Qualitative Employment Multipliers for Belgium, Results for 2000 and 2002

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Abstract - The paper describes how an input-output table of a given year can be linked to detailed employment data in order to provide qualitative employment multipliers. Those multipliers specify the direct and indirect labour use of final demand products by differentiating between gender, age class, professional status and educational attainment level of the workers.

A simple multiplier model was applied to the Belgian input-output tables for 2000 and 2002 and a new series of industry level employment data for the period 1999-2005. The latter have been compiled using social security and labour survey data and were made consistent with industry employment totals in the Belgian national accounts.

A series of employment multipliers is computed reflecting the differential impact of more than 140 final demand products on various types of employment in the years 2000 and 2002. It can thus be examined to what extent (homogeneous) industry multipliers differ by gender, age class, professional status or educational attainment level of workers.

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1 The views expressed in this paper are those of the authors and not necessarily reflect those of the Federal Planning Bureau

The paper further explores how those qualitative employment multipliers can be updated in the absence of an input-output table, and examines their relation with changes in the composition of final demand.

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1. General introduction

Detailed employment multipliers are interesting from the perspective of growth accounting. For a given year, they specify which human resources have been involved, both directly and indirectly, in the production of various final demand products as industrial goods, construction activities, trade services, financial, public or health services.

They also provide information on the effects of specific final demand shocks or structural changes in final demand composition on different types of employment or labour demand. Yet the compilation of detailed employment multipliers faces some important data problems. Moreover, their application for estimating the impact of final demand shocks raises even more questions this paper only starts to address.

First we propose a solution for the data problem. In a traditional symmetric input-output (IO) framework, employment multipliers show the cumulated (=direct + indirect) employment use of each final demand product. Both the final demand and employment are specified at the product level, since the industries in the symmetric input-output table are homogenized. This implies working with homogenized employment data. Homogenised data for hours worked have been used recently for distinguishing women's and men's contributions to final demand in Germany (Schaffer, 2007). The author only adds the distinction men/ women and does not mention how the detailed labour volume data have been homogenised. This could be using a commodity technology or an industry technology type of approach.

Our objective is to generate a richer set of homogenised employment multipliers, detailing the relation between final demand products and employment by sex, age class, professional status and education level and all combinations of these caracteristics.

To generate differences between labour categories, we use a recently created set of labour quality data for Belgium on industry empoyment for the period 1999-2005. These qualitative labour data[1] are consistent with detailed industry employment totals in the national accounts , and thus comparable to the IO tables. In the labour data industries are heterogeneous. They are a group of firms that produces the same major output, but may have a secondary production.[2]. Thus, the problem is that of linking detailed labour data at a heterogeneous industry level with final demand detailed at the product level.

In part 2, we propose a method for calculating detailed employment multipliers using a symmetric input-output table and qualitative labour data of the type above. Part 3 shows the employment multipliers that result from applying this method to the Belgian labour data and the input-output table of 2000.

In part 2 and 3, the employment multipliers are somewhat optimistically presented as predicting the “effects” of shocks in final demand on employment by type. We do not believe that employment multipliers can readily be used to predict the effect of shocks by type of labour. Yet employment multipliers can give a good description of the (type of) labour that is actually used to produce final demand products. They can thus be a

1 For a description of this database, and its compilation, see Bresseleers, V. *et al* (2007). The labour data are a detailed version of the EU Klems (Working party 2) database Belgium sent to Eurostat in december 2006.

2 It is more straightforward to collect labour data at the firm or (heterogeneous) industry level, than to do so at the level of (local) units within firms that produce the same product. Survey data, like the Labour Force Survey, do not often provide such information, while the (Belgian) plant level data in social security sources is insufficiently oriented at differentiating between different products.

starting point both for formulating policy measures and (with the proper assumptions on labour demand and supply added) for estimating the effects of final demand shocks.

To be usable for policy questions, and even more for the calculation of potential effects of shocks, employment multipliers must be available for recent years. Therefore, in part 4, we look at the stability of detailed employment multipliers by comparing the results of 2000 with those for 2002. Furthermore, it is investigated how employment multipliers can be updated even in the absence of a recent input-output table by taking into account price changes and product weight changes in final demand.

2. Deriving Employment Multipliers of Final Demand

The use of a domestic input-output table is necessary for deriving employment mulipliers, but it is instructive to view this problem in the context of the Supply and Use tables.

The heterogeneity of industries is shown in the output part of the Supply table, referred to as the Make table (M). The rows of a Make table represent products, the columns industries, so that each element m_{ij} represents the amount of product i made by industry j. The Make table allows to translate product related output shocks into shocks at the industry level. The only step left is to translate industry output shocks in employment shocks.

The sections 2.1 and 2.2 show how the Make table can be used to translate final demand shocks into output and employment shocks. In section 2.3 we discuss this approach.

2.1. The Output Multipliers of Final Demand

In an input-output model, the relation between final demand and output is given by:

$$q = (I - A^d)^{-1} \cdot f^d \qquad (1)$$

In (1), f^d is the vector of final demand for domestic output. Final demand for domestic output includes all consumption, investments, exports and stock changes of goods and services that have been produced domestically. It excludes domestically produced intermediate uses and directly imported final demand.

The expression before f^d is the Leontief inverse. A^d is the matrix of technical coefficients for domestically produced intermediate inputs. This input-output table is of the product by product (p/p) type. Likewise, f^d is a vector of products. So far we only assumed the existence of a domestic p/p input-output table.

When using (1) as an impact model, we assume that the coefficients of A^d are stable in the case of a final demand change. As can been seen by replacing f^d with a unity matrix (of shocks), the Leontief inverse can be interpreted as a matrix of output multipliers of final demand shocks, where each column yields the effect of a single product shock in final demand on all outputs.

The results in q are given in terms of products. To shift from products to industries, it is necessary to formulate an additional assumption. The assumption of constant market shares says that, whenever there is a shock in demand for a product, each industry maintains its market share of that product. If D is a matrix of market shares, it is given by:

$$D = M' \cdot \hat{q}^{-1} \quad (2)$$

Here, *M'* is the transposed Make matrix, while $\hat{q}$ is a diagonal matrix of outputs by product. Post multiplying both sides in (2) with q yields:

$$Dq = M'i = g \quad (3)$$

g is defined as the vector of industry output totals. Using (3), we can rewrite (1) as:

$$g = D \cdot (I - A^d)^{-1} \cdot f^d \quad (4)$$

Thus pre-multiplying the Leontief inverse with a matrix of market shares yields the industry output levels as a function of final demand. Under the assumption of constant market shares (D constant), equation (4) gives the impact of a final demand shock on the industry output levels. The industry output multipliers are given by the expression before f^d. With D invertible[3], it is possible to rewrite (4) as:

$$g = (I - D \cdot A^d D^{-1})^{-1} \cdot D \cdot f^d \tag{5}$$

Because $D\,f^d$ equals final demand by industry, a shock that hits an industry can be brought in by replacing $D\,f^d$ by the appropriate shock vector.

2.2. The Employment Multipliers of Final demand

The employment impact of final demand can be generated by pre-multiplying the expression on the right hand of (4) or (5) with an employment coefficient matrix L. This is a matrix of employment to output ratios given by:

$$L = S \cdot \hat{g}^{-1} \tag{6}$$

S is a matrix with in its columns industries. Its rows have every combination of the following labour types: gender, age class, professional status, education level and labour scheme (full-time, part-time). $\hat{g}$ is the diagonal matrix of industry production totals. S can reflect the number of persons (in their main occupation), but also hours or full-time equivalents, if such data are available by type of labour.

The matrix *Emult* of employment multipliers of final demand is given by:

$$Emult = L \cdot D \cdot (I - A^d)^{-1} \tag{7}$$

Each column in this matrix yields the cumulative employment multipliers for a one unit final demand shock in a product (e.g. final demand of assembled cars). Each element of that column vector yields the effect of this shock for a single type of labour (e.g. men,

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3 This implies that the number of industries equals the number of products.

aged 25-30, with lower secondary education, blue-collar worker, full-time). Adding up the elements of a column, yields the total employment multiplier by product.

If one is interested in the combined effects on industries and labour types of a given final demand shock, it is possible to compute:

$$\Delta S = L \cdot \Delta \hat{g} \tag{8}$$

Here, $\Delta \hat{g}$ is a diagonal matrix of the vector of industry output changes given by (4) that follow from a shock Δf in final demand.

2.3. Discussion

We discuss the approach proposed above by answering three objections that could be formulated.

2.3.1. The Hypothesis of Constant Market Shares

First, we want to make sure that there is no incompatibility between the assumption of constant market shares and the use of any possible p/p input-output table. The assumption of constant market shares is often related to the derivation of an input-output table (starting from supply and use tables) under the industry technology hypothesis. But product technology is often seen as a more proper technology assumption[4].

However, there is no inconsistency between assuming constant market shares and deriving a p/p input-output table under the product technology assumption! Under product technology, it is assumed that wherever a product is produced, the same input structure is used. In that case, the matrix of p/p technical coefficients A is given by[5 6]:

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4 See United Nations (1999), p 98 and Avonds (2007) for a discussion of this.

5 The product of matrices B and C^{-1} may generate negatives, which can be removed, as has been done for the Belgian

$$A = U \cdot M^{-1} = (U \cdot \hat{g}^{-1}) \cdot (\hat{g} \cdot M^{-1}) = B \cdot C^{-1} \tag{9}$$

In (9), U is the intermediate part of the use table and M is the Make table. The matrix B relates the intermediate use of products to the total production by industry, while the matrix C is a matrix of product shares (the shares of products in each industry's output). The matrix C is related to the matrix D used above. Given the definitions of D and C:

$$\hat{q} \cdot D' \cdot \hat{g}^{-1} = C \tag{10}$$

Equation (10) expresses that, if the market shares matrix D is constant, any change in output vectors q and g caused by a final demand shock, will imply an adjustment of the product share matrix C. Thus, this matrix cannot be constant.

