

Decent work in global food value chains: Evidence from Senegal

Anna Fabry^a, Goedele Van den Broeck^b, Miet Maertens^a

^a Division of Bioeconomics, Department of Earth and Environmental Sciences, KU Leuven, Belgium

^b Earth and Life Institute, Univeristé Catholique de Louvain, Louvain-La-Neuve, Belgium

Abstract

The rapid growth and transformation of global food value chains has stimulated the development of rural labour markets, and has important consequences for rural poverty reduction. While there is consensus that this transformation is associated with substantial rural employment creation, there is still debate on the inclusiveness and quality of these jobs. We provide quantitative evidence on the quantity and inclusiveness of wage employment in the horticultural sector in Senegal, and on the quality of this employment and discrimination towards vulnerable groups of workers. We use survey data from 525 workers, 392 workers in agro-industrial companies and 133 workers on small-scale horticultural farms. We assess the inclusiveness of employment towards female, young and migrant workers, and compare the quality of employment between these groups of workers and between the agro-industrial and the small-scale farm sectors. The quality of employment is assessed through wages and a decent work index that captures multiple wage and non-wage dimensions of job quality. We use bivariate and multivariate analyses to examine quality of employment and a decomposition analysis to examine discrimination. Results suggest that the agro-industry is inclusive towards migrant, female and young workers, but that discrimination in job quality occurs within and across companies. Results illustrate substantial gender and youth wage gaps, and a lower likelihood of having decent employment among migrant and young workers. Our results suggest that discrimination, for all dimensions of job quality, is mainly indirect.

Keywords: global value chains, agro-industrialization, rural labour markets, decent work, Africa, Senegal

Acknowledgement: The authors acknowledge funding from the CGIAR Research Program on Policies, Institutions and Markets (grant number 2018X044.KUL) and thank Idrissa Wade from Univeristé de Thiès and Madické Niang from IPAR for their assistance with data collection.

1. Introduction

The rapid growth and transformation of global food value chains - with increased high-value exports, more stringent food standards, increased importance of supermarkets, increased post-harvest handling and food processing and increased importance of vertically integrated estate farming - has important implications for rural labour markets in developing countries. A shift is occurring from informal and family labour on small-scale farms to formal and hired labour on medium and large-scale farms and in processing industries (Maertens et al., 2012; Rao & Qaim, 2013). High-value export sectors have caused a large increase in the creation of formal rural jobs (ILO, 2008). This is important because the creation of more and better jobs might be one of the most efficient ways to reduce rural poverty (Ayenew et al., 2017; Barrett et al., 2001; Davis et al., 2017). There is a recent body of literature that analyses job creation in global food value chains, and how this contributes to rural income mobility and poverty reduction (Deininger & Xia, 2016; Herrmann, 2017; Van den Broeck et al., 2017). Some studies specifically emphasize women's employment in global value chains and associated positive development effects (Krumbiegel et al., 2017; Maertens & Swinnen, 2012; Maertens & Verhofstadt, 2013; Van den Broeck & Maertens, 2015). Few studies explore the inclusion of other vulnerable groups, such as rural youth and migrants, in global value chains – an exception is the study by Benali and co-authors (2018) who explore age-disaggregated employment in the vegetable export sector in Tanzania – while rural youth employment and rural out-migration are challenging issues that require increased attention, especially in Sub-Saharan Africa (Estruch et al., 2019; Fox et al., 2016).

The quality of jobs in global food value chains is a contentious issue. On the one hand, the outsourcing of production and post-harvest activities to developing countries might be driven by low wages and less strict labour (and other) regulations in these countries. On the other hand, global value chains might transmit better labour practices from consumer to producer countries,

e.g. through private standards. Studies document that wages are relatively low and that employees face long working hours, unsafe work environments and insecure contracts (Krumbiegel et al., 2018; Staelens et al., 2018; Van den Broeck & Maertens, 2016). Improving job quality is high on the policy agenda, e.g. through the strive for full and productive employment and decent work for all in the Sustainable Development Goals (SDG 8), and the emphasis on job quality in the ILO decent work agenda (ILO, 2018; UN, 2019). While women, youth and migrants in developing countries often face inferior working conditions (Best & Mamic, 2008; Estruch et al., 2019; Kabeer & Mahmud, 2011; Sehnbruch et al., 2020), little is known on whether global value chains reinforce or alleviate such discrimination. Studies analysing job quality in global value chains are limited to an assessment of wages, to the impact of standards on job quality, or to a descriptive analysis of working conditions (Ehlert et al., 2014; Krumbiegel et al., 2018; Schuster & Maertens, 2016).

In this paper, we provide quantitative evidence on the quantity and inclusiveness of employment in horticultural export chains in Senegal, and on the quality of this employment and discrimination towards vulnerable groups of workers. We use data from an original worker survey and semi-structured interviews with agro-industrial export companies. We assess the inclusiveness of employment towards female, young and migrant workers, and compare the quality of employment between these groups of workers and between workers in the export agro-industry and workers on small-scale horticultural farms. The quality of employment is assessed through wages, a decent work index that captures multiple wage and non-wage dimensions of job quality, and decent work incidence. We use multivariate regressions to examine quality of employment, and the Oaxaca-Blinder decomposition method to examine possible discrimination.

Our study is innovative and relevant. First, empirical studies on decent work in developing countries are rather limited (Ayenew et al., 2017; Suzuki et al., 2018). Second, most studies focus on either monetary or non-monetary measures of quality of employment. Our approach,

constructing a decent work index, allows for a more comprehensive assessment of employment quality. In addition, by combining primary worker- and company-level data, we can control for a large set of factors in our regression and decomposition analyses. This allows for an appropriate comparison of decent work across different groups of workers, and assessment of possible discrimination. Third, our focus on female, young and migrant workers in the horticultural export sector in Senegal is particularly relevant. Accessing productive and decent jobs is particularly challenging for rural youth in Senegal (Estruch et al., 2019; Hathie et al., 2015) and elsewhere in Africa (Fox et al., 2016), and is associated with rural outmigration. Horticultural exports from Senegal have grown very rapidly, resulting in substantial employment creation. Our study reveals to what extent this dynamic sector can be a source of decent rural employment.

2. Data and Methods

2.1. Data collection

We collected quantitative data in the three main horticultural export areas in Senegal, including *Les Niayes*, the *Senegal River Delta* and the region around *Lac de Guiers* (Figure 1). First, we conducted semi-structured interviews in December 2018 with 20 agro-industrial companies, randomly selected from a list provided by the Senegalese export agency ASEPEX. We collected information on number of workers, employment conditions, company services, production and export strategies. In addition, we organized semi-structured interviews with workers of the sampled agro-industrial companies and workers hired on small-scale farms to gain more information on workers' perceptions on decent work.



Figure 1: Map of the research area: (1) *Les Niayes*, (2) *Senegal River Delta*, (3) *Lac de Guiers*

Second, we conducted a worker survey in March-April 2019, which coincides with the peak export season when most workers are hired. We sampled workers in agro-industrial companies (agro-industry workers) as well as workers on small-scale family farms (small-scale farm workers), using for both a two-stage sampling strategy. For agro-industry workers, we first selected ten of the 20 interviewed companies proportional to the hired number of workers in each region: five in *Les Niayes*, three in the *Senegal River Delta* and two around *Lac de Guiers*. In the second stage, we randomly selected about 5% of the total workers from each of these companies. To have a sufficiently large sample of migrants, we oversampled migrant workers¹. For small-scale farm workers, we first selected 18 villages in a 5 km radius from the ten agro-industrial companies, and then randomly selected hired workers on the farms in these villages. We used a structured quantitative questionnaire with modules on demographic characteristics, employment conditions, work and migration history, life and job satisfaction, and aspirations. We applied a 12 month-recall for employment-related questions. Four observations are not retained in the analysis because of missing information. The final sample consists of 392 agro-industry workers, including 161 women and 231 men, 96 young and 296 elder workers², 136 migrant and 256 local workers, and 133 workers on small-scale farms.

2.2. *Measuring quality of employment*

To capture the multiple dimensions of quality of employment, we use three measures: 1) hourly wage, 2) a decent work index, and 3) decent work incidence. First, we calculate the hourly wage based on cash payments, the frequency of payment and number of hours employed (per day, per

¹ Migrant workers are defined as workers whose close relatives live elsewhere in Senegal (mainly in southern regions like Fatick, Kaolack and Kolda) and who go back home at least once a year.

² Young workers are below the age of 25 years.

week and per month). Wage is a fundamental aspect of employment quality and is therefore assessed in addition to other non-monetary aspects (Schuster et al., 2019; Standing, 2003).

Second, we create a decent work index (DW-index), which covers both monetary and non-monetary aspects of employment. We base the index on the guidelines put forward by the International Labor Organization (ILO, 2013a), and consider dimensions that are relevant for the agricultural sector and measurable at individual level. All indicators are objective measures to avoid self-reported bias (Burchell et al., 2014), and are adapted to the legal framework of Senegal (ILO, 2013b). Detailed calculations are described in Table A1 in annex. We consider four dimensions that are each measured with three indicators: (i) adequate earnings and productive work, (ii) decent work time, (iii) stability and security of work and (iv) safe work environment. The first indicates whether the worker receives the national minimum wage³, fringe benefits (transportation, housing and/or meals) and training from the employer. The second dimension indicates whether the worker is employed between 35 and 48 hours per week (unless correct compensation is provided if employed longer), does not work during nights and/or holidays (unless correct compensation is provided), and receives sufficient time-off. The latter entails a maximum of 2,352 working hours per year, a maximum of 8 working hours per day for casual workers, and two days of holidays for every 30 days worked for employees with at least one year of service. The third dimension of stability and security of work, indicates the contract type (written, oral or no contract), status (permanent, seasonal or daily) and job tenure (working for the same employer for more than one year). The last dimension of safe work environment indicates whether the worker has had any work-related accidents, can use on-site health care facilities when necessary and does not work unprotected with dangerous products (e.g. pesticides). We compute each dimension as

³ The national minimum wage is 214 CFA/h, which comes down to 0.33 €/h (at a fixed exchange rate of 655.957 CFA / €).

the arithmetic mean of its three indicators, and an aggregated index that covers all four dimensions as the arithmetic mean of the four dimensions. These indices range between 0 and 1. This is the same approach used by other welfare indices, such as the Human Development Index and the Multidimensional Poverty Index (Alkire & Foster, 2011).

