Working papers series

WP ECON 11.03

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AN EMPIRICAL ANALYSIS OF THE MATCHING PROCESS IN THE SPANISH PUBLIC EMPLOYMENT AGENCIES: THE VACANCIES*

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Abstract:

Our work tries to assess the degree to which the matching process of the vacancies managed by the Andalusian public employment agencies (SAE) approaches a theoretical model of the stock-flow type as described by Coles (1994, CEPR) and his collaborators. According to this model, a new vacancy can be "good" (relatively scarce in its labour segment) or "bad" (relatively abundant in its labour segment); this unobservable heterogeneity at the aggregate level determines the probability of coverage of the vacancy and the characteristics of the worker who occupies it. For our study, we work with a sample of 3.565 vacancies registered in the SAE between March 2006 and October 2008. The proposed test requires the estimation of a duration model for the hazard rate of vacancies with multiple exits. A novelty of our test is that it does not require information about the entire stock and flow of candidates of the other side of the market. The main result obtained is the existence of certain evidence in favour of stock-flow matching.

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* We are grateful to the Observatorio ARGOS of the Andalusian Public Employment Agency (SAE) for the kind collaboration received with the data, especially from María Dolores Porras and Fernando Martínez. We are also grateful to the Centro de Estudios Andaluces for the funding received specifically for this project (Project PRY027/08). We also acknowledge funding from: the Andalusian Government -Excellence Projects (01252, P07-SEJ-02905, SEJ-4546) and PAI (SEJ-246, TEP-216)-; the Spanish Government: Department of Science (SEJ 2006-04803, ECO2009-13357); and the Pablo de Olavide University (APP2D09033). Finally, we also acknowledge the comments from Melvyn Coles, Barbara Petrongolo, Luis Toharia, J. Ignacio García-Pérez, Pablo Antolín, Francisco Gómez, Manuel Salas-Velasco and Cristina Borra, among many other participants in the seminars and conventions at which previous versions of this work were presented. The usual disclaimer applies.

1. Introduction.

When the underlying microfoundation of any process of labour matching is analysed, it is possible to distinguish at least between two extreme theoretical scenarios: random matching and stock-flow matching[1]. In the first model, the participants in the market are heterogeneous, and the available information to search for the matching is incomplete, because every individual has to select vacancies randomly until finding a suitable one; in this scenario, in every round of matching, a worker will try to fill some existing vacancy, either from the stock of vacancies that exists at the beginning of the period or from the new vacancies that are entering the market during the period. With respect to the stock-flow model, the available information is perfect, but there exists at least a type of heterogeneity that can slow down the matching process: the labour market is divided into different segments that are unconnected and differentiated by the characteristics required from the worker and from the vacancy to be able to form a suitable job placement.

In this work, which is built on that of Álvarez de Toledo *et al.* (2008) but from a microeconomic perspective[2], we will try to test by means of the estimation of a duration model for the vacancies managed by the Andalusian Employment Agency (SAE)[3] to what degree their matching process responds to a theoretical model of the stock-flow type as described by Coles (1994). According to this model, a new vacancy can be "good" or "bad". In this way, a "good" vacancy is one that belongs to a segment of the labour market where the vacancies do not accumulate -they are in the “short side” of the market- so that when this type of vacancy is registered, it is quickly filled with some worker from the available stock in this segment. On the contrary, a "bad" vacancy is one that belongs to a segment in which the vacancies and not the workers accumulate in the stock -the vacancies are in the “long side” of the market- so that when the vacancy is registered initially, there are not available workers to occupy it, and the vacancy will have to wait for the arrival of new workers to allow for a job placement. According to Coles (1994), this dynamics of flows and stocks can yield two types of matching: new vacancies (instantaneous flow) with old job demands (stock) and vice versa. Nevertheless, our real data do not show a complete fit to a stock-flow model of partially instantaneous flows, so even a "good" individual can go several rounds without matching. In practice, this fact means that in a certain segment there could coexist vacancies and workers and that we also observe matching between new vacancies and new job demands (flows) and between old vacancies and old job demands (stocks), although these job placements should always be between "good" ones and "bad" ones.

In the literature of matching, it is common to estimate duration models[4] for workers in search of employment with the aim of analysing the influence of many covariables such as sex, age, education, labour experience, family characteristics, disposition towards mobility, perception of unemployment subsidies, and the macroeconomic environment[5]. In other works, the duration models take into account different possible exits: permanent versus fixed-term contracts, self-employment versus working for others, and reemployment at the same firm ("recall") versus

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[1] In practice, the matching processes in the labour markets must be at some point between both theoretical extremes.

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

[3] In Spain, there are no databases showing vacancies in the overall economy. The best database corresponds to the vacancies managed by the public sector, but it only covers part of the labour market.

[4] On the methodology of the duration models, see, among others, Kiefer (1988), Lancaster (1990) and Jenkins (2005).

[5] For the case of Spain, see Andrés *et al.* (1989), Ahn and Ugidos (1995), García-Pérez (1997, 2006), Alba-Ramírez (1998, 1999), Ahn *et al.* (1999), Lassibille *et al.* (2001), Bover *et al*. (2002), Gonzalo (2002), Jenkins and García-Serrano (2004), Fernández (2006), Güell and Hu (2006) and Arranz and Muro (2007). For other countries, see, for example, Nickell (1979) and Narendranathan and Stewart (1993) for the United Kingdom; Katz and Meyer (1990) and Meyer (1990) for the United States; Ham and Rea (1987) for Canada; and Salas-Velasco (2007) for different European countries.

changing between firms, among others[6]. On the other hand, the duration models are much less frequent for the studies about vacancies and even rarer when combined with the stock-flow matching approach[7].

In general, the duration models obtain decreasing hazard rates from relatively limited durations, as much for the workers in search of employment as for the vacancies, which is consistent with the stock-flow matching model (the lower durations correspond to workers and vacancies that belong to the short side of the market and vice versa). Nevertheless, there can be other explanations for these decreasing hazard rates, even for the side of the vacancies[8]. A more rigorous test of the stock-flow model thus not only needs to analyse whether the hazard rate of the vacancies decreases with its duration, but also to control whether the matching takes place with new or old job demands depending on the duration of the vacancy; the reasoning for the side of the workers would be analogous.

For our empirical analysis, we used a sample of 3.565 vacancies registered in the SAE between March 2006 and October 2008. This sample contains valuable information about the characteristics of the vacancies (group of occupation, sector of activity, province, public or private character, type of contract, etc.), which will allow us to control for observable heterogeneity in our estimations. Andalusia is an important Spanish region that is characterised by a high unemployment rate as well as some idiosyncratic features (Usabiaga, 2004), hence giving relevance to our case study.

Therefore, our estimations look for a twofold objective: to determine the profile of the vacancies with higher and lower matching rates and to test whether the matching process of the vacancies of the SAE shows certain stock-flow dynamics. With regards to the latter point, we will take the work of Andrews *et al.* (2009) for the United Kingdom as the main reference at the methodological level, though we introduce some changes in comparison with the methodology proposed by these authors. An alternative method is proposed to distinguish between new and old vacancies and job demands, based on the change of regime in their (non-parametric) empirical hazard rates, compatible with the stock-flow approach. With this information, we develop our own stock-flow test -until now not used in this literature- which analyses the evolution, depending on the duration, of the ratio between two hazard rates for the vacancies towards old and new job demands. The advantage of this test, in comparison with the other tests available in the literature, is that it does not need to have any temporarily aggregated information about the evolution of the other side of the market; we refer to the evolution of all of the job demands (stocks and flows) that have been "at risk" of matching with the vacancies in every moment. The main result of our work, which reaffirms the results of Álvarez de Toledo *et al.* (2008), points towards the existence of certain evidence in favour of the stock-flow type of matching in the vacancies managed by the SAE, especially once we control for heterogeneity. As we will note later, this fact can have some implications on the design of employment policies and the unemployment protection system.

The rest of the work is structured as follows: in section 2, we analyse the characteristics of the stock-flow matching model, and we refer to a version of the model that differs slightly from the

[6] For the case of Spain see, for example, Alba-Ramírez (1994) (in comparison with the United States), Carrasco (1999), Bover and Gómez (2004), Cueto and Mato (2006), Alba-Ramírez *et al.* (2007), Güell and Petrongolo (2007), Albert *et al.* (2008) and Cebrián and Toharia (2008).

[7] In this line, we have only found the works of Andrews *et al.* (2008, 2009) and Coles and Smith (1998). The first authors use individual data (weekly aggregated) on the vacancies and the job demands registered at an employment agency for young persons in Lancashire (England); the second authors analyse the monthly statistics on the durations of the vacancies and the job demands registered at the U.K. Job Centres.

