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A DURATION ANALYSIS OF THE MATCHING PROCESS IN SPANISH PUBLIC EMPLOYMENT AGENCIES

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Abstract:

This work boasts a double objective: not only does it attempt to offer a complete panorama of the matching process in Andalusian public employment agencies (Servicio Andaluz de Empleo, SAE) for both sides of the job market, based on duration analysis, but also to assess the degree to which the matching process of the job vacancies managed by the SAE approaches a stock-flow theoretical model. In this study, two samples are taken, one for job demands and another for vacancies, both registered in the SAE between January 2007 and March 2009. The proposed test for the vacancies requires the estimation of a competing risks duration model. An innovation of our test is that it consists of a ratio of hazard rates. The main result obtained is the existence of evidence in favour of the stock-flow friction. Our economic policy recommendation principally points to active labour market policies.

JEL codes: J63, J64.

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1. Introduction.

According to the Spanish Labour Force Survey (*Encuesta de Población Activa,* EPA), at the beginning of the year 2007 the Andalusian and Spanish unemployment rates were 12.5% and 8.5%, with a mere 4 percentage points between them. In the second quarter of 2011, these rates rose to 29.7% and 20.8% respectively, displaying a differential of 8 points. The Andalusian workforce has historically suffered from the effects of recession to a greater degree than the rest of Spain; and the current economic crisis is no exception. In general, the relative weight of this Community among the Spanish regions, its high unemployment rate, and the peculiarities of its economy (Usabiaga, 2004) are without doubt compelling reasons for a search for a better understanding of how its labour market functions. One way of approaching this objective is to analyse the functioning of one of the most important labour institutions in Andalusia: the Andalusian Public Employment Agency (Servicio Andaluz de Empleo*,* SAE), which, in June 2011, as an indication of its importance, had 1,420,999 registered applicants of various services, principally in job search and intermediation.

In this work, an exhaustive analysis is presented of the durations observed of the vacancies and of the job demands that were registered in the SAE between 1st January 2007 and 31st March 2009; durations which run from the moment of registration by seekers until either a post is found or the job search is withdrawn for other reasons.

The objectives of this work are three-fold. Our samples contain valuable information about the characteristics of the units, which enables us to determine the structure in the SAE of the job offers and that of the demand for work, and to discover to what degree their durations depend on these characteristics. In the second part of this work, an analysis is carried out on the hazard rates of the job vacancies and demands dealt with by the SAE, whereby the microeconometric techniques of competing risks duration models[1] are applied. The matching of vacancies and workers of the SAE can be directed towards participants who are also registered in the SAE or towards others who are not. The final part of our research focuses on the empirical testing of a type of labour market friction that has been studied in recent decades within the literature of search and matching models, and that arises when information on employment is centralised in one marketplace, as in the SAE. What happens, for example, if the new job seekers have sufficient information on the other part of the market and end up discovering that no suitable matching exists for them in their labour segment?

[1] A wide range of literature exists on duration models applied to the Spanish labour market. These studies include Bover *et al*. (2002), Jenkins and García-Serrano (2004), Arranz *et al.* (2010), and García-Pérez and Muñoz-Bullón (2011). For the Andalusian case, see Congregado and García-Pérez (2002), and Gámez and García-Pérez (2004).

In the evolution of the literature on search and matching models, at least three stages can be distinguished over the last few decades. In the first stage, the matching of the labour market is understood to be a random process which can be modelled by means of a function which enables the impact of frictions in the labour market to be determined; frictions due to incomplete information on potential partners, heterogeneities and mismatches, the absence of perfect insurance markets, slow mobility, and congestion, among other factors. Instead of representing each friction more specifically according to its origin and type, they are all put jointly into an aggregate "black box" called the matching function, which gives the rate at which jobs form over time as a function of the search effort by workers and firms, which in the simplest and most common form are represented by unemployment and vacancies. From this perspective, in a market with frictions, every firm with a vacancy has to select job seekers randomly until a suitable candidate is found (and vice versa). Work related to this focus on the labour market includes Pissarides (1979, 1984, 2000), Mortensen and Pissarides (1994, 1999), and Petrongolo and Pissarides (2001).

In a second stage, certain authors attempt to achieve a more structural matching function by representing the frictions in specific forms. For example, the urn-ball game assumes that the frictions are due to conflict when two workers apply for the same job and only one candidate is successful -Hall (1979) and Pissarides (1979)-. More recently, the stock-flow model, originally due to Coles (1994), and Coles and Smith (1998), considers the following friction: the labour market is divided into different segments (or "islands") that are unconnected, and are differentiated by the characteristics required from workers and vacancies to be able to form a suitable job placement. In this model, the matching occurs in a marketplace with complete information, in which firms and job seekers can search the other side of the market in a short period of time. If, for instance, a newly unemployed worker searches the market in the appropriate segment and fails to find a match, then this worker enters the pool of job seekers who can only match the flow of new vacancies entering the marketplace in their segment.

In recent years, a third generation of models has been under development which, rather than initiating the analysis from the existence of a stable matching function, focuses attention upon the assumptions of how the labour contacts take place. The existence of segmentation with scarce mobility, together with the fact that only certain workers are suitable for a specified vacancy, and the existence of search costs for the companies, constitute some of the sources of friction contemplated by these models; along these lines see studies by Shimer (2007), Mortensen (2009), and Ebrahimi and Shimer (2010).

In this work, built on that of Álvarez de Toledo *et al.* (2008) but from a microeconomic perspective[2], a competing risks duration model is estimated in order to generate a new test for the stock-flow model, and a sample of the vacancies managed by the SAE is used. By representing a ratio of vacancy hazard rates, towards "old" job seekers and "new" job seekers, it can be determined whether the vacancy matching process shows, among others, the class of friction that is controlled for the theoretical stock-flow model *à la* Coles. The main focus is on firms (worker seekers) due to the imperceptibility of mobility when dealing with vacancies as required by the stock-flow model. In this regard, our work is related to Andrews *et al.* (2009)[3], although, as shown below, there are significant differences between the two approaches.

The rest of the work is structured as follows: In Section 2, the theoretical framework is presented. Reference is made to a version of the stock-flow matching model that departs slightly from the original (which is expressed in infinitesimal terms). In Section 3, the main characteristics of the vacancies and those of the job demands in the SAE and their observed durations are analysed. Section 4 contains two subsections. In the first, the empirical Kaplan-Meier hazard rates are analysed for both sides of the market and a method which deals with some of those hazards is proposed in order to determine the standard duration that a "good" vacancy or a "good" job demand remains "at risk" of matching before becoming "old" or "bad". The second subsection is divided into three parts. Firstly, an explanation is given of the econometric model, the competing risks hazard model that is subsequently applied in the following two parts. In the second part, the hazard rates of the vacancies and the job demands in the SAE are estimated parametrically whilst heterogeneity is controlled and the possibility of two transitions and of right censoring is taken into account. It is found that heterogeneity of data is a significant factor. In the third part, the existence of a certain stock-flow structure is explored in our data on vacancies by means of the estimation of a continuous competing risks duration model with heterogeneity, multiple exits and right censoring. The ratio of the hazard rates is the key to our test, which cannot be applied when the other side of the market is analysed due to the labour mobility of SAE workers. Finally, in Section 5, the main conclusions of our work are presented.

[2] In Álvarez de Toledo *et al.* (2008), stock-flow matching is tested in comparison with random matching for the case of Spain, Andalusia and Madrid in the period 1978-2005, but using aggregate data instead of individual data.

[3] These authors use individual data (weekly aggregated) on the vacancies and the job demands registered at an employment agency for very young persons in Lancashire (England).

2. Theoretical framework.

The fundamental equation of the search and matching model is denoted as the aggregate labour matching function, which provides, in its reduced form, the flow of job placements (*M*) in each period based on the initial stocks of job seekers (*U*), the majority of whom are unemployed workers, and of job vacancies (*V*):

$$M = M(U, V) \tag{1}$$

It is normally assumed in the theoretical literature that this function is increasing in *U* and *V*, is concave towards the origin, and has constant returns to scale; the Cobb-Douglas specification is commonly used to describe this function. Furthermore, a problem of temporal aggregation arises in the matching function when it is estimated in discrete time, since the job placements provided in each period correspond not only to the vacancies and to the job seekers at the start of each period, but also to the flow of new vacancies and new job seekers during that period. Therefore, the flows of new vacancies and new job seekers can be incorporated into the conventional matching function:

$$M = M(U, u, V, v) \tag{2}$$

In the model of random matching, the firms with vacancies are unaware of the characteristics of the job seekers (and vice versa) and must therefore be subjected to the long and costly process of random selection of candidates until one is found whose characteristics match those required for the job; the job market is considered without any segmentation. On the other hand, in the stock-flow model, the job market is divided into unrelated segments, where the participants have full information on the possibilities of completing a job placement due to the availability of a marketplace where information is centralised. In this approach, firms with job vacancies select those workers available in their segment (and vice versa), and those firms that fail to fill their vacancies since no available workers are left in the segment have to wait for new workers to enter that segment.

The literature in this field is essentially centred on testing both models empirically. Coles and Smith (1998) and Coles and Petrongolo (2008) for the United Kingdom, Gregg and Petrongolo (2005) for Great Britain, and Álvarez de Toledo *et al.* (2008) for Spain, all find evidence in favour of a stock-flow framework. Andrews *et al.* (2009) analyse individual data from a job placement office in England and also report evidence supporting that framework. From our perspective, in real matching in the labour markets, frictions are observed due to random matching, combined with those frictions peculiar to the stock-flow approach.

In our work, the stock-flow model is taken as reference, although some assumptions are relaxed in order to render it empirically more plausible. As in the stock-flow model, we analyse the implications of the job search process when the job market is segmented and the participants within this process make contact through a marketplace, such as a public employment agency. However, following the model of random matching, we also assume that, within each segment, perfect information does not exist and that mismatching of preferences may be present; assumptions which mean that, at the end of every round of matching, some firms with vacancies and some job seekers can coexist in their segment.

Once temporal aggregation in a discrete time matching function is considered, the stock-flow model assumes the existence of heterogeneity in the flow of workers and of vacancies in the sense that they can both include "good" and "bad" individuals[4]. The "good" individuals belong to a segment of the market where they are relatively scarce: they are on the "short side" of the market. The "bad" individuals present the characteristic of being relatively abundant in their segment: they are on the "long side" of the market. An important implication of the model is that a "good" individual rarely becomes part of the stock in its segment because a match can be found quickly in the first round of searching. Our "relaxed" stock-flow model offers a more realistic view of the matching process: for instance, taking the case of the vacancies, we consider that even a "good" vacancy may need a certain period of search (some rounds of searching) for a job placement to be completed since the available information about suitable job seekers is not perfect. Consequently, it can be stated that most of the "good" vacancies should achieve a match before some moment T_V rather than in the first round, where T_V represents the period over which the current stock of potential job seekers can be searched. Following this line of reasoning, it is possible for a "good" vacancy to be part of the stock for several periods, although logically most of the stock should be composed of "bad" vacancies, since these generally remain unfilled for a longer period.

Evidently, the matching process is different for the case of a "good" individual in comparison with that of a "bad" individual. Continuing on in terms of vacancies, we denote the stock and flow of "good" vacancies in each period as V^g and v^g respectively, while V^b and v^b represent the stock and flow of "bad" vacancies in each period. In the same way, in the case of job seekers, the values U^g and u^g denote the stock and flow of "good" individuals, with the values U^b and u^b for the "bad" individuals. The sum of the "good" and "bad" stocks and of the "good" and "bad" flows on each side of the market yields the stock and flow totals. The job

[4] For a more detailed explanation of the stock-flow matching function in discrete time, see Núñez and Usabiaga (2007).

placements in each period or round associated to the "good" vacancies (otherwise known as those on the "short side" of the market) and those associated to the "bad" vacancies (those on the "long side") are given by $M^g(V^g, v^g, U^b, u^b)$ and $M^b(V^b, v^b, U^g, u^g)$ respectively, where it can also be assumed that $U^b > U^g$ and $V^b > V^g$; that is to say, the stocks are principally composed of "bad" participants, and hence "good" vacancies, that have to be matched with "bad" workers, mostly exit towards the stock of job seekers, and the "bad" vacancies towards the flow. The sum of all these placements yields the following aggregate matching function:

$$M(U, u, V, v) = M^g(V^g, v^g, U^b, u^b) + M^b(V^b, v^b, U^g, u^g) \quad (3)$$

The rate of matching for the "good" vacancies is given by $\frac{M^g}{V^g + v^g}$, whilst that of the "bad" vacancies takes the value $\frac{M^b}{V^b + v^b}$.