Third, we determine a cut-off value of the DW-index to create a binary variable for decent work incidence. In line with the Human Development Index and Multidimensional Poverty Index, we consider a worker to have a decent job if his/her DW-index is less than one standard deviation below the median of the DW-index for agro-industry workers.

2.3. *Bivariate and multivariate analysis*

We use a bivariate analysis to compare the quality of employment across different groups of workers. We first compare agro-industry workers and workers on small-scale farms, and then focus on different groups of workers within the agro-industry (male vs. female workers, young vs. elder workers, and migrant vs. local workers). We use t-tests for mean comparisons and a chi² test for comparisons of standard deviations for the wage and DW-index, and z-tests for the decent work incidence.

We use a multivariate analysis to derive whether differences in employment quality remain after controlling for other characteristics, and estimate the following regression models:

$$Y_a = \beta_0^1 + \beta_1^1 D_{Ga} + \beta_2^1 D_{Ya} + \beta_3^1 D_{Ma} + \beta_4^2 X_a + \beta_5^1 T_a + \varepsilon_a \quad (1)$$

$$Y_i = \beta_0^2 + \beta_1^2 D_{Gi} + \beta_2^2 D_{Yi} + \beta_3^2 D_{Mi} + \beta_4^2 X_i + \varepsilon_i \quad (2)$$

$$Y_i = \beta_0^3 + \beta_1^3 D_{Gi} + \beta_2^3 D_{Yi} + \beta_3^3 D_{Mi} + \beta_4^3 X_i + \beta_6^3 A_i + \varepsilon_i \quad (3)$$

$$Y_i = \beta_0^4 + \beta_1^4 D_{Gi} + \beta_2^4 D_{Yi} + \beta_3^4 D_{Mi} + \beta_4^4 X_i + \beta_6^4 A_i + \beta_7^4 J_i + \varepsilon_i \quad (4)$$

$$Y_{ij} = \beta_0^5 + \beta_1^5 D_{Gi} + \beta_2^5 D_{Yi} + \beta_3^5 D_{Mi} + \beta_4^5 X_i + \beta_6^5 A_i + \beta_7^5 J_i + \beta_8^5 C_j + \varepsilon_{ij} \quad (5)$$

$$Y_{ij} = \beta_0^6 + \beta_1^6 D_{Gi} + \beta_2^6 D_{Yi} + \beta_3^6 D_{Mi} + \beta_4^6 X_i + \beta_6^6 A_i + \beta_7^6 J_i + \mu_j + \varepsilon_{ij} \quad (6)$$

We estimate separate models in which Y represents one of the three measures of employment quality - log-specified hourly wage, DW-index, and DW-incidence - of worker a (all workers) or i (agro-industry workers) in company j . The main variables of interest are D_G , D_Y and D_M , dummy variables for female, young and migrant workers. X represents a vector of demographic characteristics (marital status, number of children, education, ethnicity and religion); ε is an error term; and β are parameters to be estimated. Model 1 is estimated for all workers and includes a dummy variable T_a for workers on a small-scale farm. Models 2 to 6 consider only agro-industry workers. We gradually control for more characteristics, including job activity A (production on the field, sorting/washing/packing in conditioning centers, technician, supervision and other activities), a vector J of other job characteristics (type of contract, job status and job tenure – which are only included in the estimation of hourly wage), and a vector C of company characteristics (age, total workforce, share of women, youth and migrants employed, and location). In model 6 we use company fixed effects μ_j instead of company characteristics. We estimate OLS regressions for hourly wage, DW-index and for DW-incidence⁴, and report estimated coefficients and robust standard errors⁵.

2.4. Decomposition analysis

To analyse wage gaps between male and female workers, young and elder workers, and migrant and local workers, we apply the Oaxaca-Blinder (OB) decomposition. This approach is widely used in labour economics to investigate sources of wage inequality (Fortin et al., 2011; Jann, 2008).

⁴ A probit model led to similar estimates for the DW-incidence, but we prefer to use the OLS regression given that this model requires fewer distributional assumptions.

⁵ Clustering of standard errors at village or company level does not alter our results.

The wage gap is decomposed in two parts: 1) a part that is explained by differences in observable covariates between two groups, including demographic, job and company characteristics, and 2) a part that is explained by differences in returns to these characteristics and unobserved factors. The first part is referred to as the endowment effect and is associated with indirect wage discrimination. The second part is referred to as the structural effect and can relate to direct wage discrimination as well as to the impact of unobserved factors that are not controlled for.

We use a regression based mean-decomposition method and express the wage gap as $D_{mean} = E[Y_1] - E[Y_2]$, where $E[Y_i]$ denotes the expected value of the logarithm of hourly wage of group i (Fortin et al., 2011; Islam et al., 2018; Kilic et al., 2015). We first store the estimated coefficients from model 5 where the groups are pooled as the reference-coefficients $\hat{\beta}^*$. We use the pooled, non-discriminatory coefficients as we do not want to impose assumptions on positive or negative discrimination towards a specific group (Jann, 2008). For simplicity we combine the vectors of X , A , J and C into one vector V with K number of parameters. We then analyse model 5 for each group separately and store these coefficient estimates as $\hat{\beta}_1$ and $\hat{\beta}_2$. This implies we decompose D_{mean} as:

$$D_{mean} = \underbrace{\sum_{k=1}^K (E[V_{1k}] - E[V_{2k}])\hat{\beta}_k^*}_{\text{Endowment effect}} + \underbrace{\left(\sum_{k=1}^K E[V_{1k}](\hat{\beta}_{1k} - \hat{\beta}_k^*) + \sum_{k=1}^K [E[V_{2k}](\hat{\beta}_k^* - \hat{\beta}_{2k})] \right)}_{\text{Structural effect}} \quad (7)$$

The decomposition describes the quantitative contribution of observed factors to the wage gap, which can be interpreted as indirect discrimination, but does not allow to completely disentangle the effect of unobserved factors that we fail to control for and the structural or direct component of discrimination. A first assumption of ignorability, which implies that the distribution of unobservables is the same in both groups, is likely not satisfied. Factors such as work effort,

dedication and experience likely influence wages while they are not controlled for and might vary across the different groups of workers. This requires care in the interpretation of the results, especially in the interpretation of the structural effect as direct discrimination. A second assumption of overlapping support, which implies that none of the groups of workers is perfectly identified by the vector of observable factors X , is less restrictive. None of the variables is omitted from the group-specific wage regressions, implying that this assumption is satisfied.

3. Results

3.1. Horticultural exports and employment in Senegal

Horticultural production in Senegal has almost tripled in the period 1995-2017, and exports have increased from 2,000 tonnes to more than 110,000 tonnes in the same period (Figure 2). Compared to other African countries, the Senegalese horticultural sector is expanding more rapidly (FAOSTAT, 2020). The three main export crops are green beans, mangos and melons, and the majority of the produce is supplied to the European Union.

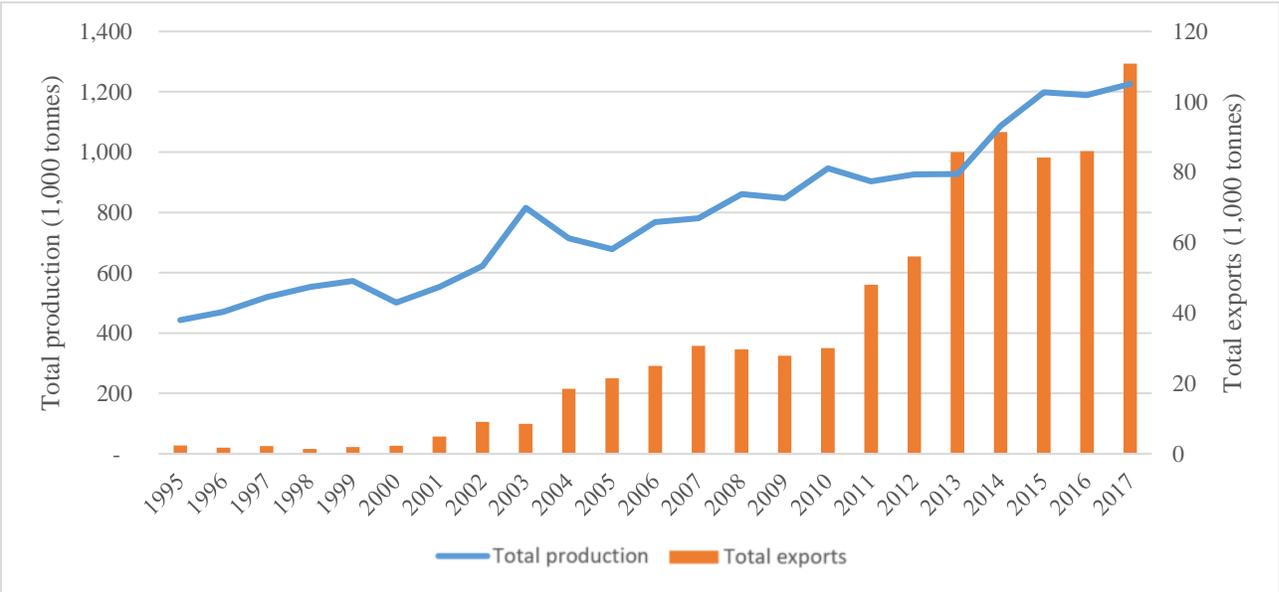


Figure 2: Horticultural production and exports from Senegal, 1995-2017. (Source: FAOSTAT 2020)

The 20 interviewed agro-industrial companies produce about 40% of total exports, and represent 10% of total production. All export-oriented companies are GlobalGAP certified, and most companies are vertically integrated with primary production on land leased from rural communities (especially in the *Senegal River Delta* and around *Lac de Guiers*). Only 30% of the companies partially source from small-scale farmers through contract farming. While these companies are export-oriented, the majority (75%) distribute their products on both the local and the export market. Half of them have been established through foreign direct investments. Companies operate in the sector for 18 years on average, with the most recent companies around *Lac de Guiers*. They cultivate on average about 500 ha and hire on average about 1,000 workers, with large differences between companies (ranging from 50 to 2,000 ha and from 75 to 5,000 workers). On the other hand, the small-scale farms at which workers in our sample are employed are all owned by Senegalese people, and sell exclusively on the local market. None of them is GlobalGAP certified. On average, they cultivate 1.5 ha and hire two workers per season, with some farms hiring up to 7 workers.

