# How long does it take to enforce a debt in the Portuguese judicial system?

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**Abstract**
This paper applies duration analysis to a dataset covering all enforcement cases related to commercial and civil debts, dealt with by first instance courts in Portugal between 2007 and 2016. Evidence points to a strong reduction in the duration of cases since the beginning of the current decade. At that time, the median duration was above five years and it declined to around two and a half years by the end of the period under analysis. The probabilistic profile of case resolution changed significantly, with the hazard rate of resolution of pending cases being nowadays higher in their initial stage. Case duration is influenced notably by its complexity, proxied by a higher claim value, the existence of procedural aspects (*apensos*), and also by the overall enforcement litigation faced by the *comarca*. (JEL: K40, H11, C41)

## Introduction

The ability to ensure the fulfilment of an obligation through the judicial system is essential for the regular functioning of the market, and the mass use of credit and deferred payment increased its relevance. The efficiency of debt enforcement should be a relevant part of the framework costs that companies consider in their investment decisions, thus affecting potential economic growth. Recent evidence based on surveys to companies shows that, on the one hand, payment risk is particularly high in Portugal (European Payment Report 2017) and, on the other hand, justice system delays are a very important issue for Portuguese companies (Business Cost of Context Survey from Statistics Portugal 2015).

From the perspective of companies, effectiveness of debt enforcement is related with the ability of the judicial system to quickly promote the fulfilment

of the obligation or, if that is not possible (for instance, due to lack of assets to seize), to declare the debt as uncollectible. As a result, the effectiveness of the justice system in this area closely relates not only with the ability to ensure the fulfilment of the obligation, when the debtor has that capacity, but also to the duration of cases.

In broad terms, an enforcement case is a lawsuit by which the plaintiff demands the fulfilment of an obligation, generally a debt payment. Debt enforcement is based on a document that creates or recognizes such an obligation - the enforceable title (*título executivo*) - which can be generated inside the judicial system (as a court decision or an injunction procedure), or outside it (as a cheque or a promissory note). The pledging plays a major role in these cases. This is the judicial seizure of debtor's assets, giving the plaintiff the right to be paid before any other creditor without previous guarantees over those assets. Moreover, following an enforcement case, several procedural aspects (*apensos*) can be raised by the defendant or third parties that must be resolved so that the enforcement case can be closed. Therefore, the duration and effectiveness of enforcement lawsuits closely relates both with the ability of the judicial system to identify and pledge assets and the rights provided to the debtor and other creditors (Leiras 2015).

The enforcement procedure in Portugal was constantly changing over the last decades, with significant modifications in the role of the different parties involved (Pimenta 2012). The 2003 reform meant a clear paradigm shift, with the establishment of enforcement officers in order to reduce the reliance on the ability of the plaintiff to identify the assets to seize. This change promoted the de-jurisdictionalisation of debt enforcement as the enforcement officer was given the powers to coordinate the process even if the judge maintained a controlling role (Gomes 2007). The reform implementation generated clear blockages, as the clarification of the powers of different players[1] and the establishment of instruments for its proper functioning were only gradually accomplished (Lourenço 2017).

More recently, are also worth mentioning some changes set out by the new civil procedure code in the enforcement area. On the one hand, the transitory rules created by the decree-law no. 4/2013 of January 11 were made permanent, broadening the rules to close cases and defining a 6-month deadline for the closure of cases due to inactivity of the plaintiff. On the other hand, debtor's rights were enhanced, with a narrowing of the set of private documents that can be used as enforceable titles and the reduction of the claim value beyond which a greater intervention by the judge is required for cases based on non-judicial enforceable titles (de Freitas 2014).

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1.  In this regard, changes introduced by the decree-law no. 226/2008 of November 20, which transferred some responsibilities from judges and judicial clerks to enforcement officers, were particularly relevant (Araújo 2009).

As regards procedural changes, it is important to highlight, in 2013, the streamlining of the procedure to freeze bank accounts. The need for an intervention by the judge was abolished and the procedure to identify the banks in which the debtor has deposits or bank accounts was simplified[2] (Leiras 2015). Moreover, in 2014 a new procedure was created - PEPEX (*Procedimento Extrajudicial Pré-Executivo*) - which allows the holder of an enforceable title to obtain information regarding the feasibility of an enforcement case before presenting it, namely by gathering information available on several datasets about the assets held by the debtor.

The constant legislative changes in enforcement area and the considerable investment in the streamlining of procedures show the high priority given by the Portuguese legislator to the effectiveness of debt enforcement. This paper focuses on a particular aspect of enforcement effectiveness: its duration. In particular, duration analysis methods are applied to a dataset covering enforcement cases related to commercial and civil debts dealt with by first instance courts in Portugal between 2007 and 2016, containing more than 2 million observations. This methodology allows an estimation of the probability that an enforcement case is resolved depending on the time elapsed since it entered the system and to identify the characteristics impacting that duration.

The vast majority of studies of court efficiency are based on court level data. The main findings indicate high heterogeneity in efficiency, with a lack of a clear link between the human resources allocated and the duration of cases (Voigt 2016). Evidence with Portuguese data confirms these conclusions (Pereira and Wemans 2017). There is also evidence of a large impact of judge characteristics on the number of cases resolved and duration of cases (Christensen and Szmer 2012).

The implementation of duration analysis to judicial cases requires case level information and the studies that apply this methodology are relatively scarce,[3] probably due to the difficulty in gathering datasets with that detail. One of the main benefits in using case level information as opposed to more aggregate data is the availability of information about characteristics capturing case complexity, such as normative complexity cited in the decision (Vita 2012), claim value or existence of multiple parties on either the plaintiff or the defendant sides (Bielen *et al.* 2017). In addition, these datasets allow the

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2. Between September 2013 and December 2016, more than one million requests to access this dataset, managed by Banco de Portugal, were granted to judicial clerks and enforcement officers, in order to identify the financial institutions legally authorized to receive deposits in which the debtor held bank accounts or deposits.

3. There have been applications to administrative cases in Italy (Vita 2012) and medical malpractice in the same country (Grembi and Garoupa 2013) and in the UK (Fenn and Rickman 2014), to compensation of damages in commercial relationships in Slovenia (Grajzl and Zajc 2017) and to cases focused on contracts in the construction sector in Belgium (Bielen *et al.* 2017).

estimation of the impact on duration of some procedural events, such as the availability of an expert's report or the holding of court hearings (Fenn and Rickman 2014, Grajzl and Zajc 2017 and Bielen *et al.* 2017). Another element covered by this type of studies is the characteristics of the different parties involved (Heise 2000). This may have a special impact for debt enforcement, as the resources put forward to resolve the case by companies vis-a-vis individuals would be distinct, and this could influence case duration.

