A Pilot SAM for Italy: Methodology and Results

F. Battellini, A. Coli, F. Tartamella

ISTAT, Italy

Introduction

SAMs are an important analysis tool, not only as a coherent accounting structure for National Accounts data, but also as a base for economic modelling since "the structure of each SAM already reflects the relationships represented in an economy-wide model" (SNA93, 20.130).

The distinctive feature of a SAM, which makes it an attractive tool also from an economic point of view, is the fact that the whole economic system is represented, with its complexity and with its interrelations. Social Accounting Matrices were in fact elaborated as a tool to improve economic analysis, before than as an accounting apparatus.

The traditional macro economic aggregates were able to measure the whole economic growth which followed the Second World War, but they were not able to capture the inequalities in the change of living conditions. SAMs were conceived as a distributive analysis tool to investigate how economic aggregates growth is distributed among institutions and especially within families. In fact, SAM analysis allows linking the primary to the secondary distribution of income, so that it is possible to connect the degree of household income inequality (secondary income distribution) to value added generation (primary income distribution). The full economic cycle is shown in a matrix format: national accounts are therefore displayed in a way that easily allows for modelling and analysis of transmission mechanism.

Building a SAM is not trivial since the accounts (in particular those referred to primary and secondary income distribution) have to be further subdivided into subcategories according to the socio-economic aspects under investigation. This has to be done adopting the same definitions, starting from the same classifications and following, as far as possible, the same methodology used to build national accounts. Istat has started a project for the compilation of a labour oriented SAM in the context of an international working group[1]. This group identified gender and education level as the key variables which, in addition to the traditional ones of national accounts (such as industries and institutional sectors), are more suited to study the labour market. This detail in the analysis shows how the worker's characteristics both the ones due to individual choices

1. Leadership Group on Social Accounting Matrices. The group is coordinated by the Dutch Statistical office. Its aim is the drafting of a handbook for the compilation of SAMs and the construction of a pilot SAM for each participating country: Belgium, Finland, Greece, Italy, Netherlands, Norway, Portugal, United Kingdom.

(such as the education level) and those predetermined (as gender) are linked to the productive structure (analysed by industry) and influence the remuneration of labour.

Factor remuneration is the crucial linking pin between industries and institutional sectors. Through it, industries pay institutional sectors for having supplied factors in the production process. In national accounts (NA) this linkage is not completely elaborated. In fact, in the standard accounts, the generation of income account plays the role of an intermediate account mainly "serving to derive surplus/mixed income as balancing item" (see SNA93 § 20.49). Standard national accounts do not provide detailed information on the quality of factors employed in the production process. Nor it is possible to know what kind of household is endowed with specific types of factors. In short, the accounts do not clearly show the interrelationships between production units (local kinds of activity units, LKAUs for short) and institutional units.

SAMs overcome this shortcoming by deepening the analysis of the income distribution process. Namely, a SAM gives details on processes involving households: "The allocation of primary income account of a detailed SAM presents households labour income(s) as a contribution by one or more (self-) employed household members. Among other things, this will indicate to what extent each household group depends on multiple sources of labour income. Apart from this, the transaction categories shown in the distribution and use of income accounts of a SAM are typically about the same as in the central framework" (see SNA93 § 20.56).

Data on labour can be reconciled to the SAM figures through the decomposition of value added categories into volume and price components, namely labour (persons employed, jobs, full time equivalent units (FTEU), hours worked) and earnings (wage rates, mixed income per self-employed). Both volume and price measures are disaggregated according to the SAM socio-demographic criteria.

Labour is the volume component both of the value added cell and the generated income cell. The former (demand side of labour) analyses labour input according to the employing industry *and* the socio-economic characteristic of the worker. The latter (supply side of labour) analyses labour according to the individual characteristics (gender and education level) of the worker *and* the characteristics of his/her household.

In fact, the input of labour underlying the SAM figures can be considered from two different perspectives: on the production side as one of the inputs used to produce GDP; from the income perspective, as a source of income for household. This double reading reflects the main macro-economic identity underlying national accounts according to which GDP is at the same time a measure of output and of income.

The analysis of the labour factor in a SAM format represents a further impulse to the estimation of the input of labour on the basis of national accounts concepts. This allows to enhance the reliability of the macro-economic indicators (such as performance indicators, per capita values) conventionally used by policy makers for economic analysis, time series analysis and international comparisons.

The SAM and the integrated set of labour tables are an example of the so called SESAME (System of Economic and Social Accounting Matrices and Extensions). Here national accounts variables are dis-aggregated according to economic, social and demographic criteria and/or decomposed into volume and price measures.

This paper focus on *the value added cell, i.e.* on the factor remuneration process. The first paragraph is devoted to an overview on the national accounts matrix. Subsequently

we focus on the theoretical aspects of the value added cell and the underlying labour input. The examples presented in these sections are taken from the Europeland SAM[2]. We then describe the Italian method used to estimate the value added matrix and the related labour matrix based on the LEG directives. Finally we present some analysis on the results of the pilot SAM of three countries participating to the group. The analysis is limited to the value added matrix and in particular to employees' figures. Data refer to 1996 for Italy and to 1997 for Belgium and the Netherlands.

An overview on the National Accounts Matrix

A national account matrix (NAM) is the presentation of the national accounts variables in a matrix format. Rows show entries whereas columns record outlays.

The simplest version is the National Accounts Matrix for the whole economy (aggregated NAM). The construction of such a matrix is easy, the only relevant question being the choice of the accounts. The NAM displayed in table 1 includes the accounts suggested by ESA95. Figures are taken from The Europeland SAM (see footnote 2).

We can get more detailed national accounts matrices by subdividing each account according to groups of actors and/or transactions. As a result the NAM cells become matrices and vectors.

The first step towards a detailed NAM is the subdivision of the accounts according to the NA definitions and classifications. This operation is not always straightforward due to the lack of detailed enough data. For example, in the Italian NAM we have to consider an *ad hoc* account for "Taxes and subsides". Besides, it is not possible to separate out the consumption of fixed capital from the operating surplus and the mixed income.

The cells where the income distribution process takes place are the following:

- the value added cell (see table 1 cell 3,2) which transfers value added from the production units to the primary inputs employed in production;
- the generated income cell and the property income cell (see table 1 cells 4,3 and 4,4) which transfer value added from primary inputs to the institutional sectors whom they belong to;
- the current transfer cell (see table 1 cell 5,5) which completes the income distribution process leading to disposable income.

In this paper we focus on *the value added matrix, i.e.* on the passage of primary income from industries to production factors.

2. The European Leadership Group on Social Accounting Matrices has developed a SAM viewer called Europeland SAM. It is an electronic sheet which displays the pilot SAMs of the LEG countries and a SAM based on ESA95 figures. The tables of section 3 are taken from the ESA95 SAM.

Table 1. An aggregated National Accounts Matrix

Euroland SAM figures (see footnote 2)

Account		Goods and services	Production	Generation of income	Allocation of primary income	Secondary distribution of income	Use of income	Capital	Gross fixed capital formation	Financial	RdM (current)	RdM (capital)	Total
	codes	1	2	3	4	5	6	7	8	9	10	11	12
Goods and services	1	TRADE AND TRANSPORT MARGINS 0	INTERMEDIATE CONSUMPTION 1.904				FINAL CONSUMPTION 1.371	CHANGES IN INVENTORIES (1) 38	GROSS FIXED CAPITAL FORMATION 376		EXPORTS OF GOODS AND SERVICES (2) 535		4.225
Production	2	OUTPUT 3.595											3.595
Generation of income	3		NET VALUE ADDED 1.469								COMPENSATION OF EMPLOYEES FROM R.O.W. 6		1.475
Allocation of primary income	4	TAXES ON PRODUCTS LESS SUBSIDIES 133		NET GENERATED INCOME 1.473	PROPERTY INCOME 341						PROPERTY INCOME FROM THE R.O.W. 66		2.013
Secondary distribution of income	5				NET NATIONAL INCOME 1.633	CURRENT TRANSFERS 1.096					CURRENT TRANSFERS FROM THE R.O.W. 10		2.739
Use of income	6					NET DISPOSABLE INCOME 1.604	ADJUSTMENT FOR CHANGE IN NET EQUITY ON PENSION 11				0		1.615
Capital	7						NET SAVING 233	CAPITAL TRANSFERS (3) 62		BORROWING 603		CAPITAL TRANSFERS FROM THE R.O.W. -1	897
Gross fixed capital formation	8		CONSUMPTION OF FIXED CAPITAL 222					NET FIXED CAPITAL FORMATION 154					376
Financial	9							LENDING 641				NET LENDING OF THE R.O.W. -38	603
RdM (current)	10	IMPORTS OF GOODS AND SERVICES (4) 497		COMPENSATION OF EMPLOYEES TO R.O.W. 2	PROPERTY INCOME TO THE R.O.W. 39	CURRENT TRANSFERS TO THE R.O.W. 39	0						577
RdM (capital)	11							CAPITAL TRANSFERS TO THE R.O.W. 3			-41		-39
Total	12	4.225	3.595	1.475	2.013	2.739	1.615	897	376	603	577	-39	

* The matrix is based on table 8.20 of ESA95.

(1) Including acquisition less disposable of valuables

(2) Including purchases in domestic market by non-residents

(3) Including acquisitions less disposable of non-produced non-financial assets

(4) Including purchases abroad by residents and taxes on products and imports paid to the Rest of the World

Focus on the value added matrix

From a standard to a labour-oriented value added matrix

The *value added cell* is the interception of the production account (column) and the generation of income account (row). This means that a monetary flow moves from production units to kinds of primary inputs (labour, capital).

The sub-matrix in Table 2 is obtained by applying national accounts standard classifications to the NAM Production and Generation of income accounts.

Value added is classified by (net/gross) primary input categories: compensation of employees, mixed income, operating surplus and other taxes and subsidies on production.

Industries are grouped into six branches:

1. Agriculture, hunting, forestry and fishing (NACE-Rev.1 A/B)
2. Mining, quarrying, manufacturing, electricity, gas and water supply (NACE-Rev.1 C/D/E)
3. Construction (NACE-Rev.1 F)
4. Trade, repair, hotels and restaurants etc. (NACE-Rev.1 G/H/I)
5. Financial intermediation, real estate, renting and business activities (NACE-Rev.1 J/K)
6. Public administration and defence, education, health and social work, services n.e.c. (NACE-Rev.1 L/M/N/O/P)

Starting from this sub-matrix we can further detail the compensation of factors. Particularly, LEG members have decided to subdivide compensation of employees by gender and education level. In particular we distinguish workers according to three levels of education attained:

- Lower: this includes primary and lower secondary school (ISCED 1-2)
- Medium: this includes upper or post secondary school (ISCED 3-4)
- Higher: this corresponds to tertiary education (ISCED 5-6)

Table 2- **A standard value added sub-matrix**

Figures from ESA95 SAM (see footnote 2)

Generation of income account	Production account						FISIM	Total
	Agriculture etc.	Mining, quarrying, manufac. etc.	Construc.	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.		
Compensation of employees	9	349	58	60	54	232		762
Net mixed income	14	227	35	39	99	18		432
Net operating surplus	9	30	18	7	160	41	-48	217
Other taxes less subsidies on production	-2	44	5	-6	12	5		58
Total	30	650	116	100	325	296	-48	1 469

We can analyse mixed income according to the gender and the education level of the self-employed as well. In this case, however, the ratio between this amount and the underlying volume of labour does not represent a per capita compensation of self-employed labour, but mixed income per self-employed labour units.

Table 2a shows a value added sub-matrix where such classifications have been applied.

In order to get a proper *labour-oriented SAM*, we should separate out the remuneration of labour from the other remuneration of primary inputs. This means estimating an imputed labour compensation for the self-employed which is then separated and subtracted from mixed income.

In this case we would get a value added sub-matrix as the one displayed in table 3. Compensation of labour now reflects the remuneration of *all* labour provided in the production process, which is made of self-employed and employee labour. The net operating surplus of self-employed records the remuneration of self-employed, *other* than labour compensation.

Table 2a - **A more detailed value added sub-matrix**

Figures from ESA95 SAM (see footnote 2)

Generation of income account			Production account						FISIM	Total
			Agriculture etc.	Mining, quarrying manufacturing etc.	Construction	Trade, repair, hotels, etc.	Financial intermed. etc.	Public administ.		
Compensation of employees	Male	Lower	6.4	179.9	49.0	30.8	13.0	34.4		313
		Medium	0.2	29.7	3.5	5.7	10.5	10.1		60
		Higher	0.4	34.6	3.2	5.6	14.5	70.7		129
	Female	Lower	1.9	82.0	1.0	11.2	6.4	40.6		143
		Medium	0.2	12.4	0.7	3.6	5.1	10.6		33
		Higher	0.0	10.6	0.7	3.2	4.6	65.6		85
Net Mixed income	Male	Lower	8.6	128.5	31.4	21.8	21.5	5.0		217
		Medium	0.3	28.0	2.0	5.0	23.2	1.9		60
		Higher	0.0	12.0	1.5	1.5	35.0	1.9		52
	Female	Lower	5.1	47.9	0.1	8.2	5.7	5.8		73
		Medium	0.1	8.7	0.0	2.2	4.8	2.4		18
		Higher	0.0	2.0	0.0	0.4	8.8	1.0		12
Net operating surplus			8.8	29.9	18.4	7.0	159.6	41.3	-48	217
Other taxes less subsidies on production			-2.0	44.0	5.0	-6.0	12.0	5.0		58
Total			30	650	116	100	325	296	-48	1 469

Table 3 - **A labour-oriented value added sub-matrix**

Figures from ESA95 SAM (see footnote 2)

Generation of income account		Production account						FISIM	Total
		Agriculture etc.	Mining, quarrying, manufac.	Construction	Trade, repair, hotels, etc	Financial intermed. etc	Public administr. etc.		
Compensation of labour	Employees	9	349	58	60	54	232		762
	Self Employed	7	120	19	21	52	10		229
Net operating surplus of self-employed		7	107	16	18	47	8		203
Net operating surplus		9	30	18	7	160	41	-48	217
Other taxes less subsidies on production		-2	44	5	-6	12	5		58
Total		30	650	116	100	325	296	-48	1 469

The labour-oriented value added sub-matrix has the following advantages:

- It shows the labour income share of GDP (NDP).
- It allows calculating the labour compensation per unit of output. This index can be useful for measuring the actual labour intensity of each industry.