3.2. *Quantity and inclusiveness of employment*

Based on our sample of companies, we estimate that the number of jobs created in the Senegalese horticultural agro-industry in 2019 is more than 30,000, and can reach to 50,000 jobs in peak season, between November and April. The 20 interviewed agro-industrial companies hire about 20,000 workers during the peak season, of which 91% are temporary workers. Two thirds of the workers in the sampled companies are female, and 29% is under 25 years old. The reported share of migrant workers is 5% but this might be underestimated as the companies are not always aware of the origin of the workers.

Table 1 compares characteristics of the sampled agro-industry and small-scale farm workers, and different groups of agro-industry workers. None of the small-scale farm workers in

our sample is female but small-scale farms employ more young and migrant workers (53% and 80% resp.)⁶. Small-scale farm workers are less likely to be married and have fewer children, are less educated (2.6 versus 5.5 years) and are more likely to belong to the Fula ethnicity, a semi-sedentary pastoralist community spread over several countries in West-Africa. The majority of them (66%) are engaged in a mix of activities (seeding, irrigating, fertilizer application and harvesting), while workers in the agro-industry focus on a more specific task. Comparing agro-industry workers, we find that women have more children than men and are more likely to be Oulof, the main ethnicity in Senegal and in the research areas. Men are more likely to be migrants and originate from regions where Fula and Serer ethnicities dominate. Women are more likely to work in the conditioning centres and in harvesting, while men are more likely to perform technical functions and heavier production activities. Young workers are more likely to work in production. As migrant workers are more likely to be young and male, their characteristics largely correspond to these groups of workers. In addition, migrants are more likely to belong to non-Muslim religions. While the overall education level is very low, we do not find differences between the different groups of workers.

⁶ As our sample of small-scale farm workers is small relative to the population of such workers and confined to the main horticultural export production areas, this is not representative for the national small-scale farm sector. Yet, this is representative for small-scale horticultural farms in the main horticultural export production areas.

Table 1: Descriptive statistics of worker characteristics and activity in horticulture, by sector and group of workers

	Small-scale farm and agro-industry workers			Agro-industry workers								
	Small- scale	Agro- industry	Test	Women	Men	Test	Youth	Elder	Test	Migrant	Local	Test
<i>Worker characteristics</i>												
Female	0.000	0.411	***				0.396	0.416		0.103	0.574	***
Youth	0.526	0.245	***	0.236	0.251					0.301	0.215	*
Migrant	0.797	0.347	***	0.087	0.528	***	0.427	0.321	*			
Married	0.308	0.533	***	0.534	0.533		0.156	0.655	***	0.485	0.559	
Children (#)	0.594	1.880	***	2.516	1.437	***	0.208	2.422	***	1.162	2.262	***
	(0.119)	(0.123)		(0.202)	(0.147)		(0.067)	(0.148)		(0.169)	(0.161)	
Schooling (years)	2.647	5.518	***	5.081	5.823		4.990	5.692		5.419	5.570	
	(0.328)	(0.256)		(0.379)	(0.343)		(0.449)	(0.306)		(0.435)	(0.317)	
Muslim religion	0.947	0.954		0.969	0.944		0.969	0.949		0.904	0.980	***
Oulof ethnicity	0.263	0.406	***	0.497	0.342	***	0.385	0.412		0.243	0.492	***
Fula ethnicity	0.361	0.258	**	0.186	0.307	***	0.323	0.237	*	0.324	0.223	**
Serer ethnicity	0.226	0.171		0.168	0.173		0.219	0.155		0.235	0.137	**
Other ethnicities	0.150	0.166		0.149	0.178		0.007	0.020	***	0.199	0.148	
<i>Activity</i>												
Production	0.331	0.316		0.354	0.290		0.417	0.280	**	0.353	0.297	
Technical	0.000	0.056	***	0.000	0.095	***	0.042	0.060		0.081	0.043	
Supervisor	0.008	0.066	***	0.068	0.065		0.000	0.090	***	0.029	0.086	**
Conditioning	0.000	0.306	***	0.453	0.204	***	0.260	0.320		0.162	0.383	***
Other/Mix	0.661	0.256	***	0.124	0.346	***	0.281	0.247		0.375	0.191	***
<i>Number of observations</i>	133	392		161	231		96	296		136	256	

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. Comparison of means through two-sided t-tests (continuous variables) and z-tests (binary variables).

3.3. *Quality of employment*

Quality of employment in the horticultural sector in Senegal is relatively good, with better employment conditions in the agro-industry compared to small-scale farms (Figure 3). Detailed results can be found in Tables A2 and A3 in annex. We find that 88% of the agro-industry workers receive at least the minimum wage with an average wage of 353 CFA/h, while this is only 33% for small-scale farm workers whose wage is 218 CFA/h on average. Also non-monetary employment conditions are better in the agro-industry: the average DW-index for agro-industry workers is 0.53 compared to 0.41 for small-scale farm workers. Among the former 85% is classified as having decent work compared to only 62% among the latter.

The four dimensions of decent work differ slightly between agro-industry and small-scale farm workers. The agro-industry performs better in terms of adequate earnings and productive work. Fringe benefits, especially the provision of meals and housing, are more common though on small-scale farms while agro-industry workers receive more training. Decent work time is the worst dimension of employment quality in both sectors. Working more than 48 h/week is common (53% for agro-industry workers and 39% for small-scale farm workers) and only 28% of agro-industry workers and none of the small-scale farm workers are compensated for this. Also working during nights and holidays is common without being compensated, and few workers receive official annual leave. Stability of work does not differ much between agro-industry and small-scale farm workers. Among agro-industry workers 56% has no or only an oral contract and 62% is employed on a daily basis. However, they work on average about 178 days per year, spread over 8 months, and work for the same company for more than five years on average. Only 5% of the small-scale farm workers receive a written contract, but these workers are more likely to be employed on a seasonal basis. The work environment is relatively safe in both sectors with a very

low occurrence of work-related accidents, despite 22% of the workers using dangerous products.

About 40% of workers has access to health care facilities.

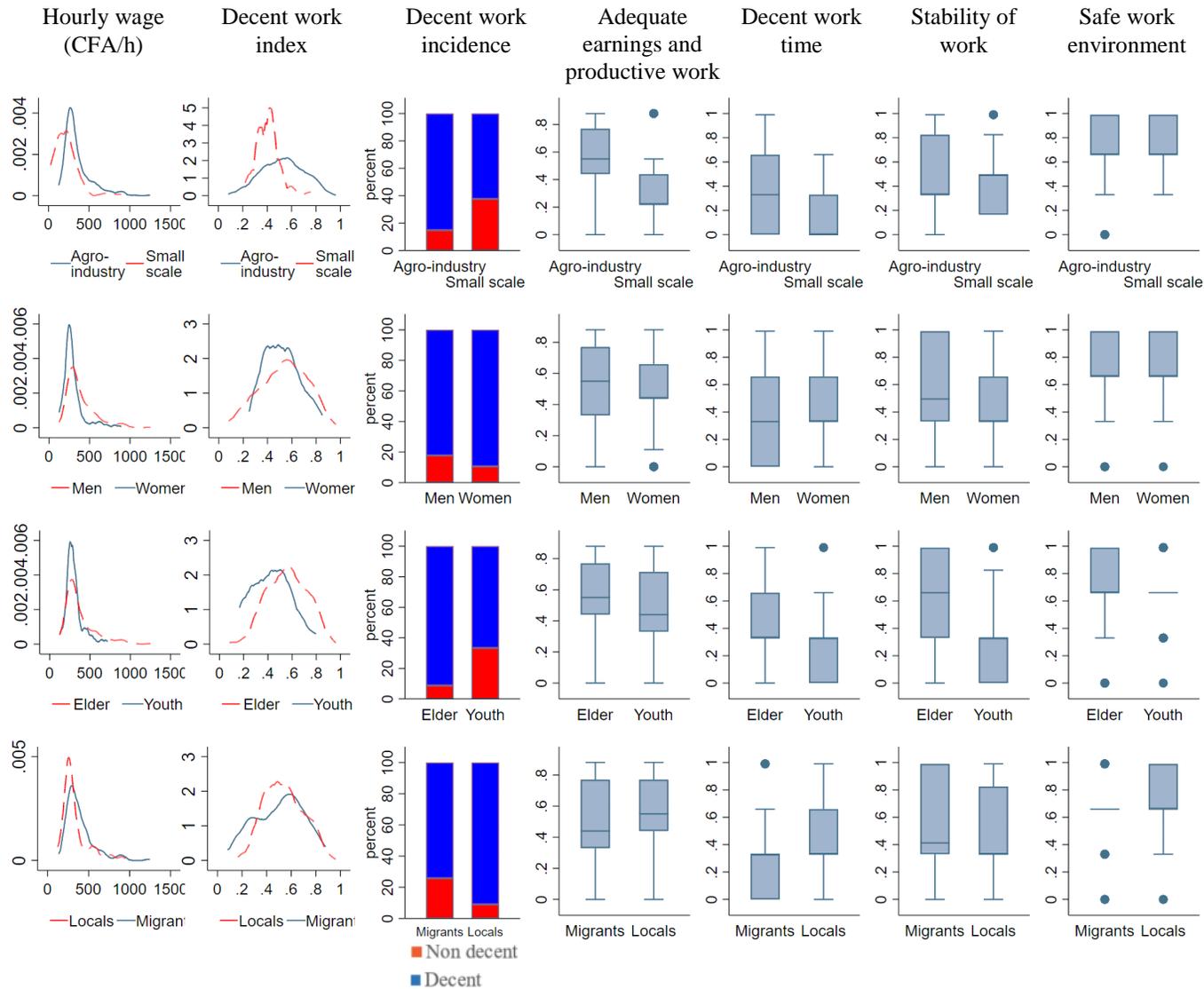


Figure 3: Quality of employment. Notes: Density plot of wage: Comparison agro-industry (M= 353, SD= 170) and small-scale farms (M = 218; SD= 141). Comparison between female (M= 297, SD= 132) and male workers (M= 392, SD= 182), between youth (M= 304, SD= 107) and elder workers (M= 369, SD= 183), and between migrant (M= 388, SD= 175) and local workers (M= 334, SD= 164). All differences in mean salary are significant at the $p < 0.01$ level. DW-index; Comparison agro-industry (M= 0.53, SD= 0.17) and small-scale farms (M= 0.41, SD= 0.10). Comparison between female (M= 0.52, SD= 0.14) and male workers (M= 0.53, SD= 0.19), no significant difference, between youth (M= 0.43, SD= 0.16) and elder workers (M= 0.56, SD= 0.16), significant at the $p < 0.01$ level, and between migrant (M= 0.50, SD= 0.20) and local workers (M= 0.54, SD= 0.16), significant at the $p < 0.05$ level.

