

## 1. Introduction

When frequency of workplace accidents is analyzed, an intriguing empirical regularity arises: there are more cases on Mondays than on the rest of the days. If the working-time were not evenly distributed along the working week, this empirical observation could be the result of a higher number of workers performing their tasks on Mondays. In other words, if more employees were at work on Mondays than on the rest of the days, the exposure risk would increase on Mondays and, due to this, more accidents will be reported on the first day of the week.

Nevertheless, what is more striking and difficult to justify with this sort of arguments is why there is a higher proportion of the so called soft-tissue<sup>1</sup> (Butler et al., 1996) injuries on Mondays than on the rest of the days. When we use this kind of relative indicators (that is, the percentage of soft-tissue injuries conditional on having suffered an injury) then we are implicitly controlling the possible differences among the days of the week with respect to the number of employees actually at work. For all of these reasons it has been established that there exists a Monday effect on claims for accident insurance compensation.

The remainder of the paper is organized as follows. In section 2 we present the state of the art. In Section 3 we outline the legislative and institutional framework of sick leave regulation in Spain. Section 4 deals with the basic theory to understand the empirical strategy employed in the next sections. Section 5 describes the database used in the empirical work. In section 6 we explain the econometric methodology used in the article. Section 7 contains the basic findings of the paper. The final section summarizes our main conclusions.

## 2. State of the art

Academic literature in Economics has tried to explain the Monday effect. A good example of the relevance of this topic is the recent publication of the work of Butler et al (2013). In this survey the

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<sup>1</sup> We will use the terms *hard-to-diagnose*, *easy-conceal* and *soft-tissue* interchangeably throughout the paper. With them we refer to strains, sprains and low back pains. In the literature it has been quite common to use them practically as synonyms.

authors review the economic effects and consequences of the workers' compensation and devote a section to the Monday effect. Nevertheless, it is worth mentioning that they predominantly adopt a North American perspective.

The more plausible justification for that effect is that individuals carry out an opportunistic behaviour because they report some injuries as work-related on Mondays when they really are out-of-work injuries. In other words, there are problems of moral hazard associated with accident insurance. This is so as a result of the economic incentives generated by institutional settings of several countries. In most of the countries workers compensation (WC) insurance pays for the cost of medical treatment and partial income replacement for lost wages as a consequence of a work-related injury. Therefore, those workers without health insurance coverage can postpone out-of-work injuries suffered during the weekend to the Monday in order to obtain health care from WC systems. On the other hand, workers can also postpone weekend injuries in order to claim compensation benefits from WC systems.

Nonetheless, it must be noted that there is a competing explanation provided from the field of Physiology. This alternative explanation simply states that after the rest over the weekend, workers become more prone to injuries when they come back to work on Monday.

The key question is to find an adequate test to verify which of these two hypotheses – the physiological explanation or the economic justification – is more credible. There have been some attempts of doing this in previous economic literature. The seminal work on this issue is that of Smith (1990), but this paper does not try to verify which of the two competing hypotheses above mentioned is more believable. Instead, the work of Card and McCall (1996) presents a direct test to validate which of the hypotheses is better. They try to find differences in reporting behaviour between two groups of workers: those who are covered by health insurance and those who are not. These authors are not able to identify any significant difference, so they conclude that the Monday effect could be explained by the physiological hypothesis.

In another paper, Campolieti and Hyatt (2006) try to find empirical evidence in favour of one of the two competing alternatives by means of a comparison between the United States and Canada<sup>2</sup> WC systems. These authors consider that as a result of the universal government-provided medical insurance in Canada (unlike the United States) and of its relatively more generous WC system, it would be expected to find a larger Monday effect in the United States than in Canada. This is so because in the United States there are two sources of moral hazard (obtaining medical care via WC insurance and getting at least partial income replacement for lost wages) while in Canada there is only one (collecting compensation benefits to replace lost labour-incomes)<sup>3</sup>. But their estimates do not show that. They find a quite similar Monday effect in the case of both Canada (Ontario) and the United States (Minnesota)<sup>4</sup>. Thus, and in their own words, the main finding reached by Campolieti and Hyatt (2006) is that the results are not inconsistent with the strictly physiology-based hypothesis. Nonetheless, these authors have to recognise that although these arguments provide support for a physiological explanation, this is highly speculative and cannot be taken as a definitive argument against the economic (moral hazard) explanation.

From our point of view, neither the work of Card and McCall (1996) nor that of Campolieti and Hyatt (2006) presents a conclusive argument that can reject the economic explanation<sup>5</sup>. We think that more research on this topic is really necessary before concluding that the evidence is irrefutable<sup>6</sup>. What is more important, it could be quite possible that both the moral hazard explanation and the physiological one were operating at the same time. In this sense, we construct a theoretical setting that allows taking into account the above mentioned

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<sup>2</sup> In fact, they employ data from Ontario to reach their conclusions.

<sup>3</sup> In addition, the authors note that WC benefits in Canada are more generous than those in the United States.

<sup>4</sup> The results for Minnesota are obtained from Card and McCall (1996).

<sup>5</sup> Furthermore, in a more recent unpublished paper, Hansen (2008), some evidence in favour of the economic explanation of the Monday effect is found. The author, taking advantage of substantial reforms in California, concludes that: “(...) *in the post-reform period, the fraction of claims on Monday for difficult-to-diagnose injuries drops by 7 percentage points in California, with no change (...) in other states*”.

<sup>6</sup> In this regard, in Campolieti and Hyatt (2006, p. 449) it is stated: “*Only further empirical work can definitely reject that explanation*”.

issue from an empirical perspective. In our view, this is one of the main contributions of the paper to previous literature. Another one would be that adopting a European standpoint adds some valuable insights to the literature (mainly North American).

Moreover, we believe that if we are looking for any proof of the strategic and opportunistic behaviour of the *homo oeconomicus* in the labour market, then the experiment carried out has to be more theoretically guided. Moreover, this theoretical analysis should be capable to admit that part of the gap could be a consequence of medical reasons. This is one of the main aims of the present work. Here, we defend that Spain is a good ‘laboratory’ to check whether the economic explanation is more likely than the physiological one or vice versa, as a result of the singular legal regulation of sick-leave benefits.

Due to the dual regulation<sup>7</sup> for work-related and non-work-related sick-leaves in the Spanish law, a clear incentive mechanism is generated and that is what we are going to exploit to design our experiment. And more importantly, such an incentive mechanism depends on the expected duration of the injury recovery period that allows us to define a quite specific test for identifying the validity of the economic explanation of the Monday effect.

### **3. Legal background**

The Spanish Social Security system distinguishes between work-related and non-work-related injuries and illnesses as far as sick-leave is concerned. The amount of income received as compensation by a worker is different if the accident (or the illness) happens at the workplace or out of the workplace<sup>8</sup>. This singular legislative feature is going to be exploited to test the economic explanation for the Monday effect.

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<sup>7</sup> A general discussion on the effects of regulation on occupational safety in relation to the worker’s behaviour, with some references to moral hazard problems, can be found in the works of Shapiro (2000) and Vicusi (2007).

<sup>8</sup> In this paper we focus on temporary incapacity. Those injuries that produce permanent incapacity are less susceptible to be associated with moral hazard problems.

In Spain, when a worker has to leave his/her job to recover from an injury or an illness, whether that is work-related or non-work-related, it is said that the employee is in a *temporary incapacity* (TI) situation. When that contingency occurs, workers have to face two drawbacks. First, their costs increase as a result of the health attention expenses. Second, their labour income decreases because the labour contract relationship is suspended<sup>9</sup> while employees are in sick-leave (article 45.1.c. of the Workers' Statute) and employers do not have to remunerate their injured workers (article 45.2 of Workers' Statute). To mitigate this situation of necessity the Social Security system in Spain covers medical expenses, on the one hand, and pays benefits that partially substitute lost wages, on the other.

As it is well known, medical expense coverage is practically universal in Spain. In other words, a worker who is in sick-leave does not have to pay for his/her treatment and other related costs. And this is so no matter whether the injury is work-related or not. Nonetheless, there are differences in TI payments depending on whether it is an occupational injury or not.

