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Marriage Wage Premium with Contract Type Heterogeneity

Roberto Bonilla[*], Newcastle University, UK

Miguel Á. Malo[†], Universidad de Salamanca, Spain.
Fernando Pinto, Universidad Rey Juan Carlos, Spain.

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Abstract

We present a model of interlinked labour and marriage markets, both characterised by sequential search, where men are seen as breadwinners in the family. Two types of jobs exist – temporary and permanent. Men's reservation strategy in their labour market search results in two reservation wages - one for each type of job. Women's reservation strategy in their marriage market search results in two distinct reservation wages: for men on temporary jobs and for men on permanent jobs, where the former is higher. This reflects a trade-off between husband's wage and type of contract. This generates equilibria with a positive marriage wage premium for all workers, but higher for temporary workers. We successfully test our results using Spanish data. Linked to this, we also find that permanent employment is linked to higher wages among never married workers, but to lower wages among married employees. We argue that the traditional arguments of specialisation and selection for a marriage wage premium predict the opposite results.

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[*]Corresponding author: Newcastle University, Business School, 5 Barrack Road, NE1 4SE, United Kingdom. Tel.: +44 191208 1670. Email: Roberto.Bonilla@ncl.ac.uk

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1 Introduction

On average, married men seem to earn more than single men. This wage gap persists after controlling for systematic in individual attributes. According to Daniel (1995), estimates range from 10 to 30%. Cohen and Haberfeld (1991), Nakosteen and Zimmer (1997) are two influential examples of the wide empirical literature on this topic. Crucially, the empirical evidence seems to suggest no marriage wage premium for women.

The traditional explanations for the male marriage wage premium are based on the concepts of "specialisation" and "selection". The selection hypothesis (see Nakosteen and Zimmer (1997) for an example) posits that some unobservable characteristics of men are valued not only in the labour market but also in the marriage market. Based on these unobservables, productive men may be perceived as more attractive partners, thus generating the positive correlation between wages and married status.. However, the empirical evidence on this is quite weak. Ginther and Zavodny (2001) find that only up to 10% of wage premium is a result of selection, whereas Chun and Lee (2001) go even further and argue that the selection effect is minimal.

In turn, the household specialisation argument originates in the work of Becker (1993). It proposes that marriage increases a man's productivity, following the labour market specialisation that is possible due to the support of a wife. Korenman and Neumark (1991) provide some empirical support for this hypothesis. They find that wages increase after marriage, married men get better performance evaluations and are promoted more frequently.

A growing body of empirical evidence shows that the difference in wages of married and unmarried men stems from selection into marriage directly based on wages and wage growth - crucially, both observable. Grossbard-Shechtman and Neuman (2003) call this the "breadwinner" effect. Going a step further, Ludwig and Brüderl (2018) propose that the traditional arguments of specialisation and selection should be discarded.

This, in fact, seems to reflect existing evidence on the gender asymmetry in the interaction between labour market and marriage preferences and outcomes. For example, Blundell et al. (2016) show that female attachment to the labour market weakens considerably after marriage. In turn, Gould and Paserman (2003) suggest that increased male wage inequality leads to a decline in marriage rates for women. They also find that women are more selective in the marriage market when female wages increase (a proxy for the value of being single relative to married) and that they are less selective when male wages increase (proxy for the value of being married relative to single). In all these, the analogue is not true for men. They conclude that their findings support a search model of the female marital market. Similarly Oppenheimer and Lew (1995) find that increased economic independence leads to a delay in marriage for women, but not to a substantial decrease in the proportion of women who will marry. Oppenheimer (1988) calls this the "extended spouse search" theory. Once again, they argue that the analogue is not true for men. In all these studies, men's economic potential is positively related to likelihood of marriage.

Bonilla and Kiraly (2013) introduced a theoretical framework of interrelated frictional labour and marriage markets that captures the above asymmetries. They are the first to obtain a marriage premium as a result of search frictions, without relying on the traditional explanations: the result does not depend in any way on any notion of specialisation or male heterogeneity (observed or unobserved). Instead, the causality is in the direction suggested by Ludwig and Brüderl (2018). In Bonilla and Kiraly (2013), women choose a reservation match in their (marital) search efforts, and this translates into a reservation wage such that they will not marry any employed man who earns less than that. Aware of this, men's job search is characterised by an optimally chosen reservation wage which may be lower - that is, while they of course hope for a high wage that would be acceptable to women, they will still accept wages that imply women will reject them for marriage, provided these wages are not too low. The gap between the male (labour market) reservation wage and the female (marriage market) reservation wage is what generates the marriage wage premium.

The framework has proved useful to study related issues. For example, Bonilla et al (2019) introduce male heterogeneity as regards to the marriage market (some men are more attractive) and shows that the framework can explain the existence of Beauty Premium - including its links to marriage premium. The theoretical results are successfully tested using British data. Similarly, Bonilla et al (2021) introduce male heterogeneity as regards to the labour market (some men are more productive than others), and it generates a prediction of the ranking of the marriage premia across men of differing productivities. This is tested successfully using Chinese data. In turn, Bonilla et. al (2017) introduces female heterogeneity as regards to the marriage market (some women are more attractive than others) and show that this can lead to class formation as in Burdett and Coles (1997), but based on the exogenous distribution of productivities and the *endogenous* distribution of wages.

In this paper we extend benchmark framework in Bonilla and Kiraly (2013) by introducing male heterogeneity not in the male or the female side of the market, but in the labour demand side: two types of jobs are available, some are temporary and some are permanent. This results in a clear testable prediction: The marriage wage premium that characterises men on permanent jobs is in general lower than that which characterises men on temporary jobs, when a marriage premium exists at all. The reason is clearly linked to the forces that generate the marriage wage premium in the first place: given a wage earned by the prospective husband, the future is nicer if his job is permanent. As a result, women set lower marital reservation wages for men on permanent contracts, and this translates into lower marriage wage premia for these men.

We test the model using Spanish data. Spain seems to be a very good scenario to test our model for at least two reasons: First, the dualisation of its labour market between temporary and permanent workers. In Spain, the share of temporary contracts relative to all wage and salary workers reached a peak of 33% at the beginning of the 1990s (Dolado et al., 2002), and has remained above 20% including at the worst moments of the great recession, even though temporary workers where severely affected by employment losses (International Labor Organization, 2014). Second, there is evidence that the link between labour and marriage market dynamics differs across genders in a way closely linked to the heart of the model: De la Rica and Iza (2005) find that there is a delay in the transition to marriage for men on unstable contracts (or indeed not working) relative to men on open-ended contracts, but this difference does not exist for women.

Our empirical results are in line with the predictions of the model: the marriage wage premium is higher for temporary workers. Deconstructing this result, we find that among never married workers, a permanent employment is linked to higher wages. In stark contrast, it is linked to lower wages among married employees.. We see this as evidence that, ceteris paribus, women 'select' higher earning men for marriage, and marry workers with 'bad' features in the labour market -as a temporary contract- when this can be compensated with higher earnings. We also present some robustness checks, broadly confirming our results.

Crucially these results are opposite to what would be expected if specialisation or selection based on unobserved heterogeneity were the main forces behind the marriage wage premium. One would expect more labour market specialisation on men on permanent contracts. Following this, the marriage wage premium among men on permanent jobs should be higher. Regarding the selection on unobservables argument, one would expect married men on permanent job to exhibit more valuable labour market characteristics, and this to be reflected in a higher wage premium. Thus, this explanation would predict a higher marriage wage premium among men on permanent jobs. If one considers that this is reflected in the nature of the contract itself (open ended vs temporary) instead of wages, then the selection on unosbervables approach does not result in a prediction related to the result in this paper. This view is, nevertheless, not supported by the fact that, overall, we observe single men on permanent contracts earning higher wages than on temporary contracts, but this is not true for married men.

Section 2 introduces the model in detail and derives steady state values for the ensuing analysis, while Section 3 analyses optimal search by women and men respectively. Section 4 addresses the equilibria and finishes with a discussion of the testable predictions, relative to the marriage wage premia. The empirical test is addressed in Section 5, while Section 6 concludes.