This work is focused on the analysis of the behaviour of the hazards based on the duration of the search; as can be seen, the distribution that is assumed for the random variable of search duration determines its functional form. On the other hand, our stock-flow model presents at least three significant implications to be taken into account in the empirical analysis:

1. The possibility that the vacancy (or the worker) displays mobility between segments during its search episode is not considered. Therefore, a "bad" vacancy cannot become "good" at any time of its search, nor vice versa. Evidently, this assumption of no mobility is more plausible in the case of vacancies than for the workers; an aspect that is clarified in the empirical part of this work.

2. In the same way as for the random search model, our model admits the existence of heterogeneity and of imperfect information, although unlike that model these frictions are placed inside each segment. According to our model, a certain period of time, normally no more than a determined threshold $T_{V,}$ is needed for a suitable matching to be encountered for a "good" vacancy. As regards the "bad" vacancies, their durations fall within a wide range depending on their segment; implicitly, different levels of difficulty in finding placements are admitted for the "bad" vacancies.

3. When vacancies mature, they are less frequently covered with "old" or "bad" job demands, since a long duration is a sign that the vacancy is also "bad" (on the "long side" of the market).

3. Description of the data.

In order to enable an analysis of the two sides of the market, a sample of vacancies and another of job demands are obtained from the SAE. The first is a random sample of the job vacancies registered between 1st January 2007 and 31st March 2009; this sample contains a total of 84,540 observations, thereby representing 20% of all the job vacancies registered in the SAE in this period. The second sample consists of a random selection of the job demands registered in the same period, which corresponds to the first experience of the worker as a job seeker within the period; this sample consists of 219,542 observations (5% of the total). The most interesting feature of our data is the possibility of determining the spell or duration of each observation "at risk" of matching, as well as a wide range of individual characteristics. The percentage assumed by the sample of job seekers is lower than that applied in the case of vacancies, due to the high volume of the population of job seekers registered within the period analysed. Nonetheless, the representativeness of the two samples has been verified with their respective populations. Two aspects were compared: the principal descriptive statistics of the duration variables (mean, median, and mode), and the structure of the data according to the observable characteristics employed in our study.

3.1. The sample of vacancies.

The duration of the period in which the vacancies remain "at risk" of matching is now analysed. As Table 1 shows, once the vacancy is registered in the SAE, the survival time of the vacancy can end due to any one of the following four circumstances: the vacancy is covered by a SAE job seeker; the vacancy is covered by a non-SAE job seeker; the offer to which it belongs is closed[5]; or the period of observation ends (on 31st March, 2009) before any of the three circumstances above can arise.

[Table 1]

It should be pointed out that, in this table, 62% of the vacancies are covered within the period of observation, whether it be with job seekers registered with the SAE, which is the common occurrence (at 56.7%), or with non-SAE job seekers (at 5.3%). From among all these "successful" vacancies, those which the SAE manages to cover with registered workers present a mean and median duration of 45 and 22 days respectively; slightly less than for those vacancies covered with non-SAE job seekers at 49 and 28 days. This seems to indicate that these latter vacancies require a worker profile that the SAE finds more difficult to

[5] It is necessary to distinguish between a job offer and a vacancy in the SAE. A job offer can contain one or more vacancies, all of which must have the same profile in terms of group of occupation, sector of activity, type of contract, etc.

arrange. Most of the vacancies that are covered do so during the first month, and more specifically within the course of the second week of duration, with the most frequent duration of 14 days.

Those vacancies with no matching experience longer durations, especially those that remain uncovered when the period of observation is concluded. We suggest that the relatively high mean durations in these two groups, vacancies closed without coverage and vacancies remaining open, can be due, to a certain extent, to the existence of "false" vacancies that appear owing to an administrative mismatch at the moment of crossing a job offer with a job demand when a job placement occurs.

Our econometric analysis employs up to six characteristics that are observed at the moment of registration of a job vacancy: its public or private character, the type of contract, the sector of activity, the group of occupation, the province of the workplace, and the size of the firm. Table 2 presents the results of the analysis of these covariates together with the durations.

[Table 2]

By means of considering the total sample, and taking into account that each characteristic or covariate is analysed individually, that is, without being crossed with other covariates, it can be observed that the most common vacancy in the SAE is of a public character, is temporal, belongs to the public services sector or to that of construction, is aimed at manual workers (above all, those qualified), is registered in Seville, Granada or Jaen, and belongs to a micro or small enterprise. This structure is similar when the vacancies that are covered by SAE job seekers are analysed; the main difference lies in the loss of weight carried by Granada in favour of provinces such as Cordoba and Malaga. As regards the vacancies covered with non-SAE job seekers, certain interesting differences exist with respect to the structure shown by the total sample: the majority are private vacancies (52.7%); the group of occupation of the non-qualified non-manual workers carries more weight and surpasses that of non-qualified manual workers; and Seville gains relative importance.

From the point of view of the durations, it can be observed, in the same way as in the above table, that the vacancies that are covered show shorter mean and median durations than the rest, and within these "successful" vacancies those that are covered with SAE job seekers are those that survive a shorter time. However, this cannot be said for the group of occupation of the non-qualified manual workers, where hardly any difference can be observed, and another exception can be found in the vacancies offered in the province of Seville, where the vacancies covered with non-SAE job seekers show a shorter relative duration.

The "successful" vacancy that presents the longest mean duration would have the following profile: it is covered with a non-SAE job seeker, is of public character, is temporal, belongs to the construction or agriculture sector, is destined for non-qualified manual workers, is offered in Granada, and is registered by a micro-firm. The case of Granada stands out since it is the second province in the registration of vacancies and takes the longest time to cover them.

To conclude this subsection, Figure 1 illustrates the crossing of the durations corresponding to every vacancy and every worker that have formed a job placement; evidently both durations can only be determined when the SAE vacancy is covered by a SAE job seeker[6]. In this figure, a certain predominance of the vacancies that show a relatively short duration (for example, lower than 28 days) is noted, whereas the durations of the job demands present a wider time range; this fact might constitute an indication of some degree of stock-flow matching in our data. This idea is explored in greater detail below.

[Figure 1]

3.2. The sample of job demands.

The durations of the job demands are now analysed. As Table 3 shows, four types of demand episodes are considered: those which terminate in the placement of a SAE vacancy; those which terminate in the placement of a non-SAE vacancy, which constitute the majority; those which conclude due to causes different to that of placement, principally by the non-renovation of the demand on the part of the job seeker[7]; and those which remain without coverage on 31st March, 2009.

[Table 3]

As can be observed in the table, the demands that result in a placement (57.2% of the total) show shorter relative durations than those of the remaining demands, and within these, those that are matched with non-SAE vacancies (52.7% of the total) last the shortest time, and are mainly concentrated around a duration of two weeks. The demands that are matched with SAE vacancies represent only 5% of the total and their durations are slightly longer than in the case above; these demands are mostly concentrated within the first 5 weeks of duration.

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[6] It should be observed that the sample under analysis is of job vacancies with a registration date after 1st January, 2007, although this is not necessarily true for the demands with which they are matched. These demands may have been registered before the said date. We omit extreme durations, which are scarce, to present a clearer figure.

[7] We have carried out a correction of the data so that those registrations that have not been renewed within 15 days do not interrupt the duration of the episode of demand. In other words, when a job seeker is taken off the register of the SAE since the demand is not renewed, but then registers again within two weeks, we consider that this job seeker has not actually stopped looking for work.

The episodes which remain unfulfilled on 31st March, 2009, show a greater mean and median duration, although their mode (28 days) is not the highest; the highest mode corresponds to the episodes that conclude due to causes different to that of placement (96 days). This last value may be explained by the high concentration of job seekers being taken off the register after approximately three months, which appears to indicate that the SAE carries out some type of administrative adjustment.

Table 4 enables an analysis of the characteristics of the job demands that are used in our study.

[Table 4]

The profile of the most frequent job demand in the SAE corresponds to a female worker under 44 years old with a secondary education, who belongs to the sector of agriculture or that of trade, catering, transport and communications, and who also belongs to the manual group of occupation, and is registered in Seville, Cadiz or Malaga. It can be observed, however, that a certain mismatch exists, at the level of sector of activity and that of province, between the job demands and the vacancies that are registered in the SAE, inasmuch as the latter are essentially registered in the sectors of public services or construction in the provinces of Seville, Granada and Jaen.

As for the durations, the demands that are matched with non-SAE vacancies are those that show shorter relative durations. Within this collective, a better relative situation is shown by the young men with secondary or postsecondary education, whose previous sector of activity was that of construction or services in the private sector, and who belonged to the non-manual group of occupation, registered in Huelva or Seville.

In the econometric analysis in the following section, special attention is paid to those workers who are matched with SAE vacancies, since in these cases it is possible to determine the "at risk" duration both of the job seeker and of the vacancy[8]. In this group, those that stand out due to their short duration are the young men with secondary education based on vocational training, whose previous sector of activity was trade, catering, transport and communications, of a non-qualified group of occupation (either manual or non-manual), and registered in Cordoba or Seville. Similarly to that of the analysis of the sample of vacancies, a clear predominance of those vacancies of a relatively short duration is noted, whereas the

[8] In the sample of job demands, all have a registration date after 1st January, 2007, but this does not necessarily mean that the same is true for the registration date of the vacancies with which they are matched; they could have been registered before the said date. Given the similarity to the representation obtained from the sample of vacancies in Figure 1, we have opted not to represent the diagram with the cross of the two durations.

durations of the job demands present a wider time range; again, this fact might constitute an indication of some degree of stock-flow matching.

Finally, in order to control for the macroeconomic environment in which the SAE carries out its intermediation for the period under study, three indicators of the monthly aggregate unemployment in the Andalusian labour market are obtained. The *administrative unemployment rate* is achieved each month by means of the ratio of the number of claimants who form part of the registered unemployment divided by the total number of claimants registered in the SAE. This indicator shows a slight growth rate throughout the period analysed. The *EPA unemployment rate* is obtained by taking the quarterly unemployment rate on a monthly basis; to this end, the quarterly value is assigned to each month of a quarter. *The registered unemployment rate* is calculated by means of the ratio of the number of registered unemployed provided by the SAE each month divided by the number of the labour force (EPA) corresponding to the quarter which contains the month in question. These last two rates show a more pronounced growth than the first, especially in the case of the EPA unemployment rate, and above all from the beginning of the year 2008, when the economic crisis started to become more evident in Andalusia.

4. Microeconometric duration analysis of the matching process within the SAE.

4.1. Standard durations of good vacancies and good job demands.

In this section, it is supposed that both a job demand and a job vacancy become old when their hazard rates (which depend on the duration) experience some change of regime that could make sense from the perspective of the stock-flow model.

The time period that a new vacancy or a new job demand must survive in order for it to be considered old is denoted here as T_V and T_U, respectively; in these periods, sufficient time is given to check their respective stock for possible partners. Andrews *et al.* (2009) adopt similar duration thresholds. Their initial values of T_V and T_U are taken as those that allow the maximisation of the matching between new and old individuals subject to $T_V = T_U$, and then values that are allowed to differ[9] are fitted by means of the estimation of a duration model. In contrast to these authors, we propose the following method to determine the values of T_V and T_U: first, the Kaplan-Meier hazard rates of both the vacancies and the job demands are calculated; and second, on the condition that the hazard rates are functions of the duration, an attempt is made to identify, by means of a Chow test, some change of regime coherent with the prediction of the stock-flow model: when a worker (firm) checks all of the current

[9] As these authors point out, T_V and T_U do not have to coincide; for instance, it is plausible that $T_V < T_U$.

possibilities of employment and no match is found, then the hazard rate of that worker (firm) diminishes due to the wait incurred in the stock for the arrival of new vacancies (workers) in order to achieve a job placement.