[8] An example for the side of the worker is the "stigma" effect modelled by Blanchard and Diamond (1994). For the side of the vacancies, the hazard rate must fall sooner or later if some vacancies observed along the period of analysis tend to remain uncovered; this can happen if the available data come from administrative sources.

original (which is expressed in infinitesimal terms). In section 3, the observed durations of the vacancies and the job demands that cover them are analysed. Section 4 develops a new test of stock-flow matching. In the first subsection, we propose a method to determine the maximum duration that a "good" vacancy and a "good" job demand remain "at risk" of matching before becoming old. In the second subsection, we estimate parametrically the hazard rate of the vacancies of the SAE while controlling for heterogeneity; we find that the observable heterogeneity is important in our data. In the third subsection, we confirm the existence of some stock-flow structure in our data of vacancies by means of the estimation of a duration model with heterogeneity and multiple exits. The ratio of the hazard rates is the key of our test; likewise, we will try to prove the robustness of our results. Finally, in section 5, the main conclusions of our work are presented.

2. Methodology: the "stock-flow" matching model.

Coles (1994) and Coles and Smith (1998) analyse the implications of the job search process when the labour market is segmented and the participants in it come to an established place or marketplace, such as a public employment agency, with complete information about all of the candidates; in this context, the firms know the available job seekers in their segment (and vice versa), so that at the end of every round of matching, no firm that could have covered a vacancy is going to remain without doing so. An important implication of the described process is that a firm (worker) that has not managed to form a job placement after a round of matching will not try to contact an already known worker again (firm)[9].

The dynamics can be described in terms of stocks and the flow of unemployment and vacancies. At the beginning of a period, the stock of vacancies does not relate to the stock of workers (and vice versa), since both coexisted in the round corresponding to the previous period and did not result in job placement. Therefore, this process of matching is based on the fact that the stocks of vacancies and workers at the beginning of a period will try to match, respectively, with the flows of new workers and new vacancies corresponding to this period, with these flows thus leading the matching process. This process is denoted as stock-flow labour matching.

From the origin of the stock-flow approach, the literature in this field has essentially centred on two aspects: the empirical testing of the model and the problem of temporal aggregation that arises in the empirical estimation of the matching function or of the hazard rates of the individuals (vacancies or workers).

With regard to the empirical testing of the model, 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)[10] for Spain find evidence in favour of a stock-flow framework. Andrews *et al.* (2009) analyse individual data, though aggregated weekly, from a job placement office for young persons in Lancashire and report evidence in favour of the stock-flow model. All these works bear in mind that the estimation of matching functions or of hazard rates towards the employment presents a problem of temporal aggregation of the data if the time period of measurement of the job placements is discrete. In this way, the flow of job placements in every period can be generated with unemployed workers and vacancies of the respective stocks at the beginning of the period or with the new unemployed workers and the new vacancies that appear

[9] This fact tries to capture a plausible characteristic of the labour markets: for example, from the side of the worker, this one checks the announcements of employment before deciding to contact; and if, after answering an advertisement, the worker is rejected, the worker will not likely contact the same firm in a later round, leaving the worker to answer only new advertisements.

[10] The main result obtained in this work, of the existence of a stock-flow scenario for the labour market intermediated by the Spanish Public Employment Agency (INEM/SPEE), is robust across time and geographical dimensions and is very close to the extreme case of queues of workers.

along the period. Burdett *et al.* (1994) show that the estimated parameters of the conventional matching function -the function that has, like regressors, only the initial stocks of unemployed workers and vacancies- can be downwards biased, a bias that will be proportional to the extension of the reference period.

The main implication of the stock-flow model on the matching function once we control for temporal aggregation consists of assuming the existence of unobservable heterogeneity in the flows, in the sense that in each (in terms of the flow of workers and the flow of vacancies) include "good" and "bad" individuals[11]. The "good" individuals belong to a segment of the market where they are relatively scarce -they are on the short side of the market- and the "bad" ones present the characteristic of being relatively abundant in its segment -they are on the long side of the market. In the perfectly continuous version of the model, the new "good" individuals instantaneously disappear when they match with an individual from the existing stock of candidates, so they do not become old and they do not enter the stock of "bad" individuals. In a more realistic view of matching, placed at some point between random matching and stock-flow matching, and considering the case of the vacancies, for instance, we must think that even a "good" vacancy needs a certain finite period of search to be able to form a job placement, since the available information about suitable job seekers is not perfect.

Let us suppose therefore that there exists a brief but finite period of time in which the "good" vacancies manage to be filled, which allows us to think of the model in discrete terms. This would mean that any "good" or short-side vacancy will match within the above mentioned period with a worker who is a "bad" or long-side worker, probably coming from the stock, since they are more abundant than "bad" candidates who have just entered the market, due to the accumulation of the former ones. From another perspective, the "bad" vacancies will show higher durations and higher variance, since they could be short or long[12], and they will go out more frequently towards new workers, as their duration is longer; that is, we expect that the exits towards new job demands gain relative weight in relation to the exits towards old or "bad" job demands when the duration of the vacancy increases.

One of the aims of this work is to estimate empirically the typical duration of a job demand and of a vacancy of the SAE when they are labelled "good".

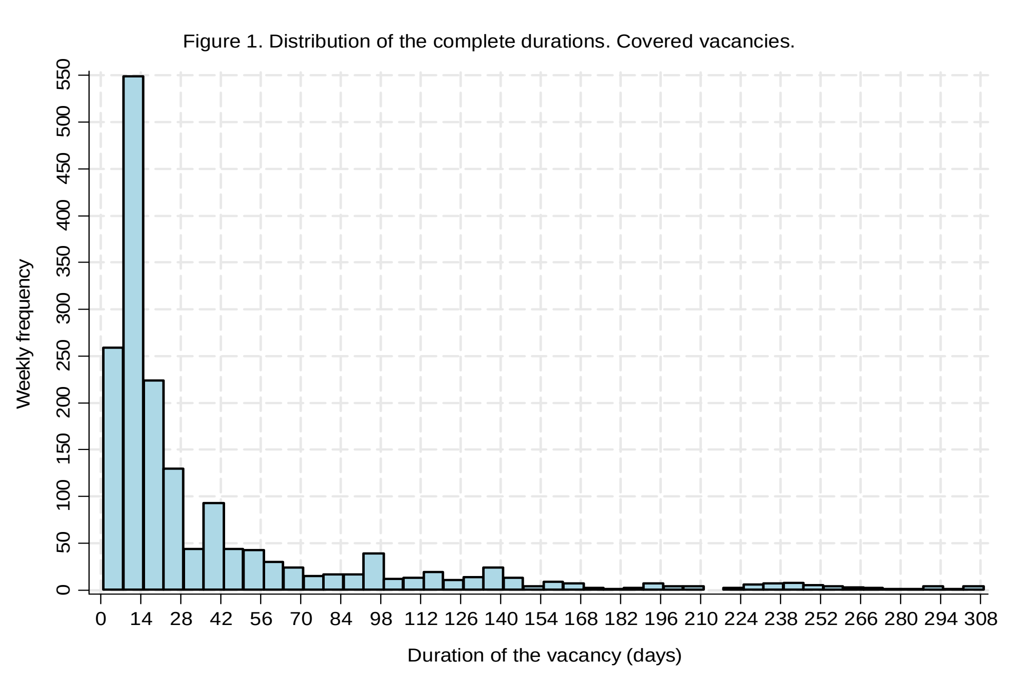
3. The observed durations of the vacancies and the job demands.

We now analyse the duration of the period in which the vacancies remain "at risk" of matching; the period since the vacancy is registered in the SAE until one of these three circumstances occurs: the vacancy is covered; the offer to which it belongs is closed[13]; and, if those two things do not happen, because the period of observation ends (on October 31, 2008). We also analyse the complete search duration of the workers who matched those vacancies of the sample that were finally covered.

With respect to the covered vacancies (1.722 vacancies), the mean and the median duration take values of 39 and 16 days, respectively, whereas durations of 10 and 14 days are the most frequent. The minimal duration observed for these vacancies is lower than one day, and the maximum duration is 305 days. The histogram in Figure 1 shows that most of the vacancies that are

[11] For more detailed treatment of the stock-flow matching function in discrete time, see Núñez and Usabiaga (2007).
[12] In our finite time model, a "bad" vacancy might have the fortune of being covered soon by some "good" job demand, so this vacancy would show a short duration. On the other hand, only the "bad" individuals can become old.
[13] It is necessary to distinguish between a job offer and a vacancy in the SAE. A job offer can contain one or more vacancies, but all of them with the same profile, in terms of the group of occupation, the sector of activity, the type of contract, etc.

covered do so during the first month and more specifically in the course of the second week of duration.



