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How Do Household Tasks Shape Employment Contracts? The Provision of Care in Portugal

Fátima Suleman and Abdul Suleman

ABSTRACT

This study illustrates the complexities involved in outsourcing domestic work to the market. It draws on an original dataset of paid domestic workers in Portugal to examine how specific tasks interact with and explain contractual arrangements. A fuzzy cluster analysis categorizes paid domestic workers into caregivers and cleaners; however, a great degree of overlap implies that caring also entails cleaning tasks necessary for the care receiver's well-being. A subsequent Tobit regression analysis shows that caregivers have more formal and stable contracts but earn lower wages and have longer working hours relative to cleaners. The study finds a segmentation of national origin and that some migrants are at a disadvantage in care work. The study also examines how employers deal with the idiosyncrasies of domestic work such as navigating trust-related issues.

KEYWORDS

Paid domestic work, caregivers, contractual arrangements, fuzzy clustering, Tobit regression

JEL Codes: J41, J42, J81

INTRODUCTION

In recent years, the commodification of household tasks, notably caring, and the rise in the number of paid domestic workers worldwide have received much attention in the literature. Studies and statistics document the growing demand for paid workers to perform household tasks traditionally assigned to women family members, unveiling a relationship between caring, gender, and globalization (Parreñas 2001; Glenn 2010).

Paid domestic workers provide invaluable services to households not only by maintaining the home, but also by caring for children, the elderly, and the disabled. However, they are undervalued, underpaid, and vulnerable to violations of their human and labor rights (International Labour Organization [ILO] 2010). Paid domestic work can therefore

be considered a secondary segment of the labor market where migrant women, notably from developing countries, find job opportunities in developed countries. But do all paid domestic workers have equally poor conditions? Or, do some categories of paid workers enjoy different patterns of relationships with employers?

Our study reexamines segmentation arguments in the context of paid domestic work. We attempt to illustrate that the outsourcing of domestic chores to the market involves complexities and decisions that might be incompatible with the secondary labor market. Our research questions are: To what extent do the characteristics of work performed by paid domestic workers affect the quality of their jobs? How do employers deal with the idiosyncrasies of care work? How do paid workers' characteristics interact with the employment characteristics of paid domestic workers? Do certain categories of paid worker prevail in certain jobs with less attractive working conditions? Is the country of origin a source of inequality within paid domestic work?

We draw on an original dataset collected from a sample of $N = 684$ paid domestic workers in Portugal and examine the occupational configurations in paid domestic work and the associated characteristics of jobs and workers. Our study attempts to ascertain how the tasks involved in paid domestic work – for example, cleaning, cooking, and caring – explain the contractual arrangement and category of worker employed.

Given that paid domestic workers are responsible for a range of different but overlapping tasks, we begin with a fuzzy cluster analysis to identify the particular jobs within paid domestic work based on workers' statements about the tasks they perform. Specifically, we use a grade of membership (GoM) representation of the data to determine the occupational structure within paid domestic work (Woodbury and Clive 1974). Subsequently, we estimate a Tobit regression model to examine the association between this occupational structure and the contractual arrangements. Paid domestic work encompasses a variety of arrangements (Chen 2011); we focus on formal (or informal) and stable (or flexible) arrangements.

In Portugal, formality involves a relationship based on a written contract and/or declaration to social security authorities, and stability is associated with regular payment – notably, a monthly wage. We aim to find out whether certain tasks – for example, caring chores – discourage employers from using flexible and informal contracts. The empirical analysis seeks to shed light on the way private households, regarded as employers, deal with the idiosyncrasies of paid care work and whether this kind of paid work fosters compliance with labor market regulations.

The regression model also includes employee characteristics and tests the segmentation hypothesis that certain categories are overrepresented within specific segments. Paid domestic work is a job dominated by women, but gender intersects with race, ethnicity, and citizenship (Rollins 1985;

Parreñas 2001; Romero 2002). Although an intersectional approach is often neglected in economic analysis (Brewer, Conrad, and King 2002), it is useful when looking at how racial origin affects the assignment of tasks in paid domestic work. For example, it is known that certain chores labeled as "dirty tasks" have been persistently allocated to specific racial groups (Glenn 2010). Our study provides a good opportunity to test this association since migrants from the former Portuguese colonies, women from elsewhere in Europe, and Portuguese women see paid domestic work in the homes of wealthy and middle-class employers as job opportunities. We therefore contribute to the debate on the commodification and globalization of care services that ultimately shape relations of inequality in this sector.

THE LABOR MARKET OF PAID DOMESTIC WORKERS

Domestic chores and employment conditions

Demographic changes and population aging, together with the increasing participation of women in the labor market, have increased the need for paid domestic workers worldwide. Unpaid and informal care, namely from family members, is less available, and this has also transformed the state's role in care provision (Benería 2008; Razavi and Staab 2010). How is the care market organized, and what influences the provision of care? Annamaria Simonazzi (2009) suggests that it is the combination of state, family, and the market that explains the differences between countries.

Whereas families constitute the core actor for care provision in some contexts, such as in Mediterranean countries, the public provision of care predominates in others – for example, in Scandinavian countries. Simonazzi insists that this impacts both the working conditions and the quality of care. Francesca Bettio, Annamaria Simonazzi, and Paola Villa (2006) also emphasize that working conditions vary in accordance with the contractual arrangement, region, and personal characteristics of paid domestic workers. In the following paragraphs, we, therefore, discuss the characteristics of the work and examine the employment characteristics of paid domestic workers, drawing on different strands of the literature to portray an accurate picture of the complexity of the paid domestic work research agenda.

Although the literature focuses largely on care work, there is an interesting discussion around other chores performed by paid domestic workers. Bridget Anderson (2001), for example, offers a simple distinction between cleaners and caregivers, while other studies attempt to classify tasks in various different ways depending on their nature and specific requirements. Dorothy E. Roberts (1997) splits paid domestic work into spiritual and menial tasks. The former includes tasks such as nurturing

children, and the latter refers to unpleasant and dirty work for which moral traits and cognitive skills are seldom required. It is often suggested that paid domestic workers charged with providing care must also do cleaning tasks and prepare meals (Anderson 1997); so nonrelational work is concomitant with caring (Razavi and Staab 2010). In sum, even though the dual-segment model fits the labor market of domestic work, we are aware that cleaning and care segments overlap.

The affective nature of care work is also discussed in the literature. Caring is work performed on the basis of face-to-face interaction with the aim of developing the human capabilities of the care receiver (England, Budig, and Folbre 2002). It is social reproductive labor "which creates and sustains human life (beings) as different from commodities and products (things)" (Yeates 2009: 5). Susan Himmelweit (2007) stresses that the paid work of caring is an economic activity associated with a personal relationship. It involves emotional labor, affective relations, and intimacy between the paid care provider and patient or client (Gutierrez-Rodriguez 2014). This often entails dependency, especially on residential caregivers who are expected to be available whenever needed (de Ruijter and van der Lippe 2007). Caregivers supply both active care – that is, performing physical tasks for the care receiver – and passive care – namely, being available to assist when required (Himmelweit 2007). Esther de Ruijter and Tanja van der Lippe (2007) distinguish between flexible or occasional tasks, like cleaning and housekeeping, which can be done at any time, and inflexible tasks, such as caring and cooking, which entail timely performance.

