



# The efficiency of bankruptcy law: evidence of creditor protection in Poland

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## Abstract

A debt does not function as a liquid asset in an ineffective enforcement environment. In this study, we investigated the efficiency of creditor protection in insolvency. We approached efficiency in three dimensions: ex ante, ex post, and interim. This paper presents the differences between Polish and Spanish ex ante efficiency, the factors influencing the interim recovery rate and efficiency, and the differences between ex ante and ex post efficiency in Polish proceedings. We studied 17,494 financial statements of Polish companies and the finalized proceedings of 784 court cases from the period 2004–2012. We applied regression analysis, combined with classification and robustness tests. Our evidence supports the conclusion that Polish insolvency proceedings are inefficient. The interim efficiency oscillates at 12% per annum. The duration of the proceeding from filing until resolution takes an average of 853 days. These results have policy implications, as creditor protection is a major aspect in attracting investment for net foreign debtors.

**Keywords** Insolvency · Efficiency · Poland · Transition economy · Recovery rate

**JEL Classification** K4

## 1 Introduction

This study asks how insolvency<sup>1</sup> procedures are efficient from the perspective of the creditor.

On 13 November, 2013, Spain's Fagor filed for insolvency. Its Polish operation, Fagor Mastercook SA, filed for protection at a court in northern Spain. The Fagor

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<sup>1</sup> In this paper we do not distinguish between economic bankruptcy and legal procedures, thus the terms “failure”, “insolvency” and “bankruptcy” we treat as synonyms for simplicity.

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Mastercook SA proceedings were retaken by the Polish insolvency court. On Friday 17 April, 2015, after the official receiver in bankruptcy was dismissed from the post, the new one entered into a contract to sell the bankrupt Fagor Mastercook plant to the Bosch und Siemens Hausgeräte GmbH. It encouraged a debate both at professional and academic forums on the insolvency proceedings efficiency. This case represents one of the first cross-border insolvency proceedings between Poland and Spain, two European Union's economies with comparable population size, surface area and international credit ratings.<sup>2</sup> Thus, we use Spain as a benchmark for an ex ante efficiency assessment for Poland.

Weak protection of creditor rights in insolvency is a key source of financial barriers (Demirgüç-Kunt and Maksimovic 1998; La Porta et al. 1997; Ponticelli and Alencar 2016; Shleifer and Vishny 1997). In Europe the enforcement of debts from firms with multiple creditors is done by the court through bankruptcy proceedings. Despite the importance of the proceeding for society's prosperity the insolvency courts are not necessarily functioning well (Ponticelli and Alencar 2016).

The aim of this research is to give empirical evidence about the economic impact of the Polish bankruptcy law in terms of creditor protection efficiency. We address with this paper the following issue raised by Shleifer and Vishny (1997): "How do corporate laws differ, and how does enforcement of these laws vary across countries?", and particularly answer the concerns of Camacho-Miñano et al. (2013, p. 187) that on research data: "[...]it is not possible in Spain to have access to some important aspects such as real costs of the bankruptcy process or recovery rate data."

To address these questions, we studied 17,494 financial statements of Polish companies and uniquely manually collected samples of debt enforcement for 784 cases. Our research data encompassed 9 years, over the period of 2004–2012.

We focus our analysis on Poland for three reasons. Firstly, in 2003 Poland undertook a major reform of its bankruptcy law, which reconciles the Polish insolvency procedures with those applicable in the European Union. This gives us a unique opportunity to judge the system's efficiency in a transitional economy on its convergence path. Secondly, Polish court allocations are highly heterogeneous in terms of efficiency. Polish laws do not allow creditors or firms to choose the court in which to file a bankruptcy case. Thus, there is no arbitrage opportunity for creditors in terms of court selection. By limiting the scope of research to one country, we controlled the range of a set of variables that cannot be as convincingly controlled in cross-country data (e.g. the cultural environment). Thus, the effect of judicial efficiency is isolated from factors such as laws, legal origins, and other country-wide characteristics. Thirdly bankruptcy proceedings in both countries are among the lowest in the developed world economies (García-Posada and Mora-Sanguinetti 2014).

We contrast our results with prior research relating to Spain to assess the coherence of influencing factors in ex ante efficiency. We use Spain as a benchmark, due to the lack of priori robust evidence for Poland and to anchor our study on a similar economy in terms of the number of proceedings and cross-border cases.

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<sup>2</sup> Compare: Country comparison Poland versus Spain, access 6 June 2019 from: <https://countryeconomy.com/countries/compare/poland/spain>.

We collected the actual proceedings data from three major insolvency courts in Poland and assessed the efficiency of the proceedings. We combined the proceedings data with financial data retrieved from EMIS, Orbis and Amadeus.<sup>3</sup> We then regressed the actual efficiency with different factors and analyzed the time horizon of the ex ante, interim and ex post efficiency.

Our study contributes to the literature on bankruptcy by delivering robust empirical evidence on the efficiency of Polish bankruptcy procedures. This study complements the Camacho-Miñano et al. (2013) terms of the interim efficiency assessment. We contrast the ex ante efficiency of the Spanish and Polish legal systems, at 41% and 75% respectively. We advance the findings of Djankov et al. (2008) by providing the actual long term average of the duration of proceedings in Poland—853 days, and the long term annual efficiency rate—12%. We argue that synthetic case methodology may result in an underestimation of the recovery rate. Although the evidence is derived from the Polish environment, we infer that the results here are relevant to other economies with similar insolvency decision paths.