The fundamental Spanish law in which TI benefits are regulated is Social Security General Law (SSGL). Article 129 of SSGL establishes:

*“The economic benefit in the various situations that produce temporary incapacity to work will consist in a subsidy equivalent to a percentage of the contributory basis that will be determined and effective in the terms established in this Law and in the general Regulations for its development”.*

From article 129 of SSGL, we can conclude that TI benefits can be assessed as the result of multiplying a coefficient times a contributory basis. With regard to contributory basis we must point out that there are not many differences if the injury or the illness are of an occupational nature or not. Without going into too many details, it must be mentioned that the applicable legislation to this subject is article 13 of Decree 1646/1972 of 23<sup>rd</sup> of June, which develops Law 24/1972 of 21<sup>st</sup> of June. In a few words, the contributory basis is a

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<sup>9</sup> It has to be mentioned, however, that this does not mean that the worker is dismissed.

function of the previous wage (with upper and lower limits) earned by the worker before the sick-leave takes place<sup>10</sup>. In the case of the assessment of the contribution basis, the only significant difference between occupational and non-occupational contingencies deals with the overtime contribution. Whereas in the case of non-occupational sick-leave the overtime is not taken into account to calculate the basis, in the case of work-related leave article 109.2.g of SSGL states that annual average of overtime has to be computed to assess the contributory basis.

Nevertheless, there are important differences in terms of applicable coefficients. In this regard, article 2.1 of the Decree 3158/1966 of the 23<sup>rd</sup> of December, (General Regulations of Economic Benefits of Social Security) establishes the following:

*“The economic benefit in any situation that causes inability to work, as it is stated in article 126 of Social Security Law, will consist in a subsidy equivalent to 75 per 100 of the worker’s contribution base on the date in which the inability is legally declared (...)”.*

This precept was modified by Royal Decree 53/1980 of 11<sup>th</sup> of January, of which the single article establishes:

*“The amount of economic benefit for temporary incapacity to work as a result of a non-work related illness or an non-occupational accident, stated in second article of the Decree 3158/1966 of the 23<sup>rd</sup> of December, will be a subsidy equivalent to sixty per cent of the corresponding contributory basis during the period which goes from the fourth day after the accident or sickness leave to the twentieth day, both days included”.*

From the above two laws, the following regulation is obtained. On the one hand, if TI is derived from an occupational accident or illness then the worker will receive a subsidy of 75% of the contributory basis from the day after the physician issues the sick-leave certificate. On

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<sup>10</sup> A reference where the interested reader can find a quite detailed discussion of the regulation of TI benefits in Spain is Galiana-Moreno and Camara-Botia (2005).

the other hand, if TI is the result of a non-work related illness or injury then the benefit scheme has three parts. First, the worker perceives nothing from the first day to the third day of the sick-leave. Second, from the fourth day to the twentieth, the worker obtains 60% of the contributory basis. Finally, from the twenty-first day onwards the employee receives 75% of the contributory basis.

As it can be appreciated, non-work related contingencies are less covered than occupational injuries and illnesses. For this reason, some authors have pointed out that, in certain occasions, workers try to conceal some non-work injuries to, later on, report them as work related<sup>11</sup>. In that case, the substitution moral hazard of Fortin and Lanoie (2001) would be present<sup>12</sup>. We make use of this feature of the TI Spanish system to test the Monday effect.

At this point, it seems interesting to clarify what Spanish legislation considers work-related and what it is regarded as non-work-related. First section of chapter III of SSGL establishes which the protected contingencies are. Specifically, articles 115, 116 and 117 define respectively the concepts of occupational accident, occupational illness and non-occupational accident and illnesses. Article 115 states that:

*“It will be considered as an occupational accident any injury suffered by the worker either due to or as a consequence of any work performed for an employer”.*

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<sup>11</sup> See Cisnal-Gredilla (2002, p.21).

<sup>12</sup> In Fortin and Lanoie (2001) up to four types of moral hazard linked to the workplace accidents insurance are pointed out. The first type is called *ex ante injury hazard*. Since insurance covers financial and medical costs of accidents, workers are less incentivized to take care of themselves than in a situation with no insurance. A second type of moral hazard is called *ex ante causality hazard*. This type occurs because sometimes it is hard to recognize which injuries are caused by the job. For this reason, employees might file claims for off-the-job accidents. A third type could be named *ex post duration hazard*, which causes an increase in the length of the recovery spell as a consequence of the opportunistic behaviour of workers. A fourth form might be termed *substitution hazard* and it arises because the workplace accident insurance could be more generous than other types of insurance, as for example the unemployment benefits.

Particularly, it will be considered occupational accidents those suffered when the worker goes to or comes back from work (that is, the so-called “*in itinere*” accidents), occupational illnesses not classified as such, and aggravations as a result of the accident<sup>13</sup>.

On the other hand, article 116 characterizes an occupational disease in the following manner:

*“It will be considered an occupational disease that contracted as a consequence of the work performed for an employee in the activities specified in the table passed by provisions of implementation and development of this law, and caused by the action of elements and substances stipulated in such a table for each occupational disease”.*

Finally, article 117 determines, on the one hand, that all those accidents which are not considered as work-related according to article 115 can be classified as non-occupational accidents. On the other hand, health alterations which are not included in any paragraph of articles 115 and 116 have to be thought as non-occupational diseases.

#### **4. Theoretical framework**

Once we have described the main features of the sick-leave insurance system in Spain, it is easy to understand, from a theoretical point of view, why problems of moral hazard (mentioned in the introductory section) may arise. If a worker suffers an accident whose expected recovery period lasts from 1 to 3 days and such an accident is classified as work-related he/she will receive TI benefits equal to 75% of contributory basis. On the other hand, if the accident is classified as non-work related he/she will receive nothing; if the expected recovery period is between 4 and 20 days the relevant percentages are 75% and

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<sup>13</sup> It should be noted that all those accidents caused by “force majeure” and fraud or by reckless negligence of the worker are excluded. However, neither the normal negligence of the worker in the exercise of a habitual task nor a third party responsibility in the accident can be considered enough justification for exclusion. As a general criterion, it can be assumed that, unless evidence against it can be found, all injuries suffered at or in the way to/from work are work-related.



60% respectively; from day 21 onwards there is no difference between both schemes.

As it will be shown later, these gaps may cause a potential situation of substitution moral hazard (in terms of Fortin and Lanoie's classification). There is an incentive for the worker to substitute sick leave (SC) insurance by workers' compensation (WC) insurance due to the differences in replacement rates. In other words, some individuals might try to conceal out-of-work accidents and report them as work-related.

To better understand this idea, let us construct a simple microeconomic model which captures two basic features<sup>14</sup>: first, in the Spanish case WC is more generous than SC, but the difference between both coverage rates depends on the length of the recovery spell. For this reason a rational worker could try to substitute SC by the WC. But by doing this, and in the second place, the worker has to face reputational risk. This would mean that if the worker were caught performing this opportunistic behaviour, he/she would be penalized with a lower labour income in the future<sup>15</sup>. This penalty will be imposed by the employer<sup>16</sup> because there is a cost for the firm of reporting high rates of accidents and injuries<sup>17</sup>.

To rationalize the empirical findings obtained in this paper, we are going to use a utilitarian economic framework. Let us assume that individuals maximize their expected discounted utility. Their planning

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<sup>14</sup> A rather general discussion on the theoretical effects of the employment law with special attention to workplace safety can be found in Jolls (2007). A more specific analysis of the effects of social insurance (with an explicit treatment of worker's compensation) is the work of Krueger and Meyer (2002).

<sup>15</sup> There are a number of ways through which an employer might do this. The most obvious one is by dismissing the employee. However, without being so extreme, an employer could reduce promotion possibilities of an employee who behaves opportunistically.

<sup>16</sup> With this assumption, and for the sake of simplicity, we are leaving aside the role of the insurer (in Spain the mutual organizations of the Social Security). In any case, the consideration of the mutual organizations would only reinforce the effect described.

<sup>17</sup> Besides reputational considerations, a firm with a high accident rate could be forced to assume higher costs because of the higher contributions to fund WC system and the fines imposed by the Labour and Social Security Inspectorate.

horizon consists of two periods<sup>18</sup>. Period 1 comprises the present while period 2 refers to the future. Period 1 begins after the weekend in which an individual has suffered an accident out of the workplace. In that moment, the worker has to take the decision of reporting the accident as non-work related or, alternatively, of concealing the injury when arriving at the workplace on Monday and trying to notify the physical damage as work related. In the first case, the worker obtains SC and in the second he/she receives WC. In other words, what we are considering is that workers take their decisions in a two-period framework. Period 1 has a definite duration  $T$  and it is equal to the maximum work-related sick leave spell allowed by Spanish law<sup>19</sup>, and period 2 would last since period 1 has finished onwards.