Paid domestic work also involves risk and trust issues (de Ruijter, van der Lippe, and Raub 2003). Employers entrust their family members and home to relative strangers, often giving them a key to the house. As employers are frequently absent during working hours, they cannot be sure of the quality of the service supplied or the risk of opportunistic behavior. This may explain why households nearly always rely on references and recommendations from friends, family, and neighbors when making the decision to hire domestic workers from the informal labor market (Hondagneu-Sotelo 1994; Moras 2008).

Employers have to cope with the many complexities of paid domestic work. The idiosyncrasies of care work and the need for quality care can dictate employment practices that will ensure the protection of assets and family members. This is particularly striking in family-based care provision, where caregivers are hired directly by families and often on an informal basis (Simonazzi 2009). However, the literature offers a very disturbing picture of the terms of contractual arrangements and working conditions in paid domestic work.

Pierrette Hondagneu-Sotelo (1994) notes that paid domestic workers in the United States are hired in a variety of arrangements – namely, working for multiple employers on a weekly, bi-weekly, or monthly basis or as live-in

contracts. Martha Alter Chen (2011) differentiates between working for single or multiple employers, on a part- or full-time basis, in a regulated or unregulated arrangement, and for single or multiple tasks. However, unregulated and informal employment relationships are pervasive in paid domestic work (ILO 2013); the employment relationship is often "wholly unregistered by, or hidden from, the state for tax, social security and labor law purposes, and can be temporary or permanent and relatively low- or high-paid" (Williams 2014: 740). Vanessa R. de la Blétière (2008) points out that formality can be neglected by employers and paid domestic workers because a commonly held belief is that the employment relationship is based on trust.

Working hours is also an important issue in paid domestic work and is strongly linked to contractual arrangements and the tasks to be performed. Paid residential workers (live-in) are likely to have full-time contracts and long working hours, while live-out workers may work for one or more employers, with different arrangements for working hours (ILO 2011).

Although scarce, the available statistics indicate that paid domestic workers' wages are the lowest of all paid occupations in the labor market (ILO 2011; Shierholz 2013), and caregivers have a lower wage than non-care workers. Moreover, wages are often lower than the regulated minimum wage and this low-cost strategy of families is made possible by the fact that migrant workers are often willing to accept low wages (Bettio, Simonazzi, and Villa 2006).

The reported literature has described characteristics that allow job quality in paid domestic work to be assessed, but it has failed to show how the tasks performed are associated with the workers' employment conditions. Our assumption is that contractual arrangements and other employment characteristics differ in accordance with the services provided by paid domestic workers. Our research Hypothesis 1 is: *Given the particularities of caring services, employers are more likely to formalize contracts with care workers than with other paid domestic workers.* While flexible arrangements may be used in the case of flexible tasks, like cleaning and housekeeping, caring involves complex transactions that make flexible work arrangements unsuitable.

We consider that the relationship between contracts and tasks offers an incomplete picture of paid domestic work. It is important to understand why substandard conditions persist despite the initiatives of international bodies, notably ILO Convention No. 189 and Recommendation No. 201.

Drivers of working conditions in paid domestic work

The literature on care regimes looks at how the state, the family, and the market interact and how this combination affects the organization of the care sector (Bettio and Plantenga 2004; Simonazzi 2009). The argument is that, unlike countries with public care provision, contexts like Southern

Europe, in which the family is itself the care provider, usually have an informal and low-wage market (Simonazzi 2009). This means families seek cheap labor due to budget constraints, often employing migrant domestic workers.

Our knowledge about the quality of the job, notably the wage setting, is furthered by studies that address factors such as the nature of paid care work, the workers, and job characteristics (Budig and Misra 2010; Razavi and Staab 2010). They show that caring is a labor-intensive service and a female-dominated job where migrant women, especially from developing countries, supply care and other related services in developed countries, and chores are performed within private households and beyond the control of authorities.

Another branch of the literature examines the implications of the intersection between gender, citizenship, race, and class stratification in perpetuating the employment conditions in paid domestic work in general (Brewer, Conrad, and King 2002; Altman and Pannell 2012), or in specific countries (for example, Rollins [1985] or Glenn [2010] for the US; Parreñas [2001] for Italy and the US; Raghuram [2001] for India). The underlying assumption is that "gender, ethnic origin, and immigration status all matter in terms of what jobs are offered to international migrants and what pay they receive" (Altman and Pannell 2012: 298). The authors also stress that these individual characteristics have a strong bearing on the kind of tasks and workplace available to the worker. To illustrate this interaction, Roberts (1997) reports the overrepresentation of women of color in menial tasks, and Parvati Raghuram (2001) highlights the allocation of the dirtiest tasks, like cleaning toilets and removing human and animal excrements, to the lowest castes. Nicola Yeates (2005) notes that households make clear choices by attempting to hire domestic workers with particular behavioral, cultural, linguistic, or religious characteristics. These choices are explained by ethnic stereotypes associated with low cost and the ease with which they can control a migrant's work and employment conditions.

Emilio Reyneri (2003) calls attention to the unfavorable employment conditions of irregular migrants in paid domestic work in Southern European countries. Bridget Anderson (1997) suggests that undocumented migrants tend to accept live-in contracts, and Meryl Altman and Kerry Pannell (2012) note that this makes them dependent on their employers. Undocumented migrants represent cheap labor whom employers may exploit and force to work long hours without additional pay. It is this intersection between gender, ethnicity, and migration status that facilitates the employers' control and encourages them to hire foreign rather than local workers (Altman and Pannell 2012).

This intersection also reinforces social stratification and inequality between families from richer countries – that is, the employers – and

paid domestic workers from poor families and poor countries or regions supplying the care services (Yeates 2005). In fact, due to the shortage of these services in developed countries, developing countries see migration as part of their development strategy and encourage both women and men to migrate so as to send remittances back to their country of origin (Rodriguez 2008). This extends the discussion of the commodification of household work (Glenn 1992) to the international transfer of care work (Parreñas 2001), which is often legitimized by political discourses on the benefits of working abroad. Yeates (2009) emphasizes the role of migration, and women's migration in particular, in the "global care chain" and claims it is an important part of the welfare policies of developed countries.

However, the migration policy of receiving countries sometimes increases the inequality and vulnerability of paid domestic workers. For example, in Portugal the state often excludes paid domestic work as a valid category of employment for a visa application, preventing the legal integration of immigrants into the labor market (Baptista 2011). Altman and Pannell (2012) draw attention to gaps in migration and labor policies that undermine paid domestic workers' rights, especially those of migrants.