In contrast to the analysis presented in this study, other papers that apply duration models to judicial cases are based on relatively small samples. The authors are not aware of any paper applying duration analysis to enforcement cases. Moreover, despite the importance of this area in the reform agenda for the judicial sector in the past years, particularly during the Economic and Financial Assistance Programme (European Commission 2014), quantitative analyses of the effectiveness of enforcement in Portugal are relatively scarce. In this respect, the analyses in Correia and Videira (2015, 2016) stressing the improvement of performance indicators in this area between 2011 and 2014 are noteworthy.

This paper is organized as follows. The first part describes the dataset, characterizing enforcement cases in Portugal, including type of litigant, enforceable title, court where cases were resolved, claim value and incidence of specific procedural aspects. The second and third sections focus on duration and profile of case resolution considering all cases, also the pending ones, overcoming the limitations of duration measures based only on resolved cases (a discussion of these shortcomings is made by Pereira and Wemans 2017). The fourth section addresses the role of enforcement cases' characteristics as determinants of duration. Finally, one makes some concluding remarks.

**Main characteristics of enforcement cases related with the payment of civil and commercial debts**

The dataset used in this paper includes 2,351,768 observations corresponding to all enforcements related to civil and commercial debts (including those regarding provision of services) which were dealt with in first instance judicial courts in Portugal between 2007 and 2016.[4] The dataset includes around 75% of all resolved enforcement cases, mainly excluding the ones related to the payment of judicial fees, fines, penalties and insurance premia.

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4. Several observations were excluded from the dataset. Firstly, those with a duration shorter than one day, probably corresponding to case re-openings. Secondly, special enforcement cases regarding the payment of alimony. Thirdly, those for which the *comarca* where the case was resolved was not compatible with the territorial organization in place at that time. Finally, those with zero claim value and with missing information on the enforceable title. These exclusions totalled 10,890 observations.

As duration analysis is the focus of this paper, dates when the cases were filed and resolved are the key variables. The dataset includes 661,898 cases that started before 2007. However, these are only a fraction of the cases brought in those years (the ones not resolved until the end of 2006) and consequently the dataset is left-truncated. In addition, there are 616,073 cases without a resolution date: those pending at the end of 2016 (right-censored observations).

Information about the plaintiff is available for around 80% of resolved cases, but only for around 17% of cases pending at the end of 2016. Companies filed the vast majority of enforcement cases (87%), followed by individuals (12%). Finally, public entities represent a residual share (1%) as enforcement cases brought by the state are generally dealt with by tax and administrative courts. Available information also allows an identification of mass litigants[5] for around 70% of resolved cases and 15% of those pending. Considering resolved cases, the weight of mass litigants between 2007 and 2016 is approximately 22% but this percentage has been falling since 2011 (Figure 1A). As regards the economic activity sector, information is available for only 43% of all cases brought by companies. In this subsample, the most important sectors are financial and insurance services as well as information and communication services, each corresponding to around 30% of cases. Also relevant are the commercial sector (13%), manufacturing (7%) and real estate (5%).[6]

Moreover, the dataset includes information about the *comarca* where the case was resolved or pending at the end of 2016[7] and the cases resolved in judgeships specialised in enforcement cases - *juízos de execução*. There is a clear concentration of enforcement cases in the two major *comarcas* (Lisboa and Porto), although this has dropped significantly up to 2012, recovering in the following years, particularly in 2015, the first complete year after the implementation of the new judicial map which increased the territorial scope of these *comarcas*. As regards specialisation, between 2007 and 2009 only around 15% of cases were resolved in enforcement judgeships. This

5. Companies that filed more than 200 cases, protective measures, proceedings or enforcements each year and which have to pay higher judicial fees, according to the *Regulamento das Custas Processuais* and to *Portaria* no 200/2011 of May 20. It is important to note that this variable, along with the one regarding procedural aspects which will be presented ahead, were especially compiled for this study and therefore were not subject to the same consolidation and validation procedures performed for the other variables that are included in official statistics.

6. Taking into account that the activity sector is only available for around half of the cases filed by companies, the actual percentages can differ substantially from those presented here.

7. A small fraction of cases do not have such information about the *comarca* (7,127), because they were dealt with in courts which cover several *comarcas* as labour and family courts.

proportion increased steadily up to 2014 and it jumped to 90% in the last two sample years, with the implementation of the new judicial map (Figure 1A).[8]

Regarding case characteristics, there is information about the type of enforceable title and, for 98% of the observations, claim value. Among enforceable titles[9], the injunction procedure is the most common, underlying around 30% of resolved cases in the beginning of the sample period and almost 60% in the more recent years (Figure 1B). The increasing role of this procedure should be related with legislative changes that broadened its scope, as discussed in Pereira and Wemans (2015), and was accompanied by a reduction in the relevance of private documents (from 30% to 14%) and court sentences (from 20% to 10%). Authenticated documents, contracts and other titles cover around 5% of cases each (Figure 1B).
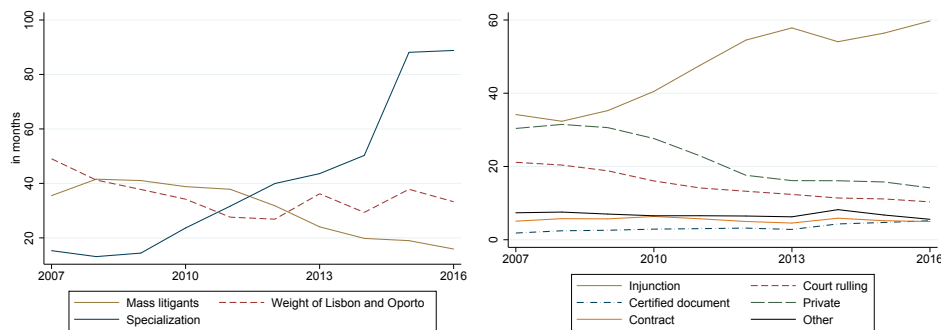


(A) Characteristics of enforcement cases    (B) Enforceable title

FIGURE 1: Main trends in enforcement by resolution year (%)

Notes: Note that the territorial scope of Lisboa and Porto *Comarcas* was enlarged in September 2014, with the implementation of the new judicial map.
Sources: DGPJ and authors' calculations.

