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WOLIWEB

The socio-economic determinants of citizens' work life attitudes, preferences and perceptions, using data from the continuous web-based European WageIndicator Survey

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1. INTRODUCTION

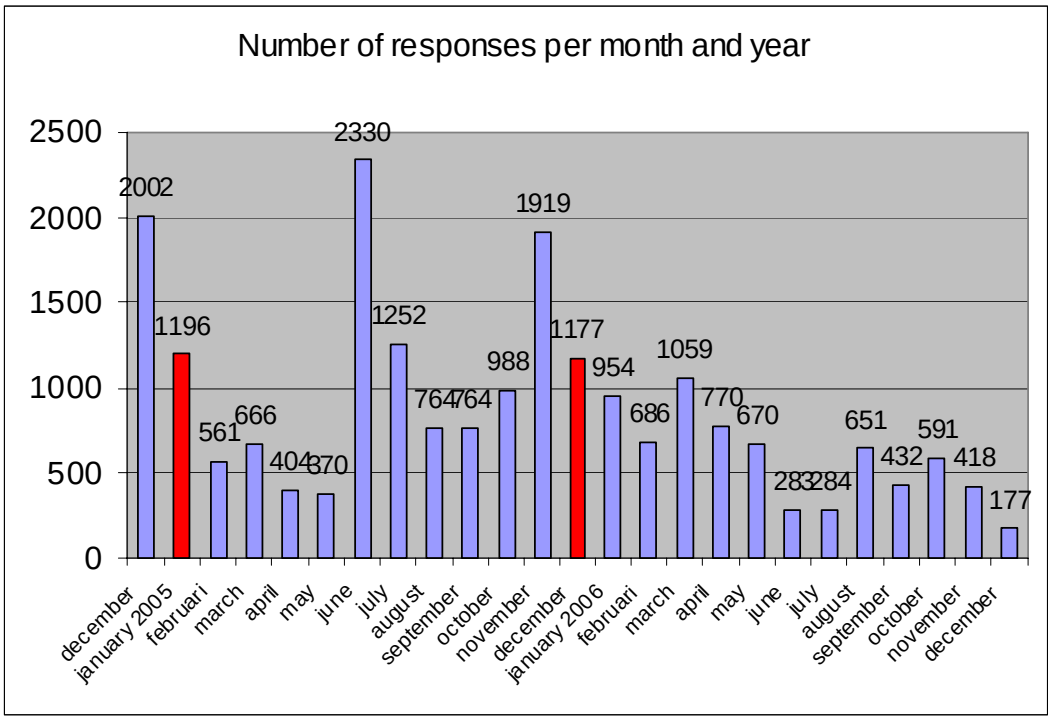
In this paper, we give an overview on the *WageIndicator* data, release 1-9 (sept2004-dec2006). Furthermore, we present the results of the analysis on the explanation the gender pay gap. For Belgium, we collect this data from several intake points. The Belgian trade unions have opted to set up different websites to cater to the specific needs of their audience. They have data intake points for both their Flemish and French clients. The data collection runs through these dedicated data collection channels. All in all 21.368 people have completed the questionnaire during the period of December 2004-December 2006.

This report presents an analysis of the data in four different sections. In a first section we look at the response data. How well did the people respond to the online questionnaire? And during which time period did most people fill in the questionnaire? In a second section we look at the representativeness of the data. To what degree do the results for the *WageIndicator* questionnaire line up with the results from other surveys that use a different data collection approach? As an estimator we will use data from the Labor Force Survey of 2005 (LFS). This survey is administered by the Belgian National Institute of Statistics (NIS) and is generally deemed to be representative for the labour market. In a third section, we have a closer look at the gross hourly wage. We go into detail why we use this measure instead of the monthly wage. In a closing section we investigate the gender pay gap. Here, we have a closer look at the distribution of the male and female wages. We define the gender wage gap in absolute terms. Furthermore, we offer a statistical explanation of the gender pay gap. We explore to what degree the different factors impact the gender pay gap.

2. MONTHLY RESPONSE

First of all, we have a look at the monthly response figures for the entire data intake. We have been collecting data since the end of 2004. We started out with a trial version in September 2004 but left these trial data out of the final data set. Below you find the number of responses per month and per year, beginning in December of 2004.

Figure 1 Number of responses per month and year



Source: *WageIndicator*, data release 1-9, unweighted data

The bars in red signify the beginning of each new working year. We notify striking peaks in the number of responses, both for the end of 2004 and the end of 2005. In 2004, around this period, we made an extensive promotion for the website. The peak at the end of 2005 can be explained by the election of the 'Loonwijzer.be' website as 'website of the year' by the readers of the biggest economical newspaper (de Tijd) in Belgium.

In the middle of the year 2005, in the month of June, we had the highest peak in number of respondents. During this period, we published an announcement in 'Visie', a trade union magazine with an audience of 1.2 million people, which triggered an enormous amount of respondents.

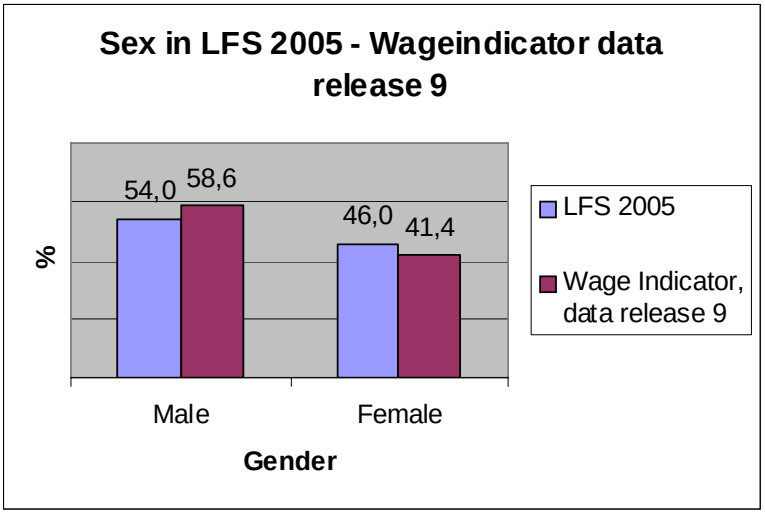
3. REPRESENTATIVENESS

Unlike a traditional paper survey, for which there is a sampling framework available, the *WageIndicator* survey is open to be filled in by everyone with access to the Internet. Because of the lack of a sampling frame, we need to check in other ways whether the conclusions from the results of the data analysis can be generalized for the whole population.