We can analyse both self-employed and employee compensation of labour according to the gender and education level of labour units. The result is displayed in table 3a.

Table 3a - **A more detailed version of the labour-oriented value added sub-matrix**

Figures from ESA95 SAM (see footnote 2)

Generation of income account			Production account						FISIM	Total
			Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediate. etc	Public administration etc.		
Employees	Male	Lower	6.4	179.9	49.0	30.8	13.0	34.4		313
		Medium	0.2	29.7	3.5	5.7	10.5	10.1		60
		Higher	0.4	34.6	3.2	5.6	14.5	70.7		129
	Female	Lower	1.9	82.0	1.0	11.2	6.4	40.6		143
		Medium	0.2	12.4	0.7	3.6	5.1	10.6		33
		Higher	0.0	10.6	0.7	3.2	4.6	65.6		85
Self-employed	Male	Lower	5	62	16	11	13	1		108
		Medium	0	10	1	2	10	0		24
		Higher	0	12	1	2	14	3		32
	Female	Lower	2	28	0	4	6	2		42
		Medium	0	4	0	1	5	0		11
		Higher	0	4	0	1	5	3		12
Net operating surplus of self-employed			7	107	16	18	47	8		203
Net operating surplus			9	30	19	7	160	41	-48	217
Other taxes less subsidies on production			-2	44	5	-6	12	5		58
Total			30	650	116	100	325	296	-48	1 469

Most of the objections against this framework are due to the difficulty of estimating self-employed labour compensation which, in fact, is not paid out separately from the

compensation of self-employed capital. Therefore, such a separation can only be imputed with the help of a specific estimation method. For the same reason ESA95 has established to consider a mixed income category through which all the factors supplied by self-employed are remunerated.

Nevertheless there are countries (like Italy) where self-employed labour is dominant and so peculiarly organised that such an approach is particularly favoured.

The methods used to construct a value added sub-matrix

Though the labour-oriented value added matrix may have some advantages, it may be advisable to start with a simpler framework, such as the one shown in Table 2a.

From a practical point of view this means estimating the compensation of 36 kinds of employee as well as the net mixed income generated by 36 kinds of self-employed.

We can identify two methods. The former consists in applying proper per capita wage rates to the volume of labour employed in the production process. We can call this approach as the "labour-funded method". The latter consists in subdividing directly national accounts compensation of employees and net mixed income by proper indicators.

In the first case we have to estimate a matrix of per capita values as well as a labour matrix. Both of them have to respect national accounts constraints: particularly, the weighted average of per capita values must equal averages in the national accounts and the sum of labour units must be equal to national accounts totals. Reconciliation with national accounts data can be reached through iterative processes aimed at distributing discrepancies.

In the second case we estimate directly compensation of employees and net mixed income sub-matrices.

Both the methods belong to the general class of top-down methods. The choice between the mentioned methods depends on the availability of data, especially on the existence of labour accounts coherent with national accounts.

The LEG countries which apply the labour-funded method are Italy, Netherlands and Portugal, i.e. those countries where employment data are consistent with national accounts. The estimation process follows more or less the same steps.

The labour input underlying the value added sub-matrix

The estimation of the input of labour within national accounts is aimed at measuring the volume of labour underlying the output produced by the economic system in the reference period. Therefore the measure of the input of labour is strictly linked to the production boundaries set by ESA 95 (see ESA95 §§ 11.11-11.16), this requiring the estimates on the input of labour to be exhaustive as the estimates on production, income and expenditure are. The strict link between the production boundaries and the definition of the input of labour in national accounts explains the difference between the latter and the definition of employment set by statistical surveys (both by surveys on households and surveys on firms). In particular this difference concerns two main aspects: the first one is related to the reference population; the second one regards the coverage of the activities included. These aspects are strictly linked but it is possible to schematically separate them.

As mentioned at the beginning of this paragraph, the reference population in national accounts is represented by all the labour units who have provided labour to production units taking part in the realisation of production and income as defined in national accounts. In this respect it differs from the population measured by statistical surveys or administrative archives which respond to specific purposes different from the measurement of the input of labour in the national accounts context; in particular they all survey a specific economic or social phenomenon, thus determining the reference population and the survey boundaries. For example, as far as the residence is concerned, surveys on households generally refer to the resident population and, therefore, they register employment (in terms of number of persons employed) referring to the legal residence of persons surveyed; on the contrary the national accounts allows two different measures of employment: domestic employment and national employment. In particular domestic employment is defined with respect to the residence of the production unit since the objective is that of measuring the input of labour contributing to the final output of the economic system. In ESA95 a complete list of the categories of workers to be included and excluded from the domestic concept of employment is presented (see ESA95 §§ 11.17-11.19)[3].

Therefore the use of different statistical and administrative sources in order to estimate the input of labour in national accounts requires a series of adjustments first of all aimed at harmonising definitions adapting those of basic statistics to the national accounts ones.

With respect to the second aspect explaining the diverging concepts of employment in national accounts and in surveys (i.e. the coverage of the activities to be included), it has been assumed that the ESA95 production boundaries include "… production, primary income and expenditures that are directly and non-directly observed in statistical surveys or administrative files"[4]. In particular the non observed economy includes:

1. the underground economy (SNA93, §§ 6.34), illegal activities (SNA93, §§ 6.31-6.33), the informal sector (SNA93, Annex to Chapter 4)[5]: in particular the activities classified as "underground economy" are characterised by the deliberate intention of an economic agent to avoid paying taxes, social security contributions, to ignore minimum wages, work schedules, safety standards;
2. other productive activities not surveyed because of inefficiencies of the statistical information system (caused, for example, by failure to up-date statistical archives or registers on existing employment which complies with law) or because of lack of sensitivity of those who are responsible for the compilation of the questionnaires (non response).

3. A detailed analysis of all the differences among surveys concepts and between surveys and national accounts ones is presented in chapter 4 of the Handbook of the SAM and in the documents produced by the Eurostat Task Force on ESA employment. (in particular see "Annex to CN 427. Employment in National Accounts", Eurostat B1/Annex CN 427e ; "Employment in national accounts. Italian comments to annex CN 427", document presented at the meeting of the Working Party "National Accounts", Luxembourg 16-17 December 1999).

4. See Decision of the European Commission 94/168/EC, Euratom 22 February 1994, art. 2.

5. EU member states have agreed on postponing the inclusion of illegal activities in the current estimates, at least in the first phase of ESA95 implementation. With respect to informal activities, the definition of this sector has just been set in details by a Handbook on the Non Observed Economy edited by OECD.

Different methodologies have been proposed and implemented by countries in order to measure the non observed economy. Part of the techniques allowing to integrate information in order to fill the gap due to statistical reasons (point b.) are presented in chapter 4 of the Handbook on SAM, while the Italian approach for the estimation of labour input can be assumed as an example of the methodologies used in order to estimate the input of labour including the underground economy.

Both chapter 4 of the Handbook on SAMs and the paragraph in this paper describing the Italian approach for the estimation of the input of labour show that generally no survey is specifically aimed at the measurement of underground activities and the related employment. In this respect comparing figures derived from different sources allows to point out discrepancies which can assume very different meanings: in particular when definitional aspects have been solved and when all the "statistical" causes of discrepancies among sources have been removed, discrepancies can help in the measurement of economic phenomena. As cited in the Italian case, for example, the basic assumption for the estimation of the "underground input of labour" is that establishment survey data do not incorporate the underground economy while surveys on households do; therefore the estimations for this can be made by comparing data from households and data from establishments, after adjustments for all other differences caused by "non-economic" reasons (see point b. above) have been made.

In order to respond to the objective of measuring the amount of labour underlying GDP and income, the measurement of employment in national accounts is not limited to the number of employed persons. Actually ESA95 indicates four different measures of employment in the National Accounts context: employed persons, jobs, full-time equivalent units (FTEU) and hours worked. Jobs result as the summing up of the number of persons employed and their multiple jobs (see §§ 11.22 and 11.23). The amount of hours worked should refer to the production boundaries, i.e. to exhaustiveness requirements: a detailed description of what to include and exclude in order to estimate such an indicator is presented in ESA95 (see § 11.27-11.31). Finally FTEU can be obtained in two different ways. When exhaustive estimates on the number of hours actually worked is available, FTEU are calculated as the ratio between the number of hours worked and the number of hours worked by full-time jobs (see ESA95 § 11.32-11.34). When exhaustive estimates on the amount of hours actually worked (representing the numerator in the calculation of FTEU) are not available, FTEU can be indirectly estimated through coefficients. In this latter case available data on hours worked (captured by surveys or recorded by administrative registers) can be used in order to calculate indicators through which jobs can be transformed into full-time equivalents units.

When the national accounts provide such estimates on the input of labour, indicators can be calculated and used for international comparisons and economic analysis. In particular at the international level the economic aggregates can be homogeneously compared through per capita values if employment figures provided by countries respond to the same definitions and if they are coherent with the definitions of the economic aggregates considered. Furthermore estimates on the input of labour represent important variables for economic analysis purposes. For example the input of labour is the variable used in the building up of performance indicators (productivity of labour in terms of value added or production); it allows to elaborate indicators on the intensity of labour or intensity of capital; it is a volume component of economic aggregates, such as compensation of employees, allowing to analyse separately the volume effect and the price effect in time series perspective: in the latter case, for example, ESA95 suggests the

calculation of employee labour input at constant compensation which allows to calculate implicit price indices for labour to be compared with implicit price indices on final uses (see ESA95 § 11.36-11.37).

According to ESA 95, the input of labour should be estimated adopting the following classifications: by economic activity or by institutional sector. When the input of labour is integrated into a SAM, it must be reported into a matrix format where figures can be dis-aggregated and cross-classified according to the same classifications used in the SAM. In particular the labour matrix underlying the value added matrix is supposed to analyse labour by the employing industries and by labour factor categories (identified by status in employment, gender and education level).

The compilation of a matrix presenting the input of labour dis-aggregated by economic activity and labour categories allows to measure the volume of work provided by each category of labour factor to each industry and it can be directly linked to the value added matrix showing the flow of value added produced by each industry and the labour category which is remunerated by it. The labour matrix underlying the value added matrix is represented in table 4. The input of labour registered in this matrix refers to the domestic concept, which means that labour provided by resident workers to non resident production units are excluded while labour provided by non resident persons to resident production units are included (ESA95 §§ 11.17-11.19). This is shown in table 4 where column 7 is blank. Table 4 reports figures referring to the Europeland SAM, where domestic employment (i.e. including non resident workers) is cross classified by industry, gender and level of education.

Table 4 - **The labour matrix underlying the value added matrix**

Figures from ESA95 SAM (see footnote 2)

Labour categories				Industries						
				Agriculture etc.	Mining, quarrying manufac. etc	Construction	Trade, repair, hotels, etc	Financial intermed. etc.	Public administr. etc.	Total
				1	2	3	4	5	6	
1	Employees	Male	Lower	24.0	156.7	58.9	94.3	14.6	71.0	419
2			Medium	1.0	16.9	3.0	13.4	10.9	16.7	62
3			Higher	0.8	10.0	1.4	5.7	9.2	31.9	59
4		Female	Lower	11.2	118.2	1.3	53.0	12.2	119.0	315
5			Medium	0.7	11.1	0.9	12.9	8.2	23.3	57
6			Higher	1.0	5.1	0.6	6.2	5.4	69.7	88
7	Self-employed	Male	Lower	32.1	111.9	37.8	66.8	24.1	10.3	283
8			Medium	1.9	15.9	1.7	11.7	24.2	3.2	59
9			Higher	0.0	3.4	0.7	1.5	22.1	0.8	29
10		Female	Lower	30.2	69.1	0.1	38.7	10.8	17.1	166
11			Medium	0.3	7.8	0.0	7.8	7.7	5.2	29
12			Higher	0.3	1.0	0.0	0.7	10.4	1.1	13
	Total			104	527	106	313	160	369	1 579

Implementing a labour-oriented value added matrix in Italy

The value added matrix

Our target is the estimation of the value added matrix shown in table 3a where compensation of self-employed labour is separated out from mixed income.

The first step is the estimation of the standard value added sub-matrix (table 5).