The remaining part of the paper is organized as follows: in section two we discuss the efficiency aspects and we develop our testing hypothesis, section three outlines the methodological approach, section four is devoted towards the data sets, section five discusses the findings, and the last section concludes.

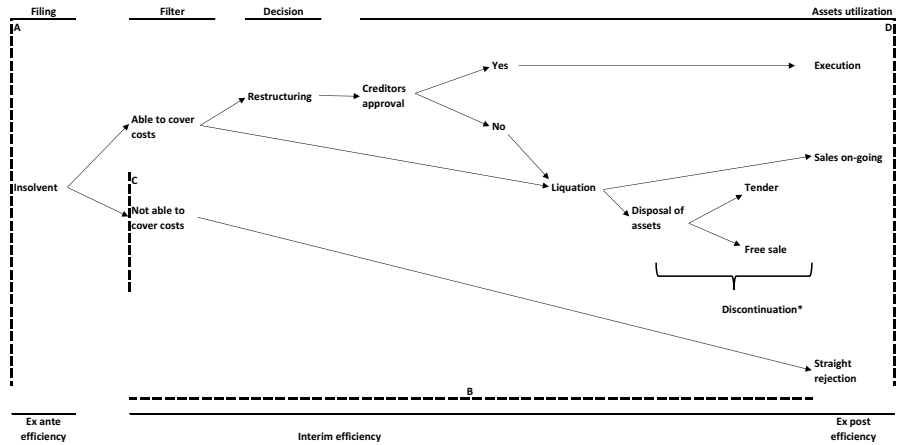
## 2 Efficiency in bankruptcy

Bankruptcy is a fruitful field of research containing different dimensions. Early on, the discussion by Modigliani and Miller (1958) on the optimal structure of capital, abstract from tax and bankruptcy issues, provoked a considerable amount of research (Jappelli et al. 2005; Warner 1977). A decade later, the pioneering work of Altman (1968) laid down the fundamentals for research on failure prediction. The globalization of the world economy motivates research for exploring legal efficiency across countries (Acemoglu and Johnson 2005; Franks et al. 1996; La Porta et al. 2008; Succurro 2012) and domestic settings (Chemin 2009a, b; Ponticelli and Alencar 2016; Visaria 2009). In the background, there is ongoing discussion on the efficiency of the bankruptcy conditions, bankruptcy procedures, and the consequences of the insolvency proceedings. We explore the national wide efficiency of Polish bankruptcy law from the position of the net foreign debtor.

One of the general definitions of efficiency is proposed by Voigt (2016): “Efficiency prevails when a given output is realized with minimum input, or a maximum output is produced with a given amount of inputs.” In respect of the bankruptcy law procedures, there is no ultimate approach to the efficiency assessment. The reference point for efficiency can take the form of market value or market oriented procedures (Thorburn 2000), time, cost, and recovery rate of the procedure (Succurro 2012), ability to strike a balance between debtors and creditors protection (Franks et al.

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<sup>3</sup> Amadeus and Orbis are commercial databases provided by Bureau Van Dijk, while EMIS is a database run by the Euromoney Group.



**Fig. 1** Polish insolvency proceeding stages, decision flow and efficiency types for the years 2004–2012. Asterisk Option available during the proceedings. Dash lines show the type of efficiency tested, A=ex ante, B=interim, C=ex post (rejection of proceeding), D=ex post (closure of proceeding)

1996; La Porta et al. 2008), or the behavioral changes of process actors. As Poland is a net foreign debtor (Roxburgh et al. 2011), in order to produce capital injections, the bankruptcy procedures should be creditor as opposed to debtor-oriented.<sup>4</sup> Therefore, in this study we take of the Succurro perspective and creditors protection. Consequently, we address mainly the interim creditor protection aspect of the legal system efficiency. We apply the combination of time and recovery rate, (while the cost factor we treat as the independent variable) to assess the level of the creditors actual protection. We merge this approach with time horizon analysis. We show our approach to efficiency measurement, with the background of Polish legal proceeding stages, in Fig. 1. We measure efficiency in different moments:

- Ex ante (dashed line A)—we follow the Camacho-Miñano et al. (2013) strategy, SG efficiency.
- Interim (dashed line B)—we follow broadly Djankov et al. (2008), but we apply both recovery rate (first model) and time adjusted recovery rate (efficiency—second model).
- Ex post—examines the entity’s ability to survive after rejection of the proceeding (dashed line C) or after closure of the proceeding (dashed line D), measured with the error percentage.

Claessens and Klapper (2005) provide the time horizon insolvency regime efficiency. They distinguish between ex ante and ex post efficiency. An efficient ex ante insolvency regime prevents managers and shareholders from taking imprudent

<sup>4</sup> Most recently Arruñada and Casari (2016) suggests that motivating judges with creditors or society perspectives is more beneficial than motivating them with the borrowers perspective.

loans, and lenders from giving risky loans. An ex post efficiency system assures that the highest total value will be obtained for the distressed firm. Camacho-Miñano et al. (2013) enhance it by considering interim efficiency, that should allow a realization of the assets in the shortest time at the lowest achievable cost. Thus, in the research we follow the Camacho-Miñano et al. (2013) test for ex ante efficiency. We apply the time value of the creditors recovery rate as the proxy for interim efficiency, while for the ex post efficiency we use the surviving test (the ability of the company to go through the bankruptcy procedures as a going business for a period of at least 3 years after the end<sup>5</sup> of the court procedure).

