discrepancy of property income to 20% of the richest households, it is a mechanism to compensate this deficiency.

The study of Julio Boltvinik and Enrique Hernández-Laos on the evolution of income in the ENIGH

The approach of Julio Boltvinik and Enrique Hernández Laos (1999) responds, like the two previous proposals, to the need of having sufficient statistical resources for the calculation of the incidence of poverty and income distribution. The starting point is to justify the need for adjustment based on the detailed explanation that the authors made of the way in which income behaves throughout the survey. Through the study of the surveys, it concludes that the trend of ENIGH between 1984 and 1994 was to capture a larger share of income relative to income from NA, without considering the problem of underreporting; it could be interpreted as if the income of families had increased, even in a period of crisis. These changes in the income level of one survey event to another may be due to changes in the information captured as changes in the composition of the sample, that is, income increases not only because the average household income has increased, but also because he met families with higher income levels compared to the families interviewed in previous surveys. In such a manner that by comparing and adjusting of sources is possible to isolate the effect of errors in the survey of actual changes in income.

The adjustment methodology as such is very similar to that Altimir proposed. This proposal has different adjustments distinguishing income wages, mixed income (monetary transfers and income) and non-cash income (in kind). From this, calculate the disposable income taking as reference the System of National Accounts and estimate the degree of coverage by source of income. After apply the adjustment coefficients to expand the micro data and distributes undeclared household income in proportion to family income (sub unitary report elasticity). Only property income is distributed among the 20% of households with higher incomes. The big difference between this approach and the Altimir one, is that here the distinction of the type of income by households groups disappears. Hernandez Laos adjusts income by type according to the level of total household income, without paying much attention to the particular type of income that is adjusted.

Other proposals with a more general adjustment as like Guillermo Paraje and Melvin Weeks (2002) who applied a methodology which also takes as its starting point the assumption that the discrepancy cannot be assigned neutrally. Assuming that the only error of the survey is the sub report, they estimate no reported income and reallocate it according to certain characteristics, reported in the survey, which show a high correlation with their level of income.

The use of tax records and the study of the richest 10%

Given the complexity of the proposed methodologies, as well as the particularities in data from both sources, some researchers have resorted to the use of administrative and tax records instead of NA, to correct the problems of ENIGH[8]. It is not an objective of this work to make an adjustment from administrative data (pure), however given the redistributive approach adopted by several of these authors; it is interesting to consider the basis on which these methodologies are proposed.

One of the most recovered and controversial proposals within the studies of the richest 10%, is the one proposed by Piketty and Atkinson (2011), who were also pioneers in the field. These authors propose the study of the richest population, to get a slight idea of their behavior, the dynamic of the concentration of the wealth proper of the capitalist system. The construction of their database *"The world top incomes database"* reflects the need for reliable statistics available over long periods of time and sufficiently detailed to identify the different sources of income and its correlation with the inequality in the perception of it, and the accumulation of wealth; that is, a distinction between income from labour and capital. In concrete terms, their databases are constructed from tax statistics, only treat the last 10 percentiles and within these assume that the Pareto[9] function defines the distribution. The international database built from this methodology is the most robust. They define the disposable income before taxes and emphasize that the results gotten show a clear trend towards the concentration of income in that group of households defined, even actually in the last five percentiles.

Another approach that seeks to adjust the income of micro data is the one proposed by Lakner and Milanovic in 2013, in the document *"Global Income Distribution: From the Fall of the Berlin Wall to the great Recession"*. They fit directly the surveys at the level of the accounts, start to evaluate the difference between consumption in NA regarding the consumption in the survey, and identify this difference as unreported income in the highest range of the distribution of the survey. This methodology is derived from the consideration that much of the discrepancy between NA and surveys is in the highest income deciles, and that can be seen in the behavior of consumption of household groups according the increasing in the income. This consideration leads to the hypothesis that the consumption can indicate the true margin of underreport on the income and assessing the trend of it throughout income groups compared with the trend of NA, it is observed

8 The note "Inequality in Mexico is worse than thought: INEGI", published on April 4, 2016 in the newspaper Excelsior, it is made known that is being developed a proposal for adjustment of microdata from household surveys regarding administrative or tax records, which have not yet applied for Mexico. However, the president of the Board of INEGI announced that within the same institute it was being developed a research, which aims to analyze the distribution of income in Mexico from the ENIGH data adjusted to the records of the Tax Administration Service (SAT, Spanish Acronym). The use of this data source responds to the need to address the deficiencies identified in the ENIGH, allowing a more optimal distribution of income. However, the results of such an approach may not be known until it is possible to expose the research report as a scientific publication.

9 The theory of the economic welfare is based on the maximization of the individual utilities based on the acceptance of the distribution conditions imposed by the market. The Pareto conception of the social welfare defines that can be considered there is an improvement in this when a change raises the improving of the person, at least, as long as it is without worsening the conditions of the rest of the group, which implies that the optimal distribution of the income is given by market conditions (crossing of the competitive balance with the functions of individual welfare) and that redistributing the wealth, taking away wealth to the highest deciles for distribution among the poorest, is a measure affecting the welfare of the whole. Underlying this argument is the fact that the competitive balance, and therefore, the function of Pareto, is biased in favor of those functions of individual utility with higher incomes, which is useful when if what you want is to assess the real way in which the free market allocates the income among the individuals (Lustig, 1976).

that the consumption of the poorest households is consistent with their income, not being the case of households in the highest deciles. Thus, the methodological steps are the following: a) determine the discrepancy in the consumption in the NA and the households surveys, and calculate the average of the consumption for both, the highest is the one used in the study; b) recalculate the new percentage of income of the decile 1 to 9 based on that average; c) calculate a new proportion of income for the decile 10 as the difference between the new average and the sum of the proportions of the deciles 1 to 9, that is, assign the whole difference between the consumption in NA and the households survey to the decile 10; and, d) with the proportions of the richest 10% and 20% make the adjustment assuming a Pareto distribution, and with this function divide the decile 10 in the following branches: from the percentile 90 to 95, 95 to 99 and 99 to 100.

Criticism of the adjustment: the discussion on the truncation of the household surveys

Precisely because it is a topic related to income distribution and the study of the poverty study, the approach of the expansion of micro data from household surveys to NA is somewhat controversial, the more when considering that the problems observed in the ENIGH in this work may eventually be common to other countries, even though of different magnitudes. In Mexico, the most important critics argue that this adjustment is a method of comparison basically unfeasible due to three common factors in their arguments: a) the lack of a conceptual framework in the ENIGH that is comparable with NA, B) the erroneous capture of income of the ENIGH (underreport of the income already mentioned) and, c) the truncation of the survey sample at the extremes of lower and higher income of the population. The authors that hold these arguments in Mexico are Gerardo Leyva Parra (2004) and Fernando Cortes (2001), and their position is derived from that, as the sample is designed on statistical principles, it is reasonable to assume that the households whose weight relative to the total population is small remain systematically excluded from the sample. When the ENIGH is compared with NA in terms of the income this problem is exacerbated because, given the inequality observed in Mexico, a large amount of income is concentrated in a small number of households. Therefore, if this small number of households is excluded in the sample of the ENIGH, the entire amount of their income is not captured by the survey, so when comparing the data a lot of income is missing. In this respect, the proposed solution is to introduce to the survey additional observations that capture the income omitted in the original sample, or re-weighting the expanding factors of the survey to modify the distribution structure captured. Additionally, Leyva-Parra maintains that it is not reliable to compare these two statistics especially in the scenario in which there is no reliable estimate of income in NA (Leyva, 2004).

In this regard, it must be said that the objection to the conceptual comparability, as discussed in the first chapter, is an issue that can be saved by making an exhaustive review of both sources. On the other hand, this work is aimed to adjust the distribution structure to add to NA data and therefore this and its relative reliability is the starting point, as well as the knowledge that there is about its construction to bring the micro-data and generate new ways of calculation. Although it is recognized that the survey presents problems in the consistency of the frequencies associated with income of the richest

The most important contributions of these proposals are that they are based on more robust theoretical analysis. Which allow infer a dynamic of distribution of the income that can be seen as a trend in both the household surveys and the data from NA, but ultimately do not match, because effectively the highest income families did not report their full income in the survey or simply were not involved in it by probabilistic issues. Focusing on the analysis of the highest income group, using a source such as tax records has the logic to track more specifically the absent households in the survey. This implies that for the rest of households the differences in the income levels reported by the surveys are not as significant, allowing to remit to the argument of Hernández-Laos, on the erratic way in which the income of ENIGH behaves because of the changes in their

conceptual bases and the danger that this behavior implies to simulate a recovery trend in the average income of the families.

III.2 Methodological proposals to solve the problem of the under report in the most unstable income groups in the ENIGH

The previous theoretical and methodological revision is the first step in the creation of a different proposal of the unitary distribution to solve the discrepancy in income; the next step is to search for the most feasible proposal according to the characteristics observed in the data. The objective of this section is to find correlations between the behaviors of the data that requires different adjustments to the unitary one and with such relationships propose particular forms of adjusting each type of income and therefore give better results. In this way, it will be presented the proposals recovered for each income and the way in which these are suited to the patterns of behavior of variables when evaluating the ENIGH throughout the series.

One of the most immediate results of this comparison is that the first proposal that applies to this analysis is the principle of conceptual comparability. The possibility to achieve a suitable degree of correspondence between the conceptual structure and a methodological construction of one or other sources, allows to generate a reliable comparison, so an adjustment of the same. This assumption was not assumed a priori but comes from a much more structured exercise developed in the DNA templates. Thus, it is assumed that the conceptual alignment is not only possible but is one of the most important elements in this proposal.

Another principle that is recovered from the revision discussed above is the critical assessment of NA, as well as the possibility that the ENIGH can contribute to national accounting in transactions whose nature prevents them from being captured correctly through administrative records or, in general, the sources that feed the calculations of national accounts. It takes as a reference point the magnitude of the transactions in the Households accounts, however, this principle is always kept when the magnitude of AIS exceeds the ENIGH, when this is not satisfied, and the data of the ENIGH is taken as the correct one.

Overall the most important consequence of the unitary distribution of the discrepancy becomes that, regardless of the type of income concerned or of the specific transaction, and regardless also that within the survey such transactions are received by a group of specific households, the total magnitude of the discrepancy is distributed across all frequencies or households of the micro data. This is identified as one of the possible causes of the erratic results of DNA templates, the resources to fix this way to assign the discrepancy are within the same ENIGH. It is possible to generate this statement especially from the several authors that identified the need to implement mechanisms that allow the allocation of the discrepancy with objective parameters that correspond to the behavior of both variables in question, as the level of household income and the

conditions of income distribution in the country. The allocation of the discrepancy will be made according to three general principles:

a) The determination of discrepancies and adjustment of the variables is performed based on the maximum level of disaggregation, the transactions are adjusted though the sums of their more specific components. To the extent that each transaction has its specific behavior, the adjustment on this principle substantially modifies the distribution of the discrepancy, especially when you consider the following guidelines.
b) Once determined the maximum degree of conceptual and numerical comparability, the adjustment of the variables will be responding to the behavior of each variable, regardless of whether this behavior is unrelated to the trend of the group of transaction or type of income at which the transaction belongs. To do this it is necessary to check that these trends of specific variables are consistent all over the series. Thus, the methodology will incorporate the use of survey data (in this case behavior trends) to determine the adjustment parameters without introducing arbitrary elements in the allocation of the discrepancy.
c) The third and final general parameter to break the unitary income distribution is the determination to assign the discrepancy only to those sample observations that have reported the transaction in question. Since the sequence of accounts used for the adjustment involves adding the incomes received and subtracting those transactions paid, it is understood that when assign each of these parts to the corresponding incomes, different results are obtained than in the case of assign to all households in the sample only to net balances.

According to these three general principles the adjustment of the variables listed above will be developed: Property income, Mixed income, Employers' social contributions and Remittances, to the extent they are the group of lower coverage within the entire block of Current transfers.

As noted in the section on analysis of the frequencies, the income block with the most problematic behavior is the income from the Property income. Not only because it is the income group with the highest underrepresentation versus NA, but also because the number of frequencies are getting lost as the survey progresses, not to mention that given the nature of the transactions associated with this type of income, its behavior may show very specific trends depending on the level of household income. As shows the Graph 6 (see Annex), the behavior of the frequencies of property income show a clear tendency to accumulate in the highest income deciles. Unlike the positive responses to the Remunerations to employees or Net transfers, the possibility to report property income in households is positively related with the level of total income of the household. This observation points to one of the theoretical and methodological proposals considered earlier, the adjustment of property income with incidence only in the richest 20% households.

Nevertheless, the concentration of frequencies by itself does not allow inferring a significant concentration of income in a specific group of households. To verify that this trend actually exists

and is constant along the series, it necessary to assess the sum of accumulated income in each decile and according to a level of greater disaggregation shown so far, this also to evaluate the behavior of each of the components of this set of transactions. To address this dimension of analysis the Graph 7 (see Annex) shows the behavior of the five components of Net Income Property. The share of each decile of income per transaction is analyzed, alongside the participation by decile of total frequencies associated with the transaction. This indicates the distribution structure of each of the variables and the relationship of the behavior of this relative variable to household income (B6).

To summarize, the adjustment of property income will be made by blocks. The first group of transactions, which match the adjustment on the richest 20% of the population, will be adjusted by assigning the missing discrepancy in the ENIGH only 20% of the richest households (those belonging to the deciles 9 and 10) and according to the share of each household to the total income per transaction, but only those 2 deciles. The second group, transactions whose behavior does not fit with the principle of 20%, is adjusted only according to their frequencies observed and the distribution of each one of the respective transactions. Assigning the total of the discrepancy to households that reported that transaction according to the participation of each household to the total income by transaction reported in the ENIGH. Finally, the incomes linked to external variables to the Property income: life and non-life insurance and the participation in Retirement Savings System (SAR, Spanish acronym), were adjusted as follows: once was determined the total of both transactions, obtain the share of each household to the total of the transaction, and then assign the discrepancy to adjust, being this the total of the variable in question, as the ENIGH does not report directly an amount for them.