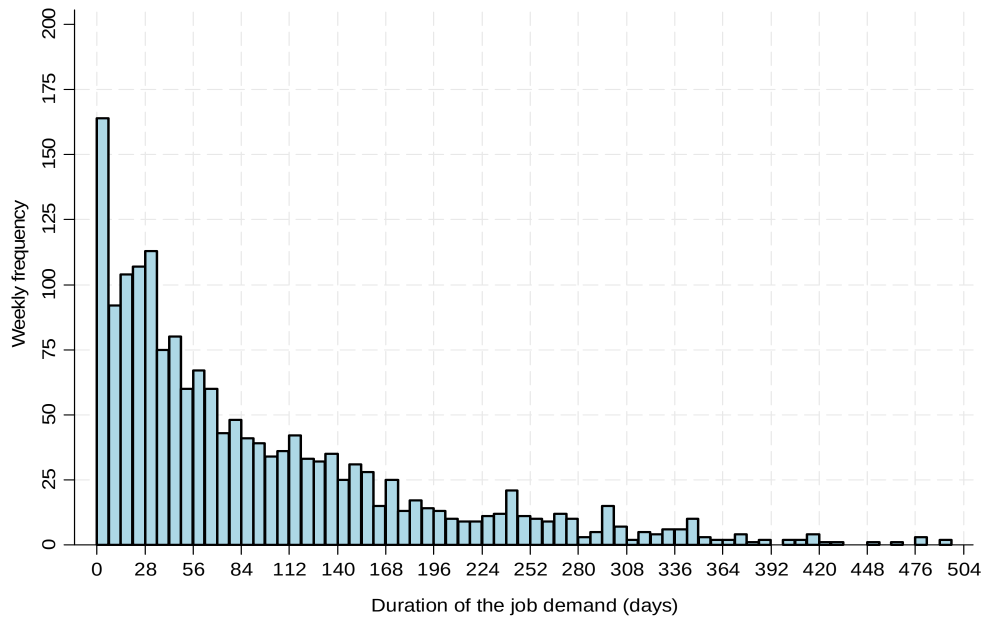
Source: Our elaboration based on the sample.

For vacancies closed by causes other than job placement, the mean duration, median duration and mode take values of 155,6, 117 and 131 days, respectively. The minimum duration observed is less than one day, and the maximum duration is 585 days. Therefore, vacancies that are closed without matching have longer durations, on average, than vacancies that are filled. Finally, if we pay attention to the vacancies that remain opened at the date of sample extraction, we observe mean duration, median duration and mode values of 524, 605 and 633 days, respectively. The maximum duration observed in this type of vacancies is 966 days, whereas the minimum duration is less than one day. We suggest that the relatively high durations in this group can be due to the existence of "false" vacancies (not real vacancies) that appear due to an administrative mismatch at the moment of crossing a job offer with a job demand when a job placement occurs. In this way, for example, if a job placement is registered without correct information about the codes of the offer, that vacancy would remain open until the closure of the offer in spite of having been covered.

We now analyse the durations of the job demands that have been matched with the vacancies of the sample that were finally filled; we thus analyse complete and successful episodes of job demand. The mean duration of a job demand is 100 days, and the median duration and the mode are, respectively, 62 days and one day. On the other hand, the minimal duration observed in the sample is less than one day, and the maximum duration is 1.337 days (more than 3.5 years). The histogram of Figure 2 shows a clear decrease in frequency after the first week of duration of the job demand and, from there, a softer evolution with a decreasing trend[14].

[14] For a clearer view of the figure, we represent durations of up to 500 days on the horizontal axis. The frequencies for durations longer than 500 days are very small.

Figure 2. Distribution of the complete durations. Job demands.



Source: Our elaboration based on the sample.

To conclude this section, we illustrate in Figure 3 the crossing of the durations corresponding to every vacancy and every worker who has formed a job placement[15]. In this figure, a certain predominance of the vacancies that show a relatively short duration (for example, lower than 15 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[16]. The following section will explore this idea in greater detail.

Figure 3. Duration of the vacancy and of the job demand in each job placement.

Source: Our elaboration based on the sample.

[15] We omit extreme durations, which are scarce, to present a clearer figure.

[16] Nevertheless, the matching observed between short-duration vacancies and job demands on the one hand and between long-duration vacancies and job demands on the other indicates that our data do not adjust perfectly to the stock-flow model.

4. Estimations and results. Stock-flow test.

Our sample is composed of 3.565 vacancies registered in the SAE between March 2006 and October 2008, of which 48,3% (1.722 vacancies) form a job placement; it means a daily hazard rate for the vacancy of 0,23%[17].

From this sample, it is possible to design an empirical test that allows us to detect some evidence of stock-flow matching in our data. As we will show later, and unlike what happens in other works, the test that we propose is not based on information about all of the workers (stocks and flows) who are on the other side of the market trying to match in every period with our vacancies.

Section 4 has three parts. In subsection 4.1, we obtain, by means of samples of vacancies and job demands, the Kaplan-Meier hazard rates. From these rates, we will estimate, by means of a test of structural change, the duration in days from which a vacancy (or a job demand) can be considered to belong to the long side of the market; that is, it belongs to a labour segment where they are relatively abundant in relation to the other side of the market. In subsection 4.2, we estimate, parametrically, the hazard rate of the SAE vacancies and analyse the observable heterogeneity. An interesting perspective of this analysis, apart from the study of the shape of the hazard rate, is that we can approach the detection of those sectors of the Andalusian labour market where the vacancies show the best or worst survival rates, which can be very useful for the employment policy. Finally, in subsection 4.3, we propose a test on the existence of a stock-flow framework in the matching process followed by the SAE vacancies.

4.1. The Kaplan-Meier hazard rates: Maximum durations of "good" vacancies and "good" job demands.

The fundamental hypothesis that we defend and test in this work is that if in the matching process that takes place across the Andalusian public employment offices some stock-flow dynamics is observed, the vacancies must be covered, less and less, in relative terms, with old or "bad" job demands when the vacancy matures, since duration is a sign that the vacancy is also "bad", that is, on the long side of the market[18]. According to this, we might define old job demand as that which survives up to a certain temporary point and verify with our sample of vacancy durations whether the above mentioned hypothesis is satisfied[19].

In this section, we suppose that a job demand becomes old when its hazard rate (which depends on the duration) experiences some change of regime that could make sense from the optics of the stock-flow model. Once the point at which the job demand becomes old is identified, if our above mentioned hypothesis is confirmed empirically, we will have demonstrated that the vacancies show certain stock-flow dynamics.

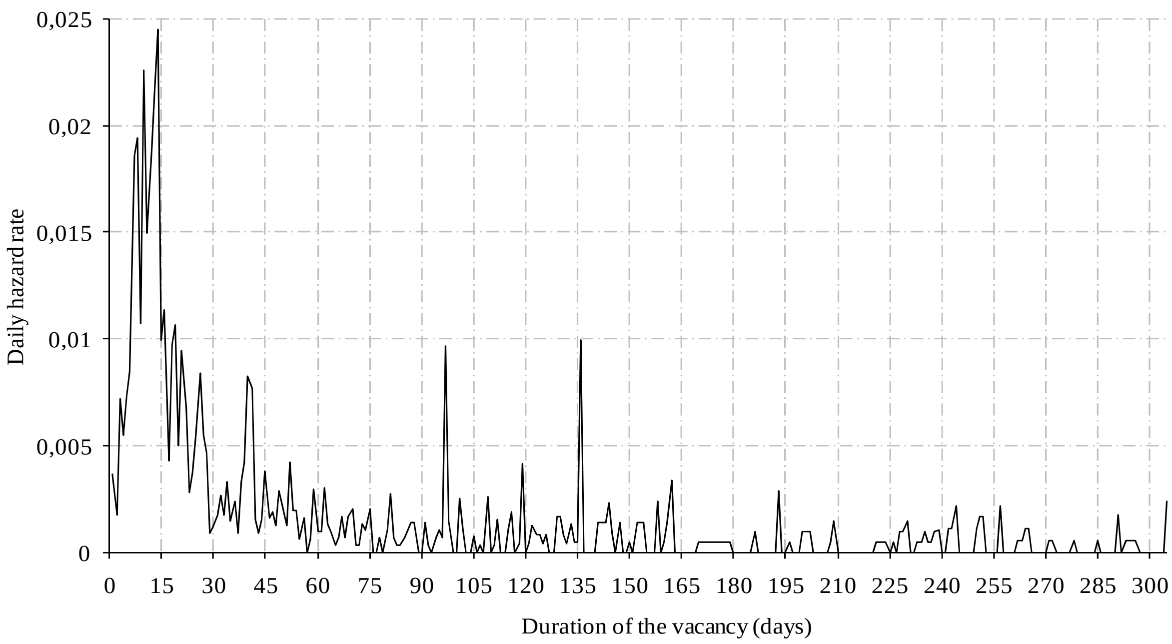
We will follow Andrews *et al.* (2009) and name k^e and k^w to the time period that a new vacancy or a new job demand must exceed, respectively, to be considered old[20]. Initially, these