The vast majority of existing studies on legal efficiency address the horizon insolvency regime separately. We aim to provide robust evidence on the Polish economy for all three time dimensions. Thus, we mimic for the definition of efficiency the Polish insolvency procedure. Figure 1 outlines the Polish decision path to the Claessens and Klapper (2005), and Camacho-Miñano et al. (2013) horizon insolvency setting:

Our definition of ex ante efficiency for the purposes of bankruptcy is based on Polish bankruptcy law, which stipulates that non-solvent companies should be involved in the insolvency procedure. This is the pre-entry condition. If the entity is insolvent, then the court examines whether the remaining assets under control of the entity are sufficient to cover the court's expenses, if not, the request for proceedings is rejected. The accepted filing is validated for restructuring (if requested) or liquidation. The restructuring plan is then feasible, subject to the creditor's approval. Restructuring which does not receive the creditor's concession is redirected to liquidation, where the court appoints a trustee in bankruptcy to arrange for the sale on an on-going basis, or the piecemeal disposal of the assets. In the case of the insufficiency of the assets to cover the expenses during administration, the court might announce the discontinuance of the proceedings.

We reconcile the Polish environment with the Spanish in order to assess the coherence of the processes in a Continental framework. Thus, we hypothesize that:

**H<sub>1</sub>** There are no significant differences in influential factors of ex ante efficiency between Poland and Spain.

If all the variables which are significant for the Spanish model turn out to be significant for the model reassessed on the Polish dataset, we will consider that both economies have similar sets of factors influencing the screening for entrance to bankruptcy proceedings. If so the reference to Spain ex ante efficiency would be justified.

We control the link between ex ante and interim efficiency. In addition, to mimic the local decision process, we control the variables of the type of asset liquidation

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<sup>5</sup> We consider the survival aspects severally. For an interim assessment we define the independent variable as surviving since the filing for bankruptcy. For the ex ante, surviving is an independent variable and we define it since the date of closure or discontinuance of bankruptcy proceedings.

(piecemeal disposal, or on-going sale of the bankrupt business) and the level of the creditors impact on the proceedings.

As the benchmark for interim efficiency, the Djankov et al. (2008) study was used. These authors applied a synthetic case of the Mirage hotel to assess cross-country data. The measure of efficiency ( $E$ ), they defined as the present value (compounded) the terminal value of the firm after bankruptcy costs,<sup>6</sup> thus:

$$E = \frac{100 * GC + 70 * (1 - GC) - 100 * C}{(1 + r)^t} \quad (2.1)$$

where:  $GC$ —is one if the Mirage continues as a going concern and zero otherwise,  $C$ —is the cost to complete the insolvency proceeding, expressed as a percentage of the bankruptcy estate at the time of entry into bankruptcy,  $t$ —is the time to resolve insolvency,  $r$ —is the nominal lending rate.

First, the Mirage hotel case is not a real case, thus it is not necessarily representative across all jurisdictions and all possible paths of insolvency proceedings. In the numerator the authors assume a fixed haircut on the mark value if insolvent— $70*(1-GC)$ .

This approach requires an assumption of the moment of incurring costs, lending rate value, and zero added value of the entity if sold as an ongoing concern assumption. In contrast to the above-mentioned setting, we applied the rate of efficiency, based on the actual case data, for interim efficiency, assuming simple<sup>7</sup> capitalization:

$$E_i = \frac{VRD_i}{TDD_i} t^{-1} \quad (2.2)$$

However, due to the layered educational process in Poland, we doubt that the non-economically skilled court staff do follow the time value of money pattern, and therefore we contrast the efficiency rate with the recovery rate defined as follows:

$$RR_i = \frac{VRD_i}{TDD_i} \quad (2.3)$$

where:

$E$ —is the annualized efficiency rate,  $RR$ —is the recovery rate,  $t$ —is the duration, time (in years) to resolve a dispute, counted from the moment the plaintiff files the lawsuit in court until payment. This includes both the days when actions take place and the waiting periods between,  $VRD$ —is the value of recovered debts to the creditors of the bankrupt company,  $TDD$ —is the value of total creditor's debts outstanding at the date of bankruptcy filing,  $i$ —stands for the bankrupt company.

To address the consistency in efficiency and recovery rate perception, we test the null hypothesis that:

<sup>6</sup> However, formula 2.1 is modified in the case of piecemeal sale and secure creditor individual assessment of the recovery rate.

<sup>7</sup> And tested it for robustness assuming compound capitalization:  $E_i = \sqrt{\frac{VRD_i}{TDD_i}}$ .

**H<sub>2</sub>** The recovery rate and efficiency rate are significantly influenced by the same factors.

For interim efficiency, unlike Chemin (2009b), we abstract from changes to the legislation and High Court indications, as there are uniform legal and High Court procedures across Poland. Following mostly the Djankov et al. (2008) study we test efficiency in respect of the initiator of the insolvency procedure, the level of pre-entry pledges on assets, asset utilization decisions made by the court, and the level of creditor activity. We linked the interim efficiency with the ex ante value by including in the testing variables the solvency with leverage ratio (total liabilities to total assets), combined with the short-term liquidity measured with current ratio.