The above-mentioned literature highlights the relevance of the macro perspective, the feminist position, and especially the intersectional approach to the understanding of the labor market of domestic workers. It suggests that institutional settings for the provision and financing of care impact and contribute to perpetuating substandard employment in domestic work. Further research is needed to examine how private employers organize care work and employment practices and, more importantly, how they deal with the idiosyncrasies of paid care work. In light of this, we consider Hypothesis 2: *Gender, ethnic origin, and immigration status are relevant to contractual arrangements, tasks performed, and other working conditions offered to paid domestic workers.* In other words, employers categorize paid domestic workers by type of employment.

PAID DOMESTIC WORK IN PORTUGAL

The provision of care

The family-based care provision model dictates that households purchase care services directly from the market to care for elderly members of the family and children, often employing migrant domestic workers (Bettio and Plantenga 2004; Simonazzi 2009). This typifies the Portuguese care regime and distinguishes it from the regimes prevailing in other Southern European countries.

Portugal has the highest female employment rate in Southern Europe, and the dual-earner family model is well established (Tavora and Rubery 2013). In this context, paid domestic workers facilitate the balance of family

and career (Benería 2008), help maintain the labor division within families (Crompton 2006), and do so at a low cost (Torres 2008). The provision of care by family members in Portugal is lower than elsewhere (Bettio and Plantenga 2004). It is also provided almost exclusively by women, revealing a continuing pattern of gender division within families. These factors, together with the poorly developed long-term care provision in Portugal (Scheil-Adlung 2015), have increased families' needs for paid domestic workers.

While the "care crisis" in some countries has created job opportunities for women from developing countries (Benería 2008), the demand in Portugal has been met by both native-born and migrant workers, especially those from Portuguese speaking ex-colonies and Eastern European countries (Baptista 2011; Abrantes 2012). Paid domestic work is closely linked to Portugal's long history of internal and international migration. Decades ago, it was common for children or teenagers (from ages 7 to 17) from poor families to move from the countryside to urban centers where they performed household tasks for wealthy or middle-class employers (Brasão 2012). They are generically referred to as *criadas* (maids). The pattern began to change with international migration from the former colonies, especially from Cape Verde in the early 1960s, and from other African countries – namely, Angola, Guinea-Bissau, and São Tomé and Principe – after the decolonization of those countries in 1975 (Pereira 2013). In recent decades, paid domestic work has been a port of entry for skilled workers, notably from Brazil and Eastern European countries.

When countries have immigration quotas, paid domestic work may not be sufficient to secure a work visa, as in the Portuguese case (Baptista 2011). Often, migrant women enter Portugal on tourist visas and then apply for residence permits once they have employment contracts. However, employers are often unwilling to formalize the employment relationship (Pereira and Vasconcelos 2008; de la Blétière 2015), and frequently hire unskilled, irregular, and/or undocumented immigrants with exploitative conditions (Baptista 2011).[1] Indeed, employers in Portugal perceive informality as a mechanism to reduce employees' bargaining power and ability to fight for their rights (de la Blétière 2015).

Workers sometimes see paid domestic work as a stepping stone to a job in another sector (de la Blétière 2015). They may consider informal contracts as facilitating disengagement with employers and consequently the ability to quit a job without huge problems. Employees also accept informal contracts to circumvent labor costs.

The legislation on paid domestic work

Portuguese governments have already closed some policy gaps in paid domestic work. The legislation on paid domestic work in Portugal dates

back to 1980, and significant progress has been made since the early 1990s. Decree-law 235/92 stipulates the working conditions that employers should provide, together with the list of tasks to be performed and pay components, including paid holidays and a Christmas bonus. According to this decree-law, the employment contract does not need to be written to be legally binding (Martins 2009), although formal contracts are obligatory in the case of a fixed-term contract and for the purpose of obtaining or renewing work visas. It is preferable for paid domestic workers to have a written contract as it gives them more favorable social security protection (Grupo de Apoio às Mulheres Imigrantes [GAMI] 2012). Like other employees, paid domestic workers are entitled to the national minimum wage, which, in 2017, was set at a monthly based pay of €557 (it was €475 in 2010), plus paid leave and a Christmas bonus, for live-in or full-time employees.

Paid domestic workers are legally allowed to work on a flexible basis (hourly or daily) and pay social contributions accordingly. Social security authorities impose a minimum of 30 hours per month for occasional contracts as the baseline for contributions (Instituto de Segurança Social 2013). Paid domestic workers can choose whether to pay social security contributions based on a preset wage or on the total earned wage (GAMI 2012). The social security rates levied on a preset wage are 18.9 percent for employers and 9.4 percent for employees, compared with 22.3 percent and 11 percent, respectively, when based on total earned wages. Portugal has a special contributory scheme for paid domestic workers that attempts to address the specificities of employees and employers (UGT 2006) and avoid very high contributions, which would lead to much lower wages (GAMI 2012). However, paid domestic workers are eligible for unemployment insurance schemes under the latter system but are only eligible for unemployment benefits if they have been in a full-time job with a monthly based wage.

Although the minimum wage was introduced in Portugal in 1974, the law was only extended to paid domestic workers in 1978 (Carneiro et al. 2011). However, the minimum wage defined for paid domestic work corresponded to 61.4 percent of the national minimum wage and only achieved parity in 2004.

Employers often fail to comply with regulations, notably through the nonpayment or noncompliance with the requirement to declare the employment relationship to social security authorities and hiring without a written or legally valid contract (Pereira and Vasconcelos 2008). They frequently fail to pay holiday allowances and the Christmas bonus, give maternity leave, or bear the cost of health services in the case of an accident occurring at work (Abrantes 2012).

In sum, paid domestic workers often suffer from labor abuses,[2] and employment conditions are still far from satisfactory despite regulatory

efforts (GAMI 2012). This is particularly critical in the case of migrants because an employment contract is required for legalization purposes in Portugal.

DATA AND EMPIRICAL STRATEGY

The dataset

Our empirical study draws on an original dataset from an international project and addresses a sample of Portuguese paid domestic workers (see Guibentif [2011] for details). The survey took place between 2009 and 2010 when data were collected through face-to-face interviews. Due to occupational specificity, we used a snowball sampling strategy to obtain the contacts of paid domestic workers through domestic work unions, immigration-related institutions, and personal acquaintances. The amount of data collected is limited ($N = 684$) and, as might be expected, is far from random. The results must therefore be interpreted with circumspection.