2 The model

Men enter the economy single an unemployed. They search sequentially for jobs, of which there are two types (type denoted by i): Permanent ($i = p$) or Temporary ($i = t$). We assume that unemployed men contact jobs of type i with exogenous arrival rate λ_i.The distribution of wages is common across job types, and is denoted $F(w)$, with minimum and maximum and wages given by $\underline{w}$ and $\overline{w}$ and respectively. Simultaneously, single men meet women at rate λ_w- this rate is the outcome of a quadratic matching function that characterises search in the marriage market. Men take as given that women are picky, and only accept marriage to men employed in jobs of type i if they earn wages not lower than T_i. If employed at wage w and single, men enjoy flow payoff w. If married, men enjoy flow payoff $y > 0$ in addition to the wage. Jobs of type i are destroyed at rate δ_i, with $\delta_t > 0$ and $\delta_p = 0$. There is a continuous flow ξ of single unemployed men into the economy. Divorce is prohibited. In this environment characterised by sequential search, men's optimal policy is to decide two reservation wages R_i such that they do not accept employment in a job of type i if it pays less than R_i.

Women enter the economy single. While single, women enjoy flow utility x. Only when single, they meet employed men of type i at rate τ_i- these are endogenous and are the result of a quadratic matching function. A woman married to a man earning wage w enjoys flow payoff $w-$ we assume flow value x is given up upon marriage. In this environment, women's optimal strategy is characterised by two marital reservation wages T_i, such that they do not marry a man employed in a job of type i if he earns less than T_i. We assume that when a woman gets married, she is replaced by an identical woman. Hence the number of women, n can be treated as exogenous. To avoid confusion with the male reservation wages in the labour market, we refer to these female reservation wage as cut-off wages from now on.

As in Bonilla an Kiraly (2013) and Bonilla et al. (2018) we will focus on equilibria in which women do nor marry unemployed men. As is shown there, this equilibria are trivial and uninteresting because the marriage market does not affect men's labour market decisions.

2.1 Arrival rates, stocks, and wage distributions in steady state

Arrival rates. We address first the relevant arrival rates as a function of the steady state measures. In steady state, let u denote the measure of single, unemployed men and N_i denote the measure of single-marriageable men in type i contracts - in the sense that they earn a wage not lower than T_i. Further, let $\widetilde{N}_i$ denote the respective measures employed, unmarriageable men. With with the measure of single women given by n, the number of meetings between a man and a woman is given by $m = \lambda(u + N_t + N_p + \widetilde{N}_t + \widetilde{N}_p)$ where λ is an efficiency parameter. It follows that the rate at which a single man encounters a single woman is $\lambda_w = \lambda n$. Similarly, the rate at which a woman meets a single marriageable man of type i is given by $\frac{m}{n}\frac{N_i}{(u+N_t+N_p+\widetilde{N}_t+\widetilde{N}_p)} = \lambda N_i$.

Steady state stocks. We now turn our attention to the determination of the relevant measures of men in different states. With $\delta_p = 0$, the stock of single and unemployed men (u) is given by flow in equal flow out, or

$$u = \frac{\xi + N_t\delta_t + \widetilde{N}_t\delta_t}{\lambda_t[1-F(R_t)] + \lambda_p[1-F(R_p)]}$$

In the above, the flow into u is composed of the exogenous flow of men into the economy plus the single men (marriageable and unmarriageable) in type t jobs who lose their job. Please note that married employed men also lose jobs at the respective rates, but being married they do not fall back into the single and unemployed category. The flow out of u includes men who accept jobs of either type: they meet a job of type i that pays a wage not lower than R_i (recall that we consider equilibria where single men are not accepted by women).

The stock of employed, unmarriageable men of type t, denoted $\widetilde{N}_t$ is given by

$$\begin{aligned} u\lambda_t[F(T_t) - F(R_t)] &= \widetilde{N}_t\delta_t \\ \widetilde{N}_t &= \frac{u\lambda_t[F(T_t) - F(R_t)]}{\delta_t} \end{aligned}$$

where the flow in is given by the single unemployed men who accept jobs of type t with wages below the cut-off wage a woman would accept. The flow out is given by those who lose their job[1].

Finally, the stocks of employed marriageable men in temporary jobs, which we denote N_i, solve (noting that we have assumed $\delta_p = 0$)

$$\begin{aligned} u\lambda_i[1 - F(T_i)] &= N_i(\delta_i + \lambda n) \\ N_i &= \frac{u\lambda_i[1 - F(T_i)]}{(\delta_i + \lambda n)}. \end{aligned}$$

[1] The stock of unmarriageable men in jobs of type P never reaches a steady state since there is no flow out. This is of no consequence for the analysis below. It could in any case be addressed by introducing a rate at which men leave the economy.

Here, the flow in is given by single unemployed men who accept jobs of type i with a marriageable wage, while the flow out includes men in this group who either lose their job or get married.

As shown in Appendix 1, substituting out $\widetilde{N}_i$ and N_i in u above leads to:

$$\begin{aligned} u &= \frac{\xi(\delta_t + \lambda n)}{\Gamma_a} \\ \Gamma_a &= \lambda_t[1 - F(T_t)]\lambda n + \lambda_p[1 - F(R_p)][\delta_t + \lambda n] \end{aligned}$$

and thus N_t and N_p are given by

$$\begin{aligned} N_t &= \frac{\xi\lambda_t[1 - F(T_t)]}{\Gamma_a} \\ N_p &= \frac{\xi(\delta_t + \lambda n)}{\Gamma_a}\frac{\lambda_p[1 - F(T_p)]}{\lambda n} \end{aligned}$$

It is straightforward to show that $\frac{\delta N_p}{\delta T_t} > 0$,and the intuition is quite interesting: ceteris paribus, as T_t increases, *less* men accept marriageable t jobs and eventually get married - these men would never fall back into the unemployed and single category (u). In addition, *more* men accept jobs with unmarriageable wages, these men eventually fall back into single and unemployed category. Thus, the stock of single and unemployed men *increases*. This in turn means more men flow into marriageable permanent jobs, resulting in an increase in N_p.

Further, $\frac{\delta N_t}{\delta T_t} < 0$ as expected, since temporary jobs with marriageable wages are, ceteris paribus, more difficult to find.

Steady state wage distributions. Following from the above, we now compute the distribution of wages among marriageable men of type i, those with wages higher than or equal to women's respective cut-off wage. We use $G_i(w)$ to denote these distributions. The flow of men into employment at wages which are marriageable but less than w in type i jobs is given by $u\lambda_i[F(w) - F(T_i)]$, while the flow out is given by $N_iG_i(w)(\lambda_n + \delta_i)$. Equating these and substituting out N_i yields

$$G_i(w) = \frac{[F(w) - F(T_i)]}{[1 - F(T_i)]}$$

3 Optimal search

Here we address the optimal search strategies. In this sequential job search framework in which two types of jobs can be encountered, men optimally chose two reservation wages: one for each type of job. Since women are homogenous from men's point of view (marriage to any woman yields flow payoff y), men always want to get married and there is no male marriage market reservation wage. In turn, women face a sequential search problem in which two types of unemployed men can be found (working in p or t jobs) and thus optimally choose two cut-off wages, one for men employed on t jobs and one for men on p jobs. We also address the conditions for women to reject unemployed men. We start by analysing women's problem.

3.1 Women

We first derive the conditions under which women will reject marriage to an unemployed worker. For this, will be useful to obtain the reservation wage of a married unemployed workers. Using $\underline{R}_i$ to denote these two wages, Appendix 2 shows that the value attributed to married, unemployed men is given by $U^M = \frac{\underline{R}_p + y}{r} = \frac{\underline{R}_t + y}{r}$, and that

$$\underline{R}_t = \underline{R}_p = \frac{\lambda_t}{r + \delta_t} \int_{\underline{R}}^{\overline{w}} [w - \underline{R}]\, dF(w) + \frac{\lambda_p}{r} \int_{\underline{R}}^{\overline{w}} [w - \underline{R}]\, dF(w) \equiv \underline{R}$$

Since marriage market is irrelevant to married men, their reservation wage is that of a stand alone search labour market. Indeed, this reservation wages are not affected by y, since marriage will never be lost. There are two reasons why this "baseline" reservation wage is the same for both types of jobs: First, search is not directed, so both different types of jobs are found while searching in the same pool. Second, because the reservation wages equate the value of working at that wage and the value of unemployment, the job destruction rate -the only difference across these two job types- does not make a $\underline{R}_t$ differ from $\underline{R}_p$.