The application of real cases allows us to abolish both of the assumptions of Djankov et al. (2008) in regards to entry at the cost of cross-country comparability. The study design allows us both to reconcile our results with the Djankov et al. (2008) approach and assess the Mirage approach in terms of the duration and efficiency assessment by reference to actual data.

Chemin (2009b) used as a proxy the efficiency with the expected trial duration. With regard to duration, Chemin (2009b) applies the fraction of pending cases over those solved during a year. It shows the expected number of years to complete the case by the court subject to a last in, last out assumption. This cost-effective approach however, produces variation among cases. Therefore, unlike Chemin (2009b), we gathered the source data directly from court proceedings at the cost of the sample size. We measure the actual duration as the time of proceedings, in years, for an individual case.

The ex post inefficiency we link to the situation when the entity enters bankruptcy procedures, but in fact it is feasible for it to survive on the market. This aspect of inefficiency we attribute to a weak market adjustment mechanism. Ex post efficiency we assessed with the error rates both for entities which were rejected and accepted for the insolvency procedure. We consider the companies which were straight-rejected because of insufficient costs for proceedings, that went on to survive in the market. On the other hand, we consider the inefficiency of the straight rejection procedure in the case that the company was rejected, even if the total assets exceeds the cost threshold. Those accepted for the bankruptcy proceedings that were sold or survived as on-going companies we treat in terms of the inefficiency of the market mechanism. To link both aspects of ex ante and ex post efficiency, we formulate the working hypothesis as follows:

**H<sub>3</sub>** Ex post and ex ante efficiency is equal for Polish economy.

### 3 Methodology

#### 3.1 Ex ante efficiency

If all insolvent firms enter into the bankruptcy procedure and solvent firms do not, it means that Polish law is perfectly ex ante efficient. We follow the two-fold Camacho-Miñano et al. (2013) setting for the insolvent firm identification. Thus, if the firm's current assets to current liabilities (CA/CL) ratio  $> 2$ , it is considered solvent in the short term (SOL); if the firm's total assets to total liabilities (TA/TL) ratio  $> 1.5$ , the firm is considered solvent in the long term (GUA). If a company meets both criteria, then it is an economically viable enterprise (SG), and is classified a "healthy firm". Thus, the dependent variable ( $y=1$ ), "inefficiency" is defined as one when an insolvent firm does not enter the bankruptcy procedure and zero otherwise.<sup>8</sup> We applied logit regression for assessment factors influencing the efficiency, the analytical form of the model is as follows:

$$\text{logit } P = \ln \frac{P}{1-P} = \ln \frac{P(Y=1)}{1-P(Y=1)} = a_0 + a_1x_1 + \dots + a_mx_m \quad (3.1)$$

where:  $x_i$ —denotes independent variables,  $a_i$ —denotes regression coefficients.

Following the study on the Spanish market, we regressed the efficiency against the short-term debt to capital ratio (debt/capital ratio), size proxy with the logarithm of the total assets (size) and working capital to total assets (WC/TA) to reconcile the ex ante efficiency drivers for both economies. The observed interaction of companies and legal ex ante can be classified into three scenarios: an efficient system when insolvent firms enter into bankruptcy and an inefficient system in two dimensions of errors:

- "Type 1" errors occur when non-economically viable companies do not enter into the bankruptcy procedure.
- "Type 2" errors occur when economically viable companies enter into the bankruptcy procedure.

For efficiency evaluation and comparability between Poland and Spain we follow the rule applied by Camacho-Miñano et al. (2013). In the case where the sum of Type 1 and 2 errors is less than 3%, the legal setting is to be considered efficient, otherwise, inefficient.

#### 3.2 Interim efficiency

For the interim efficiency test, we apply both the efficiency and recovery rates as dependent variables. We apply ordinary least squares (OLS) estimators with heteroscedastic correction. We polled our sample across the period under examination.

<sup>8</sup> The opposite situation denotes "efficiency" in the narrow sense of "efficacy".



**Table 1** Definition of variables for interim efficiency assessment. *Source:* own presentation

Name of variable	Definition
Gdansk	Binary variable stands 1 for cases filed in Gdansk City Court, otherwise 0
Wroclaw	Binary variable stands 1 for cases filed in Wroclaw City Court, otherwise 0
Crisis	Binary variable stands 1 for years 2007–2009, otherwise 0
Initiator	The variable describing who filed the request for the bankruptcy of the company: 0 for debtor, 1 for creditor
Ongoing	The variable denoting how the company was sold: 1 for as an ongoing firm, 0 for liquidated
EX/mass	Executor in insolvency costs to total recovered assets value
EC/TC	Executor in insolvency costs to total proceeding costs
Mortgages	Number of mortgages and pledges on debtor's assets at commencement of the insolvency procedure
Impact	Total number of actions taken by creditors during the insolvency procedure including: numbers of objections, requests for alert of trustee, bailiff claims etc
TL/TA	Total liabilities to total assets
CR	Current liabilities to current assets
Surviving	The binary variable denoting survival: 1 for if the company is still in business 3 years after filing for bankruptcy, 0 for not
TC/mass	Total costs of proceedings to the total value of the assets recovered to the mass of the bankruptcy