A comparison between different groups of agro-industry workers reveals important differences (Figure 3 and Tables A2 and A3 in annex). First, women earn 24% less than men (297 versus 392 CFA/h), and they have less access to permanent and written contracts. Yet, they score better on the dimensions of decent work time and safe work environment. The aggregated DW-index does not differ significantly between male and female workers. However, the variation of the DW-index is larger for men, which explains why they are slightly less likely to have decent jobs (82%) compared to women (89%). Second, young workers score lower on all dimensions of the DW index than elder workers, except for adequate earnings. Even though elder workers earn 21% more on average, they have the same likelihood (88%) of receiving at least the minimum wage. Only 67% of young workers have a decent job while this is 91% for elder workers. Third, migrants earn 16% more than local workers, but the DW-index is significantly lower for migrant workers. This is mostly due to a lower score for decent work time (they work on average 57 h/week while for locals this is 49 h/week, and migrants work more often during nights and holidays as guards). In addition, migrants are more likely to use dangerous products. They are more likely to occupy permanent positions, but this does not translate in a longer job tenure. Overall, 75% of migrant workers are employed in decent jobs compared to 91% of local workers.

3.4. Regression results

Our multivariate analysis reveals whether observed differences remain when controlling for other characteristics. Table 2 presents the different model estimates for (log-specified) wages. The high R^2 values indicate that up to 64% of the variability in wages is explained by the models, indicating a good fit. The first model combines agro-industry and small-scale farm workers, and finds that the latter earn 59% less, all other characteristics being equal. The other models focus on agro-industry workers only and find significantly negative coefficients for women and youth but a positive coefficient for migrants. We find that women earn 23% less, youth 9% less and migrants

10% more. The gender wage gap becomes smaller when controlling for activity and job characteristics, and disappears completely when controlling for company characteristics. The wage gap for young and migrant workers disappears when taking activity and job characteristics into account. This indicates that gender wage gaps are higher across companies than within companies, while wage gaps for young and migrant workers are more related to the type of job.. Whether we explicitly control for company characteristics or use company fixed effects does not alter our results, indicating limited unobserved heterogeneity at company level.

Table 3 and Table 4 present the different model estimates for the DW-index and DW-incidence. Small-scale farm workers have a DW-index that is 7.4 percentage points (pp) lower and are 11.1 pp less likely to have decent work. When analyzing agro-industry workers only, we find some differences with respect to the findings from the wage models, pointing to the need to go beyond monetary aspects of employment quality. In contrast to the gender wage gap, women have a 4.9 pp lower DW-index, even after controlling for all characteristics, but are not less likely to have decent work. Also the age gap in the DW-index remains significant at 3.7 pp⁷ and the probability of young workers to have decent work is 11.0 pp lower. While migrants receive a higher wage than locals and their DW-index is not different, their likelihood to have decent work is 6.3 to 7.8 pp lower.

The results in Tables 2 to 4 reveal that workers with a higher level of education receive higher wages, have a higher DW index and a higher likelihood to have decent work. Having a contract and being employed permanently is associated with higher wages. We do not a significant correlation between job tenure and wages. There are no significant differences in wages between the type of activities, apart from a significantly higher wage for workers in a supervisory job

⁷ This becomes insignificant when controlling for company fixed effects.

(which is not significant across all specifications). Yet, technical jobs result in a higher DW-index score and conditioning activities in a lower DW-incidence – differences that disappear when company characteristics are controlled for. The type of company matters a lot for job quality. Wages are lower in older and larger companies with less temporary workers and a more diversified labour force while decent work scores and incidences are higher in these companies. This again points to the complementarity in wage and non-wage aspects of job quality, and suggests that companies make a trade-off between wages and other employment conditions.

Table 2: OLS regression results for hourly wage (logarithm of CFA/h)

	(1)	(2)	(3)	(4)	(5)	(6)
Worker characteristics						
Female (dummy)	-0.257 *** (0.047)	-0.234 *** (0.047)	-0.203 *** (0.050)	-0.125 *** (0.041)	-0.024 (0.034)	-0.015 (0.031)
Youth (dummy)	-0.111 ** (0.053)	-0.090 ** (0.045)	-0.091 ** (0.045)	0.007 (0.044)	-0.013 (0.038)	0.016 (0.036)
Migrant (dummy)	0.066 (0.052)	0.098 * (0.052)	0.092 * (0.053)	0.060 (0.043)	-0.002 (0.036)	0.024 (0.035)
Married (dummy)	0.068 (0.052)	0.070 (0.048)	0.056 (0.047)	-0.010 (0.041)	-0.022 (0.034)	-0.022 (0.033)
Total children (#)	0.015 (0.011)	0.012 (0.012)	0.011 (0.013)	0.008 (0.011)	-0.002 (0.009)	-0.001 (0.008)
Ethnicity (Oulof as base level)						
Ethnicity Fula	-0.159 *** (0.048)	-0.099 ** (0.043)	-0.079 * (0.043)	-0.084 ** (0.037)	-0.078 ** (0.032)	-0.071 ** (0.031)
Ethnicity Serer	-0.097 (0.062)	0.020 (0.068)	0.024 (0.070)	0.059 (0.062)	-0.036 (0.047)	-0.029 (0.046)
Other ethnicity	-0.119 * (0.066)	-0.100 (0.061)	-0.095 (0.061)	-0.009 (0.049)	0.024 (0.042)	0.020 (0.040)
Muslim (dummy)	-0.066 (0.074)	0.059 (0.085)	0.056 (0.090)	0.100 (0.076)	0.118 ** (0.058)	0.131 ** (0.056)
Schooling (years)	0.017 *** (0.005)	0.018 *** (0.004)	0.019 *** (0.004)	0.010 *** (0.003)	0.011 *** (0.003)	0.009 *** (0.003)
Small-scale employer (dummy)	-0.586 *** (0.069)					
Activity (production as base level)						
- Technical			0.078 (0.105)	0.007 (0.080)	0.029 (0.065)	0.041 (0.068)
- Supervisory			0.142 * (0.084)	0.112 (0.077)	0.095 (0.059)	0.119 ** (0.05)
- Conditioning			0.063 (0.055)	0.028 (0.049)	0.022 (0.045)	0.055 (0.043)
- Other activities			-0.037 (0.048)	-0.025 (0.046)	-0.035 (0.047)	-0.053 (0.046)
Job characteristics						
Oral contract (vs no contract)				0.167 *** (0.044)	0.082 ** (0.035)	0.060 * (0.034)
Written contract (vs no contract)				0.151 ** (0.058)	0.128 *** (0.045)	0.092 ** (0.038)
Casual worker (vs permanent)				-0.478 *** (0.069)	-0.557 *** (0.056)	-0.54 *** (0.05)
Seasonal worker (vs permanent)				-0.279 *** (0.056)	-0.285 *** (0.05)	-0.278 *** (0.048)
Job tenure (years)				-0.003 (0.004)	0.003 (0.003)	0.003 (0.003)
Company characteristics						
Company age					-0.378 *** (0.072)	
Total workers					-0.137 ** (0.053)	
% temporary workers					0.040 *** (0.009)	
% female workers					-0.021 *** (0.005)	
% young workers					-0.010 *** (0.002)	
% migrant workers					-0.013 *** (0.004)	
Location (Senegal River Delta as base level)						
- Lac de Guiers					-0.160 * (0.087)	
- Niayes					0.102 (0.090)	
Constant	5.866 *** (0.101)	5.680 *** (0.108)	5.654 *** (0.113)	5.889 *** (0.115)	6.084 *** (0.307)	5.737 *** (0.097)
R ²	0.311	0.186	0.200	0.433	0.612	0.641

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. N = 497 in model (1) and N=392 in models (2) to (6). Model 6 controls for company fixed effects.

Table 3: OLS regression results for decent work-index

	(1)	(2)	(4)	(5)	(6)
Worker characteristics					
Female (dummy)	-0.029 * (0.017)	-0.031 * (0.017)	-0.020 (0.019)	-0.055 *** (0.017)	-0.049 *** (0.017)
Young (dummy)	-0.063 *** (0.017)	-0.098 *** (0.022)	-0.103 *** (0.022)	-0.037 ** (0.018)	-0.025 (0.018)
Migrant (dummy)	-0.018 (0.016)	-0.034 * (0.020)	-0.039 * (0.020)	0.003 (0.018)	0.011 (0.017)
Married (dummy)	0.018 (0.017)	0.028 (0.020)	0.025 (0.020)	0.000 (0.017)	-0.001 (0.016)
Children (#)	0.004 (0.004)	0.003 (0.004)	0.002 (0.004)	0.005 (0.004)	0.006 (0.003)
Ethnicity (Oulof as base level)					
Ethnicity Fula	-0.022 (0.017)	0.005 (0.021)	0.007 (0.021)	-0.011 (0.017)	-0.009 (0.017)
Ethnicity Serer	-0.055 *** (0.018)	-0.056 ** (0.022)	-0.055 ** (0.023)	-0.038 * (0.022)	-0.035 (0.022)
Other ethnicity	-0.016 (0.019)	-0.013 (0.023)	-0.012 (0.023)	-0.028 (0.02)	-0.026 (0.019)
Muslim (dummy)	-0.039 (0.026)	-0.051 * (0.031)	-0.049 (0.030)	-0.032 (0.022)	-0.027 (0.022)
Schooling (years)	0.007 *** (0.002)	0.008 *** (0.002)	0.009 *** (0.002)	0.008 *** (0.002)	0.007 *** (0.002)
Small-scale employer (dummy)	-0.074 *** (0.017)				
Activity (production as base level)					
- Technical			0.055 * (0.032)	0.043 (0.029)	0.047 * (0.028)
- Supervisory			-0.007 (0.032)	0.012 (0.023)	0.020 (0.025)
- Conditioning			-0.011 (0.023)	0.005 (0.018)	0.017 (0.018)
- Other activities			-0.036 * (0.020)	-0.009 (0.020)	-0.015 (0.020)
Company characteristics					
Company age				0.313 *** (0.030)	
Total workers				0.281 *** (0.025)	
% temporary workers				-0.044 *** (0.004)	
% female workers				0.021 *** (0.002)	
% young workers				0.000 (0.001)	
% migrant workers				0.019 *** (0.002)	
Location (Senegal River Delta as base category)					
- Lac de Guiers				0.209 *** (0.042)	
- Niayes				0.067 ** (0.033)	
Constant	0.562 *** (0.034)	0.568 *** (0.04)	0.574 *** (0.041)	-0.01 (0.133)	0.639 *** (0.042)
R ²	0.221	0.202	0.217	0.464	0.488

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. N = 525 in model (1) and N=392 in models (2) to (6). Model (6) controls for company fixed effects.

