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Part I: Non-cash incomes  
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**THE AGGREGATE DISTRIBUTIONAL IMPACT OF NON-CASH  
INCOMES IN BELGIUM**

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## 1. Introduction

Distributional analyses mainly focus on inequality of cash incomes (see e.g. Atkinson et al. 1995; Marical et al. 2006). However, as the balance between cash transfers and social benefits in kind may vary between countries, in kind services should in principle be included in the analysis to give a more accurate picture. Moreover, countries may also differ with respect to private incomes in-kind, such as the advantage deriving from home-ownership, income from home production or employer-provided fringe benefits. In previous reports we have already discussed the distributional effects of the most important non-cash incomes in Belgium, namely imputed rent and company cars as private income in-kind, and education and health care as publicly provided benefits (see Goedemé & Verbist, 2006; Verbist & Lefebure 2007a, 2007b & 2007c).

In this report we bring the four components together for Belgium and analyse the aggregate distributional impact of the inclusion of these non-cash incomes in the income concept. In the following section we summarize briefly the four types of non-cash incomes in Belgium. We then calculate the aggregate distributive effects and present the results in section 3. Section 4 summarizes the main findings.

## 2. The calculation of non-cash incomes: the four components

For Belgium we have been able to identify and analyse four different components of non-cash income. The publicly provided benefits include expenditures on education on the one hand and on health care services on the other. For **public education** expenditures we calculated the average public expenditure per pupil (or student) by level of education, using data from the OECD (2005). These amounts were assigned to the person with the relevant level of education and then added to disposable household income of the household to which the pupil/student belongs. The distributive implications of including this benefit in-kind in the household income concept can be found in Goedemé and Verbist (2006). Overall we found that including education had an equalizing effect. This was mainly due to transfers going to pupils in compulsory education (corresponding roughly to primary and secondary

education); the equalizing effect of tertiary education was much smaller, mainly due to its distribution pattern of participation.

**Public health care** is one of the largest categories of government expenditures. However, including these services in a distributional analysis provides probably the most conceptual and practical difficulties of our four non-cash income components: how should one value public health services to households? How should we distribute the aggregate value of these services among individuals (for the various options see e.g. Marical et al. 2006, Garfinkel et al. 2006)? We opted for the insurance value approach to calculate public health care expenditures per individual according to his/her age. Including these health care benefits in disposable household income had, expectedly, a strong equalizing effect: the main beneficiaries are older people who are more prominent at the bottom of the distribution (for more detailed results see Verbist & Lefebure, 2007b).

For Belgium we have been able to identify and analyse two types of private income in-kind, namely 1) the advantage arising from home-ownership or reduced rent, captured by the concept of imputed rent, and 2) the benefit derived from the private use of company cars. We explored two methods to calculate **imputed rent** for the relevant households. First, we looked at the self-assessed value of houses; secondly we used an opportunity cost approach. Although the correlation of the two estimates is rather low, they both yield similar distributional consequences: overall, including imputed rent in the income concept results in a reduction of inequality. This is to a major extent due to the importance of imputed rent for older people: outright home-ownership is widespread among the elderly, as in most cases they are not burdened any more with mortgages (for more details see Verbist and Lefebure, 2007a). For private non-cash incomes we were only able to investigate the effect of **private use of company cars**. The effect of including these derived benefits was small and lead to small uplift in inequality (see Verbist and Lefebure, 2007c).

We now bring these four non-cash income components in Belgium together for an analysis of the aggregate distributional analysis. For imputed rent we only present the results based on the opportunity cost method. As in the study of the separate components, we use again the Belgian EU-SILC of the survey year 2004 (with

income data referring to 2003). We have used the Belgian dataset, which apart from the variables provided to EUROSTAT also contains some extra information. The SILC-2004 of Belgium contains 5,275 households and 12,971 individuals. For the distribution analysis households with a negative or zero household income were excluded, which leaves us with 5,248 households and 12,930 individuals for our analyses. The sample is weighted up to population level.

### **3. Results**

We present the results for each component separately, and for various combinations of the components. We look at the joint effect of publicly provided benefits on the one hand, and the joint effect of private incomes in-kind on the other. Next, we look at the joint effect of the three most important components, i.e. education, health care and imputed rent. Finally, the aggregate effect of all four components together is considered.