Our sample of job vacancies is composed of 84,540 vacancies registered in the SAE, of which 62% (52,414 vacancies) form a job placement; this implies a daily hazard rate for the vacancies of 0.8%[10]. Of all these vacancies that are covered, the majority, 91.4%, are covered with workers registered in the SAE. Figure 2 represents two non-parametric hazard rates for the vacancies; one hazard rate for those that achieve a match with a SAE job seeker and another for those that match with a non-SAE job seeker.

[Figure 2]

In both cases, increasing trends of the hazard rates are observed during the first weeks of duration of the vacancies, followed by a drop in the hazards tending towards zero. In other words, when a vacancy survives without coverage for more than two or three weeks, its probability of matching begins to decrease. However, certain differences are also observed between these two hazards: when the exit is towards the SAE job demands then the hazard is greater, and starts to drop earlier and in a more drastic way.

Of the two hazard rates, that linked to the SAE job seekers is of special interest since our stock-flow test requires information on both the duration of the job vacancy and that of the matching demand. The Chow test gives a stock-flow break point in this hazard rate at the duration of 4 weeks (28 days), and therefore, although a vacancy that is placed on the short side of the market[11] (a good vacancy) reaches its maximum probability of a transition to a SAE job demand at a duration of two weeks, it could perfectly be covered during the first 4 weeks; that is to say, the whole process experienced by a good job vacancy from its registration in a SAE office until it is covered (initialisation of the process, search for and selection of candidates, dispatch of candidates to the firm, trial period and registration of the contract), can take nearly a month or even longer, to be covered[12].

On the other hand, if the vacancy remains without coverage for 29 days or more, then it belongs to the long side in its segment of the labour market (a bad vacancy). In this case, the

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[10] To obtain this rate we have divided all of the matches that have taken place in the sample period (52,414) by the total number of days "at risk" of matching that have accumulated all the episodes of the vacancies in the sample (independently of whether they have been covered): 6,574,814 days; consequently, 6,574,814 days (not overlapped) were needed to fill 52,414 of a total of 84,540 registered vacancies.

[11] The vacancy is on the short side of its segment in the labour market. That segment is defined by the characteristics of the vacancy, in terms of the sector of activity, the group of occupation, etc.

[12] This data and that corresponding to the job demands have been corroborated by the SAE administration, with whom we have interacted in our research.

vacancy would not be covered from the stock of available workers but from the new entrants, since most of the stock corresponds to bad job seekers, and bad-bad pairs are not possible.

The sample of job demands is composed of 219,542 workers registered in the SAE, of which 56.8% (124,772 job demands) eventually form a job placement. From among those SAE job demands that are matched with job vacancies managed by the SAE, the durations of both the demands and of the vacancies can be determined. These job demands (9,706 workers) represent 7.8% of those who achieve a job placement and show a daily hazard rate of 0.25%.

Figure 3 represents the non-parametric hazard rates for workers, both for those who achieve a match with non-SAE vacancies and for those who achieve a match with SAE vacancies.

[Figure 3]

Both hazard rates increase during the first weeks and from that point they experience a drop, and increase again from approximately halfway through the first year of the duration of the demand until slightly later than at 10 months (week 44), when they fall again. The rise of both hazards after a few months may be related to the existence of mobility by job seekers, in order to increase their employment opportunities. Mobility includes circumstances such as when job seekers exhaust their benefits, complete a training course or any other type of activity of insertion, and decide to change careers or borough. Furthermore, it can be observed that this rise especially affects job demands that are matched with SAE vacancies, an indication that the SAE may grant a preference in the selection of candidates to those workers who demonstrate some type of mobility; for example, those claimants who participate in programmes of insertion into employment within the SAE have preference over the other candidates sent to firms.

Given the form of the hazard described for the job seekers that are matched with the SAE vacancies, it is difficult to identify a stock-flow breakpoint, since the stock-flow model does not contemplate any mobility or changes in the worker's profile, and hence, neither does it consider the effects on the hazard of the individual. Nonetheless, the F-statistic of the Chow test reaches a local maximum value for a duration of 56 days (8 weeks), and, similarly in the reasoning for the case of the vacancies, it is supposed that a job demand with a duration of 57 days or more can be considered an old job demand; in this respect, it is also assumed that this demand belongs to the long side of the market, and try to match with the new vacancies that are arriving. As in the case of the vacancies, the breakpoint between new and old units does not have to coincide exactly with the maximum value of the hazard rate.

4.2. Competing risks hazard models applied to the entrants into the SAE.

4.2.1. Econometric Model.

The econometric model that we have selected to analyse the transitions towards the employment of workers and vacancies is that of the competing risks hazard model[13]. This type of model considers the possibility of transition to one of several possible states, in such a way that as many hazards can be derived as can possible destinations. Two simplifying assumptions adopted in our study come in the form of the continuous-time character of the durations of the individuals, for vacancies and workers, given that these are expressed in terms of days; and the independence between the various risks or hazards, in the respect that the probability of transition towards a possible destination is not constrained by the options of moving to other destinations. Thus, the probabilities that a vacancy registered in the SAE is covered with a SAE or non-SAE worker, or with a new or old job demand, should carry little bearing since the SAE does not take this into consideration in its computer search process. The job demands dealt with in the SAE are under a similar situation.

In order to develop the econometric model, the existence of two types of transitions for the vacancies is considered: towards SAE job seekers and towards non-SAE job seekers; the case of the exits towards new or old job demands, or the cases in which the individual who moves is the worker, would be similar. The following hazards are defined:

$\mu_{SAE}(t)$: the latent hazard rate of exit towards SAE job seekers, with survival times characterised by the density function $f_{SAE}(t)$, and latent failure time T_{SAE}.

$\mu_{non\text{-}SAE}(t)$: the latent hazard rate of exit towards non-SAE job seekers, with survival times characterised by the density function $f_{non\text{-}SAE}(t)$, and latent failure time $T_{non\text{-}SAE}$.

$\mu(t)$: the hazard rate of exit towards any destination.

Since competing risks exist (the vacancy could exit towards more than one possible destination state), the hazard rates are latent rather than observed. Furthermore, if risks are assumed to be independent, standard duration analysis can be employed for each of the hazards separately: each destination-specific hazard rate can be thought of as the hazard rate that would apply if transitions to all the other destinations were impossible. The destination-specific hazard rates can then be estimated with our vacancy database if, for each vacancy, the duration until the first of the following causes can be observed: the occurrence of an exit, which can be towards a SAE or a non-SAE job seeker; or no event at all (a censored case,

[13] For further information on this type of model, see Lancaster (1990), Jenkins (2005), and Cameron and Trivedi (2009).

with a spell length T_C). Therefore, the observed failure time for every vacancy is $T = min \{T_{SAE}; T_{non\text{-}SAE}; T_C\}$.

The assumption that μ_{SAE} and $\mu_{non\text{-}SAE}$ are independent implies that:

$$\mu(t) = \mu_{SAE}(t) + \mu_{non\text{-}SAE}(t) \quad (4)$$

That is to say, the hazard rate for the exit towards any destination is the sum of the destination-specific hazard rates. Independence also means that the survival function for the exit towards any destination can be separated into a product of destination-specific survival functions:

$$\begin{aligned} S(t) &= \exp\left[-\int_0^t \mu(u)du\right] = \exp\left[-\int_0^t \left[\mu_{SAE}(u) + \mu_{non-SAE}(u)\right]du\right] = \\ &= \exp\left[-\int_0^t \mu_{SAE}(u)du\right]\exp\left[-\int_0^t \mu_{non-SAE}(u)du\right] = S_{SAE}(t)S_{non-SAE}(t) \end{aligned} \quad (5)$$

The likelihood contribution in the independent competing risks model with our two destinations is of three types: exit towards a SAE job seeker (L^{SAE}), exit towards a non-SAE job seeker ($L^{non\text{-}SAE}$), and a censored spell (L^C). The following expressions can be given:

$$\begin{aligned} L^{SAE} &= f_{SAE}(T)\, S_{non\text{-}SAE}(T) \\ L^{non\text{-}SAE} &= f_{non\text{-}SAE}(T)\, S_{SAE}(T) \\ L^C &= S(T) = S_{SAE}(T)\, S_{non\text{-}SAE}(T) \end{aligned} \quad (6)$$

In the L^{SAE} case, the likelihood contribution summarises the chances of a transition to a SAE job seeker combined with the no transition to a non-SAE one, and vice versa in the $L^{non\text{-}SAE}$ case.

The destination-specific censoring indicators can now be defined:

d^{SAE}: "1" if the vacancy exits towards a SAE worker; "0" otherwise (exit towards a non-SAE worker or censored case).

$d^{non\text{-}SAE}$: "1" if the vacancy exits towards a non-SAE worker; "0" otherwise.

The overall contribution of the individual to the likelihood, L, is:

$$\begin{aligned} L &= (L^{SAE})^{d^{SAE}}(L^{non-SAE})^{d^{non-SAE}}(L^C)^{1-d^{SAE}-d^{non-SAE}} = \\ &= (f_{SAE}(T)S_{non-SAE}(T))^{d^{SAE}}(f_{non-SAE}(T)S_{SAE}(T))^{d^{non-SAE}}(S_{SAE}(T)S_{non-SAE}(T))^{1-d^{SAE}-d^{non-SAE}} = \\ &= \left[\frac{f_{SAE}(T)}{S_{SAE}(T)}\right]^{d^{SAE}} S_{SAE}(T)\left[\frac{f_{non-SAE}(T)}{S_{non-SAE}(T)}\right]^{d^{non-SAE}} S_{non-SAE}(T) = \\ &= \left[(\mu_{SAE}(T))^{d^{SAE}} S_{SAE}(T)\right]\left[(\mu_{non-SAE}(T))^{d^{non-SAE}} S_{non-SAE}(T)\right] \end{aligned} \quad (7)$$

or:

$$\ln L = \left[d^{SAE}\ln\mu_{SAE}(T) + \ln S_{SAE}(T)\right] + \left[d^{non-SAE}\ln\mu_{non-SAE}(T) + \ln S_{non-SAE}(T)\right] \quad (8)$$

The log-likelihood for the sample as a whole is the sum of this expression over all the individuals in the sample. The log-likelihood for the continuous-time competing risks model with two destination states is divided into two parts, each of which depends only on parameters specific to that destination. Hence the overall log-likelihood can be maximised by maximising the two parts separately. This means that the model can be estimated simply by defining the destination-specific censoring variables and then estimating separated models for each destination state. The overall likelihood value is the sum of the likelihood values for each of the destinations.

The log-likelihood function (8) can be written explicitly if all the relevant functional forms involved are specified. The log-normal distribution for the durations has been chosen here since it captures the shape of our empirical hazard rates better than do other distributions, such as the Weibull and the Gompertz distributions. Other flexible specifications, such as the log-logistic and the Cox semi-parametric, have also been employed, whereby similar results were obtained in general.

The log-normal model belongs to the accelerated failure-time type of models. The exponential of the estimated coefficients corresponds to the ratio of the resultant time periods of survival in response to a unitary change in the value of a certain characteristic of the unit (vacancy or job seeker), while all other factors are maintained constant; this means, when dummy variables exist, that every variable is compared with the reference variable (the variable that has not been included in the estimation).

Finally, the model allows the existence of unobservable heterogeneity in the data, which has been introduced in the hazard function and in the function of survival through the parameters that define its supposed distribution of probability, which, in our case, is the "gamma" distribution with mean 1 and unknown variance σ^2 (Jenkins, 2005).