Although equation (9) comprises a matrix C, it must not be constant if final demand changes. As argued by Avonds (2005), the necessary assumption for product technology is the constancy of A. Any change in C can be compensated by a change in B to obtain the same A matrix.

Thus (4) and (5) can be combined with an input-output table that is largely based on the product technology hypothesis. Still it is interesting to look at what happens if not product technology, but industry technology is used to derive the input-output table. If industry technology is applied A^d equals B^d.D. Then equation (5) can be rewritten as:

$$g = (I - D \cdot B^d)^{-1} \cdot D \cdot f^d \tag{11}$$

Input-output table, by applying the Almon (2000) method.

6 To simplify the discussion, equation 9 gives the derivation of the full matrix A, while the matrix A^d used in the former equations is obtained by subtracting the IO matrix of imports from A. It is possible to derive the IO matrix of imports respecting the product technology hypothesis, following a method proposed by Konijn, P. (2002). This methodology was used for deriving the Belgian IO matrix of imports of 1995 and 2000 (Avonds *et al* (2003)).

The expression $D.B^d$ in (11) is the industry by industry input-output table under the assumption of industry technology[7]. As this matrix product cannot lead to negatives, (11) could be applied directly to find the impact of final demand shocks on products (replacing f^d) or industries (replacing $D.f^d$).

Note that the hypothesis of constant market shares is only needed to use expression (7) or (8) to estimate the impact of a shock. The employment multipliers generated by expression (7) can also simply be used to find the direct and indirect use of each employment type by the final demand product for a given year.

In that case, the assumption is made that labour inputs within industries are spread proportionally over all products produced. In the absence of employment data by product, this is the easiest solution. The alternative is to try to homogenize the detailed employment data using product technology. In the next section we explain why this has not been done.

2.3.2. Can homogenizing detailed labour data using commodity technology be an alternative ?

If one works with a p/p input-output table, why not first transform the employment data by industry into employment data by product? This question has to be reformulated, because in fact we have homogenized the employment data, using industry technology. To see this, note that in (7), the L matrix is post-multiplied by the D matrix. This is exactly what would have been done if the employment data were homogenized using industry technology.

Thus the model in (7) can be seen as one where the employment data are homogenized using industry technology, while the IO inputs could be homogenized using the com-

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7 See United Nations (1999), p 91.

modity technology or (more generally) the best combination of commodity and industry technology.

Now the question can be reformulated as follows: is it not better to explicitly homogenize the detailed employment data using commodity technology? There are four reasons why this is not the most appropriate method of working.

1) The first one is the negatives problem. If product technology is applied, analogously to equation (9) the matrix L could be homogenized as follows:

$$L_q = L \cdot C^{-1} \tag{12}$$

Like the matrix A in (9), the homogenized matrix L_q in (12) is not directly usable because it will be full of negative cells. Methods like Almon (2000) en RAS can be used to remove negatives, but negative cells can never obtain positive values. Thus, one would be forced to present a homogenized S matrix where the production of certain products would not include women, persons aged between 50-60 years, workers with higher education, or some other category. This is more painful in the context of labour types than in the context of product inputs.

Our full S matrix contains 2 056 combinations of worker characteristics. In comparison, the number of products in the input-output table is only about 300. To limit the amount of negatives, we would have to limit the distinctions in labour type in the S-matrix to only a few. This implies painful choices and poorer results, which is undesirable. We prefer to work with an S matrix with a very large number of labour types and their combinations.

However, for splitting up the labour input into only two groups, doing this with commodity technology could still be envisaged. For deriving women's and men's contributions to satisfying consumers' needs in Germany, Schaffer (2007) premultiplied the expression in our equation (1) with a 2 x n vector of working hour coefficients differentiated by gender. The coefficients equal the (paid) hours worked by gender divided by the production values in each homogenised industry. The author does not make clear how the labour volume data by gender have been homogenised, so this could still have been done using industry technology. In stead of adding the formation level as another characteristic, the authors weighted the hours worked by men and women as a function of the educational attainment level.

2) The problem of negatives is likely to be worse for employment data than in the case of the input-output table itself, because product technology is less defendable here. There are three arguments supporting this statement.

The first one is the absence of a technological link between labour types and outputs. Products are often technologically linked to specific inputs of raw materials, energy sources or intermediate goods. To paint houses, you need paint. To hang paper, you need paper. But in principle, any type of worker (male / female, low, medium or high skilled, young/ old) can perform both jobs. Who does which jobs depends on demographic, social and economic factors.

Thus, in the case of labour types, the product produced gives less information. It is necessary to look at the labour composition of the firms and units that produce a good to relate goods to worker types.

The second argument is socio-economic. If a firm's product mix changes in time, it can quickly adapt its use of goods and services to the new situation. But the costs of training workers, of hiring and firing them, as well as the actual labour market situation, may withhold it from directly adjusting its labour composition towards more suitable worker types for the new activities. A firm that combines a declining industrial activity with an increasing wholesale activity avoids much of the costs of firing and hiring workers if it can shift part of its workers towards the wholesale activity. As a result, this firm's wholesale division might count more low-skilled men, and less medium skilled women than a typical wholesale firm. Thus a firm's history can be more important than its exact product mix for the composition of its labour force.

This second argument always applies to a single person firm that combines two or more activities. Changes in its product mix will affect its use of materials and services, but never the characteristic of the (self-employed) worker.

A third argument relates to wage costs. Both the number of persons employed and their composition according to gender or education level depends on the wages offered. The net wages and wage costs per hour can differ between firms offering the same service. They depend among other things on a firm's remuneration policy, on its size (determining the strength of labour unions), on its ownership (private or public) or on the collective bargaining committee to which a firm adheres. The latter could be determined by a firm's main activity.

An example is the banking sector. Many banks offer, as a secondary activity, insurance services to their clients. If banks offer higher wages than insurance companies, the characteristics of workers involved in the insurance activities within banks, could be expected to look more like those of other bank workers than those of homogeneous insurance companies[8].

We conclude that changes in the product mix are more likely to affect the use of raw materials, energy and services than the composition of the labour force within a firm or industry. Although the firm or industry composition of workers changes in time, it is unlikely that it does so for every change in the product mix, particularly if the total output level remains the same.

3) The third problem is the connection between homogenized wage and employment data. Besides data on workers, it is possible to work with hours worked or wage cost data per type of worker. If wage data are homogenized using the C matrix as in (12), there is no guarantee that the homogenized wage data and employment data will match. It is quite possible that some cells will have negative employment data and positive wage data or the other way round.

4) The fourth problem is the connection with recent employment data. In Belgium, input-output tables are compiled only every 5 years, with a delay of at least 3 years. Detailed employment data can be made available much more rapidly and at an annual basis. The last available Belgian input-output table is an update for 2002 of the input-output table of 2000 , while the matrices S and L are available up to 2005.

With shocks formulated in constant prices (or in chain euros) of 2000 or 2002, the A matrix for this year could still be used for a shock which occurred in 2005, but it would

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8 An argument against this is that some firms attribute workers of different product lines to different bargaining committees. This way they can still offer different wages to those workers. In that case, both the employment data and the input-output table should be compiled at the firm division (or local kind of activity) level.

be preferable to use the employment coefficient (as in the matrix L) of 2005 for computing the employment effect of a final demand shock occurring in 2005.

If the employment data would have to be homogenized with product technology, it would not be possible to generate the effects of a shock in 2005 before the existence of a homogenized SAM of 2005, which implies the existence of a full Make matrix for that year. However, even when leaving employment data in their heterogeneous state, generating employment multipliers for years without a symmetric input-output table (of imports) remains a problem. That point will further be discussed in part 4.

2.3.3. The Separation of Direct and Indirect effects

Employment multipliers include both direct and indirect employment effects of final demand. The indirect employment effects are generated by the intermediate demand for domestic production. So another question is whether it is possible to separate direct and indirect effects.

In our model, the employment multipliers of final demand are given by equation (7). Since the multiplication by the Leontief inverse is responsible for introducing the indirect effects, dropping it yields the direct employment multipliers, given below:

$$Edir = L \cdot D \tag{13}$$

Thus, under the assumption of constant market shares, the direct employment multipliers are given by post multiplying the matrix L by the market shares matrix D. As L has dimensions (s x g), with s the number of labour types and g the number of industries, and D, as given in (2) has dimensions (g x p), with p the number of products, this multiplication yields a matrix that converts (one unit) product shocks into effects by employment type. In the special case where employment data are homogenized, and imposing that the number of products equals the number of industries, the market shares matrix D becomes an identity matrix, so that in that case the direct effects are given by the employment coefficient matrix L.

We conclude that the direct effects of final demand shocks can be isolated using the market shares matrix. The more the production of industries is heterogeneous (that is the further matrix D is away from the identity matrix), the more direct effects of final demand shocks can differ from the employment coefficients of industries.

3. The Employment Multipliers for 2000

In this part we discuss the employment multipliers for 2000. That year was chosen, because it is the last year for which a symmetric Belgian input-output table exists, compiled on the basis of a complete database. In part 3 we will work with an IO update made for 2002.

In section 3.1, the employment data are briefly discussed. Section 3.2 gives the results for the output and employment multipliers for 2000 in the major economic activities. In section 3.3 we discuss the employment multipliers at a more detailed product level.

3.1. The Employment Data for 2000

Table 1 presents the employment data for nine branches.

It is comparable to the S matrix in (6), except that the industries have been aggregated into 9 broad groups of industries, that the worker characteristics have been aggregated, and that all combinations between different types of worker characteristics have been left out. The full S-matrix used in the calculations has 147 industries and 2 056 combinations of worker characteristics. In the S-matrix all the elements in one column sum to the total number of workers in an industry. In table 1, the shares sum to one for each type.