For this, we make use of the LFS of 2005. We look at a number of characteristics that are included in this questionnaire and we compare the results with the data from the WI, release 1-9 to see to what degree they match.

We take four characteristics into account: sex, education, age and industry. First we consider the distribution of the sexes. To what degree is this distribution comparable?

Figure 2 Sex in LFS, 2005 – *WageIndicator* data release 1-9

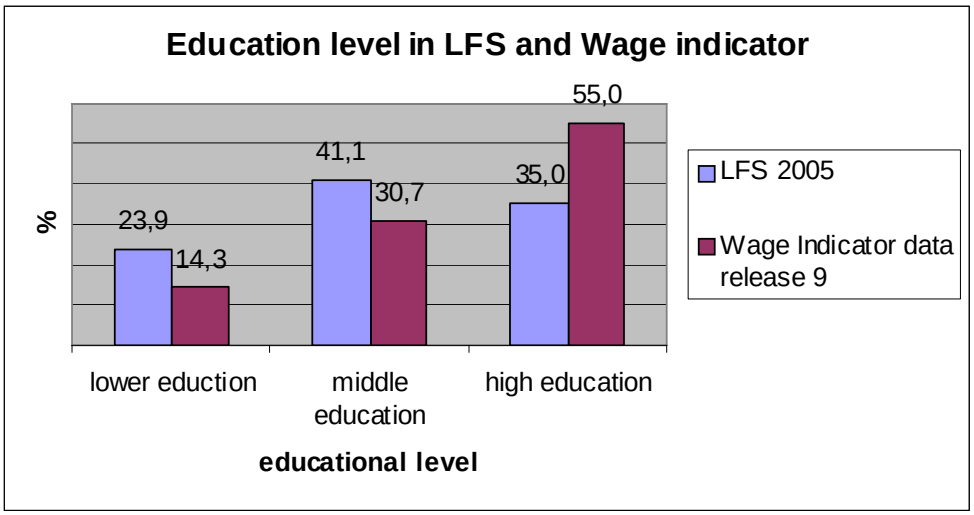


Source: LFS 2005, *WageIndicator* data release 1-9, unweighted data

About 54% of the respondents of the LFS are male. For the *WageIndicator* survey, this number is a bit higher, almost 59%. We have proportionally more male responses compared to the LFS. But all in all, the distribution in terms of gender is relatively similar in gender terms.

The differences between the two questionnaires become more pronounced when we consider the educational level of respondents in the LFS and *WageIndicator* population.

Figure 3 Education level in LFS 2005, *WageIndicator* data release 1-9



Source: LFS 2005, *WageIndicator* data release 1-9, unweighted data

Before we discuss these results, let us clarify what we mean with the different education levels. Lower education we define as the level up to lower secondary education. Middle education is the level up to the end of the secondary education while high education equals to everything that follows the secondary educational level. For the LFS, around 41% of the respondents have a middle education level. A smaller percentage of the respondents of the LFS are highly educated. When we compare these percentages to the ones we find for the WI, we notice a different trend.

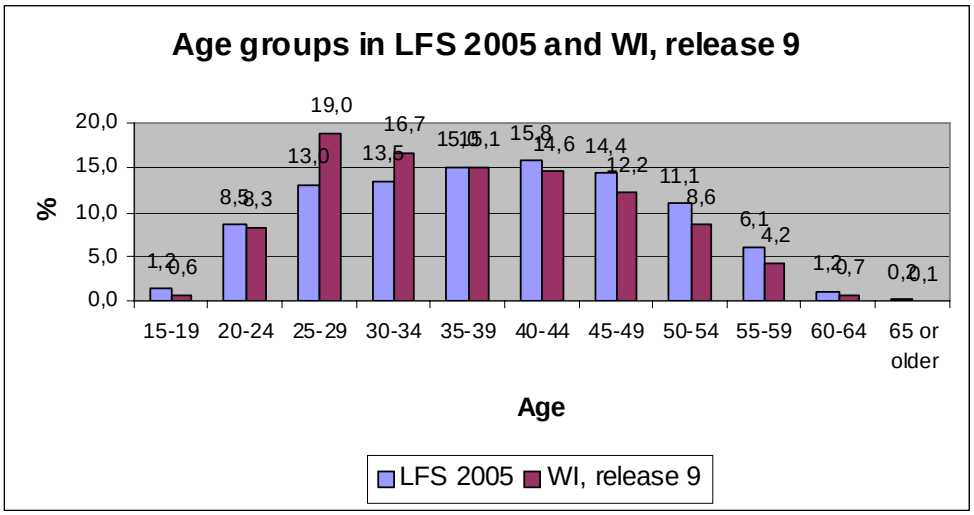
For the WI, the majority of the respondents are highly educated. More than half of them completed a post-secondary education. Compared to the LFS, there is a smaller proportion of the respondents who are lowly educated while more of them have a high educational level.

We can conclude that - compared to the LFS - the *WageIndicator* includes less low educated and more high-educated people. This is a result we expected, because at this moment there is still a bias in the use of Internet. Highly educated people still use the Internet more often then lower educated people[1].

Next we compare the age groups of the people who filled in the *WageIndicator* with those of the LFS. To what degree do we find similarities in the ages of the people that answer?