Average claim value, at constant 2011 prices (private consumer deflator), is 21 thousand euros and its distribution is highly asymmetric - around two thirds of enforcement cases have a claim value lower than 5 thousand euros (Figure 2). Average claim value is considerably higher for companies in the

8. One could identify resolved cases in enforcement judgeships in the *comarcas* of Lisboa, Porto, Guimarães and Oeiras already in January 2007 and Vila Nova de Gaia from May of that year onwards. With the implementation of *comarcas-piloto*, one could find enforcement cases resolved in this type of judgeships also in Grande Lisboa-Noroeste and Baixo Vouga. Finally, with the implementation of the new judicial map, in 2014, 16 out of 23 *comarcas* have enforcement judgeships.

9. Different enforceable titles were aggregated in relatively homogeneous categories with a similar treatment by the judicial system. Appendix A in the Portuguese version of this paper details the construction of these categories.
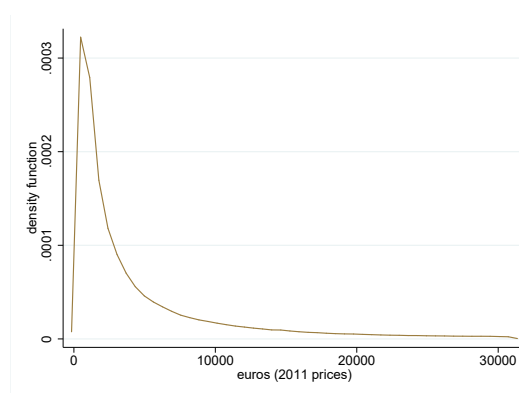
FIGURE 2: Distribution of claim value, excluding the upper decile

Sources: DGPJ and authors' calculations.

financial sector (around 40 thousand euros) and lower for companies in the information and communication sector (2 thousand euros).

Procedural aspects (*apensos*) were identified in around 5% of the observations.[10] The most common type of *apensos*, identified in around 3% of enforcement cases, are oppositions by the defendant and *embargos de terceiro* by other creditors.[11] In addition, around 2% of the cases have creditors' claims[12] and 0.4% have other types of *apensos*. Note that resolved cases with *apensos* have, on average, a considerably high claim value (74.8 thousand euros).

Finally, there is also information about the type of closure, spread over 39 categories, several of those with a very residual importance in the case of enforcement. Therefore, these categories were aggregated into four groups, with the aim of measuring the importance of successful enforcement cases - cases that ended in the fulfilment of the obligation - and of the different reasons the remainder cases did not succeed. Indeed, only around 36% of

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10. For cases pending at the end of 2016, the identification of procedural aspects was made including information available up to 15 January 2018, which can lead to an underestimation of their incidence, as *apensos* can still be filed for such cases. However, in the following sections only *apensos* filed until the end of 2016 were considered, as only those might have a direct influence on observed duration. Moreover, only *apensos* recorded in the same court as the related enforcement case were considered, a procedure that may also lead to an underestimation of their incidence, particularly for cases resolved in the months that followed the implementation of the new judicial map, in September 2014.

11. *Embargos de terceiro* can be filed by any asset holder whose ownership of the asset is not compatible with the scope or the implementation of the seizure (see Gomes 2007, pp. 74).

12. This procedure allows other creditors with secured claims over the seized assets to intervene in the case, even if their debt is not overdue or they do not yet have an enforceable title (Leiras 2015).

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enforcement cases ended with the fulfilment of the obligation,[13] 29% were closed due to a lack of assets, while 27% ended by reasons attributable to the plaintiff, as withdrawals or inactivity. Note that around 9% of the observations do not fit with in the mentioned categories or have an unspecified type of closure (appendix B in the Portuguese version of this paper presents a list of the types of closure included in each category). In this respect, not only the speed at which the system promotes the payment of debts, but also the rules governing the closure of cases may have a significant impact on the duration of enforcement cases.

**Duration of enforcement cases**

Statistics available concerning case duration in Portugal focus on the duration of the cases resolved in a given year, an indicator that does not correctly express what happened in that year, as most of the cases started in previous years. However, using information about the dates the cases were filed and resolved, it is possible to use duration analysis (see, for instance, Kiefer 1988 and, for the implementation in *Stata*, Cleves *et al.* 2010) to obtain the survival function of enforcement cases, which depicts how the probability of a case remaining pending evolves as time since case filing goes by.[14] In this approach, the function is estimated taking into account all the information regarding each time period, namely all pending cases in the beginning of the period and new cases filed, even if they remain pending at the end of the period.

The annual median case duration - the time until which half of cases are expected to be resolved - estimated according to these two indicators presents a very different pattern in the period under analysis (Figure 3A). Whereas the median duration of resolved cases remained stable around 40 months, the median estimated from the survival function increased significantly between 2007 and 2009, presenting thereafter a decreasing trend, with particularly significant reductions in 2011, 2013 and 2016. In 2013 the decline was very steep in longer durations, while the time needed to resolve 25% of the cases had a constant decrease since 2010, from 25 to only 9 months. This reduction in 2013 may be related with the following measures - see decree-law no. 4/2013 of January 11 (Correia and Videira 2015). Firstly, special units were established to reduce case backlog in the courts of Lisboa, Porto, Maia, Vila Nova de Gaia and Oeiras. Secondly, new measures were introduced to facilitate the closure of cases due to inactivity of the plaintiff. Finally, for cases filed before

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13.  This type of closure includes not only situations in which effective payment existed, but also in which fulfilment of the obligation is expected, such as when payments occur in instalments.

14.  Formally, the survival function is given by $S(t) = Pr(T > t)$, $T$ being the random variable which represents the time elapsed until the case is resolved.

September 2003, the closure resulting from a lack of seizable assets was also simplified.

As mentioned, significant changes were introduced to the rules governing the closure of cases due to inactivity of the plaintiff. Consequently, it is important to analyse whether the reduction in duration was actually accomplished by a quicker response of the judicial system or simply reflected a swifter closure of cases without giving a proper response to the plaintiff, namely the fulfilment of the obligation or the recognition that it could not be fulfilled due to a lack of sufficient assets. An analysis of the duration of enforcement cases that only considers as resolved the ones ending in the fulfilment or non-fulfilment of the obligation, and in which the cases ending by reasons attributable to the plaintiff are treated as censored[15], also points to a strong decline in average duration between 2010 and 2015 (Figure 3B). As will be discussed ahead, after controlling for the impact of the change in observable characteristics of enforcement cases, evidence of shorter durations for the most recent period remains.
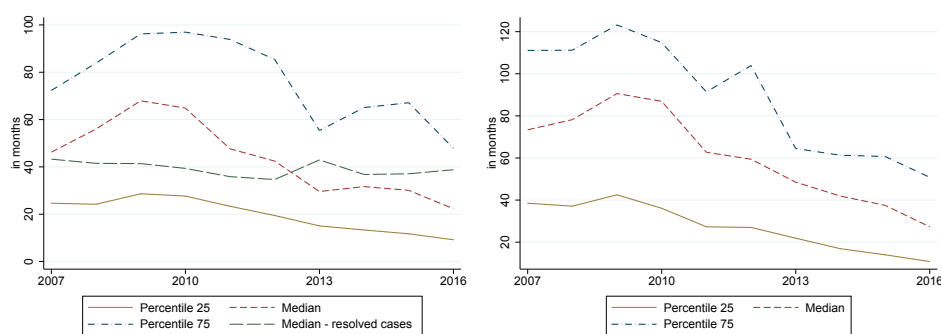


(A) All types of closure        (B) Type of closure: effective resolution

FIGURE 3: Developments in the duration of enforcement cases 2007-2016, comparing different measures

Note: Percentiles driven from survival functions estimated with complete information about the enforcement cases dealt with by the system in each year. For comparison, figure A also shows the median of resolved cases in each year.
Sources: DGPJ and authors' calculations.