The dataset offers detailed information on sociodemographic characteristics, assigned tasks, type of payments, earnings, working hours, employment arrangements, tax and social security contributions, employers' characteristics, and paid domestic workers' family backgrounds. The variables in the analysis are split into two groups: task and non-task. Task variables involve house cleaning, washing and ironing clothes, cooking, child and adult care, and organizing activities. The nineteen task-related variables,[3] all with yes/no-type outcomes, are: (1) house cleaning, (2) room cleaning, (3) washing clothes, (4) ironing, (5) cooking, (6) deciding on meals, (7) washing the dishes, (8) taking care of a child, (9) taking a child to school, (10) cooking for a child, (11) cooking for an adult, (12) administering medication to an adult, (13) keeping an adult company, (14) caring for an animal or plant, (15) preparing a shopping list, (16) shopping, (17) welcoming guests, (18) organizing parties, and (19) answering the telephone.

The following non-task variables define the characterization of contracts, employers, and employees:

- Pay system (monthly or non-monthly wage). A non-monthly wage comprises of hourly, daily, or other (for example, weekly) wages. We assume that non-monthly pay indicates a flexible employment arrangement, whereas a stable contract is signaled by monthly pay.
- Formal labor contract (characterized by a written contract).
- Social protection (registered in a social security institution).
- Power and control (presence or absence of the employer).
- Trust issues (entrusted with the key to the house, references demanded prior to hiring, candidate recommended by network of contacts).

- Employment status (live-in or external worker).
- Employer's characteristics (workplace is an apartment or house).
- Wage level (hourly wage earned by the domestic worker).
- Number of hours per day.

The hourly wage is computed using data on total paid working days per month and week, and the total paid working hours per day, as reported by the paid domestic workers. However, this calculation is not necessary for employees who state their hourly wage in the survey. The most difficult case is that of live-in employees on call 24 hours a day, but it was decided to consider at least 7 hours of rest and 17 hours of paid work per day, and, as some live-in employees reported one day off per week, one day is excluded from the total days per week. The dataset does not include information on public holidays. Where applicable, the hourly wage includes the amount paid for Christmas and holiday bonuses. The hourly wage is weighted by 1.083 if the employee receives one bonus and 1.166 if there are two bonuses, corresponding to thirteen or fourteen monthly wages a year, respectively.

Table 1 describes the non-task variables in detail and provides some summary statistics of the paid domestic workers in the sample. We note that 99.6 percent of the sample is composed of female employees.

Multivariate statistical analysis

Our first step is to empirically define occupational categories in paid domestic work and examine how they parallel the above-mentioned dual-segment model. Then we analyze how the innate characteristics of paid domestic workers are subjacent to these labor market segments. We focus on the interaction between contractual arrangements and occupational groups and are particularly interested in whether caring tasks impose restrictions on flexible arrangements, and thus benefit or penalize any demographic group. This might help assess the labor market segmentation argument.

Paid domestic workers are involved in a variety of tasks that are often performed simultaneously. With many tasks and the possibility of multiple category combinations, it is reasonable to expect these employees to be very heterogeneous. Not surprisingly, the segments of paid domestic work tend to overlap (see, for example, Razavi and Staab [2010]), so common cluster techniques are inappropriate to describe the distribution of employees in this idiosyncratic labor market. Nevertheless, we can assume that the universe of paid domestic work is structured by a small number of clusters or typologies of tasks and that the workers do not necessarily belong to a single cluster. They may share the characteristics of two or more clusters at the same time. In other words, the employees who do not fit entirely

Table 1 Descriptive statistics of non-task variables

Non-task variable	%
Pay system (monthly)	56.8
Health insurance (yes)	20.2
Written contract (yes)	29.0
Social security (yes)	69.8
Live-in (yes)	12.5
Workplace (flat)	63.3
Employer present	
Never	13.4
Rarely	46.2
Often	25.0
Always	15.4
House key (yes)	75.3
References (yes)	27.4
Network	
Family members	5.4
Friends	21.6
Personal acquaintance	24.1
Previous employer(s)	10.9
Job agency	10.8
Others	27.3
No. of employers (only one)	43.7
Hours per day (continuous variable)	
Hourly wage (continuous variable)	
Marital status	
Single	26.4
Married	50.0
Unmarried couple	6.2
Divorced	8.2
Separated	2.5
Widow	6.7
Origin	
Portuguese	66.9
African	12.5
Brazilian	12.2
(Other, e.g., European)	8.5
Education	
Illiterate	1.6
Reading literacy	5.2
4 years of schooling	33.7

(*Continued*).

Table 1 Continued.

Non-task variable	%
6 years of schooling	16.0
9 years of schooling	19.1
11 years of schooling	6.9
12 years of schooling	11.1
Bachelor	0.8
Higher education	5.6

into any cluster of tasks may have partial membership in different clusters. The partial membership accounts for the interaction between clusters that technically translates into overlapping. The distribution of individuals in this typological structure serves to model the labor market of domestic work. This approach to data analysis is referred to in the literature as fuzzy clustering, and it strives to quantify the heterogeneity of the universe under study. A fuzzy cluster member is therefore represented by an index together with his or her GoM in that cluster. The GoM is a number between 0 and 1, where 1 represents full membership in the classical sense and 0 means no membership. The numbers between these two extremes account for the extent of partial membership – that is, the degree of belonging to each cluster. For example, an employee indexed by the number 3 and having a GoM of 0.4 in a given fuzzy cluster is represented in that fuzzy cluster by the ordered pair (3; 0.4). This employee is further away from that cluster than 5, for example, represented by (5; 0.9). The use of fuzzy sets theory in social sciences has already been reported in the literature (Smithson and Verkuilen 2006; Cooper and Glaesser 2011) and has proven a useful tool to model heterogeneous populations (Berkman, Singer, and Manton 1989; Suleman and Suleman 2012). An important concept here is that of the fuzzy K-partition where the universe is decomposed into $K \geq 2$ fuzzy sets. Each individual is then represented by the coordinate vector $g_i = (g_{i1}, g_{i2}, \ldots, g_{iK})$, where its generic element g_{ik} represents the membership degree or degree of belonging of individual i in fuzzy cluster$k$, $k = 1, 2, \ldots, K$, and obeys two conditions: $0 \leq g_{ik} \leq 1$ and $\sum_{k=1}^{K} g_{ik} = 1$.

We use the GoM model (Woodbury and Clive 1974) to estimate the fuzzy K-partition that hypothetically represents the universe of paid domestic workers; here K must be specified beforehand. This data analysis is accomplished by means of the above-mentioned nineteen task variables. The model output potentially allows the identification of K typologies and provides the estimates of membership degrees in each cluster for every paid worker in the sample. Readers interested in a more in-depth explanation of the GoM model may consult Kenneth G. Manton, Max A. Woodbury, and Dennis Tolley (1994). It is briefly described in analytical terms in the Supplemental Online Appendix 1.