Please note, the decision problem that we analyse relates to R_i and T_i. Hence it is worth highlighting that $\underline{R}$, although a fairly complicated object, is a function of parameter values only. Further, since x is not one of the parameters affecting $\underline{R}$, the latter can be considered as exogenous for the purposes of the analysis below.

We denote W_U^M the value of marriage to an unemployed worker. Since any wage the husband earns in the future is a public good within marriage, the value of marriage to an unemployed is determined by his job acceptance strategy. Having solved for $\underline{R}_i$, and using $W_i^M(w)$ to denote the value of marriage to a worker earning w in a type i contract, it follows that W_U^M solves:

$$rW_U^M = \lambda_t \int_{\underline{R}}^{\overline{w}} \left[W_t^M(w) - W_U^M\right] dF(w) + \lambda_p \int_{\underline{R}}^{\overline{w}} \left[W_p^M(w) - W_U^M\right] dF(w)$$

where $W_t^M(w) = \frac{w+\delta_t W_U^M}{r+\delta_t}$ and $W_p^M(w) = \frac{w}{r}$. In the above, if the husband finds a job (permanent or temporary) at an acceptable wage, then he becomes employed and the lifetime discounted value enjoyed by the woman changes accordingly.

Finally, we deal with the lifetime discounted value of a women who are single, W^S. At this point, we consider the possibility of marriage to unemployed workers, in order to determine the region in which women will optimally reject it. They meet marriageable men in a type i job at rate N_i, which leaves them enjoying $W_i^M(w)$. They meet unemployed men at rate u, and if the accept them for marriage they enjoy W_U^M. Hence, W^S is given by

$$\begin{aligned} rW^S \;\; = \;\; & N_t \int_{T_t}^{\overline{w}} \left[W_t^M(w) - W^S\right] dG_t(w) + N_p \int_{T_p}^{\overline{w}} \left[W_p^M(w) - W^S\right] dG_p(w) + \\ & + u\Omega \left[W_U^M - W^S\right] dG_t(w) + x \end{aligned}$$

where N_i and $G_i(w)$ are as above, $\Omega = 1$ if $W_U^M \geq W^S$ and $\Omega = 0$ otherwise. Recalling that here $W_i^M(T_i) = \frac{T_i+\delta_i W_U^M}{r+\delta_i}$, the reservation wages T_i are thus defined by

$$W_i^M(T_i) = W^S \tag{1}$$

As a result, $u\Omega \left[W_U^M - W^S\right] dG_t(w) = 0$ for $W^S \geq W_U^M$[2]. From here, we have that $\frac{\delta W^S}{\delta x} > 0$, and thus $\frac{\delta T_i}{\delta x} > 0$, for $W^S \geq W_U^M$.

[2]Because $\Omega = 0$ if $W^S > W_U^M$ and $\Omega = 1$ but $W_U^M - W^S = 0$ if $W_U^M = W^S$

Since we are interested in the relationship between W^S and W_U^M, and noting that $\frac{\delta W^M}{\delta x} = 0$, it is useful to define $\underline{x}$ such that $W^S(x = \underline{x}) = W_U^M$. From $W_i^M(T_i) = W^S$, we have that $W_i^M(T_i) = W^S = W_U^M$ at $x = \underline{x}$, and it follows immediately that $W^S(\underline{x}) = \frac{T_i}{r}$ for $i = t, p$. A consequences of this is that $T_t(\underline{x}) = T_p(\underline{x}) \equiv T_{\underline{x}}$. Since $W_t^M(w) - W_U^M = \frac{w - T_i}{r + \delta_t}$ when $x = \underline{x}$, we can use all this in W_U^M to obtain that, $x = \underline{x}, T_{\underline{x}}$ solves:

$$T_{\underline{x}} = \frac{\lambda_t}{r + \delta_t} \int_{\underline{R}}^{\overline{w}} [w - T_t(\underline{x})] \, dF(w) + \frac{\lambda_p}{r} \int_{\underline{R}}^{\overline{w}} [w - T_p(\underline{x})] \, dF(w)$$

and thus $T_{\underline{x}} = \underline{R}$[3]. Hence, for any $x \geqq \underline{x}$ we have $W^S \geqq W_U^M$ and $T_t, T_p \geqq \underline{R}$. In this case, women do not accept unemployed men for marriage. Equally important, for any $x < \underline{x}$ we have $W^S < W_U^M$ and $T_t, T_p < \underline{R}$. In this case, women accept unemployed men for marriage.

This is an important result regarding the impact the marriage market has on men's job search strategy. Intuitively, there is a female flow value when single $\underline{x}$ such that:

i) If $x < \underline{x}$, then women's cut-off wages are lower than the reservation wage men would use if they did not consider the marriage market ($\underline{R}$). It is straightforward to show that if this is the case, men's optimal reservation wage is $\underline{R}$ for both types of jobs. The intuition is as follows: The only incentive men could have to increase their reservation wage above $\underline{R}$ is related to marital purposes, but if $\underline{R}$ is enough for them to be marriageable, then $\underline{R}$ is optimal even when men take into account the constraints in the marriage market. Please note the significance of this: the marriage market does not affect men's labour market decisions.

ii) If $x \geqq \underline{x}$, then men find that $\underline{R}$ is not enough to be marriageable, and thus have an incentive to increase their reservation wage. We show below that indeed men's reservation wages are higher than $\underline{R}$ in this scenario.

Following *i*) and *ii*) above, we work from now on on the scenario $x > \underline{x}$.

Turning our attention to the relationship between the female cut-off wages (T_i), Proposition 1 below shows that women apply a higher T_i to men on temporary jobs is higher than to men on permanent jobs. The intuition behind

[3] It can be shown that $T_i(\underline{x}) \gtrless \underline{R}$ both lead to a contradiction.

this is that, given the wage earned by the prospective husband, marriage to him is nicer if his job is permanent rater than temporary.

Proposition 1 $T_t > T_p$.

Proof. We know $\frac{T_t+\delta_t W_U^M}{r+\delta_t} = \frac{T_p}{r}(= W^S)$ in equilibrium, or

$$T_t r - [r+\delta_t]T_p = -r\delta_t W_U^M$$

First, note that $r\delta_t W_U^M$ is independent of x, and when $x = \underline{x}$ we have $W_U^M = W^S = \frac{\underline{R}}{r}$ and $T_t = T_p = \underline{R}$. In this case, the above equality is satisfied. For $x > \underline{x}$, $-r\delta_t W_U^M$ does not change, but $T_t r - T_p[r+\delta_t]$ changes since T_i both increase. Denote the respective increments ΔT_t and ΔT_p . For the equality to hold, ΔT_t and ΔT_p must be such that $r\Delta T_t - [r+\delta_t]\Delta T_p = 0$ or $r\Delta T_t = [r+\delta_t]\Delta T_p$. Since $r < r+\delta_t$, it must be that $\Delta T_t > \Delta T_p$, which means that $T_t > T_p$ for any $x > \underline{x}$. ■

At this point is important to highlight that, as shown in the proof of Proposition 1, there is indeed functional link between T_p and T_t since it will be useful in the analysis below.

3.2 Men

Here we derive the two reservation wages chosen by unemployed men: one for each type of job. We will show that the reservation strategy is differs qualitatively for different ranges of the female cut-off wages, which men take as given.

The reservation wage men would use in a stand alone labour market (equal to that of married unemployed men) plays an important role in the analysis of single unemployed men search strategies. We reproduce $\underline{R}(= \underline{R}_t = \underline{R}_p)$ here from Section 2:

$$\underline{R} = \frac{\lambda_t}{r+\delta_t}\int_{\underline{R}}^{\overline{w}} [1-F(w)]\,dw + \frac{\lambda_p}{r}\int_{\underline{R}}^{\overline{w}} [1-F(w)]\,dw$$

3.3 Single unemployed men

Below we address separately three possible outcome configurations in terms men's job market reservation wages relative to women's marriage market cut-off wages. In the next section we pin down the values of x required for each of these configurations to obtain in equilibrium.