1 http://aps.vlaanderen.be/statistiek/cijfers/media/ICT/huishoudens/Vlaanderen/-MEDIICTHV008.xls

Figure 4 Age groups in LFS 2005 and WI, release 1-9

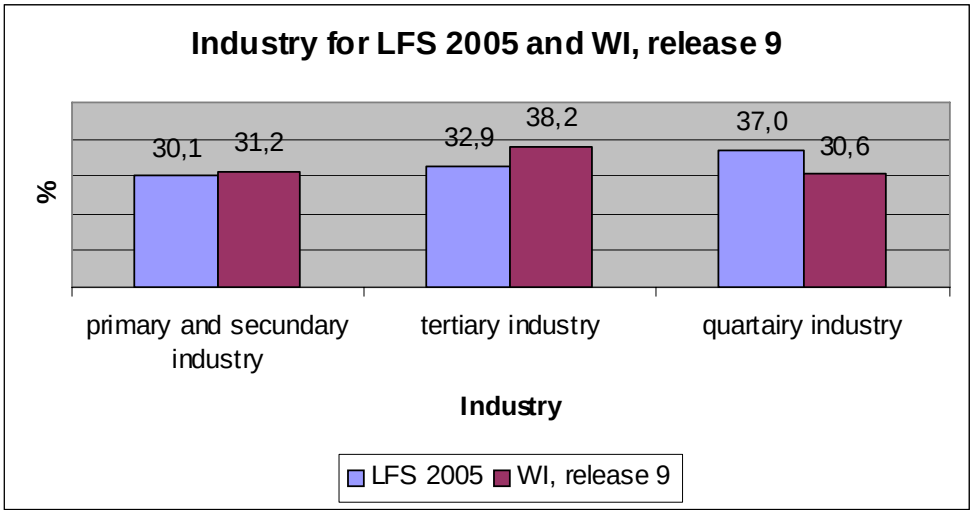


Source: LFS 2005, *WageIndicator* data release 1-9, unweighted data

When we compare the distribution of age for both the LFS and the *WageIndicator* results, we notice a similar profile of the respondents. One difference is striking however. For the *WageIndicator* we have substantially more respondents in the age groups of 25 to 34 years old. We can conclude that the *WageIndicator* websites attract a relative young audience that is starting to build up a career and is looking for valuable information on wages.

Finally we looked at the industry in which the respondents of both the LFS and the *WageIndicator* work. To what degree do they work in similar industries?

Figure 5 Industry for LFS 2005 and *WageIndicator* data release 1-9



Source: LFS 2005, *WageIndicator* data release 1-9, unweighted data

When we look at the distribution of industry, we get similar results for both questionnaires. For the LFS, approximately one out of three respondents works in the

commercial services. About four out of ten employees work in the public services while 30% works in the primary and secondary industry.

For all these characteristics (gender, educational level, age, industry), we have calculated weights based on the LFS 2005 and we have applied them to the *WageIndicator* data release 1-9. Thus, we should be able to make more general representative claims, based on our data.

It is equally important to mention that we have restricted the analysis to employees. This means that we have excluded the self employed, the apprentices, etc. systematically from the analysis, because their wage situation is totally different.

4. GROSS HOURLY WAGE

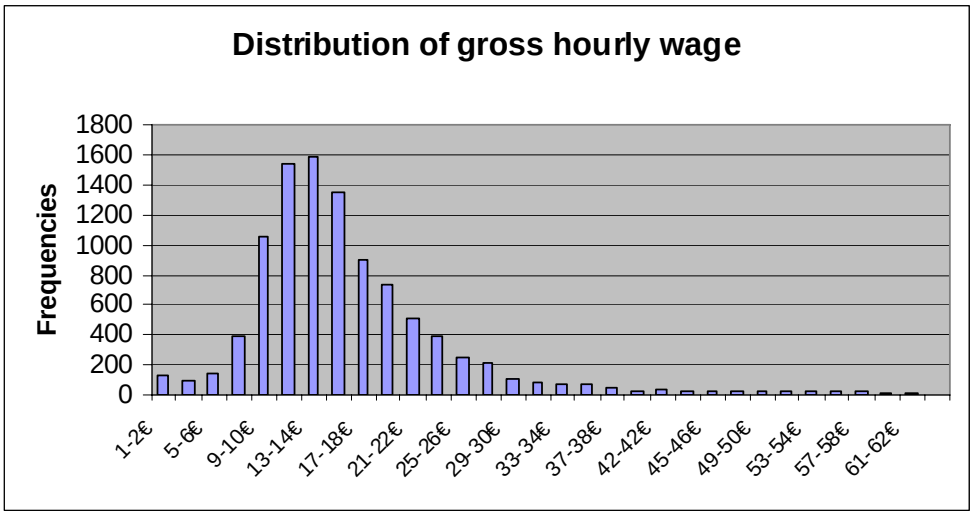
For all the wage calculations involved in the analysis, we use the gross hourly wage. We prefer to use this constructed measure instead of the monthly wage, which is directly measured to filter out the wage differentials caused by part time work. We live in a society that requires workers to become more and more flexible. In certain occupations, the number of part time workers is on the rise. To illustrate this, 14.8% of all the *respondents of the WageIndicator* have a part time job.

So what does it mean to get a monthly wage if you don't take into consideration the hours spent on working? For some people a working week is 40 hours long, for others 38 hours or less. Just using the monthly wage would give a flawed result in comparing both wages. That is why we consider the number of working hours during which the wage was earned when analysing the monthly gross wage of employees.

It may seem like an artificial wage measure, because white-collar workers don't know from their pay slip what their gross hourly wage is. In terms of usability for them, this seems to be an artificial concept. However, for the scientific comparison of wages, this is the most accurate measure.

In the figure below, we present the distribution of the gross hourly wage for all the *respondents of the WageIndicator* data collection.