The standard value added sub-matrix simply arranges data currently produced in the national accounts.

According to ESA95, mixed income is the balancing item of the generation of income account of unincorporated enterprises owned by households, excluding quasi-corporations and excluding the owner-occupiers as producers of housing services for own final consumption. In the Italian national accounts these enterprises identify the Production Households sector which is namely composed by unincorporated enterprises owned by households, with less than five workers[6].

Differently from the theoretical framework, we cannot separate out fixed capital consumption from operating surplus and mixed income. As a consequence the matrix records *gross operating surplus* and *gross* mixed *income*.

Finally, it is worth stressing how the matrix shows value added at basic prices. The only taxes remaining to be paid out of gross value added at basic prices consist of "other taxes on production". These taxes mainly consist of current taxes (or subsidies) on the labour and capital employed in the enterprises as payroll taxes or taxes on vehicles or buildings. National accounts analyse such taxes by 101 industries.

Table 5 - **The standard value added sub-matrix for Italy**

Current millions euro, 1996

Generation of income account	Production account						FISIM	Total
	Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediation etc.	Public administr. etc.		
Compensation of employees	7 428	118 598	18 740	81 088	54 434	137 427	0	417 714
Gross mixed income	19 468	11 088	11 703	60 676	30 563	20 858	0	113 638
Gross operating surplus	4 056	92 517	17 126	80 803	133 624	19 623	-40 720	347 748
Other taxes less subsidies on production	-1 178	25	167	1 630	5 258	68	0	5 970
Total	29 774	222 228	47 736	224 197	223 879	177 976	-40 720	885 070

In the standard matrix, compensation of labour is included both in compensation of employees and in mixed income.

In order to construct a labour-oriented SAM, it is preferable, in our view, to separate out self-employed labour compensation from mixed income thus getting a value added matrix where compensation of labour remunerates both employees and self-employed.

We compensate self-employed labour exactly as the labour supplied by employees, provided they work in the same kind of activity and in enterprises of similar dimension,

6. In the Italian national accounts, self-employed labour underlying mixed income is only a part of self-employed labour engaged in the production process. In fact, in Italy there are self-employed working in corporations and quasi-corporations who cannot be considered strictly neither employees nor capital earners. These persons are remunerated through operating surplus in the generation of income account, and through capital income in the allocation of primary income account.

taking into account the different (generally higher) number of hours worked by self-employed. The results are in table 6.

Table 6 - **The labour-oriented value added sub-matrix for Italy**

Current millions euro, 1996

Generation of income account		Production account						FISIM	Total
		Agriculture etc.	Mining, quarrying, manufact.	Construction	Trade, repair, hotels, etc	Financial intermed. etc	Public administr. ecc.		
Compensation of labour	Employees	7 428	118 597	18 741	81 088	54 434	137 427	0	417 714
	Self-employed	12 963	7 179	5 679	37 517	13 098	7 028	0	83 465
Gross operating surplus*		10 562	96 426	23 151	103 961	151 089	33 452	-40 720	377 921
Other taxes less subsidies on production		-1 178	25	167	1 630	5 258	68	0	5 970
Total		29 774	222 228	47 736	224 197	223 879	177 976	-40 720	885 070

* This aggregate is equal to the operating surplus and mixed income less imputed self-employed compensation of labour

Italy applies a labour-based method in order to estimate compensation of employees, the variable being estimated by multiplying compensation of employee rates by full time equivalent labour units.

For the time being, national accounts analyse compensation of employees by industry (101 branches), class size (8 classes), and separating out workers employed in the underground economy (non-registered) from the others (registered).

Our objective is to further analyse compensation of employees/self-employed labour by gender and education.

The exercise presented here refers to 1996. Monetary variables are measured in current lire, labour in full time equivalent units.

The first step is the estimation of a labour matrix where both employee and self-employed labour are analysed by gender and education (table 9).

As a second step we estimate the per capita remuneration of labour, both for employees and self-employed. Such values are multiplied by the underlying labour units in order to get a first estimate of compensation of labour and the corresponding per capita values (tables 11, 12).

Finally estimates have to be reconciled to the NA data on compensation of employees and mixed income by industry (table 13).

The labour matrix

The Italian approach for the estimation of the input of labour

ISTAT has a long tradition about the integration of labour statistics within the national accounts framework. Actually, national account estimates move from this integration which guarantees on the exhaustiveness of Italian GDP. In fact, almost 70% of Italian GDP is estimated through the following method: per capita values (value added, production, wages and salaries) are multiplied by the estimated input of labour, after having corrected the per capita values for underreporting and after having estimated the overall labour underlying product (registered and non-registered).

Labour input estimates aim at measuring exhaustively both observed and non observed labour.

The labour input is estimated for the benchmark year[7] applying the technique described hereafter; for the following years, estimates are obtained updating benchmark estimates through a set of indicators. The estimation technique for the benchmark year is based on the collection of all the available sources of information and proceeding on the following steps (schematically presented in the box):

A1 harmonisation of the reference period and territory;

A2 conceptual harmonisation to national accounts definitions (with reference to "domestic employment" as a production factor of GDP);

B1 estimation of labour demand through the integration of sources on enterprises (for example *ad hoc* estimation of employment in some economic activities for which exhaustive data sources exist, like General Government; integration of administrative data on special categories of workers like own account workers, if under-covered);

B2 estimation of labour supply through the integration of sources on households (Census of the Population and Labour Force Survey) and correction of main errors within the sources on the side of labour supply (for example classification of economic activity).

The objective of steps A and B, is to achieve the exhaustiveness of sources measuring in the households the number of primary jobs, both registered and non registered, and in the enterprises the number of registered jobs. These steps aim at filling statistical gaps due to non-response or lack of up-dated registers, or due to differences in the reference population of surveys.

C comparison of labour supply and labour demand to identify primary and multiple registered jobs and most of the non-registered primary jobs.

Comparison of data sources is made at a very detailed level. In particular estimates are made separately for three status in employment (employees, own-account workers/employers, family workers: I=1, 2, 3; consistently with ESA95 definitions), economic activities (5 digit of ATECO91[8]: J=1… 873) and regions (2 digit of NUTS: N=1… 20)[9]. The process is displayed in the box which follows:

D estimation of other components of the underground economy: non registered foreign workers (through indirect estimates based on administrative and other sources), non registered multiple jobs (indirectly estimated through monetary aggregates or other indicators), persons declaring themselves as non-employed but declaring also to have worked in the reference week (surveyed by the labour force survey -LFS), informal jobs (in the agriculture and construction sectors);

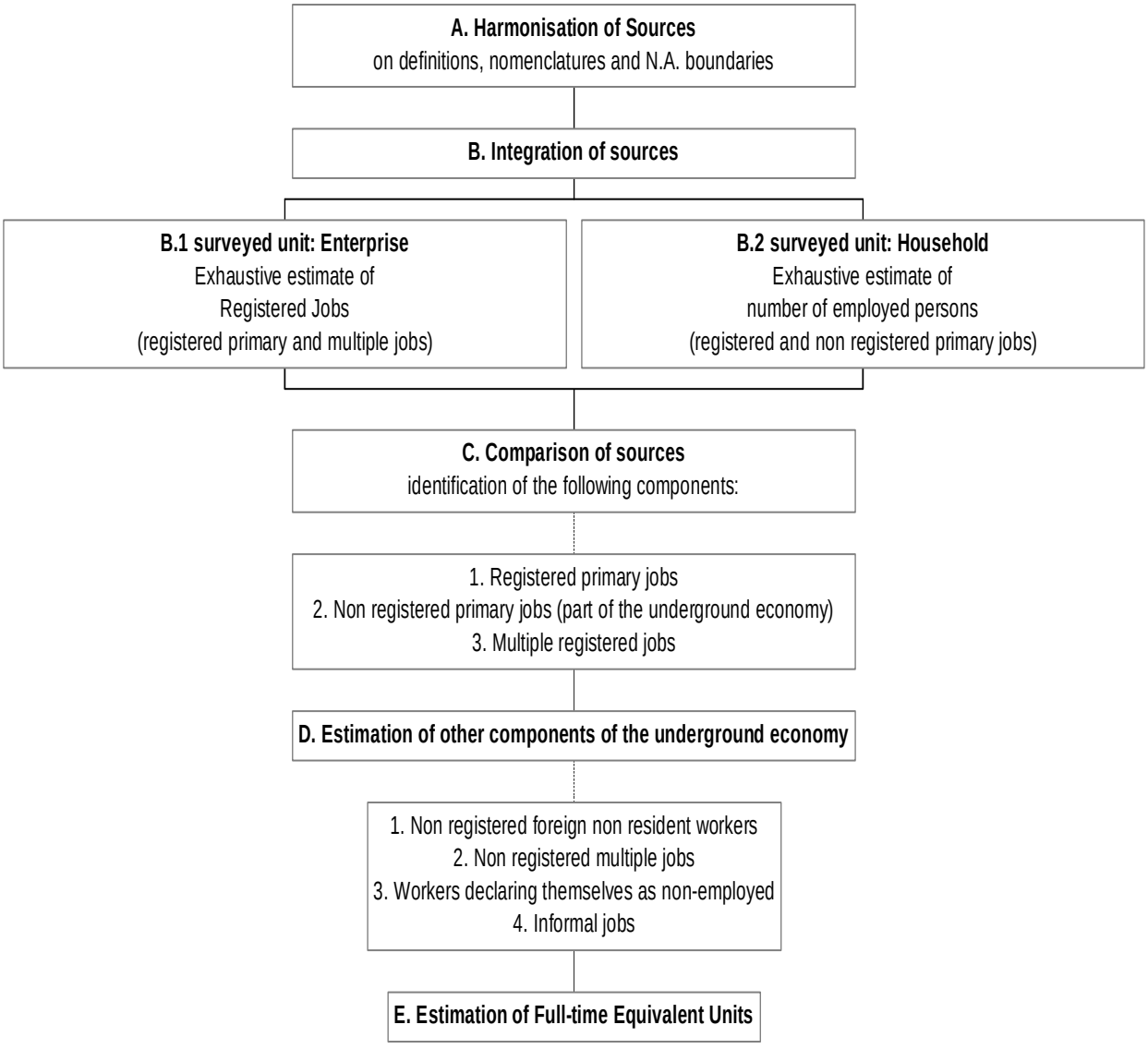
7. The last benchmark refers to 1991, when the last available Population and Enterprises Census was performed.

8. The first four digits of ATECO91 correspond directly to NACE Rev1.

9. We build two matrices, one with the data integrated from the supply side and one from the demand side, each matrix of 20x3x873=52380 cells (regionsxstatusxATECO). Each cell identifies the number of workers of region N, status I and ATECO J.

E transformation of jobs into full-time equivalent units through a coefficient resulting as the ratio between the average number of hours actually worked and the number of hours to be worked according to National Contracts[10].

Italian approach to the estimation of the input of labour



The updating reflects the benchmark principles since different sources are used in order to derive indicators which are directly applied to update the different segments of employment. For example households surveys (like LFS) provide the indicators applied to primary registered and non- registered jobs, while administrative data and registers of enterprises provide the indicators applied to registered jobs.

10. Note that the number of hours actually worked used to calculate the coefficient to transform jobs into FTEU is not the exhaustive estimate of the total amount of hours worked (as defined by ESA95) but it represents an average indicator separately estimated by status in employment, economic activity and segment of labour, derived from the available sources of information.

Table 7 reports the sources of data used both for the estimation of the input of labour in the benchmark year and for the updating in the following years. In particular census data were available only in 1991, while administrative data and sample surveys are available every year.

Table 7 - **Main Sources of Information used for the purpose of the estimation of the input of labour**

Sources		Typology of Information	1991	Current Years
Households and Enterprises:				
A	Population Census	Resident employed persons by working place	X	
B	Labour-Force Survey	Resident employed persons	X	X
C	Multipurpose Survey	Persons employed by households		X
D	Manufacture, Services and Institution Census	Registered employment, main and multiple activities	X	
E	Agriculture Census	Agricultural sector, main and multiple activities	X	
F	Tax Register	Enterprises and employed persons with VAT code	X	X
G	Register of Production Enterprises (A.S.I.A.)	Number of people employed by economic activity		X
H	INPS (National Institute for Social Security) data on employees and coadjutants	Employees from households and enterprises, co-ordinated and continual co-operators, foreigners	X	X
I	ISTAT statistic surveys on the accounts of enterprises	Employees, up to 19 people, more than 20, more than 500 people in bigger-sized enterprises		X
L	Balance date per specific economic activity	Energy, tobacco, railways, post offices, telecommunications, credit, insurance	X	X
M	Periodical statistic surveys on activities sensitive to underground works	Ordinary and extraordinary maintenance of homes, holidays		Casual
N	Administrative data and statistic surveys on specific typologies of employees	Non-resident foreigners, temporary lay-off, part-time workers	X	X
O	Administrative data on specific economic activities	Transport of goods and passengers on the road, research and development, private education	X	X
Institutions				
P	State General Accounting Office, Ministries and other Bodies	Employees of the General Government	X	X
Q	ISTAT statistic surveys on public institutions	Municipalities, Mountain communities, provinces, regions		X
R	INPS Data for Private Social Institutions	Associations, Organisations and others	X	X

The labour matrix underlying the value added matrix

As explained above, ISTAT estimates full time equivalent units integrating and comparing different data sources, from the supply and the demand side of labour. This process is conceived in a way that makes impossible to associate to each labour unit the characteristics of the worker underneath it which have not been used as classification variables throughout all the benchmark steps. Therefore in order to derive a classification of labour by gender and education level we had to replicate the benchmark process considering from the beginning gender as one of the classification variables. With respect to education, no information is available from the demand side sources so that the disaggregation of labour by education level is carried out applying to the whole amount of labour the coefficients derived from the supply side sources.