[17] To obtain this rate we have divided all of the matches that have taken place in the sample period (1.722) 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), a number that increases to 742.377 days; in other words, 742.377 days (not overlapped) were needed to fill 1.722 of a total of 3.565 registered vacancies.
[18] Logically, the reasoning would be symmetrical for the side of the unemployed workers.
[19] The hypothesis will be fulfilled if there exists a stock-flow dynamics in our data of vacancies and if the job demand that we label as old is truly old (in terms of the model), in other words, if it is really a "bad" job demand, which is on the long side of the market.
[20] We define a duration threshold not only for the job demands but also for the vacancies. We do this to be able to make some calculations *à la* Andrews *et al.* (2009) later on, in subsection 4.3.

authors choose the above mentioned thresholds of the duration of "ad hoc" form, since they take as initial values of k^e and k^w those that allow the maximisation of the matching between new and old individuals (subject to $k^e = k^w$), and later they fit those values, allowing them to differ[21], by means of the estimation of a duration model. In contrast to Andrews *et al.* (2009)[22], we propose the following method to determine the values of k^e and k^w: first, we will calculate the Kaplan-Meier hazard rates of both the vacancies and the job demands[23]; and second, provided that the hazard rates are functions of the duration, we will try to identify by means of a Chow test some change of regime that is coherent with the prediction of the stock-flow model: when a worker (firm) checks all of the current possibilities of employment and does not manage to match, his hazard rate diminishes because he has to wait in the stock for the arrival of new vacancies (workers) to get a job placement[24].

Figure 4 shows the non-parametric hazard rate for vacancies, bearing in mind that from 305 days, we do not find any job placement. In this figure, an increasing trend of the hazard rate is observed during the first two weeks of duration of the vacancy; the trend later decreases, tending to zero. In other words, when a vacancy survives without coverage for more than two weeks, its probability of matching begins to decrease.

Figure 4. Non-parametric hazard rate of the managed vacancies.



Source: Our elaboration based on the sample.

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[21] As these authors point out, k^e and k^w do not have to coincide; for instance, it is plausible that $k^e < k^w$.

[22] The concrete method used for the determination of the duration thresholds k^e and k^w should not be a central element in this kind of analysis; however, we consider it important to demonstrate the validity of the chosen thresholds. In subsection 4.3, we will show the robustness of our results.

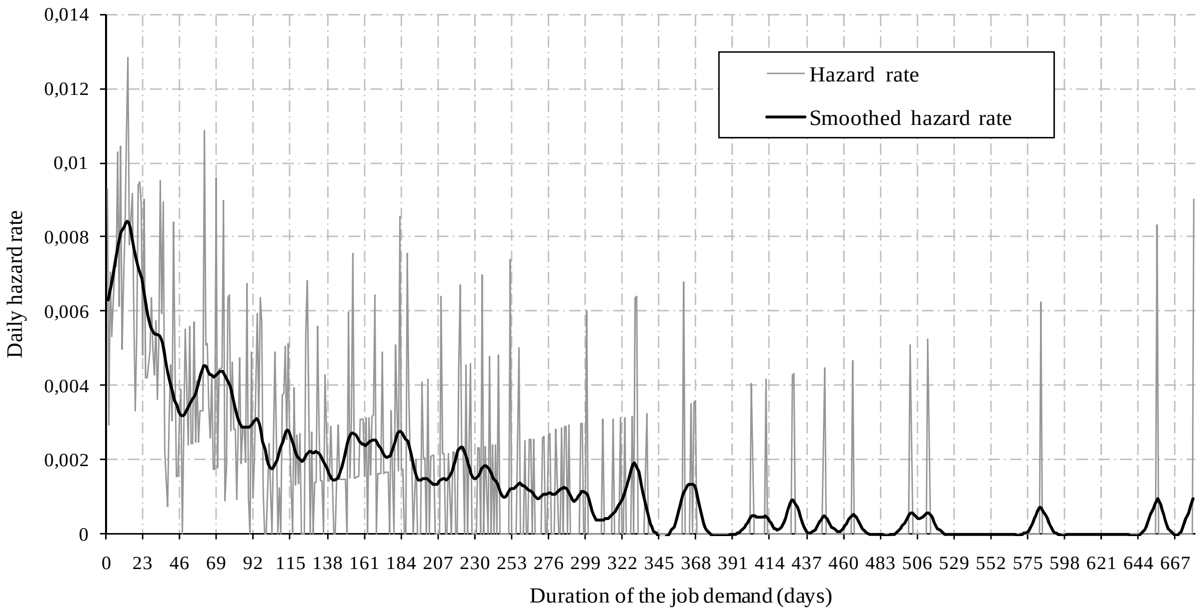
[23] To obtain the non-parametric hazard rate of job demands, we have used a different sample from the sample of vacancies analysed in this work. The job demands of the sample are registered in the SAE for the same period corresponding to the sample of vacancies (March 1, 2006-October 30, 2008).

[24] In practice, our data represent a matching scenario that is placed at some point between two pure theoretical extremes (random vs. stock-flow matching). Therefore, if our sample is closer to the stock-flow extreme, the empirically calculated stock-flow duration thresholds (k^e and k^w) are more heavily adjusted. On the other hand, to implement the Chow test, we suppose a null hazard for those durations in which no matches take place.

The Chow test gives a stock-flow break point in the hazard rate at the duration of 14 days: a vacancy that is placed on the short side of the market[25] (a "good" vacancy) should be covered in the first two weeks. The firm that offers the vacancy and the office of the SAE that manages it do not have any problems finding a suitable worker for that vacancy in the existing stock of job demands. On the other hand, if the new vacancy belongs to the long side in its segment of the market (a "bad" vacancy), then we expect that it will probably become an old vacancy, that is, it will remain without coverage for 15 or more days. In this case, the vacancy is not covered in the short term from the stock of available workers, and it will be necessary to wait for the entry of new candidates to cover it.

Figure 5 represents the (raw and smoothed)[26] non-parametric hazard rate for job demands, with 679 days being the longest duration for a job placement.

Figura 5. Non-parametric hazard rate of the managed job demands.



Source: Our elaboration based on the sample.

Analogous to the case of the vacancies, though on a smaller scale, the hazard rate tends to increase during the first two weeks of duration; it then shows a decrease that is less pronounced than in the previous case. Consequently, it is more difficult to identify the stock-flow break point. In any case, the F-statistic of the Chow test reaches a maximum value for a duration of 22 days, and, analogous to the reasoning for the case of the vacancies, we suppose that a job demand with a duration of 23 days or more can be considered an old job demand; in this sense, we suppose that this job demand belongs to a segment of the labour market where the workers are on the long side, trying to match the new vacancies that are arriving. In the hazard rate of the vacancies and in that of the job demands, the point of break between new and old units does not have to coincide exactly with the maximum value of the function. This implies that a short-side vacancy or a short-side job demand can experience a decrease in its hazard rate in spite of its short duration; this may be a result of how the job offers and job demands are managed by public employment agencies. For instance, in the case of a "good" vacancy, we could observe that a few days are necessary to begin

[25] Concretely, the vacancy is on the short side of its segment or sector in the labour market. That segment comes defined by the characteristics of the vacancy, in terms of the sector of activity, the group of occupation, etc.
[26] Due to the high variability in the hazard rate of the job demands, we have chosen to implement the test of structural change on the smoothed series –which were obtained following the method of Hodrick-Prescott (1997), using a smoothing parameter of 100.

to really manage it, which explains the hazard rate increases in the first days of the duration; and once this vacancy has been covered, it takes one or more days until the job placement is fully registered[27], which would explain the decrease in this rate.