The second concept whose behavior was identified as problematic is the Mixed Income. Regarding this item, it must be said that even the ENIGH is a survey applied to households and its intention is to capture the income as is received by them. The degree of coverage for this concept captured in the survey is very small respect to the mixed income in NA. On the other hand, it must remember that the income received from informal activities is quantified in this balance item in NA. At this point is necessary a clarification, though there was verified that the ENIGH does not offer a very different outlook to the NA in terms of capturing the informality, it has to recognize that national accounting might be undervaluing this concept that is inferred truly important within the household income.

Because of this, it will take the most important element of the survey containing the frequencies of households who observed mixed income, as well as the type of activity in which they operate. Although Mixed income appears in the AIS only as a whole, there is another product of NA that can aid in determining a distributive structure, the measurement of the Informal Economy. This calculation has two components: the informal sector, which is the set of the informal economy that belongs to the household sector, and other forms of informality, where are counting the agriculture and farming businesses in the household. In such a way that it will take the segments of the informal sector and the agricultural sector of the other forms of informality, to create a distributive structure with which generate a breakdown for the same sub sectors in the case of

mixed income of AIS (see Table 5, Annex). Thus, the data for Household accounts is fully comparable with that from the ENIGH, since the survey reports information of informality disaggregated by type of activity. Once built this disclosure of the AIS data, the next step is to determine the magnitude of the discrepancy for each one of these activities, and finally assign the share of each household to that discrepancy, depending on the share of each household to the total income reported by sector. Although this way of distributing the discrepancy certainly breaks with the unitary distribution of the income, also prevents the data comparability with the DNA template, since it obtains the total of the Mixed income by the aggregation of activities and not more on the concepts proposed by the templates.

The contributions and remittances are the most underrepresented items in the ENIGH; the adjustment for them is carried out closed to the three general rules described above, with minor variations determined by the nature of each transaction. However, it is necessary to make a clarification; the Employers' actual social contributions (D.121) are an element that, like D.441 and D.442, is not present in the ENIGH, because it is not a concept captured as part of the current household income. However, exactly as they were calculated in the initial methodology of DNA templates, the amount depends directly on the amount of gross wages and salaries received. Due to this, to be able to adjust the employers' social contribution first is necessary to adjust the gross incomes by wages and salaries. This implies that first is necessary to assign the discrepancy of wages and salaries (D.11) to observations that perceived this concept, and distribute such difference under the same principle as in all transactions: the participation of each household to the total income of the ENIGH for the concept in question. Once the gross wages and salaries are adjusted (which involves the treatment of income taxes described in the point I.2), is defined the number of households with access to formal employment, the amount of wages corresponding to formal work and the number of benefits associated with this. This way to adjust the income take advantage of direct information captured by the ENIGH, because in its section on information associated with the conditions and occupational characteristics the information is captured on the type of contract associated with employment, as well as the benefits offered. Hence, the benefits to be used for the calculation, as discussed in point I.2, is the access to SAR, credit for dwelling or access to health benefits, while the condition of formality is given by the observation of the three or any of the three benefits and the existence of the signed contract. In this way, the discrepancy is allocated to D.121 by each of its components (D.1211 and D.1212) according to the principle applied to all variables: the share of each household to the total, but in this case, of total salaries and wages adjusted. On the other hand, the imputed social contributions (D.122) are adjusted considering only their participation to the total of them.

Lastly, the remittances are one of the most volatile components of the whole group of incomes by net transfer, at the same time is a transaction on which there is much ancillary information to make the adjustment. One of these sources is the Balance of Payments, which publishes in quarterly basis the amount of the familiar remittances received by federal entity. As stated from the beginning of this section, a priority in this approach is to make an adjustment by the least amount of arbitrary parameters, therefore is an important matter using as much information

available. Hence, while the remittances do not have a distribution pattern associated with the level of household income, they are associated by federal entity in each observation. In this way, the adjustment will be made taking as a starting unit the federal entity and the total amount of remittances reported by the Balance of Payments and the ENIGH. The magnitude of the discrepancy is determined between the NA data (data from the Balance of Payments) and the ENIGH, and then the discrepancy is distributed between the households belonging to each federal entity concerned, according to the participation of each household to total remittances of their federal entity observed in the survey.

This is the manner how is proposed to solve the problematic outcomes identified in the survey, starting with a comprehensive assessment of the problems in the survey, while an assessment of the elements of the methodology that distort the information. As the unitary adjustment is one of the problems identified in the methodology, in the theoretic and methodological review are presented ways in which other researchers have proposed to overcome similar problems. It should be said that a very important element of this analysis is having a lengthening series of survey events comparable due to methodological alignment. In such a way that the combination of all these elements gave as result the methodology raised here and the results that will be evaluated and discussed below.

III.3 Results achieved by the proposed methodology and findings in the NA from the ENIGH

The methodology adjustment of the templates not only involved distributing the discrepancies of all variables among all households in the sample, but also do it from the synthetic structure of the templates. Assign the discrepancy from the templates, although it might seem to generate the same results as doing it from the micro data, certainly has shortcomings since it prevents the disposable income be generated as a balance item from the purest disaggregation of data, in this case the households unit. This is one of the shortcomings solved in the methodology used and explained in the previous section. Although it was a partial solution, because not all income components were adjusted in the same way, i.e. remunerations, by all contributions associated with them, property income, mixed income and remittances, were adjusted from the micro data, while the rest of the concepts continued adjusting from the template, and according to the principle of the unitary allocation of the discrepancy. In this manner, the adjustment of the four concepts discussed in this proposal is also differentiated; each one of them received a specific treatment to the extent were identified behavior and problems relating to the differentiated nature of them. Thus also addressed one of the most important considerations observed within the proposed adjustments like their criticisms: the requirement for an adjustment by the least amount of arbitrary parameters and according to the nature and problems inherent in each type of income.

The effects on disposable income obtained once these data are incorporated affect the most important groups and, to the extent that also affect Disposable Income as a result of the sequence

of accounts, modify income distribution observed by the survey, and even they modify income distribution observed from the first stage. This element is clearly observed when trends are compared in the Graphs 8 showing the ratio saving/adjusted disposable income for the first DNA exercise in the micro data (blue line), the expansion of these data at the level of NA (red line) and expansion of the micro data with the treatment discussed above (green line). It cannot be overlooked that the persistent presence of negative savings in the first 3 or 4 quintiles, however, the magnitude of the deficit has been significantly reduced to the extent that even in some years (2006 or 2005) almost disappears.

Another important element recovered from this set of graphics is the fact that the treatment of micro data tends to resemble the distribution structure derived from the macro data, which refers to a substantial transformation of the structure of the survey. Emulating a different distribution structure has another implication: the significant increase in disposable income and the point at which the increase becomes noticeably evident. As shown in the Graphs 8, the ratio saving/adjusted disposable income in the micro data without treatment reflect two issues: the income of the last two deciles does not grow very significantly compared to other income groups and to saving, or that the saving in these sectors grows at the same rate as their income, and hence the ratio will not grow so quickly. However, since the lack of a significant part in the household income recognized and in extent that the ratio of saving is built by the subtraction of consumption from the same survey, it is easy to assume then that the ratio is small because both consumption and income grow at a similar rhythm as the household income increases. Hence, the distribution of saving is so constant over the deciles, and even is the cause that in the exercise without adjustment there is dissaving (blue line). However, when the missing revenue to the survey is incorporated, while the missing consumption is incorporated, it becomes clear that the ratio of income and expense also changed, since the positive trend of saving becomes negative in several sectors, while the positive savings is concentrated in the households in quintiles 4 and 5, mainly. The high concentration of saving in these groups of households can only mean one thing, that when incomes were adjusted, most of the discrepancy was absorbed by these groups of households, while the distribution of negative balances as interest paid or taxes on income and wealth, significantly affected households in the lower quintiles.

On the other hand, it seems to peek at this point a very important element in the further development of the work done, the persistence of negative saving in the poorest quintiles. In this regard, the observation that is obvious at this point is the fact that in the micro data this problem does not occur, it means, the households do not have dissaving until income and expense is adjusted with any method. Consequently is convenient to leave pointing that it becomes necessary evaluate the consumption behavior, and the way in which can adjusted their items again retrieving information from ENIGH, to isolate the effect of possible distortions between one or two concepts within the survey, which are exacerbated by comparison.

Despite these already proved inconsistencies derive more from survey, and perhaps ultimately more of the nature of the NA data than the treatment, the methodology applied has the utility to generate more accurate household groupings, depending on the main source of income they earn.

Although this grouping of households had already been developed from the first application of DNA templates. The truth is that was inconsistent to generate clusters in the micro data, because the expansion to macro data would undermine the composition of income of each household, which change the relative importance of property income or wages within each individual observation, mainly due to the discrepancy of some of these transactions in terms of quantitative weight in the total income of households. When the income with lower rates of representation was adjusted, it was also thought about assign to each household in a more reliable way as much of the discrepancy. This principle is precisely the aspect that allowed generating more reliable clusters of households, depending on the type of income they receive and evaluating the results in terms of this group.

Lastly, another important result is the identification of transactions whose magnitude is greater in the ENlGH compared to NA. It is necessary to emphasize that such transactions were identified only when it became a thorough comparison of data, that is, until the transactions are compared to the greatest extent of disaggregation possible. That was how was determined that transactions such as Retirement Investment collective funds (D.443) or more Other current transfers between households (D.759), were higher in the ENIGH than in NA. It must be recognized that this is possible because it is very likely that these transactions are captured wrong in the sources of the NA. Thus, opens the possibility of improving NA, from a specific methodology for the survey characteristics as those of the national accounting.

IV. Future works and Conclusions

Given the work experience gained in the development of the methodology shown above, it considers that solving the current problems when confronting the micro data obtained from the survey, with the macro data from NA, is finished a key part of all the complex methodology that can lead to generate information of distributional income and consumption of the Household sector. In this way, the method presented above is therefore a fundamental base for further development of tasks and improvements of NA statistics, incorporating the best elements of the available Survey of Income and Expenditure in Households.

In line with the above, in this final section are presented some methodological and technical applications that allow bringing a new dimension of analysis to the household sector, income distribution. In this regard, it is underlined that is not the central objective of this document to address such problems, because the study of income distribution and poverty requires a solid theoretical framework to explain the causes, its consequences and ways of measuring it. Furthermore, as stated at the beginning of the document, what is intended is to generate more accurate and complete statistics to further strengthen the national accounting, so that the introduction of these technical and methodological instruments actually points to that objective. Secondly it will be assessed all the tasks that, according to the methodology, were identified as necessary to further strengthen the proposed calculations in the methodology and even,

calculations currently being carried out within NA that can be enriched from the perspective of micro macro confrontation.

Lastly, it is mentioned the importance that this calculation has in the national context, not only in terms of international commitments that the country has acquired. But also as information that arise in the national context, from the institutions in charge for analyzing and designing public policies up to the academic sectors to study and analyze the economic and social processes in the country.

IV.1 Introduction of equivalence scales and generation of Disparity Index between income groups

As mentioned, while the aim of this document is not to analyze income distribution, a very useful approach to data is precisely through measures of disparity and its concentration. The usage of these measures in the context of construction of data for National Accounting from the ENIGH micro data is in two ways: a) allows understanding the way in which the processed data (adjustment methodologies) modifies income distribution, expressed by the survey. Which also implies how the missing income affects the distribution of the survey, i.e. how it affected the original data of income reported by NA based on the group of households to which it was assigned; and b) also it opens the possibility of identifying the existent relationship (according to the micro macro data confrontation) between the volumes of income in NA and groups of households, in the same way that this relationship but between types of income and the number of households, depending on the crossing of the main source of income. Although the latter function is more related to the analysis of income distribution than with the construction of more accurate statistics on households within the framework of the National Accounting, the fact is that the analysis of trends associated with these problems are also useful for corroborating the trends of NA.

For the first point mentioned above, the Gini and Theil indexes were used, with the intention of having two different approaches to the changes in income distribution which originally shows the ENIGH. In Graph 9 (see Annex) it is clear that in both cases, the index with adjusted data according to the methodology set out above (blue line) grows and stays parallel to the calculated index with the original data. However, although this behavior holds for both indexes, the Gini coefficient is more pronounced. This behavior can be explained by the way in which the measure of disparity is constructed, and the imputation of the income discrepancy. The Gini coefficient is constructed as a measure of accumulated income by quintile of households that compare an ideal distribution (the equidistance curve), with the Lorenz curve derived from the observed income distribution. This means that it measures the difference between an ideal distribution, given the premise that all individuals receive the same income, and therefore this is a general measure of entropy, since it captures the general discrepancy of the distribution or summary of the differences between each one of the groups of the population regarding the equal distribution curve. The fact that the index is the sum of the differences regarding a perfectly equal distribution, explains that the distance between the blue curve (adjusted data) and the red curve (simple data) is slightly greater than the

distance between the two Theil curves. It should be clear that when the distances between the two curves are presented, it is actually referring to the magnitude measures of inequality. In such a way that the first impression is that the Gini index increased significantly from the incorporation of the survey data to NA, which implies that the assigned discrepancy between households significantly increase the discrepancies between the average income of each group and the equal distribution of the same.