The decline in the duration of cases might be associated with changes in the judicial system, either through a streamlining of procedures, availability of new resources or the implementation of new rules for case closure. However

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15. This analysis excludes resolved cases for which the type of closure is not identified. The closure of cases due to reasons attributable to the plaintiff should reflect a cost-benefit analysis, taking into account that the system was not able to respond to the claim up to that time. As this event prevented case closure by the system, these observations can be regarded as censored.

it can also relate to a change in the quantity or the average complexity of cases filed. In this respect, it is important to understand how duration varies with case characteristics.

As regards the enforceable title, there is no clear distinction among survival functions estimated for injunctions, court sentences, private documents or other titles. However, duration is much longer for cases with authenticated documents as the underlying enforceable title - which also have a very high average claim value (134 thousand euros) - and for enforcement cases based on contracts. The incidence of *apensos* attached to the case considerably increases duration (Figure 4A), as expected given that the case can only be resolved after the resolution of these *apensos*.

Cases featuring higher debts take, on average, longer to be solved, as illustrated by the clear distinction between survival functions weighted by claim value and unweighted (Figure 4B). This result can be driven by a positive association between complexity and claim value as these cases may demand the fulfilment of a higher number of procedural steps. In addition, the connection between procedural rules and claim value, as well as the relationship between the amounts at issue and the resources allocated by the defendant to prevent enforcement could explain such result.



(A) Procedural aspects                    (B) Weighted by claim value
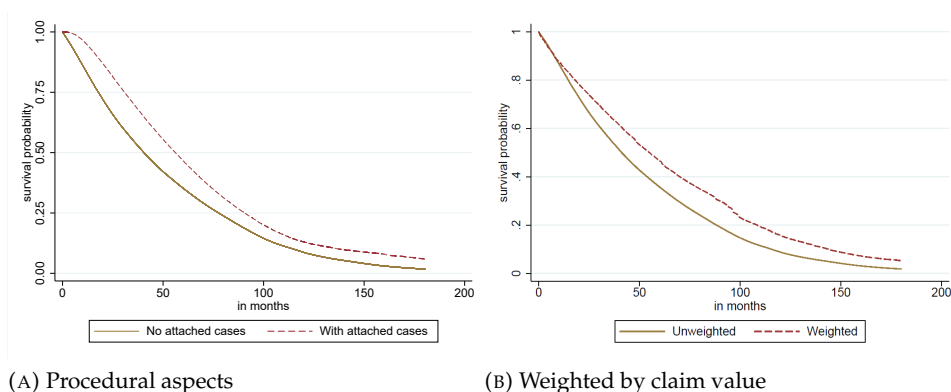
FIGURE 4: Survival functions

Note: The figures depict Kaplan-Meier survival functions for durations up to 15 years that cover the time span of the vast majority of cases. The dashed line in figure 4B is weighted by claim value in real terms.
Sources: DGPJ and authors' calculations.

Regarding the characteristics of the litigant and the type of closure, it is only feasible to look at the duration of resolved cases.[16] By type of litigant,

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16.   As information regarding pending cases on these variables is virtually unavailable, survival functions would be clearly biased to shorter durations.

case resolution is, on average, faster for individuals, lasting 45 months, which compares to 49 months for companies. By activity sector, financial and insurance companies present higher durations (61 months), while information and communications, trade and manufacturing sectors have a duration close to that for all companies and real estate activities have a significantly lower average duration (32 months). The enforcement cases filed by mass litigants took on average 6 months less than those from other companies. Regarding the type of closure, the fastest cases are those that end with the fulfilment of the obligation (39 months), followed by those that end because of insufficient assets (48 months) and finally those closed by reasons attributable to the plaintiff (60 months).

### Probabilistic profile of resolution of enforcement cases

The time profile of case resolution can be studied through the hazard function which is an alternative way to characterize the duration distribution along with the survival function presented above. The hazard function measures the instantaneous rate of resolution of a pending case, in probabilistic terms, reported to a given moment after start.[17] Figure 5 shows this function for the entire period under analysis. As described in the introduction, recent years have been marked by profound changes, both in the enforcement procedure with the entry into force of the 2013 Civil Procedure Code and the availability of electronic platforms to support the activity of enforcement officers, and organization with the implementation of the new judicial map in the 2014 judicial year.[18]

Figures 6A and 6B show the hazard functions, respectively, for the periods before and after the beginning of 2014 judicial year. Taking the latter as the break point of the sample, the second figure will capture approximately the current profile of case resolution's probabilistic intensity, already reflecting the various changes that have been affecting enforcement procedure. The figures also show the time elapsed until the median (red line) and the 90th percentile (blue line) of case resolution are reached, giving an indication of duration intervals during which most cases are resolved.

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17. More specifically, the hazard function measures the probability of case resolution to occur during an infinitesimal interval of time, conditional on the case having remained pending until that moment, divided by the amplitude of the interval. The hazard function ($h(t)$) relates to the survival function through the expression $h(t) = -dlnS(t)/dt$.

18. In this article references to judicial years always take the period from 1 September to 31 August of the following year and not the official judicial year which sometimes coincided with the calendar year. In fact, the main policy measures took effect after the end of the judicial holidays, not at the beginning of the year, signalling that period as the most relevant reference for the Portuguese judicial system.