Figure 6 Distribution of the gross hourly wage



Source: *WageIndicator* data release 1-9, unweighted data

For this data presentation, we left out all outliers. We did not taken into account all gross hourly wages lower then 1 Euro and higher then 65 Euro. The figure presents the distribution of the gross hourly wages. Visually, the data appears to be fairly normally distributed. The mean wage is 16.6 Euro/hour when we don't take into consideration the wages of the outliers as presented above. The median gross hourly wage is a bit lower. This amounts up to 14.5 Euro/hour which is approximately 2 Euro lower then the mean wage.

5. THE GENDER PAY GAP

In this section, we will have a closer look at the distribution of the male and female wages. We will define the gender wage gap in absolute terms. Furthermore, we will offer an explanation of the gender pay gap. How do person related, function related and company related variables affect the gender wage gap? What types of variables have the biggest impact?

For this analysis, we take into consideration that outliers can influence the results in a bad way. Therefore we have opted to only look at those respondents with gross hourly wages between the range of 1 Euro and 65 Euro/hour.

We know that the mean wage is 16.6 Euro. Do we find a difference between the wage of men and women? Apparently we do. On average, the male respondents earn 19,0 Euro/hour. The female respondents earn considerably less. They earn 14,6 Euro/hour.

From the regression analysis, we can deduce that the gender pay gap (female/male) amounts up to 16.5%. This means that if you only take gender into account as an explaining factor for wage differences, females earn 16.5% less than males.

In the literature, we find different hypotheses that try to explain the gender pay gap. A part of the explanation, the literature tells us, can be found in the difference in age structure between men and women. Working women are said to be younger, have less experience and thus earn less. Many of them work part time and the combination of work and family life restricts their possibility of finding a better paid jobs[2].

Furthermore, the labour market is also horizontally and vertically segregated. In many of the organization, dominated by men, there is a glass ceiling or a sticky floor that prevents women to reach the better-paid jobs[3]. This is what is meant by vertical segregation. The labour market is also horizontally segregated: women work more often in industries that pay less.

On the basis of these theoretical elements, we look for an explanation in the wage differences between men and women. We do this using a linear regression with the natural logarithm of the standardized gross monthly wage as the dependent variable. By means of this regression analysis, we investigate to what degree the height of the wage can be explained by a number of elements.

Based on these theoretical assumptions, we distinguish three groups of variables that have an impact on the height of the wage.

First of all, there are the objective attributes of the person involved. Among these personal attributes, we include age, working experience, the educational level and the having of children in the analysis.

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2 Geurts, K., Van Woensel, A. (2005), *Genderzakboekje 2005: Hij en zij op de arbeidsmarkt*, Steunpunt WAV: Leuven

3 Wirth, L. (2001), Breaking *through the glass ceiling. Women in management,* ILO: Geneva

Apart from these personal attributes, we can expect the job you perform to have a big influence too. An employee receives a wage for the function he performs within a company. His job will determine to a high degree the amount of money he receives. The job specific characteristics we include are the functional domain in which the respondent works, the occupational group, the functional family, his hierarchical position, the number of subordinates, the job autonomy, the pressure at work, the complexity of the job, the duration of the labour and the type of contract.

Furthermore, there are characteristics that are typical for the organization that can influence the wage. We think of the industry, the size, the nationality of the employer, the region, the number of women in the organization, if there is a collective bargaining agreement and whether there is a representation of the trade union.

The regression analysis allows us to determine what the effect is of a variable on the wage gap between men and women. The table below summarizes all the variables we include in the regression model.

Table 1 An overview of all the included variables

Person related characteristics	Function based characteristics	Company based characteristics
Sex (male-female)	Functional domain (white collar worker, blue collar worker, staff level, civil, other))	Industry, based on joint committee
Age	Job autonomy	Number of women in the company
Number of years of working experience	Work pressure	Trade union representation
Level of education (low, medium, high)	Hierarchical level (number of subordinates)	Size of the firm
Children	Complexity of the job	
	Part time or full time	

Source: *WageIndicator* data release 1-9

5.1 Person related variables

In our model, we have incorporated several person related variables, e.g. age work experience with the current employer (work experience quadrupled), educational level and the having children.

First of all, we will have a closer look at the gender variable. For our research, where we look at gender differences, this is a crucial variable. For each group of control variables, we have looked at the impact of gender on the pay gap. Consequently, we will measure the joint impact of the different person related characteristics on the gender wage differences. In order to arrive at such an estimate, we analyze the parameters of two different regression models. Both models have the gross hourly wage as a dependent variable. In the first model, we only introduce gender as an independent characteristic.

In the second model, we also include different person related variables. The relative change in the gender parameter can be interpreted as the effect of the several person related characteristics on the gender pay gap.

Table 2 Effect of gender and person related variables on the standardized gross hourly wage

Model	Variables	Adj R^2	B	% exp(b)
1	Gender	0,027***	-0,18	16,5
2	Gender + person related variables Gender+ person related variables	0,146 ***	-0,19	17,6

** level of significance p=0,001

Source: *WageIndicator* data release 1-9 (weighted data)