Table 4: OLS regression results for decent work incidence

	(1)	(2)	(4)	(5)	(6)
Worker characteristics					
Female (dummy)	0.003 (0.035)	0.012 (0.034)	0.023 (0.038)	-0.048 (0.033)	-0.036 (0.032)
Young (dummy)	-0.154 *** (0.047)	-0.208 *** (0.052)	-0.225 *** (0.051)	-0.134 *** (0.043)	-0.110 ** (0.045)
Migrant (dummy)	-0.119 *** (0.040)	-0.147 *** (0.040)	-0.154 *** (0.040)	-0.078 ** (0.037)	-0.063 * (0.036)
Married (dummy)	-0.031 (0.041)	0.007 (0.040)	0.016 (0.039)	-0.011 (0.034)	-0.013 (0.031)
Children (#)	0.006 (0.007)	0.002 (0.007)	-0.005 (0.008)	-0.005 (0.007)	-0.004 (0.006)
Ethnicity (Oulof as base level)					
Ethnicity Fula	-0.085 ** (0.042)	0.012 (0.043)	0.005 (0.044)	-0.004 (0.038)	0 (0.038)
Ethnicity Serer	-0.091 * (0.052)	-0.102 * (0.054)	-0.091 * (0.052)	-0.097 * (0.052)	-0.091 * (0.052)
Other ethnicity	-0.047 (0.047)	-0.001 (0.045)	0.004 (0.044)	-0.02 (0.040)	-0.016 (0.039)
Muslim (dummy)	-0.127 ** (0.064)	-0.208 *** (0.044)	-0.174 *** (0.046)	-0.109 *** (0.039)	-0.099 ** (0.040)
Schooling (years)	0.002 (0.004)	0.006 * (0.003)	0.008 ** (0.003)	0.006 ** (0.003)	0.004 (0.003)
Small-scale employer (dummy)	-0.111 ** (0.005)				
Activity (production as base level)					
- Technical			0.023 (0.062)	0.002 (0.073)	0.01 (0.074)
- Supervisory			-0.039 (0.033)	0.027 (0.037)	0.044 (0.041)
- Conditioning			-0.174 *** (0.046)	-0.043 (0.041)	-0.054 (0.040)
- Other activities			-0.179 *** (0.051)	-0.093 ** (0.042)	-0.068 * (0.041)
Company characteristics					
Company age				0.486 *** (0.082)	
Total workers				0.447 *** (0.064)	
% temporary workers				-0.072 *** (0.011)	
% female workers				0.034 *** (0.006)	
% young workers				-0.002 *** (0.001)	
% migrant workers				0.035 *** (0.005)	
Location (Senegal River Delta as base category)					
- Lac de Guiers				0.263 *** (0.088)	
- Niayes				0.255 ** (0,077)	
Constant					
R ²	0.13	0.161	0.217	0.419	0.441

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. N = 525 in model (1), N=392 in models (2) to model (6). Model (6) controls for company fixed effects

3.5. *Decomposition of wage gaps*

The results of the decomposition analysis on wages for agro-industry workers is reported in Table 5. Aggregate effects for worker, activity, job and company characteristics are reported; the decomposition to the level of individual characteristics is reported in Table A4 in annex. We find that 96% of the gender wage gap is related to the endowment effect and hence explained by differences in observed characteristics. Only 4% of the observed gender wage gap among agro-industry workers can be attributed to a structural effect and/or unobserved factors. We find that the largest part of the endowment effect relates to job characteristics (57%), in particular to the job status as casual or permanent worker. Company characteristics explain 29% of the endowment effect, with especially older companies and companies with a higher share of young workers contributing to the gender wage gap. The type of activity only explains 13% of the endowment effect, and worker characteristics and job tenure are not important at all. This suggests that there is indirect wage discrimination against women that is associated with the employment status women have, and much less with the type of activities they perform or their experience and schooling.

Also in the decomposition of the youth and migrant wage gaps, the endowment effect is substantial with respectively 98% and 99% of the observed wage gaps explained by differences in characteristics. Job characteristics, especially holding a contract and job status as casual or permanent worker, explain a very important share of the youth wage gap. Against the expectations, job tenure is not a major factor in the wage difference between young and elder workers. For migrants, both job and company characteristics are important in explaining the endowment effect. Again job status is important, and leads to higher wages for migrant workers. Companies with an older labour force corroborate the wage differential between migrant and local workers; while

younger companies and companies with a higher share of migrant workers corroborate the youth wage gap.

For all groups of workers, differences in returns to characteristics are negligible, suggesting that there is no evidence of structural or direct discrimination in wages according to gender, age or origin of the workers. Differences in characteristics or the estimated endowment effects are substantial, and can be interpreted as signs of indirect wage discrimination against women and young workers.

Table 5: Decomposition analysis of wage gaps for different groups of workers

	Gender		Age		Migrant status	
A. Mean wage gap						
Mean wage (CFA/h)	Female		Young		Migrant	
	297.483	***	304.332	***	387.920	***
	(10.393)		(10.867)		(14.967)	
	Male		Elder		Local	
	391.655	***	368.754	***	334.414	***
	(11.971)		(10.628)		(10.258)	
Mean wage gap	94.171	***	64.422	***	-53.506	***
	(15.853)		(15.200)		(18.145)	
Wage ratio	1.32		1.21		0.86	
B. Aggregate decomposition						
Endowment effect	90.239	***	62.894	***	-53.105	***
	(15.807)		(15.900)		(15.091)	
	96%		98%		99%	
Structural effect	3.933		1.528		-0.401	
	(13.770)		(13.970)		(15.147)	
	4%		2%		1%	
C. Detailed decomposition						
<i>C.1. Endowment effect</i>						
Worker characteristics (agg.)	0.354		7.478		4.591	
	(7.924)		(9.223)		(6.584)	
	0%		12%		-8%	
Activity (agg.)	12.097	**	2.813		-5.828	
	(5.731)		(3.702)		(4.767)	
	13%		4%		11%	
Job characteristics (agg.)	51.730	***	71.975	***	-22.228	*
	(10.580)		(12.035)		(11.644)	
	57%		115%		43%	
Company characteristics (agg.)	26.058	***	-19.294	*	-27.786	***
	(8.907)		(10.231)		(9.430)	
	29%		-31%		54%	
<i>C.2. Structural effect</i>						
Worker characteristics (agg.)	33.026		38.598	*	0.345	
	(27.663)		(20.697)		(29.863)	
Activity (agg.)	-19.217		-26.863		47.084	
	(18.536)		(20.921)		(29.730)	
Job characteristics (agg.)	-12.231		-44.973	*	18.271	
	(19.555)		(24.555)		(28.036)	
Company characteristics (agg.)	-307.893		-192.186		-73.268	
	(263.804)		(306.297)		(339.961)	

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. N = 392

4. Discussion

The growth in horticultural exports and the development of horticultural value chains in Senegal, is an important source of employment creation in rural areas. We estimate that a total number of at least 30,000 formal jobs have been created directly by the horticultural agro-industry in the three main horticultural production regions in Senegal. Given an earlier figure of about 12,000 to 15,000 jobs in 2005 (Maertens, 2009), this implies a doubling of the number of jobs over 15 years.

Our results document that global food value chains can entail important employment opportunities for rural women and youth, and can trigger rural to rural migration. We estimate that women occupy 66% of the jobs in the horticultural agro-industry. The large inclusion of women is in line with previous studies on global food value chains in various African countries (e.g. Barrientos et al., 2003; Maertens & Swinnen, 2012; Rao & Qaim, 2013; Suzuki et al., 2018). We find that 29% of the agro-industry workers are younger than 25 years, and that more than 5% originate from rural areas in other regions of Senegal (mainly Fatick, Kaolack and Kolda). The former is in line with the study of Benali and co-authors, (2018) who indicate that employment in vegetable export chains in Tanzania is inclusive towards younger workers (aged 15 to 34). The documented inclusiveness towards female, young and migrant workers is important from a development perspective for multiple reasons. First, various studies show that engaging women in formal wage employment contributes to favourable development outcomes, such as female empowerment, reduced fertility rates and increased child schooling (Krumbiegel et al., 2017; Maertens & Swinnen, 2012; Maertens & Verhofstadt, 2013; Van den Broeck & Maertens, 2015). Second, the enormous challenges that rural youth in Sub-Saharan Africa face to access formal and productive employment is seen as an important economic development problem (Estruch et al., 2019; Fox et al., 2016). The growth and transformation of global food value chains can contribute

importantly to alleviate this. Third, the inclusion of migrant workers from other rural areas may induce positive spill-over effects on the regions of origin of these migrants (Christiaensen & Todo, 2014).

Despite the fact that, due to seasonality of production and international demand (Nolte & Ostermeier, 2017), the horticultural sector in Senegal offers mainly casual and seasonal jobs, we find a relatively good job quality in the sector, especially in agro-industrial companies. Compared to other sectors in Senegal, wages in the horticultural agro-industry are low (Van den Broeck & Maertens, 2017) but they are substantially higher in agro-industrial companies than on smallholder farms. Also with respect to non-wage dimensions, the quality of employment is better in the agro-industry. While there are few permanent contracts, export companies are increasingly expanding their product range, their destination markets and the length of their export and production season, resulting in longer employment periods for seasonal and temporary workers. In the sector overall, decent work time is the most problematic dimension of decent work.