However, the Gini index, being a global disparity index does not indicate what part of the distribution was allocated most of this income. Equally, it does not provide much information on inequalities in the income distribution among households themselves and the way in which these inequalities of the income increases over time change. Precisely because of this, the Theil index was applied with the same data, the highest limit for this index is 17.5. In line with this, the first observation is that the growth of inequality was lower (see Graph 9, Annex), although in relative terms, the starting point of this index (red line, data without adjustment) is much higher considering the absolute levels of disparity (that every year is between 15.0 and 15.5). In the case of the adjusted data (blue line), the Theil index increases in proportion to a half of unit, reflecting the same trend as the Gini index, in levels from 15.5 to 16.0.

The Theil index is based on the relative measure of average income of the economy, and measures the discrepancy of specific groups around such income. In this way, it explained that while the Gini index curves does not move as much through the period, it means, that the behavior of both (adjusted and simple, as long as they are parallel) were flat, except in 2005 because a particular problem in the consumption. Even its magnitude would decrease; the curves of the Theil index have a clear tendency to grow former time progresses. Such behavior can be explained as that, both simple and adjusted data, inequality in income distribution has grown as the growing of national income, and compared to average income. And that the positive difference between the highest income distribution is comparable to the negative difference between the lowest income of it, it means that what is lacking to the poor in the lowest deciles to achieve the deciles of middle income, can be solved with the surplus of the richest groups on the same average income. This hypothesis is confirmed by reviewing the overall performance of the survey in 2005 and 2004. As can be remembered, frequencies and amounts of income associated with property income soared in those years, which is expected that in the scenario from ENIGH the index increases, whereas when the data were adjusted on the observed frequencies (being many frequencies of property income compared to previous years) the index declined.

In terms of what this means for modifications of the adjustment, not only the global income disparity increased with the addition of income, leading to significant magnitudes since in relative terms of the Theil index, it is equivalent to a concentration ratio of 80% in its scale. But also most of the income was assigned to a small group of households, and if it was not enough, the magnitude of that income kept increasing or the number of households decreased throughout the period progresses, or even both possibilities.

Analyzing these trends is a very useful exercise, especially when considering the different empirical implications deriving from the behavior of the data, no doubt, a contrast of this nature can help to validate or refute the trends evidenced by the data. Moreover, to the extent that behind the validation of these trends, the methodology applied and proposed is found, and ultimately, once both components of statistics are known depth they can be isolated the effects from both. Another of the advances introduced by this methodology, although as has already been mentioned comes from the same applications of DNA, is the grouping of households by main source of income. It is important to reiterate the usefulness of this opening data not only lies in the possibility of generating Households accounts by sub sectors according to the most important type of income, but also in the possibility of rebuilding the trends mentioned above from those same groupings. In the Graph 9 (see Annex) this trend is clearly observed, that a diminishing group of households received a magnitude of increasingly important income, a trend that actually does not keep many discrepancies with the behavior of the economy.

Lastly, it should be noted that these indexes were constructed from the consideration of an equivalent disposable income per household. In the OECD methodology, it also emphasizes the construction of this index for the stratification of households in quintiles according to their level of equivalent income. The equivalent income is the amount of income received by individuals of a given household depending on the level of total household income and the number of members. However, as noted in the references of the OECD, the number of members of a household does not provide, by itself, the information needed to build an equivalent income, in such a way that they have to consider the characteristics of age of the members. Thus, the equivalent scale proposed by the OECD to determine the consumer units considering the following: the head of the household is equal to one unit of consumption, any additional adult (person over 25 years or between 16 and 25 years and works) 0.7 consumption units of generic consumption, while household children (under 16 years or between 16 and 24 who do not work) represent only 0.3 units of consumption of an adult. Accordingly, by subtracting the basis of this information as sums, a total of consumption units were built by household to finally obtain a level of equivalent disposable income. With this construction, any distributive measure also incorporated the scale economies for all the households captured.

IV.2 Future work and improvements of the calculation

Although the work done may seem very complete, it is certain that within the same process more deficiencies have been identified that undoubtedly affect the quality of the data and which may refer to problems other than those assessed until this point, and to a certain, more complex. Many of the comments below concern the persistence of negative savings once all income data is adjusted so it is about dealing with the search for more complex explanations.

It is of value to say that these considerations are based on the fact that the income was already handled, as thorough as possible, and that the underreport of the ENIGH against NA was solved by assigning as best as possible, to the groups of households that the survey indicates are candidates

to receive them according to the survey. Furthermore, the way in which saving is determined in NA does not let to observe the underlying relationship behind this calculation, the size of income over consumption. This relationship becomes very important when the disaggregated data by sub sectors, groups of households or even considering the households individually is observed. As the underreport of consumption also has to be solved in the confrontation of the macro and micro data, it means, each household also receives a portion of content consumption in NA, always depending on the level of consumption reported in the ENIGH, and the saving of each unit is then determined by their level of consumption and income. It must be said that the dissaving gap is significantly reduced once the data were adjusted, but the negative balance of saving from the first to the fourth quintile continued, and as discussed in section II that is a result a little consistent with economic reality. Based on the above, the analysis of consumption, as well as some other details of the treatment of income, are central to determining the ultimate origin of these results. Thus, the remaining work can be displayed as follows:

- Detailed distribution of current income taxes (D.5): as mentioned in the exposed process applied to the original DNA templates, a part of this concept was distributed on the population that reported income of formal wage labour, which makes them subject to pay income tax on wages and salaries. However, when these data are compared with data from NA, which in turn comes from the administrative records of SAT, it is found that this treatment is insufficient. In addition to the income tax of employees, SAT receives taxes on wealth and rents, and indeed this is an important portion of the total. Because of this, one of the remaining tasks is to refine the allocation of D.5 and award the amount corresponding to those that perceived property income, so as performed in the calculation, the total amount thereof awarded to formal employees. It is important to note that the setting of this concept should be done on the income of the adjusted property income and trying to isolate those that are actually subject of such imputation.
- Evaluation and adjustment of consumption to evaluate possible under valuations of income of NA: it is clear that the present proposal focuses on the reconstruction of incomes of the ENIGH to reach the levels in NA. This is because from the beginning income was identified as the most unrepresentative element in the survey, however, comparison of the data and determining the saving apparently indicate that consumption behaves erratically equally within the same, hence when compared with income (even adjusted) the result is a negative adjusted saving. Because of this, the next step is the evaluation and determination of a methodology of adjustment consistent with consumption, but also consistent with income. However, it is important to rescue the theoretical elements that may be useful in this topic, so it has to be an adjustment that considers the problems behind the compilation of income and consumption in NA.
- Retaking all data that are superior in the ENIGH and reconstructing the income is a central element, its application is severely restricted within the OECD methodology. As mentioned in the performance assessment of income, it is imperative to identify those data where the ENIGH outperforms NA, and if the behavior of these data is consistent, then it is information that is most likely underestimated in NA. Omitting this consideration can lead

to a bigger underreport of household income, even at individual level and against the consumption reported in the same survey, the bigger the gap is made if considers the adjusted consumption at NA level.

- Evaluating the groups of households with deficit saving and their relationship with variables of income or consumption that may explain this deficit, in line with the above, it is necessary to maintain a critical perspective on both sources, disclaimed those variables whose capture may be wrong in one or another data source. Thus, a way to search possible causes of the deficit households is identifying the variables that have problems with in NA, and evaluating its behavior in its confrontation with the ENIGH.

IV.3 Need for calculation under the recommendation 9 of G-20 Data Gap´s Initiative: Interest of calculation at country level

As part of the development work conducted by the OECD and raised from the first report of the "Commission on the Measurement of Economic Performance and Social Progress", the Initiative for information gaps was generated in 2009. Within this initiative is the recommendation #16 distributional information, indicating that statistical experts should look for the compilation of distributional information through aggregate figures. In the field of measurement of Households, this recommendation becomes the need to identify the units and their characterizations, their welfare and the relationship that these schemes saved with the overall scheme of the NA.

In a specific way, the work of construction of the DNA templates was carried out in the framework of the Expert Group on Disparities in National Accounts Framework or group of macro data (EG DNA). This group resulted in two working documents: 1) Distributional Measurements between groups of households in the Framework of National Accounts, and 2) A Comparison of Income, Consumption and Wealth of Households between Micro sources and aggregates of NA through different countries. The main objective of this expert group is to bring micro statistics on Households, census and administrative records to the macro data of NA. Specifically the household accounts by institutional sector, assuming and considering proposals to solve the problem of conceptual and numerical disparities. These results are evaluated, compared and discussed by the board of the same EGDNA, then to be published as part of the results of the working group. In this sense, the work done covers a significant part of the total course of the process that would involve generating openings of the Household Sector, based on the micro data from household surveys (mainly ENIGH). But reaching income levels of NA, as for the successful completion of the templates, it was required an exhaustive methodological research on the nature and characteristics of the micro data, an exercise of conceptual alignment, the processing of the data for the grouping in the scheme outlined by the DNA templates, as well the subsequent processing of information to make it reach the levels of NA.

Currently, the second phase of the Data Gaps Initiative is starting and its recommendation# 9 Distributional Information households, endorses and incorporates the theme of wealth within its

objectives. What is concluded is that in a short-and medium term the issue of distributional measures will remain subject to statistical work in the international environment, and therefore task of the statistical offices that have responsibility to do this work.

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Statistical Annex: Index of Tables and Graphs

Statistical annex

Table 1: Detailed breakdown Current Income of the ENIGH-new construction

1. Current Income= labour income+ property income+ transfers + estimate of rental housing+ other income arising from work
1.1 Labour Income
1.1.1 Compensation by subordinate work
a) Salaries, Wages, stipend, Piecework
b) Extra hours
c) Commissions and tips
d) Bonus and profit-sharing
e) Other monetary compensation
f) Compensation in kind
1.1.2 Income by independent work
a) Industrial businesses and maquila
b) Commercial business
c) Business by provision of services
d) Agricultural business
e) Breeding business, exploitation and animal products
f) Business collection and reproduction of forest products and felling of trees
g) Business fishing, hunting and animal trapping
1.1.3 Income from other works
1.2 Property income
1.2.1 Income from cooperatives, corporations and enterprises that function as corporations
1.2.2 Leasing of tangible and financial assets
1.3 Transfers
1.3.1 Retirement, pensions and compensation for work accidents, redundancy and voluntary retirement
1.3.2 Scholarships from the government and institutions
1.3.3 Gratuities of Money from institutions and other households
1.3.4 Income from other countries
1.3.5 Benefits from governmental programs
1.3.6 Transfers in kind from other households
1.3.7 Transfers in kind of institutions
1.4 Estimate of rental housing
1.5 Other current income

Source: INEGI (2009) ENIGH 2008 Nueva Construction. Income and Expenditure in Households

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Table 2: Conceptual alignment DNA-ENIGH

Concepts DNA-CN		Concepts ENIGH new construction
B2	Operating surplus	
	Owner occupied dwellings	Imputed rent of homeownership
	Leasing of dwellings	Rental houses, buildings, local and others within and outside of the country
B3	Mixed income	
	Own account production	Own consumption from the table Non-monetary expenditures
	Underground production	Rental brand names, patents and copyright
	Mixed income excluding underground and own account production	Income by own business with industrial activity Income by own business with commercial activity Income by service provider business Income by business with agricultural activity Income by a breeding and exploitation of animals business Income by a collection, reforestation and felling of trees business Income by a fishing, hunting and animal trapping business Sales of vehicles, machinery and secondhand electronic devices or used in the home business Negative balances in the home business
D1R	Compensation of employees	
D11R	Wages and salaries	Wages and salaries by subordinate work and by subordinate work and enterprises that function as corporations Other incomes of work in Cooperatives and enterprises that function as corporations Monetary incomes of subordinate secondary work Profit-sharing and bonus Total of income from other works Income by work of persons under 12 years old Income by non-specific work Compensation in kind
D121R	Employers'' actual social contributions (*counterpart in D611)*	Imputations made from labour benefits reported in the ENIGH
D122R	Employers'' imputed social contributions (*counterpart in D612*)	Compensation by accidents, redundancy and voluntary retirement (imputed contributions)

Table 2: Conceptual alignment DNA-ENIGH, continue

D4R-D4P-FISIM	Net property income received	
D41'R	Interest (not adjusted for FISIM)	Income from investments from savings accounts and loans to third parties
		Other property incomes not considered previously
D42R	Distributed income of corporations	Income by share performance in enterprises where they did not work (family) and bonds performance, Earnings and profits from cooperatives and enterprise that function like corporations
D44R	Investment income disbursements	
D441R	Investment income attributable to insurance policy holders	
D441AR	Property income received attributed to non-life insurance policy holders (*counterpart in current transfers*)	
D441BR	Property income received attributed to life insurance policy holders	
D442R	Investment income payable on pension entitlements (*counterpart in current transfers*)	
D443R	Investment income attributable to collective investment funds share holders	Withdrawn investments, savings, Loan Club, Bank savings, etc.
D45R	Rent	Renting land inside and outside the country and not specified rent or lease
-D41'P	Interest (not adjusted for FISIM)	Interest payment by loans received
-D45P	Rent	

Table 2: Conceptual alignment DNA-ENIGH, continue

-D61P	Net social contributions	
-D611P	Employers'' actual social contributions (*see corresponding item above*)	
-D612P	Employers' imputed social contributions (*see corresponding item above*)	
-D613P+D614P	Households' social contributions (actual and supplements) (*including D442 (see above)*)	
D62R	Social benefits other than STiKs	Retirement and pensions originated inside and outside the country and not specified retirements
D7R-D7P	Other current transfers (net)	
D72R-D71P	Net non-life insurance claims minus premiums	
-D71P	Non-life insurance premiums (including D441AR (see above))	Expenses for a car insurance, against fires, risks and damage for the household, education and a not capitalized life insurance
D72R	Non-life insurance claims	Compensation received from a third-party risk insurance
D75R	Net miscellaneous current transfers received - paid	
D75R	Miscellaneous current transfers received	
	D.752 Remittances	Incomes from other countries
	D.759 Miscellaneous current transfers (charged)	Transfers in kind from households and from ISFLH
		Scholarship from the government or from ISFLSH, Monetary donations from ISFLSH, Benefits from the program opportunities, Procampo and “Adultos Mayores”, Benefits from other social programs, Other incomes not considered previously.