Configuration 1: $\underline{R} < R_i < T_i$ for $i = t, p$

To address this scenario, recall first that when $\underline{R} < T_i$ we have that unemployed men are rejected by women. Then the value of an unemployed and single man, which we denote U, solves

$$rU = \lambda_p \int_{R_p}^{\overline{w}} [V_p^S(w) - U] dF(w) + \lambda_t \int_{R_t}^{\overline{w}} [V_t^S(w) - U] dF(w). \tag{2}$$

Here, a man who is unemployed and single meets jobs of type i at rate λ_i and accepts them if they offer wages not lower than the chosen R_i. The value of accepting any given wage w, $V_i^S(w)$, depends on whether it is a "marriageable" wage or not. Because $R_i < T_i$, men will accept wages that belong to the range $[R_i, T_i)$ and preclude marriage. Thus we have:

$$V_i^S(w) = \left\{ \begin{array}{ll} \frac{w+\delta_i U}{r+\delta_i} & \text{if } \ w < T_i \\ \frac{w}{r+\delta_i} + \frac{\delta_i U}{(r+\delta_i+\lambda n)} + \frac{\lambda n \left[y+\delta_i \frac{\underline{R}+y}{r}\right]}{(r+\delta_i+\lambda n)(r+\delta_i)} & \text{if } \ w \geq T_i \end{array} \right\}.$$

[4]The discontinuity of $V_i^S(w)$ at $w = T_i$ is a result of the marriageability at wages equal to T_i or higher.

Following this, men who accept jobs at the reservation wage are not marriageable so $V_i^S(R_i) = \frac{R_i+\delta_i U}{r+\delta_i}$. Further, from the definition of reservation wage R_i, we know $U = V_i^S(R_i)$ and hence $V_i^S(R_i) = \frac{R_i}{r} = U$ for both $i = t, p$. Note that his men apply the same reservation wage to both types of jobs. The key to understanding this result is that the only difference across jobs is the job destruction rate, and because the reservation wages equate the value of employment and unemployment, the difference in job destruction rate does not draw a gap between the two R_i.

[4]For $w \geq T_i$ we use $rV_i^S(w) = w + \delta_i[U - V_i^S(w)] + \lambda n[V_i^M(w) - V_i^S(w)]$ and the value of being married and earning w as $V_i^M(w) = \frac{w+y+\delta_i U^M}{r+\delta_i}$, with $U^M = \frac{\underline{R}+y}{r}$ as derived before.

Using all this in U, the common reservation wage can be derived (as shown in Appendix 3),

$$R = \sum_{i=t,p} \left[\frac{\lambda_i}{r+\delta_i} \int_R^{\overline{w}} [1-F(w)]dw + \frac{\lambda_i \lambda n [1-F(T_i)]}{[r+\delta_i+\lambda n][r+\delta_i]} \left(y + \delta_i \left[\frac{\underline{R}+y}{r} - \frac{R}{r} \right] \right) \right] \tag{3}$$

where, recall, $U^M = \frac{R+y}{r}$. As was the case for the "baseline" reservation wage $\underline{R}$, the reservation wage of unemployed single men must compensate for the loss in the value of continued search. But now, because $R_i < T_i$, accepting the reservation wage implies giving up any chance of marriage in the future, which would have been kept alive had the wage not been accepted in favour of continued search. As a result, the reservation wage must also compensate for this loss of "marriageability": Finding a job at a marriageable wage $(\lambda_i[1-F(T_i)])$ and then a woman who would have accepted marriage (λn), all properly discounted, and accounting foe the the risk of unemployment in the future.

From the reservation wage equation above, it can be shown that $\frac{\delta R}{\delta T_i} < 0$ if $R < T_i < \overline{w}$. As either T_i increases, the probability of encountering marriageable wage decreases, and with it the value of marriageability. This is reflected in a decrease of the reservation wage. This intuition should be complemented by noting that if T_i are high enough, then the optimal male reservation wage is lower than T_i reflecting the high labour market cost of increasing reservation wages above the "baseline" reservation wage $\underline{R}$. It follows that there is a T_i low enough that $R < T_i$ stops to hold.

Further, it is straightforward to show that $\frac{\delta R}{\delta T_i} = 0$ if $T_i \geq \overline{w}$. When women are so picky that they require wages higher than the highest wage in the market from men on temporary and permanent jobs, then we obtain $R = \underline{R}$. However, when women are not that picky and $T_t \geq \overline{w}$ but $T_p < \overline{w}$, then marriageable wages exist if on a permanent contract. Then we have that $R > \underline{R}$, reflecting the incentives related to the marriage market that come from this.

Proposition 2 below states that this configuration describes men's optimal job search strategy if both female cut-off wages are high enough.. Before stating Proposition 2, we define a threshold value of female cut-off wages for permanent workers such that men's reservation wage for permanent jobs is equal to this cut-off wage. We denote this $\widehat{T}_P$, and our definition yields $R = \widehat{T}_p$ in equation (3). Given that $T_t > T_p$, it is clear that as T_i decrease, R will hit T_p first: $R = T_p$ occurs when $R < T_t$.

Proposition 2 *If $T_p \epsilon [\widehat{T}_p, \overline{w}]$, then men's optimal search strategy is described by reservation wages that solve* (3)*; and $R_i < T_i$ in the whole range.*

Proof. Follows from the derivation of (3) and noting that $\frac{\delta R}{\delta T_P} < 0$. Then for $T_p < \widehat{T}_p$ we have $R > T_p$ and Configuration 1 is broken. When $T_t \geq \overline{w}$ and $T_p < \overline{w}$ then $F(T_t) = 0$ in (3). When $T_p \geq \overline{w}$, then $F(T_t) = F(T_p) = 0$ in (3). ■

The threshold value $\widehat{T}_p$ corresponds to a particular value of the female reservation wage for men on *temporary* jobs, which we call $T_t(\widehat{T}_p)$ (from Section 3.1 we know that $T_t r - [r+\delta_t]T_p = r\delta_t W_U^M$). The two panels in Figure 1 depict the above male reservation wage against T_P and T_T respectively. Following from Proposition 2, there is a different configuration of R_i relative to T_i for $T_p < \widehat{T}_p$. This is addressed in the sub-section below.

Figure 1 around here

Configuration 2: $R_p = T_p$, $R_t < T_t$

Appendix 4 shows that if $R_t < T_t$, then it is never optimal to set a reservation wage for p jobs higher than the cut-off wage women apply to men on p jobs: setting the former equal to the latter already implies the man is marriageable after accepting employment, so increasing R_p further will just delay marriage because it delays employment, itself a pre-condition for marriage in equilibrium. This is in addition to the labour market loss related to increasing the reservation wage above $\underline{R}$. Then, for $T_p = \widehat{T}_p - \varepsilon$, men's reservation strategy is characterised by $R_p = T_p$ as it regards to permanent jobs. In relation to temporary jobs, the reservation wage is still determined by the standard definition $U = V_t^S(R_t)$.Hence $R_t = rU$ where

$$\begin{aligned} rU &= \frac{\lambda_p}{r}\int_{T_p}^{\overline{w}}[1-F(w)]dw + \frac{\lambda_p\lambda n[1-F(T_p)]}{[r+\delta_p+\lambda n][r+\delta_p]}\left[\frac{-\delta_p R_p}{r} + y + \delta_p U^M\right] \quad (4) \\ & \frac{\lambda_t}{r+\delta_t}\int_{R_t}^{\overline{w}}[1-F(w)dw + \frac{\lambda_t\lambda n[1-F(T_t)]}{[r+\delta_t+\lambda n][r+\delta_t]}\left[\frac{-\delta_t R_t}{r} + y + \delta_t U^M\right] \end{aligned}$$

Clearly $\frac{\delta R_t}{\delta Tp} < 0$[5]. The intuition behind this is analogue to the one addressed in Configuration 1, while the intuition for the strategy for R_p has been already hinted at: If T_p is not high enough (i.e. lower than $\widehat{T_p}$), then the labour market cost of "matching" it by setting $R_p = T_p$ is lower than the marriage market related benefits: ensure marriageability after employment.