Our findings reveal that wages and job quality vary with worker, job and company characteristics and that there are trade-offs between wage and non-monetary aspects of job quality across and within companies. We find evidence of indirect discrimination towards women in the horticultural agro-industry. We find that women are slightly more likely to have decent work than men and score similar to men on non-wage dimensions of quality of employment, while women's wages are on average 24% below those of men. Our regression results reveal that this gender wage gap is much more important across companies than within companies while gender differences in decent work scores are more prevalent within companies. We find a much larger gender wage gap than other studies focussing on horticultural export sectors, e.g. 9% in Zambia and 6% in the Kenya (Tallontire et al., 2005), as well as compared to studies on industry sectors, e.g. 18% in Mali and

8% in Bangladesh (Doumbia & Meur, 2003; Menzel & Woodruff, 2019). While other studies conclude that gender wage gaps are explained by occupational differences (Dolan & Sutherland, 2002; Kritzinger et al., 2004; Maertens & Swinnen, 2012), our decompositions analysis reveals indirect gender wage discrimination that is mainly due to contractual rather than occupational differences. Despite the substantial gender wage gap and the evidence of indirect gender wage discrimination, our findings contradict statements that women face unfavourable employment conditions in general (Garikipati, 2009; Maertens & Swinnen, 2012).

Moreover, we find a lower job quality for young workers, both in terms of wages and non-monetary aspects. The wage of young workers is on average 21% below that of elder workers. Our decomposition analysis reveals evidence of indirect wage discrimination against young workers, which mainly relates to the lack of written contracts (79%) and a status as casual worker (86%), and not to job tenure as may be expected. We find that migrant workers face inferior employment conditions and are 16 pp less likely to have decent work, but benefit from wages that are on average 16% higher. Our findings imply that global food value chains create formal employment opportunities for rural youth and migrants, but that within these formal jobs migrant workers face inferior working conditions and young workers indirect wage discrimination. This is more prevalent across companies than within companies, suggesting that some companies discriminate less than others and that company selection is important for these workers.

Our results entail some important research and policy implications. First, our results clearly document the importance of looking beyond wages and taking into account non-wage dimensions in assessing quality of employment. We find some opposing results, such as lower wages but a higher likelihood of decent work for women, and the opposite for migrant workers. These nuanced findings show that quality of employment is a complex and multidimensional issue. Second, a

multidimensional index such as the decent work index based on ILO guidelines that we construct in this paper, is useful in quantitative analyses on quality of employment and highly complementary to a focus on monetary measures. A multidimensional index is also useful for identifying a cut-off point and incidences of decent or indecent work. Yet, a limitation to our approach is that this cut-off point was identified only based on the distribution of decent work scores within our sample of agro-industrial workers in the horticultural sector in Senegal. This allows for a comparison of decent work between different groups of workers in the sector and an analysis of discrimination but does not allow us to make more absolute claims on the occurrence of decent work in the sector. Ideally, a decent work cut-off point is determined for a larger sample of workers from different sectors and different countries, which requires further empirical research. Third, we can conclude that horticultural value chains in Senegal create decent rural employment that is inclusive towards more vulnerable groups but bears some indirect discrimination in employment conditions. The best way for the agro-industry in Senegal to improve employment quality and reduce the indirect discrimination against women and young workers is to respect decent work times and to offer more stable jobs under written contracts.

Our findings in general and these implications in particular, are specific for our study area. Given the lack of empirical evidence on decent work from other sectors and countries, further empirical research is needed to understand global food chains as a source of inclusive, decent and equitable rural employment. Our results might suffer to some extent from selection bias that we are unable to rule out with the available data. If female workers refrain from entering employment in the horticultural agro-industry due to low wages and bad working conditions, our results might underestimate gender differences in wages and decent work, and the occurrence of indirect gender discrimination – the same holds for young workers.

5. Conclusion

This article draws on the recent policy attention to decent work for all and job quality, and investigates decent work in global food value chains. The study provides quantitative evidence on the quantity and inclusiveness of wage employment in the horticultural export sector in Senegal, and on the quality of this employment and discrimination towards vulnerable groups of workers. We find that the horticultural export agro-industry is rather inclusive towards women, youth and migrants, and offers relatively good quality jobs. We find a much better overall job quality and a higher incidence of decent work in the export agro-industry than on small-scale horticultural farms producing for the local market. The ongoing agro-industrialization of the horticultural export sector advances the decent work agenda.

Yet, we find substantial differences in wages and decent work across workers, jobs and companies and evidence of indirect wage discrimination. We find substantial gender and youth wage gaps that can to a large extent be attributed to indirect discrimination related to women's and youth's casual employment status. While migrants are observed to have larger wages, their overall job quality is inferior. The decent work for all agenda could be further advanced in the Senegalese horticultural export sector by respecting decent work times, especially for migrant workers, and by offering more stable jobs and written contracts, especially for women and young workers. Our findings stress the complementarity between wage and non-wage dimensions of job quality. Decent work is a complex and multidimensional issue that requires looking beyond wages and single dimensions of job quality.

References

- Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, 95(7–8), 476–487. <https://doi.org/10.1016/j.jpubeco.2010.11.006>
- Ayenew, H. Y., Estruch, E., Sauer, J., Abate-kassa, G., Schickkramm, L., & Wobst, P. (2017). Decent rural employment and farm production efficiency : empirical evidence from Tanzania and Ethiopia. *Agricultural Economics*, 48, 587–596. <https://doi.org/10.1111/agec.12359>
- Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy*, 26(4), 315–331. [https://doi.org/10.1016/S0306-9192\(01\)00014-8](https://doi.org/10.1016/S0306-9192(01)00014-8)
- Barrientos, S., Dolan, C., & Tallontire, A. (2003). A Gendered Value Chain Approach to Codes of Conduct in African Horticulture. *World Development*, 31(9), 1511–1526. [https://doi.org/10.1016/S0305-750X\(03\)00110-4](https://doi.org/10.1016/S0305-750X(03)00110-4)
- Benali, M., Brümmer, B., & Afari-Sefa, V. (2018). Smallholder participation in vegetable exports and age-disaggregated labor allocation in Northern Tanzania. *Agricultural Economics*, 49, 549–562. <https://doi.org/10.1111/agec.12441>
- Best, S., & Mamic, I. (2008). *Employment and social issues in fresh fruit and vegetables* (ILO Employment Working Paper No. 20). Geneva.
- Burchell, B., Sehnbruch, K., Piasna, A., & Agloni, N. (2014). The quality of employment and decent work : definitions , methodologies , and ongoing debates. *Cambridge Journal of Economics*, (December 2013), 459–477. <https://doi.org/10.1093/cje/bet067>
- Christiaensen, L., & Todo, Y. (2014). Poverty reduction during the rural-urban transformation - The role of the missing middle. *World Development*, 63, 43–58. <https://doi.org/10.1016/j.worlddev.2013.10.002>
- Davis, B., Di Giuseppe, S., & Zezza, A. (2017). Are African households (not) leaving agriculture? Patterns of households' income sources in rural Sub-Saharan Africa. *Food Policy*, 67, 153–174. <https://doi.org/10.1016/j.foodpol.2016.09.018>
- Deininger, K., & Xia, F. (2016). Quantifying Spillover Effects from Large Land-based Investment: The Case of Mozambique. *World Development*, 87, 227–241. <https://doi.org/10.1016/j.worlddev.2016.06.016>
- Dolan, C., & Sutherland, K. (2002). *Gender and employment in the Kenya horticulture value chain. Globalisation and Poverty Discussion Paper*.
- Doumbia, S., & Meur, D. (2003). Gender equality at work in sub-Saharan Africa: A case study of Mali's modern sector. *International Labour Review*, 142(3), 295–316.
- Ehlert, C. R., Mithöfer, D., & Waibel, H. (2014). Worker welfare on Kenyan export vegetable farms. *Food Policy*, 46, 66–73. <https://doi.org/10.1016/j.foodpol.2014.01.004>
- Estruch, E., Dijck, L. Van, & Schwebel, D. (2019). Youth Mobility and its Role in Structural Transformation in Senegal. In *Youth and Jobs in Rural Africa: Beyond Stylized Facts* (Vol. 1, pp. 251–276). <https://doi.org/10.1093/oso/9780198848059.003.0009>
- FAOSTAT. (2020). Crops. Retrieved February 13, 2020, from <http://www.fao.org/faostat/en/#data/QC>
- Fortin, N., Lemieux, T., & Firpo, S. (2011). Decomposition methods in economics. *Handbook Labor Economics*, 1–102.
- Fox, L., Senbet, L. W., & Simbanegavi, W. (2016). Youth employment in Sub-Saharan Africa: Challenges, constraints and opportunities. *Journal of African Economies*, 25, i3–i15. <https://doi.org/10.1093/jae/ejv027>
- Garikipati, S. (2009). Landless but not assetless: female agricultural labour on the road to better