The unit of analysis is the individual in the context of his household. Baseline income is household disposable income on a yearly basis excluding fringe benefits (i.e. the monetary value of company cars). The income advantage of company cars for the household is compared to the baseline in both absolute and relative terms. Both disposable income and the income advantage from fringe benefits are equivalised in order to take account of family size and composition. The equivalence scale used is the modified OECD-scale, which attributes a value 1 to the first adult, 0.5 to each other adult and 0.3 to each child. Results are presented in the tables at the end of this paper.

#### ***3.1 Income advantages***

Average income advantages per quintile are presented in Table 1. The effect of health care is the largest (16.3% increase of disposable income), followed by education (13.2%) and imputed rent (6%). The distributive pattern of these three components is rather similar: the increase in disposable income is most important in the bottom quintile (39%, 30% and 8.9% respectively). Not surprisingly, the joint effect of these

three components is very high for the bottom quintile: if these in-kind benefits would be monetarised, then they would imply an increase in disposable income of 78%. For the upper quintile the impact is much smaller, though still considerable (an increase of 19.5% for the three largest components). Employer-provided fringe benefits represent a higher advantage when moving the income ladder. However, as company cars represent only a tiny fraction of disposable income, they hardly influence the overall pattern.

### ***3.2 Effect on income inequality and poverty***

The effect of including non-cash income components in the income concept on income inequality and poverty is measured by calculating a series of commonly used inequality and poverty measures for both baseline income and for income plus non-cash components. The inequality measures used are the Gini index and the Atkinson index for inequality aversion parameters 0.5 and 1.5. The poverty measures are those from the FGT family with parameters 0 (head count), 1 (normalized poverty gap) and 2 (average squared normalized poverty gap) (see Foster, Greer and Thorbecke, 1984). The poverty line is a variable one, which means that it is recalculated each time the income concept is changed.

As can be expected from our analysis on the basis of quintile distributions, inclusion of all four non-cash incomes considerably lowers inequality and poverty (see Table 2). The Gini coefficient decreases with 22.2%. This equalising effect is mainly driven by health care (-15.2%), and to a lesser extent by education (-7.5%). Imputed rent has a relatively small equalising impact (-1.3%), whereas company cars slightly increase inequality (+0.4%). The inequality indicator that is more sensitive to changes at the bottom of the distribution, namely the Atkinson 0.5, reports a higher decrease in inequality (-53.2%) than the Atkinson 1.5. Again, this result follows from the preponderance of health care. The effect on poverty is also considerable with a decrease varying from -43.1% (FGT0) to -64.3% (FGT2). Also here we find a higher effect for measures that are more sensitive to change at the bottom of the income distribution. And again, health care is the main driver of the decrease.

### **3.3 Breakdowns for characteristics of the household**

Table 3 presents average income before and after inclusion of all four non-cash income components broken down for household characteristics, as well as the decomposable mean logarithmic deviation (MLD), which allows distinguishing within and between-group inequality. The household characteristics considered are: household type; socio-economic group of the reference person; educational level of the reference person and age of the household member. The highest relative increase in income is experienced by mono-parental households and older singles and couples (+63.9% and 47.4%), individuals with a low education level and younger than 25 or older than 65. Inequality decreases also the most within these groups. Those who benefit the least are singles or couples younger than 65, and individuals aged between 25 and 64; this should not come as surprise as health care and imputed rent are mainly beneficial for the elderly, whereas education provides a benefit for the younger. As older people have in general a lower education level, income increases less for the higher educated. Inequality within groups drops considerably, but also between-group inequality. As income increases most for the elderly, and the younger, between group inequality decreases considerably when we look at age categories and at household types (-63.6% and 74.2% respectively)

Decomposing the FGT-poverty measures for these characteristics yields strong decreases for the groups already mentioned (see Table 4). According to all three FGT-measures poverty decreases most strongly for singles/couples older than 65 (FGT(0): -65.9%; FGT(1): -78.4%; FGT(2): -84.7%), for lone parents (FGT(0): -78.2%; FGT(1): -76.8%; FGT(2): -78.7%) and for couples with children younger than 18 (FGT(0): -57.6%; FGT(1): -70.7%; FGT(2): -79.6%). For younger singles/couples the headcount increases (+17.9%): their income increases far less than for the other groups, and hence they experience a relative decline in income position. Consequently, their share in the poor population goes up considerably to 41.6% (FGT(0); to 48.6% for FGT(1) and to 56% for FGT(2)). A similar shift is visible if we focus on age of the household member, where prime-age individuals make up a larger share of the poor population after inclusion of non-cash incomes.