4.2.2. Multiple exits for the vacancies and the job demands: Matching with SAE and non-SAE partners.

Two competing risks models are now estimated, one for the vacancies and the other for the job demands, with the durations following a continuous log-normal distribution. Both estimates allow two types of exit, towards non-SAE partners and towards SAE partners. The explanatory variables that are introduced into the estimations are the following:

- Descriptive variables of the vacancy: group of occupation, sector of activity, whether the vacancy is public, province of the vacancy, type of contract, and size of the firm. These variables remain unchanged throughout the duration of the vacancy.

- Descriptive variables of the job demand: gender, age group, group of occupation, sector of activity, education level, and province of the worker. It is also supposed that these variables remain unchanged throughout the duration of the demand.
- Macroeconomic variables (used in both estimations): the unemployment rates that we described in Subsection 3.2. These rates, which change with the duration of the individual (vacancy or job demand), capture the effect of the arrival of the economic crisis to the Andalusian labour market over the time period of survival.

Table 5 presents the results of the estimation of the model for the vacancies managed by the SAE. Two types of exits or transitions are considered: towards SAE job seekers and towards non-SAE job seekers[14]. In each estimation, three types of vacancies are censored to the right: exits towards the other destination, those vacancies that remain open on the date of sample extraction, and those that have been closed due to causes other than coverage. The model allows the existence of unobservable heterogeneity in the data, which is significant, even though the estimation involves several observable characteristics of the vacancies. The table presents the exponential of the estimated coefficients.

[Table 5]

Among the vacancies covered with SAE job demands, those that show a shorter survival time are of a public character and of a permanent character; in both cases the estimated duration of the vacancy is shorter than half of that necessary to cover a private vacancy or a temporal vacancy respectively. Interestingly, these results are not maintained in the analysis of the vacancies that are covered with non-SAE job seekers.

If the sector of activity is analysed, with the construction taken as the reference, it can be observed that in agriculture and in financial and business services the estimated duration of a vacancy is significantly higher, whereas other services[15] and trade, catering, transport and communications show better rates of coverage; these differences are more acute in the case of the transitions towards non-SAE job seekers. The vacancies offered in industry appear to be more suitable for the non-SAE job seekers, since they are covered in a relatively shorter time.

Grouped by occupation, in general, the vacancies for qualified manual workers (the reference group) are those with a lower duration, whereas from among the vacancies that are

[14] The model has also been estimated by means of considering both exits together (without competition), but it remains omitted since the estimations are very similar to those obtained when only the exits towards SAE job seekers were considered, given that these transitions are in the majority.
[15] This sector includes estate agencies, recreational, cultural and sports activities, personal and home services, etc.

covered with non-SAE job seekers, the group of non-qualified non-manual workers shows a survival rate similar to that of the above group.

With regard to the provinces, Almeria, Malaga, Jaen, Cordoba and Cadiz present either similar or lower rates of survival than Seville. The case of Granada is interesting, since it shows the highest rate of survival, especially for the vacancies that are covered with SAE job seekers.

If the size of the firm is examined, it can be observed that there are no significant differences between the small, medium-sized and large companies when the vacancies are covered with SAE job seekers, whereas the micro-firms need longer to fill a vacancy. However, when the vacancy is covered with a non-SAE worker, the medium-sized and large companies clearly spend less time filling the vacancy.

Finally, it is observed that, solely in the case of the vacancies that are filled with SAE job seekers, the EPA unemployment rate shows a negative effect on the rate of survival of the vacancies[16], as would be expected in terms of the Beveridge curve.

Figure 4 shows the estimated hazard rates for the vacancies managed by the SAE according to the type of exit. As with the non-parametric hazard rates, both estimated hazard rates increase during the first weeks of duration and then follow a downward trend as the good vacancies become less abundant within the stock of vacancies. It can be observed that the hazard of the vacancies covered with SAE job demands is significantly higher and shows a more acute initial drop in terms of percentages; a fact that could be even better appreciated in the Kaplan-Meier representation.

[Figure 4]

Table 6 presents the results of the estimation of a competing risks model with respect to the workers. Two types of exit are considered: those towards SAE vacancies and towards non-SAE vacancies. The latter estimation yields results very close to those obtained with the model that considers both causes of exit together, and hence the estimation corresponding to this last model is not presented here. In both estimations, the unobserved aspects of the individuals carry no significant bearing on the hazard rates.

[Table 6]

In the same way as for the vacancies, certain differences are also observed in the demands which depend on the type of transition considered. It is observed that women are dealt with more quickly than men when the exits are towards the SAE vacancies, whereas the

[16] Estimations have also been implemented where this variable is replaced with the alternative rates obtained in Subsection 3.2, and similar results are achieved.

opposite occurs when the transition is towards non-SAE vacancies. Differences are also observed according to the age groups: in the exits towards SAE vacancies, the workers aged between 30 and 54 years old present the lowest survival rates, while in the case of the exits towards non-SAE vacancies, the workers with the lowest survival rates are the youngest candidates; from 16 to 29 years old. These results could indicate that the SAE favours certain groups, such as women, and the unemployed middle-aged.

According to the education levels, in both types of transition the hazard rates are greater when the workers have a secondary education or above; interestingly, in the case of the transitions towards SAE vacancies, university graduates present the highest hazard rate despite their apparent lack of priority within the SAE. In the case of the transitions towards non-SAE vacancies, it is the group with professional training which presents the greatest hazard rate.

Agriculture, public services, and construction are the three sectors of activity where the Andalusian job seekers show shorter search times, independent of the type of transition, although the differences between sectors are more extreme in the case of the exits towards the SAE vacancies. The sample would have to be temporally extended in order to capture how these sectors behave when the Andalusian economic situation worsens in recent years.

Among the groups of occupation considered, it is the reference group (qualified manual worker), which is dealt with the fastest in both types of exit, while the group of qualified non-manual workers (otherwise known as "white-collar" workers) presents the relatively worst hazard rate, possibly since these workers can be more selective in their matching.

According to provinces, significant differences are observed. Workers who exit towards the SAE vacancies pass through the system relatively faster in Jaen, Cordoba, Granada and Almeria. With respect to the non-SAE vacancies, only workers from Huelva present better hazard rates than the job seekers registered in Seville.

The rate of unemployment positively affects the survival time of both types of job seeker, with the strongest effect in the case of the workers matched with non-SAE vacancies.

Figure 5 shows the estimated hazard rates for the managed job demands according to the type of exit.

[Figure 5]

Contrary to what occurs with the job demands whose transition is towards non-SAE vacancies, the demands that fulfil SAE vacancies show a significantly lower hazard rate, which begins to decline relatively late and does so in a milder way. As discussed in Section

4.1, the mobility of the job seekers, understood in its broader sense, could explain this differential evolution.

4.2.3. Multiple exits for the SAE vacancies: Testing the stock-flow model.

In this section, more attention is paid to the matching process of the vacancies than to that of the job demands, for various reasons: in the first place, vacancies tend to be far less studied than job demands; in second place, the way in which the vacancies are processed by the SAE corresponds more closely to the search system implied by our model, since a complete revision of the stock of possible candidates can be performed in a short period of time. This kind of revision is not possible for the job seekers, who, rather than check the stock of vacancies, are limited to remaining available until the computer system of the SAE proposes them for a determined vacancy[17]; and, finally, the job demands present a series of peculiarities which hinder the proposed test, such as the possibility that the job seekers update their demands, the existence of congestion, the existence of multiple episodes or of recalls, and the role played by passive and active employment policies.

The fundamental hypothesis tested here is that if any stock-flow friction is observed in the matching process of the vacancies that takes place in the SAE, then the vacancies must be covered, less and less in relative terms, with old or bad job demands when the vacancy matures. In order to test this hypothesis, the previously calculated duration threshold for the job seekers is needed; therefore a demand is considered old if it lasts more than 56 days. Our study uses a concept of duration threshold similar to that proposed by Andrews *et al*. (2009), although the way in which it is determined and the stock-flow test itself differ from that proposed by these authors. They estimate a reduced-form mixed proportional hazards model which enables measurement of the effect that the stocks and the flows of all the job seekers who participate in the matching process have upon the hazard of the vacancies when these become old (they belong to the stock). They also study the case of the job demands similarly. In the case of the vacancies for example, these authors add a variable to control for the new job seekers (flow) in the estimation of the old vacancy hazard, and then study whether it has any impact on the hazard of obtaining a partner over and above the effect of the stock of all the job seekers. In sum, Andrews *et al*. (2009) try to determine whether employers find it harder to match their vacancies to old job demands once their vacancies become old, as is predicted by the stock-flow approach. Unlike these authors, we have designed an empirical test that does not need information about all the potential partners (stocks and flows) of the

[17] This is not necessarily true for those job seekers who access the virtual office of the SAE, since they can review the jobs registered online; however, this case still represents a small percentage of the total.

other side of the market which attempt to match with our seekers (firms or workers) in every period. This constitutes a methodological advantage; furthermore, we analyse a ratio of hazards rather than the elasticity of one particular hazard to a particular stock or flow covariate.

Once the threshold of duration is known, the empirical hazard rates can be calculated for the vacancies when they are exiting towards either new or old job demands.

[Figure 6]

The fact that both hazard rates decrease in Figure 6 with the duration of the vacancy could be unexpected from the point of view of the stock-flow model, which only predicts a decreasing hazard rate when the transitions are towards old job demands. However, other factors, apart from the stock-flow framework, could explain the decrease of both rates, such as the permanence in the stock of managed vacancies, period after period, of fictitious vacancies[18]. Therefore, we suggest that the evidence in favour of the stock-flow model in our data cannot rest totally on the fall in the hazard towards old job demands. Furthermore, the fact that, when the vacancies are recent, the hazard rate towards old job demands is higher than the hazard rate towards new job demands does not suppose a clear indication of stock-flow hypothesis, even if it could appear so, since for any duration of the vacancy, the volume of old job demands "at risk" of matching is considerably higher than the volume of new job demands.

In an effort to address all these methodological questions, the formulation of the hypothesis under testing is as follows: if a certain degree of stock-flow matching in our data exists, then the ratio "hazard rate of the vacancies towards old job demands / hazard rate of the vacancies towards new job demands" should decrease with the duration of the vacancy. Clearly the reasoning is symmetrical in the case of the job demands. In contrast, under a random matching scheme, where the lack of information, among other frictions, forces all the firms and all the workers to search randomly in every period, the maturing of a vacancy does not determine its exit towards an old or a new job demand.

Figure 6 shows certain evidence of stock-flow matching with respect to the vacancies, since the fall in the ratio indicates that the exits towards old job demands become relatively less important when the vacancies become old. In a complementary way, and as an approximation to the behaviour of the workers, in Figure 6 the ratio of the hazards for the demands is also represented. It can be observed that the ratio also tends to drop with the

[18] If the stock of vacancies is running out of those with real matching options, and hence only the problematic vacancies remain, the hazard rate of the vacancies must decrease with duration.

duration of the demand, although slightly less than in the case of the vacancies, which indicates that the exits towards new vacancies (of 28 days of existence or less) increase in relative terms with the duration in comparison with those towards old vacancies; an aspect which again points towards the existence of a certain stock-flow structure, this time on the side of the demands. Nonetheless, these conclusions should be considered cautiously, since other characteristics or heterogeneities contributing towards those results might exist in the labour market, apart from the stock-flow scheme.

In order to control for the possible existence of heterogeneity, both observable and unobservable, in the vacancies, a competing risks duration model is estimated, which again considers two types of successful exits: towards new job demands and towards old job demands. If the estimation shows that, after controlling for heterogeneity, the ratio of the hazard rates decreases with the duration of the vacancy, then it can be consistently affirmed that evidence in favour of the stock-flow matching has been found.

The results are presented in Table 7. No major differences are observed between the two types of transitions: public vacancies are covered before private vacancies, in the same way as the permanent vacancies are taken before temporal vacancies; the permanent vacancies show a time ratio significantly lower in the exits towards recent demands, which presumably correspond to workers with high relative employability. The sector of trade, catering, transport and communications and that of other services cover their vacancies faster with both types of workers, and the same occurs with the reference group (qualified manual workers) for the groups of occupation; indeed, the two groups of manual workers present the shortest relative durations in the transitions towards recent demands. As for the provinces, the vacancies registered in Granada and Huelva show the longest durations; while the medium-sized and large companies present a shorter relative time of coverage when their vacancies are covered with old job demands. It can be observed in both types of transitions that greater aggregate unemployment reduces the duration of the vacancy.