Table 1 reflects the large differences in labour composition according to gender, age class, professional status and education level among branches. While some branches, like Health care & other services, and Public administration and education present a majority of female workers, in others, like Construction and Mining, water & energy, the share of women is very small.

Agriculture shows the highest presence by far of self-employed workers and persons aged 60 years or more, followed by Financial, real estate & business activities. Workers in both branches have a completely different education level. Indeed the share of tertiary long type & academic workers is the lowest in Agriculture (2%), and with 25% it is highest in the Financial, real estate & business activities.

With such large differences among the types of people working in these branches, it can be expected that final demand shocks have quite a different impact on each employment type depending on the final demand product concerned. However, in order to evaluate the impact of final demand shocks properly, one needs to calculate employment multipliers. This has to be done not only because the industries in table 1 do not fully reflect products, but also because indirect effects of shocks matter as well.

Table 1

The importance of the calculation of the indirect effects is illustrated by the following. It is important to realize that the use of interim workers and company administrators is not taken into account when no indirect effects are computed. In national accounting, interim workers belong to the interim sector (nace 74.5), while company administrators are allocated to industry 74.14. Since both industries are a part of branch J+K, all these workers pertain to that branch in table 1. Firms that hiring interim workers and (self-employed) company administrators report intermediate expenditures on the services "interim work" and "administration services". This will be reflected in their industry input-output coefficients but not in their employment. However, indirect employment effects include those interim workers and company administrators.

Thus, the employment impact of a shock affecting industries that use a lot of interim workers or administration services would be underestimated if indirect effects are not taken into account.

A second illustration of the importance of the calculation of indirect effects has to do with employment in manufacturing. The bottom 4 lines of table 1 show the total number of workers (in 1000s), the total production or output (p1) and the output and employment shares of each branch. What is striking is the low share of workers in manufacturing (16%) compared to its high share (32.7%) in total output. It is well known that the manufacturing industry is not very labour intensive, but rather capital intensive. But does this imply that labour effects of shocks to demand for manufacturing products are lower than the effects of comparable shocks to demand for services ? This question cannot be answered without taking into account the indirect labour effects generated in the industries supplying intermediate inputs to manufacturing..

The multiplier analysis will show to what extent the final demand for industrial goods is based on the indirect use of (domestic) workers.

3.2. The Main Output and Employment Multipliers for 2000

Tables 2 and 3 give the employment multipliers for a final demand shock of 1 million euro in each of the nine products that correspond to the branches in table 1. Table 3 shows the employment multipliers by type of labour, while table 2 gives the direct and the indirect employment multipliers.

The first row in table 2 shows the output multiplier. As explained in part 2, a final demand shock is translated into a series of direct and indirect output shocks, each generating industry specific employment effects. The output multiplier in table 2 is the total or cumulated effect, the direct effect always equals 1 million euro.

The second and third rows in table 2 give the direct and indirect employment effects of each final demand shock. The direct effect is computed using equation (13). The indirect effect is the difference between the total multiplier and the direct effect. The total multiplier, computed using equation (7), is given in the fourth row.

The column most to the right of tables 2 and 3 gives the effect of an average 1 million euro shock of final demand. This shock is average in the sense that it is distributed over products according to their share in final demand for domestic output. The fifth row in table 2 gives these shares. Weighting the four product multipliers column by column by their respective product shares gives the average or total final demand multipliers reported in the last column in tables 2 and 3.

Table 2

Table 3

The results in table 2 show that the cumulated effects on output are highest in the case of a final demand shock for Construction activities (2.09) and Agricultural products (1.84). Only in the case of Construction activities, the indirect effect on output is more important that the direct effect.

The cumulated effects on employment are highest in the case of a shock in Health and other services (23.1) , and Public administration, defence and education (20.42). They are lowest for a final demand shock in the Products of mining, electricity, gas and water (5.87) and in Products of manufacturing (7.74).

For two types of products, the indirect employment effects are more important than the direct effects: Construction activities and Manufacturing products. Thus a relatively high number of workers is indirectly involved in the production of industrial goods. Still, with 7.74, the employment multiplier is weaker in the case of industrial products than the average of 12.04.

The last row in table 2 gives the contribution of each final demand product in the total employment multiplier in percentage points. This row summarizes the importance of each product for employment. Demand for industrial goods represents 37.7 % of final demand for domestic output and is responsible for 24.2% of employment. The latter is clearly higher than the 16% employment share of manufacturing presented in table 1. Part of this difference is due to the higher final demand share of industrial goods (37.7%), since manufacturing only produces 32.7% of output (table 1).

Although, in 2000, the demand for industrial goods was still responsible for an important share of total employment, the large difference between its share in final demand and its (generated) employment share points to the low employment intensity of industrial production compared to other branches.

The part-time worker multipliers reported in table 3 offer a partial explanation for the low employment intensity of industrial goods. A 1 million increase in final demand for industrial goods gives rise to 1 additional part-time employee, while the same increase in final demand for Health & other services (N+O+P) or for Public administration, defence & education (L+M) leads to an increase in part-time employment by respectively 9.3 and 5.4 units.

If one is interested in the effects on full-time jobs only, the employment share of Manufacturing goods rises to 27%, while that of the services N+O+P and L+M drops to 12.7% and 16.2% of the total final demand multiplier of 9.4[9].

The high worker productivity in the production of industrial goods also becomes clear if one considers the employment multiplier of workers with only primary or lower secondary education. While this multiplier (3.0) is responsible for almost 40% of the total employment effect of an industrial output shock (7.7), it is still lower than the average multiplier of 4.0 for low-skilled employment. This is striking, since a larger fraction of the workers used in the production of industrial goods are low-skilled[10]. This illustrates that in the production chain of industrial goods, domestic labour has already been largely replaced by other inputs. These other inputs are capital and imported intermediary inputs. Of course, the imported intermediary inputs may be relatively labour intensive.

A stronger international competition in the industrial goods production could explain a higher use of the (relatively abundant) factor capital compared to the (relatively expensive) factor labour. The high degree of globalisation in Belgian manufacturing -- Belgium being a small economy in the heart of Europe -- explains the important use of imported intermediary inputs.

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9 As in the last row of table 2, these shares are computed by weighing the multipliers with the final demand shares of the corresponding branches. The full-time employment multipliers equal the total multipliers minus the part-time employment multipliers. The total economy full-time jobs multiplier equals 12 - 2.6 = 9.4.

10 To see this, we refer to table 4, where the qualitative employment multipliers have been expressed in percentages of the total multiplier by final demand shock.

Given this explanation, it is interesting to note that the Financial, real estate and business activities services have an employment multiplier of 7.75, which is almost identical to Manufacturing, and have an equally large difference between their final demand share (14.6%) and employment impact (9.4%).

However, the multipliers of this branch are influenced to a large degree by the industry “Renting services involving own residential household property”, which in itself is responsible for 6,3% of final demand, but only has an employment multiplier of 1.7. Table 5, discussed in the next section shows this and other employment multipliers at a more relevant level of 36 products.

There are also important differences in the type of labour used. Compared to Manufacturing, Financial, real estate and business services hire more persons with long type (or academic) tertiary schooling, white-collar workers, self-employed workers and women, while the production of industrial goods involves more men, blue-collar workers and low-skilled workers.

In table 4, the qualitative employment multipliers have been expressed as a share of the total employment multipliers. Table 4 gives some additional information to tables 2 and 3, since the direct and indirect effects of each final demand product have been given separately for men and women. Thus, the table shows that in products of Manufacturing, Mining, water electricity & gas and Construction activities, the direct effects on female employment are less important than the indirect effects.

If expressed as shares of the total multiplier, the distribution of the effects over employment type has a nice property. For the whole economy (or for an average final demand shock) the distribution of the employment effects over employment types must be equal to the total economy distribution in the Employment table. This is because employment multipliers are average in stead of marginal propensities. By comparing the right side columns in tables 1 and 4, it can be verified that this is indeed the case.

Table 4

Table 4 can be compared with table 1. The main differences are that branches now refer to products and that indirect effects have been taken into account. Both differences have had the effect of reducing the qualitative employment differences between branches. For example, in the manufacturing sector, only 23% of the workers are women in table 1, in table 4, 30% (=12%+18%) of the cumulated employment concerns women[11]. Likewise, the share of long type tertiary formation has increased for branches with few of these workers, such as Agriculture, Construction, Trade and Transport if table 4 is compared to table 1.

To evaluate whether table 3 or 4 are a good representation of the employment structure of the economy, it is good to remind that calculations have been done at a very detailed level of 147 industries (and products). This is important, since the employment structure in, say, selection & supply of personnel (nace 74.5) or industrial cleaning (nace 74.7), is quite different from that in financial institutions (nace 65) or technical advice, architects & engineers (nace 74.2), while all of these industries are part of the more aggregated branch K Financial, real estate & business activities reported here.

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[11] The contribution of the indirect effect to augment the cumulated share of women in products of manufacturing is clear, but there was also a smaller contribution from the transfer of branches to products, because the share of women in the direct effect was 25%, which is higher than the 23% reported in table 1. This is due to the higher share of female workers in trade and service branches with a secondary production of manufactured goods.

Once the multipliers are calculated at the level of 147 industries, they are aggregated by using the product shares in the final demand for domestic output as weights. The next section will show the results at a less aggregated industry level.

3.3. Employment Multipliers by Detailed Product in 2000

Table 5 shows the qualitative employment multipliers for 36 goods and services. The products in table 5 correspond to the CPA product classification[12]. In table 5, they are represented by the letters and numbers of their CPA section or group. Their description is listed below the table. Each column in table 5 gives the employment multiplier for a specific type of workers. The first column gives the total employment multiplier. The table cells corresponding to the largest five multipliers of each type have been shaded.