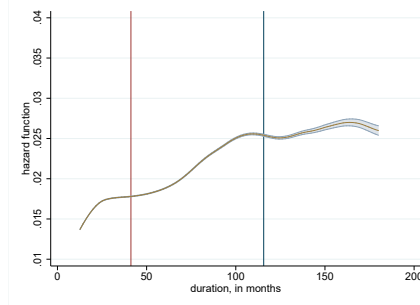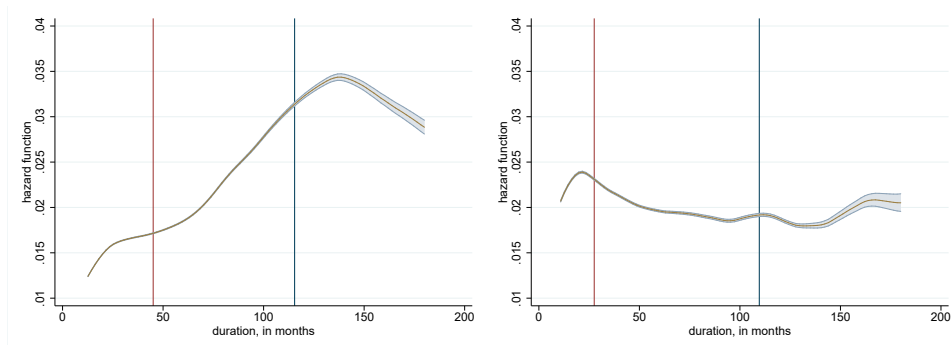FIGURE 5: Instantaneous rate (probabilistic) of case resolution, full sample

Note: The figure shows the hazard function and confidence bands at 95%, for durations up to 15 years that cover the time span of the vast majority of cases. The red line is the median of case duration and the blue line the 90th percentile.
Sources: DGPJ and authors' calculations.



(A) Before the 2014 judicial year       (B) 2014 judicial year and following

FIGURE 6: Instantaneous rate (probabilistic) of case resolution

Note: The figure shows the hazard function and confidence bands at 95%, for durations up to 15 years that cover the time span of the vast majority of cases. The red line is the median of case duration and the blue line the 90th percentile.
Sources: DGPJ and authors' calculations.

When the entire period under study is taken, the hazard function indicates positive duration dependence (Figure 5), i.e. the instantaneous rate of resolution of pending cases increases over time (except for very long durations, when a very small number of unresolved cases remains). However, this result is essentially determined by the profile in the first sample period (Figure 6A). In the sample beginning in the 2014 judicial year (Figure 6B), the resolution intensity does not have a marked trend, varying within a much more limited range. In addition, such intensity is higher in this second period,

over a span that extends from the start of cases up to about 5 years of duration. This is the reason the median of resolved cases is reached much earlier.

In the pre-2003 reform regime, the intervention of judges in all enforcement cases would be a reason for an increasing profile of the hazard rate, on the assumption of a natural prioritization of older cases. Although the first sample starts already in 2007, the system still had a significant number of pending cases at the time, both pre-reform and entered in the changeover to the new regime. It is also to be expected that the profile estimated in figure 6A reflects the adjustment of the system to the new rules, notably with respect to the formation of a body of enforcement officers capable of responding to the volume of incoming cases.

The probabilistic profile of case resolution also depends on the several steps related to the seizure of debtor's assets. Thus, the greater intensity of resolution in the first years of the case and the absence of an upward trend in the second sample will also reflect the gains of speed in the procedures for identification and seizure of assets, including the impact of the effectiveness of these mechanisms in promoting voluntary compliance at an early stage.

**Determinants of duration of enforcement cases**

*Methodology*

The impact of the different explanatory variables on duration is studied on the basis of a semiparametric model, the Cox (1972) model, rather usual in this context (see, for example, Cameron and Trivedi 2005). The Cox model assumes that the hazard function of a case associated with the set of explanatory variables $\mathbf{x}_i$, $h(t|\mathbf{x}_i)$, is given by

$$h(t|\mathbf{x}_i) = h_0(t)exp(\beta_1 x_{1,i} + \beta_2 x_{2,i} + ... + \beta_k x_{k,i}), \tag{1}$$

where $h_0(t)$ is the baseline hazard function and $exp(\mathbf{x}\boldsymbol{\beta})$ the relative hazard. There is a proportional relationship between the hazard functions of any two cases $\mathbf{x}_j$ and $\mathbf{x}_i$, the proportionality ratio being given by $exp(\mathbf{x}_j\boldsymbol{\beta})/exp(\mathbf{x}_i\boldsymbol{\beta})$. In particular, if these cases differ only up to a characteristic expressed through a binary variable (which takes on, say, the value 1 if the case is filed by a company and the value 0 if the case is filed by an individual), the multiplicative constant relating the hazard functions is given by the exponential of the coefficient of that variable. The main advantage of the Cox model is that it does not require modelling the hazard function (although this can be estimated). Nevertheless, the Cox model assumes, in its simplest form, that all the regressors move this same function in a multiplicative way, that is, it assumes the proportionality of hazards.

The proportionality hypothesis can, however, be partially lifted through a stratified estimation procedure, in which it is assumed that the baseline hazard functions differ across the strata (1, 2, ...) corresponding to the values of one or more categorical variables for which one does not want to assume proportionality of hazards. Thus, there will be several hazard functions given by

$$h_1(t|\mathbf{x}_i) = h_{01}(t)exp(\beta_1 x_{1,i} + \beta_2 x_{2,i} + ... + \beta_k x_{k,i})$$
$$h_2(t|\mathbf{x}_i) = h_{02}(t)exp(\beta_1 x_{1,i} + \beta_2 x_{2,i} + ... + \beta_k x_{k,i}) \qquad (2)$$
$$...,$$

in which the coefficients of the explanatory variables not used for stratification are common to all strata.

In addition to the Cox model, the Weibull and Gompertz parametric models were estimated, both assuming the aforementioned proportional hazards hypothesis. These models are compatible with the increasing profile of the non-parametric risk function for the entire sample period (Figure 5). However, results (available upon request) are similar to those presented below for the Cox model (as in Vita 2012 and Bielen *et al.* 2016), so a separate analysis is not justified.

### *Variables*

The explanatory variables cover the following characteristics of cases: case filed by a company versus individual, mass litigant status (companies), claim value in real terms, enforceable title underlying the case and procedural aspects (existence of *apensos*) - see section describing the characteristics of debt collection cases, for more details. The claim value has a strongly asymmetric distribution to the right, and was taken in logs. The nature of the plaintiff and the mass litigant status have a significant number of missing observations, particularly affecting pending cases (i.e. the censored observations), while the claim value has a residual number of missings. The missing observations in these variables were imputed through a multiple imputation procedure.[19]

In the database there is information about the *comarca* where the lawsuit ended in accordance with the configuration of the judicial map in place at the time. However, the territorial organization of the judicial system has

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19.  In the implementation of this procedure the standard routines available in Stata were used, the nature of the plaintiff and mass litigant status having been imputed on the basis of a logistic regression, and the claim value on the basis of a linear regression, on the various regressors, the failure indicator and the baseline cumulative hazard (see White and Royston 2009). The binary variables have, respectively, about 35% and 45% of missings, and the claim value about 2%. It was decided not to impute the activity sector of the plaintiff company, also available in the database, given the existence of a very high proportion of missings.

changed over the period covered by the study. In addition to the most recent revision, there was the establishment of *comarcas-piloto* in 2009. The current configuration was taken as a reference and extended to the whole horizon, through an exercise of territorial aggregation. The *comarca* of case resolution - thus determined - was used to stratify the sample, given that it did not seem appropriate to impose proportional hazards throughout all *comarcas* (by including fixed effects in the Cox regression). This procedure allows a more flexible modelling, while ensuring that the coefficients of the remaining variables are not affected by their correlation with the characteristics of *comarcas*. However, it has the disadvantage of not allowing to directly estimate the impacts of these same characteristics on the duration of cases.