[Table 7]

The estimates of the hazard rate of the vacancies according to the type of exit, and the ratio of the two rates, appear in Figure 7:

[Figure 7]

Both rates show a negative dependence of the duration after the first days, with the hazard rate towards old job demands being consistently higher, especially when the vacancies are recent. The ratio between the two rates decreases when the vacancy increases its duration, which from our point of view indicates the existence of evidence in favour of the stock-flow friction. This result is coherent with the findings, based on the use of a different methodology, of Andrews *et al.* (2009).

One last deliberation on our methodology: The duration threshold employed here to separate new from old job demands is 56 days, although it was found that if any similar duration threshold is selected, then the results remain robust. However, if this threshold is set at beyond 6 months, the results of the test become more difficult to interpret. This is due to entering a period where a significant percentage of job seekers experience some modification in the profile of their demand, and this "transformed" job seeker could be considered as a new job seeker from the perspective of the stock-flow model. It should be borne in mind that the concept of mobility must be taken in the broader sense: exhaustion of benefits, changes in training, career or borough of residency, transition towards a group of preference on the part of the SAE, etc. This problem becomes more patent when the matching of the job seekers is analysed, and hence this perspective is not investigated further. However, it must be remembered that the ratio of the empirical hazards of the job demands represented in Figure 6 shows a certain decreasing tendency, and therefore points towards the stock-flow scheme. Andrews *et al.* (2009) also find evidence favourable to the stock-flow model on the part of the workers. Undoubtedly, our future research will move into this territory, in an effort to tackle these complexities.

5. Conclusions.

Our analysis of the individual databases of vacancies and job seekers registered in the SAE has enabled us to make at least two worthy contributions to the study of the Andalusian labour market. In first place, a relatively complete descriptive and econometric analysis is performed of the principal characteristics of the SAE vacancies and job seekers, while also relating them to their observed durations. It is observed, for example, that the vacancies and job demands that end up being covered show shorter durations than those remaining uncovered. The majority of the vacancies are covered with job seekers registered with the SAE, while most job demands are matched with non-SAE vacancies. Furthermore, both in the vacancies and job demands, differences are observed in the survival time in terms of their individual characteristics.

The hazard rates of the vacancies and of the job demands registered at the SAE are analysed, by taking into account whether the transition of each item is towards partners that are also registered in the SAE. To this end, empirical hazards are obtained and two separate competing risks models are estimated which control for heterogeneity. Both the vacancies and the job demands show hazards that initially increase but then decrease with the duration;

although certain interesting differences can be appreciated in the hazards depending on the type of exit and on the individual characteristics.

The second part of our work proposes a new method to test whether the matching process of the SAE vacancies that are covered with SAE job seekers follows a stock-flow pattern. Our test is innovative in this field, since it focuses on the ratio of hazards. Our analysis indicates that the matching of the vacancies follows the stock-flow model, as does the matching of the workers, although this perspective is not investigated further in the latter case due to the reasons described earlier.

In our opinion, active labour market policies constitute a necessary tool for the improvement of labour matching -see Usabiaga (2007) and Gómez *et al.* (2009)-, and we would like to propose a series of recommendations for their design, which could serve the employment services in Andalusia and other zones. The design of any active employment policy should rest upon at least three pillars: willingness, information, and mobility of the workers. "Willingness" is cited here in the sense that, in order to find a job, the most important factor is that of being willing to work. The administrators of the SAE can play an important role in making individuals focus on obtaining a job instead of on the subsidy or service they may be receiving. Our analysis of the matching on the side of the workers suggests that, with the ending of subsidies, the hazard rate of the worker experiences an increase. Faced with these circumstances, mechanisms are required so that the worker searches with an optimum intensity and approaches the SAE willing to work. In this respect, one useful tool could be the mechanism which ensures that the worker must be engaged in a personalised itinerary of insertion into employment in order to receive subsidies. There is also the possibility, recently introduced in Spain, of transforming unemployment subsidies into subsidies for permanent contract hiring; on employment vouchers, see for instance Orszag and Snower (2000).

With respect to information, this is the key to any search process. The SAE should seek mechanisms so that more Andalusian companies, or even those of other regions or countries, register their vacancies in the SAE, given that this organism contains an extensive database of workers with profiles that, on average, are more than adequate for the necessities of the production system. The Andalusian government could, for example, concede benefits to those companies that register their vacancies in the SAE, especially to companies in the industrial sector. To a lesser extent, the SAE could incorporate workers who could fill those vacancies which are on the long side of the market through such actions as promoting the registration of immigrant workers. For instance, Bentolila *et al.* (2008) conclude that the high labour flexibility of immigrants is the key factor in explaining the best behaviour observed in the Spanish Phillips curve during the period 1995-2006 (which consisted of unemployment reduction without inflation pressure).

The necessity of labour mobility is becoming increasingly important in the Andalusian economy, mainly due to the change in the production model related to globalisation, understood in its broader sense, and the persistent crisis in recent years. The SAE places great emphasis on the need for old job demands to change their profile, in terms of occupation, training, borough of residency, etc., in order to increase their chances of employment. To this end, a guidance network has been created in the SAE which seeks to promote mobility of the workforce; a course of action that needs to be extended.

The stock-flow model implies segmentation of the labour market. In this work, evidence has been found that fits this model. Álvarez de Toledo *et al.* (2008) also found such evidence, and suggested a scenario of workers in a queue. In this respect, the analysis of duration by labour segments points towards significant differences from this perspective (Álvarez de Toledo *et al.*, 2011), and hence mobility, understood in its broader sense, can be a key factor. As a clear extension of this work, the duration analysis of the matching process for the labour market as a whole, and not only for the public employment offices, could be undertaken; for example, by means of further research along the lines of Núñez *et al.* (2011).

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TABLES AND FIGURES

Table 1. Description of the durations of the vacancies depending on the cause of closure.

	Total	Closure due to coverage with a SAE job seeker	Closure due to coverage with a non-SAE job seeker	Closure due to causes different from the coverage	Episode open on 31st March, 2009
Percentage	100%	56.7%	5.3%	33.7%	4.3%
Duration. Mean *(standard deviation)*	78 *(92.5)*	45 *(56.9)*	49 *(55.8)*	126 *(99.2)*	170 *(183.8)*
Duration. Median	40	22	28	111	110
Duration. Mode	14	14	14	112	559
Minimum Duration	0	0	0	0	0
Maximum Duration	803	662	359	705	803

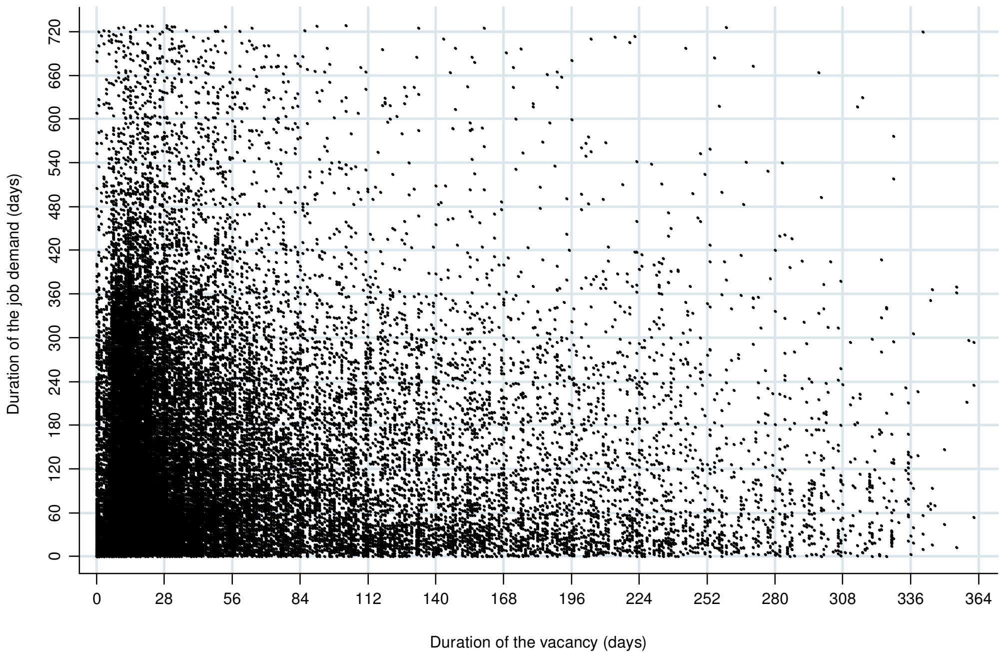
Source: Authors' own, based on the sample.

Table 2. Description of the sample of vacancies. Durations.

Characteristics of the vacancy when it is registered		Total of vacancies			Vacancies covered with SAE job seekers			Vacancies covered with non-SAE job seekers		
		Percentage	Mean duration	Median duration	Percentage	Mean duration	Median duration	Percentage	Mean duration	Median Duration
Public or private type	Private vacancy	28.8%	74.4 *(73.1)*	50	14.6%	31.9 *(30.2)*	23	52.7%	39.7 *(44.2)*	26
	Public vacancy	71.2%	79.1 *(99.3)*	34	85.4%	47.1 *(60)*	21	47.3%	59.6 *(64.9)*	34
Contract type	Fixed contract	96.9%	78.4 *(93.2)*	40	97.5%	45.4 *(57.4)*	22	95.9%	49.7 *(56.4)*	28
	Permanent contract	3.1%	57.6 *(64.4)*	34	2.5%	25.9 *(24.5)*	18	4.1%	35 *(35.7)*	22.5
Sector of activity	Agriculture	4.9%	99.5 *(82.1)*	99	2.5%	33.3 *(41.3)*	20	3.5%	52.9 *(52.5)*	35.5
	Industry	2.5%	75.9 *(74.7)*	54	1.4%	33.2 *(37)*	20	4.4%	44.1 *(49.8)*	27
	Construction	25.4%	79.4 *(90.3)*	39	29.1%	58 *(71.1)*	22	21.2%	62.1 *(67.1)*	33
	Trade, catering, transport, communications	6.9%	63.1 *(62.2)*	42	3.6%	30 *(29.4)*	21	18.8%	44.6 *(51.9)*	27
	Financial services, business services	0.7%	77.5 *(79.4)*	59	0.3%	31.2 *(23.4)*	25	0.7%	49.6 *(51.5)*	32
	Public services	51.3%	76.7 *(97.1)*	34	57.8%	40.9 *(51.2)*	22	38.1%	49.8 *(56.1)*	28
	Other services	7.9%	78.6 *(97.7)*	47	5.2%	36.3 *(40.4)*	23	13.3%	33.2 *(35.1)*	22
	Without information	0.4%	81.5 *(141.1)*	32	0.1%	17.4 *(11.8)*	12.5	0%	-	-
Group of occupation	Qualified non-manual worker	4.8%	65 *(66.3)*	45	3.8%	34 *(24.7)*	29	6.3%	40.6 *(33.1)*	32
	Non-qualified non-manual worker	14.9%	67.3 *(68.9)*	46	10.2%	35.3 *(29.5)*	28	26.8%	40 *(40.7)*	28
	Qualified manual worker	48.6%	78.1 *(99.1)*	35	50.6%	38.9 *(54)*	18	41.1%	52 *(58.8)*	28
	Non-qualified manual worker	31.7%	84 *(94.5)*	40	35.4%	57.4 *(66.5)*	27	25.8%	56.1 *(66.6)*	28
Province	Almeria	5.5%	37.1 *(47.2)*	21	6.7%	21.7 *(15.6)*	19	6.9%	26.4 *(27.2)*	20
	Cadiz	10.8%	54.8 *(58.9)*	31	11.8%	31.8 *(28.3)*	24	11.8%	41.5 *(41.4)*	30
	Cordoba	11.6%	53.8 *(61.6)*	28	15.7%	44.5 *(53.8)*	21	8.9%	49.3 *(53.3)*	30.5
	Granada	17.2%	135.3 *(103.1)*	112	12.1%	91.8 *(79.7)*	67	13.5%	84.9 *(72)*	65
	Huelva	7.4%	96.9 *(95.5)*	64	5.7%	65.2 *(63.9)*	43	7.8%	73.3 *(69.1)*	54
	Jaen	14.8%	76.3 *(128.6)*	19	16.3%	18.7 *(22.2)*	14	13.1%	24.7 *(32.4)*	15
	Malaga	11.8%	31.7 *(42.8)*	16	13.7%	17.3 *(15.3)*	13	12.3%	29.5 *(35.4)*	19
	Seville	19.1%	86.6 *(81)*	59	17.7%	69.6 *(70.6)*	43	23.4%	52.9 *(57.8)*	33
	Other provinces	1.8%	87.7 *(84.6)*	77	0.3%	46.9 *(45.6)*	31	2.3%	65.9 *(55.1)*	48
Size of the firm	Micro-firm (0-9 workers)	41.9%	96.7 *(105.9)*	59	29.2%	43.3 *(58.2)*	21	34.6%	50.1 *(56.3)*	31
	Small firm (10-49 workers)	38.2%	68.5 *(85.3)*	33	46.2%	47.9 *(60.3)*	21	36.5%	49.4 *(55.3)*	28
	Medium-sized firm (50-249 workers)	12.8%	61.7 *(69.3)*	32	14.9%	44.7 *(54.1)*	22.5	19%	48.1 *(59.8)*	26
	Large firm (250 workers or more)	7.1%	44.7 *(49.7)*	27	9.7%	35.8 *(35.7)*	25	9.9%	46.4 *(48)*	28