The typologies and grades under the GoM model are estimated using DsiGoM software (Decision System 1999). Initially, we run this software on a trial basis, specifying a different number of typologies successively – that is, $K = 2$, 3, and 4. All resultant GoM models are a good fit to data and do not substantially differ from the statistical standpoint. We opt for the model comprising four fuzzy clusters since it provides a meaningful interpretation of the universe under study. Formally, we consider the Portuguese domestic worker labor market as represented by a fuzzy 4-partition. Full results, as well as the accessory files required to run DsiGoM software and the sample data, are available upon request and can be easily reproduced.

EMPIRICAL EVIDENCE

Task typologies and interaction

Table 2 gives an overview of task categories we can expect to find in each of the four fuzzy clusters, which we label I, II, III, and IV. These qualitative results reflect the output of the GoM model detailed in Supplemental Online Appendix 2. The fuzzy 4-partition indicates that the labor market of domestic workers is decomposed into four occupational categories according to tasks performed. Cluster I has no prevalence of any task (Table 2, column 2) and may be referred to as "null" cluster. This suggests that the paid domestic worker is available to do whatever the employer needs. It is therefore labeled *helpers*.

Cluster II gathers general household tasks like cleaning, washing, and cooking tasks. It differs from *helpers* in that there is a regular contractual agreement with the paid domestic worker to perform a range of tasks; we call it *cleaners*. The hallmark of Cluster III is elderly care, but it also includes many different general tasks, like cooking or cleaning. Cluster IV is quite similar to that of elderly care but encompasses caring tasks related to children. Essentially, we obtain this cluster from the latter by replacing elderly care tasks with the tasks associated with childcare. We label these clusters *elderly caregivers* and *child caregivers*, respectively. Figure 1 illustrates the empirical findings and shows the overlapping of tasks between occupational categories.

Fuzzy clustering provides a clearer picture of the data structure. For example, a fuzzy 4-partition can be illustrated graphically by a tetrahedron, as shown in Figure 2. Employees with full membership in fuzzy clusters lie at the vertices and those with partial membership in exactly two clusters are found on the edges. On the faces we find employees who share three clusters. All remaining employees lie in the interior of the tetrahedron. Figure 2 portrays the distribution of Portuguese paid domestic workers on a fuzzy 4-partition, as given by the GoM model application to our dataset. It is constructed by depicting the individual GoM estimates in each typology.

Table 2 Predominant task categories on fuzzy clusters

Task	*Cluster I*	*Cluster II*	*Cluster III*	*Cluster IV*
House cleaning		X	X	X
Room cleaning		X	X	X
Washing clothes		X	X	X
Ironing		X	X	X
Cooking		X	X	X
Deciding on meals			X	X
Washing dishes			X	X
Taking care of child				X
Taking child to school				X
Cooking for child				X
Cooking for adult			X	
Administrating medication to adult			X	
Keeping adult company			X	
Animal/plant care			X	X
Preparing shopping list			X	X
Shopping			X	X
Welcoming guests			X	X
Organizing parties			X	X
Answering the telephone		X	X	X

Notes: Findings based on numerical results presented in Supplemental Online Appendix 2. X means yes; blank means no.

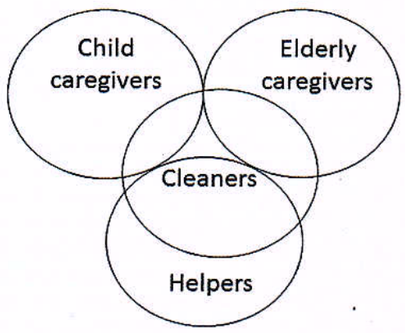

Figure 1 A segmentation model for the Portuguese domestic worker labor market

Besides this graphical analysis of the distribution of paid domestic workers, the estimates can also be used to quantify the heterogeneity in the dataset. Table 3 shows the number of domestic workers found in different

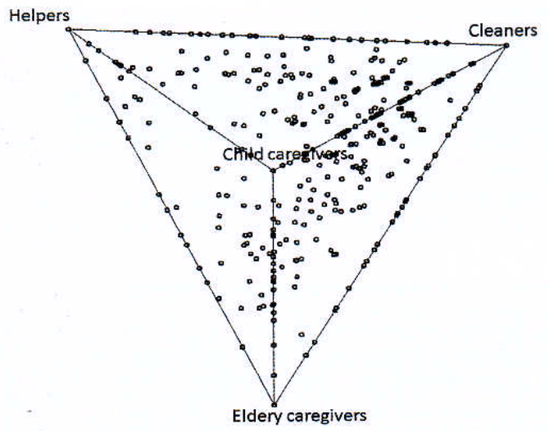

Figure 2 A fuzzy 4-partition of domestic workers in Portugal

Table 3 Distribution of domestic workers over a fuzzy 4-partition

Part of tetrahedron					*Total (N = 684)*
Vertices					67 (9.8%)
I – Helpers	II – Cleaners	III – Elderly caregivers	IV – Child caregivers		
20 (2.9%)	19 (2.8%)	9 (1.3%)	19 (2.8%)		
Edges					374 (54.7%)
I–II	I–III	I–IV	II–III	II–IV	III–IV
156 (22.8%)	15 (2.2%)	10 (1.5%)	114 (16.7%)	59 (8.6%)	20 (2.9%)
Faces					216 (31.6%)
I–II–III	I–II–IV	I–III–IV	II–III–IV		
111 (16.2%)	33 (4.8%)	14 (2.0%)	58 (8.5%)		
Interior					27 (3.9%)

parts of the tetrahedron. Only 9.8 percent of them are full members. In other words, more than 90 percent share two or more clusters at the same time. Of these, about 60 percent (54.7 percent of the sample) have membership in exactly two clusters – that is, they lie at the edges. If we focus on the figures at the edges, we see that very few helpers are found on the edges connecting Clusters I and III (2.2 percent) or Clusters I and IV (1.5 percent). This means they are unlikely to be required to perform care tasks. The most relevant overlapping occurs between *helpers*

and *cleaners* (22.8 percent). It is also curious to note the almost total absence of overlapping between caring task clusters (III–IV: 2.9 percent). These two clusters seem to be separated by a distinct boundary, conforming to the paid domestic work segmentation model presented in Figure 1. However, statistical evidence reveals a non-negligible amount of interaction between Cluster II and the clusters involving paid care work (II–III: 16.7 percent; II–IV: 8.6 percent). This means caregivers not only provide the necessary care but also perform similar housekeeping duties to those assigned to *cleaners*.