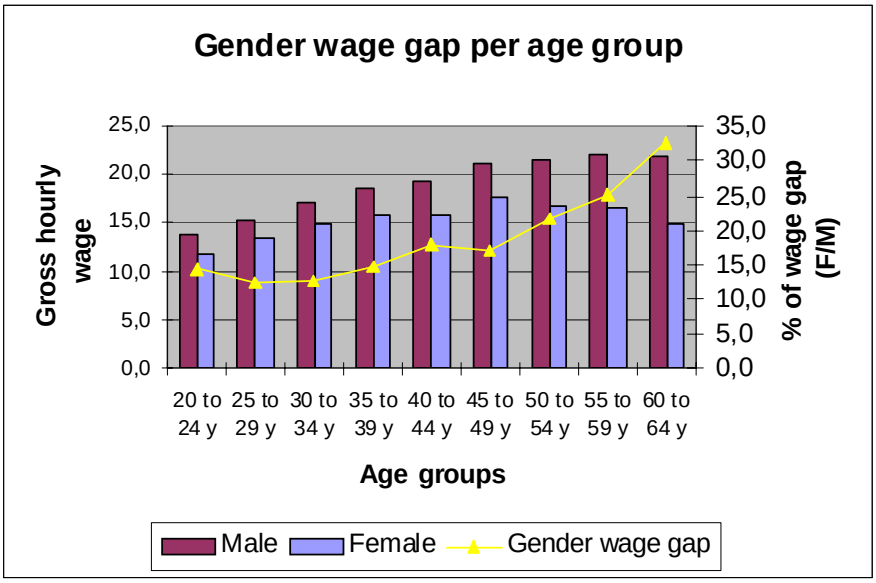
The overall gender pay gap in our regression model 1 amounts up to 16,5%. This means that if we don't control for other variables, the wages between men and women differ more then 16%. In the second model, we add a number of person related variables. Introducing these variables in the regression model (2) results in an increase of the gender pay gap with more then two percentage points. The fact that working men and women differ in terms of age, experience, educational level and the having of children increases the existing wage gap. This means that human capital characteristics do not have an explanatory value when it comes to the gender pay gap. On the contrary, they increase the gender pay gap.

5.1.1 Age groups

The education variable turned out to have the biggest impact on increasing the gender pay gap. That is why we opted to further investigate this variable. Further more, we are also interested in the relationship between the age of the respondents and the gender wag gap. Do we find a gender wage gap for all the age groups? Is the gender wag gap larger for the older segment of the labour market as we might expect? We will explore this relationship first.

Before we discuss the analysis in detail, it is important to know how to interpret the graphics that will follow. The columns represent the gross hourly wages of the men and women. The axis for the interpretation of these wages is found on the left. They yellow line presents what percentage women earn of the male wages. The axis with these percentages is found on the right.

Figure 7 Gender wage gap for age groups



Source: *WageIndicator* data release 1-9, weighed data

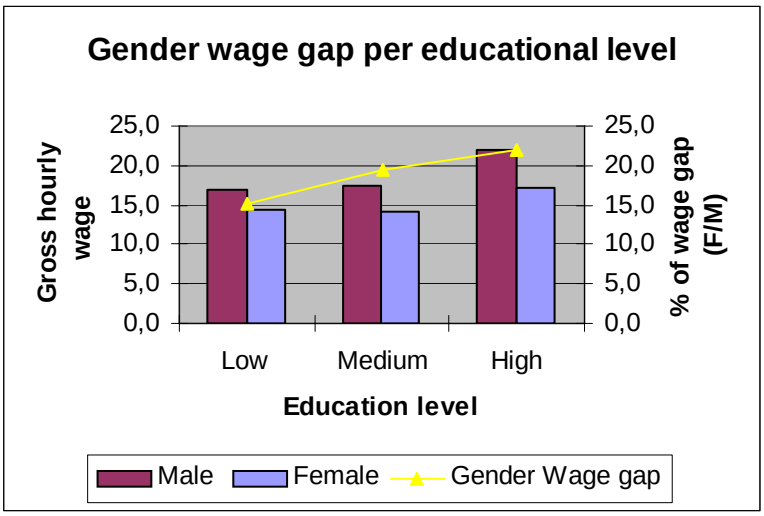
From these data, we can conclude there is a persistent gender pay gap between all the different age groups. Male respondents earn more then their female counterpart in all age groups. The gender wage gap however is not equally distributed among these different groups. It is considerably larger among older people. We notice a small lump with the group of 45 to 49 year old. In this group, the set trend is broken and the wage gap slightly diminishes from 18% to 17%. Afterwards, the rise of the gender pay gap continues steadily.

Not surprisingly, the largest gender pay gap is in the oldest group. It amounts up to 32.6%. The variation between the pay gaps in the different age groups is considerably larger. There exists a difference of 20 between the gender wage gap of the oldest and the second youngest group.

5.1.2 Education

A second relationship we want to investigate is the relation between the educational level and the gender wage gap. Our hypothesis is that the gender wage gap is larger for the more highly educated group. Highly educated people are more often employed in higher paid jobs so we can suspect that their average wage will be higher.

Figure 8 Gender wage gap by educational level



Source: *WageIndicator* data release 1-9 (weighted data)

The impact of education on the evolution of the wage is a bit ambiguous. The difference in wage between the low and medium educated is particularly small. Low educated men earn 17.0 Euro/hour where as middle educated men earn 17.5 Euro/hour. This difference in hourly gross wage is not really pronounced. For women we even find a reversed situation. Medium educated women earn less (14.1 Euro/hour) then low educated women (14.4 Euro/hour), even though the difference between the two wages is minimal.

The difference in educational level only becomes visible in the difference between the medium level and the high level of education. Highly educated men earn 4,5 Euro/hour more then medium educated men. For highly educated women, the difference is smaller. They earn 2.6 Euro/hour more then their medium educated counterpart.

We can conclude that the impact of education between the low and medium educated respondents is neglectable. There is no significant difference in the pay people receive when they have finished up to the lower secondary education level or when they have finished the secondary education level. The difference in educational level only pays off when people start to be high educated.

The gender wage gap rises significantly with the educational level. For low educated women earn 15.1% less then low educated men. This difference increases steadily with the educational level. For middle age women, this rises up to 19.3%. High-educated women earn almost one fifth less then their male counterparts.

5.2 Function related variables

What is the significance of the function one fulfils within a company in explaining the wage differences between men and women? Similar to the model we discussed with personal variables, we looked at the effect of the type of job on the gender wage gap. Our hypothesis is that the characteristics of the job have a big influence on the gender wage gap. From the theory about the gender wage gap, we know that the labour market is horizontally and vertically segregated. Women work in different type of jobs then men. Based on these theoretical assumptions, we can expect a big influence of these characteristics. The function based characteristics we have taken into account are the functional domain, the job autonomy, the work pressure, the hierarchical level, the complexity of the job and full time versus part time work.