With these theoretical assumptions, we can formalize the workers' decision as follows: if the worker chooses not to report a false work-related accident he or she will receive SC benefits in period 1 and a labour income in period 2, as it is established in expression (1):

$$V_A = U(\alpha(d^e)w_1d^e + w_1(T - d^e)) + \delta U(w_2) \quad (1)$$

Where  $U(\cdot)$  is the utility function (increasing and not convex in its argument, consumption or total income; that is,  $U'(\cdot) > 0$  and  $U''(\cdot) \leq 0$ , as usual),  $\delta$  is the discount factor,  $w_1$  is the daily contributory basis to assess the amount of both WC and SC in period 1, and  $w_2$  is the labour income for period 2.  $T$  is the number of days of which period 1 is composed, and  $d^e$  is the expected number of days in which the worker is off the job<sup>20</sup>. The parameter  $\alpha$  refers to the percentage of the contributory basis received as SC, and evidently it is comprised between 0 and 1. Furthermore, it should be noted that  $\alpha$  is a function of  $d^e$ . More precisely:

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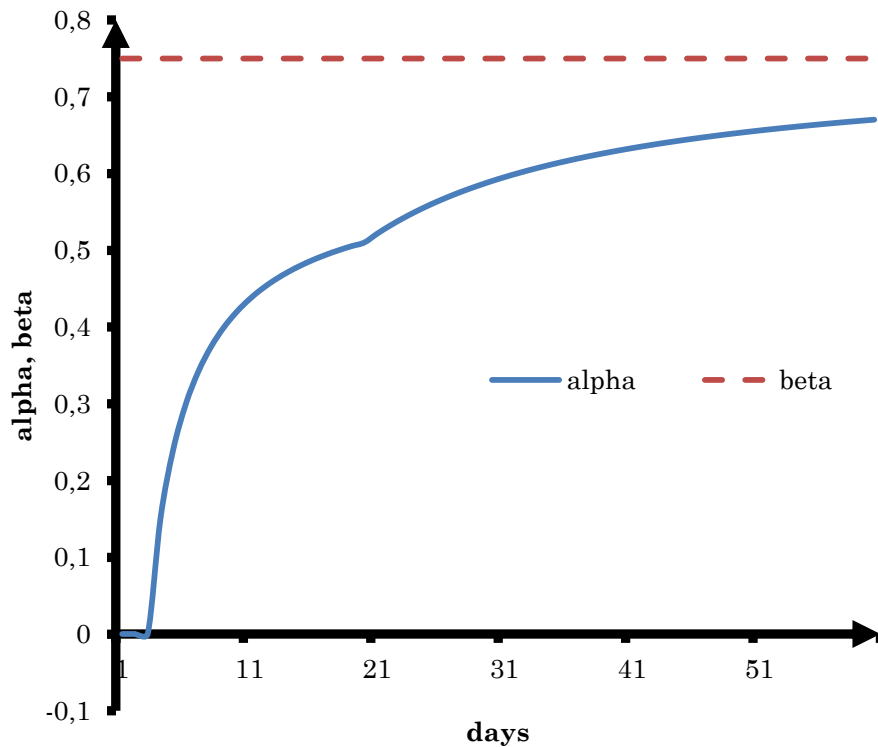
<sup>18</sup> We omit any consideration about leisure and suppose that the unique argument of the utility function is consumption (or income). The inclusion of leisure within the theoretical framework only would complicate the model without shedding any valuable light on the reasoning.

<sup>19</sup> In Spain, a worker can be off work on sick leave for a normal maximum period of 18 months.

<sup>20</sup> We consider  $d^e$  as being an expectation because the decision has to be taken at the beginning of period 1.

$$\alpha(d^e) = \begin{cases} 0 & \text{for } d^e \leq 3 \\ 0.6 \frac{(d^e - 3)}{d^e} & \text{for } 3 < d^e \leq 20 \\ \frac{(17 \cdot 0.6 + (d^e - 20) \cdot 0.75)}{d^e} & \text{for } d^e > 20 \end{cases}$$

In figure 1, we depict  $\alpha(d^e)$ . It is an increasing function of  $d^e$  from day 4 onwards. It can also be seen that it is a piecewise concave function with a slight break point on day 20, as a consequence of the Spanish regulation. Finally, it is worth mentioning that it is asymptotic to 0.75.



**Figure1. Alpha and Beta as functions of time.**

On the other hand, if the worker chooses to report an out-of-the-work accident as work-related, he/she will receive WC benefits in period 1 but in period 2 the worker will face a reputational risk. The

employer may detect the opportunistic behaviour of the worker and in such a case the employer can take measures that lower the worker's labour income in retaliation. With probability  $p$ , the employee escapes from the monitoring of the employer and faces no penalty, and with probability  $(1 - p)$  he/she is caught and, as a consequence, earns less in period 2. The discount expected utility for an opportunistic worker is:

$$V_B = U(\beta w_1 d^e + w_1(T - d^e)) + \delta[p(d^e)U(w_2) + (1 - p(d^e))U(\lambda w_2)] \quad (2)$$

In expression (2)  $\beta$  is the replacement rate of WC and  $\lambda$  is a parameter ( $0 < \lambda < 1$ ) which reflects the fact that if the worker is caught shirking he/she will receive less income in period 2 than if he/she behaves non-opportunistically<sup>21</sup>. It has to be noted that  $p$  is assumed to be a decreasing function of  $d^e$  ( $p(d^e)$  with  $\partial p/\partial d^e < 0$ ). The reason for that is not difficult to understand: if the worker suffers a minor injury, it will be easier for him/her to conceal it at the workplace than if he/she suffers a serious one. Minor injuries are related to short out-of-work spells and serious injuries are associated with long absences. Thus, the shorter the expected recovery period is the higher the probability of not being caught.

From the rationale described above we can conclude that if  $V_A$  is larger than  $V_B$  then the worker will choose to behave correctly and otherwise to behave opportunistically. To put it another way, if we define the indicator  $Z(d^e) = V_A - V_B$ , then the individual will perform an opportunistic behaviour when  $Z < 0$  and will behave as a non-shirking worker when  $Z > 0$ . Consequently,  $Z(d^e)$  may be written as follows:

$$Z(d^e) = U(\alpha(d^e)w_1 d^e + w_1(T - d^e)) - U(\beta w_1 d^e + w_1(T - d^e)) + \delta[(1 - p(d^e))(U(w_2) - U(\lambda w_2))] \quad (3)$$

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<sup>21</sup> As it has been mentioned before, period 2 comprises all the future. The worker could experience a spell of unemployment and later on could find a new job. When unemployed, the worker could be entitled for unemployment benefits (UB) or not. In any case, as UB does not cover the whole labour income the worker receives less income than if he or she is not caught carrying out an opportunistic behaviour. Alternatively the employer could not promote workers who behave opportunistically instead of dismissing them. That is the reason for supposing that the parameter  $\lambda$  runs between 0 and 1.

## 5. Two theoretical effects and the Monday Effect

For the purposes of this paper, we are interested in analysing how  $Z$  varies when  $d^e$  varies. It is worth noting that  $Z$  is a piecewise function of  $d^e$ . The first section would be defined for those durations between 1 and 3 days, the second one for durations between 4 and 20 and the last one for sick leaves over 20 days. When the section changes, the slope of  $Z$  will change.

Let us make two additional assumptions in order to keep the discussion simple. The first one is quite reasonable: when  $d^e \rightarrow 1$  then  $p \rightarrow 1$ . In words, when the injury is not very serious, the likelihood of concealing the injury at the workplace without being detected by the employer is very high. As an implication of this assumption we obtain that  $Z$  is negative for the lower values of  $d^e$ <sup>22</sup>. The second supposition is that the utility function is linear in consumption (that is,  $U''(\cdot) = 0$ ). This idea is not critical for reaching the main theoretical results but simplifies the calculus.