- status, evidence from India. *The Journal of Peasant Studies*, 36(3), 517–545. <https://doi.org/10.1080/03066150903142774>
- Hathie, I., Wade, I., Ba, S., Niang, A., Niang, M., Sow, M. K., ... Ba, C. O. (2015). *Emploi des jeunes et migration en Afrique de l'Ouest (EJMAO)*. Dakar. Retrieved from <https://www.ipar.sn/Emploi-des-jeunes-et-migration-en-Afrique-de-l-Ouest-EJMAO-Rapport-final.html?lang=fr>
- Herrmann, R. T. (2017). Large-Scale Agricultural Investments and Smallholder Welfare: A Comparison of Wage Labor and Outgrower Channels in Tanzania. *World Development*, 90, 294–310. <https://doi.org/10.1016/j.worlddev.2016.10.007>
- ILO. (2008). *Promotion of rural employment for poverty reduction*.
- ILO. (2013a). *Decent work indicators: Guidelines for producers and users of statistical and legal framework indicators*. Geneva.
- ILO. (2013b). *Profil pays du travail décent: Senegal*. Geneva.
- ILO. (2018). *ILO Flagship Programmes*. Geneva.
- Islam, A., Palacios Lopez, A., & Amin, M. (2018). Decomposing the Labour Productivity Gap between Migrant-Owned and Native-Owned Firms in Sub-Saharan Africa. *The Journal of Development Studies*, 1–18. <https://doi.org/10.1080/00220388.2018.1520215>
- Jann, B. (2008). The Blinder – Oaxaca decomposition for linear regression models. *The Stata Journal*, 8(4), 453–479.
- Kabeer, N., & Mahmud, S. (2011). *Does Paid Work Provide a Pathway to Women ' s Empowerment ? Empirical Findings from Bangladesh* (Vol. 4070).
- Kilic, T., Palacois-Lopez, A., & Goldstein, M. (2015). Caught in a Productivity Trap : A Distributional Perspective on Gender Differences in Malawian Agriculture. *World Development*, 70, 416–463. <https://doi.org/10.1016/j.worlddev.2014.06.017>
- Kritzinger, A., Barrientos, S., & Rossouw, H. (2004). Global Production and Flexible Employment in South African Horticulture : Experiences of Contract Workers in Fruit Exports. *Sociologia Ruralis*, 44(1).
- Krumbiegel, K., Maertens, M., & Wollni, M. (2017). *Modern agri-food systems, horticultural employment and women's empowerment GlobalFood*.
- Krumbiegel, K., Maertens, M., & Wollni, M. (2018). The Role of Fairtrade Certification for Wages and Job Satisfaction of Plantation Workers. *World Development*, 102, 195–212. <https://doi.org/10.1016/j.worlddev.2017.09.020>
- Maertens, M. (2009). Horticulture exports, agro-industrialization, and farm-nonfarm linkages with the smallholder farm sector: Evidence from Senegal. *Agricultural Economics*, 40(2), 219–229. <https://doi.org/10.1111/j.1574-0862.2009.00371.x>
- Maertens, M., Minten, B., & Swinnen, J. (2012). Modern Food Supply Chains and Development: Evidence from Horticulture Export Sectors in Sub-Saharan Africa. *Development Policy Review*, 30(4), 473–497.
- Maertens, M., & Swinnen, J. F. M. (2012). Gender and Modern Supply Chains in Developing Countries. *Journal of Development Studies*, 48(10), 1412–1430. <https://doi.org/10.1080/00220388.2012.663902>
- Maertens, M., & Verhofstadt, E. (2013). Horticultural exports, female wage employment and primary school enrolment: Theory and evidence from Senegal. *Food Policy*, 43, 118–131. <https://doi.org/10.1016/j.foodpol.2013.07.006>
- Menzel, A., & Woodruff, C. (2019). *Gender wage gaps and worker mobility: Evidence from the garment sector in Bangladesh*.

- Nolte, K., & Ostermeier, M. (2017). Labour Market Effects of Large-Scale Agricultural Investment: Conceptual Considerations and Estimated Employment Effects. *World Development*, 98(2016), 430–446. <https://doi.org/10.1016/j.worlddev.2017.05.012>
- Rao, E. J. O., & Qaim, M. (2013). Supermarkets and agricultural labor demand in Kenya: A gendered perspective. *Food Policy*, 38(1), 165–176. <https://doi.org/10.1016/j.foodpol.2012.11.008>
- Schuster, M., & Maertens, M. (2016). Do private standards benefit workers in horticultural export chains in Peru? *Journal of Cleaner Production*, 112, 2392–2406. <https://doi.org/10.1016/j.jclepro.2015.10.038>
- Schuster, M., Vranken, L., & Maertens, M. (2019). You Can (' t) Always Get the Job You Want : Employment Preferences in the Peruvian Horticultural Export Chain. *The Journal of Development Studies*, 1–22. <https://doi.org/10.1080/00220388.2019.1666976>
- Sehnbruch, K., González, P., Apablaza, M., Méndez, R., & Arriagada, V. (2020). The Quality of Employment (QoE) in nine Latin American countries : A multidimensional perspective. *World Development*, 127(104738). <https://doi.org/10.1016/j.worlddev.2019.104738>
- Staelens, L., Desiere, S., Louche, C., & Haese, M. D. (2018). Predicting job satisfaction and workers ' intentions to leave at the bottom of the high value agricultural chain : evidence from the Ethiopian cut flower industry. *The International Journal of Human Resource Management*, 29(9), 1609–1635. <https://doi.org/10.1080/09585192.2016.1253032>
- Standing, G. (2003). A family of decent work indexes. *International Labour Review*, 142(2).
- Suzuki, A., Mano, Y., & Abebe, G. (2018). Earnings, savings, and job satisfaction in a labor-intensive export sector: Evidence from the cut flower industry in Ethiopia. *World Development*, 110, 176–191. <https://doi.org/10.1016/j.worlddev.2018.05.029>
- Tallontire, A., Dolan, C., Smith, S., & Barrientos, S. (2005). Reaching the marginalised? Gender value chains and ethical trade in African horticulture. *Development in Practice*, 15(3–4), 559–571. <https://doi.org/10.1080/09614520500075771>
- UN. (2019). *The Sustainable Development Goals Report, 2019*. New York. Retrieved from <https://unstats.un.org/sdgs/report/2019/The-Sustainable-Development-Goals-Report-2019.pdf>
- Van den Broeck, G., & Maertens, M. (2015). Female employment reduces fertility in rural Senegal. *PLoS ONE*, 10(3), 1–15. <https://doi.org/10.1371/journal.pone.0122086>
- Van den Broeck, G., & Maertens, M. (2016). Horticultural exports and food security in developing countries. *Global Food Security*, 10, 11–20. <https://doi.org/10.1016/j.gfs.2016.07.007>
- Van den Broeck, G., & Maertens, M. (2017). Moving Up or Moving Out? Insights into Rural Development and Poverty Reduction in Senegal. *World Development*, 99, 95–109. <https://doi.org/10.1016/j.worlddev.2017.07.009>
- Van den Broeck, G., Swinnen, J., & Maertens, M. (2017). Global value chains, large-scale farming, and poverty: Long-term effects in Senegal. *Food Policy*, 66, 97–107. <https://doi.org/10.1016/j.foodpol.2016.12.003>

Annex

Table A1: Dimensions and indicators of decent work index

Indicator	Definition	Calculation
<i>1) Adequate earnings and productive work</i>		
Minimum wage	Worker earns at least the minimum wage (214 CFA/h)	<ul style="list-style-type: none"> • 1 if hourly wage is at least the minimum wage • 0 otherwise
Fringe benefits	Worker receives fringe benefits (housing, meals and/or transportation) in addition to the wage	<ul style="list-style-type: none"> • 1 if 3 fringe benefits received • 0.66 if 2 fringe benefits received • 0.33 if 1 fringe benefits received • 0 otherwise
Training	Worker receives job training	<ul style="list-style-type: none"> • 1 if job training received • 0 otherwise
<i>2) Decent work time</i>		
Weekly hours	Worker works on average between 35-48 h/week: working more than 40 h/week (48 h/week) should be compensated by a 115% (140%) wage increase	<ul style="list-style-type: none"> • 0 if worked more than 48 h/week without compensation • 1 otherwise
Unsocial hours	Worker works during nights and/or official holidays: working during nights and/or official holidays should be compensated by a resp. 160% and 200% wage increase	<ul style="list-style-type: none"> • 0 if worked during nights and/or holidays without compensation • 1 otherwise
Work intensity	Worker does not exceed the max. hours worked: <ul style="list-style-type: none"> • The yearly hours worked in the agricultural sector is limited to 2,352 h/year • Casual workers are not allowed to work more than 8 h/day • When employed for more than 12 consecutive months, the worker should receive 2 days of paid holiday per month worked 	<ul style="list-style-type: none"> • 0 if worked more than 2,352 h/year; or if worked more than 8 h/day; or if no annual leave • 1 otherwise
<i>3) Stability and security of work</i>		
Type of contract	Type of contract	<ul style="list-style-type: none"> • 1 if written contract • 0 otherwise
Status	Status	<ul style="list-style-type: none"> • 1 if permanent • 0.5 if seasonal • 0 otherwise
Tenure	Tenure	<ul style="list-style-type: none"> • 1 if employed for more than 1 year • 0 otherwise
<i>4) Safe work environment</i>		
Health facilities	Worker can benefit from on-site health facilities whenever necessary	<ul style="list-style-type: none"> • 1 if health facilities are provided • 0 otherwise
Work accidents	Worker has had any work accidents since the start of his employment for the current employer	<ul style="list-style-type: none"> • 1 if no work accidents • 0 otherwise
Dangerous products	Worker works unprotected with dangerous products (e.g. pesticides such as Arsenal or D6)	<ul style="list-style-type: none"> • 1 if no dangerous products • 0 otherwise

Note: The index is based on the guidelines put forward by the International Labor Organization (ILO, 2013a).

Table A2: Outcome variables for different groups of workers

		Small-scale farm and agro-industry workers						Agro-industry workers					
		<i>Small- scale</i>	<i>Agro- Industry</i>	<i>test</i>	<i>Female workers</i>	<i>Male workers</i>	<i>test</i>	<i>Young workers</i>	<i>Elder workers</i>	<i>test</i>	<i>Migrant workers</i>	<i>Local workers</i>	<i>test</i>
Wage (CFA/hour)	Mean	218.239	352.977	***	297.483	391.655	***	304.332	368.754	***	387.920	334.414	***
	s.d.	141.121	169.609	**	132.993	182.010	***	106.659	182.881	***	174.718	164.169	
Decent Work Index	Mean	0.407	0.527	***	0.516	0.535		0.428	0.559	***	0.503	0.540	**
	s.d.	0.096	0.172	***	0.144	0.189	***	0.163	0.163		0.197	0.156	***
Adequate Earnings	Mean	0.312	0.538	***	0.512	0.557	**	0.510	0.547		0.532	0.541	
	s.d.	0.198	0.215		0.236	0.198	**	0.223	0.212		0.193	0.227	**
Decent Work Time	Mean	0.174	0.335	***	0.363	0.316	*	0.248	0.363	***	0.284	0.362	***
	s.d.	0.209	0.265	***	0.256	0.270		0.267	0.258		0.285	0.250	*
Stability Of Work	Mean	0.424	0.530	***	0.455	0.582	***	0.309	0.601	***	0.539	0.525	
	s.d.	0.176	0.327	***	0.273	0.351	***	0.276	0.310		0.374	0.300	***
Safe Work Environment	Mean	0.72	0.710		0.736	0.684	**	0.646	0.725	***	0.658	0.731	***
	s.d.	0.221	0.220		0.193	0.236	***	0.219	0.218		0.236	0.208	*
Decent work incidence	Mean	62.41%	85.20%	***	89.44%	82.25%	**	66.67%	91.22%	***	74.26%	91.02%	***
<i>Number of observations</i>		133	392		161	231		96	296		136	256	

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. Comparison of means through two-sided t-tests (continuous variables) and z-tests (binary variables).