If we include these function-based variables in the analysis, the gender pay gap diminishes dramatically.

Table 3 Effect of gender, person related and job related variables on the standardized gross hourly wage

Model	Variables	Adj R^2	B	% exp(b)
1	Gender	0,027***	-0,18	16,5
3	Gender + characteristics of the job	0,121***	-0,140	13,1
4	Gender + characteristics of the person + characteristics of the job	0,187***	-0,130	12,2

** level of significance p=0,001

Source: *WageIndicator* data release 1-9 (weighted data)

The gender pay gap diminishes from 16.5% to 13.1%. More then 3% of the gender pay gap can be attributed to the difference in the jobs of men and women. This difference turns out to be the most important one in explaining the gender pay gap.

We will discuss a number of these job specific characteristics in detail. We will examine to what degree part time work, the scope of control and the complexity of the job influence the gender wage gap.

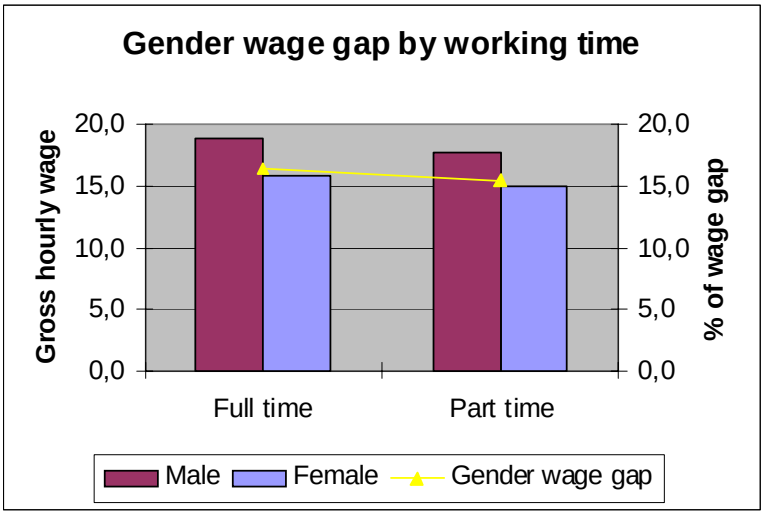
5.2.1 Full versus part time work

A first characteristic we discuss is the degree to which full- and part time work influences the gender pay gap. Before exploring the analysis for this variable, let me explain that the gross hourly wage as we calculate it takes into account the real number of hours people work. So we take into account the real difference in hours that a full time and a

part timer work. On the basis of this data, it is possible to make an 'honest' comparison between a part and a full time worker.

This being said, let's have a closer look at our data. Our hypothesis is that part timers earn less then full timers. We expect full timers to have more opportunities to prove themselves within the organization and thus have more promotion opportunities.

Figure 9 Gender wage gap by working time



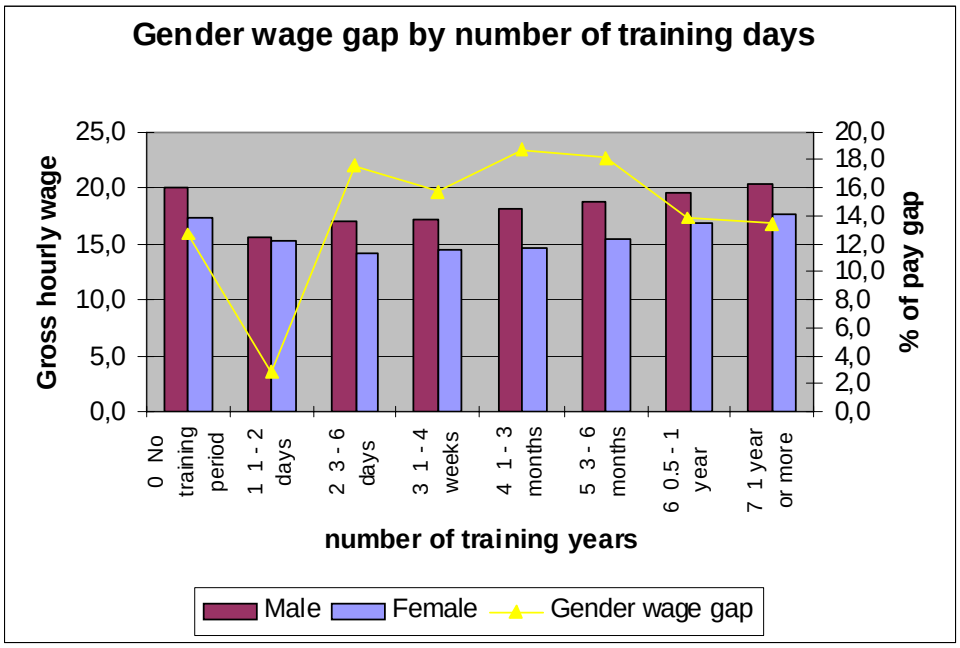
Source: *WageIndicator* data release 1-9 (weighted data)

The hypothesis we formulated does not hold. We cannot conclude that there is a significant wage difference between full time and part time working males or females. The gender wage gap for both groups revolves around 16%. In other words, working full or part time has no effect on the size of the gender pay gap. In itself, the explanatory factor of part time versus full time work for explaining the gender pay gap is minimal.

5.2.2 Complexity of the job

A second characteristic we want to explore in relation to the gender wage gap, is the complexity of the job. In the WI, we don't have a variable to measure complexity of the job directly. That is why we use 'the number of training days to do the job' as a proxy variable. We can expect that there is correlation between the number of training days to master a job and the wage you earn. However is there a correlation with the gender wage gap?

