

Quality of Insolvency Proceedings in Selected Countries – Analysis Focused on Recovery Rates, Costs and Duration

Luboš SMRČKA¹, Markéta ARLTOVÁ², Jaroslav SCHÖNFELD³

Abstract: *The study attempts to define the dependence between how efficient insolvency proceedings are in particular countries (especially from the perspective of the yields for creditors from these proceedings) and the general level of development of the surveyed countries. This level of development is measured by the data of gross domestic product per inhabitant. The afore-mentioned data was selected on the basis of a hypothesis according to which the GDP per inhabitant in particular captures the ability of a given economic system to create wealth, whilst one of the fundamental prerequisites for such an ability is the general level of enforceability of a contract and therefore also the enforceability of a receivable. Insolvency proceedings as a formally demanding process based on legal specialties (usually an insolvency act) are a suitable representative of the requirement of enforceability of law. The yield for the creditor, then, is understood to be a crucial parameter of the insolvency system, for it is a natural gauge of the result of the enforcement process. Five groups of countries were formed for the purposes of comparison – the most developed European states, post-communist European states already included into the European Union, post-communist European states outside the EU, the most developed economies outside Europe and finally also oil-producing Arab states, where wealth is not necessarily proportional to the quality of enforceability of law. With the aid of regression analysis of the data, the work has proved that the quality of the legal environment measured by the efficiency of insolvency processes is truly related to the general efficiency of the economy. It is thus possible to assert on this foundation that, if we exclude states with exceptional mineral wealth, a high level of enforceability of law too is truly imperative in order to acquire wealth.*

Keywords: *Bankruptcy, debtor, creditor, GDP per capita, insolvency, insolvency proceedings*

JEL: *G33; P26.*

¹ Associate professor, Ph.D.; University of Economics Prague; Faculty of Business Administration; Prague, Czech Republic; e-mail: lubos.smrcka@vse.cz

² Associate professor, Ph.D.; University of Economics Prague; Faculty of Informatics and Statistics; Prague, Czech Republic; e-mail: marketa.arltova@vse.cz

³ Professional assistant, Ph.D.; University of Economics Prague; Faculty of Business Administration; Prague, Czech Republic; e-mail: jaroslav.schonfeld@vse.cz

Introduction

The dissolution of trading companies is, like the conditions of their emergence, among the fundamental parameters of the business environment (Richter, 2008). If the emergence of a trading company or some other introduction of a business intention into the real world is overly complicated or costly, it is a more significant limitation of business activity and a greater hindrance to economic growth on a national and state scale than many tax or customs problems are, for instance.

It is nevertheless a fact that attention usually devoted to the problem of debtor default, insolvency proceedings, debtor bankruptcy and subsequently the fulfilment reached by insolvency proceedings for the creditor is by no means significant (Kislingerová, Arltová, 2013). This is to some extent surprising as the problem of the growth of companies and freedom of enterprise in general is a relatively frequent theme of research. At present, however, we do not in fact have at our disposal any statistics or even a study which could tell us what yields individual types of creditors in various countries attain in insolvency proceedings. The data which we use in the calculations that follow are not figures which have arisen through a collection of statistical data. These are experts' answers to a question as to the outcome of a specific case in their countries. The figures concerning the results of insolvency proceedings have been taken from the publication *Doing Business* (Smrčka, Schönfeld, Arltová, 2014 and Smrčka, Arltová, 2014).

This fact requires at least a brief digression. Data from the *Doing Business* survey are used relatively frequently and often with a somewhat imprecise definition of how these figures arise. It is here necessary to add that these are: 1) assessments of specialists in a given country, not real results from real cases, 2) the case assigned to the experts is in no way defined as a "typical" case in the given country, but it is the same for all states; in any event, it has no connection whatsoever with the types of insolvency cases that are usually settled in this or another country, 3) we can with high probability assert that the defined case is exceptional in practically each state insofar as the debtor did not take steps to excise property from the supervision of the creditors, nor did it attempt to rescue its business activity with any risky operations (Popescu, G.H. & Ciurlau, 2016). It makes no sense, in the issues of the debtor's behaviour and motivation, to conceive of anything which would even remotely refer to the fact that the debtor would, in the event of a looming bankruptcy, act in the interests of the creditors. The vast majority of available cases show the opposite, which applies also for highly developed countries. At a time when a debtor realistically expects bankruptcy, the creditor usually does not yet know anything specific as to the debtor's problems. This enables the debtor to take drastic risks in an endeavour to rescue the business – the risk of these hazardous operations is borne by the creditor who is, however, unaware of this – if the question of risk and the debtor's authority to undertake the risk on the creditor's account is even posed, it can always respond that this was an

entrepreneurial aim that “did not work out”. This is an age-old problem of asset administration and does not concern only one country; it does not even concern a single group of countries (Becerra et al., 2016). On the contrary, it applies that these problems can be seen practically everywhere in more or less sophisticated manifestations.