Both panel and pseudo-panel data approaches are unbalanced.<sup>9</sup> The time effect was tested by the application of dummy variables. The analytical form of the model is as follows:

$$y = \alpha_0 + \beta'x + \varepsilon \quad (3.2)$$

where:  $y$ —is the response variable vector: for first model recovery rate (2.2), for second model interim efficiency (2.3),  $\alpha_0$ —is the intercept,  $\beta$ —is the vector of parameters,  $x$ —is the matrix of independent variables (for definition see Table 1),  $\varepsilon$ —is the error terms vector

Our set of independent variables was derived from the Djankov et al. (2008) study, adjusted for the unique characteristics of the Polish procedure and the global financial crisis (variable—Crisis). Table 1 presents the variable definition applied:

### 3.3 Ex post efficiency

We measure the ex post efficiency and the classification errors. We account separately for the case when the entity is straight-rejected, and where it is proceeded with. Thus, we distinguish four types of errors, two under the common heading of

<sup>9</sup> We did not operationalize, among others, the Data Envelopment Analysis, Stochastic Frontier Analysis, or Directional Distance Function due to their limitations. For a detailed review of the portfolio of methods used across efficiency research, refer to Voigt (2016).

incoming errors relating to straight rejection and another pair under the heading of outgoing errors for cases accepted for proceeding. The incoming population is tested against the sample of rejected applications, while the outgoing is within the undertaken proceedings. The definitions of errors types are as follows:

- “Incoming type 1” errors denote straight-rejected companies which survive more than 3 years in the market from the date of rejection of filing for bankruptcy.
- “Incoming type 2” errors denote straight rejection from the proceedings, while the assets value exceeds the first percentile costs of the procedures undertaken by the court as per the interim sample.
- “Outgoing type 1” errors denote companies which survive more than 3 years in the market from the date of closure of bankruptcy proceedings.
- “Outgoing type 2” errors denote companies sold as going concerns during liquidation of the assets phase.

Finally, we contrast our findings for ex ante and ex post error types, in order to investigate the differences across time and with the Spanish economy.

## 4 Data set

Our data consists of three layers. The first layer applies to the ex ante efficiency. The initial dataset of 17,494 yearly observations of Polish companies’ financial statements are drawn from the Amadeus, Orbis and EMIS databases and refer to both bankrupt and active companies for the years 2004–2012. Out of the initial sample, 470 financial statements were incomplete and thus were dropped from the final set. The final usable sample consisted of 17,024 yearly observations for 2175 companies.

The second layer relates to the interim efficiency. Due to the costs of acquiring the data set, the interim efficiency sampling was limited based on a cost/benefit assessment. The sample was drawn from the three major courts in Poland, namely Gdańsk, Wrocław, and Warsaw. For Gdańsk and Wrocław, all completed cases from 2004–2012 were sampled, and for Warsaw 50% of the entire population of cases was randomly selected for cost-efficiency. Our final interim efficiency data set comprised 784 bankrupt companies that filed for insolvency protection. The data was hand-collected by the court staff during 2015–2016. The data set was enhanced by financial information obtained from the Orbis database according to the company name and city.

The third layer relates to the ex post efficiency. This data was subsampled from the interim efficiency dataset. The sample selection is shown in Table 2.

**Table 2** Sample selection. *Source:* own presentation

Panel A		Panel B		Panel C	
Ex ante		Interim		Ex post*	
Total sample	17,494	Total cases sampled	784	Total cases sampled	474
Less missing data financial statements	(470)	Straight-rejected cases	474		
Usable financial statements	17,024	Cases proceeded	310	Final sample size	474
Number of companies within sample	2175		784		474

\*Incoming types errors

**Table 3** Summary statistics for the ex ante efficiency setting

Variable	Mean	Median	Minimum	Maximum	SD	5% Q	95% Q
Panel A: Independent variables							
WC/TA	- 0.49099	0.181283	- 1718.00	1.16391	27.7319	-0.534038	0.772334
Debt/Capital ratio	1.12393	0.390566	- 0.16391	1719.00	27.7388	0.0367998	1.11840
CA/CL	7.25333	1.48034	- 3215.00	11112.0	116.786	0.337120	11.5551
TA/TL	12.7731	1.97690	- 3215.00	12633.4	217.748	0.777232	16.4774
Size	6.7958	6.7821	2.0975	9.8177	0.83038	5.4786	8.1740
			Frequency			Rel. (%)	Cum. (%)
Panel B: Dependent variables—ex ante efficiency distribution							
Efficient			12,719		74.71		74.71
Not efficient			4305		25.29		100.00

## 5 Empirical findings and discussion

### 5.1 Descriptive statistics and results

We began by noting the most basic results. The ex ante efficiency of the Polish system is 75%, while the incomings and outgoings represent 25% and 68% respectively. The interim recovery rate mean is 20% per case, while the interim efficiency oscillates at 12% per annum. The total duration of the proceedings from filing until resolution takes on average 853 days, while the average Spanish proceeding varies between 336–672 days (Van Hemmen 2012).

Further we present our statistics separately for ex ante (Table 3) and interim efficiency.