Although we replicated the benchmark process, the already disseminated national accounts estimates represent a constraint. Therefore the results of the re-benchmarking process are used as indicators to split through a top-down approach the official data on labour. The advantage of this approach with respect to a mere application of coefficients derived from one source of information (for example the LFS), is that it is based on the same procedure and data sources used to estimate the official data: *i.e.* for each segment of labour estimated for the benchmark year, we estimated separately the corresponding indicators by gender.

We replicated the process with a less detailed classification of the economic activities. The purpose is twofold: first we decided to rely more upon a variable which less suffers from classification errors (gender) and to rely less upon the detailed classification of economic activity, which is often mistaken in the supply side sources. Secondly to overcome, at least partially, the impossibility to replicate the too onerous *filières*[11] process which, in the benchmark, allowed to correct classification errors related to economic activities in the population census.

The re-benchmarking process has been carried out by gender, three statuses in employment, twenty regions, sixteen economic activities[12]. The steps followed are the same described for the benchmark process (see box). The main aspects to be pointed out are the following.

1. Independent workers.

As stated in note 6, the self-employed included in the labour matrix are those employed in the Production Households sector which is namely composed by unincorporated enterprises owned by households, with less than five workers. Since the information needed in order to separate self-employed by institutional sector are not available in the Census of the Population and in the surveys on households in general, the break-down of self-employed by gender is based on indicators derived from the Census on Manufacture, Services and Institutions (which is also the main input for the estimation of labour by institutional sector). These indicators by gender have been differentiated for registered and non registered jobs using the information obtained from the re-benchmarking process[13].

2. The sources of information used in order to estimates the indicators to split national accounts estimates on the input of labour by gender and education are described in table 8 (letters in the first column refer to the corresponding source in table 7).

11. A *filière* is a group of economic activities describing the whole process through which a raw material is extracted, transformed into a finished product and sold on the market. The *filière* approach is based on the grouping of data from households survey (Census of the Population) in *filières*. Each macro-*filière* contains data classified by economic activity. The basic assumption is that economic activity classification errors resulting from information given by individual workers in the Census of Population will, in all probability, remain within the same *filière* of production thus nullifying the error. (Istat, 1993).

12. 1 agriculture (NACE divisions 01-05); 2 mining, quarrying, extraction and transformation of raw materials and electricity, gas and water supply (NACE divisions 10-14, 23-28, 40-41); 3 manufacturing (NACE divisions 15-22, 36-37); 4 manufacture of machinery and equipment (NACE divisions 29-35); 5 construction (NACE division 45); 6 trade (NACE divisions 50-52); 7 hotels and restaurants (NACE division 55); 8 transport and communications (NACE divisions 60-64); 9 credit (NACE division 65); 10 insurance (NACE division 66); 11 auxiliary to financial intermediaries and business activities (NACE divisions 67-74); 12 Public Administration (NACE division 75); 13 Education (NACE division 80); 14 Health and social work (NACE division 85); 15 Other Social and Personal activities (NACE divisions 90-93); 16 Private Households with employed persons (NACE division 95)

13. The underlying assumption is that once self-employed of Production Households sector are broken down by gender, the quota of registered for males and the quota of registered for females is the same in the Production Households sector and in the Corporations and Quasi-Corporations sector.

Table 8 - **Main Sources of Information used for the purpose of the estimation of the input of labour**

Sources		Typology of Information	Gender	Education
Households and Enterprises:				
A	Population Census	Resident employed persons by working place	X	X
B	Labour-Forces Survey	Resident employed persons	X	X
D	Manufacture, Services and Institution Census	Registered employment, main and multiple activities	X	
E	Agriculture Census	Agricultural sector, main and multiple activities	X	
L	Balance date of specific economic activities	Credit, insurance	X	X (credit only)
N	data on specific typologies of employees	Non-resident foreigners	X	
Institutions				
P	State General Accounting Office, Ministries and other Bodies	Employees of the General Government	X	X

3. Estimation of indicators for the different segments of labour. Summarising what we explained above, the indicators by gender for each of the different segments of labour have been calculated as follows:

   1. registered primary jobs, registered multiple jobs, non registered primary jobs.

   For 1991, comparison of census data (integrated as described above) is made separately for gender (K=1,2), three status in employment (employees, own-account workers/employers, family workers: I=1, 2, 3; consistently with ESA95 definitions), economic activities (macro-industries: J=1, …, 16) and regions (2 digit of NUTS: N=1, …, 20) [14]. The process is displayed in the box which follows:

   A) $Ls_{nijk} \cap Ld_{nijk}$ = registered primary jobs

   B) $|Ls_{nijk} - Ld_{nijk}| > 0$: B1) $Ls_{nijk} > Ld_{nijk} \rightarrow Ls_{nijk} - Ld_{nijk}$ = non registered primary jobs

   Once 1991 indicators by gender are obtained, they are updated through the rates of change of the gender structure derived from the LFS.

   2. *Workers declaring themselves as non-employed* (see previous paragraph, point D).

   This segment of labour is estimated using LFS and the Population Census and currently updating on the basis of LFS; therefore the dis-aggregation by gender and education is directly obtained from LFS for the year 1996.

   3. *Non-registered and non-resident foreign workers are broken down through indicators derived from data provided by ISTAT and Caritas (a private non profit institution) which publishes a yearbook on immigration in Italy.*

   4. *Non-registered multiple jobs* are broken down by gender applying the same coefficients calculated for the non registered primary jobs (see point a.)

14. We build two matrices, one with the data integrated from the supply side and one from the demand side, each matrix of 20x2x3x16=1920 cells (regions x gender x status x macro-industries). Each cell identifies the number of workers of region N, gender K, status I and macro-industry J.

A further analysis can be made for some sectors of economic activities, for which specific and exhaustive sources of information are available.

5. *Agriculture* (NaceRev.1 division 01 - 05)

The Census of Agriculture carried out in 1990 is the base for the calculation of indicators by gender for all the segments of labour of this sector (registered and non registered primary and multiple jobs, excluding non-registered and non-resident foreign workers, the estimation of which is described at point c). The updating method is the same described in point a.

6. *Public Administration* (NaceRev.1 division 75)

The Public Administration Yearbook provides detailed data on labour by gender and education level. The Yearbook is the main source used in the current estimation of labour in the GG sector. Data are estimated and broken down by gender and education directly for 1996.

7. *Credit and Insurance sectors*. (NaceRev.1 division 65 and 66)

The National Associations of Companies engaged in the credit and insurance sectors provide yearly detailed statistics on registered workers. This allowed to estimate directly for 1996 labour by gender and education (in the credit sector) or gender only (in the insurance sector).

8. *Private Households with employed persons* (NaceRev.1 division 95)

The INPS (National Institute for Social Security) yearly provides data on registered workers employed by Households and the ISTAT Multipurpose survey provides data on the registered and non-registered workers. Data are available by gender.

Where not stated differently, the break-down by education level (ISCED 1-2, ISCED 3-4, ISCED 1-2) is carried out through a mere top-down approach, applying indicators derived from the LFS, estimated separately for status in employment, six industries[15], gender.

Following the steps described so far, it was possible to estimate jobs by gender and education. Next step focus on the estimation of full-time equivalents. As explained in par.3.2, this implies the estimation of coefficients to transform part-time jobs (both registered and non-registered) into FTEU, taking into account the amount of hours worked. When the input of labour is analysed also by gender and education, coefficients to transform jobs into FTEU should be estimated separately for gender and education, in addition to the economic activity. In this respect the current coefficients used, have been differentiated by gender and education using the information on hours worked derived from the LFS.

Table 9 reports the input of labour by industry, status in employment, gender and education. Data refer to FTEU for 1996. Tables A.1-A.3 in the Annex report some analysis on the distribution of labour by status in employment, macro-industries, gender and education level.

15. The six industries are those used in the pilot SAM.

Table 9 - **The labour matrix underlying the value added matrix**

Full time equivalent units, 1996

Labour categories			Industries						
			Agriculture etc.	Mining, quarrying, manufac. etc.	Construction	Trade, repair, hotels, etc	Financial intermed. etc.	Public administr. etc.	Total
Status	Gender	*Education*							
Employees	male	low	306 767	1 907 648	659 330	1 313 372	191 088	948 608	5 326 813
		medium	48 044	902 975	129 428	654 357	513 446	705 231	2 953 481
		high	2 240	101 973	9 107	71 292	157 473	441 196	783 281
		total	*357 051*	*2 912 596*	*797 865*	*2 039 021*	*862 007*	*2 095 035*	*9 063 575*
	female	low	187 395	874 915	18 799	658 578	202 374	1 067 412	3 009 473
		medium	13 825	426 408	38 747	532 651	439 477	1 377 677	2 828 785
		high	597	39 375	804	41 441	47 995	622 412	752 624
		total	*201 817*	*1 340 698*	*58 350*	*1 232 670*	*689 846*	*3 067 501*	*6 590 882*
	total employees		***558 868***	***4 253 294***	***856 215***	***3 271 691***	***1 551 853***	***5 162 536***	***15 654 457***
Self-employed(*)	male	low	562 776	193 602	184 595	797 809	47 087	131 800	1 917 667
		medium	72 069	88 871	91 115	380 200	129 320	83 106	844 681
		high	4 553	10 453	27 905	36 989	356 113	89 161	525 175
		total	*639 398*	*292 926*	*303 615*	*1 214 998*	*532 520*	*304 067*	*3 287 523*
	female	low	159 000	75 612	14 413	400 975	44 488	108 060	802 549
		medium	19 723	39 827	3 006	194 775	33 884	76.111	367 326
		high	1 152	4 604	1 009	17 300	29 667	43 808	97 540
		total	*179 875*	*120 043*	*18 428*	*613 050*	*108 039*	*227 979*	*1 267 415*
	total self-employed		***819 273***	***412 969***	***322 043***	***1 828 048***	***640 559***	***532 046***	***4 554 938***
Total FTEUs			**1 378 141**	**4 666 263**	**1 178 258**	**5 099 739**	**2 192 412**	**5 694 582**	**20 209 395**

(*) FTEUs of self-employed included in the table relate to self-employed working in unincorporated enterprises. In order to get the total amount of FTEUs of self-employed estimated as labour input in National Accounts it is necessary to sum up 1) self-employed producing for own final consumption and 2) self-employed working in corporations.

Compensation of labour by industry, gender and education

The monetary counterpart of the labour matrix is a matrix containing *compensation of labour per capita values* for each category of employment.

The data sources

The main data sources used for the estimates are national accounts, sample surveys and administrative data sources.

National accounts

Particularly we have used the following NA statistics:

- Wages and salaries (D.11) paid to registered employees, cross-classified by 101 industries and 8 size classes;
- Wages and salaries (D.11) paid to non-registered employees, cross-classified by 101 industries and 8 size classes;
- Employers' actual social contributions (D.121) cross-classified by 101 industries and 8 dimensional classes;

- Employers' imputed social contributions (D.122) cross-classified by 101 industries and 8 size classes
- Full time equivalent units of registered employee labour cross-classified by 101 industries and 8 size classes
- Full time equivalent units of non-registered employee labour cross-classified by 101 industries and 8 size classes

Sample surveys

In Italy, there are only few surveys which collect data on wages and salaries simultaneously by industry, gender and education. For this exercise, we have used the Bank of Italy survey on households' income and wealth (SHIW) for the year 1995 and the ISTAT survey on wages and salaries (ESES) for the year 1995.

The SHIW collects data on the net income earned by each component of the household, by pointing out each single source of income. The survey collect also demographic, social and economic characteristics of the earner. The surveyed unit is the household. The sample is about 8000 households and 25000 persons. The SHIW is carried out every two years.

The ESES collects data on the structure of wages and salaries by social and demographic characteristics of the employee and according to the industry where he/she is employed.

According to the European statistical program the survey is carried out every four years. The survey focuses on local units with more than 10 workers and belonging to the manufacturing and service economic activities (namely, NACE rev.1 C-K). In 1995, the sample was 7500 local units and about 103000 employees.

Administrative data

We have used statistics on wages and salaries by professional level, collected by the Italian Bank Association on the employees of the credit and insurance sectors. Moreover we have used Government statistics on the wages and salaries of the public sector employees. Both the data sources provide only the professional level detail.

Method and results

We apply different methods for each industry, depending on the availability and reliability of data.

As a first common step, we calculate compensation of employees per capita values for each industry, separating registered employees from non-registered employees. The difference is equal to the employers' actual and imputed social contributions.

On the basis of available data sources we calculate wage differentials by gender and education for each industry.

For what concerns the agriculture sector, we can only use the SHIW data. Due to the very small size of the sample, some cells record only a few number of cases, especially for the less frequent typologies like high education. For this reason, at first we differentiate wages by gender, and only as a second step we differentiate them by education. The assumption is that wage differences due to education are independent from the gender of the worker. Another problem is connected with the use of the SHIW.