The form and position of the  $Z$  function depends on the individual's preferences and on the parameters above mentioned. However, it is still possible to get some useful insights by studying the slope of the function. To begin with, it is important to bear in mind that we may single out two theoretical effects: one related to period 1 and another related to period 2. So as to identify both of them clearly, let's split  $Z$  into its two components  $Z_1$  and  $Z_2$ , the first one associated with period 1 and the second one with period 2.

$$Z_1(d^e) = U(\alpha(d^e)w_1d^e + w_1(T - d^e)) - U(\beta w_1d^e + w_1(T - d^e)) \quad (4)$$

$$Z_2(d^e) = \delta[(1 - p(d^e))(U(w_2) - U(\lambda w_2))] \quad (5)$$

From expression (4), it is easy to calculate the slope of  $Z_1(d^e)$  in the space  $Z_1$ ,  $d^e$ :

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<sup>22</sup> Note that if, for example,  $p = 1$  when  $d^e = 1$  then the utility level of reporting an out-of-the-work accident as work-related turns into  $V_B = U(\beta w_1d^e + w_1(T - d^e)) + \delta U(w_2)$ , which implies that  $Z < 0$  because  $\beta = 0.75$  and  $\alpha(1) = 0$ .

$$\frac{\partial Z_1}{\partial d^e} = U_c w_1 \left[ \frac{\partial \alpha(d^e)}{\partial d^e} d^e + \alpha(d^e) - \beta \right] = \begin{cases} U_c w_1 (-0.75) & \text{for } d^e \leq 3 \\ U_c w_1 (-0.15) & \text{for } 3 < d^e \leq 20 \\ 0 & \text{for } d^e > 20 \end{cases}$$

On the other hand,  $Z_2$  is simply an increasing function of  $d^e$ , starting from 0 for  $d^e = 1$ , if we assume that when  $d^e = 1$  then  $p = 1$ . Figure 2 has been depicted according to these facts.

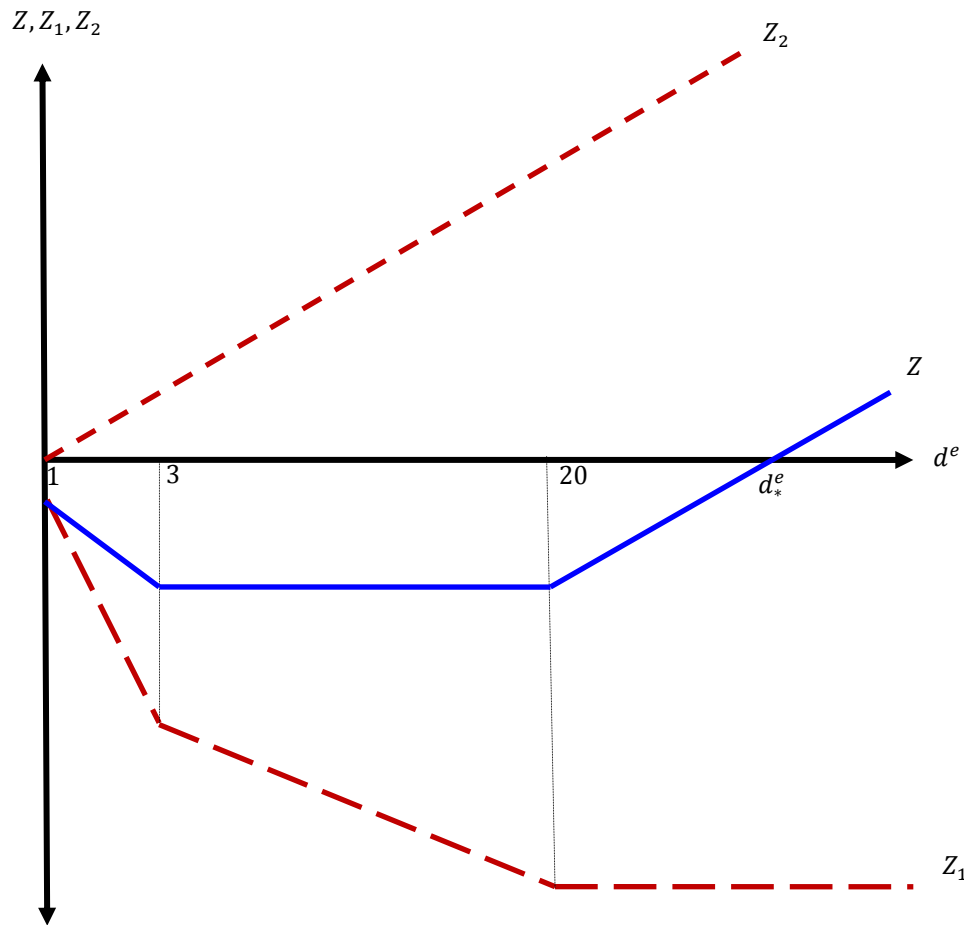


Figure 2.  $Z$ ,  $Z_1$  and  $Z_2$  as functions of the expected duration of the sick leave.

As it is clear from figure 2, the theoretical effect related to period 1 (and captured by  $Z_1$ ) would make the individual behave

opportunistically as a consequence of the greater generosity of WC payments as compared to SC benefits. The theoretical effect associated with period 2 is a reputational effect that makes the individual behave non-opportunistically. Putting together  $Z_1$  and  $Z_2$  we obtain  $Z$ , which is negative for low values of  $d^e$ . Nonetheless,  $Z$  eventually become positive due to  $Z_1$  is flat from day 20 onwards and the reputational period 2 effect finally offsets the economic incentives to behave opportunistically. This is what we represent in figure 2 from  $d_*^e$  onwards.

However, it is worth mentioning that the graphical representation showed in figure 2 is only a particular case. It would be easy to prove that, depending on worker's preferences, the critical value  $d_*^e$  could be below 20 days. What is more, for those extremely job-committed workers the value of  $d_*^e$  could perfectly be lower than 3 days<sup>23</sup>. But, from an aggregate point of view, we can still reach some clear conclusions. If we assume a continuum of individuals with different preferences, but distributed in a conventional manner, i.e. if they follow a uniform or a normal statistical distribution, for instance, the theoretical predictions obtained from our model could be summarized by means of three propositions.

**Proposition 1.** *When the expected duration of the absence is not very long, the economic incentives to substitute SC by WC are strong. In this way, data should show the highest percentage of unjustified Monday claims for those short sick leaves.*

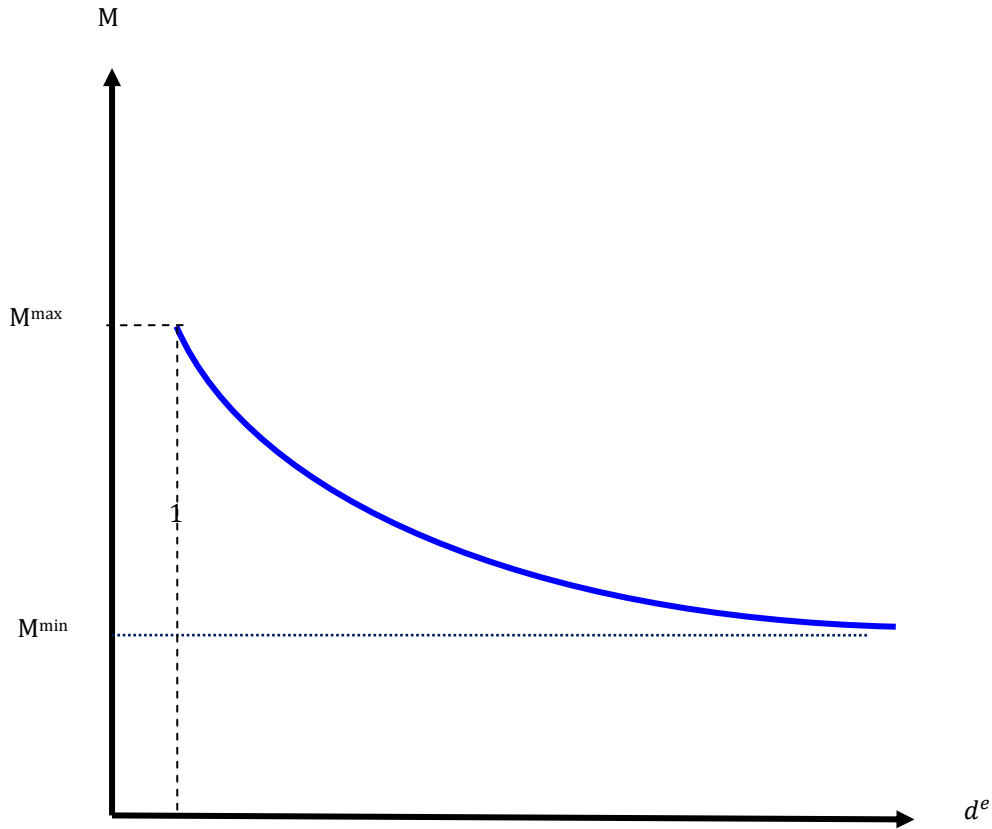
**Proposition 2.** *As  $d$  increases, the economic incentives become less strong because of the increase of  $\alpha$  at day 4 and at day 21 and as a consequence of the rise of the reputational cost associated with period 2. This means that we should observe a decline in the percentage of unjustified Monday claims as long as  $d$  goes up.*

**Proposition 3.** *When  $d$  reaches an enough high value, economic incentives to report a false work-related injury tend*

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<sup>23</sup> This would be the case if the slope of  $Z_2$  were greater than the absolute value of the slope of  $Z_1$  in the 1 to 3 days stretch.