Table 4 shows descriptive statistics for the independent variables (Panel A) and the dependent variables (Panel B)

**Table 4** Summary statistics, using 310 observations. *Source:* own presentation

	Mean	Median	Minimum	Maximum	SD	Q5%	Q95%	Missing obs.
Panel A								
Gdańsk	0.19097	0.0000	0.0000	1.0000	0.39375	0.0000	1.0000	0
Wrocław	0.31250	0.0000	0.0000	1.0000	0.46432	0.0000	1.0000	0
Crisis	0.23264	0.0000	0.0000	1.0000	0.42325	0.0000	1.0000	0
Initiator	0.14931	0.0000	0.0000	1.0000	0.35701	0.0000	1.0000	0
EC/mass~	0.16799	0.0991	0.0000	6.7358	0.44760	0.0004	0.3564	0
EC/TC	0.25563	0.2002	0.0000	1.8818	0.24338	0.0228	0.6630	0
Mortgage	2.0069	0.0000	0.0000	67.000	7.4254	0.0000	12.550	0
Impact	1.8194	0.0000	0.0000	82.000	5.8240	0.0000	8.0000	0
TL/TA	28.464	2.0585	0.0000	4795.9	284.65	0.0000	66.175	0
CR	0.66730	0.7328	0.0002	4.0418	0.49842	0.0361	1.0508	0
Surviving	0.26389	0.0000	0.0000	1.0000	0.44151	0.0000	1.0000	0
TC/mass	40.631	0.5453	0.0000	1067.4	174.39	0.0000	327.68	1
Variable	Mean	Median	Minimum	Maximum	SD	5% Perc.	95% Perc.	Missing obs.
Panel B								
Recovery rate	0.196423	0.0881172	0.00000	1.07870	0.258887	0.00000	1.00000	0
Days	854.431	726.500	0.00000	2947.00	499.057	280.000	1845.05	0
Efficiency	0.125822	0.0438966	0.00000	4.08990	0.337116	0.00000	0.473930	0

The average duration for the sample, measured in days from filing the request for bankruptcy to the end of the procedures, amounts to 839 days. The World Bank's 2016 issue of "Doing Business"<sup>10</sup> follows the Djankov et al. (2008) methodology and it indicates the time of a synthetic case to be processed for Poland is 658 days and by the court in the range of 546 days (Wrocław) to 715 days (Gdańsk). In our sample, the averages were 1148 days (Gdańsk), 864 days (Wrocław) and 695 days (Warsaw). Djankov et al. (2008) reports that the average insolvency procedure has a duration of 2.64 years (app. 950 days). Thus, comparing the actual versus synthetic case approaches indicates the differences in duration assessment. Our approach averages a case duration for a long-term sample, while the synthetic case methodology allows for point estimation.

Around 26% of the companies entering the interim proceeding stage in Poland survive as going concerns, in contrast to the world-wide percentage of 36%. The Polish actual recovery rate mean amount is 20%, but after allowance for the time value of money, the actual annual efficiency rate is less than 12%. In contrast, the efficiency based on the percentage of the cost to assets indicates an efficiency as high as 68% (Djankov et al. 2008). Both values are hardly comparable, due to methodological

<sup>10</sup> Available at: <http://www.doingbusiness.org/ExploreTopics/EnforcingContracts/>.

differences in their calculation, however, we suggest that the substantial differences might be methodology driven. Another plausible explanation for the differences is the fact that the liquidation mass is initially valued at carrying values (accounting rules for assets), while disposal prices are substantially discounted to reflect the lack of liquidity. Therefore, the approach which considers the nominal value of liabilities against value settled, reflects more closely the creditors risk at insolvency.

The first percentile of the costs for the interim statistics amounts to 2673.66 PLN, thus this value was applied for the incoming type 2 error calculation for ex post efficiency.

### 5.2 Multivariate statistics

Factors influencing ex ante efficiency regression results are presented in Table 5.

Our results support the Camacho-Miñano et al. (2013) observation on the Spanish market: all parameters are significant for insolvency efficiency diagnostics. Those results, in general, reconcile with Altman’s (1968) theoretical setting and form a theoretical link with ruin theory proposed by Scott (1981). The overall fit of the model is weak, which indicates the existence of a case-driven set of specific characteristics is not necessary uniform across the population. However, both Polish and Spanish efficiency factors are similar.

**Table 5** Logit regression results. *Source:* own presentation

Logit using observations 1-17024				
Dependent variable: Ex ante efficiency				
QML standard errors				
Efficiency (0—efficient, 1—inefficient) = $a + b_1\text{Log}_{10}(\text{Total assets}) + b_2\text{WC/TA} + b_3\text{debt/capital ratio}$				
	Coefficient	SE	z	p value
Intercept	- 2.54157	0.261124	- 9.7332	< 0.0001***
Size	0.117253	0.0307636	3.8114	0.0001***
WC/TA	0.860958	0.0839012	10.2616	< 0.0001***
Debt/Capital ratio	1.03821	0.126625	8.1991	< 0.0001***
Mean dependent var.	0.252878	S.D. dependent var		0.434675
McFadden R-squared	0.025898	Adjusted R-squared		0.025482
Log-likelihood	- 9377.342	Akaike criterion		18762.68
Schwarz criterion	18793.65	Hannan-Quinn		18772.90
Number of cases ‘correctly predicted’ = 12717 (74.7%)				
f(beta’x) at mean of independent vars = 0.435				
Likelihood ratio test: Chi square(3) = 498.617 [0.0000]				
Actual	Predicted			
	0	1	0	1
0		12,675		44
1		4262		42

Table 6 shows the regression results for the recovery rate and efficiency estimation. We run regression analysis with the same types of the independent variables for both aspects of the efficiency perception.