The system of insolvency law is similar in all developed countries and, in a certain sense of the word, even in other countries. Understandably, we think here of such economic systems where collective enforcement (as a form of insolvency proceeding or other similar mechanism) is in fact defined.

The study that follows stems from several fundamental hypotheses which we will not argue precisely here; we will mostly be satisfied with a reference to pertinent literature and also with a basic explanation of the situation.

- Insolvency proceedings are significant, among other things, from the perspective of the amount of property that passes through them, (Smrčka, Schönfeld, Arltová, 2014 and Smrčka, L., Arltová, M., 2014)
- individual proceedings and especially proceedings as a whole influence the business environment of a given country or economic area (Smrčka, Schönfeld, Arltová, 2014; Smrčka, Arltová, Schönfeld, Louda, 2014; Smrčka, Arltová, 2014a; Ékes, Koloszar, 2014; Čámská, 2015; Arltová, Smrčka, Louda, Mateos-Planas, 2016; Mihalovič, 2016 and Paseková, Fišerová, Bařinová, 2016)
- insolvency proceedings are an indicator of parameters such as enforceability of law and the enforceability of contracts or enforceability of receivables derived there from (Davydenko, Franks, 2011; Kislingerová, Arltová, 2013; Smrčka, Arltová, Schönfeld, Louda, 2014; Smrčka, Arltová, 2014a and Arltová, Smrčka, Louda, Mateos-Planas, 2016)
- enforceability of law is among the decisive parameters of the economic environment (Richter, 2008; Lee, Yamakawa, Peng, Barney, 2011)
- a fundamental circumstance of enforceability of law is not only the length of court proceedings as of the filing of the lawsuit through to the passing of a ruling, but besides other circumstances, also the level of transaction expenses which have to be paid by the creditor in order for the law to be enforced. For when the law can be enforced from the perspective of processes and legislation, although through disproportionate expenses, this entails a factual reduction of enforceability of law (Schönfeld, Smrčka, Kislingerová, 2014).

We decided to utilize certain available data to subject to appropriate analysis data on insolvency proceedings in numerous countries which vary culturally, geographically and especially in terms of the level of gross domestic product per inhabitant.

1. The used sample – selected countries

A sample of fifty countries divided into five groups was used for the purposes of the survey. These groups are described in Table 1. For which we will analyze the following basic data: time in years, cost in percentage of monetization of debtor property, recovery rate in percentage of receivable, GDP in USD per capita (GDP inh), GDP in millions of dollars and population in thousands, in the year 2014.

Table 1. Selected countries

Group	Countries
1. Developed European countries	Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, UK
2. New members of the European Union from among the ranks of post-communist states	Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia
3. Less developed European countries	Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Georgia, Moldova, Montenegro, Russia, Serbia, Ukraine
4. Developed world countries with the highest GDP per capita (with the exception of the European states, which are in the 1st group)	Australia, Canada, Hong Kong, Israel, Japan, Korea, New Zealand, United States
5. Arab oil-producing countries	Bahrain, Brunei, Kuwait, Oman, Qatar, Saudi Arabia, UAE

2. The analyses

We will pursue several aims in the calculations that follow. Firstly, we will attempt to survey the homogeneity of individual groups from the perspective of various parameters. Secondly, we will then verify the hypothesis according to which the general maturity of a state (in the given case, we have measured it with the aid of GDP per capita) and the quality of insolvency proceedings should be connected on a general level.

This hypothesis stems from the assumption that only the general maturity of the economic environment (measurable in the given connection by the quality of insolvency proceedings) could also entail reaching a significant gross domestic product per capita. We must clearly accept the fact, however, that each rule has an exception, which is obvious even from a perfunctory critical analysis of the presented hypothesis.

Oil-producing countries were included in the survey primarily so that they could undergo the hypothesis of the loading test of the situation where we have in the comparison countries which have a high gross domestic product per capita, albeit thanks to the specific advantages of mineral wealth. We could then expect here that a high GDP per capita need not necessarily be connected with the institutional maturity of these countries, so the quality of insolvency proceedings will be lower than what we would expect face to face with the gross domestic product per inhabitant.

2.1. Recovery rate

We will first survey the individual groups of countries from the perspective of the recovery rate which a creditor can expect in the event of its debtor's bankruptcy.