Table A3: Descriptive statistics for indicators of decent work index for different groups of workers

	Small-scale farm and agro-industry workers			Agro-industry workers								
	Small- scale	Agro- Industry	test	Female workers	Male workers	test	Young workers	Elder workers	test	Migrant workers	Local workers	test
Minimum wage	0.331	0.878	***	0.926	0.810	***	0.875	0.878		0.949	0.840	***
Fringe Benefits	0.524	0.241	***	0.241	0.240		0.254	0.237		0.238	0.242	
Meals	0.865	0.163	***	0.204	0.110	***	0.229	0.142	**	0.154	0.168	
Transport	0.000	0.497	***	0.429	0.600	***	0.479	0.503		0.427	0.535	**
Housing	0.707	0.061	***	0.091	0.020	***	0.052	0.064		0.132	0.023	***
Training	0.090	0.513	***	0.520	0.500		0.417	0.544	**	0.427	0.559	**
Weekly hours	0.045	0.319	***	0.286	0.370	*	0.188	0.362	***	0.235	0.363	***
Hours per week	51	51		47	55	***	55	50	***	57	49	***
Worked > 48h/w	0.391	0.526	***	0.593	0.430	***	0.625	0.493	**	0.574	0.500	
Compensation > 48h/w	0.000	0.277	***	0.270	0.290		0.150	0.329	***	0.167	0.344	***
Worked > 40h/w	0.887	0.875		0.935	0.790	***	0.896	0.868		0.919	0.852	*
Compensation > 40h/w	0.000	0.219	***	0.213	0.230		0.151	0.241	*	0.176	0.243	
Unsocial hours	0.218	0.571	***	0.524	0.640	**	0.469	0.605	**	0.478	0.621	***
Worked at night	0.165	0.230		0.286	0.150	***	0.323	0.199	**	0.287	0.199	**
Compensation night	0.000	0.156	**	0.106	0.290	**	0.032	0.220	**	0.077	0.216	*
Worked holidays	0.767	0.579	***	0.597	0.550		0.521	0.598		0.625	0.555	
Compensation hol.	0.000	0.405	***	0.384	0.440		0.220	0.458	***	0.306	0.465	**
Work Intensity	0.263	0.125	***	0.147	0.090		0.094	0.135		0.147	0.113	
<8h/day	0.015	0.214	***	0.108	0.370	***	0.292	0.189	**	0.125	0.262	***
<2.352h/year	0.767	0.809		0.732	0.920	***	0.875	0.787	*	0.750	0.840	**
Annual leave	0.008	0.166	***	0.247	0.050	***	0.010	0.216	***	0.213	0.141	*
Contract	0.045	0.444	***	0.528	0.320	***	0.208	0.520	***	0.500	0.414	
Written contract	0.045	0.444	***	0.528	0.320	***	0.208	0.520	***	0.500	0.414	
Oral contract	0.699	0.301	***	0.234	0.400	***	0.427	0.260	***	0.272	0.316	
No contract	0.256	0.255		0.238	0.280		0.365	0.220	***	0.228	0.270	
Status	0.504	0.302	***	0.396	0.170	***	0.094	0.370	***	0.368	0.268	**
Casual	0.023	0.617	***	0.507	0.780	***	0.865	0.537	***	0.552	0.652	*
Seasonal	0.947	0.161	***	0.195	0.110	**	0.083	0.186	**	0.162	0.160	
Permanent	0.030	0.222	***	0.299	0.110	***	0.052	0.277	***	0.287	0.188	**
Tenure > 1year	0.737	0.860	***	0.840	0.890		0.635	0.932	***	0.765	0.910	***
Years of tenure	2.77	5.48	***	5.610	5.40		1.83	6.67	***	4.49	6.02	**
Work accidents	0.023	0.041		0.052	0.020		0.021	0.047		0.044	0.039	
Dangerous products	0.150	0.219	*	0.299	0.110	***	0.250	0.210		0.324	0.164	***
Health care	0.346	0.398		0.424	0.360		0.229	0.453	***	0.360	0.418	
<i>Number of observations</i>	133	392		161	231		96	296		136	256	

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. Comparison of means through two-sided t-tests (continuous variables) and z-tests (binary variables).

Table A4: Decomposition analysis of wage gaps for different groups of workers

	Gender		Age		Migrant						
	Endowment	Structural	Endowment	Structural	Endowment	Structural					
Total difference	91.014 (15.733)	*** (13.551)	3.158	61.710 (15.919)	*** (13.920)	2.713	-48.767 (15.347)	*** (15.543)	-4.739		
Worker characteristics											
Female (dummy)				-0.062 (0.320)		-10.587 (10.444)			-1.488 (6.287)	-2.383 (8.270)	
Youth (dummy)	-0.041 (0.244)		-9.428 (7.269)						0.235 (1.231)	13.555 (7.960)	*
Migrant (dummy)	2.091 (6.874)		-0.115 (7.412)		-0.503 (1.675)	3.747 (11.562)					
Married (dummy)	0.012 (0.361)		-11.526 (14.153)		-3.498 (7.070)	0.581 (7.860)			-0.514 (1.102)	-2.803 (16.457)	
Total children	-1.004 (4.071)		28.464 (15.505)	*	2.061 (8.347)	3.343 (4.677)			1.024 (4.152)	-0.663 (15.114)	
Ethnicity Oulof	-0.440 (1.490)		-0.187 (8.058)		0.076 (0.304)	2.921 (8.066)			0.709 (2.393)	-9.206 (7.326)	
Ethnicity Fula	-2.871 (1.584)	*	-2.732 (4.113)		2.051 (1.543)	4.883 (6.286)			2.393 (1.518)	6.152 (5.728)	
Ethnicity Serer	-0.013 (0.118)		4.162 (4.250)		0.157 (0.812)	-0.365 (5.702)			0.244 (1.255)	-2.350 (4.270)	
Other ethnicity	0.664 (0.944)		-1.963 (3.845)		2.873 (1.667)	* (3.492)			-1.170 (1.123)	3.643 (4.477)	
Muslim (dummy)	-1.563 (1.428)		-21.050 (43.936)		-1.204 (1.451)	39.154 (48.922)			4.714 (2.577)	* (51.344)	***
Years of schooling	4.399 (3.253)		28.365 (15.853)	*	4.149 (3.404)	28.773 (15.309)	*		0.897 (3.200)	-11.116 (21.479)	
Activity											
Production	1.741 (1.987)		-7.477 (8.542)		3.616 (3.464)	-2.169 (10.279)			1.526 (1.889)	26.177 (12.885)	**
Technical	0.199 (3.182)		-0.510 (1.010)		0.040 (0.642)	0.545 (1.813)			-0.079 (1.268)	5.517 (4.027)	
Supervisory	0.003 (0.097)		-5.898 (2.731)	**	-0.076 (2.440)	-0.632 (0.626)			-0.049 (1.570)	2.599 (2.301)	
Conditioning	8.712 (6.142)		-8.766 (14.200)		-2.110 (2.326)	-11.361 (8.305)			-7.705 (5.450)	13.819 (9.691)	
Other activities	0.690 (5.065)		3.940 (5.988)		0.942 (1.195)	-11.589 (8.704)			0.639 (4.649)	-4.896 (12.200)	
Job characteristics											
No contract	0.782 (0.912)		-2.833 (4.136)		2.737 (1.529)	* (5.790)			-0.785 (0.918)	9.597 (5.098)	*
Oral contract	-0.912 (1.191)		6.629 (5.011)		-0.930 (1.225)	-8.168 (6.350)			0.247 (0.413)	-5.455 (5.389)	
Written contract	2.730 (1.951)		-2.902 (8.757)		4.151 (2.873)	-0.427 (5.870)			-1.144 (1.043)	-8.931 (14.375)	
Casual	28.504 (5.801)	***	-22.880 (14.524)		34.578 (6.085)	*** (24.232)	**		-10.653 (5.628)	* (18.870)	2.647
Seasonal	-1.274 (1.057)		2.669 (2.857)		-1.573 (1.244)	1.530 (3.242)			0.025 (0.601)	-5.841 (3.961)	
Permanent	22.606 (5.405)	***	1.916 (4.955)		27.207 (5.235)	*** (2.812)			-12.006 (5.729)	** (7.786)	6.645
Job tenure (years)	-0.289 (0.959)		8.059 (14.070)		6.638 (7.259)	8.622 (9.698)			2.101 (2.436)	25.335 (18.578)	
Company characteristics											
Company age	16.147 (8.539)	*	303.352 (199.496)		-18.766 (10.278)	* (131.212)	***		-7.517 (8.195)	-215.677 (226.087)	
Total workers	2.288 (3.020)		22.976 (339.312)		-11.019 (8.730)	-53.848 (274.594)			2.746 (3.150)	-29.566 (462.924)	
% temporary workers	2.112 (7.114)		-668.108 (800.422)		-16.206 (11.197)	-677.912 (568.770)			-12.971 (9.429)	102.674 (1,029.843)	
% female workers	-4.102 (6.087)		-2.362 (309.982)		15.225 (9.890)	100.856 (228.434)			-3.600 (6.191)	72.022 (403.036)	
% young workers	16.835 (6.008)	***	30.853 (25.930)		-2.230 (5.545)	32.887 (25.683)			-9.398 (5.152)	* (30.272)	**

% migrant workers	2.536 (4.525)	18.718 (31.798)	16.880 (9.242)	*	22.846 (28.166)	1.614 (4.559)	5.547 (38.645)
<hr/>							
Location							
Delta	4.256 (3.057)	-25.967 (17.011)	-5.915 (3.894)		-30.416 (11.927)	** (3.219)	8.923 (18.864)
Lac de Guiers	-6.731 (5.309)	35.611 (10.416)	*** (3.592)	4.132	54.230 (16.564)	*** (3.721)	-24.185 (18.571)
Niayes	-7.052	-36.125	**	-1.712	-34.264	*	1.365 24.254

Note: *p<0.1; ** p<0.05;*** p<0.01. Standard errors in parentheses. N = 392