Source: Own preparation with data from ENIGH and DNA templates.

Table 3: Percentage of GDP per capita to social transfers in kind of public health

Age ranges of individuals with access to public health services	Percentage of GDP per capita
0-4	1.366%
5-9	0.854%
10-14	0.768%
15-19	0.854%
20-24	1.024%
25-29	1.110%
30-34	1.280%
35-39	1.366%
40-44	1.451%
45-49	1.537%
50-54	1.793%
55-59	2.134%
60-64	2.561%
65-69	3.244%
70-74	4.012%
75-79	4.866%
80-84	5.634%
85-89	6.231%
90-94	6.317%
95+	5.634%

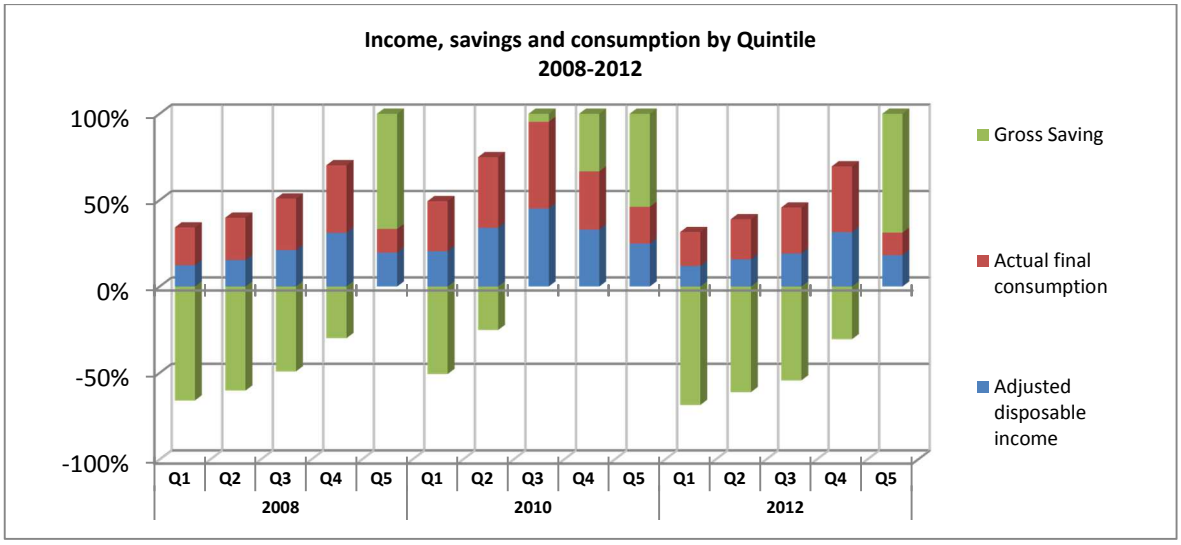
Source: OECD. (2013). *Framework for Statistics on the Distribution of Household Income, Consumption and Wealth.* Taken from OECD Publishing : http://dx.doi.org/10.1787/9789264194830-e

Table 4: Household classification by type of family

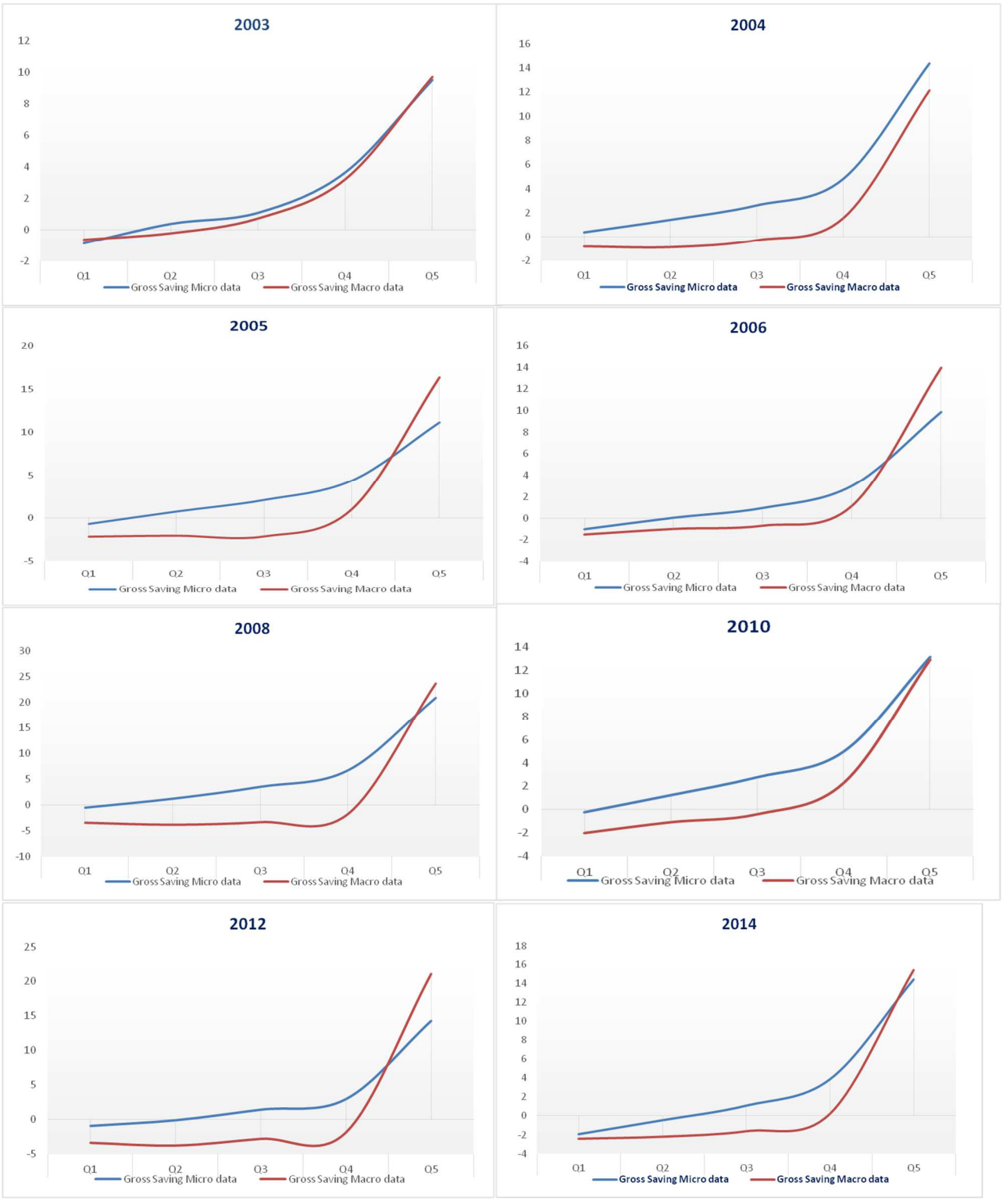
Group	Household members	Composition
A	1	Younger than 65 years
B	1	Over 65 years
C	More than1	Adult plus child
D	2	Two adults younger than 65
E	2	Two adult where al least one is 65 years old or more
F	At the most 2	Two adult with at most 3 children
G	At least 5	Two adults with at least 3 children
H	-	Other

Source: OECD. (2013). *Framework for Statistics on the Distribution of Household Income, Consumption and Wealth.* Taken from OECD Publishing : http://dx.doi.org/10.1787/9789264194830-e

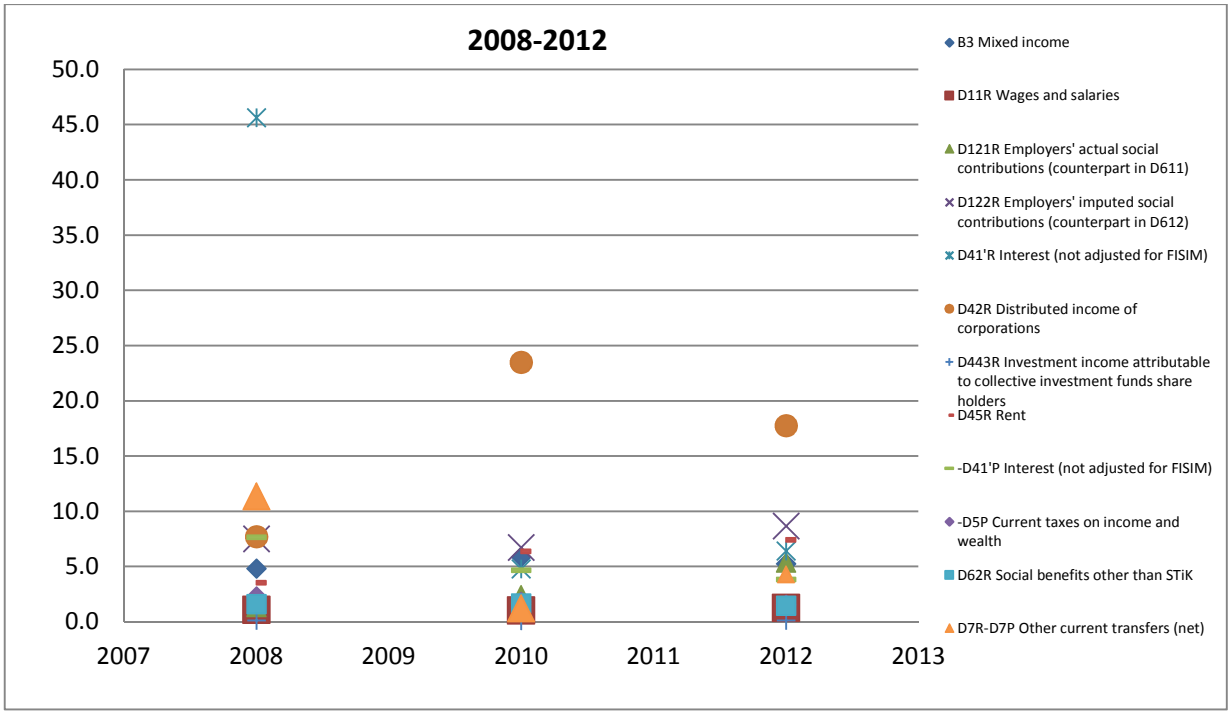
Graph 1: Main results of the DNA exercise: Distribution of Disposable Income, Consumption and Savings by quintiles