Characterization of caregivers

Let us now see how we can benefit from using a fuzzy approach to examine the characteristics inherent to different typologies. We note that every employee is represented in a fuzzy 4-partition by the coordinate vector $g_i = (g_{iI}, g_{iII}, g_{iIII}, g_{iIV})$, such that $g_{iI} + g_{iII} + g_{iIII} + g_{iIV} = 1$. For example, a high value of g_{iII} means the employee i is close to the *cleaners* typology (II) while a high value of g_{iIII} places him or her nearer to *elderly caregivers* (III). The quantity $C(i) = g_{iIII} + g_{iIV}$, which belongs to the unit interval $[0, 1]$, can therefore be used as a measure of proximity of employee i to caregiver typologies. If $C(i) \cong 1$ the employee is either an elderly or child caregiver. In contrast, values of $C(i) \cong 0$ place him or her in the opposite direction of caregiver typologies – that is, close to *cleaners* or *helpers*. The quantity $C(i)$ increases from 0 to 1 concomitantly with the caring activity of employee i – that is, the higher the value of $C(i)$ the higher the membership in one of the care typologies. Readers unfamiliar with fuzzy clustering may wish to think of it in terms of a gray scale (see Figure 3). Suppose $C(i) = 1$ means black and $C(i) = 0$ is white; this translates into care work and non-care work, respectively. In a classical cluster analysis, only the two extreme categories are possible: either black or white. Here, a continuous range of the gray scale, going from one extreme to another, is feasible. Lighter $C(i)$ stands for the employee having low membership in one care typology whereas higher membership makes $C(i)$ darker. More specifically, $C(i)$ summarizes the bundle of tasks performed by individual i: the higher the value of $C(i)$, the greater the likelihood of individual i being a caregiver.

In light of the above, we perform a regression analysis using $C(i)$ as the dependent variable and non-task variables (Table 1) as explanatory variables. This analytical approach is intended to highlight the characteristics associated with caregiver typologies and not to establish any causal link. Due to the limited range of the dependent variable, we opt for a Tobit regression model. Here, the coefficient of a numerical variable is read in a similar way as in the classical ordinary least squares (OLS) regression.[4] However, the coefficient of a categorical variable has a slightly different interpretation. If a categorical variable has $t > 1$ categories,

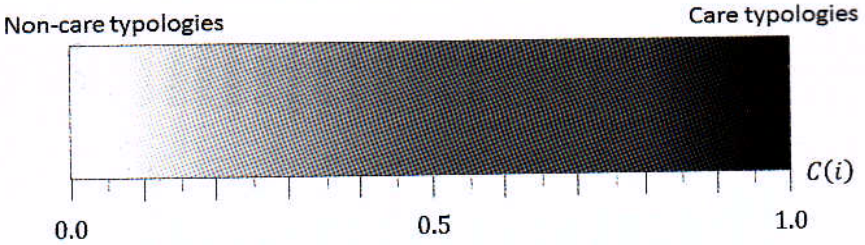

Figure 3 A gray-scale representation of the membership in care typologies

there are $(t - 1)$ subcoefficients associated, each of which indicates how the predicted value of $C(i)$ for that category differs from the predicted value calculated for the reference category. It therefore measures the relative importance of a given category. Nevertheless, higher values of the coefficients push $C(i)$ to caregiver typologies. Formally, the standard Tobit model can be written as a relationship between the observed outcome variable, $C(i)$, and the latent outcome variable of interest, $C^*(i)$, as follows (Smith and Brame 2003):

$$C(i) = \begin{cases} 1 & \text{if } C^*(i) \geq 1 \\ C^*(i) & \text{if } 0 < C^*(i) < 1 \\ 0 & \text{if } C^*(i) \leq 0 \end{cases}$$

for each value of $i = 1, 2, \ldots, 684$ observations. The relationship between non-task variables, generically x_i and $C^*(i)$ is linear, and given by:

$$C^*(i) = x_i'\beta + \varepsilon_i$$

where β is the vector of the Tobit regression coefficients, and ε_i are independent and identically distributed normal random variables with zero mean and constant variance σ^2 – that is, $\varepsilon_i \sim i.i.d.N(0, \sigma^2)$.

Table 4 displays the estimates of the Tobit regression model where the statistical significance level of $\alpha = 0.10$ is set for all tests. We can see at a glance that paid care workers are likely to be hired on the basis of a formal written contract, have monthly pay, and have social security protection. They are likely to work for a single employer, have long paid working hours, and earn lower wages, as shown by the sign of Tobit estimates. For example, an estimated mean of the hourly wage is €4.3 and €5.6, for the care and non-care segments, respectively, and the daily paid working time is 6.8 vis-à-vis 5.2 hours.

Although it is likely that the caregivers have a formal contract, higher wages and shorter paid working hours push $C(i)$ in the opposite direction of caregiver typologies – that is, these two latter predictors make $C(i)$ lighter (Figure 3). Caregivers are more likely to work under a (single) employer's

Table 4 Tobit regression model parameters and related estimates

Variable	*Category*	*Coefficient* (β)	*Standard error*	*Reference category*	*Marginal effect*	*Standard error*
Pay system	Monthly	0.1011*	0.0380	Non-monthly	0.0670*	0.0252
Health insurance	Yes	0.0325	0.0446	No	0.0215	0.0298
Written contract	Yes	0.0716*	0.0428	No	0.0480	0.0292
Social security	Yes	0.0708*	0.0398	No	0.0461*	0.0257
Live-in	Yes	0.0715	0.0564	No	0.0482	0.0389
Workplace	Detached	0.0409	0.0353	Flat	0.0270	0.0235
Employer present	Rarely	0.0775	0.0520	Never	0.0481	0.0316
	Often	0.1798*	0.0570		0.1165*	0.0358
	Always	0.1598*	0.0632		0.1028*	0.0402
House key	Yes	0.1197*	0.0407	No	0.0770*	0.0255
References	Yes	0.1785*	0.0377	No	0.1225*	0.0266
Network	Friends	0.0311	0.0471	Family members	0.0205	0.0308
	Personal acquaintance	0.0164	0.0483		0.0107	0.0316
	Previous employer(s)	0.0081	0.0620		0.0053	0.0404
	Agency	−0.179	0.1175		−0.106*	0.0641
	Other	−0.011	0.0679		−0.007	0.0438
No. of employers	More than one	−0.128*	0.0358	One	−0.086*	0.0244
Hours per day	N/A	0.0256*	0.0076		0.0169*	0.0050
Hourly wage	N/A	−0.012*	0.0069		−0.008*	0.0045

(*Continued*).

Table 4 Continued.

Variable	*Category*	*Coefficient* (β)	*Standard error*	*Reference category*	*Marginal effect*	*Standard error*
Marital status	Married	−0.033	0.0415	Single	−0.022	0.0276
	Unmarried couple	−0.117	0.0750		−0.075	0.0464
	Divorced	−0.023	0.0667		−0.016	0.0442
	Separated	0.0385	0.1107		0.0262	0.0760
	Widow	−0.037	0.0709		−0.025	0.0466
Origin	African	−0.095*	0.0541	Portuguese	−0.059*	0.0328
	Brazilian	0.0368	0.0536		0.0244	0.0359
	Other (e.g., European)	0.0850	0.0691		0.0572	0.0473
Education	Reading literacy	−0.058	0.1528	Illiterate	−0.038	0.1011
	4 years of schooling	−0.025	0.1373		−0.016	0.0917
	6 years of schooling	−0.011	0.1415		−0.007	0.0945
	9 years of schooling	0.0381	0.1410		0.0258	0.0944
	11 years of schooling	0.0230	0.1507		0.0155	0.1010
	12 years of schooling	−0.109	0.1465		−0.070	0.0967
	Bachelor	0.0496	0.2351		0.0337	0.1604
	Higher education	−0.119	0.1594		−0.076	0.1037

(*Continued*).