4.2. Estimation of a duration model for the vacancies of the SAE.

We now estimate a continuous[28] lognormal parametric model for the hazard rate of the vacancies[29]. This model belongs to the accelerated failure-time type of models, where the estimated coefficients show the effect of unitary changes in the corresponding regressor on the time of survival, given the rest of characteristics. The explanatory variables that we introduce in the estimations are as follows:

- Descriptive variables of the vacancy: the group of occupation, the sector of activity, whether the vacancy is public, whether it belongs to the PFEA (plan of promotion of the agrarian employment), the province of the vacancy, the type of contract and the size of the firm. These variables do not change with the duration of the vacancy.

- Macroeconomic variable: the SAE registered unemployment rate during the sample period[30]. This variable, which changes with the duration of the vacancy, measures the effect of the aggregate changes in the Andalusian labour market over the time period of survival.

Table 1 shows the general estimation of the model for the hazard rate of vacancies. Concretely, the table presents the exponential of the estimated coefficients, which, in this type of model, 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 vacancy, maintaining everything else constant; this means, when dummy variables exist, we must compare every variable with the reference variable (the one that has not been included in the estimation). The model allows the existence of unobservable heterogeneity in the data[31], which is significant, even though the estimation controls several observable characteristics of the vacancies.

We now comment on the results obtained. The estimated duration of a public vacancy in the SAE represents only 21,56% of that of a private vacancy, whereas a PFEA vacancy survives slightly less than 70% of the estimated duration for a vacancy that does not belong to that programme. On the other hand, the vacancies corresponding to a permanent contract last half as long as those of the fixed-term type. These results seem to indicate that in the SAE environment, workers show a preference for vacancies related to the public sector (PFEA or not) and for permanent contracts.

[27] Until this operation is not carried out, the closure of the vacancy will not take place.
[28] We have chosen to use a specification in continuous time for the hazard rate of the vacancies due to the daily frequency of our data and because the mean duration of a vacancy is 208 days. In addition, two types of vacancies are censored to the right: those that remain open on the date of sample extraction and those that have been closed by different causes from the coverage. In the latter case, we suppose that if a vacancy is closed in the SAE without coverage, it does not imply necessarily that it has disappeared; rather, it implies that the SAE has abandoned its management.
[29] The lognormal specification allows a form of the hazard rate of the vacancies in accordance with the non-parametric hazard rate of Figure 4 (Jenkins, 2005). In addition, we have worked with other flexible specifications for the hazard function, as the loglogistic or the Cox semiparametric, obtaining similar results.
[30] This rate is the result of dividing the unemployed workers registered every month in the SAE by the Andalusian labour force of the corresponding quarter. That rate has been treated in daily terms by assigning the value of the rate in the corresponding month to every day.
[31] The model has been estimated without assigning any concrete value to the random variable that controls for unobservable individual effects. That variable has been introduced in the function of survival (and of likelihood) 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, cap. 8).

Table 1. Estimation of a duration model with "gamma" unobservable heterogeneity for the hazard rate of the vacancies. Log-normal regression.						
Covariables	**Time ratio. exp(coef.)**	**Standard error**	**z**	**p > |z|**	**Confidence intervals (95%)**	
PFEA	0.6911	0.0896	-2.8500	0.0040	0.5360	0.8911
Public vacancy	0.2156	0.0392	-8.4400	0.0000	0.1510	0.3079
Permanent contract	0.4932	0.1094	-3.1900	0.0010	0.3193	0.7619
Agriculture	2.0947	0.4038	3.8400	0.0000	1.4357	3.0563
Trade, restaurants, transport, communications	0.2659	0.0548	-6.4300	0.0000	0.1776	0.3983
Industry	0.3366	0.0798	-4.5900	0.0000	0.2114	0.5357
Public services	1.3216	0.1393	2.6500	0.0080	1.0750	1.6248
Other services	0.4429	0.0847	-4.2600	0.0000	0.3045	0.6442
Financial services, services to companies	0.6073	0.2451	-1.2400	0.2170	0.2753	1.3397
Non-qualified manual worker	1.2585	0.1321	2.1900	0.0280	1.0245	1.5460
Qualified non-manual worker	0.4413	0.0838	-4.3100	0.0000	0.3041	0.6404
Non-qualified non-manual worker	1.5853	0.2411	3.0300	0.0020	1.1767	2.1358
Málaga	0.9005	0.1393	-0.6800	0.4980	0.6650	1.2194
Granada	3.0504	0.4263	7.9800	0.0000	2.3195	4.0117
Córdoba	0.4193	0.0596	-6.1100	0.0000	0.3173	0.5540
Huelva	1.0529	0.1845	0.2900	0.7690	0.7467	1.4845
Cádiz	0.7205	0.1065	-2.2200	0.0270	0.5392	0.9626
Jaén	0.6023	0.0840	-3.6300	0.0000	0.4582	0.7917
Almería	0.3304	0.0583	-6.2800	0.0000	0.2339	0.4668
Micro-firm	1.4421	0.1235	4.2800	0.0000	1.2193	1.7056
Medium firm	1.0594	0.1386	0.4400	0.6590	0.8198	1.3691
Big firm	0.8119	0.1390	-1.2200	0.2230	0.5805	1.1355
Registered unemployment rate	1.0685	0.0386	1.8300	0.0670	0.9954	1.1470
Ln_sigma	0.2127	0.0542	3.9200	0.0000	0.1064	0.3191
Ln_theta	0.8446	0.1177	7.1800	0.0000	0.6139	1.0753
Sigma	1.2371	0.0671			1.1123	1.3758
Theta	2.3271	0.2739			1.8477	2.9309
Log-likelihood = -4795,0141						
LR chi2(23) = 466,43; Prob > chi2 = 0.0000						
LR test of theta = 0: chibar2(1) = 159.94; Prob>=chibar2 = 0.000						
Number of observations: 3565. Number of transitions: 1722. Total of days "at risk" of matching: 742377.						
"Dummy" variables omitted: Sevilla, small firm, qualified manual worker, construction						

Source: Our elaboration based on the sample.

If we analyse the sector of activity of the vacancy, taking the construction as the reference, we observe that in agriculture and the public services sector, the estimated duration of a vacancy is higher[32], whereas the other sectors show better rates of coverage, especially in the case of trade, restaurants, transport and communications and in the case of industry.

Grouped by occupation, the vacancies for qualified workers are those with lower duration, especially in the case of non-manual vacancies.

With regard to the provinces, Almería, Córdoba and Jaén present lower rates of survival; in these provinces the public or PFEA vacancies have an important weight. The case of Granada is

[32] This result seems strange, since in the sectors of the construction, the agriculture and the public services are most of the public and PFEA vacancies, which show relatively low rates of survival. The worst rates of survival in these sectors can then be due to the low hazard rates of the rest of vacancies, those that are not of a PFEA or public character. In this respect, for instance, of 145 PFEA vacancies that exist in the agriculture, 118 were covered, whereas of the 64 remaining vacancies, which are not of a PFEA character, only 3 were covered.

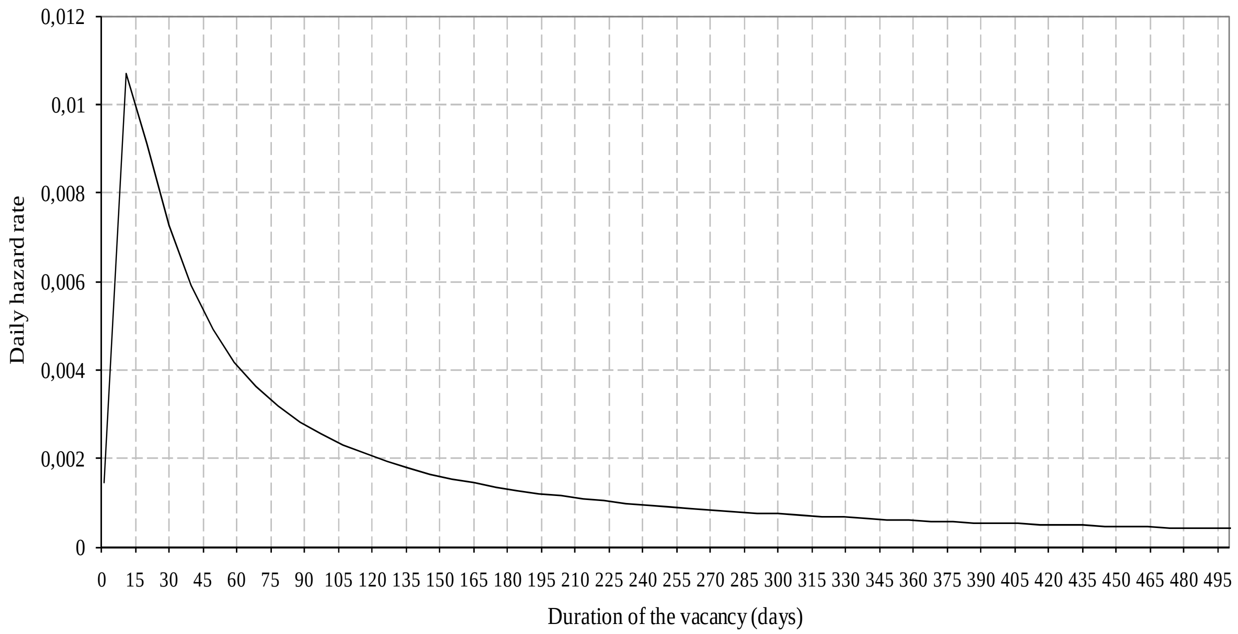
interesting, since it shows the highest rate of survival despite a high number of public vacancies -for example, the estimated duration of a vacancy in Granada trebles that in the case of Seville[33].