*to disappear. In such a case the percentage of unjustified Monday claims should be placed at its minimum. Moreover, if that minimum percentage is still positive for long durations, we could conclude that it is a measure of the physiological explanation of the Monday Effect.*



**Figure 3. Monday effect as a function of the expected duration of the sick leave.**

In figure 3 we try to summarize the main implications of the three propositions above mentioned. In the vertical axis we measure the aggregate percentage of excess reporting of easy-to-conceal injuries on Monday (with respect to Tuesday-Friday injuries) conditioned to having suffered an accident. That is what we call  $M$ . In the horizontal axis we represent  $d$ .



As it can be seen in figure 3, when  $d$  is equal to 1,  $M$  is at its maximum. As long as  $d$  advances, the reputational cost associated with period 2 increases since  $p$  diminishes, which implies that  $M$  declines. In other words, more and more individuals will reach their threshold level of  $d$  (that is,  $d_*^e$  in figure 2) and they will have no economic incentive to behave opportunistically. Eventually no individual will have economic incentives to develop an opportunistic behaviour. An important corollary that can be extracted from the previous statement is that if there is a positive level of  $M$  which remains after  $d$  reaches high values ( $M^{min}$  in figure 3), such a percentage could be seen as a measure of the “physiological part” of the Monday effect. To put it another way, the excess of  $M$  over  $M^{min}$  could be considered the “economic part” of the Monday effect.

## 5. Database

The data used in the empirical analysis come from the administrative data of the Statistic of Accidents at Work (SAW) for the year 2002. In the year 2003 there was a methodological change in such a statistic so we have opted to employ the 2002 data because of the better codification (for our purposes) of the type of injury in the old methodology. In other words, in our view it is easier to identify the so-called hard-to-diagnose injuries, which are similar to those considered in the works of Card and McCall (1995) or Campolieti and Hyatt (2006), in pre-2003 data codification. More specifically whereas it is easy to identify strains and sprains in the statistic from 2003 onwards, it is more difficult to detect which injuries are low-back pains.

Data have been checked in order to avoid errors in the registration process. In this regard, we have removed those observations that exceed the limits of the contributory basis. We have also deleted from our database those individuals from whom we have no information of the date in which they returned to work. Due to the objective of the present work, it is very important to control accurately the likely calendar effects. In this regard, and following previous literature on this topic, we have firstly eliminated those accidents happening during the weekend<sup>24</sup>. Secondly, to avoid distortions caused by bank holidays and other public holidays on the observed

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<sup>24</sup> The reason of doing that is explained in Campolieti and Hyatt (2006), for instance.

phenomenon<sup>25</sup>, we have decided to delete from our database those weeks in which there was a national or a regional public holiday<sup>26</sup>. In this way, we only have regular five-day workweeks in our database. In our view, this kind of week is more appropriate to analyse the Monday effect in an accurate way because of the lack of public holidays which can distort in several ways the observed behaviour of the worker. We have also corrected some other evident errors in the record. After data cleansing, the analysis is carried out with 458.256 observations corresponding to workers suffering injury due to a work-related accident which causes at least one day of sick-leave.

Table 1 provides some interesting results. It can be appreciated that a quarter of all accidents that occur during a regular five-day workweek (from Monday to Friday) take place on Monday. Evidently, this figure exceeds the 20% associated with an even distribution of accidents along the week and could be understood as a sign of the existence of the Monday effect. However, it is a little bit risky to conclude this so quickly because this result may be due to a higher level of economic activity (and, consequently, to a higher number of employees working) on Mondays. We also observe in table 1 that the duration of sick leave is a day shorter when the accident occurs on Monday than if it happens on any other day, which could indicate that accidents on Mondays are different. With regard to the type of injury, it can be seen that on the first day of the week there is a greater concentration of easy-to-conceal or hard-to-diagnose injuries such as sprains, strains and low back pains.

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<sup>25</sup> It must be taken into account that a public holiday may fall on any day of the week. This fact could affect the behaviour of opportunistic workers in a complex way, and it could partially mask the Monday effect.

<sup>26</sup> The list of national public holidays in Spain is: 1<sup>st</sup> January (New Year's Day), 6<sup>th</sup> January (Epiphany, Sunday in 2002), 29<sup>th</sup> March (Easter Friday), 1<sup>st</sup> May (Labour Day), 15<sup>th</sup> August (Feast of the Assumption), 12<sup>th</sup> October (Spain's National Day, Saturday in 2002), 1<sup>st</sup> November (All Saints' Day), 6<sup>th</sup> December (Constitution Day), 8<sup>th</sup> December (Feast of the Immaculate Conception, Sunday in 2002) and 25<sup>th</sup> December (Christmas Day). The list of regional public holidays is available upon request to the authors.

**Table 1. Mean Characteristics by day of the injury.**

<b><i>Day of the week</i></b>			
<b>Monday</b>		25.1%	
		(0.433)	
<b>Tuesday</b>		20.5%	
		(0.404)	
<b>Wednesday</b>		19.5%	
		(0.396)	
<b>Thursday</b>		17.9%	
		(0.383)	
<b>Friday</b>		17.1%	
		(0.377)	
	<b>Full sample</b>	<b>Monday</b>	<b>Non-Monday</b>
<b>Days out of work</b>	17.61	16.89	17.85
	(25.168)	(24.471)	(25.393)
<b><i>Type of injury</i></b>			
<b>Low-back injuries</b>	12.0%	14.2%	11.2%
	(0.325)	(0.349)	(0.316)
<b>Sprains and Strains</b>	34.3%	35.3%	34.0%
	(0.475)	(0.478)	(0.474)
<b>Fractures</b>	5.9%	5.5%	6.0%
	(0.235)	(0.228)	(0.237)
<b>Burns</b>	1.5%	1.3%	1.6%
	(0.121)	(0.112)	(0.124)
<b>Contusions</b>	15.9%	15.5%	16.1%
	(0.366)	(0.362)	(0.368)
<b>Cuts and Lacerations</b>	15.6%	14.4%	16.0%
	(0.363)	(0.351)	(0.366)
<b>Traumatisms</b>	4.5%	4.3%	4.5%
	(0.207)	(0.202)	(0.208)
<b>Daily benefits</b>	28.06	28.04	28.07
	(11.726)	(11.615)	(11.763)
<b><i>Demographic characteristics</i></b>			
<b>Age</b>	34.62	34.60	34.63
	(11.405)	(11.359)	(11.420)
<b>Male</b>	81.4%	82.7%	81.0%
	(0.389)	(0.378)	(0.392)
<b>Seniority</b>	42.42	42.81	42.29
	(76.715)	(77.024)	(76.610)
<b>Observations</b>	458256	114853	343403

Source: Own elaboration from SAW.

Note: Standard deviations in parenthesis.

## 6. Methodology

The empirical strategy employed in this paper seeks to answer to two questions: Is there a Monday effect? And if so, does it have an economic or a physiological nature? In order to do this, we begin by estimating a probit model with the following specification:

$$L_i = f(\rho_i \cdot Monday + \gamma_i \cdot X_j + \mu_i) \quad (6)$$

In expression (6)  $L_i$  is a dichotomous variable which takes the value 1 if the worker has suffered a type-i injury and 0 otherwise.  $\gamma_i$  is a vector of coefficients associated with type-i injuries,  $X_j$  is a vector of covariates which are included to control for some characteristics that may affect the accident occurrence<sup>27</sup> and  $\mu_i$  is a random disturbance related to the type-i injury. Finally,  $\rho_i$  is the coefficient of the Monday variable. Its sign and its size indicate the existence and the magnitude of the Monday effect in different types of injuries. This sort of analysis closely follows previous literature on this topic.