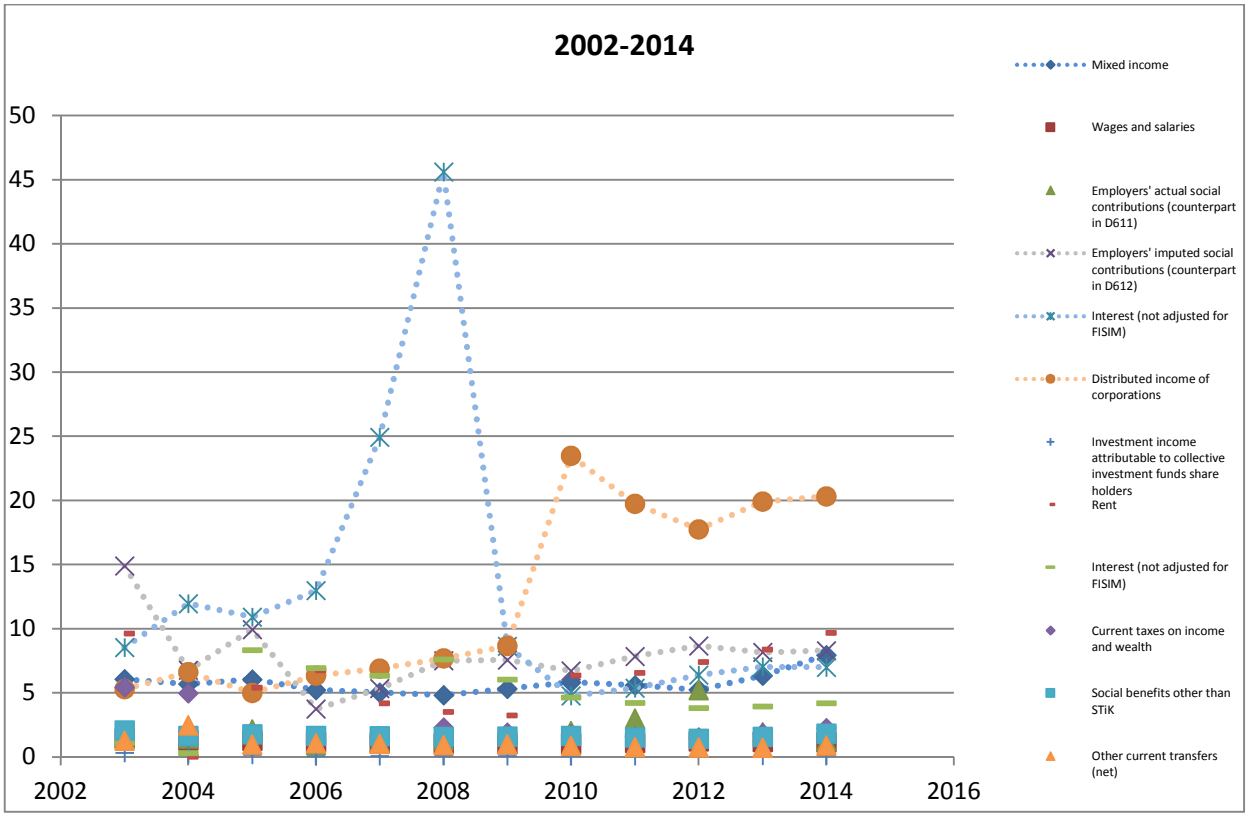


Graph 2: Ratio of Saving to Disposable Income, all series

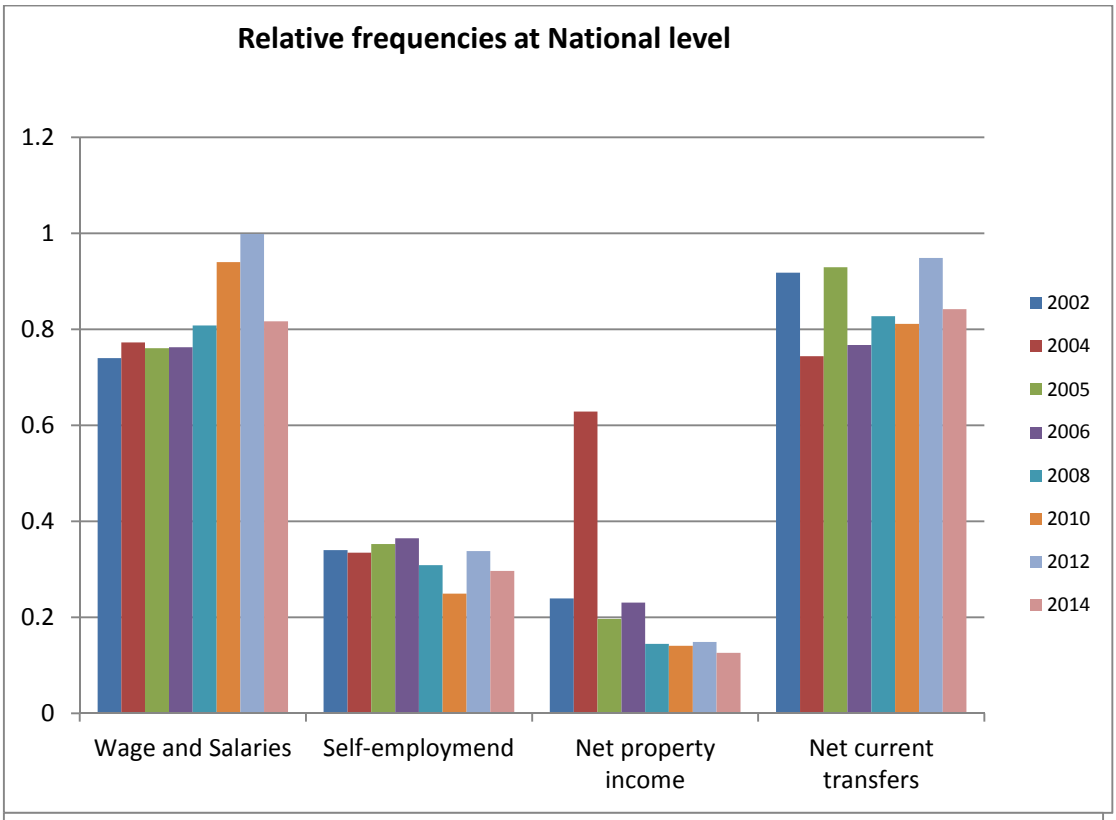


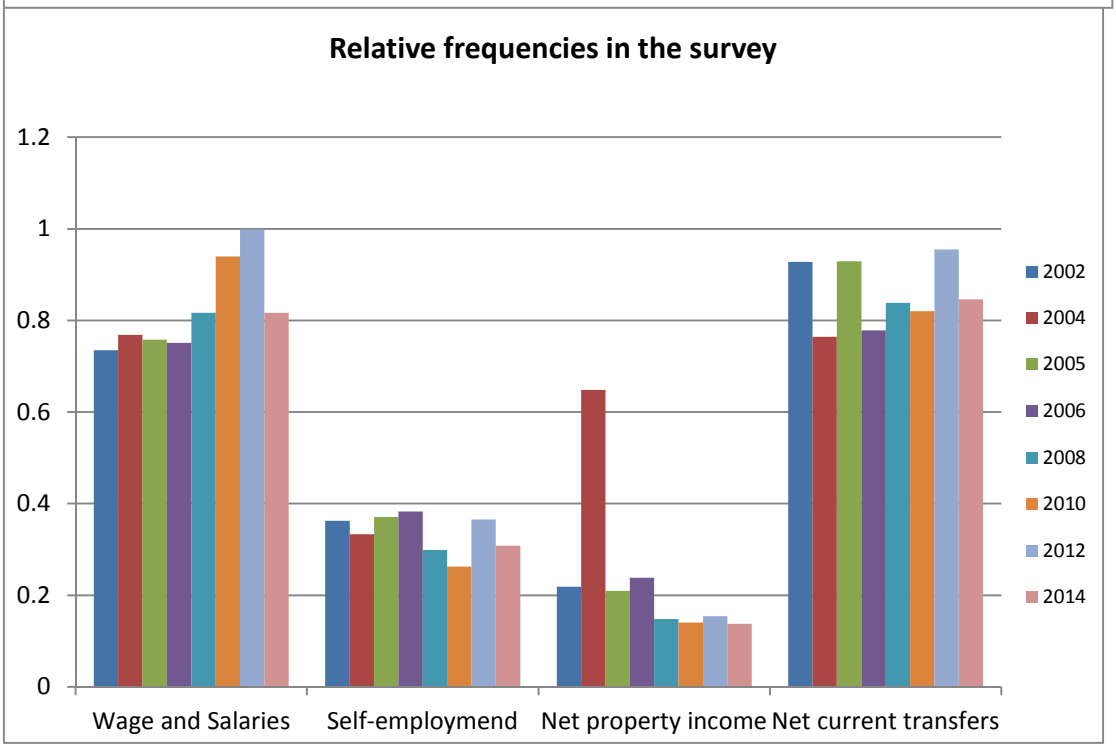
Graph 3: Coverage ratios ENIGH-CN per transaction for the series 2008-2012 and 2002-2014



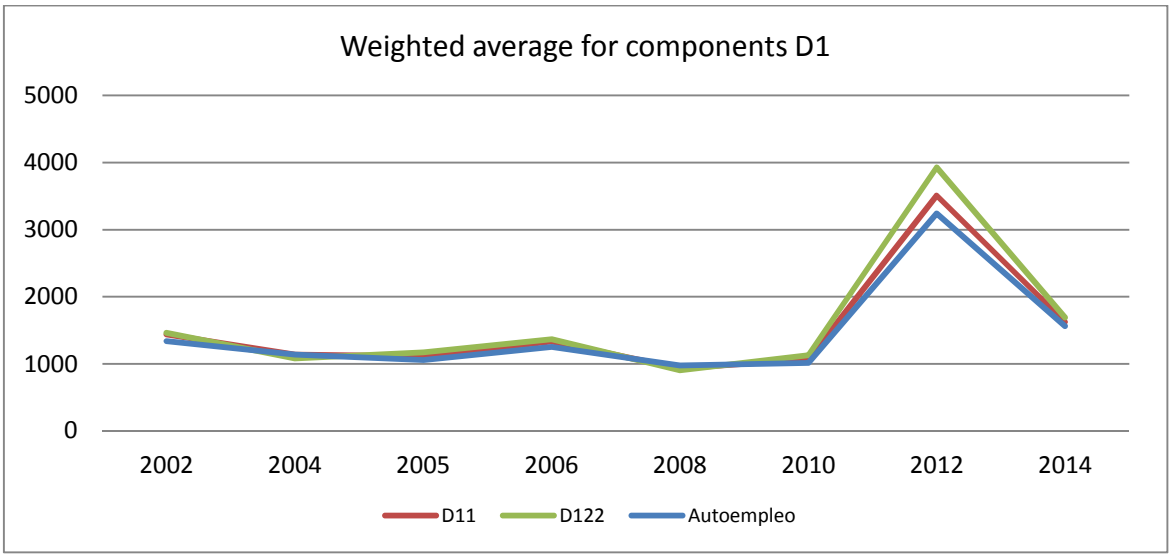


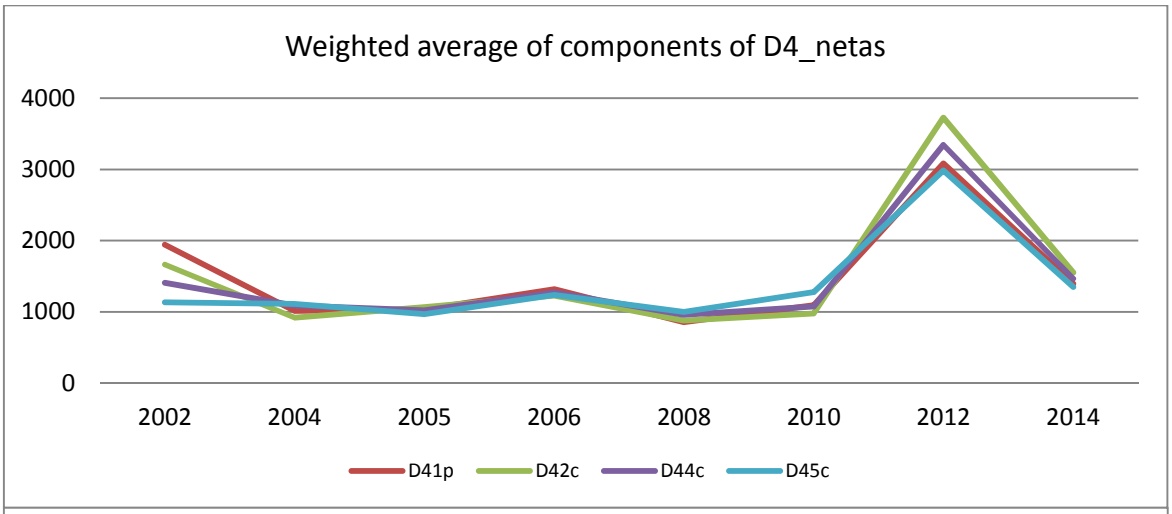
Graph 4: Relative frequencies by Income group

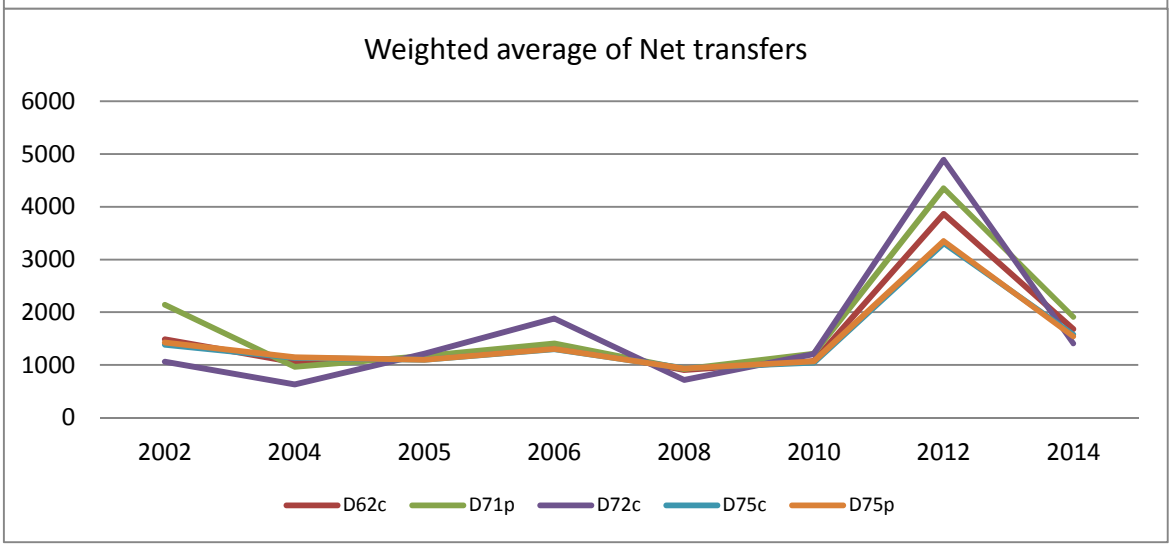




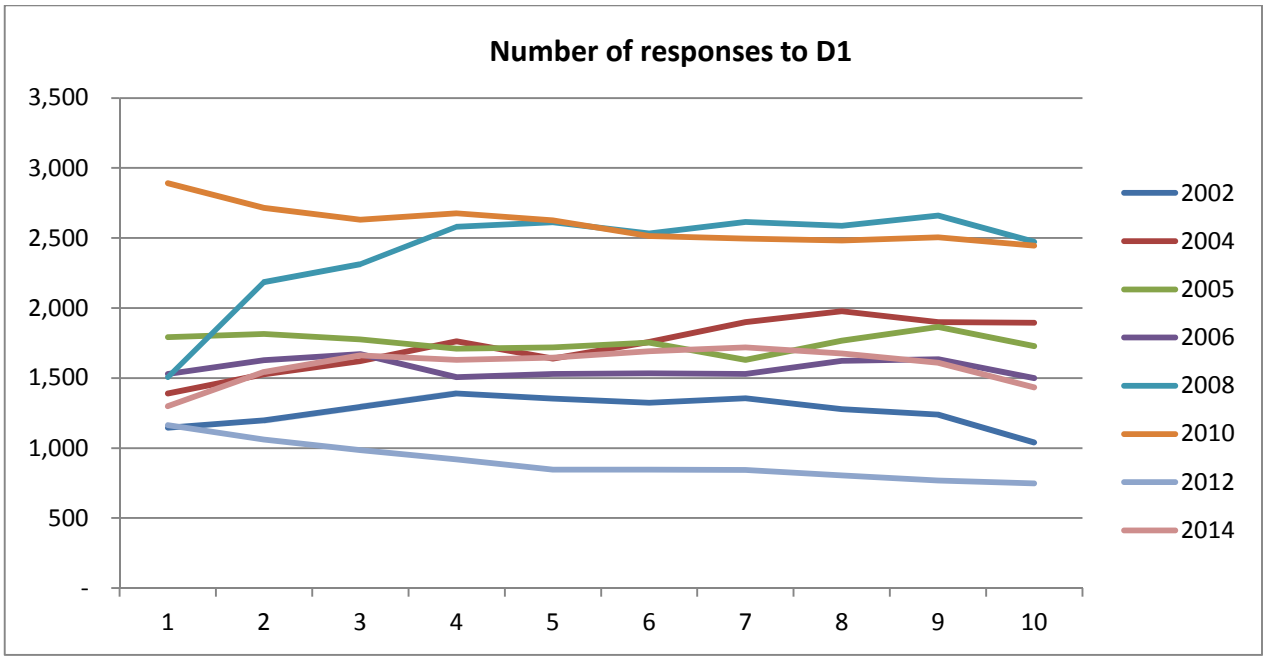
Graph 5: Weighting average per transaction