If we look at the size of the firm, we observe that vacancies in big firms have a shorter duration -in other words, they are covered faster- with micro-firms needing more time to fill a vacancy.

Finally, in contrast to the expected result at the theoretical level in terms of the Beveridge curve, the rate of registered unemployment shows a positive though slightly significant effect on the rate of survival of the vacancies[34]. This can be indicative of the fact that in the SAE, job placements depend on the registration of vacancies rather than on the volume of job demands (Álvarez de Toledo *et al.*, 2008).

Figure 6 shows the estimated hazard rate for a vacancy managed by the SAE:

Figure 6. Estimated hazard rate for a vacancy managed by the SAE. Log-normal regression.



Source: Our elaboration based on the sample.

As with the non-parametric hazard rate in Figure 4, the estimated hazard rate with the log-normal model increases during the first weeks of duration, a period during which the "good" vacancies must be covered, and begins to decrease later, when the "good" vacancies are less abundant within the stock of vacancies. As we will see, this form of the hazard rate is a necessary (but not sufficient) condition for the existence of a stock-flow environment.

[33] According to our sample data, the percentage of coverage of the public vacancies in Granada is relatively small.

[34] We have also implemented the estimation replacing the variable "registered unemployment rate" with the variable "DENOS rate" (DENOS is a wider category that includes all of the non-employed job seekers registered in the SAE), and this alternative variable is not significant.

4.3. Estimation of a duration model with multiple exits for SAE vacancies: testing the stock-flow model.

Once we know the respective thresholds of duration that determine whether a job demand and a vacancy become old, we can calculate the average hazard rates of the vacancies in each of the resultant segments of duration (Table 2); see also Andrews *et al.* (2009).

Table 2. Classification of the matching depending on the durations ($k^e = 14$, $k^w = 22$).

	"New" vacancies	"Old" vacancies	Total
Total of days without matching. Non-covered vacancies	203	674414	674617
Total of days without matching. Covered vacancies	6555	59483	66038
Matching with a "new" job demand	*178*	*217*	*395*
Matching with an "old" job demand	*630*	*697*	*1327*
Total of days "at risk" of matching	7566	734811	742377

Source: Our elaboration based on the sample.

The 1.722 job placements are disaggregated in Table 2 attending to the duration of the vacancy and that of the job demand, considering $k^e=14$ and $k^w=22$. Consequently, we obtain 4 types of matching:

- m_{11}: new job demand with new vacancy, which represents 10,3% of the job placements.
- m_{12}: new job demand with old vacancy (12,6%).
- m_{21}: old job demand with new vacancy (36,6%).
- m_{22}: old job demand with old vacancy (40,5%).

The mean hazard rates of the vacancies in every category can be obtained by dividing the total job placements by the total days "at risk" for the vacancies:

- h^e_{11} = 178 / 7566 = 0,023.
- h^e_{12} = 217 / 734811 = 0,0003.
- h^e_{21} = 630 / 7566 = 0,083.
- h^e_{22} = 697 / 734811 = 0,0009.

The notable decrease observed in the hazard rate of vacancies in Figure 4 can be decomposed in two facts: 1º) The hazard or risk of matching of a vacancy with a new job demand decreases from 0,023 to 0,0003 when the vacancy becomes old. 2º) The hazard of matching of a vacancy with an old job demand decreases from 0,083 to 0,0009 when the vacancy becomes old.

The fact that both hazard rates, those towards new job demands and those towards old job demands, decrease with duration of the vacancy could be unexpected from the point of view of the stock-flow model, which only predicts a decreased hazard rate when the transitions are towards old job demands. However, other factors, apart from the stock-flow framework, explain the decrease of both rates, such as the permanence in the stock of managed vacancies, period after period, of fictitious vacancies of administrative character[35]. Therefore, we suggest that the existence of certain evidence in favour of the stock-flow model in our data cannot rest totally on the second fact observed (that h^e_{21} is higher than h^e_{22}). In addition, the fact that when the vacancies are new, the hazard rate towards old job demands (h^e_{21}) is higher than the hazard rate towards new job demands (h^e_{11}) does not suppose a clear indication of stock-flow hypothesis, since, for every duration of the vacancy, the volume of old demands "at risk" of matching is considerably higher than the volume of new demands.

[35] If the stock of vacancies is running out of those with real matching options, with only the problematic vacancies remaining, the hazard rate of the vacancies must always decrease with duration.

Taking into account all of these problems, the testing hypothesis that we formulate in this work is as follows: if there exists some degree of stock-flow matching in our data, the ratio of "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. If this happens, we can affirm that matching towards old job demands becomes less important compared with matching towards new job demands with the duration of the vacancy, as predicted by the stock-flow model. From another perspective, under a random matching scheme, where the lack of information -among other frictions- forces all of the firms and all of 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.

If we compare, for our sample, the ratio "h^e_{21} / h^e_{11} = 3,61" with the ratio "h^e_{22} / h^e_{12} = 3", certain evidence in favour of the stock-flow matching is obtained, since the exits of the vacancies towards old job demands become less important when the vacancy becomes old. This conclusion should be taken cautiously, since other characteristics or heterogeneities might exist in the vacancies, apart from the stock-flow scheme, that explain the above mentioned result. To control for the possible existence of heterogeneity in the vacancies, both observable and unobservable, we proceed to estimate a duration model, which considers two types of matching or successful exits for the vacancies: towards new job demands (those with duration lower than 23 days) and towards old job demands (those with durations greater than 22 days). If the estimation shows that, after controlling for heterogeneity, the ratio of the hazard rates (towards old job demands and towards new job demands) decreases with the duration of the vacancy, then we can affirm that we have found evidence in favour of stock-flow matching. This type of methodology can be also very interesting for organising employment policies directed towards specific groups of workers, classified depending on the duration of their job demands. The results are presented in Table 3.

The first thing we observe in this table is that a higher relative speed of coverage of the PFEA vacancies mainly affects the exits towards old job demands, which seems to indicate that those vacancies are fundamentally destined for the high-duration job demands. However, this does not happen with the public vacancies in general, which, in spite of including the PFEA vacancies, show a relatively lower rate of survival if the transition of the vacancies is towards new job demands. For the case of permanent contract, the rate of survival is relatively lower when the exits are towards new job demands, although the variable is not very significant in this case.

At the sectoral level, important differences between the estimations are not observed; that is, the agriculture, construction and public services sectors show higher probabilities of survival than the other sectors. Nevertheless, a lower rate of survival in the industry of those vacancies that are covered with new job demands is observed. Grouping by occupation, the vacancies of higher qualification (qualified non-manual group) are filled faster towards new job demands.

Therefore, it is observed that public vacancies (but not PFEA), with a permanent contract, in the industrial sector and calling for high-level skills find suitable candidates between the new job demands, which presumably correspond to workers with high relative employability.

Table 3. Estimation of a duration model with "gamma" unobservable heterogeneity for the hazard rate of the vacancies. Log-normal regression. Multiple exits (k^w=22).