Figure 10 Gender wage gap by number of training days



Source: *WageIndicator* data release 1-9 (weighed data)

This figure is striking because jobs where no formal training is required are among the highest earning jobs. Equally striking is the fact that the gender wage gap diminishes dramatically when only one to two days of training is required. When up to 6 months of training is required, the gender wage gap is fairly high (between 16% and 18%). From then on the gender wage gap diminishes again up till approximately 13.5%.

All this seems to indicate that the gender pay gap is small in jobs that are fairly ease to learn. The more complex the job becomes, the more training is required and the higher the wage gap becomes. The effect of training time diminishes when the training period exceeds six months.

5.3 Company related variables

A third series of variables that we have employed in explaining the gender wage gap are variables, relating to the characteristics of the company. We have taken into account the industry, the number of women that work in the company, whether there is a trade union representation and the size of the firm.

Table 4 Regression analysis, relating to company related variables

Model	Variables	Adj R^2	B	% exp(b)
1	Gender	0,027***	-0,18	16,5
5	Gender + characteristics of the company	0,088***	-0,159	14,7
6	Gender + characteristics of the person + characteristics of the job + characteristics of the company	0,111***	-0,110	10,5

Source: *WageIndicator* data release 1-9 (weighed data)

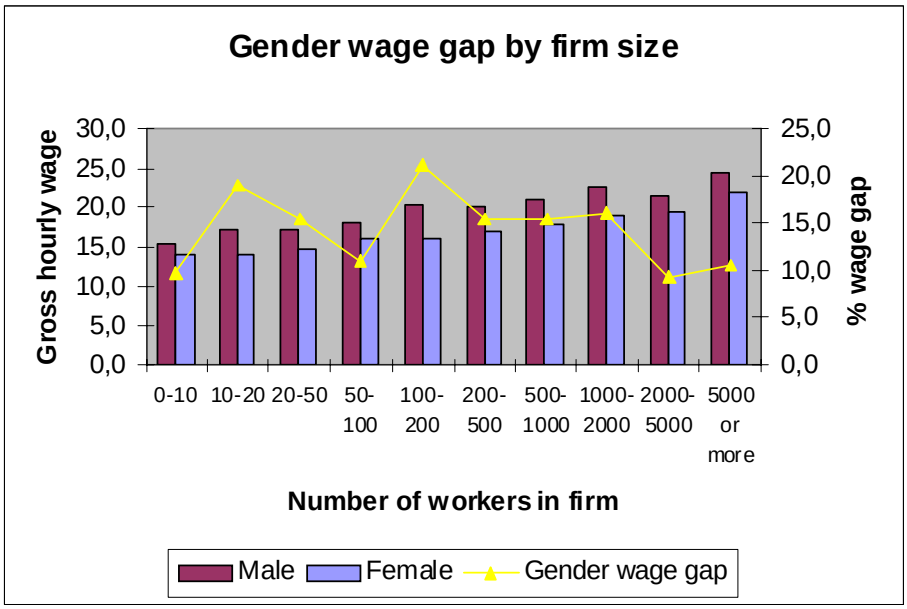
Again, we have explored several regression models. In a fifth model, we have investigated what the isolated impact is of the characteristics of the company on the gender pay gap. From the table above, we can see that effect of gender diminishes from 16.5% to 14.7% when we take these characteristics into account. The impact of company related variables is not enormous.

In the final model, when we include all three types of variables in the model, the gender wage gap is diminished from 16.5% to 10.5%. Approximately one third of the total gender wage gap can be explained by all the variables included.

5.3.1 Size of the company

Out of the company-related variables, we put two variables in the spotlight. First we look at the impact of the size of the company on the gender wage gap.

Figure 11 Gender wage gap by firm size



Source: *WageIndicator* data release 1-9 (weighted data)

We notice an obvious trend in the height of the wages. For men as well as for women, the average wage increases with the size of the firm. Larger firms pay higher wages.

The gender wage gap is the smallest in really small firms and in big firms. Firms with workers between 0-10 people have a gender wage gap of 9.7% whereas firms with 2 000 to 5 000 workers face a gender wage gap of 9.3%. It is striking that in both these firm sizes, the gender wage gap is similar. The largest gender pay gap we find in firms with 100 to 200 workers. Here, the gap amounts up to 21.1%

5.3.2 Industry

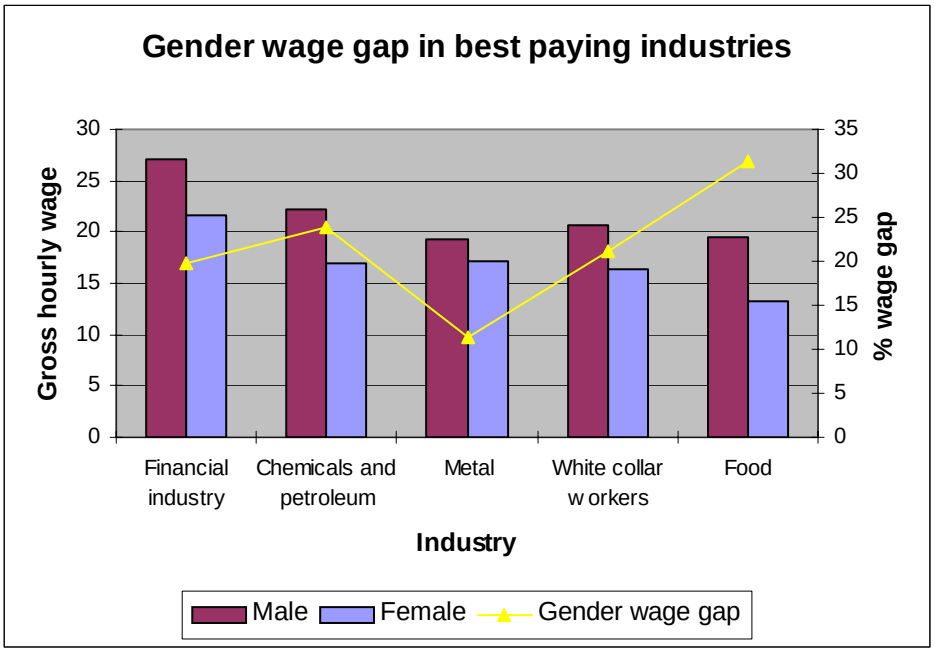
A final characteristic we explore, is the industry in which people are working. For the measurement of the industry, we have asked them under which "joint committee" they resort. The different joint committees are regrouped based on the work of Vanderbiesen (2006)[4]. The joint committee is the sectoral level where negotiations on wages and working conditions are organised in the Belgian labour market. These negotiations take place between employers' organizations and employee organizations. Consequently, this