The recovery rate and efficiency do not share the same set of significant variables. The recovery rate is influenced by the Gdansk court and contrasts to efficiency, which is not influenced by the courts. In terms of fit recovery models outperform efficiency models this suggests differences in perception in the proceedings namely, courts tend to focus on the amounts collected rather than the timing of the proceedings. This observation supports the activity of creditors during proceedings and initial leverage and current ratio, which increases the recovery rate, but does not impact efficiency significantly. Fabbri and Padula (2004) demonstrated that increases in inefficiency raise the household probability of credit downgrading.<sup>11</sup> Our results, in addition, suggest that the inefficiency perception differs with the perspective of time.

For both intersections, the prompt reaction of debtors to enter proceedings, saved costs, and improved efficiency. The ability of the firm to survive as a going concern and the execution costs in relation to the total assets are weak instruments for average rate of return and inefficiency. The ability of the judges to control the trustee expenses against the total proceeding costs directly impacts upon the rate and efficiency; however, we observe a positive relation. The unexpected sign of the parameters suggests a cost-benefit selection. Professional trustees are expensive, but the services are offset with other costs in the proceedings (marginal results for execution costs to total costs variable). This is however subject to the time aspect; the ability to survive as a going concern requires investment during proceedings. There is a continuous trade off between prevention as a going concern and efficiency. This observation is supported by the insignificant impact of the going concern sale to the overall rate of return and efficiency, even if the sign of the parameters supports the view that this is a cost saving action.

The overall fit of the model is weak. Even after allowing for the inefficiency caused by the inclusion the non-significant variables, the adjusted R-square does not exceed 20%.<sup>12</sup> This observation indicates either the existence of a significant variable influencing the proceeding, which we are unable to detect, or substantial differences in the real cases themselves. Taking into account our robustness tests, we explain the results in terms of the variety of the cases. In fact, there is substantial variation in the proceedings in terms of time costs and the number of procedures undertaken by courts. Following Chemin (2009a), we suppose it might be linked partly to a lack of sufficient training both for judges and businesses. Another explanation, following Ponticelli and Alencar (2016), is that the Polish courts work at the top tiers of their capacity. Additionally, it is probable that the motivation of the judge<sup>13</sup> themselves might be reflected in this variation; however, this aspect needs further investigation.

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<sup>11</sup> This effect, however, could result in a shorter duration due to the contradictory effects linked to efficiency. The positive effect of increased recovery in the event of default is balanced out with the negative effect where riskier bank customers may access bank credit (Laeven and Majnoni 2005).

<sup>12</sup> We do not report the model in this paper.

<sup>13</sup> E.g. measured by the judges' turnover ratio as suggested by Rosales-López (2008).

**Table 6** OLS coefficients estimates. *Source:* own presentation

Variable	Heteroscedasticity-robust standard errors					
	Dependent variables					
	Recovery rate			Efficiency		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.044 (0.038)	0.058 (0.039)	0.050 (0.039)	0.075 (0.058)	0.092 (0.065)	0.10 (0.065)
Gdańsk	0.11** (0.049)	0.11** (0.050)	0.11** (0.050)	-0.032 (0.045)	-0.044 (0.050)	-0.037 (0.046)
Wrocław	0.037 (0.037)	0.032 (0.037)	0.032 (0.037)	-0.035 (0.039)	-0.046 (0.041)	-0.044 (0.040)
Crisis	0.022 (0.040)	0.016 (0.040)	0.022 (0.040)	0.00035 (0.036)	-0.0044 (0.038)	-0.011 (0.040)
Initiator	-0.082** (0.029)	-0.081** (0.029)	-0.084** (0.030)	-0.082** (0.028)	-0.087** (0.031)	-0.078** (0.028)
Ongoing	0.057 (0.046)	0.061 (0.046)	0.059 (0.047)	0.086 (0.10)	0.094 (0.11)	0.093 (0.10)
EX/mass	0.0053 (0.038)	0.0051 (0.038)	0.0050 (0.038)	-0.0084 (0.015)	-0.0091 (0.015)	-0.0086 (0.014)
EX/TC	0.16* (0.089)	0.16* (0.089)	0.16* (0.090)	0.13* (0.068)	0.12* (0.068)	0.14** (0.069)
Mortgage	0.0019 (0.0024)	0.0017 (0.0024)	0.0020 (0.0023)	-0.0016 (0.0013)	-0.0013 (0.0012)	-0.0020 (0.0015)
Impact	0.0086** (0.0019)	0.0086** (0.0018)	0.0085** (0.0019)	0.0033 (0.0030)	0.0031 (0.0029)	0.0034 (0.0031)
TL/TA	0.00010** (2.9e-05)	0.00010** (2.8e-05)	0.00010** (2.9e-05)	1.5e-05 (3.5e-05)	1.5e-05 (3.5e-05)	1.1e-05 (3.3e-05)
CR	0.082* (0.047)	0.083* (0.046)	0.082* (0.047)	0.050 (0.057)	0.048 (0.058)	0.052 (0.055)
Surviving		-0.046 (0.032)			-0.00015* (8.7e-05)	
TC/mass			-5.2e-05 (6.0e-05)			-0.089** (0.042)
N <sup>a</sup>	288	288	287	288	287	288
Adj. R <sup>2</sup>	0.11	0.11	0.11	-0.00	-0.00	0.01
lnL	3.2	4.2	3.1	-90	-89	-88