Source: Authors' own, based on the sample.

Figure 1. Duration of the job vacancy and of the job demand in each job placement. Sample of vacancies.



Source: Authors' own, based on the sample.

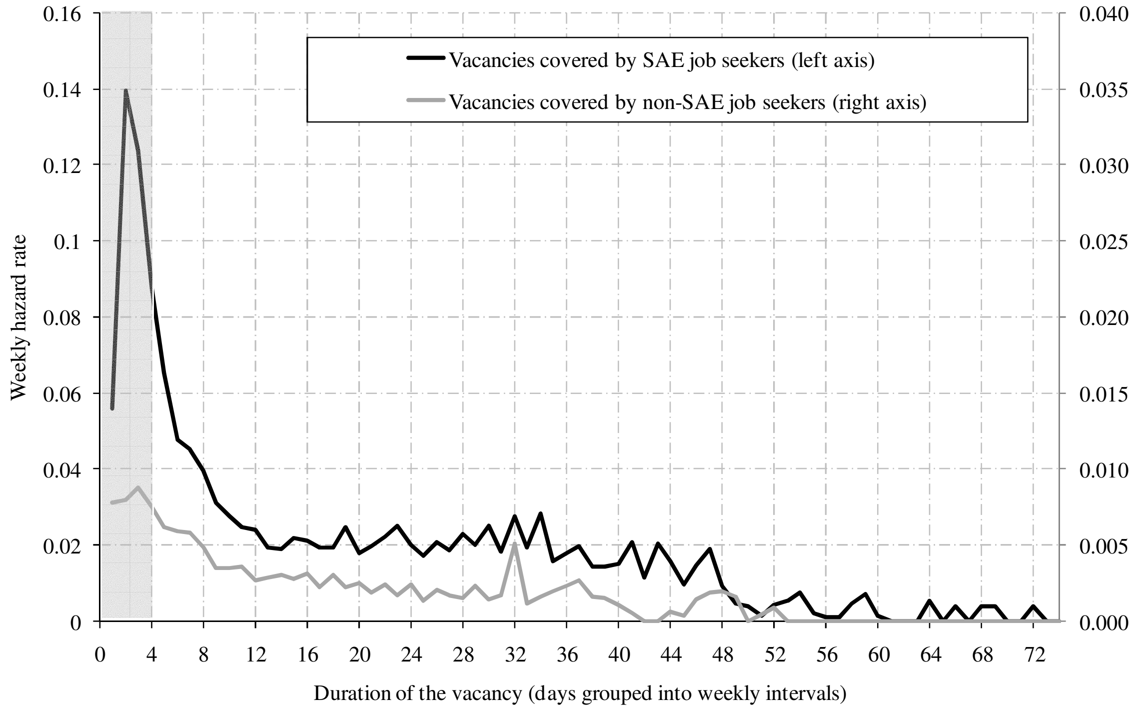
Table 3. Description of the durations of the job demands depending on the cause of closure.					
	Total	Closure due to coverage with a SAE vacancy	Closure due to coverage with a non-SAE vacancy	Closure due to causes different from the coverage	Episode open on 31st March, 2009
Percentage	100%	4.5%	52.7%	18.1%	24.7%
Duration. Mean	123 *(131.7)*	115 *(108.5)*	85 *(92.2)*	154 *(104.4)*	185 *(185.5)*
Duration. Median	91	78	52	97	124
Duration. Mode	96	14	7	96	28
Minimum Duration	0	0	0	0	0
Maximum Duration	819	812	790	814	819

Source: Authors' own, based on the sample.

Table 4. Description of the sample of job demands. Durations.										
Characteristics of the worker on registration		Total of job demands			Job demands covered with non-SAE vacancies			Job demands covered with SAE vacancies		
		Percentage	Mean duration	Median duration	Percentage	Mean duration	Median duration	Percentage	Mean duration	Median Duration
Gender	Male	47.6%	111.9 *(121.7)*	79	49.6%	75.5 *(83.4)*	47	36.8%	102.2 *(103.6)*	65
	Female	52.4%	133.6 *(139.5)*	94	50.4%	94.1 *(99.3)*	59	63.2%	122.7 *(110.5)*	86
Age group	16-29 years	34.3%	107.2 *(111.7)*	84	34.0%	73.3 *(82.4)*	45	19.8%	94.6 *(97.1)*	61
	30-44 years	41.2%	123.2 *(130.5)*	89	42.4%	87 *(94.1)*	54	46%	115.7 *(107.6)*	79
	45- 54 years	17.6%	135.3 *(145.7)*	93	17.8%	92.9 *(95.4)*	60	26.6%	120.6 *(109.8)*	84
	55 years or more	6.9%	173.4 *(171.7)*	106	5.8%	112.2 *(110.6)*	74	7.6%	146.4 *(125.9)*	114
Education level	Illiterate/No education	1.7%	122.7 *(129)*	94	1.7%	87.7 (91.5)	56	1.5%	116.7 *(104.2)*	85
	Primary education	18.3%	127.6 *(136.5)*	94	17.9%	89.7 *(92.6)*	57	22.7%	118.2 *(105.2)*	83
	Secondary education (vocational training programmes)	5.8%	120.9 *(130)*	84	6.1%	83.4 *(93.9)*	50	4.2%	108.4 *(108.5)*	71
	Secondary education (general)	63.9%	121.4 *(129.9)*	90	64.4%	83.8 *(91.5)*	51	64%	114 *(107.8)*	77
	Postsecondary (professional technicians)	3.8%	127.7 *(137.5)*	87	3.9%	83.4 *(94.8)*	50	2.7%	123.3 *(126.5)*	72
	Postsecondary (university and others)	6.5%	129.3 *(133.8)*	94	6%	82.9 *(94.3)*	52	4.9%	116.4 *(122)*	72
Sector of activity	Agriculture	26.9%	108.7 *(113.8)*	75	31.8%	92.9 *(93.5)*	59	49.9%	109.2 *(98.5)*	74
	Industry	5.6%	137.9 *(151.5)*	94	5.4%	85.4 *(96.7)*	51	2.3%	111.3 *(105.2)*	77
	Construction	11.9%	92.7 *(96.1)*	63	16.2%	80.7 *(86.1)*	50	16.2%	126.6 *(112.4)*	91
	Trade, catering, transport, communications	20.3%	139.9 *(142.7)*	96	16.7%	82.3 *(92.1)*	52	5.2%	111 *(123.6)*	66
	Financial services, business services	0.8%	131.6 *(144.4)*	91	0.6%	80.9 *(92.4)*	48	0.2%	148 *(187.5)*	77.5
	Public services	9.3%	125.1 *(132.4)*	90	9.4%	89.1 *(96.5)*	56	17.4%	126.9 *(120.3)*	87
	Other services	12.7%	135.2 *(145.2)*	94	11.7%	81.4 *(94.1)*	49	4.8%	120.7 *(127.5)*	74
	Without information	12.5%	136.3 *(144.2)*	96	8.1%	66.3 *(83.7)*	36	4%	90.7 *(96.6)*	58
Group of occupation	Qualified non-manual worker	5.1%	130.8 *(134.4)*	94	4.6%	82.4 *(94.3)*	51	3.6%	119.1 *(124.2)*	74
	Non-qualified non-manual worker	29.7%	130.6 *(139.6)*	94	27.6%	82.9 *(95.5)*	49	14.2%	114.9 *(121.3)*	71
	Qualified manual worker	34.7%	114.7 *(122.2)*	79	37.7%	86 *(90.5)*	54	55.3%	119.9 *(106.5)*	84
	Non-qualified manual worker	30.4%	124.6 *(133.3)*	94	30.1%	85.6 *(92.8)*	54	26.9%	105 (102.3)	68
Province	Almeria	6.6%	126.7 *(126.5)*	95	6%	85.5 *(83.1)*	63	6%	101.8 *(93.9)*	71
	Cadiz	15.1%	129.5 *(140.1)*	94	14.6%	81.6 *(89.3)*	51	10.3%	120.8 *(117.8)*	78
	Cordoba	11.6%	119 *(130.6)*	81	12.2%	89.4 *(97.5)*	53	16.1%	92.2 *(96.9)*	54
	Granada	10.4%	130.6 *(133.6)*	94	9.9%	92 *(98.2)*	57	12.8%	125 *(114.1)*	88
	Huelva	7.5%	111.7 *(121.4)*	82	8.4%	77.9 *(84.9)*	48	5.9%	112.3 *(103.8)*	79
	Jaen	9.6%	116.8 *(126.8)*	77	10%	96.4 *(99)*	59	17.3%	104.5 *(92.6)*	78
	Malaga	14.4%	135.3 *(138.9)*	96	13%	84.9 *(93.9)*	53	12%	184.2 *(121.8)*	183
	Seville	24.8%	116.6 *(127.1)*	83	25.9%	79.4 *(88.8)*	48	19.6%	96.8 *(100.3)*	61

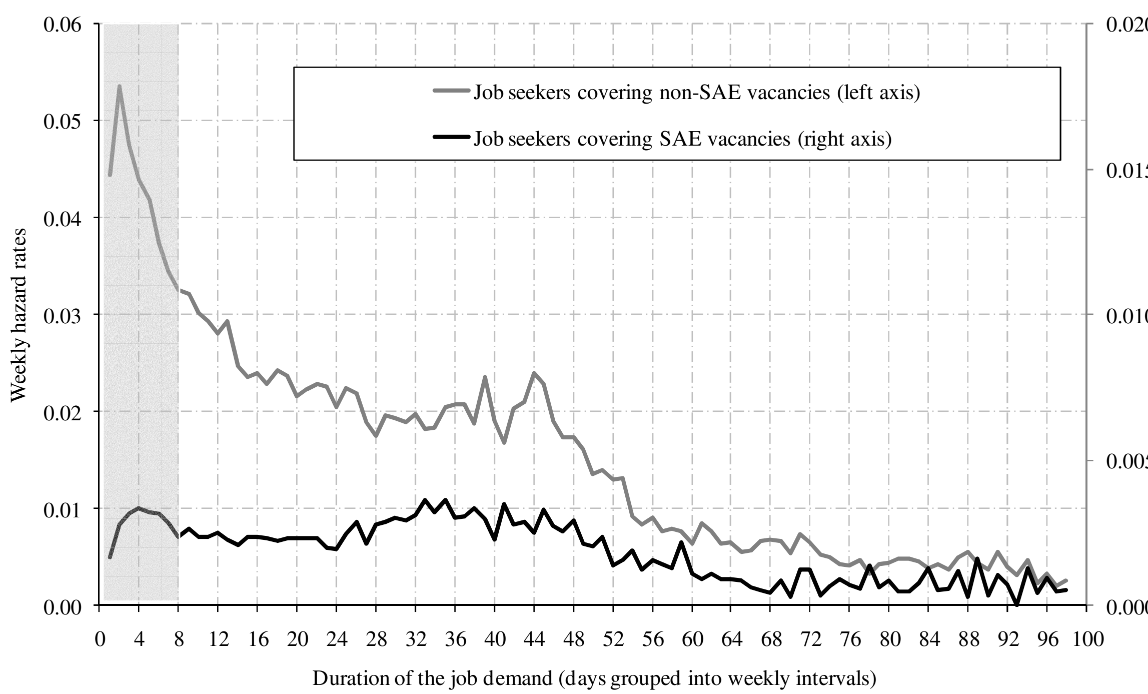
Source: Authors' own, based on the sample.