As a matter of fact, the survey collects *net* incomes whereas we need a proxy variable of wages and salaries. A micro simulation model developed at ISTAT allows estimating social contributions and taxes charging on each income. Differentials on wages and salaries are calculated using these "gross" values. Nevertheless, we have verified that social contributions and taxes are proportional to the net compensation of labour and do not affect significantly the differentials by gender and education.

The differentials for Manufacturing, Construction, Trade and Financial sectors are calculated on the basis of the ESES. The population surveyed does not include enterprises with less than 11 workers. This fact may affect the results for the industries characterised by small enterprises, namely construction and trade. The assumption is that differentials by gender and education are not affected by the size of the enterprise. Differentials for the Financial sector have been calculated also taking into account administrative data on wages and salaries by professional level.

Finally, for the sixth industry (Public administration etc) we have used mainly the SHIW and General Government administrative data on wages and salaries analysed by professional category. Table 10 displays the differentials estimated for each industry.

Table 10 - **Wage differentials by gender and education (industry average=1)**

Percentages

Kind of labour	Industries					
	Agriculture etc.	Mining, quarrying, manufacturing	Construction	Trade, repair, hotels, etc	Financial intermediation. etc	Public administration etc.
Male-Low	0.99	1.00	0.94	1.01	0.84	0.95
Male-Medium	1.49	1.28	1.28	1.24	1.27	1.07
Male-High	2.21	2.26	1.70	1.72	1.71	1.66
Female-Low	0.73	0.79	0.87	0.80	0.65	0.63
Female- Medium	1.10	0.96	1.01	0.89	0.84	0.89
Female-High	1.64	1.28	1.01	1.33	1.07	1.05

We apply wage differentials to the compensation of employee per capita values of each industry, separating registered from non-registered employees. We assume that wage differentials do not change in the underground economy. The estimates are shown in table 11.

Table 11 - **Per capita compensation of employees – first estimates**

Current thousand euros, 1996

Kind of labour	Industries					
	Agriculture etc.	Mining, quarrying, manufacturing	Construction	Trade, repair, hotels, etc	Financial intermediation. etc	Public administration etc.
Male-Low	13.15	27.94	20.60	25.04	29.51	25.40
Male-Medium	19.75	35.62	27.96	30.68	44.49	28.45
Male-High	29.38	62.90	37.26	42.71	60.11	44.20
Female-Low	9.76	22.04	19.05	19.78	22.68	16.69
Female- Medium	14.66	26.85	22.04	22.06	29.34	23.76
Female-High	21.81	35.76	22.20	33.01	37.69	28.01
Total	13.29	27.88	21.89	24.78	35.08	26.62

We apply also the same differentials to the self-employed compensation of labour, thus getting the following *imputed wages and salaries rates*.

Table 12 - **Per capita compensation of self-employed labour – first estimates**

Current thousand euros, 1996

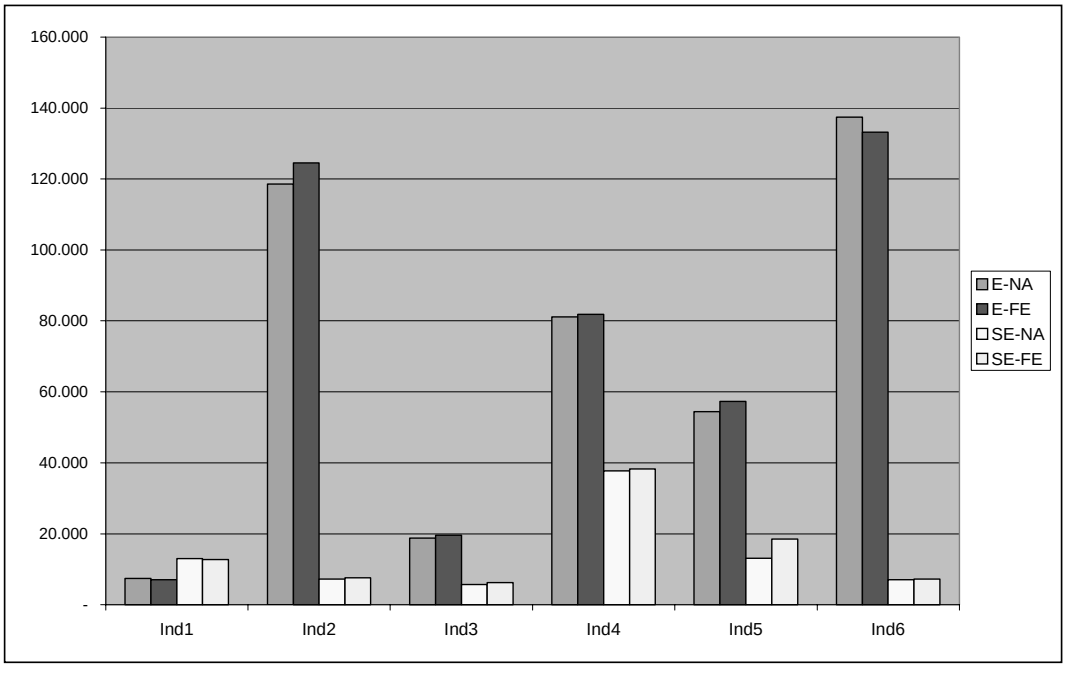
Kind of labour	Industries					
	Agriculture etc.	Mining, quarrying, manufacturing	Construction	Trade, repair, hotels, etc	Financial intermediation. etc	Public administration etc.
Male-Low	15.65	17.42	16.60	20.73	17.20	12.61
Male-Medium	23.51	22.21	22.53	25.41	25.93	14.12
Male-High	34.98	39.21	30.02	35.37	35.04	21.94
Female-Low	11.62	13.74	15.35	16.38	13.22	8.28
Female- Medium	17.45	16.74	17.76	18.27	17.10	11.79
Female-High	25.96	22.29	17.88	27.33	21.97	13.90
Total	15.82	17.38	17.63	20.52	20.45	13.21

Reconciliation with national accounts

The remuneration of labour rates are applied to the corresponding full time equivalent units. The result is a first estimate of compensation of labour by branch, gender and education. Such data have to be reconciled to National accounts constraints (namely to the compensation of employees by industry) and to the imputed compensation of self-employed: discrepancies are allocated in proportion to compensation of employees/self-employed recorded by each category of employment.

In the following figure we make a comparison between the first estimates (FE) and the post-reconciliation estimates (NA). Comparisons are made for employees (E) and self-employed (SE).

Fig. 1 **Comparison between "First estimates" and "Post-reconciliation estimates"**



Final estimates of the compensations of employees/self-employed labour are recorded in the value added sub-matrix as shown in table 13, while implicit per capita compensation of labour is shown in table A4 in the annex.

Table 13 - **The final value added matrix**

Current million euros, 1996(*).

Generation of income account			Production account						FISIM	Total
			Agriculture etc.	Mining, quarrying, manufact. etc.	Construct.	Trade, repair, hotels, etc	Financial intermediat. etc	Public administr. etc.		
Employees	male	low	4 307	50 601	13 292	31 823	5 482	25 093	0	130 598
		medium	1 021	31 325	3 753	20 563	21 359	21 990	0	100 011
		high	76	6 277	351	3 064	9 362	21 285	0	40 416
		total	*5 403*	*88 204*	*17 396*	*55 451*	*36 203*	*68 368*	*0*	*271 025*
	female	low	1 807	18 089	376	12 387	4 292	16 599	0	53 550
		medium	203	10 922	947	11 853	12 031	34 340	0	70 296
		high	15	1 383	20	1 398	1 908	18 119	0	22 843
		total	*2 024*	*30 395*	*1 343*	*25 638*	*18 231*	*69 059*	*0*	*146 689*
	total employees		***7 428***	***118 598***	***18 740***	***81 088***	***54 434***	***137 427***	***0***	***417 714***
Self-employed	male	low	8 957	3 203	2 814	16 361	574	1 640	0	33 549
		medium	1 718	1 875	1 864	9 545	2 379	1 157	0	18 538
		high	151	388	753	1 216	8 850	1 933	0	13 289
		total	*10 827*	*5 465*	*5 430*	*27 121*	*11 803*	*4 730*	*0*	*65 377*
	female	low	1 767	983	187	6 435	419	855	0	10 646
		medium	341	635	48	3 509	412	860	0	5 805
		high	28	95	14	452	463	583	0	1 636
		total	*2 136*	*1 714*	*248*	*10 396*	*1 295*	*2 299*	*0*	*18 088*
	total self-employed		***12 963***	***7 179***	***5 679***	***37 517***	***13 098***	***7 029***	***0***	***83 465***
Total compensation of labour			**20 390**	**125 777**	**24 418**	**118 606**	**67 531**	**144 455**	**0**	**501 179**
Operating surplus(**)			**10 562**	**96 426**	**23 151**	**103 961**	**151 089**	**33 453**	**-40 720**	**377 921**
Other taxes less subsidies on production			**-1 178**	**25**	**167**	**1 630**	**5 258**	**68**	**0**	**5 970**
Total Value Added (basic prices)			**29 774**	**222.228**	**47 736**	**224 197**	**223 879**	**177 976**	**-40 720**	**885 070**

(*) This table has been originally estimated in Italian lire and then transformed into euro values, thus determining very small discrepancies among the data reported in this table and the published national accounts data (in euros).

(**)This aggregate is equal to the operating surplus and mixed income less imputed self-employed compensation of labour

Analysis of the results[16]

The Italian case

The final result of the exercise is the value added matrix displayed in table 13. As shown in table 14, the weight of compensation of labour is 57% for the whole economy, ranging from the 30% of the financial sector to the 81% of Public Administration and other services.

16. This section is mainly based on Battellini F., Coli A., Tartamella F. (2002).

Table 14 - **Distribution of value added among primary inputs**

Percentages

			Agriculture etc.	Mining, quarrying, manufact. etc.	Construction	Trade, repair, hotels, etc	Financial intermediat.etc.	Public administrat etc.	Total
Labour	male	low	0.45	0.24	0.34	0.21	0.03	0.15	0.19
		medium	0.09	0.15	0.12	0.13	0.11	0.13	0.13
		high	0.01	0.03	0.02	0.02	0.08	0.13	0.06
		total	*0.55*	*0.42*	*0.48*	*0.37*	*0.21*	*0.41*	*0.38*
	female	low	0.12	0.09	0.01	0.08	0.02	0.10	0.07
		medium	0.02	0.05	0.02	0.07	0.06	0.20	0.09
		high	0.00	0.01	0.00	0.01	0.01	0.11	0.03
		total	*0.14*	*0.14*	*0.03*	*0.16*	*0.09*	*0.40*	*0.19*
	total		***0.68***	***0.57***	***0.51***	***0.53***	***0.30***	***0.81***	***0.57***
Operating surplus*			***0.35***	***0.43***	***0.48***	***0.46***	***0.67***	***0.19***	***0.43***
Other taxes less subsidies			***-0.04***	***0,00***	***0.00***	***0.01***	***0.02***	***0.00***	***0.01***
Total			1.00	1.00	1.00	1.00	1.00	1.00	1.00

* This aggregate is equal to the operating surplus and mixed income less imputed self-employed compensation of labour

Table 15 shows as the case of Public administration and other services sector is a striking example of how the analysis of value added composition, and in particular of labour compensation, can be enriched by the joint analysis of prices (per capita compensations) and volumes (FTEUs). In this sector females count for 58% of FTEUs. Since their per capita compensation is 85% when compared to the branch average, their quota of compensation reduces to 49%. On the contrary, males in the same sector counts for the 42% of the branch FTEUs: thanks to their per capita compensation which is 120% with respect to the branch average, their quota in terms of compensation reaches 51%. On the contrary, in the construction sector, where there is no gender wage differential, 93% of FTEUs are males, as well as 93% of sector remuneration is received by males. Analogously, per capita education differentials act on compensation shares. For example, in the Public administration and other services sector the quota of low educated FTEUs is twice as much the quota of high educated FTEUs (40% the former *versus* 21% the latter); per capita compensation of low educated is 77% and the one of high educated is 138% with respect to the branch average. As a result, the share of compensation is almost the same: 31% is perceived by low educated and 29% by high educated.

Table 15 – **Analysis of labour compensation**

Percentages (branch=100)

		Agriculture etc.	Mining, quarrying, manufact. etc.	Construction	Trade, repair, hotels, etc	Financial intermediat.e tc.	Public administrat etc.	Total
Total FTEUs	male	72.30	68.70	93.48	63.81	63.61	42.13	61.12
	female	27.70	31.30	6.52	36.19	36.39	57.87	38.88
		100	**100**	**100**	**100**	**100**	**100**	**100**
	low	88.23	65.40	74.44	62.17	22.12	39.61	54.71
	medium	11.15	31.25	22.26	34.55	50.91	39.37	34.61
	high	0.62	3.35	3.30	3.28	26.97	21.01	10.68
		100	**100**	**100**	**100**	**100**	**100**	**100**
Total labour compensation	male	79.60	74.47	93.48	69.62	71.09	50.60	67.12
	female	20.40	25.53	6.52	30.38	28.91	49.40	32.88
		100	**100**	**100**	**100**	**100**	**100**	**100**
	low	82.58	57.94	68.26	56.49	15.94	30.59	45.56
	medium	16.10	35.58	27.08	38.34	53.58	40.39	38.84
	high	1.32	6.47	4.66	5.17	30.48	29.02	15.60
		100	**100**	**100**	**100**	**100**	**100**	**100**
Labour compensation differentials (*)	male	110	108	100	109	112	120	110
	female	74	82	100	84	79	85	85
		100	**100**	**100**	**100**	**100**	**100**	**100**
	low	94	89	92	91	72	77	83
	medium	144	114	122	111	105	103	112
	high	213	193	141	158	113	138	146
		100	**100**	**100**	**100**	**100**	**100**	**100**

(*) Labour compensation differentials are obtained as the percentage ratio between per capita compensation of each labour category and the average per capita compensation of the branch.