[4] Vanderbiesen, W. (2006), *De sectoren in cijfers. Een analyse van de RSZ-tewerkstelling o.b.v. de paritaire comités*, Steunpunt WAV: Leuven

is the most accurate sectoral division in Belgium to analyse wage differentials. There are no clear corresponding NACE codes for the different joint committees. Note that not all industries are represented in the numbers. We have listed the five best paying industries and the five least paying industries with a minimum of 200 respondents.

In the figure beneath, we have listed the five best paying industries.

Figure 12 Gender wage gap in five best paying industries

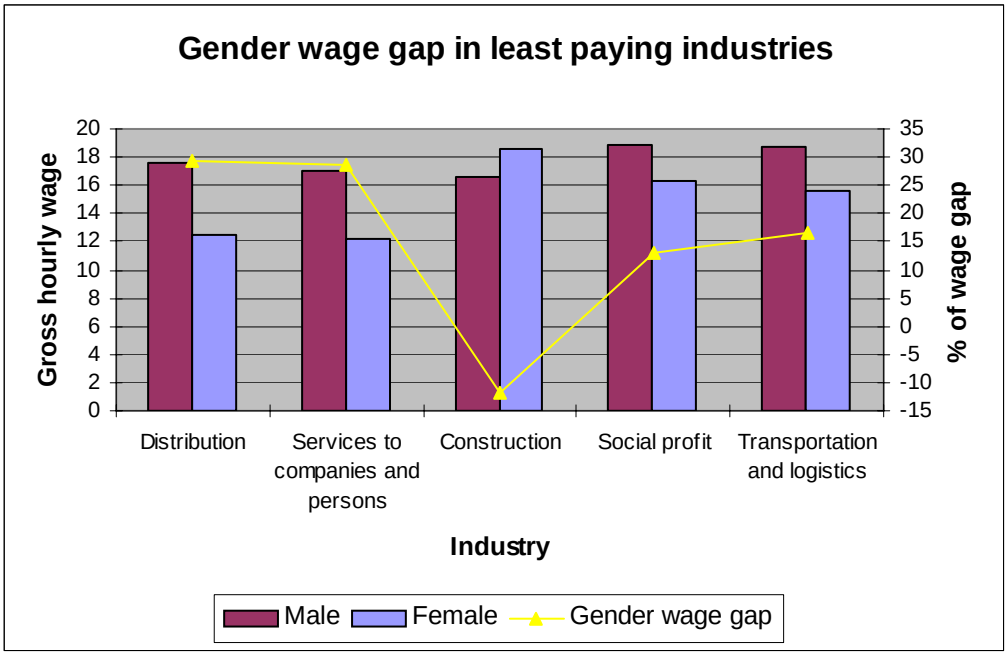


Source: *WageIndicator* data release 1-9 (weighed data)

The financial industry is the best paying industry, followed by the chemical industry in second place. Although the food industry is allocated within the five best paying industries, the gross wage for men and women is almost 8 Euro/hour lower compared to that of the best paying industry. Also, in this branch of industry, the gender wage gap is very high. In the food industry, women earn 31.3% less then men. In the metal industry, the gender wage gap is the smallest. Here, women earn 'only' 11.4% less then men.

Next to the five best paying industries, we have also looked at the five worst paying industries.

Figure 13 Gender wage gap in least paying industries



Source: *WageIndicator* data release 1-9 (weighed data)

The worst paying industry is the distribution industry, with an average hourly wage of 14.9 Euro/hour. The industry 'services to companies and persons' is situated on a similar wage level. The gender wage gap in both industries is similarly high, approximately 29%.

In the social profit and the logistics industry, the gender wage gap is smaller. It amounts up to 17%. In these industries, women earn 17% less then men.

Almost all industries have a gender pay gap, where the women earn less then the men. In one industry however, we find a reversed gender pay gap. In the construction industry, women actually earn more then men. Women earn almost 12% more then men in this industry.

6. CONCLUSION

In this paper we have presented you with an overview on the *WageIndicator* data. We have looked at the response data and the representativeness for the questionnaire. We have developed weights based on the LFS 2005, to be able to draw general conclusions from our data.

Furthermore, we have explored the gender wage gap. We have investigated the impact of types of variables: personal characteristics, function-related variables and company related variables.

The gender wage gap amounts up to 16.5%. The person related variables do not diminish the wage gap but instead increase it. The most important variable responsible for this increase is the educational level. The higher the educational level, the higher the gender wage gap.

The most important variables in explaining the gender wage gap are the function-related variables. More then 3% of the gap can be explained by the difference in the characteristics in the jobs of men and women. Contrary to what we thought, full time or part time work doesn't affect the wage gap to a great extent. We also learned that the gender pay gap is small in jobs that are relatively easy to learn. The more complex the job becomes, the higher the wage gap becomes.

The impact of company related variables is relatively minor. What is striking is that both in very small as in big companies, the gender wage gap is equally high. Concerning the gender wage gap in the industries we investigated, we showed that the gender wage gap is highest in the food industry. Equally remarking is the reversed gender wage gap in the construction industry. In this industry, females earn more then their male counterpart.