Proposition 3 below states that this Configuration describes men's optimal job search strategy if female cut-off wages are not too high and not too low. We define $\widehat{T_t}$ such that $R(\widehat{T_t}, T_p) = \widehat{T_t}$ in (4), a threshold value of T_t that plays a role analogue to $\widehat{T_p}$ for permanent jobs. As T_p, T_t both decrease, it is possible for T_p to hit $\underline{R}$ before T_t hits $\widehat{T_t}$ or the other way around. To address this, recall that $\frac{T_t+\delta_t W_U^M}{r+\delta_t} = \frac{T_p}{r}$. It follows that $T_p(\widehat{T_t}) = \frac{r\left(\widehat{T_t}+\delta_t W_U^M\right)}{r+\delta_t}$. If $T_p(\widehat{T_t}) > \underline{R}$, then it is possible for both T_p and T_t to be in the range $[\underline{R}\ , \widehat{T_p}]$. Whether this is the case or not is a matter of parameter values *only*. Here we work under the assumption that this is the case.

Proposition 3 *For* $T_p \epsilon [T_p(\widehat{T_t}), \widehat{T_p}]$,*men's optimal search strategy is described by* $R_p = T_p$ *and* R_t *that solves* (4)*; with* $R_t < T_t$ *in the whole range.*

Proof. Follows from the derivation of (4), noting that $\frac{\delta R}{\delta T_t} < 0$ and the assumption that $T_p(\widehat{T_t}) > \underline{R}$. Then for $T_P = T_p(\widehat{T_t})$ we have that $T_t = \widehat{T_t}$. A marginal decrease in T_t, T_p results in $T_p > \underline{R}$ and $T_t < \widehat{T_t} \Leftrightarrow R(T_t, T_p) > T_t$. The latter inequality violates Configuration 2. ■

From Proposition 2 and inspection of Figure 1, it is clear that configuration is broken for $T_P < T_p(\widehat{T_T})$,which leads to the third possible configuration in the subsection below.

Configuration 3: $R_i = T_i$ **for** $i = t, p.$

In this configuration, women's cut-off wage for men in both types of contracts is quite low, and this gives incentives for all men to they are marriageable after employment. The results here follow immediately from the analysis of the two previous configurations. Proposition 3 formalises this:

Proposition 4 *For* $T_p \epsilon [\underline{R}, T_p(\widehat{T_T})]$ *we have that men's optimal search strategy is described by* $R_i = T_i$.

[5] This is also depicted in Figure 1, where the slope of $R_t(T_t)$ on T_t changes at $T_t(\widehat{T_p})$ – because of the different R_p to either side of $\widehat{T_p}$.

Proof. It follows from Proposition 1 and 2 that using $R_p < T_p$ and/or $R_t < T_t$ leads to a contradiction. It is easy to show that $R_i = T_i$ is always better than $R_i > T_i$. ■

Having analysed in detail men's and women's strategies, we know turn our attention to equilibrium configurations in the next section.

4 Equilibrium

Here we address the market equilibrium. Following the three possible configurations addressed in the previous section, the three equilibria in Definition 1 below correspond to each of the three configurations studied: An equilibrium in which the relationship between R_i and T_i mirrors Configuration 1(2,3) is referred to as a Type 1(2,3).

We finish by commenting on the implications regarding male marriage wage premium and transitions to marriage, and the differences across the two types of equilibria. For this, we first define the marriage wage premium of men on contracts of type i $-$denoted MP_i- as the difference between the average wage of the employed married men and the average wage of the single employed men $-$denoted w_i^M and w_i^S respectively. Then, $MP_i = w_i^M - w_i^S$. It is easy to show that $MP_i \gtreqless 0$ if $T_i \gtreqless R_i$ and that the size of this marriage wage premium increases with the difference $T_i - R_i$.[6] This of course follows from the simple observation that the wages among married employed men are distributed $F(w)/[1 - F(T_i)]$, while the stock of single employed men includes those with unmarriageable wages, which are distributed $F(w)/[F(T_i) - F(R_i)]$.

Definition 1 *i) A Type 1 equilibrium is a triplet* R^*, T_p^*, T_t^* *where* $R^* < T_p^* < T_t^*$, R^* *solves* (3)*, and* T_i^* *solve (1).*

ii) A Type 2 equilibrium is a quadruple $R_p^*, R_t^*, T_p^*, T_t^*$ *where* $R_p = T_p$, $R_t < T_t$, R_t^* *solves* (4) *and* T_i^* *solve (1).*

iii) A Type 3 equilibrium is a quadruple $R_p^*, R_t^*, T_p^*, T_t^*$ *where* $R_p^* = T_p^*$, $R_t^* = T_t^*$*, and* T_i^* *solve (1).*

[6] Please see Bonilla and Kiraly (2013) and Bonilla, Kiraly and Wildman (2018) for a detailed derivation.

Theorem 1 *An equilibrium exists for $T_p > \underline{R}$.*

i) A Type 1 obtains if x, women's value as single, is high enough.

ii) A Type 2 obtains for mid-range values of x.

iii) A Type 3 equilibrium obtains for low values of x.

Proof. To start, note that women's strategy determines T_p and T_t functions that are continuous on R_i and x,while $\frac{\delta T_i}{\delta x} > 0$ and $\frac{\delta T_i}{\delta R_i} > 0$.To address Type 1 equilibria, note that $R(T_t, T_p)$ as described by (3) is continuous on T_p and T_t. Following Proposition 1, define $\overline{x}_p$ such that $T_p^*(\overline{x}_p) = \overline{w}$,and $\widehat{x}_p$ such that $T_p^*(\widehat{x}_p) = R^*(\widehat{x}_p)(= \widehat{T}_p)$. Because $\frac{\delta R(T_t,T_p)}{\delta x} = 0$, while $\frac{\delta T_i}{\delta x} > 0$, this type of equilibrium obtains if $x \geq \widehat{x}_p$. Tuning our attention to Type 2 equilibria, it is clear that $R(T_t, T_p)$ as described by (4) is continuous on T_p and T_t. Following Proposition 2, define $\underline{x}_P$ such that $T_P^*(\widetilde{x}_P) = T_p(\widehat{T}_T)$. Because $\frac{\delta R(T_t,T_p)}{\delta x} = 0$, while $\frac{\delta T_i}{\delta x} > 0$, this type of equilibrium obtains if for $x \in [\widetilde{x}_p, \widehat{x}_p)$. To address Type 3, it follows from all the above and Proposition 3. ■

Figure 2 below depicts equilibria of Type 1 and Type 2.

Figure 2 around here.

We now address the main predictions of our model, which relates to the marriage wage premia and ranking across job types, and will form the basis of our empirical implementation.

Corollary 1, which relates to the ranking of marriage wage premia across job types, and follows from our definition of marriage wage premium and Theorem 1 above:

Corollary 1 $MP_t > MP_p$ *if* $x\epsilon[\widetilde{x}_p, x_p^{\overline{w}}]$, *while* $MP_t = MP_p = 0$ *if* $x\epsilon[x_p, \widetilde{x}_p]$

Proof. When $x\epsilon$ $[x_p, x_p^{\overline{w}}]$ a Type 1 equilibrium obtains. In this equilibrium, $MP_t > MP_p$ because $R_p = R_t$ while $T_p < T_t$. When $x\epsilon[\widetilde{x}_p, \widehat{x}_p]$ a Type 2 equilibrium obtains. In this equilibrium, $MP_t > 0$, $MP_p = 0$ because $R_p = T_p$ and $R_t < T_t$.When $x\epsilon[\underline{x}_P, \widetilde{x}_P]$ a Type 3 equilibrium obtains. In this equilibrium, $MP_i = 0$ for $i = p, t$ because $R_i = T_i$ for $i = p, t$. ■

5 Empirical analysis

We now proceed to test the implications detailed in Corollary 1. As explained before, we use data from Spain, due to the duality of the labour market, where marriage decisions and outcomes are likely to be interrelated with the labour market. To this end, we estimate different wage equations for male workers hired under two different types of contracts: open-ended and temporary .