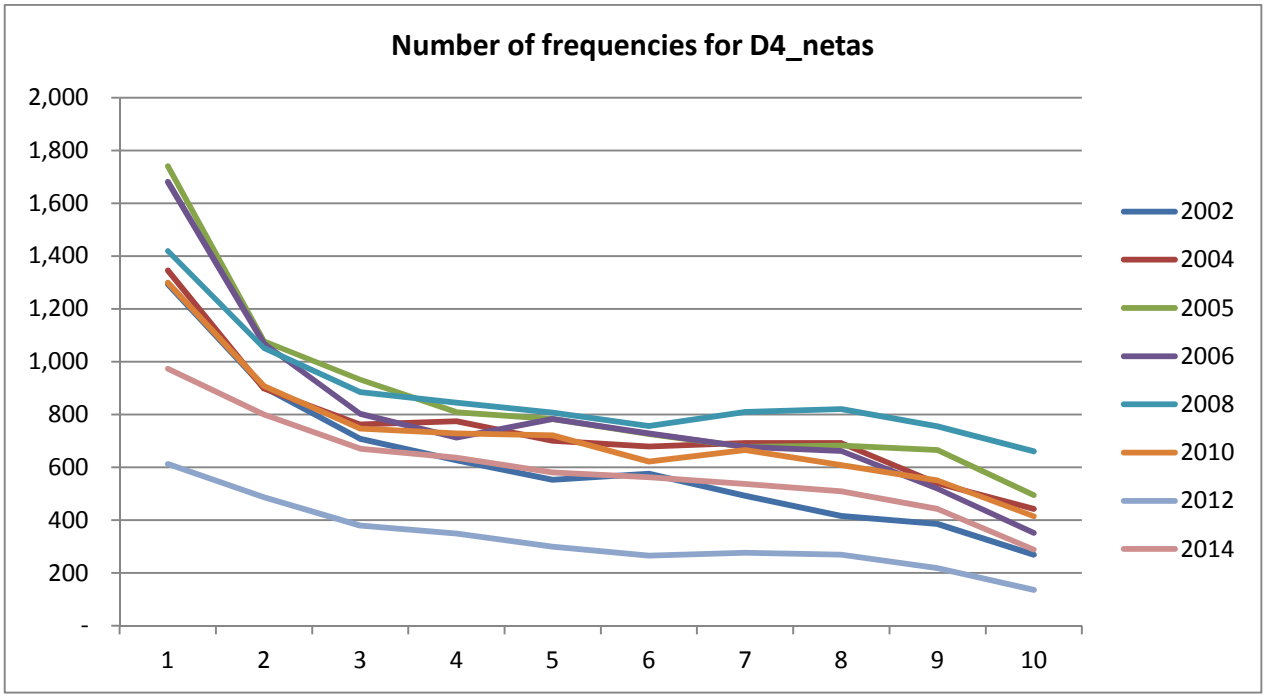


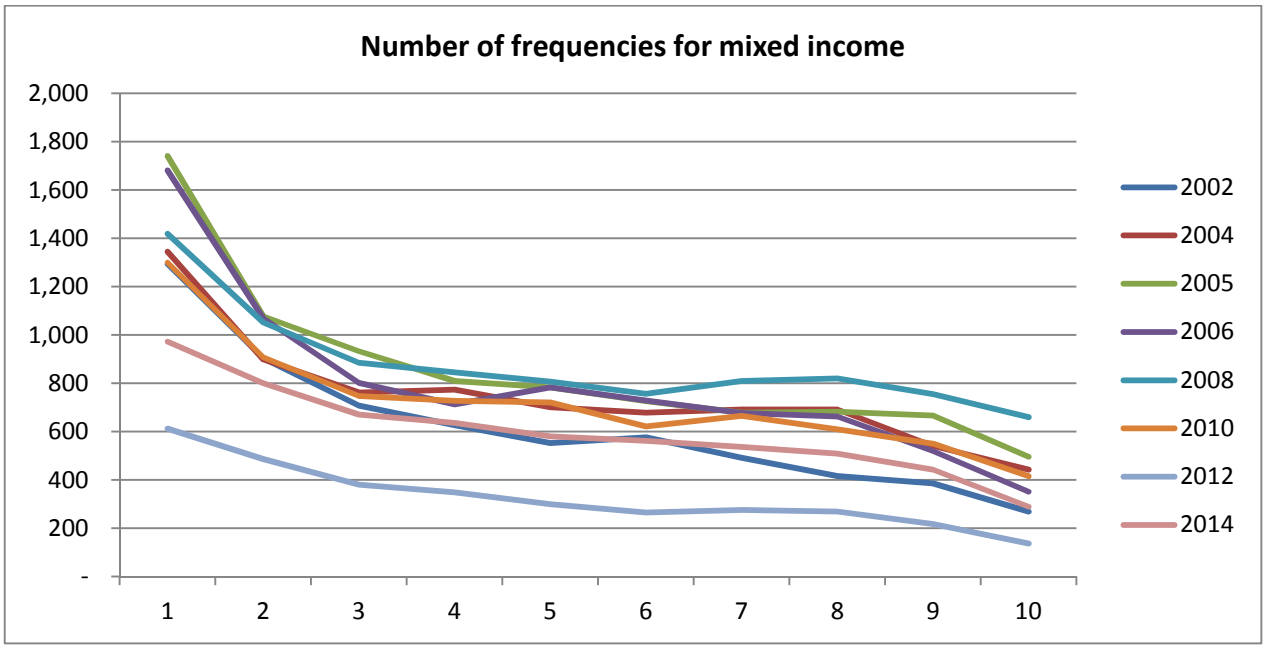


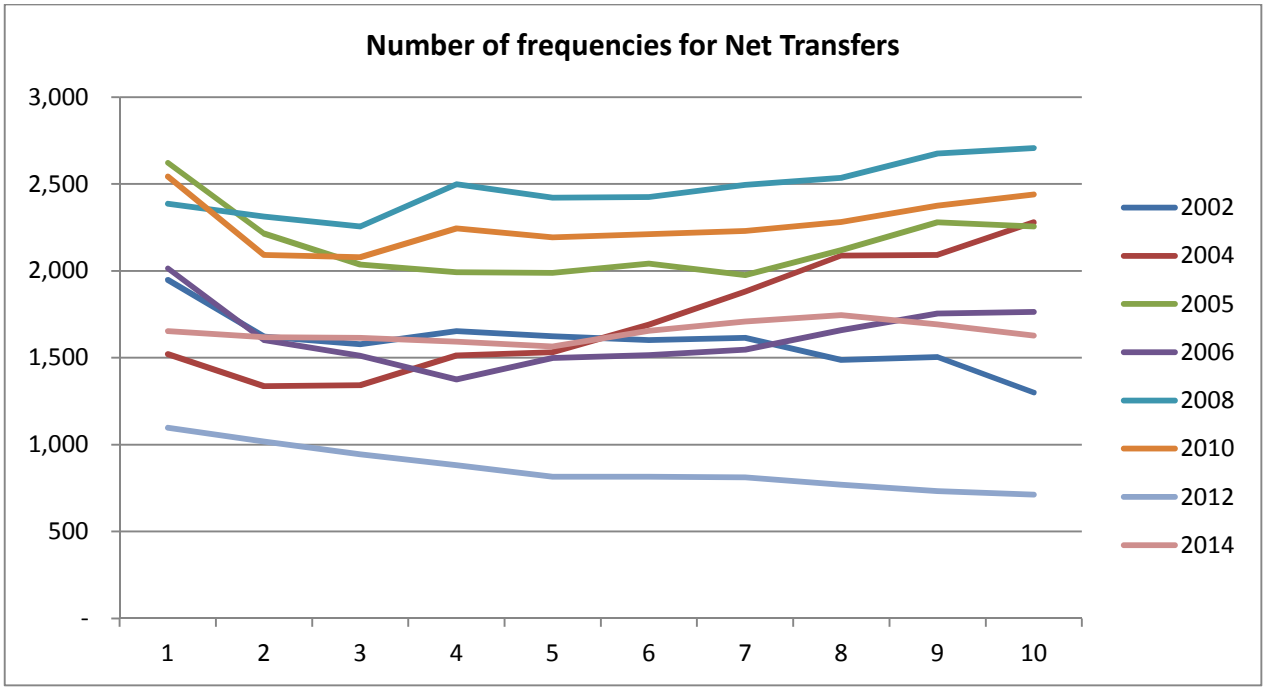


Graph 6: Sampling frequency by type of income and deciles



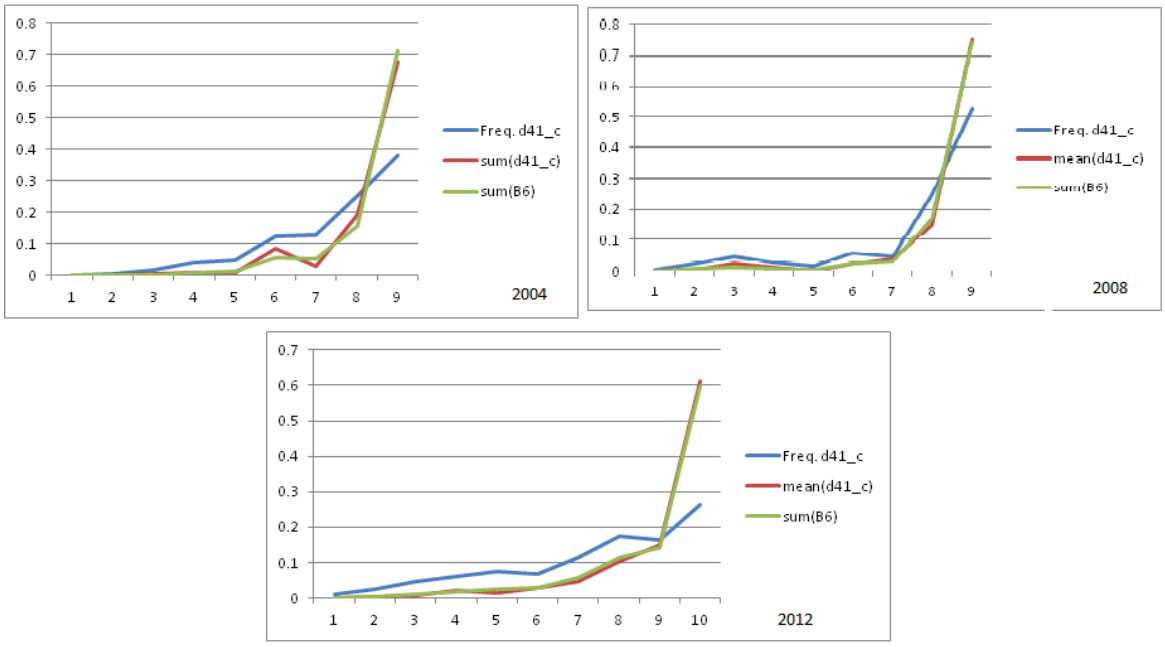



Number of frequencies for mixed income
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
-
1
2
3
4
5
6
7
8
9
10
2002
2004
2005
2006
2008
2010
2012
2014