Seven trade and service industries have a total employment multiplier of about 20 workers for 1 million euro of (change in) final demand: these are retail trade (G52), hotels and restaurants (H), postal and courier services (I64A), public administration, defence & compulsory social security (L), education and other community social and personal services (O).

With 92.9, the total employment multiplier is much larger for private households with employed persons. 91.4 of these are part-time workers (see second last column), but this only explains partly the high employment multiplier. The low wage costs households pay for these services, are the main explanation since hourly wage costs in industry P was, with 8 euros much lower than the average hourly wage cost of 20 euro for par

[12] The CPA is the European version of the Central Product Classification recommended by the United Nations. It is imposed for the product classifications in national accounts of EU countries.

time workers.. In addition to that this industry has no intermediate demand, since cleaning products or insurance costs are treated as private consumption.

Agriculture and Construction activities also have a relatively high employment multiplier. Within the manufacturing sector, the employment multiplier of food products, beverages & tobacco is highest. This employment multiplier is increased by the strong backward linkages of this industry with the agricultural sector.

Table 5

The indirect employment effect is highest for final demand for Food, beverages & tobacco. The indirect effect is also strong in the Construction activities, Wholesale, Retail trade and the Hotel and restaurant services.

With respect to gender, the multipliers show there were still activities with few female workers in 2000. In Postal and courier services (I64A), Agriculture (A+B), but particularly in Construction activities (F) and Railway and land transport of passengers (I60AB), high employment multipliers for men accompany low multipliers for women. The Postal & courier services (I64A) and the Railway and land transport of passengers (I60AB) are mainly operated by public enterprises in Belgium, while Agriculture and Construction activities are done by private firms.

The highest female employment multipliers are found in Retail trade (G52), Hotel and restaurant services (H), Education (M), Health care (N), Other services (O) and Private households (P).

Table 5 shows the multiplier for workers younger than 30 years, and the one for workers aged 50 or more. The multiplier of the group in between can be found by making the difference with the total multiplier. The multiplier for persons below 30 year is highest for the Hotel and restaurant industry (H), Retail trade (G52), Health (N), Other services (O) and Private household (P). The one for persons aged 50 or more is highest in Agriculture (A+B), followed by the Postal & courier services (I64A), Public administration (L) and Education (M).

The impact of final demand by education level is also represented by two series of multipliers. The multiplier for workers with only primary + lower secondary schooling is highest for Private households (P), Postal and courier services (I64A), Hotel and restaurant services (H), Agriculture (9.1) and railway and land transport of passengers (I60AB). All these industries also have high total employment multipliers.

This is not surprising if one knows that, being a part of value added, wage costs are included in output. Given the intermediate demand, the lower wage cost of low-skilled workers allows a greater number of workers to be employed for the same value of final demand.

Yet, not all industries with large multipliers employ many low-skilled workers. Health and Education services have a high total employment multiplier and also a high multiplier for workers with higher long type or academic education. At the same time, these are industries with many part-time employees. The manufacturing industries have moderate multipliers for low-skilled workers, and low multipliers for intermediately and highly skilled workers.

The last three columns give the multipliers for employees full-time, part-time and self-employed. The three multipliers sum to the total employment multiplier. The highest number of self-employed can be found in Agriculture (A+B), Other business services (K74), Retail trade (G52) and Hotels and restaurants (H).

If one wants to use employment multipliers for policy reasons the level of detail provided in table 5 could still be insufficient. Once the policy objective is clear, it is best to use the results at the most detailed level of 147 industries and at a detailed worker type level. One use of these employment multipliers is to find out whether popular policy goals, like “doubling research and development activities” can be realistic. The most simple way to do this, is to compare the employment multiplier of the industry/activity by skill type (up to 6 education levels are available) by the skill distribution in the labour reserve formed by unemployed or inactive persons in the province or region in question. The conclusion might be that achieving this goal in certain regions or provinces, would lead to a higher use of imported high skilled labour, or a withdrawal of high skilled workers from other industries.

Policy measures may also be aimed at improving the employment position of groups that are overrepresented among the unemployed or inactive. The general answer would be to concentrate efforts (like reducing costs, regulations, providing subsidies…) or to try to avoid measures like entry barriers, tax increases, reduced budgets for public entities in activities with high employment multipliers for the type of workers focused upon.

Table 6 presents a selection of employment multipliers at a detailed industry level. It contains the 5 industries with highest total employment multipliers, given in column [2]. Of course, employment is not the same as the hours worked, or the wages earned. Besides that, the employment multipliers of some of these industries have already been augmented by special employment programmes[13].

Table 6 also shows the 5 industries with the highest employment multiplier for low-skilled (only primary + lower secondary schooling) and the 5 industries with the highest employment multipliers for workers aged 55 years or more. Although there is some overlap (table 6 has 10 industries out of a potential number of 15), the activities involving low-skilled or older workers are sometimes different from those that generate employment in general.

Table 6

5 of the activities reported in table 6 have a larger share in output than in final demand. Activities like Agriculture or the Recruitment & provision of personnel are further away from final demand and cannot be easily influenced by changes in it. Yet for employment policy they are important. They contribute to the indirect employment effects of other final demand products.

We have used product shares in final demand for domestic output as weights to obtain results for aggregates of industries. If we had used the output shares to weigh the final demand multipliers, the total economy multipliers' distribution over worker types would no longer match the one in the employment data. It also makes little sense to compute output employment multipliers for large aggregates or for the total economy[14].

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13 Labour recruitment & provision of personnel services include Local Employment Agencies that give work to the unemployed. Once these persons work a sufficient number of hours, they are treated as "employed". But they continue to receive (a part of) their unemployment allowance, which is not included in wage costs. This increases the employment multiplier of the provision of personnel services. Likewise, a more recent program of 'service cheques may have similar effects on Washing and dry cleaning services and Private households with employed persons.

14 Output exceeds final demand for domestic output because it also contains the domestically produced intermediate inputs. For aggregates, it is preferable to work with final demand employment multipliers, since output employment multipliers would be influenced by any change in domestic sourcing (changing intermediate demand and

However, at the most detailed industry level (that of the input-output table), the employment multipliers of final demand are equal to the employment multipliers of output. Output is defined here at the homogeneous industry or product level. This property results from the fact that the technical coefficients in matrix A^d are expressed as shares of output. It is only after aggregation to higher industry levels that the final demand and output employment multipliers differ, because the product shares in final demand and output differ.

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output) that leaves total employment unchanged.

4. Generating Employment Multipliers for More Recent Years

Employment multipliers become more interesting if they can be computed for several years. In section 4.1, we present the results for the employment multipliers of 2002 and compare them with those obtained for 2000. In section 4.2 we discuss how detailed employment multipliers could be updated in the absence of a recent input-output table.

4.1. The employment multipliers for 2002

Table 7 shows the employment types for non-homogenized industries. It is the equivalent of table 1, for the year 2002. Since no input-output data are required to construct this table, a similar table exists for all years from 2000 to 2005. We will discuss the 2005 table in section 4.2.

Compared to the table for 2000, the employment structure over heterogeneous industries has already changed moderately in 2002. The most obvious overall changes are the lower shares of persons aged less than 30 years and 30-39 years, to the benefit of the workers aged 50-59 years and the 2% point drop in the share of primary/lower secondary schooled workers (from 33% to 31%).

With 15.4 %, the employment share of the manufacturing branch is lower in 2002 than in 2000 (16%). The output share of the manufacturing branch has dropped from 32.7% to 30.4%, which is quite considerable for a two years time period.

For computing employment multipliers, one needs an input-output table. This is not only to compute indirect effects[15], using the Leontief inverse, but also because the use

[15] For computing direct effects, a make matrix, relating product output with industries suffices.

table of imports and the use tables of trade and transport margins can isolate final demand from domestic output. The use tables of imports, trade and transport margins are computed as a part of the process of compiling an input-output table starting from supply and use tables.

The last available input-output table is the update made for 2002. While consistent with the supply and use tables of 2002, the use table of imports and trade and transport margins-tables necessary for compiling the (domestic) input-output table are rather mechanic updates of the corresponding tables for 2000[16]. The latter is also true for the inner parts of the make and use tables of 2002.

Table 7

Although only an update of the 2000 input-output table, the input-output table for 2002 does reflect a series of changes in the basic data, particularly with respect to final demand[17], as well as output and value added by industry. Thus, it can be interesting to see what has been the impact of these changes on the employment multipliers.

Table 8 shows the output & employment multipliers for the year 2002. The rows [1] to [6] give the results for 2002, equivalent to those for 2000 in table 2. In these rows, final demand is evaluated in current prices. Thus, the drop in the total final demand multiplier (row [4]) from 12.04 to 11.79 is influenced by the increase of the price level between 2000 and 2002.

Table 8

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[16] For the derivation of these tables, we refer to Avonds *et al* (2007).

In order to show the effect of the price changes on the employment multipliers, table 8 has been extended with the rows [7] to [10].

Row [10] represents the % price change of final demand over a 2 year period. The price evolution between 2000 and 2002 has been notably different for the 9 considered products. Manufactured goods have seen a drop in their prices, while Agricultural products, Products of mining, water & electricity & gas and Transport, storage & communication, saw a increase in their prices of respectively 15.4%, 8.1% and 8.4%.

Row [7] gives the total output multipliers with final demand expressed in prices of 2000. Once final demand is expressed in prices of 2000, the differences with the employment multipliers of 2000 in table 2 are reduced to a large extent. The total final demand multiplier of 12.07 is now even slightly higher than in 2000, where it was 12.04. This indicates that when final demand is expressed in constant prices of 2000, there has been a slight increase in the employment content of final demand.