We concentrate now on the analysis of employees. Table 16, based on table 9, displays the percentage distribution of employees of the six labour categories in each branch. The last row gives the incidence of each branch over the total economy in terms of employment.

Table 16 shows that in Italy employees in FTEUs are mainly men (57,9% of FTEUs). This is particularly evident in the construction sector where men represent 93,2% of total FTEUs. Only the Public administration and other services sector employ more women than men. With respect to the education level, 53,3% are low educated ad 63,9% of the low educated are men. Considering the quota of low educated within the same branch, the agricultural sector is the one registering the highest quota (88,4%) while the smallest quota is registered in the financial sector (25,4%). On the opposite the highest quota of high educated within the same branch is registered in the Public administration and other services sector (20,6%).

Table 16 **– Employees' labour by gender and education**

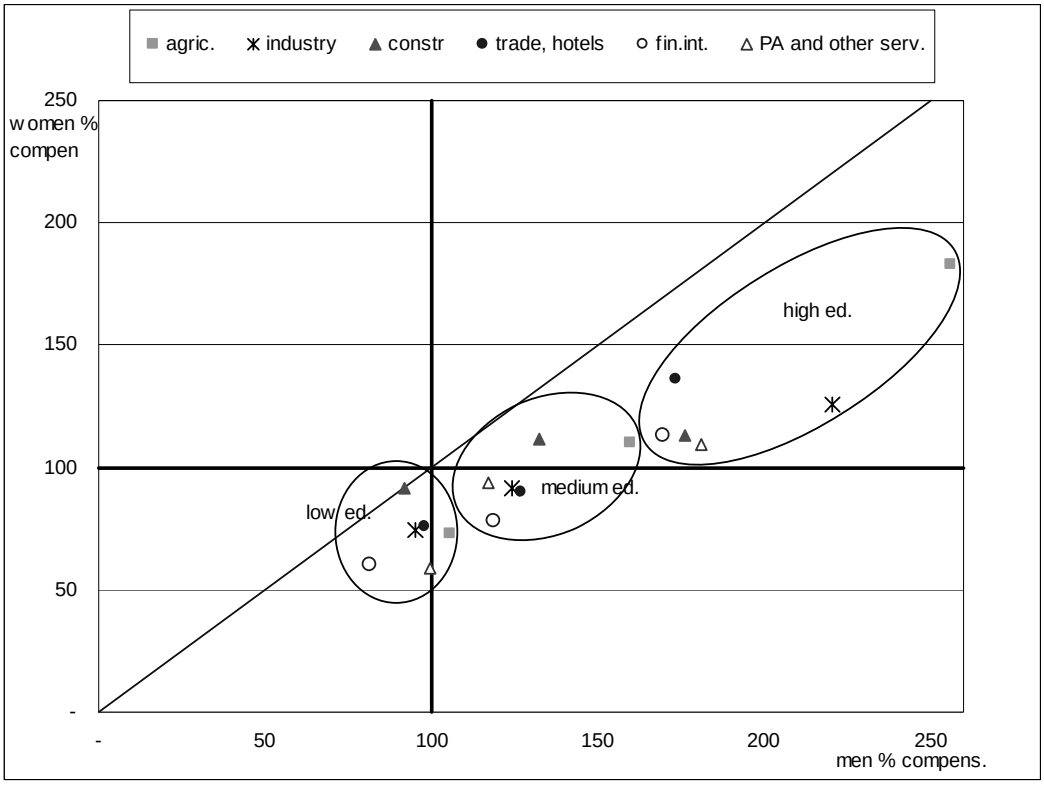
Percentage values

			Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
employees	male	low	54.9	44.9	77.0	40.1	12.3	18,4	34,0
		medium	8.6	21.2	15.1	20.0	33.1	13,7	18,9
		high	0.4	2.4	1.1	2.2	10.1	8,5	5,0
		total	63.9	68.5	93.2	62.3	55.5	40,6	57,9
	female	low	33.5	20.6	2.2	20.1	13.0	20,7	19,2
		medium	2.5	10.0	4.5	16.3	28.3	26,7	18,1
		high	0.1	0.9	0.1	1.3	3.1	12,1	4,8
		total	36.1	31.5	6.8	37.7	44.5	59,4	42,1
Total employees			**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
total low			88,4	65,4	79.2	60.3	25.4	39.1	53.3
total medium			11,1	31,3	19.6	36.3	61.4	40.3	36.9
total high			0,5	3,3	1.2	3.4	13.2	20.6	9.8
Total employees			**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
FTEU branch / FTEU total economy			3,6	27,2	5.5	20.9	9.9	33.0	100.0

Figure 2 pictures compensations differential by gender and education level for each branch. Each point coordinates correspond to percentages, with respect to the branch average, of male compensation (x axis) and female compensation (y axis) with the same education level working in the same branch. The value of 100 on both axes corresponds therefore to the branch average compensation. Points on the bisector represent cases in which average male compensation equals the female one. Points at the right (left) hand side of the vertical axis placed at value 100 represent men labour categories whose compensation is higher (lower) than the branch average. Correspondingly points above (below) the horizontal axis placed at value 100 represent women labour categories whose compensation is higher (lower) than the branch average. The figure shows as all points are below the bisector, proving that male work is more remunerated than the female one. The distance grows with the education level. Moreover figure 2 illustrates how for males medium education levels and in many cases even low education level assure, on average, an income which is equal or higher than the branch average, since it is, in percentage, equal or higher than 100. Female average compensation, instead, is higher than the branch average only when the education level is high. The only exception is in the agriculture and construction sectors where, presumably, women have higher professional status, even for medium education level. Within the same branch, differences in compensations among different work typologies can be also ascribed to differences in hours worked[17], in professional status, in years of service, or to productivity premia. Also the composition in terms of registered and non-registered work in the different work typologies can explain gender and education compensation differentials. Non-registered workers compensation does not include in fact social contributions. It is therefore, *ceteris paribus*, lower than registered workers compensation. Some branches record a higher occurrence of the non-registered work for women. This brings female average compensation to be lower than that of males, for the same branch and education level.

17. FTEUs are computed taking into account part-time work, but not overtime. This is why compensation differentials can not be explained by the prevalence of part-time work in some categories. It is possible instead to ascribe them to overtime work.

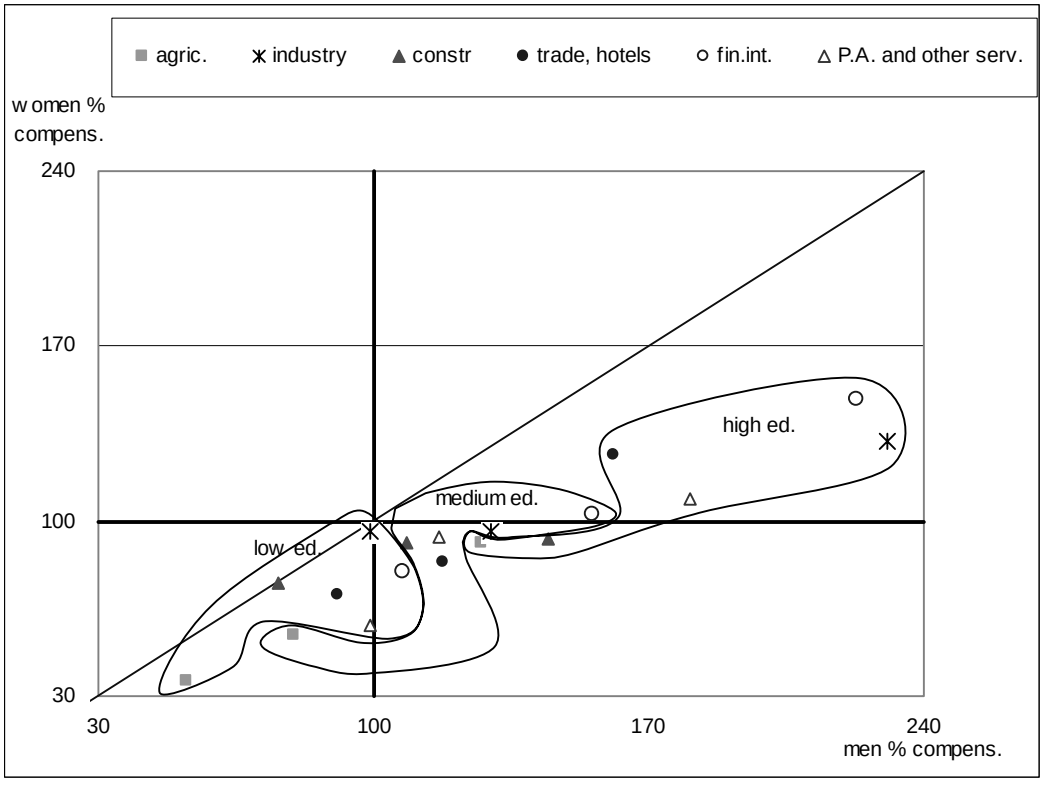
Figure 2. **Compensation of employees gender differentials by education level (branch average=100) , Italy -1996**



The situation pictured in figure 3 is more complex. It shows differentials with respect to the average national compensation. In this case compensation differentials can be also explained by a branch effect. Figure 3[18] therefore allows explaining differentials jointly with branch, gender and education effect. Moreover, the comparison with figure 2 highlights the sole branch effect. For example, figure 3 illustrates that the manufacturing and financial intermediation sectors record higher compensation than the national average, for each gender and education level, since they are always pictured in a high-right position with respect to the other points in the same circle. If we compare the same points in figure 2, it is possible to notice as they are placed at the opposite extreme in the same education circle. This proves that the male comparative advantage is mainly due to the branch more than to the education level. The joint effect branch-education-gender is more evident in the case of agriculture and construction. In these sectors for women a high education level is not enough to perceive a remuneration above the national average (figure 3), while it allows overcoming the branch average (figure 2).

18. Criteria for the construction of the picture are the same as those described for figure 2: therefore bisector and vertical and horizontal axis can be interpreted in the same way.

Figure 3. **Employees compensation gender differential for each education level (national average=100), Italy – 1996**



In the Annex, some elaboration on the weight of each labour category in terms of FTEU and the wage gaps are presented.

International comparisons[19]

Figures 4 and 5 picture the education gap, *i.e.* they show how much, for the same gender, wages[20] vary by education level in each branch. The analysis is carried out separately for males (figure 4) and females (figure 5). Values are obtained as the ratio between the average wage of each education level and the corresponding branch average wage. Figures are in percentages.

The Italian education gap is higher than the one recorded in the other countries: this may imply that in Italy education "pays" more and that a high education level increases the probability to have a higher compensation. In the three countries the "gain" due to education is in the average higher for males.

In Italy the "gain" due to education is more evident in the agricultural sector (where the number of non-registered workers with low education is particularly high), both for

19. Evaluations are restricted to countries having comparable FTEUs estimates.

20. In international comparisons we analyse wages, while examining the sole Italian case we referred to compensation of employees. We remind that the latter are obtained summing social contributions to wages.

males and females; this sector is followed by the manufacturing industries for males and by the services sector for females.

Figure 6 reports the *gender gap, i.e.* the percentage ratio between the remuneration of females and the remuneration of males, given the education level and the industry: when the ratio equals 100 the remuneration of females is equal to that of males with the same education level and in the same industry. On the contrary, when the ratio is lower (higher) than 100, the remuneration of females is lower (higher) than that of males with the same education level and in the same industry.