Figure 2. Non-parametric hazard rates of the managed vacancies.



Source: Authors' own, based on the sample.

Figure 3. Non-parametric hazard rate of the managed job demands.

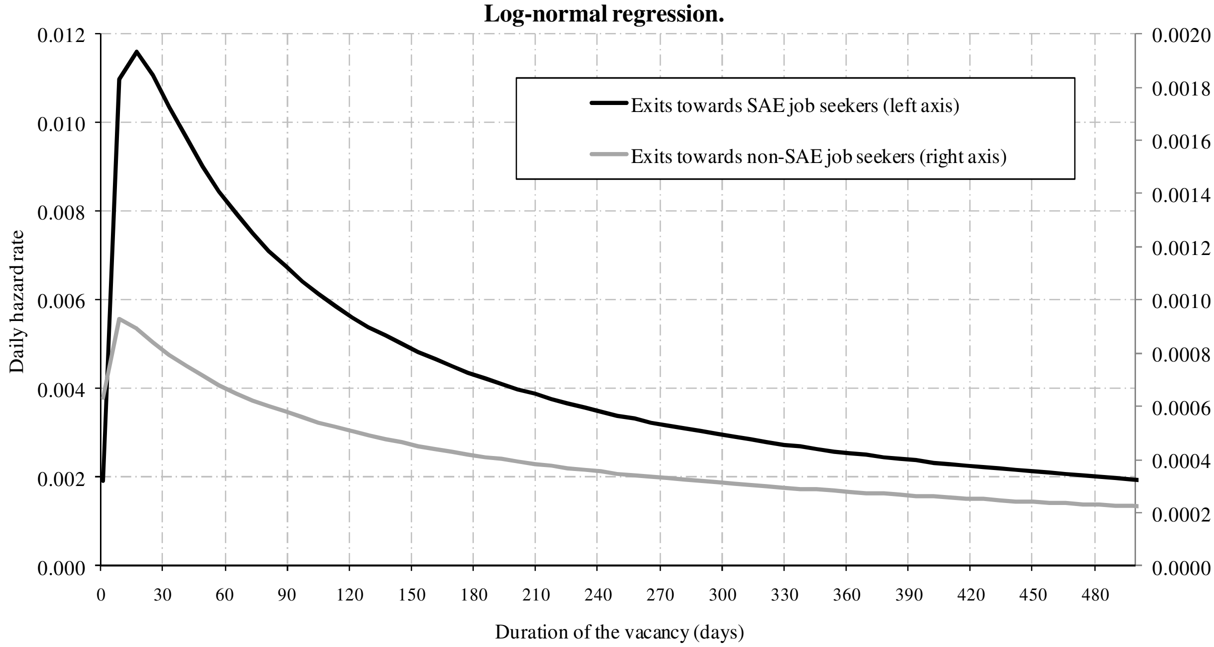


Source: Authors' own, based on the sample.

Table 5. Estimation of a competing risk duration model with "gamma" unobservable heterogeneity for the hazard rate of the vacancies. Exits to SAE or non-SAE job seekers. Log-normal regression.								
	Exits towards SAE job seekers				**Exits towards non-SAE job seekers**			
Covariates	**Time ratio. exp(coef.)**	z	Confidence intervals (95%)		**Time ratio. exp(coef.)**	z	Confidence intervals (95%)	
Public vacancy	0.381	-47.7	0.366	0.396	2.632	15.7	2.333	2.969
Permanent contract	0.427	-24.3	0.398	0.457	1.341	2.7	1.084	1.658
Agriculture	1.96	20.4	1.840	2.095	2.61	8.7	2.105	3.244
Industry	1.130	2.8	1.038	1.231	0.805	-1.9	0.639	1.013
Trade, catering, transport, communications	0.709	-10.8	0.666	0.754	0.382	-11.0	0.322	0.453
Financial services, business services	1.463	4.8	1.250	1.712	1.858	2.7	1.175	2.937
Public services	1.017	1.2	0.990	1.045	1.055	1.0	0.948	1.175
Other services	0.833	-6.5	0.788	0.880	0.753	-3.4	0.639	0.888
Qualified non-manual worker	1.309	9.3	1.237	1.386	1.054	0.6	0.879	1.265
Non-qualified non-manual worker	1.248	10.7	1.199	1.300	0.977	-0.4	0.862	1.106
Non-qualified manual worker	1.226	14.0	1.192	1.261	1.209	3.6	1.091	1.340
Almeria	0.307	-43.2	0.291	0.324	0.474	-8.2	0.396	0.566
Cadiz	0.559	-26.7	0.536	0.584	0.939	-0.9	0.812	1.085
Cordoba	0.403	-45.1	0.388	0.419	0.890	-1.5	0.766	1.034
Granada	2.015	35.4	1.939	2.095	1.606	7.0	1.407	1.833
Huelva	1.515	16.3	1.441	1.592	1.174	1.9	0.995	1.384
Jaen	0.384	-46.2	0.369	0.400	0.558	-7.5	0.479	0.650
Malaga	0.312	-55.8	0.299	0.325	0.510	-9.2	0.442	0.588
Micro-firm	1.667	39.1	1.625	1.711	1.918	13.6	1.745	2.107
Medium-sized firm	0.959	-2.4	0.926	0.993	0.630	-7.6	0.559	0.710
Large firm	0.975	-1.1	0.932	1.021	0.578	-6.8	0.493	0.677
EPA unemployment rate	0.939	-36.7	0.936	0.942	1.004	0.6	0.991	1.017
Ln sigma	0.286	53.8	0.276	0.297	0.897	44.9	0.857	0.936
Ln theta	-1.698	-26.2	-1.825	-1.571	0.351	1.1	-0.250	0.952
	Log-likelihood = -106057.09				Log-likelihood = -20702.818			
	LR chi2(22) = 21815.4; Prob > chi2 = 0.0000				LR chi2(22) = 2254.4; Prob > chi2 = 0.0000			
	LR test of theta = 0: chibar2(1) = 284.33; Prob>=chibar2 = 0.000				LR test of theta = 0: chibar2(1) = 12.65; Prob>=chibar2 = 0.000			
	Number of observations: 84,540. Number of transitions: 47,923. Total of days "at risk" of matching: 6,574,814.				Number of observations: 84,540. Number of transitions: 4,491. Total of days "at risk" of matching: 6,574,814.			
	Dummy variables omitted: construction, qualified manual worker, Seville, small firm.				Dummy variables omitted: construction, qualified manual worker, Seville, small firm.			

Source: Authors' own, based on the sample.

Figure 4. Estimated hazard rate for managed vacancies depending on the exit.
Log-normal regression.

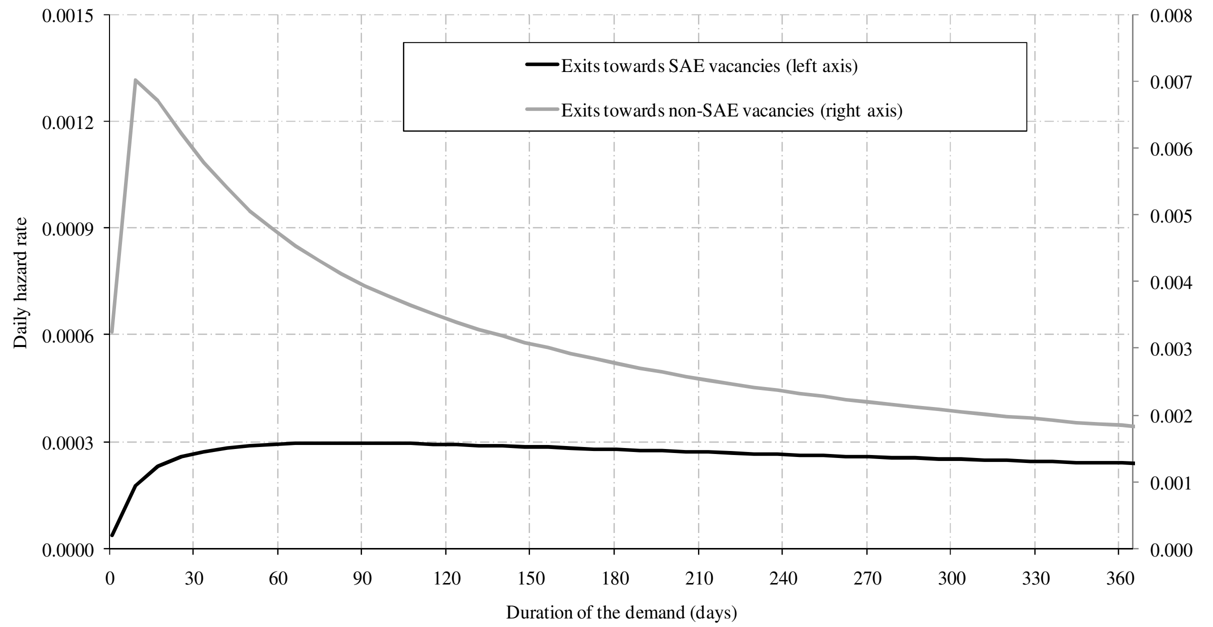


Source: Authors' own, based on the sample.