Complementary specifications were estimated, including *comarca* variables, now retaining the actual geographical configuration of *comarcas* at the end of the lawsuit. In particular, one intended to study the impact of congestion on duration of cases. It is not possible to calculate a direct congestion measure for each *comarca* in a given year, considering completed and pending lawsuits, as there is only information about the *comarca* where the case ended and the judicial map underwent significant changes in the sample period. Alternatively, one considered the average duration of «peer» lawsuits, i.e. those that ended in the same *comarca* and year as the lawsuit concerned. A measure of the complexity of litigation was included as well, taking the log of the average claim value in the *comarca*. Other *comarca* indicators outside the judicial system were calculated, namely based on INE's Purchasing Power Index and the density of businesses (from data available at the municipality level), but these showed very high correlation with «peer» lawsuit duration and were not used.

The cases starting in a given year share common determinants, whether arising from the judicial system itself, such as changes in applicable legislation and procedures, whether outside the system, as changes to the type of transactions in the economy, or variations in non-performing credit rate due to the business cycle. In the benchmark econometric specification, the judicial year the case begins has also been taken as a stratification variable, as the graphical tests were unfavourable to the proportional hazards hypothesis. However, one also experimented with a fixed-effects type modelling, with almost no impact on the magnitudes and significance of other variables' coefficients. Regarding the remaining variables, graphical tests indicated that the proporcionality assumption approximately held, except for the existence of *apensos*. In fact, the inclusion of this last information into the regression should be seen as an approximation: an adequate modelling would require a time-varying model, in order to take into account the moment the *apensos* start.

As a modelling hypothesis one interacted the impact of some enforceable titles on duration with the claim value. In fact, the civil procedure law provides for a speedier enforcement procedure for titles such as

court sentences and injunctions, and extrajudicial titles fulfilling certain requirements, in particular a claim value under a certain threshold (notwithstanding the various changes to those requirements over time). In the period covered by this study, are particularly relevant the regimes established by the 2003 and 2013 reforms which, as a general rule, do not require in such cases an order by the judge nor the delivery of notification to the defendant (see, for example, Passos 2012 and Pinto 2013).[20] There are a small number of older lawsuits in the database - about 10% - which began almost entirely after the entry into force of decree-law no. 274/97 of 8 October. In this period, for judicial titles and other titles with a claim value under a certain threshold (cumulatively with other conditions), the lawsuit began directly with the seizure of assets, without delivery of notification to the defendant, but following an order by the judge.[21] The need for an order by the judge in the period prior to 2003, either for delivery of notification to the defendant or seizure of the assets indicated by the plaintiff, was common to all titles and should in principle be captured by the indicator for the year the lawsuit starts.

Continuous variables, i.e. the claim value and the congestion and litigation complexity measures for *comarcas* - were centred on the median, so that the baseline hazard function was estimated by reference to that figure. In fact in the Cox model, this function is estimated at the origin of the covariates - the figure that makes the relative hazard equal to 1 in the expression (1).

### Results for all comarcas

Table 1 presents the results for all enforcement cases in the period 2007-2016, stratifying by judicial year of case filing and *comarca*, as explained above, and also splitting up the sample into the period before and after the 2014 judicial year, in line with the section on case resolution profile. Two additional specifications have been estimated: including *comarca* variables (dropping the stratification by *comarca*), and interacting some titles with the claim value.

Lawsuits initiated by mass litigants within those filed by companies tend to proceed more rapidly (probabilistic finalization intensity about 40% higher), and the same holds for cases brought by individuals relative to companies (with a less marked effect: approximately 20% shift in resolution intensity). The first result may stem from mass litigants' allocating significant resources to this type of litigation, possibly resorting to experienced

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20.   The current threshold is 10 thousand euros, twice the minimum allowing appeal to second instance courts, as set out by Law no. 62/2013 of August 26; between 2003 and 2013, such threshold was 30 thousand euros, the minimum allowing appeal to the Supreme Court, as set out by decree-law no. 303/2007 of August 24, and previously, an amount equivalent to 14,963.94 euros, as set out by Law no. 3/99 of January 13.

21.   The relevant threshold was then the minimum allowing appeal to second instance courts, set out at an amount equivalent to 3740.99 euros by Law no. 3/99 of January 13, and previously to 2493,99 euros by decree-law no. 38/87 of December 23.