	Exit towards a "new" job demand (22 days or less)						Exit towards an "old" job demand (more than 22 days)					
Covariables	**Time ratio. exp(coef.)**	**Standard error**	**z**	**p > |z|**	**Confidence intervals (95%)**		**Time ratio. exp(coef.)**	**Standard error**	**z**	**p > |z|**	**Confidence intervals (95%)**	
PFEA	0.9761	0.3802	-0.0600	0.9500	0.4549	2.0945	0.6813	0.0829	-3.1500	0.0020	0.5368	0.8648
Public vacancy	0.1225	0.0463	-5.5600	0.0000	0.0585	0.2568	0.4692	0.0768	-4.6200	0.0000	0.3404	0.6468
Permanent contract	0.4858	0.3000	-1.1700	0.2420	0.1448	1.6297	0.5117	0.1127	-3.0400	0.0020	0.3322	0.7881
Agriculture	2.7071	1.2714	2.1200	0.0340	1.0783	6.7965	2.5772	0.4620	5.2800	0.0000	1.8137	3.6622
Trade, restaurants, transp., comm.	0.3215	0.1525	-2.3900	0.0170	0.1269	0.8145	0.3470	0.0728	-5.0400	0.0000	0.2300	0.5237
Industry	0.3235	0.1814	-2.0100	0.0440	0.1078	0.9707	0.6303	0.1436	-2.0300	0.0430	0.4032	0.9852
Public services	1.8504	0.4877	2.3300	0.0200	1.1039	3.1018	1.2100	0.1141	2.0200	0.0430	1.0058	1.4557
Other services	0.5532	0.2334	-1.4000	0.1610	0.2419	1.2649	0.5217	0.1054	-3.2200	0.0010	0.3511	0.7753
Financial services, serv. companies	0.3185	0.3164	-1.1500	0.2490	0.0455	2.2315	0.7087	0.2697	-0.9000	0.3660	0.3362	1.4943
Non-qualified manual worker	0.7815	0.2036	-0.9500	0.3440	0.4690	1.3024	1.3945	0.1401	3.3100	0.0010	1.1452	1.6981
Qualified non-manual worker	0.2296	0.0996	-3.3900	0.0010	0.0981	0.5373	0.6381	0.1221	-2.3500	0.0190	0.4385	0.9286
Non-qualified non-manual worker	1.5689	0.5424	1.3000	0.1930	0.7968	3.0892	1.1980	0.1821	1.1900	0.2350	0.8893	1.6139
Málaga	1.4466	0.5086	1.0500	0.2940	0.7262	2.8815	0.6872	0.1023	-2.5200	0.0120	0.5132	0.9201
Granada	5.5581	1.9052	5.0000	0.0000	2.8389	10.8818	1.9461	0.2681	4.8300	0.0000	1.4856	2.5494
Córdoba	0.5389	0.1778	-1.8700	0.0610	0.2822	1.0289	0.4308	0.0557	-6.5100	0.0000	0.3344	0.5551
Huelva	1.4733	0.6019	0.9500	0.3430	0.6616	3.2812	0.9292	0.1585	-0.4300	0.6670	0.6652	1.2981
Cádiz	2.3828	0.8769	2.3600	0.0180	1.1584	4.9015	0.5734	0.0808	-3.9500	0.0000	0.4351	0.7558
Jaén	1.0258	0.3388	0.0800	0.9390	0.5369	1.9599	0.5477	0.0704	-4.6800	0.0000	0.4257	0.7047
Almería	0.6541	0.2589	-1.0700	0.2830	0.3011	1.4209	0.2305	0.0401	-8.4400	0.0000	0.1640	0.3242
Micro-firm	1.4567	0.2966	1.8500	0.0650	0.9773	2.1712	1.2789	0.1009	3.1200	0.0020	1.0956	1.4928
Medium firm	1.2388	0.3918	0.6800	0.4980	0.6665	2.3027	1.0331	0.1231	0.2700	0.7850	0.8179	1.3049
Big firm	0.6095	0.2757	-1.0900	0.2740	0.2512	1.4792	0.9897	0.1499	-0.0700	0.9450	0.7354	1.3318
Registered unemployment rate	1.0231	0.0915	0.2600	0.7980	0.8586	1.2192	1.0876	0.0348	2.6200	0.0090	1.0214	1.1581
Ln_sigma	0.5599	0.1349	4.1500	0.0000	0.2955	0.8244	-0.0861	0.0537	-1.6000	0.1090	-0.1914	0.0191
Ln_theta	2.5194	0.2632	9.5700	0.0000	2.0036	3.0352	1.6401	0.0811	20.2200	0.0000	1.4811	1.7991
Sigma	1.7506	0.2362			1.3438	2.2805	0.9174611	0.0492487			0.8258396	1.019247
Theta	12.4212	3.269021			7.415556	20.80575	5.155794	0.4181845			4.397997	6.044163
	Log-likelihood = -1723,24						Log-likelihood = -3941,78					
	LR chi2(23) = 137,92; Prob > chi2 = 0.0000						LR chi2(23) = 370,75; Prob > chi2 = 0.0000					
	LR test of theta = 0: chibar2(1) = 36,39; Prob>=chibar2 = 0.000						LR test of theta = 0: chibar2(1) = 196,86; Prob>=chibar2 = 0.000					
	Number of observations: 3565. Num. of transitions: 395. Total of days "at risk" of matching: 742377						Number of observations: 3565. Num. of transitions: 1327. Total of days "at risk" of matching: 742377					
	Dummy variables omitted: Sevilla, small firm, qualified manual worker, construction						Dummy variables omitted: Sevilla, small firm, qualified manual worker, construction					

Source: Our elaboration based on the sample.

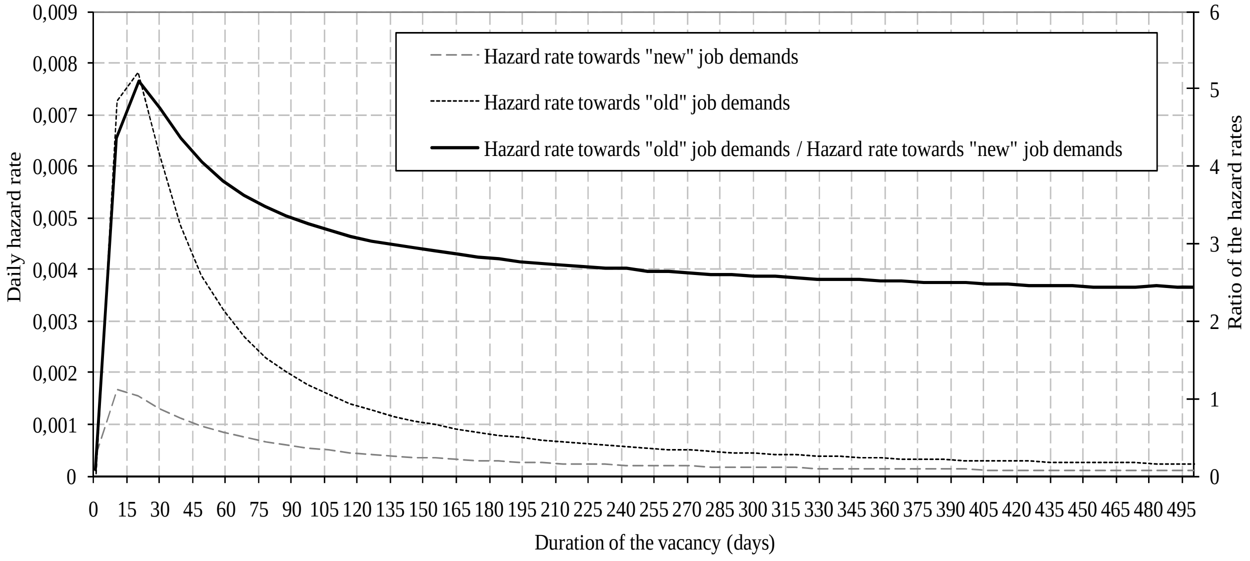
For the Andalusian provinces, exempting the cases of Granada and Cádiz, which are relatively worse, important differences between Seville and the rest of the provinces are not observed when the transitions are towards new job demands -if the reduced significance of the coefficients is taken into account. However, almost all provinces improve their positions in comparison with Seville when the transitions are towards old job demands, especially Granada and Cádiz, although Granada continues in a worse position.

According to the size of the firm, we only observe clearly the worst relative position of the micro-firm in comparison with the other sizes of firms, independent of the type of exit.

Finally, the Andalusian registered unemployment rate shows a positive and significant effect on the probability of survival for a vacancy that matches with an old job demand; this fact points towards the existence of a labour imbalance or a mismatch between the vacancies and the job demands that mature in the stock.