As expected, average wages earned by men on permanent jobs are higher than for those on temporary jobs for the whole sample and when only never married workers are considered. Parallel to this, a permanent job is attached to a positive estimated coefficient. Crucially, the opposite is true when only married employees are considered: the coefficient attached to a permanent job is now negative. This is reflected in a higher marriage wage premium for men on temporary jobs. To further control for heterogeneity, we run two robustness checks related to this, in which we split the sample by education type and then using both education and contract type. The empirical results broadly confirm our theoretical predictions.

5.1 Data and Summary Statistics

Our database consists of the Spanish data of the European Community Household Panel (EHCP) from 1994 to 2001. In this period, Spain had the highest temporary employment in Europe as a share of total employment, around 30% (Dolado et al., 2002). The time period corresponds to a more restrictive divorce law than the current one, with a markedly higher cost of divorce. In addition, cohabitation did exist during those years, but it was not as extended as it is now (Castro-Martin, 2013).

For the period 1994-2001, the Spanish sample of the ECHP included 8,000 households/year. These individuals were interviewed every year, even if the household split. The database includes rich and detailed information on income and socioeconomic characteristics. We have information on our key variables, as gender, the type of contract, marital status, and income. In addition, we can consider the following control variables: economic sector, region, age, and if they have children above 12. Likewise, it also provides data on education level which we use to test the models within education types, to check for robustness of the results.

We use the log of labour income from the previous month as dependent variable. We do not use the hourly wage because the information on working hours is limited for part time workers and we would restrict our sample size. Following the theoretical model, we only include men who were working the previous month, who are either in their first marriage or have not yet married. Those cohabiting are considered not yet married.

Table 1 shows the summary statistics. The percentage of men with a temporary contract is 27.85%, which is consistent with previous evidence of the Spanish labour market (Dolado et al., 2002; Bentolila et al., 2012; ILO, 2014).

Log monthly wages are higher for those with an open-ended contract. At the same time, the proportion of married men is seven times higher for those with an open-ended contract (73.8% versus 10.1%). This correlation is also affected by other variables such as age or education level. The majority have an education level equal to or lower than school. On the other hand, we have 28.2% percent of individuals with a university degree or higher , while those with high school only correspond to 20.8% of the observations. Those with an open-ended contract have less children above 12.

Table 1 around here

Finally, the sample average age is 36. As for the distribution by economic sector, 4.7% of the sample work in the agricultural or primary sector compared to 44.6% in the industrial sector, and 50.7% at the service sector.

5.2 Wage regressions

We run regressions to estimate to explore the correlation between marital status and wages, and regressions to explore the effect of the type of contract on the whole sample, on married men, and on never married men.

For the former we estimate the following fixed-effects linear regression:

$$\ln(w_{it}) = \beta_1 Marriage_{it} + \gamma_1' X_{it} + a_i + \epsilon_{it}$$

Here, $\ln(w_{it})$ is the natural log of monthly wages, $Marriage_{it}$ is a dummy variable for marital status, X_{it} denotes a matrix of control variables, a_i is the individual specific time-invariant heterogeneity -i.e. the fixed-effects-, and ϵ_{it} is the standard idiosyncratic error term. The coefficient of interest is β, which measures the correlation between marriage on the (log of) monthly wages, or, in other words, the marriage wage premium (MWP). The control variables included in X_{it} are age, economic activity sector, if they have children above 12 cohabiting in the household, and region. Note that we cannot include control variables constant across time, as the educational level, because they are subsumed in the fixed-effects term. We use this information in the robustness checks where we estimate different equations by educational level.

Following Corollary 1, we are interested in comparing the MWP across contract types. Therefore, we will run the above regression also by contract type - either temporary or open-ended. Following the theoretical model, we use the type of contract at the time of marriage. An alternative option would be introducing a dummy variable for the contract type. With that approach, we should also introduce an interaction of the contract type and marriage variables, to account for this interaction. That procedure assumes that the effect of the other variables on wages is the same irrespective of the type of contract, which is not supported by previous literature -see, for example, Davia and Hernanz (2004). For practical reasons, that approach would be a lesser evil if the sample sizes were not large enough to obtain reliable estimations. Fortunately, we have a large sample size in all our main regressions, as well as those by educational level and contract type.

To investigate the link between type of contract and wages (for the full sample and the two sub-samples indicated above) we estimate the following regression, also using fixed effects:

$$\ln(w_{it}) = \beta_2 contract + \gamma_2' Z_{it} + a_i + \epsilon_{it}$$

Where $\ln(w_{it})$ is the natural logarithm of monthly wages, contract denotes the type of contract of the individual in the form of a dichotomous variable that will take the value 1 if the contract is permanent and 0 if it is temporary. On the other hand, the model includes a set of control variables under the expression X_{it} (age, economic activity sector, children cohabiting, and region) and the fixed effects operator, a_i. Finally, as always, the model error term is included ϵ_{it}. In our specific case, β will be the coefficient to be interpreted, which will allow us to know the effect of the type of contract on wages, both for the general sample and for the individual samples of single and married people.

5.3 Analysis and results

As a first step, Table 2a shows that men on an open-ended contract earn almost 12% more than those on a temporary contract (fixed effects estimation). We also include an OLS regression to show that controlling by unobserved heterogeneity decreases to some extent this wage gap. This is consistent with previous literature. For example, Jimeno and Toharia (1993) found a wage gap of 10% for workers with open-ended contracts respect to those with a temporary contract in Spain -including both genders in their estimations.

Table 2a around here

We do a similar exercise for two sub-samples: married men and never married men. As shown in the tables in Appendix 5, we find that for never married men, the coefficient attached to employment in a permanent contract is positive, matching the result for the whole sample. Turning to married men, the coefficient attached to employment in a permanent contract is actually negative. We see this as directly linked to the fact that wages and type of contract of men are traded off from the potential wife's point of view, and as the building blocks of our results regarding the marriage wage premium, which we discuss below.

Table 2b below shows the results for the marriage wage premium for the whole sample and by contract type. The first column, "Overall Model", includes all individuals and shows how the wage difference between married and single men is 5 percent. We also find a marriage is statistically significant for men on open ended and on temporary contracts. Married men with an open-ended contract earn almost 7 percent more than non-married men with the same type of contract. Matching our theoretical predictions, the effect of marriage for men on temporary contracts is higher: they earn almost 10 percent more than their non-married counterparts.

Table 2b around here

5.4 Robustness check

We know that male temporary workers with university education will have better job options, including the availability of open-ended contracts (Malo and Cueto, 2013), and this is likely to affect their wages and, potentially, the size of their marriage wage premia. To account for this heterogeneity, we run two robustness checks involving data on education.

The first one is a set of estimations by educational level, shown on Table 3. The results on men with "degree or more" mirror the results on the overall sample as it relates to our theoretical model: the coefficient attached to the "marriage" dummy is higher for men on temporary jobs. For men with lower school level or less, the respective coefficients are not statistically significant. This is also consistent with our theoretical predictions (which would not be the case had the marriage wage premium of temporary workers been higher) . For men with high school education, we obtain a positive and significant marriage wage premium for those on permanent contracts, yet marital status seems not to be significant for men on temporary contracts. A possible explanation for this might be the relatively lower wage differentials amongst the different groups and/or a low absolute level of wages. This would, effectively, group men with high school on temporary contracts with lowly educated men. This could reflect the result in Bonilla et al. (2017), whereby men that can only earn low wages form part of a "last class" in which women marry men regardless of their wage or employment status, due precisely to their low wages.

Table 3 around here

We run another robustness check aggregating males in two groups, following the results obtained in Table 3. Group A is composed of those male workers with a positive marriage wage premium -corresponding to the first three columns in Table 3. That is, group A would be composed of individuals with a university and higher education level with permanent and temporary contracts, plus those individuals with a secondary education level and permanent contracts. Group B comprises the rest of the observations, that is, those men whose educational level is secondary education and who have a temporary contract, plus all males with the lowest educational level, regardless their type of contract.