One aspect that should be clarified is that the paper estimates the probability of each type of injury conditional to have suffered an accident. This is because the used database is composed by microdata referred to injured workers and we do not have information on non-injured workers. Thus, we follow the same empirical strategy as Campolieti and Hyatt (2006) and a relative frequency index is obtained.

The second part of the methodological analysis is quite more original and, to the best of our knowledge, it has never been used to analyse the Monday effect. It is based on a generalization of the Oaxaca-Blinder decomposition for non linear models. The literature has developed several decompositions of this type. Even and Macpherson (1990) and Fairlie (1999) perform decompositions to probit models, Nielsen (1998) makes an approach for logit models, Fairlie (2005) develops another application where both logit and probit models are used, and Ham et al. (1998) decompose expected durations. Finally,

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<sup>27</sup> We consider up to five alternative models.

Yun (2004) proposes a generalization of the Oaxaca-Blinder decomposition for any type of functional relation.

According to Yun (2004), if a variable  $Y$  depends on a linear combination of independent variables through a non linear function  $\varphi$ , the difference in  $Y$  at the first moment between different groups 1 and 2 can be decomposed according to the following expression:

$$\bar{Y}_1 - \bar{Y}_2 = [\overline{\varphi(\gamma_1 \cdot X_1)} - \overline{\varphi(\gamma_1 \cdot X_2)}] + [\overline{\varphi(\gamma_1 \cdot X_2)} - \overline{\varphi(\gamma_2 \cdot X_2)}] \quad (7)$$

The first addend of the right-hand side indicates that part of the whole difference is explained by the fact that groups 1 and 2 have different characteristics. The second addend shows how the same characteristics affect differently depending on which group is considered.

In the vast economic literature on wage discrimination, the unjustified (by characteristics) part of the difference in the Oaxaca-Blinder decomposition has been usually interpreted as a measure of the wage discrimination. In our case, the second addend of (7) is interpreted as being an indicator of the relative intensity of the moral hazard problems between the two groups. In this regard, we follow previous works on this topic such as Corrales et al. (2008) and Martín-Román and Moral (2008).

Assuming that and following the guide lines obtained from the theoretical model, we study such an unjustified component. To deepen this analysis, we build the counterfactual distribution for the hard-to-diagnose injuries using the characteristics of those accidents happened from Tuesday to Friday and the estimated coefficients for Monday accidents, according to expression (8):

$$A_R^M = f(\gamma_M \cdot X_R) \quad (8)$$

where  $f$  here refers to the normal distribution function used in the probit estimation. The subscript  $M$  refers to the Monday and the subscript  $R$  refers to the rest of the days. From that counterfactual distribution the unjustified component of the non-linear decomposition

associated with different sick-leave durations is built. Such a component is expressed as follows:

$$U_t = \overline{f_t(\gamma_M \cdot X_R)} - \overline{f_t(\gamma_R \cdot X_R)} \quad (9)$$

where  $U$  is the unjustified component and  $t$  is the actual number of sick-leave days. By studying that component, we can evaluate if the economic explanation of the Monday effect is likely or not. According to the theoretical model, the economic incentives tend to decrease as the sick-leave increases. So, if  $U_t$  presents a decreasing profile, we will have found strong evidence for the presence of the *homo oeconomicus* in the market for workplace accidents. At the same time, moral hazard problems tend to disappear for those very long work absences, which means that any Monday gap related to long absences could be interpreted as a measure of the physiological component of such a gap.

If we call  $M$  to the unjustified component  $U$  in order to connect this empirical part with the Monday gap discussed in the theoretical section, we can formalize more this idea by adjusting econometrically an equation such as:

$$M_t = \kappa_0 + \kappa_1 \frac{1}{t^\theta} + \varepsilon \quad (10)$$

where  $t$  is the above mentioned number of sick leave days and it would correspond to the variable  $d$  in the theoretical section. On the other hand,  $\kappa_0$  and  $\kappa_1$  are two parameters to be estimated and  $\theta$  is a parameter of shape to be calibrated,  $\theta \in (0,1)$ , so as to obtain the best econometric adjustment. Finally,  $\varepsilon$  stands for an error term. It is obvious that equation (10) represents a hyperbolic relation between  $M$  and  $t$ , and that when  $t$  increases and tends to infinite,  $M$  tends to  $\kappa_0$ , which constitutes a lower asymptote. According to our theoretical explanation of section 5,  $\kappa_0$  could be considered a measurement of size of the physiological part of the Monday effect, whereas any excess over  $\kappa_0$  in the Monday gap should be interpreted as a measurement of the magnitude of the economic part.

## 7. Results

Table 2 shows the results of the probit estimation. In such a table, the coefficients and the z-statistics associated with the Monday covariate are included. Those coefficients are obtained for six separate regressions<sup>28</sup> and for five econometric specifications. Model I only includes the Monday dummy as a covariate, taking value 1 if the accident happens on Monday and 0 if not. Model II adds age, job tenure, sex, region and the hour of the accident as control variables. Model III also includes the industry of the firm. Model IV takes into account covariates that describe the worker's occupation. Model V includes the sick leave duration as well. Finally, the model VI uses the model specification V, but takes into account the potential endogeneity problems caused by the inclusion of the sick leave duration as an explanatory variable. According to Wald and Hausman tests, there is an endogeneity problem in the model when the duration variable is included. To correct this problem a two-step estimation is carried out where the duration is instrumented by dummy variables related to the severity of the injury. Finally, the Amemiya-Lee- Newey test shows the absence of overidentificacion in the instrumented model<sup>29</sup>.

From the high significance of the coefficients related to the Monday covariate appearing in table 2, we can conclude that there is an important Monday effect. However, it is necessary to clarify that a positive sign on such a variable can only be found for low back injuries and strains and sprains. In other words, these two types of injuries are overrepresented on the first day of the week. As it has already been pointed out, in the preceding literature on moral hazard and workplace accidents this sort of injuries has been named in many ways, for instance, hard-to-diagnose injuries, easy-to-conceal injuries or soft-tissue injures. The researchers agree that it is in this kind of injuries where the problems of moral hazard are more acute. A good example of this research is the work of Campolieti (2006) that finds ex ante causality moral hazard in the report of back pain.

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<sup>28</sup> All of them are probit estimations where the dependent variable takes the value 1 for each type of injury and zero otherwise.

<sup>29</sup> Test results are not included in the paper, but there are available upon request to authors.

**Table 2.-Probit estimation of the “Monday effect” from different models and injuries. (Marginal effects).**

	I	II	III	IV	V	VI
<b>Dependent variable (Nature of injury)</b>						
<b>Low back injuries</b>	0.030 (26.85)	0.028 (25.03)	0.027 (24.87)	0.027 (24.85)	0.026 (23.93)	0.025 (22.70)
<b>Sprains and strains</b>	0.013 (7.87)	0.015 (8.87)	0.015 (9.30)	0.015 (9.36)	0.015 (9.52)	0.011 (6.57)
<b>Fractures</b>	-0.005 (-6.04)	-0.005 (-5.92)	-0.005 (-5.95)	-0.005 (-5.92)	-0.002 (-2.81)	-0.003 (-3.44)
<b>Burns</b>	-0.003 (-7.22)	-0.003 (-6.79)	-0.003 (-6.55)	-0.002 (-6.40)	-0.003 (-6.64)	-0.002 (-6.04)
<b>Contusions</b>	-0.006 (-5.01)	-0.006 (-4.75)	-0.006 (-4.87)	-0.006 (-4.95)	-0.007 (-5.50)	-0.007 (-5.87)
<b>Wounds</b>	-0.016 (-13.04)	-0.016 (-13.08)	-0.016 (-12.91)	-0.016 (-12.82)	-0.016 (-13.54)	-0.016 (-13.25)
<b>Superficial traumatism</b>	-0.002 (-3.49)	-0.002 (-3.50)	-0.002 (-3.63)	-0.002 (-3.65)	-0.003 (-3.92)	-0.003 (-4.31)
<b>Observable characteristics</b>		*	*	*	*	*
<b>Industry</b>			*	*	*	*
<b>Occupation</b>				*	*	*
<b>Duration</b>					*	*
<b>Observations</b>	458256	458256	458256	458256	458256	458256

The table reports coefficient estimates for the Monday reporting changes in probability.