Note that to compute the total final demand multiplier of 12.07, each product is weighted with its final demand share in 2002 (row [5]). If the multipliers for the 9 major final demand products are weighted with their final demand shares of 2000, as shown in row [9], the average final demand multiplier equals 12.04. The remaining small difference with the total final demand multiplier of 2000 is no longer visible.

Thus, once price changes have been controlled for, the shift in the final demand composition can explain most of the remaining part in the changes in the employment multiplier. Of course, the price changes are themselves responsible for changes in the final

[17] At product level, new data are used for compiling consumption, investments, imports and exports.

demand shares of products. This can be seen by comparing row [8], which gives the product shares in final demand in constant prices of 2000, with row [5].

Take the case of manufactured goods. Their share in final demand has dropped from 37.7% in 2000 (table 2) to 36.0% in 2002. The largest part of this drop can be attributed to the relative price decrease of manufactured goods, since their share in final demand, expressed in prices of 2000, only fell to 37.2%. The remaining 0.5% can be due to real changes. For other products, like Financial, real estate & business services, which experienced an average price growth, the increase in the share from 14.6% to 15.5% is a real increase.

Table 9 presents the share of each type of workers in the employment multipliers of 2002. It is directly comparable with table 4. Since the underlying multipliers are based on final demand valuated in 2002 prices, the changes with respect to table 4 reflect the combined effects of price and real changes.

Table 9

One can verify that the final column of table 9, expressing the employment used by total final demand in 2002, is equal to the total economy distribution in the employment data (table 7). Thus, we have already discussed the total economy changes. A comparison of table 9 with table 4 shows whether the qualitative changes differ between the large product groups.

For all product groups there is a drop in the employment share of the primary or lower secondary schooled. With 3%, this drop is even more important in the production of manufactured goods than in general (2%). Thus, the fall in the share of low-skilled workers is not due to the lower final demand share of industrial goods, but rather to a reduced use of these workers in all branches, including the branches that are labour intensive.

The share of self-employed tends to fall. It does so in particular in the Trade, repair and hotel & restaurant branch, where the share of white and blue-collar employees increases. It is striking that the share of blue-collar workers remains constant, or even rises, in branches where the share of low-skilled workers decreases.

For all product groups there is an increase in the share of workers aged between 50 and 59 year, and a decrease in their share of workers younger than 30 years. Finally, the share of part-time workers rises moderately for all product groups.

We can conclude that, despite the short time period, the structure of the economy has visibly changed between 2000 and 2002. The importance of manufactured goods in cumulated employment was reduced considerably both due to relative price changes and changes in final demand in constant prices. With respect to employment one sees a general reduction of the use of low-skilled workers as well as visible effects of ageing of the employed workers.

4.2. The updating of employment multipliers

Table 10 gives the employment by type for non-homogenized industries in 2005. It can be compared directly with table 1 (2000) and table 7 (2002).

In general, the evolutions in the employment composition that were already visible between 2000 and 2002, have continued in 2005. The share of workers with only primary or lower secondary schooling dropped to 28% (from 33% in 2000 and 31% in 2002).

These workers have been replaced primarily by workers with an average schooling level, as the share of tertiary long-type or academic education only rose by 1%.

The drop in the share of low-skilled workers was more outspoken for Agriculture, manufacturing, mining & energy and construction than in the service branches.

The ageing of the employed population continued, with relatively less workers in the age classes younger than 30 and between 30-39 years, and more in the classes from 40-49 years, 50-59 years and over 60 years. In 2005, the largest age group is no longer the one of workers aged 30-39 years, but the one of workers aged 40-49 years. In 2005, the share of part-time workers rose to 25%, compared to 22% in 2000. The total employment share of women only rose with 1% from 43% to 44%.

The employment share of Manufacturing decreased further, from 15.4% in 2002 to 14.3% in 2005. In contrast, its output share rose to 32.1% in 2005, compared to 30.4% in 2002. In the same period, the share of manufacturing in total value added fell from 18.2% in 2002 to 17.1% in 2005. Thus, Manufacturing may have increased its output share by increased domestic and international sourcing (which increases both intermediary use and output).

Table 10

As the shares are evaluated in nominal terms, such an increase may also be caused by a price increase of imported inputs such as raw materials or petroleum. Finally, changes in the industrial composition of Manufacturing (e.g. a shift away from textiles & clothing toward refining of petroleum products) can lower the global employment multiplier of manufacturing (see table 5 for detailed employment multipliers within manufacturing).

The totals in table 10 already show how the total final demand employment multiplier for 2005 will be distributed over the different labour types. Thus to update the total economy qualitative employment multipliers, only the total economy shares in table 10 need to be multiplied with an estimate of the total employment multiplier of final demand.

The total economy employment multiplier simply equals total employment divided by final demand for domestic output. The latter is in principle not known before a detailed use table of imports has been compiled, but it could be available for recent and coming years in the context of a macro-economic model.

Table 11 illustrates an alternative way to update the employment multipliers. It is based on the idea that the major changes in the employment multipliers will be caused by price changes and changes in the product composition of final demand for domestic output. Aggregated employment multipliers for 2002 can be estimated starting from the employment multipliers for 2000 at a more detailed product level.

First the employment multipliers in 2000 are expressed in prices of 2002. The numbers in column [2] are obtained by multiplying the multipliers in [1] with the inverse of each product's price deflator[18] between 2000 and 2002.

Table 11

[18] These price deflators can be computed using rows [5] and [8] in table 8.

The total final demand multiplier at the bottom of column [2] is obtained by dividing the total final demand multiplier of 2000 directly with the total final demand deflator (of 1.024). This multiplier of 12.76 is already close to the real multiplier of 11.79.

The multipliers in column [4] give the combined effects of price changes and changes in final demand shares. They are the result of weighting the deflated multipliers of 2000 by the 2002 final demand shares of the corresponding products at the lowest product level. The estimate of 11.93 of the total final demand multiplier can be reproduced by taking the sum of the products of the elements in columns [2] and [3].

The estimate for the employment multiplier sometimes comes very close to the IO based multiplier, as in the case of Finance, real estate & business services and Health and other services, but in other cases, it is further off than the deflated multiplier of 2000. The estimated total final demand multiplier of 11.93 is further from 11.79 than the one obtained by simply deflating the multipliers of 2000.

The final demand shifts between manufactured goods seem to have been globally in favour of more labour intensive production, as the multiplier for manufacturing products of 7.98 in column [4], exceeds the one of 7.82 in [2]. Yet, the IO based employment multiplier for 2002 is, with 7.77, lower than both.

One could interpret this result as a proof that most of the labour productivity increase realized in Manufacturing and its domestic suppliers in the period 2000-2002 was offset by price decreases and an increase in the final demand share of somewhat more employment intensive goods. But one should remain prudent.

First, one should not come to hasty conclusions about labour productivity when using employment data only. The labour quality data already show that between 2000 and 2002, and certainly between 2000 and 2005, there was an increased importance of part-time work. No information has been given here about hours worked.

Better estimates of recent employment multipliers might be found by using industry specific measures of worker productivity increases. Data on labour productivity increases are more rapidly available at a heterogeneous industry level, than at a product level. So the question is how to combine information on industry specific employment productivity changes (like the one in table 10, compared to tables 1 and 7) with the employment multipliers.

Our approach to compute employment multipliers facilitates the introduction of measured productivity changes at the heterogeneous industry level. Indeed, it may be sufficient to update employment to industry output coefficients in matrix L, as given by equation (6), to yield employment multiplier updates that take into account (real) changes in the employment to output ratios of industries. It is only a lack of time that prevented us from testing this at the moment.

5. Conclusions

We have shown that qualitative employment data can be linked to an input-output table to compute detailed employment multipliers. These multipliers give the cumulative (direct + indirect) use of different types of workers by final demand product.

The compilation of employment multipliers of final demand can be done by using an input-output table, a Make matrix and simple matrix algebra. By doing so, we avoid the painstaking and debatable homogenization of qualitative employment data using product technology. We give several arguments for this approach that combines an input-output table which could be computed by using product technology, with industry technology to generate the detailed employment effects.

The results obtained for 2000 and 2002 yield employment multipliers by gender, age class, professional status, education level and other characteristics much as the number of part-time workers, interim workers and company administrators. The results show large differences between branches and industries in worker composition. The detailed information that can be provided on low-skilled, younger, older, female, blue-collar, self-employed… workers at the level of 147 industries could be of interest for employment policy.

The paper also shows the virtues of employment multipliers in general. In order to describe the employment content of a product, it is more correct to use employment multipliers than to use output and employment data at the (heterogeneous) industry level. The latter do not only miss the indirect (domestic) labour inputs they also give no exact direct effect, since the production of a good or service may be spread over several industries.

In 2000, manufacturing represented only 16% of employment. Based on our employment multipliers for the same year, we find that the final demand for manufactured goods was in fact still responsible for 24.2% of cumulated (direct + indirect) employment. The employment share of manufacturing fell to 23.7% in 2002. The low employment multiplier found for manufacturing (of 7.7 workers / 1 million € in 2000), compared to the economy as a whole (12 workers / 1 mln€), despite the relatively higher presence of low-skilled workers in the production of industrial goods, is a subject for further research.

Qualitative employment multipliers show the use of domestic labour per final demand product in detail. A natural extension would be to apply the same method for capital goods and even for imported intermediate inputs.

We do not claim that the employment multipliers always "predict" the effect of changes in the final demand composition on employment or labour demand by type of qualification. To estimate the effects of final demand shocks, because of their mechanical nature, employment multipliers cannot be more than a reference point. Specific hypotheses or models are needed to take into account economic reactions and supply side effects for different worker types.

However, if they can describe current reality accurately, detailed employment multipliers can be useful for orienting employment policy efficiently towards specific age or skill groups. Alternatively, they could be used to project the demand for labour skills and types if specific shocks, changing the composition of final demand, occur. Therefore, it is desirable that employment multipliers can be updated to years for which no input-output table exist.