The estimations of the hazard rate of the vacancies according to the exit (left axis) and the ratio of both rates (right axis) appear in the following figure:

Figure 7. Hazard rates of the managed vacancies depending on the exit (kw=22). Log-normal regression. Ratio of the hazard rates

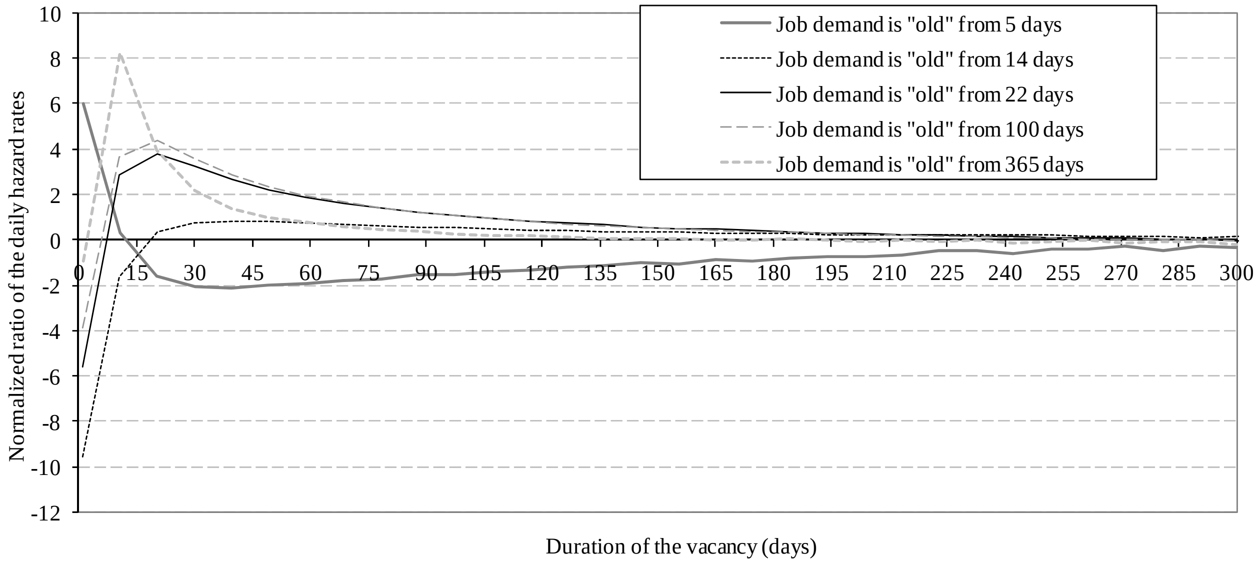


Source: Our elaboration based on the sample.

Both rates show a negative dependence on duration after approximately the first two weeks of the duration of the vacancy, with the hazard rate towards old demands consistently being higher, especially when the vacancies are new. The ratio between both rates decreases when the vacancy increases its duration, which from our point of view indicates the existence of stock-flow dynamics in the vacancies managed by the SAE: when a vacancy of the SAE is becoming old, the probability of transition towards a new job demand is reinforced to the detriment of the probability of transition towards an old job demand.

To complete our analysis, we now check the robustness of our results. In this sense, we analyse what happens with the above mentioned ratio of hazard rates of the vacancies if we use alternative durations to consider that a job demand has become old. If k^w tends to infinity, when the vacancies mature should diminish their relative rate of matching with the job demands that we consider old, since that vacancy and that worker have coexisted for a long period of time without matching. However, if k^w tends to 0, when the vacancies mature we cannot assure the reduction of their relative hazard rate with the job demands that we consider old because those workers have only been in the market for a short period of time, coexisting with the stock of old vacancies; even that relative probability might increase. The following figure shows the normalised ratio of those hazard rates supposing that the job demand becomes old after 5, 14, 22, 100 days or 1 year of searching.

Figure 8. Normalized estimations of the "hazard rate towards "old" job demands / hazard rate towards "new " job demands" for different durations of the job demand. Log-normal regression



Source: Our elaboration based on the sample.

If we consider a job demand to be old when it has only been 5 days "at risk" of matching, the ratio of the hazard rates does not behave like the stock-flow model predicts, since the above-mentioned ratio, instead of decreasing, increases with the duration of the vacancy. This is indicative that not all of the "good" job demands have access to the other side of the market and a job placement in less than 6 days; consequently, a fraction of the job demands of more than 5 days of duration corresponds to "good" job demands, which will go towards old vacancies. In conclusion, the threshold of 5 days is not calibrated to measure the maximum duration of a "good" job demand. Later, we slightly increase the threshold of duration for an old job demand, but without reaching 22 days; concretely, we consider k^w=14. In this case, we obtain a ratio of the hazard rates that is very flat but shows a certain negative slope for the high durations of the vacancy, which points to the existence of a stock-flow framework, but only of the weak form. Finally, if we consider as old the job demands that survive several months without matching (for example, 100 or 365 days), a clear decrease in the ratio of the hazard rates is observed, which is reasonable if we consider that in this case we have assured that the old job demands are in fact “bad” demands.

5. Conclusions.

The present work attempts to explain the main characteristics of the matching process of the vacancies registered in the offices of the SAE and to determine the characteristics of the vacancies that result in a job placement with higher and lower duration. In addition, our work proposes a new method to test whether the matching process of the vacancies managed by the SAE follows a stock-flow framework. According to the stock-flow model, the vacancies that are registered in a marketplace (with complete information about the existing candidates) have to be separated into two groups: those that are "good" and are covered quickly because we find many workers in the stock of candidates interested in filling them and those that are "bad" and are not covered quickly (becoming old) because they do not find initially suitable workers to cover them and have to wait for the arrival of a new suitable candidate to fill the vacancy. It is possible to apply the same reasoning to the workers, distinguishing between "good" and "bad" job demands. If the above-mentioned theoretical framework operates in a certain degree in the SAE and the duration that separates a "good" worker from a "bad" one is identified correctly, the ratio between the hazard rate of the vacancies towards old job demands vs. towards new job demands should decrease when the vacancy increases its time period of survival, since this longer survival signifies a lack of suitable candidates for the vacancy in the existing stock of workers, being more likely the transition towards a job demand recently registered, which would abandon quickly the search. To implement our test, the estimation of duration models for the hazard rate of the vacancies while considering the possibility of multiple exits is necessary; in addition, in these estimations, we tackle the existence of observable and unobservable heterogeneity. With all of these methodological elements, our work applies the state-of-the-art components of the main contributions in this field at the international level. Although our case study is interesting, because Andalusia has a special labour market that has received a lot of attention, we also think that the application of this type of analysis to other economies could be a fruitful line of future research.

The main results obtained in our work are as follows:

The vacancies managed by the SAE with a lower rate of survival present the following characteristics: they belong mainly to the public sector, are linked to permanent contracts, belong to the sectors of industry and to services in general, concern qualified workers, especially non-manual or "white collar" workers, are registered in the provinces of Almería, Córdoba or Jaén, and are offered by medium-sized or large firms. On the contrary, the vacancies showing greater difficulty in coverage are in private companies, are linked to fixed-term contracts, belong to the agricultural sector, are related to workers with low qualifications, are registered in the province of Granada, and are offered by micro-firms.

The empirical methodology that we propose in this work shows certain evidence in favour of the stock-flow matching model. First, we observe that a "good" vacancy is covered in the SAE within approximately two weeks, whereas a "good" job demand does not last more than three weeks. Our estimations show that, with the independence of the characteristics of the vacancy, when a vacancy matures, its exit towards a "good" job demand is relatively more likely, since when the vacancies and the "at risk" workers coexist, period after period, their matching is increasingly less likely. In this labour market environment, a worker who does not find a suitable vacancy, not for lack of search intensity but because the vacancy does not exist in the current stock, should not be "sanctioned" with the reduction or elimination of his unemployment subsidy; rather, it would be necessary to transform the type of payment to develop geographical mobility and the recycling of workers with the aim of improving their overall employability, which will allow them to escape from the queues of workers (Álvarez de Toledo *et al.*, 2008). In this respect, the programme of personalised itineraries of insertion to employment of the SAE could be a useful tool. In conclusion, we point to the active labour market policies -see Usabiaga (2007) and Gómez *et al.* (2009). We also have the possibility, recently opened in Spain, of transforming unemployment subsidies into subsidies for permanent contract hiring -on employment vouchers, see Orszag and Snower (2000).

Finally, we believe that the SAE would improve its matching results with a decrease in the imbalance in preferences and characteristics that seems to exist between registered job offers and job demands. We are currently working in this field to detect imbalances for very specific segments of the overall SAE labour market. In this sense, the SAE or, in general, the Andalusian government, by means of industrial location/organisation policies, should promote the registration of "good" (short-side) vacancies, which are attractive for existing unemployed workers, and, to a lesser extent, incorporate workers who could fill the "bad" (long-side) vacancies through such actions as promoting the registration of immigrant workers. 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).

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