#### 4. Conclusion

Summarising, we find that incorporating non-cash incomes has a sizeable impact on the income distribution. Inclusion of overall public and private non-cash income generally results in a dramatic decline in income inequality and poverty in Belgium. The largest impact is due to public non-cash incomes with the main driver being health care, though the effect of public education expenditures is also non-negligible. The impact of private non-cash incomes is much smaller: inclusion of imputed rent reduces income inequality, but the effect is much smaller than that of the two publicly provided benefits; inclusion of employer-provided benefits is the only component that leads to increase of inequality, but this effect is very tiny.

We have to bear in mind, though, that the overall results are to an important extent due to the methodology used to capture the distributive implications of public health care expenditures. The insurance value approach, used to estimate the benefit deriving from public health care, is based on age-specific categories. Hence, older people benefit proportionally much more from this form of non-cash income. Inclusion of this component implies a strong redistributive shift towards the elderly. Another methodology, e.g. one that incorporates differences in health care needs, is probably more appropriate and might yield different redistributive results (though the equalising effect would probably still be present, be it in an attenuated form).

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## 6. Tables

Table 1: Income advantages from public and private non-cash incomes, quintile distribution, Belgium 2003.

Quintile	Disposable income (EUR)(baseline)	Imputed rent (IR)	Employer-provided benefits (EPB)	Education (Ed)	Health Care (HC)	IR + EPB	Ed + HC	IR + Ed + HC	All
1 (bottom)	7540	8.9%	0.1%	30.1%	39.0%	9.0%	69.1%	78.0%	78.1%
2	11857	7.2%	0.2%	18.4%	26.1%	7.3%	44.5%	51.6%	51.8%
3	15362	6.3%	0.2%	14.8%	17.7%	6.5%	32.5%	38.7%	38.9%
4	19402	5.5%	0.4%	12.4%	12.6%	5.9%	25.0%	30.5%	30.9%
5 (top)	29115	4.9%	0.6%	6.3%	8.2%	5.5%	14.6%	19.5%	20.1%
All	16653	6.0%	0.4%	13.2%	16.3%	6.3%	29.5%	35.5%	35.8%

Table 2: Inequality and poverty indices, Belgium 2003.

	Baseline	Imputed rent (IR)	Employer-provided benefits (EPB)	Education (Ed)	Health Care (HC)	IR + EPB	Ed + HC	IR + Ed + HC	All
Gini	0.2608	0.2574	0.2619	0.2412	0.2212	0.2584	0.2028	0.2020	0.2029
Atkinson 0.5	0.0580	0.0561	0.0584	0.0497	0.0415	0.0565	0.0350	0.0346	0.0349
Atkinson 1.5	0.2216	0.1893	0.2227	0.2017	0.1230	0.1903	0.1046	0.1029	0.1036
FGT0	0.1476	0.1470	0.1489	0.1413	0.1050	0.1480	0.0870	0.0838	0.0840
FGT1	0.0394	0.0377	0.0396	0.0360	0.0230	0.0379	0.0184	0.0178	0.0178
FGT2	0.0175	0.0164	0.0176	0.0151	0.0087	0.0165	0.0066	0.0062	0.0063
Proportional changes in inequality indices (in %)									
Gini		-1.3	0.4	-7.5	-15.2	-0.9	-22.2	-22.6	-22.2
Atkinson 0.5		-3.2	0.8	-14.2	-28.3	-2.5	-39.6	-40.3	-39.8
Atkinson 1.5		-14.6	0.5	-9.0	-44.5	-14.1	-52.8	-53.6	-53.2
FGT0		-0.4	0.9	-4.3	-28.8	0.3	-41.1	-43.2	-43.1
FGT1		-4.2	0.6	-8.5	-41.5	-3.6	-53.3	-54.9	-54.8
FGT2		-6.5	0.6	-14.1	-50.3	-6.0	-62.2	-64.5	-64.3

Source: own calculations on SILC-Belgium 2004.

Table 3: Inequality decomposition by household characteristics, Belgium 2003.