| | Full sample Interaction value x title | Comarca variables | Period before new map | Period after new map |
|---|---|---|---|---|
| *Plaintiff (Company)* | | | | |
| Individual | 1.21*** | 1.21*** | 1.10*** | 1.26*** | 1.12*** |
| | *0.06* | *0.06* | *0.04* | *0.09* | *0.01* |
| Company, mass litigant | 1.39*** | 1.39*** | 1.24*** | 1.49*** | 1.12*** |
| | *0.05* | *0.05* | *0.03* | *0.11* | *0.01* |
| Claim value | *0.86**** | *0.86**** | *0.90**** | *0.87**** | *0.86**** |
| | *0.01* | *0.01* | *0.01* | *0.01* | *0.00* |
| *Enforceable title (Injunction)* | | | | |
| Court sentence | 1.02 | 1.02 | 1.04 | 1.08** | 0.85*** |
| | *0.05* | *0.05* | *0.06* | *0.04* | *0.04* |
| Authentic document | 1.01 | 1.03 | 1.03 | 1.03 | 1.00 |
| | *0.04* | *0.05* | *0.04* | *0.07* | *0.03* |
| Contract | 0.90*** | 0.86*** | 0.96** | 0.89*** | 0.93*** |
| | *0.02* | *0.02* | *0.02* | *0.02* | *0.02* |
| Private document | 0.92** | 0.93** | 1.01 | 0.93** | 0.90** |
| | *0.03* | *0.03* | *0.05* | *0.03* | *0.04* |
| Another title | 0.99 | 0.97 | 1.02 | 1.02 | 0.93** |
| | *0.02* | *0.02* | *0.03* | *0.02* | *0.03* |
| *Enf. title x value threshold* | | | | |
| Contract, value > threshold | | 1.22*** | | | |
| | | *0.07* | | | |
| Private doc., value > threshold | | 0.97 | | | |
| | | *0.02* | | | |
| Another title, value > threshold | | 1.13*** | | | |
| | | *0.04* | | | |
| *Apensos* | | | | |
| Creditors' claims | 0.69*** | 0.68*** | 0.64*** | 0.83*** | 0.36*** |
| | *0.02* | *0.02* | *0.02* | *0.03* | *0.01* |
| *Embargos*/oppositions | 0.90*** | 0.90*** | 0.82*** | 1.02 | 0.65*** |
| | *0.04* | *0.04* | *0.03* | *0.05* | *0.05* |
| Other | 0.80*** | 0.80*** | 0.84*** | 0.85*** | 0.59*** |
| | *0.03* | *0.03* | *0.03* | *0.03* | *0.03* |
| Two or more *apensos* | 1.03 | 1.03 | 1.01 | 1.04 | 0.89*** |
| | *0.02* | *0.02* | *0.02* | *0.03* | *0.04* |
| *Comarca variables* | | | | |
| Claim value *comarca* | | | 0.08*** | | |
| | | | *0.03* | | |
| Duration «peer» cases | | | 0.96*** | | |
| | | | *0.00* | | |
| Strat. by judicial year | yes | yes | yes | yes | yes |
| Strat. by *comarca* | yes | yes | no | yes | yes |
| No. observations | 2 351 768 | 2 351 768 | 2 351 768 | 2 061 289 | 1 051 168 |

TABLE 1. Determinants of duration of enforcement cases

Notes: Hazard ratios estimated by the Cox regression. Regressions also include a binary variable for special enforcement cases. Continuous variables were centred at the median. Robust standard errors, clustering on *comarcas*, in italics. P-values: *<0.1; **<0.05; ***<0.01.

enforcement officers. The second result is surprising, as it would be expected that companies, even those that are not frequent litigants, would be more familiar with debt enforcement. The variable may be thus capturing

specificities of cases filed by individuals, not captured by other variables in the model. Both coefficients show a reduction in magnitude from the first to the second subsample, but no conclusions can be drawn in this respect given that estimates in the second subsample are based on a very high proportion of missings for these two variables. Even for the whole sample, the estimated magnitudes should be read with some caution, taking into account the weight of imputed observations.

A higher claim value tends to lengthen enforcement cases, reflecting the specificities of the litigation associated with higher amounts not captured by other variables in the model, such as an enhanced complexity and a greater opposition on the debtor side. An increase of one standard error in this variable, at the median,[22] leads to a reduction in resolution intensity of about 20%. This magnitude also holds in each of the subperiods, before and after the implementation of the new judicial map.

Regarding the impact of the different enforceable titles on duration, measured vis-a-vis injunctions, cases based on private documents and contracts tend to be more time-consuming, a result common to both subsamples. Such a result could reflect the less swift enforcement procedure applicable to some of these titles relative to injunctions, in particular where the former assume a value above a certain threshold (as described above). However, when this is modelled by interacting the title with an indicator for a claim value above the threshold that determined different procedural rules at each moment, such an interaction is not significant or indicates a shorter duration, contrarily to what would be expected. Thus, other aspects associated with the title seem to explain the result. Court sentences - whose procedure has been broadly analogous to injunctions - tended to be comparatively faster in the period prior to the new judicial map and slower thereafter.

Procedural aspects, in the form of *apensos*, have a negative impact on the speed of proceedings, as it might be expected. This result is particularly pronounced for creditors' claims, where a case resolution rate around 30% lower is estimated. There are, however, interesting differences between the two subsamples considered. In the period prior to the 2014 judicial year, the impact of procedural aspects on the duration of enforcement lawsuits appears comparatively diluted, and the existence of *embargos*/oppositions and two or more *apensos* are not statistically significant. The greatest impact of procedural aspects in the second subsample could be due to the latter's already reflecting clearly the post-2003 regime of enforcement procedure as regards the lack of intervention of the judge in many cases. When there are *apensos* that require that intervention, making the case resolution depend on the end of a declarative action, this clearly results in an extended duration.

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22.   Corresponding to a change in the claim value from approximately 2500 to 12500 euros.

The coefficients of *comarca* variables, proxies of congestion and complexity of litigation, have the expected signs, as an increase in each of these covariates brings about a longer duration of enforcement cases. The estimated magnitudes translate into reductions in the probabilistic resolution intensity, respectively, of about 30% and 60%, for increases of one standard error in the variables, at the median.[23] These impacts are substantial, in general even higher than those of case characteristics, confirming that their duration depends heavily on the overall litigation directed to the *comarca*. Another interesting aspect is that the impacts of these variables on duration decrease greatly in the most recent subsample (coefficients not shown), with the congestion measure losing statistical significance, and an equivalent increase in the mean claim value bringing about a fall in resolution intensity of only about 10%.

### *Duration holding case characteristics constant*

One may take up again the evolution of enforcement cases' duration, now considering the baseline survival function estimated by the Cox regression (which corresponds to the baseline hazard function, described in the section on methodology). This allows an analysis of such an evolution on a more comparable basis, in that the explanatory variables are held fixed, at the medians for continuous variables and omitted groups for binary variables (one compares cases based on injunctions without *apensos*, brought by companies that were not mass litigants). In line with the remainder of this section, separate regressions are run for the period before and after the 2014 judicial year, implying that the impacts of explanatory variables are also allowed to vary. These regressions were not stratified by *comarca*, nor by judicial year of start, because it was intended that the survival functions concerned the judicial system and the years in each subsample as a whole. Figure 7 confirms the evidence of a shorter duration in the most recent sample, with the medians resulting from the baseline survival functions being approximately equal to 55 months in the first period and 25 months in the second one. A related analysis consisting in modelling the judicial year of start as fixed-effects in the Cox regression (see the discussion in the section on explanatory variables) indicates a greater speed of the lawsuits entered in the most recent years. In general terms, these results should be explained by several factors, namely the reforms implemented over time, changes to the unobservable characteristics of cases and factors outside the judicial system, such as changes in the cyclical position of the economy. Identifying the contribution of each of these factors goes beyond the scope of this work.