Table 4 Continued.

Variable	*Category*	*Coefficient* (β)	*Standard error*	*Reference category*	*Marginal effect*	*Standard error*
Constant term		−0.106	0.1448			
Sigma (σ)		0.03942	0.0145			
Dependent variable:	Prevalence in care, $C(i)$					
Statistics:	$N = 684$; LR Chi^2 (35) = 200.91; p-value = 0.0000; Pseudo $R^2 = 0.19$					
Observations summary:	195 left-censored observations at $C^*(i) \leq 0$					
	441 uncensored observations					
	48 right-censored observations at $C^*(i) \geq 1$					
N/A means:	Not applicable; the variable is continuous					

Notes: The Tobit model estimates are in column 3 and the respective standard error in column 4. The fifth column indicates the reference category for the categorical variables. The last two columns display the mean of the marginal effect on the expected value of $C(i)$, i.e., $E(C|0 < C^* < 1)$, and the respective standard error. * denotes statistical significance at the 10 percent level.

control and be entrusted with the house key, when compared to *helpers* or *cleaners*. The findings reported in Table 4 show that African women are less likely to be hired for care work than Portuguese women; however, no statistically significant difference is found for women coming from Brazil or other countries – that is, from Eastern Europe.

Generally, the marginal effects (Table 4, column 6) follow the same patterns as the Tobit estimates. However, there is some dissimilarity between coefficients and marginal effects. For example, the written contract becomes nonsignificant, while the use of job agencies to hire domestic workers becomes statistically significant but negative. Finally, a slight change was observed for some estimates. We see that the mean of the marginal effects of a change in nationality on $C(i)$ is about 0.06 (significant at the 10 percent level) for an African woman and is not significant for women coming from the other above-mentioned regions.

Discussion

Our study strived to illustrate how families in Portugal, a Southern European country, purchase care services directly from the market. It showed that families employ both migrant and native-born domestic workers to care for the house, elderly members, and children. Paid domestic work in Portugal therefore represents a job opportunity for migrants from different origins, notably Africa, Brazil, and Europe, but also continues to be a job option for Portuguese women. This makes the Portuguese labor market a good context to examine job quality in relation to categories of employee.

We explored job quality by examining the relationship between the tasks performed by paid domestic workers and the contractual arrangements offered by the families. We also analyzed the employees and job characteristics associated with segments of jobs, and we tested segmentation arguments within paid domestic work.

Fuzzy clustering offered four specific categories labeled *helpers*, *cleaners*, *elderly caregivers*, and *child caregivers*, but showed that non-caring tasks are also necessary to perform care services, namely tasks related to preparing meals, cleaning, and taking care of the house. Thus, the bundle of caring services covers relational and nonrelational tasks that are crucial to increasing the well-being of care receivers (Razavi and Staab 2010). Some interesting facts also became evident from the analysis of other job characteristics associated with those clusters.

The first involves trust issues. Caregivers are more likely to be entrusted with the key to the house. Childcare may involve taking children to and from school and other outdoor places, hence the need to entrust the paid domestic worker with the key. On the other hand, when the elderly are disabled and lack autonomy, the paid domestic worker may require

free access to the home. Moreover, the elderly care receiver is often the employer, and this makes it difficult to draw the line between trust and need.

Second, the tasks to be performed also provide visible empirical evidence. It seems that the domestic chores matter to the decisions made regarding the employment relationship model. Caregivers are hired on a formal contract – that is, households register the employee for social security, and employees are paid on a monthly basis. In other words, employers adopt a standard approach to deal with the specificities of care work.

Like de Ruijter and van der Lippe (2007), we believe that tasks carried out by caregivers are inflexible and must be performed at specific times; they often include making food and administering medicine. This is not compatible with staff turnover and, therefore, calls for a sustainable labor relationship. A formal contract potentially discourages paid domestic workers from leaving or changing employers and, at the same time, protects the employer's investment in the search for a reliable employee. Ultimately, the nature of care tasks requires customized and timely responses, which implies permanent rather than occasional assistance. This is in line with Hypothesis 1 – that is, employers are more likely to arrange contracts with paid care workers than with other paid domestic workers.[5] The empirical results suggest that households are aware of the importance of establishing and sustaining regulated and stable relationships when entrusting care services to non-family members. On the other hand, they also show that formality and stability correlate with low wages and longer paid working hours. Caregivers are more likely to earn lower wages than *helpers* and *cleaners*. The wage penalty in caring jobs has already been reported in international studies (Budig and Misra 2010; Razavi and Staab 2010), but further insights are required regarding paid domestic workers not in caring activities.

Non-care workers are expected to have multiple employers and thus work fewer hours for each one. They are often hired on a regular basis, with fixed or flexible working hours; in some cases they can be hired for specific work. Some multiple-employer workers are therefore expected to have an unstable income.

The higher wages of domestic workers paid on an hourly basis may be explained in many ways. It may be compensation for the above-mentioned instability, labor intensity, time spent commuting from one household to another (transportation), compensation for not complying with the law, or possibly national origin. In sum, flexible employees earn a risk premium, but it is still not known whether this benefit outweighs the uncertainty in employment.

Caregivers seem to be a "protected" segment with stable and formal contracts, despite their lower wages. However, residential care is extremely demanding, and these paid domestic workers may be expected to be

available day and night to assist the elderly. Indeed, some live-in employees in the sample reported being on call 24 hours a day. It is thus hard to say which employment relationship in paid domestic work is more favorable.

Finally, our empirical analysis corroborates the interconnectedness of nationality and migration and allows us to deepen the understanding of segmentation within paid domestic work. Paid domestic workers are predominantly women, and foreign women are frequently employed as caregivers in Portugal, but it is interesting to note the differences in the tasks assigned to paid domestic workers in this country. For example, African workers are likely to be assigned to menial tasks, whereas other migrant and Portuguese domestic workers are given caring tasks more frequently. Wall and Nunes (2010) suggest that cultural and language commonality may explain the preference for Brazilian workers, but Sónia Pereira (2013) indicates that families prefer European migrants due to assumptions about their education, learning ability, and work discipline.