Table 4 shows the effect of marital status on log wages for both groups by type of contract. The results are coherent with the model. For Group A we find again a positive marriage wage premium for both types of contracts, but larger for males with temporary contracts (14 percentage points versus 9.5 percentage points). For the Group B, we do not obtain significant results for any type of contract. Therefore, we consider that the results obtained in Table 3 are robust.

Table 4 around here

6 Conclusion

In this article, we expand the theoretical and empirical literature on the marriage wage premium. First, we present a theoretical model (an adaptation of Bonilla and Kiraly, 2013), where marriage and labour markets are interconnected, and there is heterogeneity in the labour demand side due to the presence of two types of jobs: temporary and permanent. The model predicts that the marriage wage premium will be lower for men on permanent jobs than on temporary jobs. Given a wage for the future husband, women would prefer someone with a permanent job, because of the more stable expected earnings of these workers. Therefore, they set a lower marital reservation wage for males on permanent contracts. Previous empirical literature shows results according to this prediction. For example, De la Rica and Iza (2015) find a delay in the marriage age for males with unstable contracts (it is worth noting that this delay does not exist for women). Thus, the model has an implication not really intuitive in the absence of formal analysis: males with temporary contracts will marry only when they enjoy higher enough wages. As a consequence, we should observe a higher marriage wage premium for male temporary workers.

We test this prediction using data from Spain, a country very suitable for this empirical analysis because of the high share of temporary contracts, ranging from 25 to 33 percent since the mid-eighties of the past century (Dolado et al., 2002). As predicted, we find that married men with permanent contracts earn 7 percent more than never married men with the same type of contract, while married men with temporary contracts earn almost 10 percent more than never married temporary workers. We also present estimations by educational level. The results are in line with the model for men with a university degree, who are those for whom a larger wage differential is expected. For lower educational levels, especially for males with only compulsory education, expected wage differential are probably so low that they are not important for women to consider in their marital decisions.

Importantly we argue that "specialisation" and selection on unobservables as a source of marriage wage premium would both yield predictions opposite to our theoretical and empirical results.

Therefore, we add to the literature on marriage wage premium not only remarking again the importance of the interaction of two frictional markets under constrained search (Bonilla and Kiraly, 2013; Bonilla et al., 2019), but also showing that the features of the jobs -here, the divide between temporary and permanent contracts- may be crucial to understand how sometimes the marriage wage premium is larger for workers with 'bad' features. Absent a very high wage, these males -here, temporary workers- would not be married.

To sum up, we show that heterogeneity in the demand side of the labour market is also potentially important to understand the marriage wage premium. This opens the door to further research enriching the analysis of the marriage wage premium considering differences related to the different characteristics of jobs and even firms, or even analysing the relative importance of heterogeneity in the supply and demand sides of the labour market from theoretical and empirical perspectives.

7 Appendices 1-5

Appendix 1. Steady States

Direct substitution and bringing the denominator on the right hand side to multiply on the left hand side yields

$$u\left(\lambda_t[1-F(R_t)]+\lambda_p[1-F_p(R_p)]\right)=\xi+[\frac{u\lambda_t[1-F(T_t)]}{(\delta_t+\lambda n)}]\delta_t+[\frac{u\lambda_t[F(T_t)-F(R_t)]}{\delta_t}]\delta_t$$

Moving the last two elements on the right hand side to the left and simplifying yields

$$u\left[[\frac{\lambda_t[1-F(T_t)](\lambda n)}{(\delta_t+\lambda n)}]+\lambda_p[1-F_p(R_p)]\right]=\xi$$

Finally multiply across by $(\delta_t+\lambda n)$ to obtain $u\Gamma_a=\xi(\delta_t+\lambda n)$.

Appendix 2. Reservation wage of married and unemployed workers ($\underline{R}$).

Using U^M to denote the value of being unemployed and married and $V_i^M(w)$ to denote the value of employment in jobs of type i while married, we have

$$rU^M=y+\lambda_t\int_{\underline{R}_t}^{\overline{w}}\left[V_t^M(w)-U^M\right]dF(w)+\lambda_p\int_{\underline{R}_p}^{\overline{w}}\left[V_p^M(w)-U^M\right]dF(w)$$

with $V_i^M(w)=\frac{w+y+\delta_i U^M}{r+\delta_i}$.The reservation wages solve $V_i^M(\underline{R}_t)=V_i^M(\underline{R}_p)=U^M$ which implies $U^M=\frac{\underline{R}_p+y}{r}=\frac{\underline{R}_t+y}{r}$. Noting that $V_i^M(w)-U^M=\frac{w-\underline{R}_t}{r+\delta_t}$, we use all this in U^M above and simplify to obtain the standard formula for a reservation wage:

$$\underline{R}_t=\underline{R}_p=\frac{\lambda_t}{r+\delta_t}\int_{\underline{R}}^{\overline{w}}[w-\underline{R}]\,dF(w)+\frac{\lambda_p}{r+\delta_p}\int_{\underline{R}}^{\overline{w}}[w-\underline{R}]\,dF(w)$$

where we are using $\delta_p=0$.

Appendix 3

For $w < T_i$, we have $V_i^S(w) - U = \frac{w - rU}{r + \delta_i}$.

For $w \geq T_i$ we know $V_i^S(w) - U = \frac{w}{r+\delta_i} + \frac{\delta_i U}{(r+\delta_i+\lambda n)} - U + \lambda n \frac{\lambda n \left[y + \delta_i U^M\right]}{(r+\delta_i+\lambda n)(r+\delta_i)}$.

Now add and substract $\frac{\lambda n \delta_i U}{(r+\delta_i+\lambda n)(r+\delta_i)}$

$$V_i^S(w) - U = \frac{w}{r+\delta_i} + \frac{\delta_i U}{(r+\delta_i+\lambda n)} - U + \frac{\lambda n \delta_i U}{(r+\delta_i+\lambda n)(r+\delta_i)} + \frac{\lambda n \left[y + \delta_i U^M - \delta_i U\right]}{(r+\delta_i+\lambda n)(r+\delta_i)}$$

Since $\frac{\delta_i U}{(r+\delta_i+\lambda n)} - U + \frac{\lambda n \delta_i U}{(r+\delta_i+\lambda n)(r+\delta_i)} = \frac{-rU}{r+\delta_i}$, this is now

$$V_i^S(w) - U = \frac{w - rU}{r+\delta_i} + \frac{\lambda n \left[y + \delta_i U^M - \delta_i U\right]}{(r+\delta_i+\lambda n)(r+\delta_i)}$$

Hence, (2) can be written

$$rU = \sum_{i=t,p} \lambda_i \int_{R_i}^{T_i} \frac{w - rU}{r+\delta_i} dF(w) + \frac{\lambda_i [1 - F(T_i)] \lambda n}{(r+\delta_i+\lambda n)(r+\delta_i)} \left[y + \delta_p (U^M - U)\right]$$

For $R_i < T_i$, we have $V_i^S(R_i) = \frac{R_i + \delta_i U}{r+\delta_i}$. Together with the definition of reservation wages, $U = V_i^S(R_i)$, we know $U = V_i^S(R_i) = \frac{R_i}{r}$, and this in turn implies $R_t = R_p = R$. Together with $U^M = \frac{R+y}{r}$ this in the above yields equation (3).

Appendix 4. $R_p = T_p$ is preferred to $R_p > T_p$

For any $R_P \geq T_P$, we have $R_T < T_T$ we have

$$\begin{aligned} rU &= \frac{\lambda_p}{r+\delta_p} \int_{R_p}^{\overline{w}} [1 - F(w)] dw + \frac{\lambda_p \lambda n [1 - F(R_p)]}{[r+\delta_p+\lambda n][r+\delta_p]} \left[y + \delta_p \left(U^M - \frac{R_p}{r}\right)\right] \\ & \quad \frac{\lambda_t}{r+\delta_t} \int_{R_t}^{\overline{w}} [1 - F(w)] dw + \frac{\lambda_t \lambda n [1 - F(T_t)]}{[r+\delta_t+\lambda n][r+\delta_t]} \left[\frac{-\delta_t R_t}{r} + y + \delta_t (U^M - \frac{R_t}{r}\}\right] \end{aligned}$$

the difference being that now changes in R_P affect the rate at which marriageable wages are accepted, which is not the case when $R_P < T_P$. It is then easy to show that $\frac{\delta U}{\delta R_P} < 0$.