The share of each worker type in the total final demand employment multiplier equals the overall employment distribution. Using this, only the general employment multiplier needs to be updated to find the employment content of final demand for domestic output per worker type.

The general employment multiplier for 2002 was estimated rather closely by using the deflated employment multipliers of 2000. To obtain more reliable multiplier estimates at the product level, or over more years, it is advisable to introduce both the impact of changes in final demand product shares, as worker productivity increases at the industry level. This paper only introduces these as ideas for further research.

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Table 1 Employment by Type for non Homogenized Industries, 2000 (shares)

Non homogenized industry:	Agricul-ture, forestry, fishing	Manu-fact-uring	Mining, water & energy supply	Cons-truction	Trade, repair, hotel and restaurant services	Transport, storage & communic ation	Financial, real estate & business activities	Public adm., defence educati on	Health, & other services	total
section	A+B	D	C+E	F	G+H	I	J+K	L+M	N+O+P	
Men	0.68	0.77	0.86	0.93	0.52	0.76	0.59	0.44	0.30	0.57
Women	0.32	0.23	0.14	0.07	0.48	0.24	0.41	0.56	0.70	0.43
29 year or less	0.18	0.24	0.15	0.27	0.30	0.20	0.27	0.16	0.22	0.24
30-39 year	0.24	0.33	0.25	0.30	0.31	0.27	0.30	0.28	0.32	0.30
40-49 year	0.22	0.27	0.27	0.25	0.22	0.34	0.24	0.33	0.31	0.28
50-59 year	0.18	0.14	0.31	0.14	0.13	0.16	0.14	0.21	0.12	0.15
60 and older	0.17	0.01	0.01	0.03	0.04	0.02	0.05	0.02	0.03	0.03
Blue-collar	0.23	0.65	0.09	0.68	0.30	0.24	0.22	0.00	0.29	0.30
White-collar	0.02	0.31	0.56	0.11	0.45	0.19	0.44	0.02	0.34	0.29
Public sector	0.00	0.00	0.34	0.00	0.00	0.52	0.01	0.97	0.18	0.24
Self-employed	0.75	0.04	0.00	0.21	0.25	0.04	0.32	0.00	0.19	0.17
Primary / lower secondary	0.58	0.40	0.27	0.53	0.37	0.42	0.23	0.22	0.28	0.33
Upper secondary tertiary short type	0.40	0.50	0.59	0.43	0.55	0.51	0.52	0.58	0.54	0.52
Tertiary long type academic	0.02	0.10	0.14	0.04	0.08	0.07	0.25	0.20	0.18	0.15
Part-time workers[1]	0.12	0.09	0.06	0.05	0.26	0.12	0.18	0.27	0.42	0.22
Company Administrators	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.03
Interim workers	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.03
Workers (x 1000) [2]	95	656	31	240	709	292	739	706	623	4091
Share of workers	0.023	0.160	0.008	0.059	0.173	0.071	0.181	0.173	0.152	100
Output (million €) [2]	7 467	175 969	10 734	35 862	76 772	47 364	111 026	37 333	36 128	538 654
Share of output	0.014	0.327	0.020	0.067	0.143	0.088	0.206	0.069	0.067	100

1 Part-time workers only include employees. Self-employed workers are not divided into part-time or full-time workers.

2 The branch totals for output (P1) and workers correspond to those in the Belgian national accounts in “nationale rekeningen Deel 2 Gedetailleerde rekeningen en tabellen 1995-2005”, Instituut voor de Nationale Rekeningen, NBB, November 2006.

Table 2 Output & Employment Multipliers by Final Demand Product, 2000 (workers/ 1 mln €)

Final demand category:	Prod. of agricul-ture, forestry, fishing	Prod. of manu-fact-uring	Prod. of Mining, water & electr. & gas	Cons-truction activi-ties	Trade, repair, hotel and restaurant services	Transport, storage & communi-cation	Financial, real estate & business activities	Public adm., defence educati on	Health, & other services	Total final demand [1]
[1] Total output multiplier (mln €)	*1.85*	1.58	1.44	2.09	1.76	1.73	1.47	1.21	1.50	**1.59**
[2] Direct effect on employment	12.63	3.73	3.05	6.35	9.98	5.83	4.29	18.92	18.86	**7.9**
[3] Indirect effect on employment	5.22	4.02	2.83	7.18	5.66	4.53	3.46	1.5	4.24	**4.14**
[4] Total employ-ment multiplier	17.84	7.74	5.87	13.52	15.64	10.36	7.75	20.42	23.1	**12.04**
[5] % in final de-mand for domestic output in 2000	0.7%	37.7%	1.2%	5.5%	14.2%	7.3%	14.6%	10.2%	8.6%	**100**
[6] Contribution in % in total employment. Multiplier	1.0%	24.2%	0.6%	6.2%	18.5%	6.3%	9.4%	17.3%	16.6%	**100**

[1] The total economy or average multiplier show the effect of a 1 million euro shock distributed over the final demand categories according tot their share in final demand for domestic output.

Table 3 Qualitative Employment Multipliers by Final Demand Product, 2000(workers/1mln €)

Final demand category:	Prod. of agricul-ture, forestry, fishing	Prod. of manu-fact-uring	Prod. of Mining, water & electr. & gas	Cons-truction activi-ties	Trade, repair, hotel and restaurant services	Transport, storage & communi-cation	Financial, real estate & business activities	Public adm., defence educati on	Health, & other services	Total final demand
Men	11.7	5.5	4.6	11.3	8.7	7.3	4.9	9.4	7.6	**6.9**
Women	6.1	2.3	1.3	2.2	7.0	3.0	2.9	11.0	15.5	**5.1**
29 years or less	3.5	2.0	1.1	3.5	4.5	2.4	1.8	3.5	5.1	**2.8**
30-39 years	4.7	2.4	1.6	4.1	4.7	3.0	2.3	5.8	7.3	**3.6**
40-49 years	4.2	2.0	1.6	3.5	3.7	3.2	2.0	6.6	7.0	**3.3**
50-59 years	3.1	1.1	1.3	2.0	2.1	1.6	1.2	4.2	2.9	**1.8**
60 and older	2.5	0.2	0.2	0.4	0.7	0.3	0.4	0.4	0.8	**0.4**
Blue-collar	4.5	3.9	1.3	7.8	4.9	2.7	1.2	0.6	6.9	**3.7**
White-collar	2.1	2.5	2.6	2.8	6.0	2.7	3.7	0.9	7.5	**3.5**
Public sector	0.4	0.3	1.2	0.6	0.6	3.8	0.5	18.6	4.4	**2.9**
Self-employed	10.8	1.1	0.7	2.4	4.2	1.1	2.4	0.3	4.3	**2.0**
Primary / lower secondary	9.1	3.0	1.8	6.3	5.7	3.9	1.8	4.5	6.8	**4.0**
Upper secondary tertiary short type	7.6	3.9	3.2	6.2	8.3	5.3	4.1	11.7	12.3	**6.3**
Tertiary long type	1.1	0.9	0.9	1.0	1.6	1.1	1.9	4.1	4.0	**1.8**
Part-time workers	2.5	1.0	0.6	1.2	3.7	1.5	1.1	5.4	9.3	**2.6**
Administrators	0.2	0.2	0.3	0.3	0.6	0.3	1.3	0.1	0.1	**0.4**
Interim workers	0.1	0.4	0.1	0.3	0.4	0.2	0.3	0.1	0.2	**0.3**
Total multiplier	17.8	7.7	5.9	13.5	15.6	10.4	7.8	20.4	23.1	**12.0**

Table 4 Qualitative Employment Multipliers by Final Demand Product, 2000 (shares)

Final demand category:	Prod. of agricul-ture, forestry, fishing	Prod. of manu-fact-uring	Prod. of Mining, water & electr. & gas	Cons-truction ac-tivities	Trade, repair, hotel and restaurant services	Transport, storage & communi-cation	Financial, real estate & business activities	Public adm., defence educati on	Health, & other services	Total final demand
Direct effect on men	0.48	0.36	0.44	0.43	0.32	0.42	0.34	0.41	0.23	0.35
Dir. effect on women	0.23	0.12	0.08	0.04	0.32	0.15	0.21	0.52	0.58	0.31
Indirect effect on men	0.18	0.34	0.34	0.41	0.23	0.29	0.29	0.05	0.09	0.22
Ind. effect on women	0.11	0.18	0.14	0.12	0.13	0.15	0.16	0.02	0.09	0.12
29 year or less	0.19	0.25	0.20	0.26	0.29	0.23	0.23	0.17	0.22	0.24
30-39 year	0.26	0.31	0.28	0.30	0.30	0.29	0.30	0.28	0.32	0.30
40-49 year	0.23	0.26	0.27	0.26	0.23	0.30	0.26	0.32	0.30	0.28
50-59 year	0.17	0.14	0.23	0.15	0.14	0.15	0.16	0.20	0.13	0.15
60 and older	0.14	0.03	0.03	0.03	0.04	0.03	0.05	0.02	0.03	0.03
Blue-collar	0.25	0.50	0.23	0.57	0.31	0.27	0.16	0.03	0.30	0.30
White-collar	0.12	0.32	0.44	0.21	0.38	0.26	0.47	0.05	0.33	0.29
Public sector	0.03	0.03	0.21	0.04	0.04	0.37	0.07	0.91	0.19	0.24
Self-employed	0.60	0.14	0.12	0.17	0.27	0.11	0.30	0.01	0.19	0.17
Primary / lower sec-ondary	0.51	0.39	0.31	0.47	0.37	0.38	0.23	0.22	0.29	0.33
Upper secondary tertiary short type	0.43	0.50	0.54	0.46	0.53	0.52	0.53	0.57	0.53	0.52
Tertiary long type	0.06	0.11	0.15	0.08	0.10	0.10	0.24	0.20	0.17	0.15
Part-time workers	0.14	0.13	0.09	0.09	0.24	0.14	0.14	0.27	0.40	22
Administrators	0.01	0.03	0.05	0.02	0.04	0.03	0.16	0.00	0.01	0.03
Interim workers	0.01	0.05	0.02	0.02	0.02	0.02	0.03	0.00	0.01	0.03
Total multiplier	1	1	1	1	1	1	1	1	1	**1**