Figure 4. Education gap, males (100=branch average male wages)

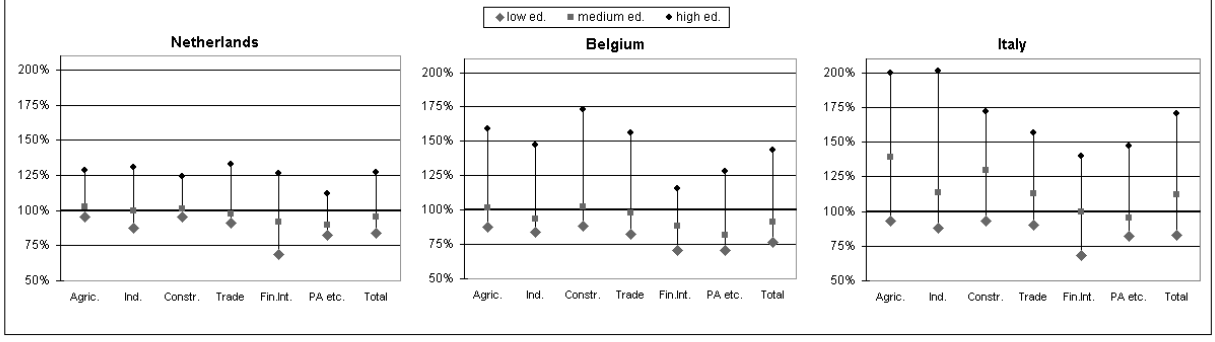


Figure 5. Education gap, females (100=branch average female wages)

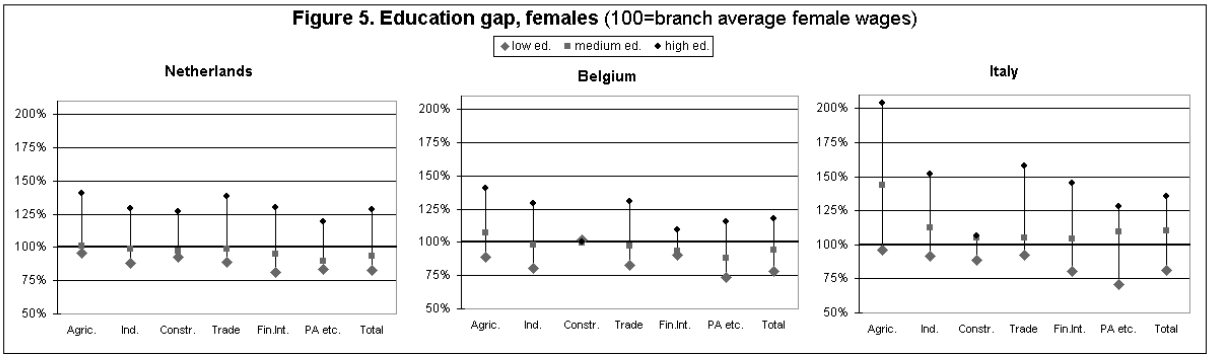
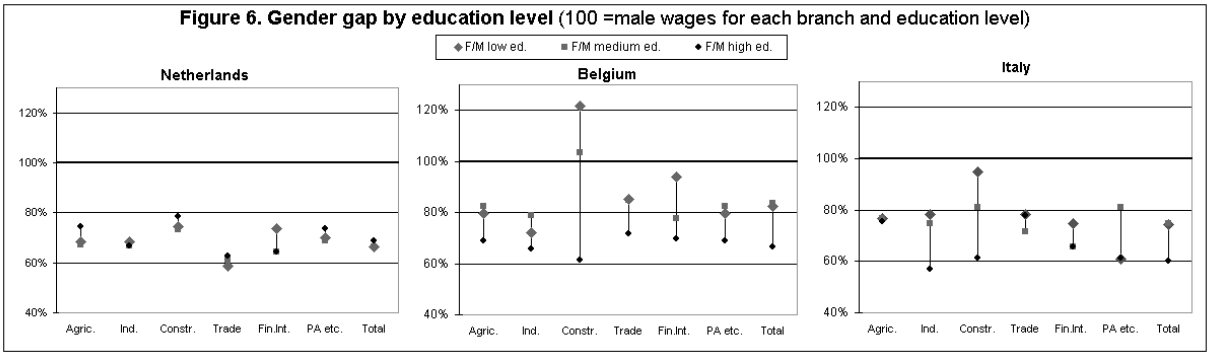


Figure 6. Gender gap by education level (100 =male wages for each branch and education level)

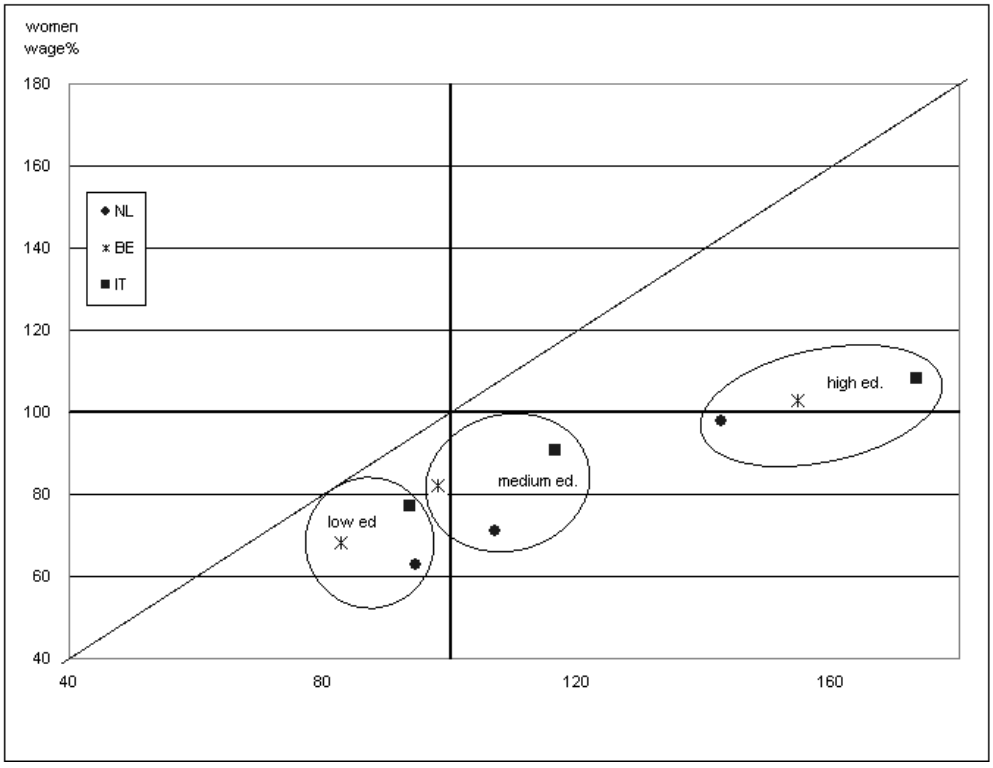


In the three countries females are paid less than men, for each education level and in each industry. The only exception is the construction sector in Belgium where low and medium educated females receive a higher remuneration than men with the same education level in the same sector. Remember that, in this sector, women presumably carry out jobs in higher professional status even when they are low educated. The same phenomenon in Italy does not allow women to gain higher remuneration than men but it reduces the gap between males and females wages.

Figure 6 also tells that in the Netherlands the gender gap does not vary with the education level as shown by the proximity of the points in the graph. The gap increases with the education level in the case of Belgium and Italy: highly educated women receive a remuneration which in the average is higher than that received by low educated women; but this gain is lower than that registered by males in the same sector and with the same education level. Therefore for high level of education the gender gap is higher than that for low educated workers.

Analogously to figures 2 and 3, figure 7 shows, for each country and for the total economy, wage differentials due to gender and education (average national wages =100).

Figure 7. **Gender wage differential by education level (national average=100) - Italy (1996), Belgium and the Netherlands (1997)**



It synthesises what is shown in details in figures 4-6 and points out that wages are positively correlated with the education level. Moreover it shows that females' wages are systematically lower than males ones and the gap increases with the education level. Note the case of the Netherlands where highly educated women receive a lower wage than the national average.

Conclusion

In most of the European countries labour data are not integrated with national accounts statistics. On the contrary, Italy has a long tradition in this field, GDP estimates being based on an exhaustive estimation of the units of labour employed in the production process. This is essential in the compilation of a labour-oriented SAM. One of the objectives of the European LEG on SAMs was, in fact, to favour the estimation of labour

input in the national accounts context by developing a labour-oriented SAM. Therefore the group decided to design a SAM where all monetary flows related to labour and the corresponding labour units are analysed by industry, status in employment (employees, self-employed), gender and education level.

In order to compile the pilot SAM for Italy, we took into account gender and education to estimate both labour units and compensation of labour. In this respect we replicated as far as possible the national account method, where traditionally the background characteristics of the workers like gender and education are not taken into account for the estimation of labour units and compensation of employees.

For what concerns employment we replicated the benchmark process adding gender as an input variable. The total amount of persons employed and jobs summed up to the same figures obtained in the benchmark of national accounts: in fact they are determined respectively by the amount of persons employed surveyed by the Census of the Population (integrated with LFS) and the number of jobs surveyed by the Manufacturing and Services Census, which represented the input sources in the benchmark and in the re-benchmark process. Nevertheless some differences have arisen. Since this method gives results which crucially rely on the disaggregation adopted, the use of a different breakdown (gender, three status in employment and only 16 industries instead of 873), determined a different distribution of employment among registered, non-registered and multiple jobs. In particular the weight of registered primary jobs over total amount of jobs resulting from the comparison of demand side and supply side sources was 1% lower in the re-benchmarking with respect to the benchmark. This difference is not significant thus validating the estimates made in the benchmark. But, at the same time, it proves that the level of detail in the analysis affects the results obtained and therefore it requires a deep investigation in order to determine the appropriate and reliable level of analysis.

For what concerns compensation of employees, we differentiated the NA per capita values according to proper wage differentials. This means that NA constraints are an input of the method. As a result we cannot clearly point out the changes induced by the inclusion of the worker's background characteristics in the estimation process. For this purpose we ought to estimate *ex novo* per capita values on the basis of both currently used data sources and the ones we have used for this exercise. This exercise has pointed out the lack of appropriate data sources for the estimate of reliable wage differentials, especially for workers employed in agriculture. Existing data sources do not cover all the economic activities or have too small sub-samples for the cross-classification of interest.

These considerations show how the application of the same methodology can lead to different estimates when different variables of analysis are used. In general this shows how relevant is the choice of variables of analysis for the estimation procedure. In particular for SAMs, this makes evident the relevance of choosing a top-down rather than a bottom-up approach for the compilation process, especially when the SAM variable of analysis are not used for national accounts estimates.

The results presented here show the existence of compensation differentials due to gender and education level, not only in Italy but also in other two countries in the EU. Also in this perspective, *i.e.* when analysing the results and investigating on their causes, the role of the variables used in order to disaggregate the data is important. For example many times it has been pointed out that compensation differentials due to gender may be explained, among other reasons, by the real capacity and/or possibility of the worker to get to a professional status adequate to his/her education level. It would be necessary and

it is desirable to further develop the level of analysis of this study, including, for example, the professional status.

In this paper the analysis of the results has been limited to compensation differentials at the national and international level. Many studies can be carried out within a SAM system. It is worth noting here that every kind of analysis which, differently than SAM, is carried out outside the macroeconomic framework of the national accounts would not allow to catch the link between the labour market dynamic and the macroeconomic variables. On the contrary in a SAM the links between the economic actors in all the phases of the economic process are made explicit. In particular the worker is considered both as labour factor and as income recipient within his/her household. This allows, for example, to measure the effects on the household income of an increase of women participation in the labour market, of retirement of wide cohorts in a certain time lag, of an increase in the education level of workers, etc.

This issue assumes a particular relevance not only at the national level but especially in the European context where planning and evaluating of European policies on the labour market requires more and more the availability of integrated information systems where analytical data on the structure and dynamics of the labour market are linked to economic fundamentals such as the GDP, public debt, the inflation rate, etc. The compilation of SAMs represents an important step towards this kind of integrated analysis.

For this purpose it would be important to elaborate SAMs timely and regularly in order to be provided with time series. This allows analysing how the distribution of income changes in time and evaluating the efficacy of policies towards the achievement of social sustainability.

Annex

Tables A.1 - A.3 are based on data reported in table 9: they show the percentage composition of labour input by gender, education and industries. In particular table A.1 analyses the distribution of labour by education in each industry and status in employment (first block of rows) and the distribution by gender in each industry and status in employment (second block of rows). Table A.2 points out the distribution of labour by education level separately for males and females in each industry and status in employment. Table A.3 shows how labour by gender and labour by education are distributed by industries.

Tables A.4 - A.6 refer to compensations of labour categories. In particular table A.4 displays implicit per capita compensation of labour by industry, status, gender and education. Table A.5 reports wage differentials due to education level, by industry, status and gender. Finally, table A.6 shows, for each education level, the ratio between per capita compensation of females and per capita compensation of males: the analysis is performed for each industry and separating out employees and self-employed.