Appendix 5. The link between wages and type of contract for married and never married men.

Tables A5a and A5b here

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Figure 1: Male reservation wages.

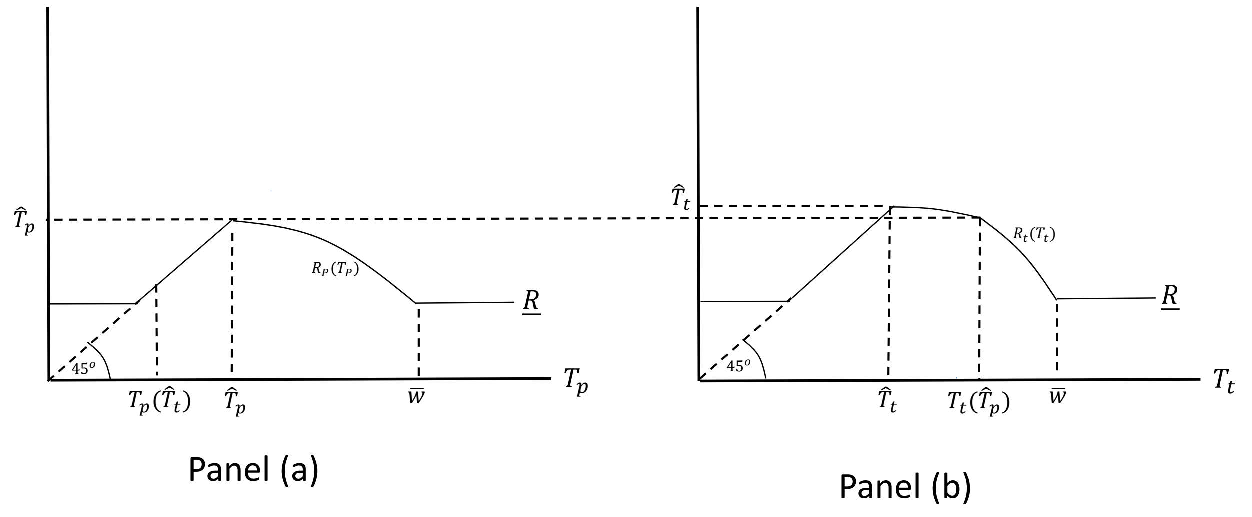

Figure 2: Market Equilibrium for Various x.

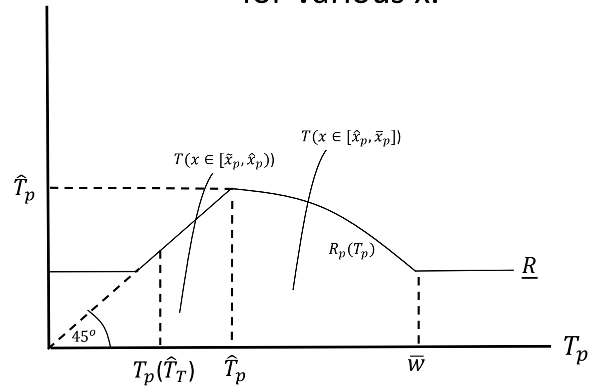

Table 1. Summary statistics: Men. Observations (N * T).

	Overall		Open-ended		Temporary	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Temporary contract (1=yes)	0.2785	0.448	0.000	0.000	1.000	0.000
Log monthly wage	12.299	0.614	12.496	0.532	12.184	0.629
Married	0.303	0.459	0.738	0.439	0.101	0.302
Age	36.95	10.99	39.46	10.50	32.14	10.28
Children	0.563	0.495	0.344	0.475	0.665	0.471
Degree or more	0.282	0.449	0.324	0.468	0.192	0.394
Higher school	0.208	0.406	0.216	0.411	0.193	0.394
Lower school or less	0.509	0.499	0.459	0.498	0.615	0.486
North-West	0.127	0.333	0.121	0.326	0.131	0.337
North-East	0.142	0.349	0.164	0.371	0.131	0.337
Community of Madrid	0.099	0.298	0.126	0.332	0.086	0.280
Center	0.146	0.353	0.141	0.348	0.148	0.355
East	0.203	0.402	0.225	0.417	0.193	0.395
South	0.209	0.406	0.165	0.371	0.229	0.420
Canary Islands	0.071	0.258	0.055	0.228	0.079	0.270
Agriculture	0.047	0.211	0.027	0.163	0.088	0.0284
Industry	0.446	0.497	0.402	0.490	0.538	0.498
Services	0.507	0.499	0.569	0.495	0.373	0.484

NOTE: For the sample as a whole. 56.80% are men and 43.20% are women. A total of 21,330 men; 68.27% with a temporary contract and 31.73% with a permanent (open-ended) contract.

Table 2a. Effect of contract type on log wages.

	OLS	Fixed Effects
Open-ended contract	0.123 **	0.117 ***
	(0.012)	(0.012)
Observations	9.702	9.702

NOTE: ** 5% level of significance; *** 1% level of significance.

The dependent variable in all regressions is log monthly wages.

Regressions include a full range of controls: age, marital status, number of children, health, education, region, activity sector and year dummies. Robust standard errors are presented in parentheses.

Table 2b. Effect of marital status on log wages.

	Overall Model (FE)	Open-Ended (FE)	Temporary (FE)
Married	0.051 ***	0.067 ***	0.097***
	(0.015)	(0.018)	(0.028)
Observations	9.702	6.584	3.118

NOTE: *** 1% level of significance.

The dependent variable in all models is log monthly wages.

The models all show the estimates attached to the "Married" variable. All models include a full range of controls: age, number of children, health, education, region, activity sector and year dummies. Robust standard errors are presented in parentheses.

Table 3. Effect of marital status on log wages by level of education.

	Degree or more		Higher school		Lower school or less	
	Open-Ended (FE)	Temporary (FE)	Open-Ended (FE)	Temporary (FE)	Open-Ended (FE)	Temporary (FE)
Married	0.075 ***	0.141 ***	0.209 ***	-0.038	-0.027	0.034
	(0.031)	(0.067)	(0.038)	(0.068)	(0.026)	(0.034)
Observations	2.145	612	1.430	599	3.009	1.907

NOTE: *** 1% level of significance.

The dependent variable in all models is log monthly wages.

The models all show the estimates attached to the "Married" variable. All models include a full range of controls: age, number of children, health, region, activity sector and year dummies. Robust standard errors are presented in parentheses.

Table 4. Effect of marital status on log wages by level of education.

	Group A		Group B	
	Open-Ended (FE)	Temporary (FE)	Open-Ended (FE)	Temporary (FE)
Married	0.095 ***	0.140 ***	-0.027	-0.039
	(0.024)	(0.067)	(0.025)	(0.030)
Observations	3.575	612	3.009	2.506

NOTE: ***: 1% level of significance.

The dependent variable in all models is log monthly wages.

The models all show the estimates attached to the "Married" variable. All models include a full range of controls: age, number of children, health, region, activity sector and year dummies. Robust standard errors are presented in parentheses.

Table A5a. The coefficient linked to “Permanent Contract” - only married men.

	OLS	Fixed Effects
Permanent Contract	-0,016 **	-0,015 *
	(0,009)	(0,009)
Observations	6.462	6.462

NOTE: ***: y 1% level of significance.

The dependent variable in all models is log monthly wages.

The models all show the estimates attached to the “Permanent Contract” variable. All models include a full range of controls: age, marital status, number of children, health, education, region, activity sector and year dummies. Clustered standard errors are presented in parentheses.

Table A5b. The coefficient linked to “Permanent contract” – never married men.

	OLS	Fixed Effects
Permanent Contract	0,081 ***	0,064 ***
	(0,012)	(0,011)
Observations	14.867	14.867

NOTE: ***: y 1% level of significance.

The dependent variable in all models is log monthly wages.

The models all show the estimates attached to the “Permanent Contract” variable. All models include a full range of controls: age, marital status, number of children, health, education, region, activity sector and year dummies. Clustered standard errors are presented in parentheses.