Table 5 Qualitative Employment Multipliers for 36 Products (workers / 1 mln €)

	Total multi-plier	Indirect effect	Men	Women	< 30 year	> 49 year	Primary + lower secun-dary	Higher long type + academic	Em-ployees, full-time	Em-ployees, part-time	Self-employed
A+B	17.8	5.2	11.7	6.1	3.5	5.5	9.1	1.1	4.6	2.5	10.8
C	8.8	4.0	6.7	2.1	2.0	1.8	3.4	1.1	6.6	1.0	1.2
DA	11.6	7.4	7.4	4.2	3.1	2.3	5.0	1.0	6.4	2.0	3.3
DB+DC	10.4	4.3	5.8	4.6	2.5	1.7	4.9	0.8	8.1	1.3	1.1
DD+DE	9.0	4.3	6.3	2.7	2.3	1.5	3.2	1.1	6.8	1.1	1.2
DF	2.5	2.2	1.7	0.8	0.6	0.5	0.8	0.4	1.7	0.4	0.4
DG	5.5	3.0	3.8	1.7	1.4	1.0	1.7	1.0	4.2	0.7	0.6
DH	8.2	3.3	6.0	2.2	2.2	1.2	3.0	0.9	6.6	0.9	0.7
DI	9.4	4.2	7.5	1.9	2.2	1.8	4.0	1.0	7.7	0.9	0.8
DJ	7.2	3.5	5.7	1.5	1.7	1.3	2.9	0.7	5.8	0.7	0.7
DK	9.6	4.5	7.5	2.1	2.5	1.7	3.5	1.1	7.7	1.0	0.9
DL	8.0	3.6	5.5	2.5	2.2	1.3	2.5	1.3	6.1	1.0	0.9
DM	6.1	3.2	4.8	1.3	1.6	0.9	2.5	0.6	4.9	0.7	0.5
DN	9.2	3.4	6.8	2.4	2.3	1.7	4.1	0.7	7.1	0.9	1.2
E	5.4	2.6	4.2	1.2	1.0	1.4	1.5	0.8	4.3	0.5	0.6
F	13.5	7.2	11.3	2.2	3.5	2.4	6.3	1.0	10.0	1.2	2.4
G50	13.1	4.9	9.4	3.7	3.6	2.4	4.9	1.3	8.0	1.8	3.3
G51	11.9	5.7	7.4	4.5	3.1	2.2	3.9	1.7	7.2	2.0	2.6
G52	20.2	5.7	9.1	11.1	5.7	3.7	7.4	1.9	8.5	5.7	6.0
H	20.7	6.3	10.6	10.1	7.2	3.3	9.0	1.2	7.5	7.2	6.1
I60AB	16.5	2.4	14.6	1.8	2.5	2.9	7.9	0.7	14.5	1.4	0.5
I60C	10.3	3.7	8.4	1.9	2.3	1.9	4.9	0.7	7.9	1.0	1.4
I61/62	7.6	5.4	4.9	2.6	2.2	1.2	2.2	1.1	5.0	1.4	1.2
I63	9.8	5.1	6.1	3.7	2.4	1.8	3.2	1.2	6.9	1.7	1.1
I64A	20.5	2.5	14.5	6.0	3.4	4.7	9.3	1.3	15.8	3.5	1.2
I64B	8.8	4.6	5.9	2.9	2.2	1.3	2.9	1.4	6.7	1.0	1.1
J	10.2	4.8	5.7	4.5	2.2	2.1	1.8	2.4	7.0	1.8	1.4
K70t	1.7	1.7	1.3	0.4	0.4	0.3	0.7	0.2	1.2	0.2	0.3
Kr7071	8.3	4.3	5.2	3.1	2.0	1.6	2.8	1.2	4.9	1.6	1.8
K7273	12.5	5.1	7.7	4.7	3.6	1.9	2.6	3.5	8.1	1.9	2.4
K74	15.0	4.6	9.7	5.2	3.2	3.4	3.5	4.0	5.5	1.7	7.7
L	20.3	2.0	11.1	9.2	3.4	4.2	6.6	2.9	15.4	4.5	0.4
M	20.5	0.9	7.3	13.2	3.6	4.9	2.1	5.6	13.8	6.5	0.2
N	21.8	4.0	6.7	15.1	5.0	3.5	5.0	4.6	9.8	7.9	4.2
O	19.8	5.2	9.3	10.6	5.0	4.1	6.3	2.8	9.5	5.1	5.2

	Total multi-plier	Indirect effect	Men	Women	< 30 year	> 49 year	Primary + lower secun-dary	Higher long type + academic	Em-ployees, full-time	Em-ployees, part-time	Self-employ ed
P	92.9	0.0	15.7	77.2	9.2	4.1	62.0	0.7	1.6	91.4	0.0
Final demand	12.0	4.1	6.9	5.1	2.8	2.2	4.0	1.8	7.4	2.6	2.0

A+B Products of agriculture, hunting, forestry & fishing; C Products from mining and quarrying;

DA Food products, beverages & tobacco; DB+DC Textiles, leather & their products; DD+DE Wood, paper & printing services; DF Coke, refined petroleum products & nuclear fuel; DG Chemicals, chemical products & man-made fibers; DH Rubber & plastic products; DI Other non metallic mineral products; DJ Basic metals & fabricated metal products; DK Machinery & equipment n.e.c. ; DL Electrical & optical equipment; DM Transport equipment; DN Other manufactured goods;

E Electrical energy, gas, steam & water; F Construction activities;

G50 Trade, maintenance & repair of motor vehicles & motorcycles, retail trade of automotive fuel; G51 Wholesale trade and commission trade services; G52 Retail trade & repair services; H Hotel & restaurant services;

I60AB Railway transportation services & other passenger land transportation services; I60C Freight transport services by road or pipelines; I61/62 Water & air transport services; I63 Supporting & auxiliary transport services, travel agency services; I64A Post and courier services; I64B Telecommunication services;

J Financial intermediation services; K70t Renting services involving own residential household property; Kr7071 Other real estate services and renting services of machinery, equipment & goods; K7273 Computer and related services, research and development services; K74 Other business services;

L Public administration & defence services, compulsory social security; M Education services;

N Health and social work services; O Other community, social and personal services; P Private households with employed persons;

Table 6 Products with High Employment Multipliers in General, for Low-Skilled and for Older Workers.

Products (homogeneous industries)	[1] Nace / CPA	[2] Total employment Multiplier	[3] Low-skilled multiplier	[4] Multiplier of workers older than 55 years	[5] Final demand share (%)	[6] Output share (%)
Products of agriculture & hunting	01	18.0	9.2	3.9	0.62%	1.35%
Products of forestry & logging	02	20.3	10.1	4.5	0.02%	0.04%
Food & beverage + canteen & catering services	55.3 - 55.5	21.6	9.5	1.9	1.76%	1.52%
Inland water transport services	61.2	17.9	7.3	3.0	0.02%	0.05%
Labour recruitment & provision of personnel services	74.5	32.8	13.8	0.7	0.02%	0.70%
Social work services [1]	85.3	30.4	8.9	1.6	1.81%	1.14%
Membership organization services [1]	91	22.1	5.6	2.9	0.34%	0.41%
News agency services, library, archives, museum & other cultural services [1]	92.4 - 92.5	22.2	7.0	2.1	0.17%	0.13%
Washing and dry cleaning services, hairdressing & beauty services, funeral services, physical well being services other services n.e.c.	93	33.6	12.8	4.9	0.42%	0.35%
Private households with employed persons	95	92.9	62.0	1	0.22%	0.14%

[1] These three service industries (products) have not been shown at the most detailed level, where a distinction is made between the market and non market institutional sector. The employment multipliers have been aggregated using the final demand product shares.

Table 7 Employment by Type for Non Homogenized Industries, 2002 (shares)

Non homogenized industry:	Agriculture, forestry, fishing	Manufacturing	Mining, water & energy supply	Construction	Trade, repair, hotel & restaurant services	Transport, storage & communication	Financial, real estate & business activities	Public adm., defence education	Health, & other services	total
	A+B	D	C+E	F	G+H	I	J+K	L+M	N+O+P	
Men	0.70	0.76	0.84	0.93	0.52	0.76	0.59	0.43	0.29	0.57
Women	0.30	0.24	0.16	0.07	0.48	0.24	0.41	0.57	0.71	0.43
29 years or less	0.17	0.22	0.14	0.26	0.28	0.19	0.25	0.16	0.21	0.22
30-39 years	0.24	0.33	0.26	0.30	0.30	0.26	0.30	0.27	0.30	0.29
40-49 years	0.24	0.28	0.28	0.26	0.23	0.34	0.25	0.33	0.32	0.28
50-59 years	0.19	0.16	0.31	0.15	0.14	0.19	0.15	0.22	0.14	0.17
60 and older	0.17	0.02	0.01	0.03	0.04	0.02	0.05	0.02	0.03	0.03
Blue-collar	0.26	0.64	0.08	0.68	0.30	0.24	0.21	0.00	0.29	0.30
White-collar	0.02	0.32	0.55	0.12	0.47	0.19	0.45	0.02	0.36	0.30
Public sector	0.00	0.00	0.36	0.00	0.00	0.52	0.01	0.97	0.17	0.24
Self-employed	0.72	0.04	0.00	0.20	0.23	0.04	0.33	0.00	0.18	0.16
Primary/lower secondary	0.55	0.37	0.24	0.50	0.35	0.40	0.21	0.20	0.27	0.31
Upper secondary/Tertiary short type	0.42	0.52	0.61	0.46	0.57	0.53	0.52	0.59	0.55	0.54
Tertiary long type/ academic	0.02	0.10	0.15	0.04	0.08	0.07	0.26	0.21	0.18	0.15
Part-time workers	0.14	0.10	0.05	0.05	0.28	0.12	0.18	0.28	0.43	0.23
Company administrators	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.04
Interim workers	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.02
Workers (x1000)	89	638	29	238	722	293	758	726	650	4 144
Share workers	0.022	0.154	0.071	0.058	0.174	0.071	0.183	0.175	0.157	1
Output (mln €)	7315	171090	11491	36394	83330	48448	122331	41926	39810	562135
Share of output	0.013	0.304	0.020	0.065	0.148	0.086	0.218	0.075	0.071	1