Standard errors in parentheses

\*Indicates significance at the 10% level

\*\*Indicates significance at the 5% level

<sup>a</sup>Full dataset type: undated Range: 1–310 (n = 310), the final subsampled data type: undated Range: 1–288 (n = 288), the dataset was reduced due to the omission and correction of outlining observations

**Table 7** Type 1 and type 2 errors in ex ante and ex post efficiency. *Source:* own presentation

	Ex ante SG%	Ex post	
		Incoming%	Outgoing%
Efficiency	75	25	68
Type 1 error	18	54	18
Type 2 error	7	21	14
Difference of errors	11	33	4

### 5.3 Ex ante and ex post inefficiency

Both in the ex ante and ex post dimension, the sum of type 1 and 2 errors exceeds 3%. Thus, we assess the legal setting as ineffective (Table 7).

The ex ante efficiency of the Polish system is slightly above the Spanish, with 75% and 41%, respectively. The type 1 to type 2 errors in the Polish system are more balanced than in the Spanish system, 1:3 and 1:18 respectively (compare: Camacho-Miñano et al. 2013). For both systems it is more likely that the non-economically viable companies avoid a bankruptcy declaration.

There is no uniformly accepted threshold for amounts of costs to be provided for the insolvency procedures. Compared to the Spanish system, the Polish provide for ordinary procedures, one court-appointed administrator instead of three, as is the case in Spain (Celentani et al. 2010). Because the administrators are paid out of the debtor's assets the direct cost of the receiver in bankruptcy should be lower in Poland than in Spain, however the by effect of the efficiency of their decisions should be considered.

The Polish system does not offer an in-front substitution for insolvency proceedings. Contrary to Celentani et al. (2010), the Polish law rate of the insolvency proceeding is not linked to the unattractiveness of bankruptcy procedures and the efficiency of mortgage collateral as in Spain. Our study used a compromise between the cut-off point estimation approach and the curt discretion right for the judging upon the cost of the expected proceedings. Our approach is less judgmental and more theoretical but on other hand, it suffers from stiffness.

The major source of inefficiency in Polish insolvency law is attributable to the decisions of courts relating to filing motivation. Following the Court decision, 54% of rejected claims continue on as a going concern for more than 3 years. Of the straight-rejected entities, 21% recorded assets exceeding the first percentile of proceedings costs observed for those companies which were involved in insolvency procedures. This raises concern in relation to expectations about the reliability of the legal framework. Even if both the Spanish and Polish systems share similar throughput limitations, the Polish system involves substantial judgement at the front, resulting in fragility of the framework. This observation reconciles back to the Ippoliti et al. (2015) differences in efficiency scores for Spain (11th position) and Poland (20th position) even taking into account the nature of the differences between civil and insolvency proceedings, the differences in rating is material for both economies.



## 5.4 Robustness tests

The interim efficiency model was tested against collinearity with all variance inflation factors below three. The initial model shows structural changes due to the Global Crisis 2007–2009 and thus we controlled this period separately, the individual yearly controls do not impact the conclusion. We applied both the compound and simple efficiency rates, both approaches sharing similar results. Non-adjusted OLS estimates suffered from minor heteroscedasticity, thus we applied a heteroscedasticity correction to the model. The final model was tested against linear specification. We did not observe significant non-linear effects. In the initial model, the specification was reviewed for outlining and influential observation. We identified one outlier resulting from an error and eliminated it from the final data set. We checked the results against the specification by including the number of years of survival of the company after proceedings, equity signs and binary variables describing the firm's ability to survive the entire proceeding under the same name by the company we control, as well as for the preliminary and mature stage of the bankruptcy law implementation (for years, 2004 to 2005 and 2010 to 2012). None of the changes to specifications threaten our results and conclusions.

## 6 Conclusions and further research

The aim of this study was to judge how insolvency procedures safeguard creditor's assets.

Our results show that the *ex ante* efficiency of the Polish system amounts to 75%. The interim recovery rate mean is 20% per case and the interim efficiency is 12%. The total duration of the proceedings from filing until resolution takes on average 853 days. The results suggest differences in perception of the proceedings, courts tend to focus on the amounts collected rather than the timing of the proceedings. Our empirical results are reconcilable in terms of duration to the World Bank methodology, however there are substantial limitations in terms of the efficiency measures.

Our evidence supports the view that there are no significant differences in *ex ante* factors of efficiency between Poland and Spain. Even if both the Polish and Spanish economies share similar inefficiencies in proceeding throughput the major source of Polish proceeding inefficiency lies with excessive judgement involved on assets needs to carry forward insolvency procedures. We observed inconsistent application of judgments across different courts.

Those findings have policy implications as they impact the capital inflow in the economy. First, there is methodological bias measuring the actual efficiency of proceedings. The application of the synthetic case might cause underestimation of the system inefficiency. Second, the economies which share the same general framework like the European Union directives differ at the level of enforcement practice. Consequently, the inefficiency of the legal framework directly impacts creditors protection. Third, we observe a tendency to develop cross-border insolvency proceedings. This requires policy setters support for practice development.

It is possible that some factors unknown to us relate to the court's efficiency. Perhaps the individual characters of judges—including their education, term of post, or priory experience—constitute such factors. We are unable to resolve these issues now, but hope to address them in future work.

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