Characteristic of household or household head	Pop. share in %	Mean equiv. income		Income position		% change in income	Mean Log Deviation (MLD)		% change in MLD	% contribution to aggr. inequality	
		Baseline	Including All	Base-line	Including All	Including All	Base-line	Including All	Including All	Base-line	Including All
<b>Household type</b>											
Older single persons or couples (at least one 65+)	15.5	13574	20005	82	88	47.4	0.1052	0.0476	-54.8	12.9	10.3
Younger single persons or couples (none 65+)	22.7	18799	22479	113	99	19.6	0.1679	0.1185	-29.4	30.1	37.6
Couple with children ≤18 (no other HH members)	37.8	17245	24424	104	108	41.6	0.1032	0.0545	-47.1	30.9	28.9
Mono-parental household	5.8	11902	19511	71	86	63.9	0.0807	0.0387	-52.0	3.7	3.1
Other household types	18.3	16878	22275	101	98	32.0	0.1116	0.0628	-43.8	16.1	16.1
% Within groups inequality	./.	./.	./.	./.	./.	./.	0.1184	0.0685	-42.1	93.7	96.0
% Between groups inequality	./.	./.	./.	./.	./.	./.	0.0079	0.0029	-63.6	6.3	4.0
<b>Socioeconomic group of HH head</b>											
Blue collar worker	19.0	15818	21425	95	95	35.4	0.0701	0.0377	-46.2	10.5	10.0
White collar worker	32.7	21184	27426	127	121	29.5	0.0754	0.0500	-33.7	19.5	22.9
Self-employed	10.3	16965	23439	102	104	38.2	0.1780	0.0910	-48.9	14.5	13.1
Unemployed	8.1	10861	16375	65	72	50.8	0.0981	0.0620	-36.8	6.3	7.0
Pensioner	23.8	14339	20338	86	90	41.8	0.1138	0.0582	-48.9	21.4	19.4
Other	6.2	11650	16905	70	75	45.1	0.1814	0.0844	-53.4	8.9	7.3
% Within groups inequality	./.	./.	./.	./.	./.	./.	0.1025	0.0570	-44.4	81.2	79.7
% Between groups inequality	./.	./.	./.	./.	./.	./.	0.0230	0.0143	-37.9	18.2	20.0
<b>Educational level of HH head</b>											
Tertiary education	30.7	20912	27236	126	120	30.2	0.1099	0.0658	-40.1	26.7	28.3
Upper secondary education	34.2	16127	22050	97	97	36.7	0.1003	0.0568	-43.4	27.1	27.2
Lower secondary education	14.9	14689	20469	88	90	39.4	0.1229	0.0668	-45.6	14.5	13.9
Primary education or less	18.6	12297	17906	74	79	45.6	0.1038	0.0501	-51.7	15.3	13.1
% Within groups inequality	./.	./.	./.	./.	./.	./.	0.1086	0.0602	-44.5	86.0	84.3
% Between groups inequality	./.	./.	./.	./.	./.	./.	0.0177	0.0112	-36.8	14.0	15.7
<b>Age of HH member</b>											
Below 25	29.5	15823	22824	95	101	44.2	0.1142	0.0608	-46.7	26.6	25.1

25-64	53.9	18007	23267	108	103	29.2	0.1293	0.0815	-37.0	55.2	61.6
Over 64	16.6	13730	20171	82	89	46.9	0.1080	0.0497	-54.0	14.2	11.6
% Within groups inequality	./.	./.	./.	./.	./.	./.	0.1213	0.0701	-42.2	96.1	98.2
% Between groups inequality	./.	./.	./.	./.	./.	./.	0.0050	0.0013	-74.2	3.9	1.8
<b>ALL</b>	100.0	16653	22622	100	100	35.8	0.1263	0.0714	-43.5	100.0	100.0

Source: own calculations on SILC-Belgium 2004.

Table 4: Poverty decomposition by household characteristics, Belgium 2003.