Table 8 Output & Employment Multipliers by Final Demand Product, 2002 (workers/ 1 mln €)

Final demand category:	Prod. of agricul-ture, forestry, fishing	Prod. of manu-fact-uring	Prod. of Mining, water & electr. & gas	Cons-truction activi-ties	Trade, repair, hotel and restaurant services	Transport, storage & communi-cation	Financial, real estate & business activities	Public adm., defence educati on	Health, & other services	Total final demand [1]
[1] Total output multiplier (mln €)	*1.85*	1.61	1.51	2.12	1.79	1.70	1.51	1.21	1.50	**1.60**
[2] Direct effect on employment	12.03	3.76	2.80	6.21	9.38	5.89	4.4	17.33	17.98	**7.76**
[3] Indirect effect on employment	4.45	4.01	3.30	7.13	5.41	4.26	3.5	1.42	4.07	**4.03**
[4] Total employ-ment multiplier 2002	16.48	7.77	6.1	13.35	14.79	10.15	7.91	18.75	22.05	**11.79**
[5] % in final de-mand for domestic output in 2002	0.6%	36.0%	1.4%	5.4%	13.8%	7.0%	15.5%	10.9%	9.3%	**100%**
[6] % in average employm. Multiplier	0.9%	23.7%	0.7%	6.1%	17.3%	6.1%	10.4%	17.3%	17.5%	**100%**
[7] Total employ-ment multiplier 2002 in prices of 2000	19.01	7.69	6.60	13.50	15.06	11.01	8.10	20.05	23.42	**12.07**
[8] % in final de-mand for domestic output in 2002, in prices of 2000	0.5%	37.2%	1.3%	5.5%	13.9%	6.6%	15.5%	10.4%	9.0%	**100%**
[9] Total employ-ment multiplier 2002, prices and weights of 2000										**12.04**
[10] % price in-crease 2000-2002	15.4%	-0.9%	8.1%	1.1%	1.8%	8.4%	2.5%	7.0%	6.2%	**2.4%**

[1] The total economy or average multiplier show the effect of a 1 million euro shock distributed over the final demand categories according tot their share in final demand for domestic output.

Table 9 Qualitative Employment Multipliers by Final Demand Product , 2002 (shares)

Final demand product:	Prod. of agricul-ture, forestry, fishing	Prod. of manufacturing	Prod. of Mining, water & electr. & gas	Construction work	Trade, repair, hotel and restaurant services	Transport, storage & communi-cation	Financial, real estate & business activities	Public adm., defence education	Health, & other services	Total final demand 1
Direct effect on men	0.51	0.36	0.38	0.43	0.32	0.42	0.34	0.40	0.23	0.35
Dir. effect on women	0.22	0.12	0.08	0.03	0.31	0.16	0.22	0.53	0.58	0.31
Indirect effect on men	0.17	0.34	0.38	0.40	0.24	0.28	0.28	0.05	0.10	0.22
Ind. effect on women	0.10	0.17	0.16	0.13	0.13	0.14	0.17	0.03	0.09	0.12
29 year or less	0.18	0.24	0.19	0.25	0.27	0.21	0.22	0.17	0.21	0.22
30-39 year	0.25	0.31	0.28	0.30	0.30	0.27	0.30	0.27	0.30	0.29
40-49 year	0.24	0.27	0.28	0.27	0.24	0.31	0.27	0.33	0.32	0.28
50-59 year	0.18	0.16	0.22	0.16	0.14	0.18	0.17	0.21	0.14	0.17
60 and older	0.14	0.03	0.03	0.03	0.04	0.03	0.05	0.02	0.03	0.03
Blue-collar	0.27	0.49	0.24	0.57	0.32	0.25	0.15	0.02	0.30	0.30
White-collar	0.12	0.33	0.42	0.22	0.40	0.26	0.46	0.05	0.34	0.30
Public sector	0.02	0.03	0.20	0.04	0.04	0.39	0.07	0.91	0.19	0.24
Self-employed	0.59	0.14	0.13	0.17	0.25	0.10	0.31	0.02	0.18	0.16
Primary / lower secondary	0.49	0.36	0.29	0.43	0.35	0.36	0.21	0.20	0.28	0.31
Upper sec. / tertiary short type	0.45	0.52	0.56	0.49	0.55	0.53	0.54	0.59	0.55	0.54
Tertiary long type	0.06	0.12	0.15	0.08	0.10	0.11	0.25	0.21	0.17	0.15
Part-time workers	0.15	0.14	0.10	0.09	0.25	0.15	0.15	0.27	0.41	0.23
Administrators	0.01	0.03	0.05	0.02	0.04	0.03	0.18	0.00	0.01	0.04
Interim workers	0.01	0.05	0.02	0.02	0.02	0.02	0.03	0.00	0.01	0.02
Total multiplier	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 10 Employment by Type for Non Homogenized Industries, 2005 (shares)

Non homogenized industry:	Agricul-ture, forestry, fishing	Manu-fact-uring	Mining, water & energy supply	Cons-truction	Trade, repair, hotel and restaurant services	Transport, storage & communication	Financial, real estate & business activities	Public adm., defence education	Health, & other services	total
	A+B	D	C+E	F	G+H	I	J+K	L+M	N+O+P	total
Men	0.69	0.76	0.81	0.93	0.52	0.76	0.59	0.42	0.29	0.56
Women	0.31	0.24	0.19	0.07	0.48	0.24	0.41	0.58	0.71	0.44
29 years or less	0.17	0.20	0.15	0.25	0.27	0.16	0.23	0.17	0.20	0.21
30-39 years	0.22	0.30	0.26	0.28	0.29	0.26	0.29	0.25	0.27	0.28
40-49 years	0.25	0.30	0.30	0.27	0.25	0.31	0.26	0.33	0.32	0.29
50-59 years	0.20	0.18	0.27	0.16	0.15	0.24	0.16	0.23	0.17	0.18
60 and older	0.16	0.02	0.02	0.04	0.05	0.03	0.05	0.02	0.04	0.04
Blue-collar	0.29	0.63	0.09	0.67	0.30	0.25	0.22	0.00	0.29	0.29
White-collar	0.03	0.33	0.53	0.12	0.48	0.20	0.45	0.03	0.40	0.31
Public sector	0.00	0.00	0.38	0.00	0.00	0.50	0.01	0.97	0.14	0.23
Self-employed	0.69	0.04	0.00	0.20	0.22	0.04	0.33	0.00	0.17	0.16
Primary/ lower secondary	0.51	0.33	0.20	0.46	0.31	0.37	0.20	0.17	0.26	0.28
Upper secon-dary/Tertiary short type	0.47	0.56	0.64	0.50	0.60	0.55	0.54	0.61	0.57	0.57
Tertiary long type/ aca-demic	0.03	0.11	0.16	0.04	0.09	0.08	0.26	0.22	0.17	0.16
Part-time workers	0.14	0.12	0.06	0.05	0.29	0.14	0.20	0.30	0.44	0.25
Company administrators	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.04
Interim workers	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.02
Workers (x1000)	84	602	27	240	749	292	790	745	682	4212
Share workers	0.020	0.143	0.007	0.057	0.178	0.069	0.187	0.177	0.162	1
Output (mln €)	7 027	206 657	12 189	42 538	84 682	57 286	141 047	46 340	45 953	643 719
Share of output	0.011	0.321	0.019	0.066	0.132	0.089	0.219	0.072	0.071	1

Table 11 Estimate of the Employment Multiplier of 2002, Based on the Multipliers of 2000

	Multipliers of 2000	Multipliers of 2000 with final demand in prices 2002 [1]	Product shares in final demand of 2002 [1]	Estimate of total empoyment multiplier 2002[1]	IO based employment multiplier of 2002
	[1]	[2]	[3]	[4] =∑ [2]*[3]	[5]
Prod. of agriculture, forestry, fishing	17.84	15.47	0.006	15.39	16.48
Prod. of manufacturing	7.74	7.82	0.360	7.98	7.77
Prod. of Mining, water & electr. & gas	5.87	5.43	0.014	5.46	6.10
Construction work	13.52	13.37	0.054	13.37	13.35
Trade, repair, hotel and restaurant services	15.64	14.89	0.138	15.0	14.79
Transport, storage & communication	10.36	10.16	0.070	10.35	10.15
Financial, real estate & business activities	7.75	7.56	0.155	7.92	7.91
Public adm., defence & education	20.42	19.10	0.109	19.11	18.75
Health, & other services	23.10	21.75	0.093	21.97	22.05
Total final demand 1	12.04	11.76	1	11.93	11.79

[1] The multipliers shown in table 11 are weighted aggregates of those obtained at the lowest IO industry level. In columns [1] and [2] the weights are the current price final demand shares of 2000. In columns [4] and [5], the weights are the current price final demand shares of 2002.