The dependent variable takes the value 1 for each type of injury and zero otherwise.

Z-statistic in parenthesis



Being more specific, the likelihood of suffering a low-back injury on Monday is 3 percentage points higher than on the rest of the week. For the case of strains and sprains that gap is about 1.5 percentage points higher. Another aspect that might be stressed is that there are no sizeable differences in the estimated coefficients for different specifications. The only significant effects are those of the covariates included to control for observable worker characteristics on low-back injuries and strains and sprains, on one hand, and the effect of the sick-leave duration on fractures, on the other hand.<sup>30</sup>

As previously discussed, model VI tries to correct the endogeneity problem of model V. The results did not reveal major differences. We only appreciate a slightly reduction in the Monday variable coefficient when analyzing sprains and strains.

Once we have checked that there are significant differences in the types of injuries reported on Mondays, we go further into the second stage of the analysis. Here we group all the hard-to-diagnose injuries (that is, strains, sprains and low-back pains) into one category and the rest of the injuries into another. Then we carry out two different econometric regressions, one for accidents occurring on Mondays and other for accidents happening from Tuesday to Friday. The above mentioned econometric regressions are also the basis for elaborating the counterfactual distribution used in the last part of our empirical analysis.

Table 3 reports the results of the estimates of the likelihood of suffering a hard-to-diagnose injury depending on the day when the accident has been reported (Monday or the rest of the week). The main conclusions obtained from table 3 are that the probability of reporting a hard-to-diagnose injury increases with age, with job tenure, with the amount of benefits, during the first working hours and in the morning shifts. Nonetheless, the probability is lower for males and for the longest sick-leaves.

We can also detect in table 3 some differences in the magnitudes of the coefficients for Monday accidents and for Tuesday to Friday

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<sup>30</sup> These findings are consistent with previous research on the Monday effect in the United States and Canada (Campolieti and Hyatt, 2006)

accidents which are responsible for the observed gap. Thus, an increase in sick-leave duration reduces more the probability of reporting a soft-tissue injury if the accident occurs on Monday.

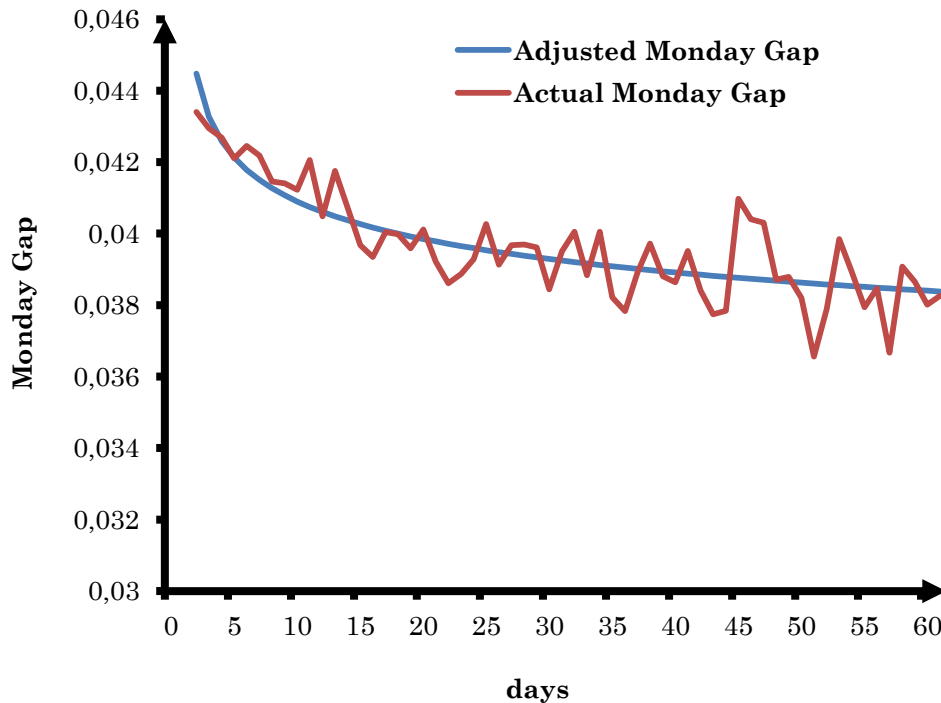
**Table 3. Probit estimation for hard-to-diagnose injuries by days out for work. (marginal effects)**

	Full sample	
	Monday	Rest of the week
<b>Duration</b>	-0.0075*	-0.0068*
<b>Age</b>	0.0116*	0.0124*
<b>Squared age</b>	-0.0001*	-0.0001*
<b>Seniority</b>	0.0005*	0.0004*
<b>Squared seniority</b>	-1.10E-6*	-8.74E-07*
<b>Benefit</b>	0.0015*	0.0013*
<b>Male</b>	-0.0979*	-0.1157*
<i>Shift (ref: morning)</i>		
<b>Evening</b>	-0.0259*	-0.0099*
<b>Night</b>	0.0063	-0.0006
<i>Time worked (ref: first two hours)</i>		
<b>Between two and six hours</b>	-0.0338*	-0.0193*
<b>After the first six hours</b>	-0.0555*	-0.0291*
<b>Regional covariates</b>		
	YES	YES
<b>Industry covariates</b>		
	YES	YES
<b>Occupation covariates</b>		
	YES	YES
<b>Observations</b>	114853	343403

Notes: \*Indicates significance at 5%. Coefficients in this table report changes in probability.

Nevertheless, we must not forget that one of the main aims of this paper is to identify traces of moral hazard in the Spanish workplace accident insurance system. As it has been previously explained, a strong argument in favour of the economic hypothesis would be to find a decreasing pattern in the unjustified Monday gap. With this objective in mind, we study the different effect of similar characteristics depending on the day of the week in which the accident takes place. At the same time we analyse how such differences evolve

while sick-leave duration increases. With the estimated coefficients for Monday and for Tuesday to Friday accidents and the characteristics referred to the latter ones we build the counterfactual distribution defined in equation (8) and the unjustified component described in expression (9). By assessing this unjustified component for a continuum of sick-leave spells we depict what we have labelled “actual Monday gap” in figure 4. In this figure we also represent the best econometric adjustment according to expression (10) and we name it “adjusted Monday gap”. The length of the sick-leave (expressed in days) is plotted in abscissas<sup>31</sup>, whereas the magnitudes of the “Monday gaps” are shown in ordinates.



**Figure 4. Actual and adjusted Monday gap.**

<sup>31</sup> Figure 4 only present the unjustified component for those injuries with recovery spells less than 60 days. This is because more than 95% of the registered accidents are comprised within these limits and because the longer the sick-leave duration is, the lower the number of observations, and as a consequence the predictions become less accurate and fluctuate more.

The shape of the estimated unjustified component or “actual Monday gap” is strongly consistent with the model developed in sections 4 and 5. The unjustified part of the decomposition presents a negative slope. As we have explained in the theoretical part of this paper, the longer the sick-leave period is, the fewer the individual’s economic incentives for experiencing a moral hazard episode. This result is interpreted here as evidence in favour of the economic hypothesis to explain the Monday effect. So, in our view, we have found traces of the existence of the *homo oeconomicus* in the “market for workplace accidents”. But, at the same time, as duration increases the gap tends to stabilize. This could indicate that part of gap do not depend on the duration, which can be interpreted as a sign of the presence of a physiological component in such a gap.

To give a better sense of the order of magnitude of the relative importance of both explanations, we focus on the results associated with the econometric adjustment of equation (10), whose graphical representation is the “adjusted Monday gap” in figure 4. The best result was obtained for  $\theta = 0.1$  and the estimated values of  $\kappa_0 = 0.0263$  (t-Statistic=23.48) and  $\kappa_1 = 0.0181$  (t-Statistic=11.93). The R-squared of the regression was 0.7105. This means that of a mean of 3.96 percentage points of Monday gap (for sick leave spells lasting 60 days or less), 2.63 percentage points could considered as a consequence of the physiological explanation, in accordance with our theoretical reasoning. That accounts for approximately two thirds of the total gap. Our results also show that for one-day sick leaves the economic explanation would account for 45.9% of the total gap, whereas for sixty-day sick leaves it would still account for the 30.5% of the unjustified difference on Mondays.