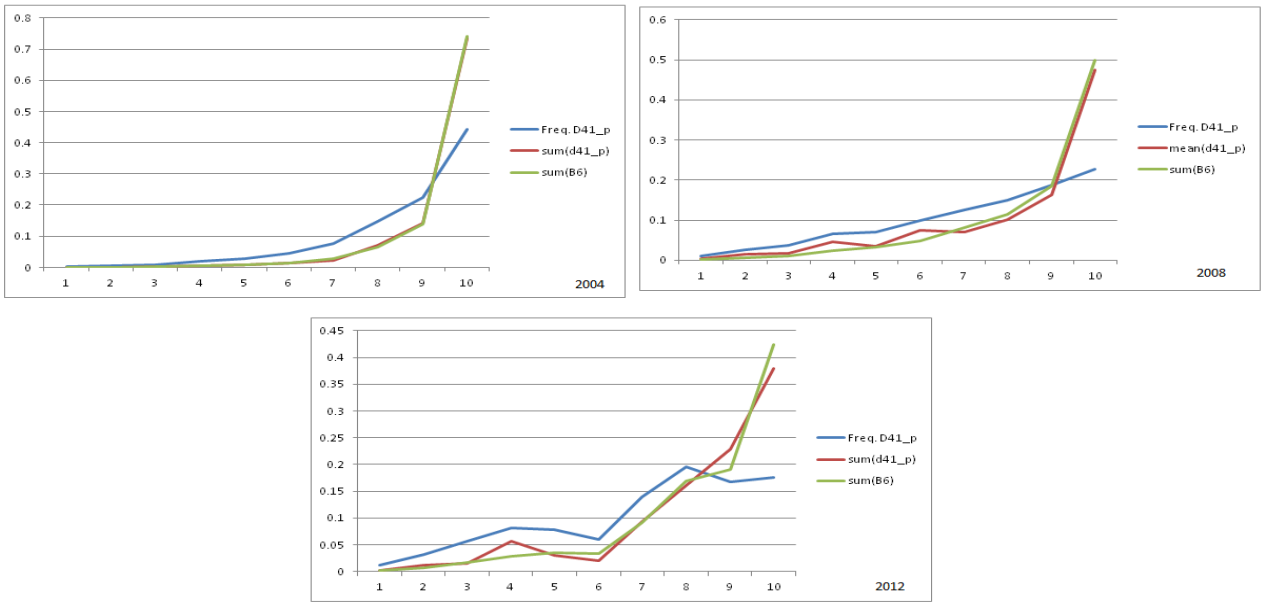

Number of frequencies for Net Transfers
3,000
2,500
2,000
1,500
1,000
500
-
1
2
3
4
5
6
7
8
9
10
2002
2004
2005
2006
2008
2010
2012
2014

Graph 7. Frequency behavior of income and property income by decile

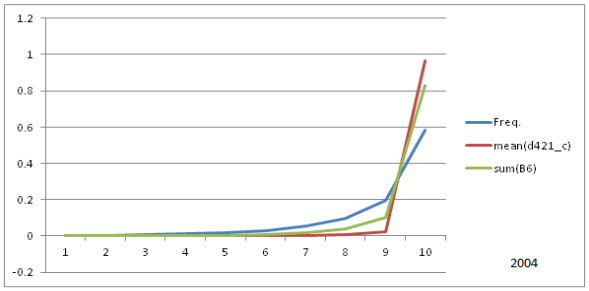
Interest received (D41_c)

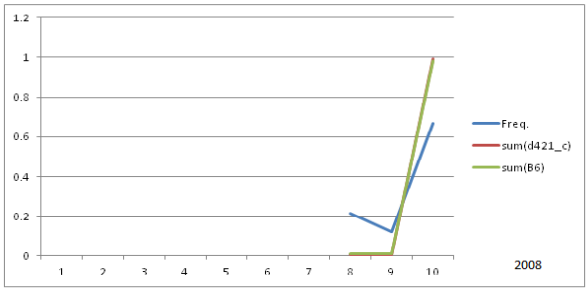


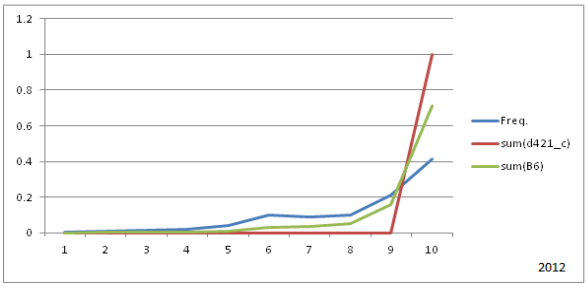
Interest paid (D41_p)



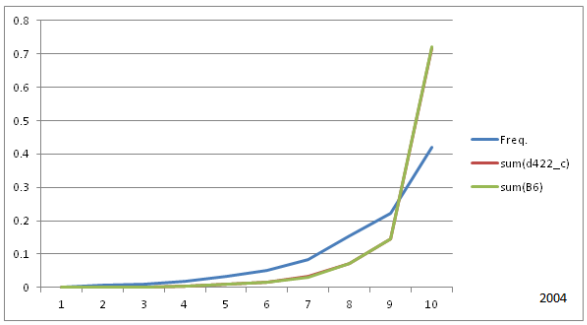
Dividend (D.421)

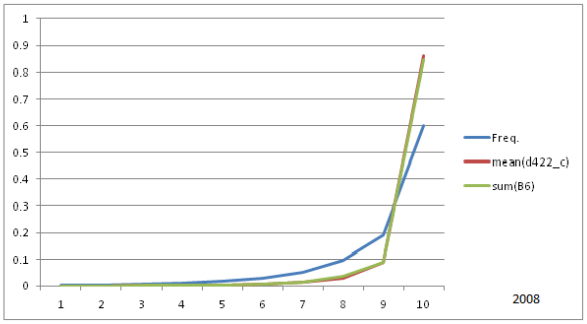


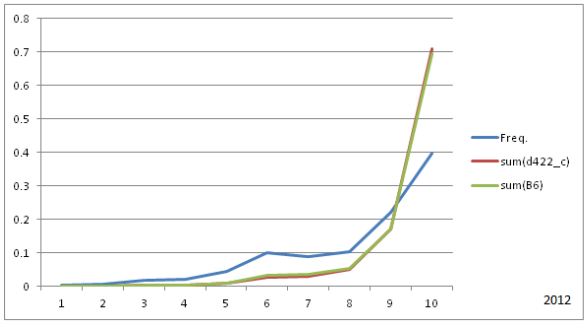




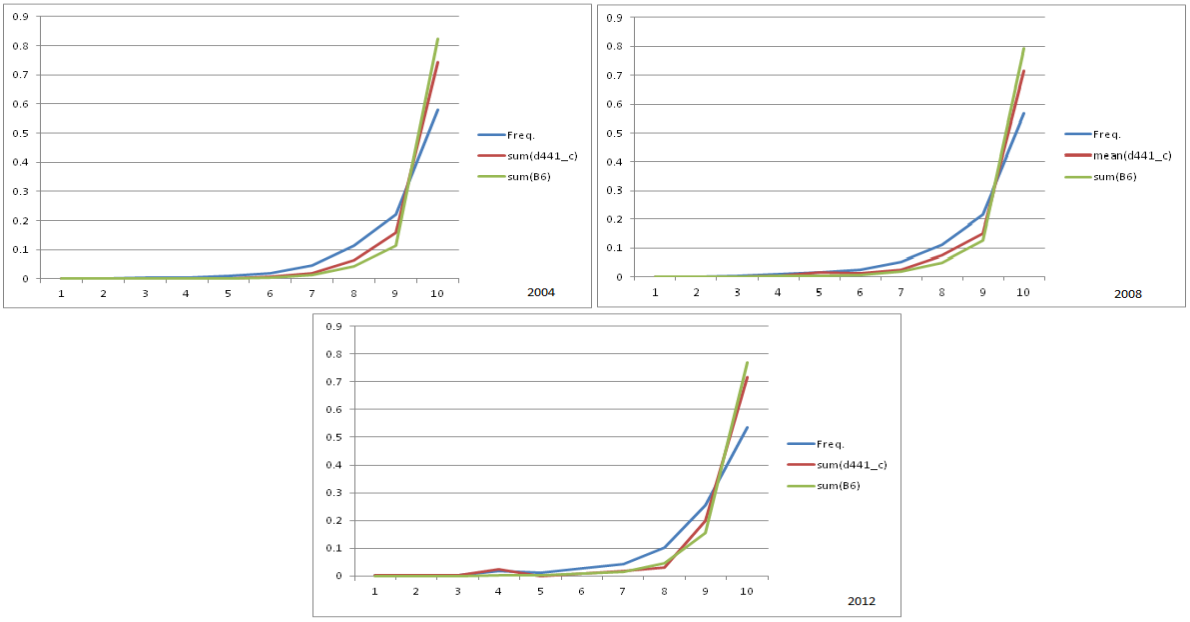
Withdrawal of quasi-corporations (D.422)



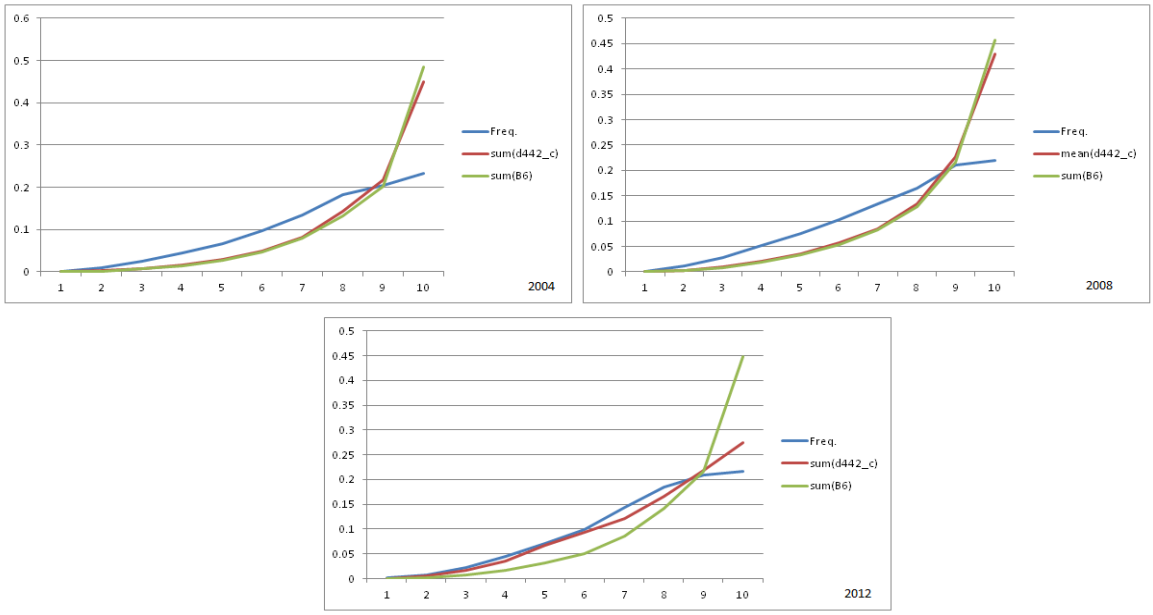




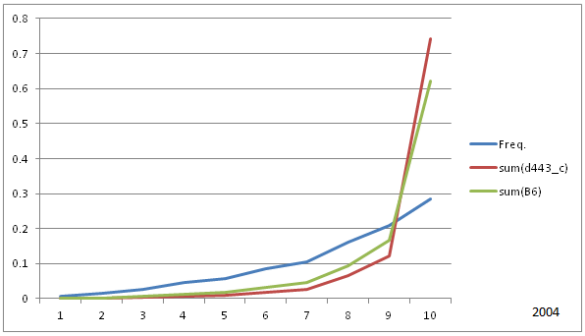
Investment income payable on pension entitlements (D.441)

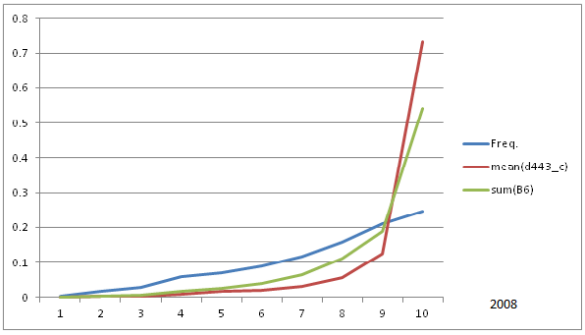


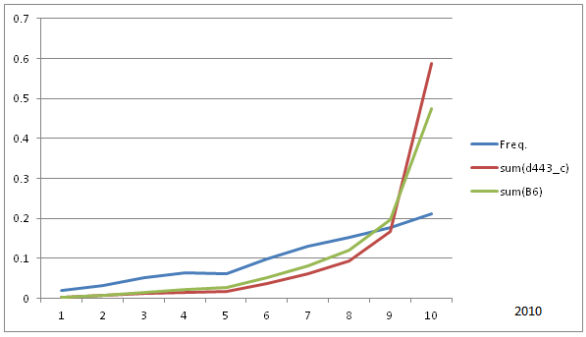
Investment income payable on pension entitlements (D.442)



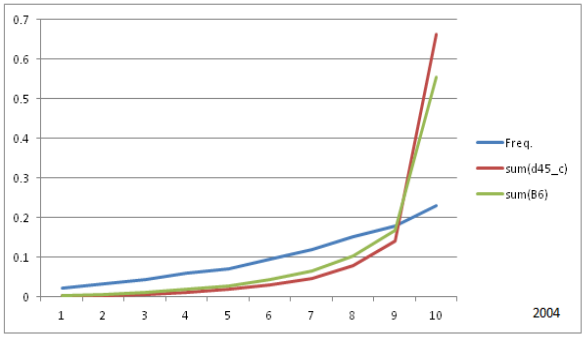
Investment income attributable to shareholders of collective investment funds (D.443)

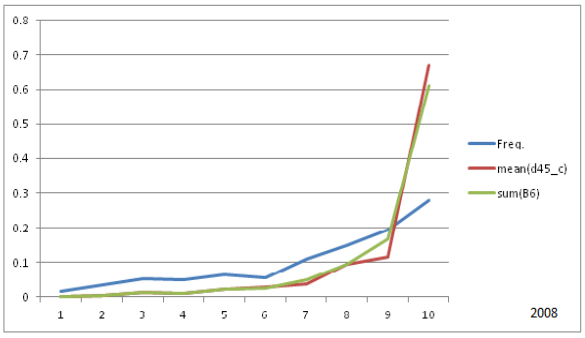






Rent on land (D.45)