These findings should, however, be interpreted with caution. Indeed, Brazilians may also be of African descent, and we are unable to observe the interconnectedness with race. We know from our day-to-day experience that employers do differentiate Brazilian from African domestic workers, and the former are easily recognized by their accent. Nevertheless, Hypothesis 2 is supported by this data analysis – that is, the nationality of workers is subjacent to the segmentation of the labor market of domestic workers in Portugal. We can infer that African migrants are less likely to have formal and stable jobs, but more likely to have higher wages; their work is occasional, with no guarantee of a stable income. We therefore suggest that African migrants may be indirectly and partially discriminated against in the Portuguese labor market because they are more likely to be hired for more precarious jobs. This may explain why African migrants prefer to work for cleaning service firms rather than in private houses, as reported by Pereira (2013), even at the expense of lower wages.

CONCLUDING REMARKS

Our study offers a picture of how households in a family-based welfare regime – namely, in Portugal – purchase care services directly from the labor market. The empirical evidence shows that private households manage the employment relationship like any other employer or firm, although they are often unable or unwilling to offer all of the desirable employment conditions. This raises the question at the core of the decent work agenda: why is compliance and a standard employment relationship difficult in paid domestic work? The findings show that some jobs inside domestic work operate under similar rules to those of other jobs, notably the jobs assigned to *elderly* and *child* caregivers, but that the wages of caregivers appear to be lower than those of *cleaners* and *helpers*.

Although this evidence is in line with the literature, it is unclear as to whether a higher wage per se benefits non-care workers. Not only does it force women to work for different employers without the full guarantee of a regular income, but, more importantly, it may affect formality. In fact, the social security system in Portugal imposes a minimum of 30 hours per month as a baseline for contributions in the case of hourly-based contracts. As flexible employees often do not reach that threshold, this probably reduces the employer's willingness to formalize the relationship. A specific regulation is thus needed to protect employees in this type of arrangement.

Our research seeks to raise the awareness of policymakers about the role families play in fostering employment conditions and job quality in the labor market of domestic workers, especially in Southern European countries. Nevertheless, this is not simply an economic issue. We stress that situations such as wage arrears and nonpayment of social security contributions are the most frequent abuses in Portugal (Pereira and Vasconcelos 2008). In other words, enforcement is still a problem despite regulations meant to protect paid domestic workers (GAMI 2012).

Social and institutional factors also help explain our above-mentioned final question. The employment relationship is frequently based on trust (de la Blétière 2008), and the law supports this private regulation of the arrangement by recognizing the validity of verbal contracts (Martins 2009). However, a declaration to social security is compulsory, and there is a special scheme for paid domestic workers (UGT 2006).

Some employers as well as employees prefer to establish an informal relationship (de la Blétière 2015). Informality gives employees freedom to change employers and allows employers to decrease labor costs. Vanessa R. de la Blétière (2015) also reports cases of employers who are unwilling to formalize the relationship because this would increase their labor costs and employees' bargaining power and place employees in a favorable position to fight for their rights. Some employers are also ill informed about legislation and rights.

The problem of different motivations behind informality needs to be accurately addressed by policymakers. Reyneri (2003) argues that there is a widespread perception, especially among immigrants, that the Portuguese labor market is lenient toward irregular employees. Both employers and employees should be informed about the benefits of formalization, and measures should be taken to force them to comply. However, enforcement is complicated by the fact that paid domestic work is performed in private houses, making access difficult for labor inspectorates (ILO 2010). Mechanisms that encourage voluntary compliance, notably by the employee, therefore seem to be the best solution. It would be interesting to examine how the Portuguese government is implementing the ILO Convention 189 recommendations and how employees and employers

behave within a new regulatory framework. Future research should explore this by exploiting samples that span the implementation period.

Although the literature highlights the importance of migrants as care providers in Southern European countries (Bettio and Plantenga 2004; Simonazzi 2009), our evidence shows that both native-born and migrant women do paid care work in Portugal and see it as a job opportunity. However, our findings also show that African domestic workers are less likely than other migrants to perform care tasks and benefit from job stability. We note that there is no conclusive evidence of discrimination against Africans in either our dataset or empirical findings.

Despite the interest of the empirical evidence, the findings must be analyzed with caution. In fact, the sample is far from random and gives a picture only of the Portuguese labor market. It is indeed difficult to build up a random sample from such a *hidden* population that involves so many employers and employees. The dataset also lacks some relevant information on paid domestic workers, notably about ethnic origin and race, which limits our contribution to the intersectional approach. Nonetheless, we believe that our results provide useful support for an international discussion on the role of private employers and on the limitations of flexible arrangements in paid domestic work.

Fátima Suleman
Instituto Universitário de Lisboa (ISCTE-IUL), DINAMIA'CET, Lisbon, Portugal
Avenida Forças Armadas, Lisbon 1649-026, Portugal
email: fatima.suleman@iscte-iul.pt

Abdul Suleman
Instituto Universitário de Lisboa (ISCTE-IUL), BRU, Lisbon, Portugal
Av. Forças Armadas, Lisbon 1649-026 Portugal
email: abdul.suleman@iscte-iul.pt

NOTES ON CONTRIBUTORS

Fátima Suleman is Professor at Instituto Universitário de Lisboa (ISCTE-IUL) and Senior Researcher at Centre for Socioeconomic and Territorial Studies (DINAMIA'CET), Lisbon, Portugal. She received her PhD in economics from ISCTE-IUL, Portugal and University of Bourgogne, France. Her research interests are related to wage and employment flexibility in the labor market. She has recently published in *Cambridge Journal of Economics*, *Scottish Journal of Political Economy*, and *The Manchester School*.

Abdul Suleman is Professor at Instituto Universitário de Lisboa (ISCTE-IUL) and Senior Researcher at Business Research Unit (BRU), Lisbon, Portugal. He received his PhD in quantitative methods from ISCTE-IUL,

Portugal. His research interests focus on multivariate analysis statistical tools, especially fuzzy clustering. He has recently published in *Fuzzy Sets and Systems, Pattern Recognition Letters,* and *Journal of Applied Statistics.*

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NOTES

[1] Portuguese governments have enacted programs since the early 1990s to regularize undocumented migrants, and, in 2007, a national migration policy was defined to regulate fluxes, promote legal migration and the integration of immigrants, and fight against irregular entries (Oliveira 2013).

[2] Labor abuses include, notably, the nonpayment of wages, wages in arrears, underpayment of wages, excessive working hours, nonpayment of overtime, and breach of contractual agreements (Bakan and Stasiulis 1997).

[3] It should be noted that these are quite general tasks involved in care work. We are aware that some more complex ones, which would help differentiate domestic workers and their working conditions, are missing and therefore limit the dataset.

[4] We note that the linear effect is on the uncensored latent variable, not the observed outcome. Below, it is denoted $C^*(i)$.

[5] However, our dataset is unable to discriminate active and passive care.

SUPPLEMENTAL DATA

Supplemental data for this article can be accessed at http://dx.doi.org/10.1080/13545701.2018.1532594.

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