As a result of all this, we could finish this section by answering the two main questions addressed in this paper. In the first place, it is clear that there is a Monday effect in the Spanish WC. In the second place, to better understand such a Monday gap, it is necessary to take into consideration both the economic and physiological hypothesis. Although undoubtedly the physiological explanation dominates from a quantitative standpoint, the economic view still plays a role.

## 8. Concluding remarks

A simple observation of the data reveals that there are not only more accidents on Mondays, but also a higher concentration of the so-called hard-to-diagnose, easy-to-conceal or soft-tissue injuries. This empirical regularity has been detected in our Spanish database but appears as well in other countries like the United States and Canada. Nonetheless, the interesting fact is to find a credible justification that explains such regularity. Two main hypotheses have arisen to rationalize the Monday effect. The first one, the physiological hypothesis, simply states that after two days off work (that is, after a weekend) an employee has a higher probability of suffering this type of accidents due to physiological reasons. The second form of rationalizing this fact involves the strategic or opportunistic behaviour which characterises the *homo oeconomicus*.

The Spanish regulation on sick-leave provides us with a legal framework to check which of the above mentioned two hypotheses is more credible or, if both are plausible, to obtain a measure of them. And this is so because the Spanish legal system differentiates between work and non-work related injuries and diseases. This distinction creates a scheme of economic incentives which is exploited for our purposes of designing a test to examine the economic explanation of the Monday effect.

We develop a microeconomic model which, despite its simplicity, sheds valuable light on the analysed phenomenon. This model is a guide to interpret the empirical results. Two main insights are obtained from the theoretical analysis. First, the legal framework creates an incentive scheme for substituting two different types of accident insurance (non-work related versus work related) that tends to disappear as long as sick leave extends over time. Second, and as a consequence, for those very long spells the Monday gap can be attributed to the physiological explanation (and, subsequently, the rest can be thought of as a measure of the economic explanation).

Our empirical strategy follows Yun's (2004) work. We utilize the generalization for non-linear models of the well-known Oaxaca-Blinder decomposition to carry out our empirical analysis. More precisely, we

have built the counterfactual distribution for easy-to-conceal injuries taking into account the characteristics of Tuesday to Friday accidents and the estimated coefficients for Monday accidents.

The main finding obtained from the empirical work is that the unjustified component of the Oaxaca-Blinder decomposition (which we consider to be a measure of the moral hazard associated with the Monday effect) follows a decreasing pattern consistently with the economic explanation. However the Monday gap tends to stabilize when the sick-leave spells are very long, which is consistent with the physiological view. This makes us think that it is not possible to totally discard neither the economic nor the physiological hypotheses so as to obtain a complete picture of the phenomenon. As a matter of fact, our calculations seem to suggest that about two thirds of a Monday gap (of a total of four percentage points) could be attributed to physiological factors, being the remaining one third a consequence of moral hazard caused by economic incentives.

The implications for the economic policy are evident. In the first place, we have found evidence of a Monday effect in the Spanish insurance for workplace accidents which should be addressed when designing measures in order to make the system more efficient. Secondly, as two thirds of the total gap is estimated to have a physiological nature, some measures and practices regarding the avoidance of this phenomenon (for instance, warming-up exercises before starting working) could be promoted when passing health and safety at work legislation. Finally, it should not be forgotten that despite the fact that the physiological explanation dominates from a quantitative standpoint, the economic hypothesis is also relevant. For this reason, from the results obtained in our research two lines of action are proposed. The first one would be to equalize the SC and WC parameters or, more precisely, to apply to WC the same replacement rates as in SC. The second measure would be to monitor carefully, ex-ante and ex-post, those short duration injuries in WC system. It is in this kind of claims where the economic incentives are stronger and, as it can be deduced from our empirical work, the economic explanation could be accounting for up to almost the 50% of the Monday gap (more exactly, 46% for those one-day sick leaves).

## References

- Butler, R. J., Durbin, D. L. and Helvacian, N. M. (1996). Increasing claims for soft tissue injuries in workers' compensation: cost shifting and moral hazard. *Journal of Risk and Uncertainty*, 13, 73-87.
- Butler, R. J., Gardner, H. H. and Kleinman, N. L. (2013). Workers' compensation: occupational injury insurance's influence on the workplace. In G. Dionne (ed.), *Handbook of Insurance*. Springer Science+Business Media, New York. Chapter 16, 449-469.
- Campolieti, M. (2006). Disability insurance adjudication criteria and the incidence of hard-to-diagnose medical conditions. *Contributions to Economic Analysis & Policy*, 5(1), article 15.
- Campolieti, M. and Hyatt, D. E. (2006). Further evidence on the "Monday effect" in workers' compensation. *Industrial and Labor Relations Review*, 59(3), 438-450.
- Card, D. and McCall, B. P. (1996). Is workers' compensation covering uninsured medical cost? Evidence from the "Monday effect". *Industrial and Labor Relations Review*, 49(4), 690-706.
- Cisnal Gredilla, J. M. (2002). Análisis formal de la siniestralidad laboral en España. *Propuestas de Actuación*. Madrid. Asepeyo
- Corrales, H., Martín-Román, A. and Moral, A. (2008): La duración de las bajas por accidente laboral en España: ¿Se justifican las diferencias entre comunidades autónomas? *Revista de Economía Laboral*, 5, 73-98.
- Even, W. E. and Macpherson, D. A. (1990). Plant size and the decline of unionism. *Economic letters*, 32, 393-398.
- Fairlie, R. W. (1999) The absence of the African-American owned business: an analysis of the dynamics of self-employment. *Journal of Labor Economics*, 17, 80-108.
- Fairlie, R. W. (2005). An extension of the Oaxaca-Blinder decomposition technique to logit and probit models. *Journal of Economic and Social Measurement*, 30(4): 305-316.
- Fortin, B. and Lanoie, P. (2000). Incentive effects of workers' compensation: a survey. In G. Dionne (ed.), *Handbook of Insurance*. Springer. Chapter 13, 421-458.
- Galiana Moreno, J. M. and Camara Botia, A. (2005). El subsidio por incapacidad temporal. *Foro de Seguridad Social*, 12-13, 22-30.

- Ham, J.C., Svejnar, J. and Terrel, K. (1998). Unemployment and the social safety net during transitions to a market economy: evidence from the Czech and Slovak Republics. *American Economic Review*, 88(5), 1117-1142.
- Hansen, B. (2008). The Monday effect in workers compensation: evidence from the California reforms. Unpublished paper. Available at SSRN: <http://ssrn.com/abstract=1940142>.
- Jolls, C. (2007). Employment law. In: A. Mitchell Polinsky and Steven Shavell (eds.). *Handbook of Law and Economics*, Elsevier, chapter 17, 1349- 1386.
- Krueger, A. B. and Meyer, B. D. (2002). Labor supply effects of social insurance. In: Auerbach, A.J., Feldstein, M. (eds.), *Handbook of Public Economics*, vol. 4. Elsevier, Amsterdam, 2327–2392.
- Martín-Román, A. and Moral, A. (2008). Moral hazard and gender differences in the workplace accidents insurance. *Empirical Economic Letters*, 7(7), 707-713.
- Nielsen, H. S. (1998). Discrimination and detailed decomposition in a logit model. *Economic letters*, 61, 115-120
- Viscusi, W. K. (2007). Regulation of health, safety, and environmental risks. In: A. Mitchell Polinsky and Steven Shavell (eds.). *Handbook of Law and Economics*, Elsevier, chapter 09, 591-645.
- Smith, R. S. (1990). Mostly on Monday: is workers' compensation covering off-the-job injuries? In: Philip S. Borba and David Appel (eds.), *Benefits, Costs, and Cycles in Workers' Compensation*. (Boston: Kluwer Academic Publishers), 115-127.
- Shapiro, S. A. (2000). Occupational safety and health regulation. In: *Encyclopedia of Law and Economics*, Cheltenham, Edward Elgar, 5540, 596-625.
- Yun, M. (2004). Decomposing differences in the first moment. *Economics Letters*, 82, 275-280.