Table A.1 - **Labour by education and by gender**

Full time equivalent units, % - 1996

		Agriculture etc.	Mining, quarrying, manufac. etc.	Construc.	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
Status	education							
Employees	Low	0.88	0.65	0.79	0.60	0.25	0.39	0.53
	medium	0.11	0.31	0.20	0.36	0.61	0.40	0.37
	High	0.01	0.03	0.01	0.03	0.13	0.21	0.10
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Self-employed	Low	0.88	0.65	0.62	0.66	0.14	0.45	0.60
	medium	0.11	0.31	0.29	0.31	0.25	0.30	0.27
	High	0.01	0.04	0.09	0.03	0.60	0.25	0.14
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total	Low	0.88	0.65	0.74	0.62	0.22	0.40	0.55
	medium	0.11	0.31	0.22	0.35	0.51	0.39	0.35
	High	0.01	0.03	0.03	0.03	0.27	0.21	0.11
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Status	*Gender*							
Employees	Male	0.64	0.68	0.93	0.62	0.56	0.41	0.58
	Female	0.36	0.32	0.07	0.38	0.44	0.59	0.42
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Self-employed	Male	0.78	0.71	0.94	0.66	0.83	0.57	0.72
	Female	0.22	0.29	0.06	0.34	0.17	0.43	0.28
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total	Male	0.72	0.69	0.93	0.64	0.64	0.42	0.61
	Female	0.28	0.31	0.07	0.36	0.36	0.58	0.39
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table A.2 - **Labour by gender and education**

Full time equivalent units, % - 1996

Status	gender	education	Agriculture etc.	Mining, quarrying, manufac. etc.	Construc.	Trade, repair, hotels, etc	Financial intermediation etc.	Public administr. etc.	Total
Employees	Male	low	0.86	0.65	0.83	0.64	0.22	0.45	0.59
		medium	0.13	0.31	0.16	0.32	0.60	0.34	0.33
		high	0.01	0.04	0.01	0.03	0.18	0.21	0.09
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Female	low	0.93	0.65	0.32	0.53	0.29	0.35	0.46
		medium	0.07	0.32	0.66	0.43	0.64	0.45	0.43
		high	0.00	0.03	0.01	0.03	0.07	0.20	0.11
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Self-employed	Male	low	0.88	0.66	0.61	0.66	0.09	0.43	0.58
		medium	0.11	0.30	0.30	0.31	0.24	0.27	0.26
		high	0.01	0.04	0.09	0.03	0.67	0.29	0.16
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Female	low	0.88	0.63	0.78	0.65	0.41	0.47	0.63
		medium	0.11	0.33	0.16	0.32	0.31	0.33	0.29
		high	0.01	0.04	0.05	0.03	0.27	0.19	0.08
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total	Male	low	0.87	0.66	0.77	0.65	0.17	0.45	0.59
		medium	0.12	0.31	0.20	0.32	0.46	0.33	0.31
		high	0.01	0.04	0.03	0.03	0.37	0.22	0.11
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Female	low	0.91	0.65	0.43	0.57	0.31	0.36	0.49
		medium	0.09	0.32	0.54	0.39	0.59	0.44	0.41
		high	0.00	0.03	0.02	0.03	0.10	0.20	0.11
		Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table A.3 - **Labour by gender and education**

Full time equivalent units, % - 1996

Status	Education	Agriculture etc.	Mining, quarrying, manufac. etc.	Construc.	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
Employees	Low	0.06	0.33	0.08	0.24	0.05	0.24	1.00
	Medium	0.01	0.23	0.03	0.21	0.16	0.36	1.00
	High	0.00	0.09	0.01	0.07	0.13	0.69	1.00
	Total	0.04	0.27	0.05	0.21	0.10	0.33	1.00
Self-employed	Low	0.27	0.10	0.07	0.44	0.03	0.09	1.00
	Medium	0.08	0.11	0.08	0.47	0.13	0.13	1.00
	High	0.01	0.02	0.05	0.09	0.62	0.21	1.00
	Total	0.18	0.09	0.07	0.40	0.14	0.12	1.00
Total	Low	0.11	0.28	0.08	0.29	0.04	0.20	1.00
	Medium	0.02	0.21	0.04	0.25	0.16	0.32	1.00
	High	0.00	0.07	0.02	0.08	0.27	0.55	1.00
	Total	0.07	0.23	0.06	0.25	0.11	0.28	1.00
Status	*Gender*							
Employees	Male	0.04	0.32	0.09	0.22	0.10	0.23	1.00
	Female	0.03	0.20	0.01	0.19	0.10	0.47	1.00
	Total	0.04	0.27	0.05	0.21	0.10	0.33	1.00
Self-employed	Male	0.19	0.09	0.09	0.37	0.16	0.09	1.00
	Female	0.14	0.09	0.01	0.48	0.09	0.18	1.00
	Total	0.18	0.09	0.07	0.40	0.14	0.12	1.00
Total	Male	0.08	0.26	0.09	0.26	0.11	0.19	1.00
	Female	0.05	0.19	0.01	0.23	0.10	0.42	1.00
	Total	0.07	0.23	0.06	0.25	0.11	0.28	1.00

Table A.4 - **Implicit per capita (compensation of labour/fteu) by industry, status, gender, education**

Current thousands euro, 1996

			Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
Employees	male	*Low*	14.04	26.53	20.16	24.23	28.69	26.45	24.52
		Medium	21.24	34.69	29.00	31.43	41.60	31.18	33.86
		high	34.04	61.56	38.54	42.98	59.45	48.24	51.60
		Total	15.13	30.28	21.80	27.19	42.00	32.63	29.90
	female	*Low*	9.64	20.68	20.01	18.81	21.21	15.55	17.79
		Medium	14.65	25.61	24.45	22.25	27.38	24.93	24.85
		high	24.34	35.14	24.78	33.73	39.75	29.11	30.35
		total	10.03	22.67	23.02	20.80	26.43	22.51	22.26
	total		13.29	27.88	21.89	24.78	35.08	26.62	26.68
Self-employed	male	*low*	15.92	16.55	15.24	20.51	12.20	12.44	17.49
		medium	23.84	21.09	20.46	25.10	18.40	13.92	21.95
		high	33.15	37.08	26.97	32.88	24.85	21.67	25.30
		total	16.93	18.66	17.89	22.32	22.16	15.56	19.89
	female	*low*	11.11	13.00	12.95	16.05	9.42	7.92	13.27
		medium	17.29	15.96	15.82	18.01	12.17	11.30	15.80
		high	24.00	20.72	14.05	26.14	15.62	13.32	16.77
		total	11.87	14.28	13.48	16.96	11.99	10.08	14.27
	total		15.82	17.38	17.63	20.52	20.45	13.21	18.32
Total	male	*low*	15.25	25.61	19.08	22.82	25.43	24.74	22.66
		medium	22.80	33.47	25.47	29.10	36.93	29.36	31.21
		high	33.44	59.28	29.82	39.53	35.46	43.78	41.04
		total	16.29	29.22	20.72	25.38	34.42	30.47	27.24
	female	*low*	10.32	20.06	16.94	17.76	19.08	14.85	16.84
		medium	16.21	24.79	23.82	21.12	26.29	24.21	23.81
		high	24.12	33.63	18.81	31.49	30.53	28.07	28.79
		total	10.90	21.98	20.73	19.52	24.47	21.65	20.97
	total		14.80	26.95	20.72	23.26	30.80	25.37	24.80
Employees	low		12.37	24.69	20.16	22.42	24.84	20.68	22.09
	medium		19.77	31.78	27.95	27.31	35.04	27.04	29.45
	high		32.00	54.20	37.43	39.58	54.85	37.05	41.19
Self-employed	low		14.86	15.55	15.08	19.02	10.85	10.40	16.25
	medium		22.44	19.50	20.31	22.70	17.10	12.67	20.09
	high		31.30	32.08	26.52	30.73	24.14	18.92	23.97
Total	low		13.85	23.88	19.00	21.13	22.20	19.59	20.65
	medium		21.36	30.70	25.21	25.81	32.42	26.02	27.83
	high		31.53	52.07	29.30	36.70	34.81	35.03	36.22

Table A.5 - **Education gap**

Percentage values

			Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
employees	male	low	93	88	92	89	68	81	82
		medium	140	115	133	116	99	96	113
		high	225	203	177	158	142	148	173
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
	female	low	96	91	87	90	80	69	80
		medium	146	113	106	107	104	111	112
		high	243	155	108	162	150	129	136
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
		Low	93	89	92	90	71	78	83
		Medium	149	114	128	110	100	102	110
		High	241	194	171	160	156	139	154
		total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
self-employed	male	low	94	89	85	92	55	80	88
		medium	141	113	114	112	83	90	110
		high	196	199	151	147	112	139	127
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
	female	low	94	91	96	95	79	79	93
		medium	146	112	117	106	102	112	111
		high	202	145	104	154	130	132	118
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
		low	94	89	85	93	53	79	89
		medium	142	112	115	111	84	96	110
		high	198	185	150	150	118	143	131
		total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total	male	low	94	88	92	90	74	81	83
		medium	140	115	123	115	107	96	115
		high	205	203	144	156	103	144	151
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
	female	low	95	91	82	91	78	69	80
		medium	149	113	115	108	107	112	114
		high	221	153	91	161	125	130	137
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***
		low	94	89	92	91	72	77	83
		medium	144	114	122	111	105	103	112
		high	213	193	141	158	113	138	146
		total	***100***	***100***	***100***	***100***	***100***	***100***	***100***

Table A.6 - **Gender gap**

Percentage values

		Agriculture etc.	Mining, quarrying, manufacturing etc.	Construction	Trade, repair, hotels, etc	Financial intermediation etc.	Public administration etc.	Total
employees	***F/M***	66	75	106	76	63	69	74
	F/M low	69	78	99	78	74	59	73
	F/M medium	69	74	84	71	66	80	73
	F/M high	71	57	64	78	67	60	59
self-employed	***F/M***	70	77	75	76	54	65	72
	F/M low	70	79	85	78	77	64	76
	F/M medium	73	76	77	72	66	81	72
	F/M high	72	56	52	79	63	61	66
Total	***F/M***	67	75	100	77	71	71	77
	F/M low	68	78	89	78	75	60	74
	F/M medium	71	74	94	73	71	82	76
	F/M high	72	57	63	80	86	64	70

References

BANCA D'ITALIA (1991,1993,1995) "I bilanci delle famiglie italiane", in *Supplementi al Bollettino Statistico*.

Battellini F. (2001) "Supply and demand of labour" draft of section 3.2 of the LEG Manual on the SAM.

Battellini F., Caricchia A., Coli A., (1997), 'La matrice de compatibilité sociale et les comptes satellites comme instruments d'intégration des statistiques économiques et sociales' in: E. Archambault and M. Boeda (eds), Compatibilité nationale - Développements récents, Economica, Paris.

Battellini F., Coli A., Tartamella F. (2001), "The construction of a value added matrix: the Italian experience", paper presented at the *SAM users workshop*, November 2001, Rome.

Battellini F., Coli A., Tartamella F. (2002), "Differenziali di remunerazione nel quadro macroeconomico dei conti nazionali", in ISTAT *Rapporto Annuale. La situazione del Paese nel* 2001 Roma.

Calzaroni, M., The exhaustiveness of production estimates: new concepts and methodologies, International Conference on Establishment Surveys, Buffalo, USA, 17-21 June, 2001.

CARITAS (1997) "Immigrazione", Dossier statistico.

Carlucci M., and R. Zelli, A sam-based system focused on labour market: perspectives and utilizations, Paper presented at the SAM User Workshop, Rome, November 2001.

Cimino E., Coli A. (1998), The compilation of a social accounting matrix for Italy, Paper prepared for the 25th General Conference of The International Association for Research in Income and Wealth, Cambridge.

Coli A. (2001) "The demand side of the labour market in a SAM" draft of section 2.2 of the LEG Manual on the SAM.

Coli A. (2001) "La remunerazione del fattore lavoro in una SAM" terzo rapporto per il gruppo di lavoro ISCONA sulla "Stima di matrici di contabilità sociale".

Coli A., Tartamella F. (2000), The link between national accounts and households micro data, Paper prepared for the 2000 meeting of the Siena group on social statistics, Maastricht.

Coli A., Tartamella F. (2000), 'A Pilot Social Accounting Matrix for Italy with a Focus on Households', Paper prepared for the 26th General Conference of the IARIW in Cracow, Poland.

EUROSTAT (1996) "European System of Accounts: ESA 1995".

EUROSTAT (forthcoming) "Handbook on Social Accounting Matrices and Labour Accounts".

Hayes K. (1996) "The Exhaustiveness of the GNP Estimates in the EU Member States", paper submitted by Eurostat at the Joint UNECE/Eurostat/OECD Meeting on National Accounts, Geneva: 30 April-3 May 1996

ILO (1993), "Resolution of the fifteenth International Conference of Labour Statisticians".

ISTAT (1991) "Classificazione delle attività economiche", in Metodi e norme, Roma.

ISTAT (1993), "The underground economy in Italian economic accounts", Annali di Statistica, Serie X, vol.2., Roma.

ISTAT (1996) "Verso il nuovo sistema di contabilità nazionale", in Annali di statistica, Roma.

ISTAT (1997) "Conti Nazionali Economici e Finanziari dei Settori Istituzionali" - Anni 1980-1995, Contabilità nazionale, tomo 2 in Annuari.

ISTAT (2000) "Tavola intersettoriale dell'economia italiana, anno 1992", in Informazioni, Roma.

ISTAT (2000) "La struttura del costo del lavoro e delle retribuzioni nella seconda metà degli anni '90", in Informazioni, Roma.

ISTAT(anni vari) "Indagine campionaria trimestrale sulle Forze di lavoro", in Annuari, Roma.

Leunis Wim (2000), "The description of ESA'95 employment; relation between Labour Force Survey and National Accounts in the Netherlands", interim summary report for Eurostat Task Force ESA Employment, Statistics Netherlands.

Keuning S.J,. De Ruijter Willem A. (1988) "Guidelines to the construction of a social accounting matrix", in Review of Income and Wealth.

OECD et al.(2002), "Measuring the Non-Observed Economy: a Handbook", Paris

Rey, G.M. (1997) "Economic Analysis and Empirical Evidence of Illegal Activity in Italy", in Contributi ISTAT, 6/1997, ISTAT, Roma

Skoglund Tor (2001), "Employment in the Norwegian National Accounts", Statistics Norway

UNITED NATIONS ET AL. (1993) "System of National Accounts: SNA93".