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23.    Corresponding to the variation of duration of peer cases in the same *comarca* from 44 to 57 months and average claim value from approximately 20 thousand to 30 thousand euros.
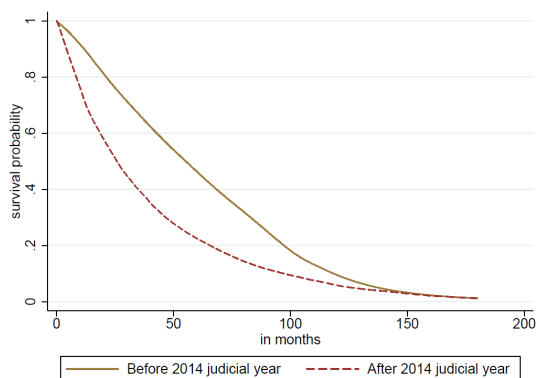
FIGURE 7: Survival functions

Note: Baseline survival functions estimated from the Cox regression, model with *comarca* variables and without stratification (for durations up to 15 years that cover the time span of the vast majority of cases).
Sources: DGPJ and authors' calculations.

### *Results considering territorial breakdowns*

Table 2 presents the results for the Cox model splitting up the sample into the cases that ended, or were pending at the end of 2016, in enforcement judgeships and the remaining ones. Enforcement judgeships were initially created in highly congested *comarcas* and their number increased considerably with the implementation of the new judicial map in 2014 (Figure 1A). Results are also presented for the four largest *comarcas* in the sample in absolute terms, i.e. Lisboa and Porto as existing until the 2013 judicial year, and again Lisboa and Porto, as defined in the new judicial map, afterwards.

The estimated impacts for enforcement cases brought by mass litigants are smaller for both types of judgeships than the one for the sample as a whole (Table 1) that thus seems to reflect the interaction of the observations belonging to the two groups. Something similar occurs for the coefficient of lawsuits filed by individuals that loses statistical significance in the subsample of judgeships specialized in enforcement.

The effect of claim value on duration is, in each of the subsamples now considered, close to that for the judicial system as a whole. As far as the enforceable title is concerned, lawsuits based on contracts and private documents (vis-à-vis injunctions) remain slower, but for the latter titles this result is restricted to the enforcement judgeships. The coefficient of authentic documents now appears as statistically significant, indicating a shorter duration in judgeships not specialized in enforcement.

As regards procedural aspects, the negative impact on the speed of cases is relatively more pronounced in the enforcement judgeships, especially for

| | Non-enforcement judgeships | Enforcement judgeships | Lisboa and Porto |
|---|---|---|---|
| *Plaintiff (Company)* | | | |
| Individual | 1.08*** | 1.04 | 0.92* |
| | 0.03 | 0.05 | 0.04 |
| Company, mass litigant | 1.22*** | 1.29*** | 1.20*** |
| | 0.02 | 0.06 | 0.03 |
| Claim value | 0.91*** | 0.86*** | 0.83*** |
| | *0.01* | *0.02* | *0.03* |
| *Enforceable title (Injunction)* | | | |
| Court sentence | 0.98 | 0.89** | 1.10 |
| | *0.07* | *0.05* | *0.10* |
| Authentic document | 1.13*** | 0.91 | 0.80* |
| | *0.03* | *0.07* | *0.11* |
| Contract | 0.96** | 0.83*** | 0.86*** |
| | *0.02* | *0.03* | *0.04* |
| Private document | 0.99 | 0.79*** | 0.91 |
| | *0.02* | *0.05* | *0.07* |
| Another title | 1.04 | 0.88*** | 0.93 |
| | *0.03* | *0.03* | *0.09* |
| *Apensos* | | | |
| Creditors' claims | 0.71*** | 0.51*** | 0.54*** |
| | *0.02* | *0.05* | *0.11* |
| *Embargos*/oppositions | 0.85*** | 0.82** | 0.99 |
| | *0.02* | *0.08* | *0.12* |
| Other | 0.89*** | 0.76*** | 0.76* |
| | *0.02* | *0.06* | *0.12* |
| Two or more *apensos* | 0.96*** | 1.08* | 1.15* |
| | *0.01* | *0.04* | *0.08* |
| Strat. by judicial year | yes | yes | yes |
| Strat. by *comarca* | yes | yes | yes |
| No. observations | 994 421 | 1 357 347 | 853 421 |

TABLE 2. Determinants of duration of enforcement cases

Notes: Hazard ratios estimated by the Cox regression. Regressions also include a binary variable for special enforcement cases. Continuous variables were centred at the median. Robust standard errors, clustering on *comarcas*, in italics. P-values: *<0.1; **<0.05; ***<0.01.

credit claims. This suggests an interaction of the effects of such claims on duration with differentiating characteristics of the enforcement lawsuits that tend to be dealt with in specialized judgeships. Finally, the coefficients of *comarca* variables (not shown) have a magnitude similar to that presented in Table 1 for the congestion measure, in both types of judgeships. The measure of complexity of litigation has, however, a much stronger impact in the enforcement judgeships, indicating an enhanced role as a determinant of duration.

## Conclusions

Changes to debt enforcement in Portugal have been very significant in recent decades. This paper presents alternative measures of duration of enforcement cases that indicate its considerable reduction in the recent period, contributing to the reassessment of this factor as a framework cost of economic activity in Portugal. The analysis of the probabilistic profile of case resolution in two different periods, before and after the 2014 judicial year, shows that there has been a structural change, with a much greater probability that the lawsuit is currently resolved in the first months after its start.

As mentioned, this improvement will certainly have been influenced by the very significant set of reforms in the area of debt enforcement implemented over time, although it cannot be ascribed to a specific policy measure. In addition, it will reflect the impact of other factors during the sample period, notably the evolution of the business cycle. The separation of the role of these factors is best done in a policy evaluation framework. The production of empirical evidence about the reforms introduced in this area could lead to improvements in other areas of justice in which performance indicators continue to disappoint. Likewise outside the scope of this paper are other considerations, such as an analysis of the impact of these reforms on the guarantees of defendants and other parties involved.

This article dealt only with one aspect of the effectiveness of debt enforcement. It would be interesting to address the evolution of the proportion of debt recovered, an indicator also influenced by factors outside the judicial system, such as the business cycle. This information is a relevant criterion for economic agents in the decision to bring an enforcement case to court. It would also be interesting to examine the impact of a faster resolution of cases on litigation costs. Continuing the research strand initiated by this study, one could explore the estimation of a duration model with time variation of some determinants, namely the moment of start of *apensos*, or a model of competing risks.[24] The identified risks would be, on the one hand, the effective resolution of the case by the judicial system and, on the other hand, the plaintiff dropping it (before the system has responded).

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24. There has been some applications of this approach to court data that focus primarily on the distinction between the time elapsed until an out-of-court settlement is reached or the time elapsed until trial (Grajzl and Zajc 2017 and Bielen *et al.* 2017).

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