Characteristic of household or household head	A	B	C	D	E	F	G	H	I	J	K
	Pop. share in %	FGT0		% change in poverty (FGT0)	% contribution to aggregate poverty (FGT0)		FGT1		% change in poverty (FGT1)	% contribution to aggregate poverty (FGT1)	
		Baseline	Plus All		Baseline	Plus All	Baseline	Plus All		Baseline	Plus All
<b>Household type</b>											
Older single persons or couples (at least one 65+)	15.5	20.2	6.9	-65.9	21.2	12.7	4.5	1.0	-78.4	17.9	8.6
Younger single persons or couples (none 65+)	22.7	13.1	15.4	17.9	20.1	41.6	4.1	3.8	-6.1	23.4	48.6
Couple with children up to 18 (no other HH members)	37.8	11.5	4.9	-57.6	29.5	22.0	3.3	1.0	-70.7	31.4	20.3
Mono-parental household	5.8	29.4	6.4	-78.2	11.5	4.4	5.7	1.3	-76.8	8.3	4.3
Other household types	18.3	14.3	8.8	-38.0	17.7	19.2	4.1	1.8	-56.5	19.0	18.3
<b>Socioeconomic group of HH head</b>											
Blue collar worker	19.0	8.7	5.5	-36.6	11.4	12.7	2.2	1.2	-44.4	10.5	12.9
White collar worker	32.7	2.2	1.6	-29.1	5.0	6.3	0.6	0.4	-28.5	4.7	7.4
Self-employed	10.3	18.3	9.9	-46.0	13.0	12.3	6.6	2.6	-61.3	17.7	15.1
Unemployed	8.1	40.6	25.7	-36.6	22.5	24.9	9.5	5.4	-43.0	19.7	24.7
Pensioner	23.8	18.7	8.8	-52.7	30.5	25.2	4.7	1.5	-68.1	29.0	20.3
Other	6.2	41.4	25.1	-39.4	17.6	18.7	11.4	5.6	-51.1	18.3	19.6
<b>Educational level of HH head</b>											
Tertiary education	30.7	5.6	3.3	-41.6	12.0	12.4	1.8	0.9	-51.4	14.7	15.7
Upper secondary education	34.2	13.0	8.2	-37.4	31.0	34.3	3.4	1.6	-53.9	30.4	30.9
Lower secondary education	14.9	19.6	10.4	-47.2	20.3	19.0	5.5	2.5	-54.7	21.4	21.4
Primary education or less	18.6	28.3	15.0	-47.1	36.7	34.3	6.9	3.0	-56.9	33.6	32.0
<b>Age of HH member</b>											
Below 25	29.5	16.5	7.0	-57.8	33.0	24.5	4.4	1.6	-63.7	33.2	26.6
25-64	53.9	12.1	9.6	-21.1	44.2	61.3	3.4	2.1	-38.7	47.1	63.8
Over 64	16.6	20.2	7.2	-64.5	22.8	14.2	4.7	1.0	-78.1	19.7	9.6
<b>ALL</b>	100.0	14.8	8.4	-43.1	100.0	100.0	3.9	1.8	-54.8	100.0	100.0

Source: own calculations on SILC-Belgium 2004.

Table 4: Poverty decomposition by household characteristics, Belgium 2003 (continued).

Characteristic of household or household head	L	M	N	O	P
	FGT2		% change in poverty (FGT2)	% contribution to aggregate poverty (FGT2)	
	Baseline	Plus All		Baseline	Plus All
<b>Household type</b>					
Single persons / couples (65+)	1.7	0.3	-84.7	15.4	6.6
Single persons or couples (none 65+)	2.1	1.5	-25.9	26.9	56.0
Couple with children up to 18	1.5	0.3	-79.6	32.3	18.5
Mono-parental household	2.3	0.5	-78.7	7.6	4.5
Other household types	1.7	0.5	-71.0	17.7	14.4
<b>Socioeconomic group of HH head</b>					
Blue collar worker	0.9	0.4	-54.1	10.3	13.1
White collar worker	0.3	0.2	-40.2	5.1	8.4
Self-employed	3.6	1.0	-72.1	21.7	16.7
Unemployed	3.5	1.8	-47.7	16.3	23.7
Pensioner	1.9	0.5	-76.3	26.9	17.7
Other	5.5	2.0	-62.5	19.7	20.4
<b>Educational level of HH head</b>					
Tertiary education	1.0	0.4	-60.8	18.3	19.9
Upper secondary education	1.5	0.5	-67.1	29.9	27.3
Lower secondary education	2.5	1.0	-60.6	22.0	24.1
Primary education or less	2.7	0.9	-65.5	29.9	28.7
<b>Age of HH member</b>					
Below 25	2.0	0.6	-69.5	33.5	28.7
25-64	1.6	0.7	-53.7	49.4	64.2
Over 64	1.8	0.3	-84.9	17.1	7.2
<b>ALL</b>	1.8	0.6	-64.3	100.0	100.1

Source: own calculations on SILC-Belgium 2004.