Table 6. Estimation of a competing risk duration model for the hazard rate of the job demands. Exits to SAE or non-SAE vacancies. Log-normal regression.								
Covariates	**Exits towards SAE vacancies**				**Exits towards non-SAE vacancies**			
	Time ratio. exp(coef.)	z	Confidence intervals (95%)		**Time ratio. exp(coef.)**	z	Confidence intervals (95%)	
Male	1.228	8.6	1.172	1.288	0.714	-37.4	0.701	0.726
30-44 years	0.817	-7.2	0.773	0.863	1.149	14.3	1.127	1.171
45-54 years	0.805	-6.5	0.754	0.860	1.359	23.9	1.325	1.393
55 years or more	1.463	8.0	1.333	1.606	2.286	44.2	2.204	2.372
Illiterate/No education	1.482	4.5	1.248	1.760	1.101	3.0	1.033	1.174
Primary education	1.121	3.9	1.059	1.186	1.070	5.8	1.046	1.095
Secondary education (vocational training programmes)	0.931	-1.4	0.840	1.032	0.881	-7.0	0.851	0.913
Postsecondary (professional technicians)	0.825	-2.9	0.725	0.938	0.905	-4.5	0.866	0.945
Postsecondary (university and others)	0.661	-5.8	0.574	0.761	0.928	-3.1	0.885	0.973
Agriculture	0.546	-19.8	0.514	0.580	0.727	-25.8	0.710	0.745
Industry	2.527	14.6	2.232	2.862	1.179	8.5	1.135	1.224
Trade, catering, transport, communications	3.080	25.5	2.825	3.358	1.352	23.4	1.318	1.387
Financial services, business services	2.907	5.5	1.985	4.255	1.309	5.4	1.187	1.443
Public services	0.502	-18.1	0.466	0.541	0.958	-2.6	0.928	0.990
Other services	2.095	15.5	1.908	2.300	1.117	7.5	1.085	1.150
Qualified non-manual worker	3.053	13.3	2.590	3.600	1.262	8.3	1.194	1.333
Non-qualified non-manual worker	2.639	27.3	2.461	2.829	1.104	8.1	1.078	1.131
Non-qualified manual worker	1.755	20.8	1.664	1.850	1.146	12.8	1.122	1.170
Almeria	0.867	-2.9	0.786	0.955	1.295	14.1	1.249	1.343
Cadiz	1.320	7.0	1.221	1.427	1.198	13.3	1.166	1.230
Cordoba	0.711	-9.2	0.661	0.764	1.053	3.5	1.023	1.084
Granada	0.831	-4.6	0.769	0.899	1.264	15.1	1.226	1.303
Huelva	1.281	5.1	1.164	1.410	0.917	-5.1	0.887	0.948
Jaen	0.635	-12.0	0.589	0.683	1.143	8.4	1.108	1.179
Malaga	1.052	1.3	0.973	1.137	1.254	16.2	1.220	1.289
EPA unemployment rate	1.015	4.7	1.009	1.021	1.035	30.7	1.032	1.037
Ln sigma	0.739	96.67	0.724	0.753	0.543	243.61	0.538	0.547
Ln theta	-15.917	-0.08	-411.417	379.583	-17.786	-0.17	-228.492	192.920
	Log-likelihood = -41722.196				Log-likelihood = -288855.84			
	LR chi2(26) = 7260.14; Prob > chi2 = 0.0000				LR chi2(26) = 8500.2; Prob > chi2 = 0.0000			
	LR test of theta = 0: chibar2(1) = 0.00; Prob>=chibar2 = 1.00				LR test of theta = 0: chibar2(1) = 0.00; Prob>=chibar2 = 1.00			
	Number of observations: 219,542. Number of transitions: 9,706. Total of days "at risk" of matching: 27,601,528.				Number of observations: 219,542. Number of transitions: 115,066. Total of days "at risk" of matching: 27,601,528.			
	Dummy variables omitted: female, 16-29 years, secondary education (general), construction, qualified manual worker, Seville				Dummy variables omitted: female, 16-29 years, secondary education (general), construction, qualified manual worker, Seville			

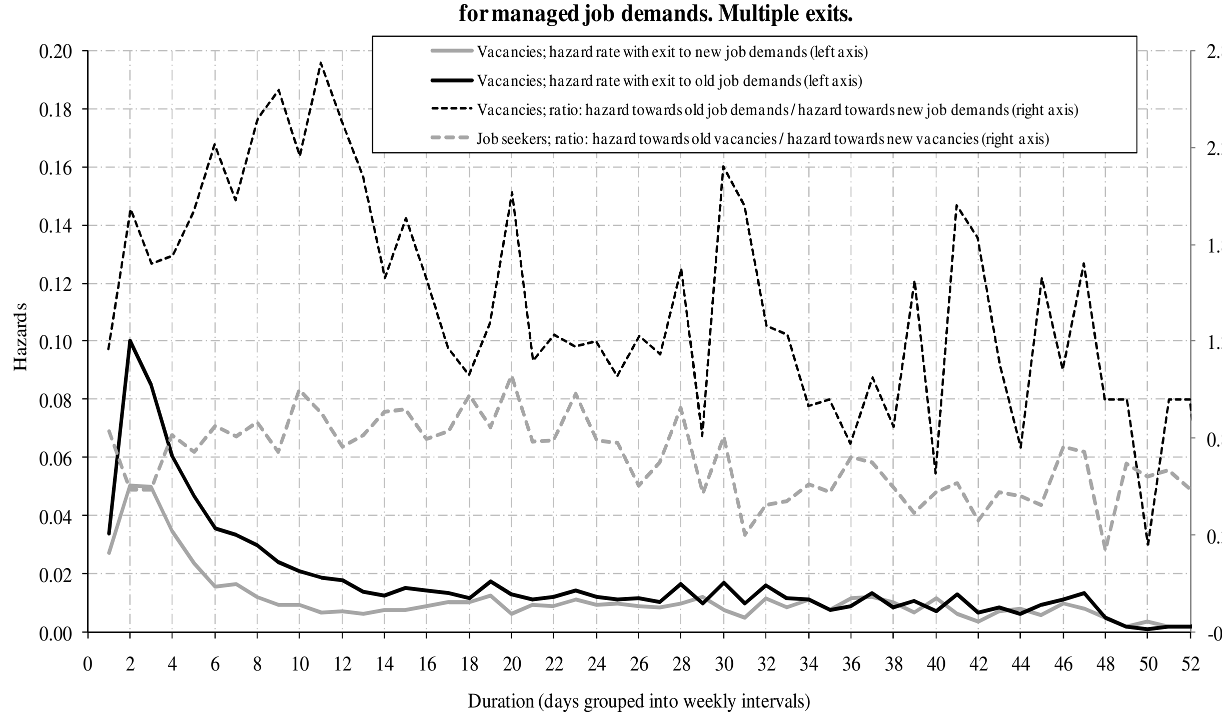
Source: Authors' own, based on the sample.

Figure 5. Estimated hazard rate for a managed job demand depending on the exit. Log-normal regression.



Source: Authors' own, based on the sample.

Figure 6. Empirical hazard rates (and ratio) for managed job vacancies. Ratio of empirical hazard rates for managed job demands. Multiple exits.

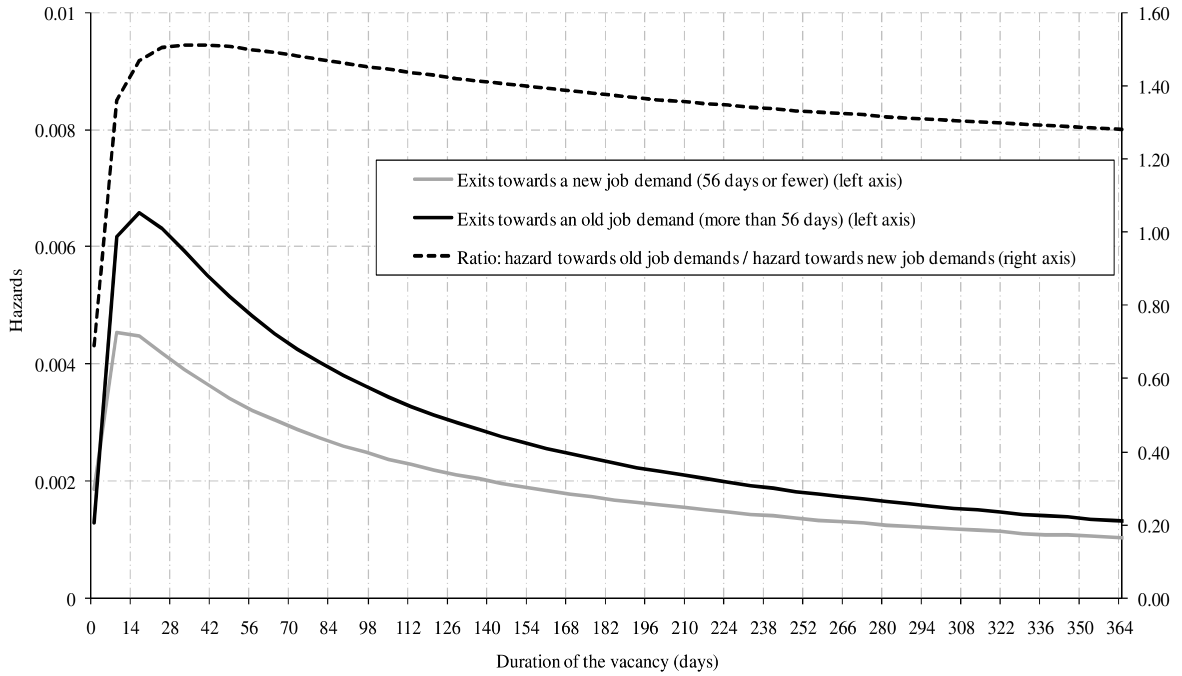


Source: Authors' own, based on the sample.

Table 7. Estimation of a competing risk duration model with "gamma" unobservable heterogeneity for the hazard rate of the vacancies. Log-normal regression.								
	Exits towards a new job demand (56 days or fewer)				**Exits towards an old job demand (more than 56 days)**			
Covariates	**Time ratio. exp(coef.)**	z	Confidence intervals (95%)		**Time ratio. exp(coef.)**	z	Confidence intervals (95%)	
Public vacancy	0.411	-24.3	0.383	0.442	0.360	-42.3	0.343	0.377
Permanent contract	0.273	-22.3	0.243	0.306	0.603	-11.2	0.552	0.659
Agriculture	2.21	13.3	1.969	2.487	1.86	15.8	1.721	2.008
Industry	0.550	-10.9	0.494	0.613	0.832	-4.7	0.770	0.898
Trade, catering, transport, communications	0.952	-0.7	0.821	1.103	1.288	4.7	1.158	1.432
Financial services, business services	1.019	0.7	0.970	1.070	1.002	0.1	0.970	1.034
Public services	0.804	-4.3	0.729	0.887	0.837	-5.3	0.783	0.894
Other services	1.525	2.9	1.148	2.024	1.390	3.4	1.149	1.682
Qualified non-manual worker	0.987	-0.5	0.938	1.039	1.356	17.6	1.310	1.402
Non-qualified non-manual worker	1.261	4.4	1.138	1.398	1.326	8.2	1.240	1.419
Non-qualified manual worker	1.215	5.3	1.130	1.307	1.251	9.1	1.192	1.313
Almeria	0.602	-12.9	0.557	0.650	0.235	-58.9	0.224	0.246
Cadiz	2.565	26.5	2.392	2.750	1.766	24.2	1.687	1.849
Cordoba	0.361	-29.7	0.338	0.387	0.425	-35.0	0.406	0.446
Granada	1.683	11.4	1.539	1.840	1.384	10.7	1.304	1.469
Huelva	0.622	-12.3	0.577	0.671	0.507	-26.3	0.482	0.533
Jaen	0.366	-27.5	0.341	0.393	0.364	-41.0	0.347	0.382
Malaga	0.274	-27.7	0.250	0.300	0.320	-34.7	0.300	0.341
Micro-firm	1.627	20.8	1.554	1.703	1.672	33.1	1.622	1.724
Medium-sized firm	1.027	0.8	0.965	1.093	0.911	-4.4	0.875	0.949
Large firm	1.051	1.2	0.969	1.140	0.933	-2.6	0.884	0.984
EPA unemployment rate	0.945	-18.7	0.939	0.950	0.937	-31.9	0.934	0.941
Ln sigma	0.581	61.2	0.563	0.600	0.312	45.4	0.298	0.325
Ln theta	-0.346	-3.9	-0.517	-0.174	-0.917	-15.6	-1.033	-0.802
	Log-likelihood = -56660.752				Log-likelihood = -79361.908			
	LR chi2(22) = 7377.2; Prob > chi2 = 0.0000				LR chi2(22) = 16273.29; Prob > chi2 = 0.0000			
	LR test of theta = 0: chibar2(1) = 159.95; Prob>=chibar2 = 0.000				LR test of theta = 0: chibar2(1) = 375.29; Prob>=chibar2 = 0.000			
	Number of observations: 84,540. Number of transitions: 17,054. Total of days "at risk" of matching: 6,574,814.				Number of observations: 84,540. Number of transitions: 30,869. Total of days "at risk" of matching: 6,574,814.			
	Dummy variables omitted: construction, qualified manual worker, Seville, small firm.				Dummy variables omitted: construction, qualified manual worker, Seville, small firm.			

Source: Authors' own, based on the sample.

Figure 7. Hazard rates (and ratio) of the managed vacancies depending on the exit. Log-normal regression.



Source: Authors' own, based on the sample.