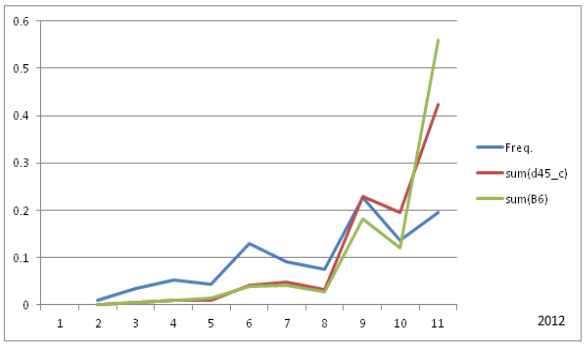
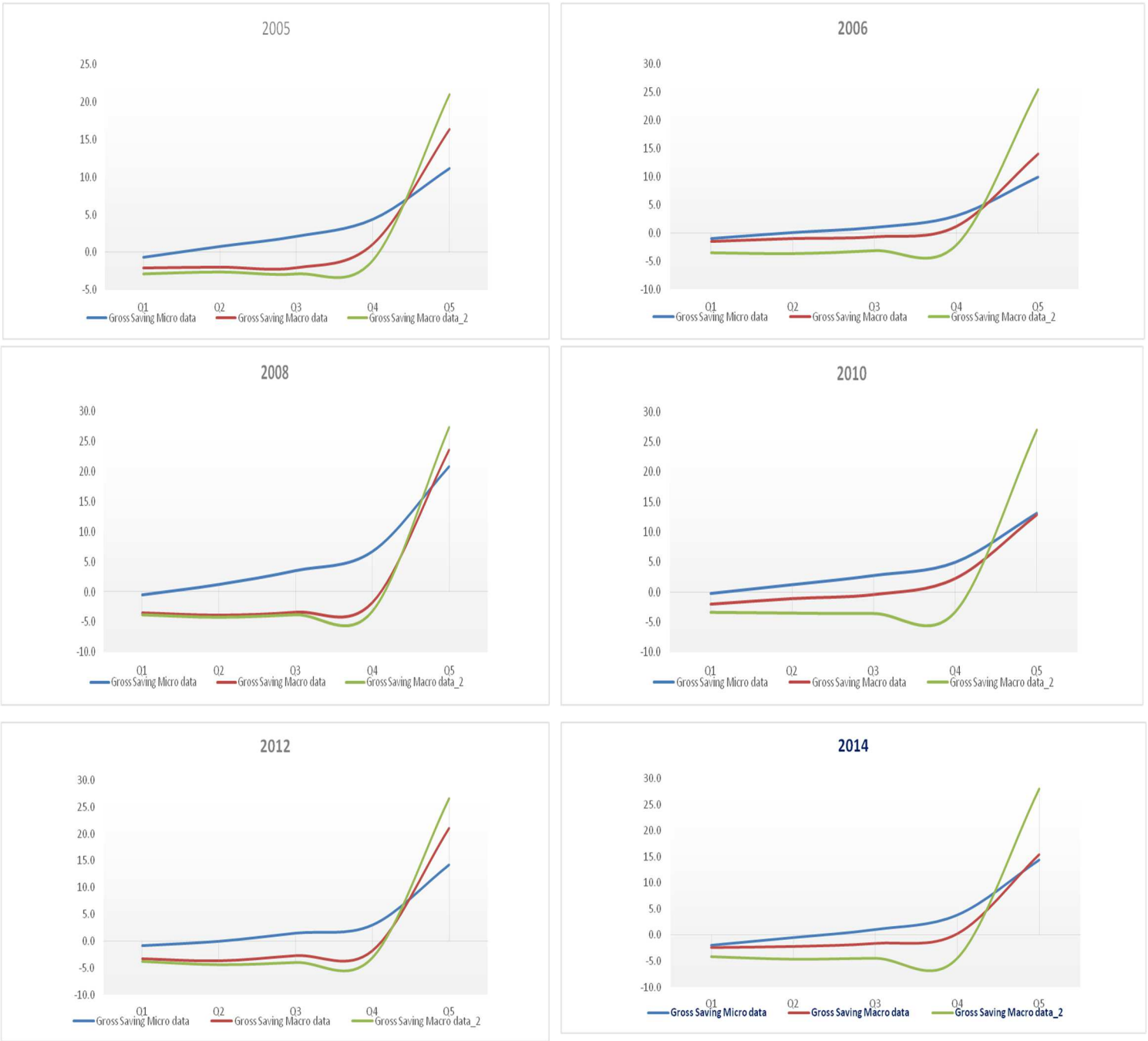
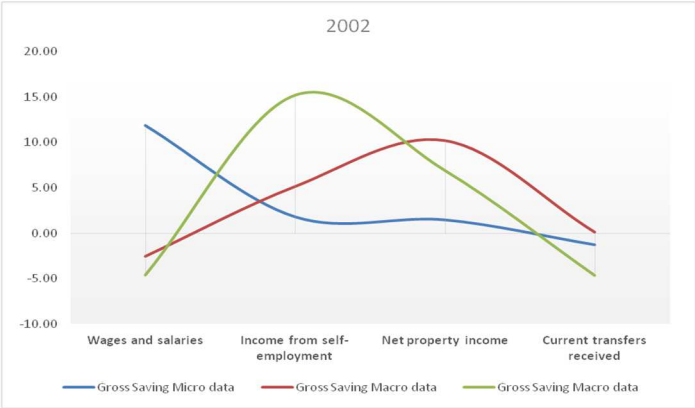


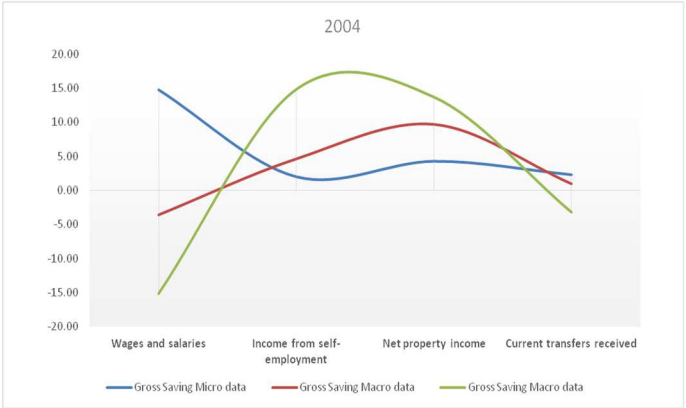
Table 5: Breakdown of mixed income

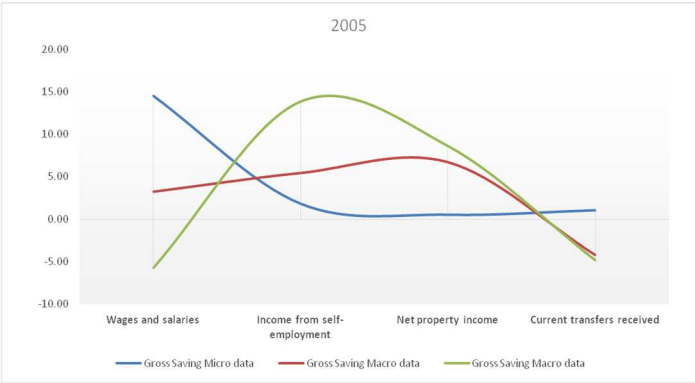
Productive sector / Year	2003		2004		2005		2006		2008		2010		2012		2014	
1 Industrial	39%	656,390	39%	653,072	39%	716,176	38%	753,596	35%	799,915	39%	1,082,468	39%	1,194,832	40%	1,339,962
2 Commercial	15%	250,927	16%	268,590	17%	311,921	18%	364,958	24%	541,058	17%	463,311	16%	491,378	15%	510,316
3 Services	24%	399,685	23%	386,560	23%	426,080	23%	454,940	21%	467,948	23%	637,966	22%	678,364	24%	786,800
4 Agricultural activities	13%	218,901	13%	220,856	11%	206,788	12%	247,464	13%	306,599	14%	401,965	15%	466,929	13%	429,908
5 Breeding and exploitation activities ...	7%	113,378	7%	114,418	7%	125,823	7%	129,314	6%	126,075	6%	170,872	6%	192,979	7%	238,457
6 Forestry activities	1%	24,875	1%	21,823	1%	22,792	1%	23,860	1%	23,757	1%	31,480	1%	31,040	1%	33,646
7 Hunting and fishing activities	1%	9,066	0%	7,904	0%	8,572	0%	8,611	0%	8,063	0%	10,355	0%	9,893	0%	7,546

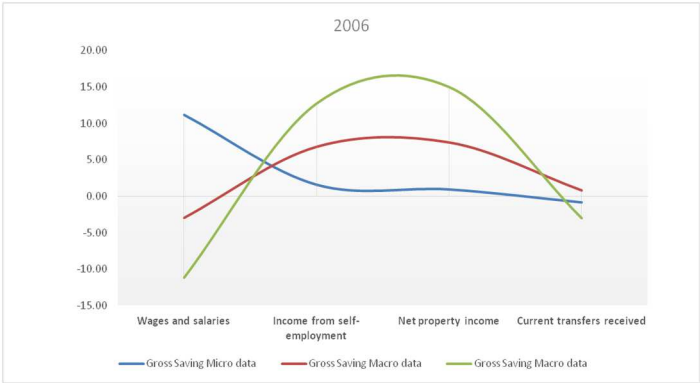
Graph 8. Savings-income ratio by quintile and main source of income

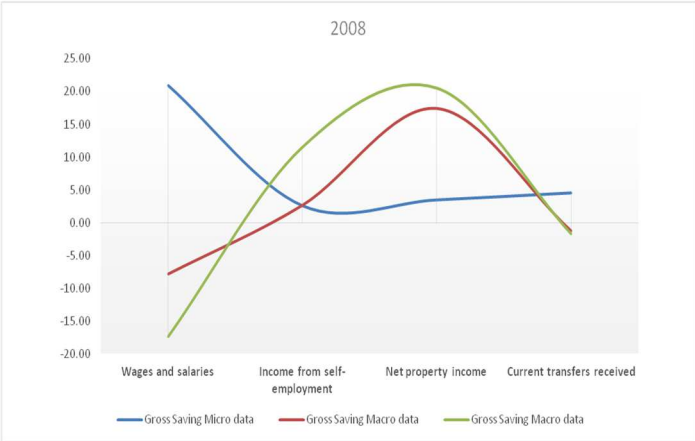


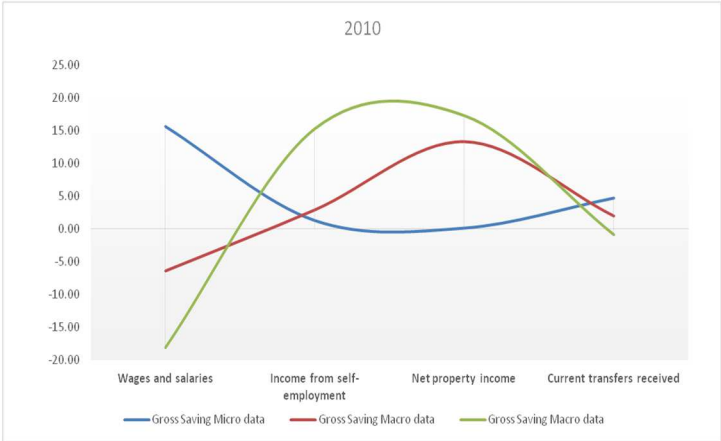

2002
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data

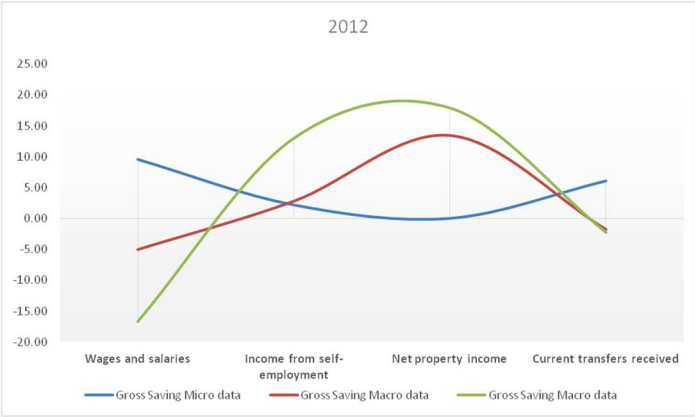

2004
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data

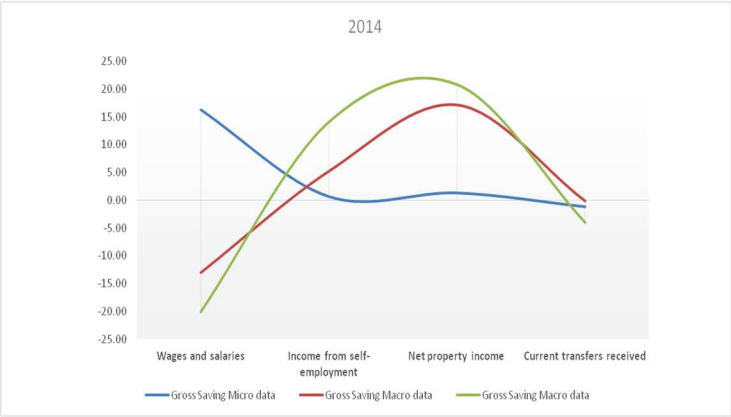

2005
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data


2006
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data


2008
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data


2010
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data


2012
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data


2014
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
Wages and salaries
Income from self-employment
Net property income
Current transfers received
Gross Saving Micro data
Gross Saving Macro data
Gross Saving Macro data

Graph 9. Gini and Theil index by decil and main source of income