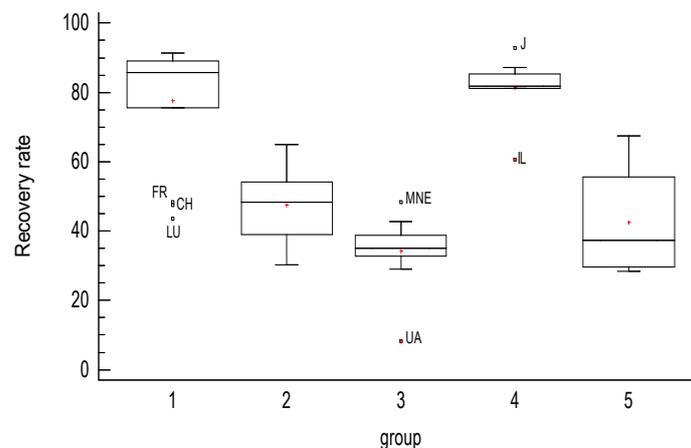


Figure 1. Recovery rate in individual groups

(Source: data World Bank – IFC (2014), own calculation)

It is necessary to present the following information: If a certain country exits from its box in Figure 1, this means that the monitored parameter is so markedly divergent from the average of the other countries that it defies processing.

As is shown by Figure 1, a certain surprise did indeed come, although we can consider the hypothesis to be fully verified. Firstly, the wealthiest countries in the world (group 4) demonstrate high homogeneity in the issue of recovery rate of receivable to creditors, even when the recovery rate is very high. Then, as we can see, only Japan (J) falls out of the compact illustration thanks to a truly high recovery rate from investment (this means that the estimation of the enforced sum of the receivable is clearly the highest from the countries monitored), and Israel (IL) due to the exact opposite reason. Generally, the recovery rate among the most

developed countries is comparable to the most developed European states, where three already-mentioned countries diverge immediately from the general trend, however: France, Luxembourg and Switzerland. It is unusual that all three represent a fluctuation in a downward direction.

As regards explanation of these fluctuations, we do not have at our disposal any hard data which we could use for this purpose. A probable explanation in the case of France is given by the somewhat unusual, or shall we say specific insolvency legislation which dominates in this country, in which the legislation, somewhat simply put, fulfils goals that were assigned to it by political decision. These include especially the goals of maintaining the “activity of the business” and “maintaining employment”, which in some cases leads to somewhat absurd results (Davydenko, Franks, 2011; Blazy, Chopard, Fimayer, Guigou, 2009) when attempts to reorganize the debtor are repeated. This occurs also in situations when this endeavour proves groundless and especially leads to lower yields and also to higher costs for insolvency proceedings.

It is highly probable that the reason for this is that during insolvency proceedings, assets (which, in other countries, are monetized and divided among the creditors) are expended in attempts to rescue the activity of the business and to maintain employment. The above-mentioned studies have, moreover, reached this conclusion (Davydenko, Franks, 2011; Blazy, Chopard, Fimayer, Guigou, 2009).

In its way, it is most interesting to see the influence of institutions on economic events when comparing countries which we can consider post-communist and which, over the last few years, have become member states of the European Union and, contrariwise, post-communist states which are outside of the European Union – i.e. groups 2 and 3. We see the post-communist states already accepted in the European Union as a relatively small compact group, where no state, however, protrudes from the framework, thus fitting into the “box” of its group. By contrast, post-communist states which have not been accepted into the EU are highly compact, but with a recovery rate level lower than that of Group 2, moreover with two protruding countries. Montenegro (MNE) markedly overreaches the other states; contrariwise, Ukraine (UA) falls considerably. In the case of Montenegro, the reason could be the decision by the country’s political leadership to apply very strictly legislation formed with the aid of foreign experts and stemming not from a specific situation, but contrariwise, from the legislation of leading European Union states. The poor situation of Ukraine (whilst the surveyed state of affairs existed prior to the civil war and conflict with the Russian Federation in the eastern part of the country) is probably the result of an extremely poor general state of enforceability of law.

And finally, there is the fifth group, where states are very highly placed (from the perspective of GDP per capita) or which at least represent the average of the surveyed sample, although as we can see on Figure 1, and as we can read from Table 3, these are either average or below-average countries from the perspective of insolvency process results. None of the states included in Group 5 (Arab oil-producing countries) have a GDP per capita lower than that of the wealthiest of

post-communist countries (whether accepted into the EU or not). One can nevertheless here observe a division into two groups – while Bahrain and Qatar demonstrate an at least relatively acceptable recovery rate from the Anglo-Saxon perspective, the other states are clearly insufficient in this comparison. On the other hand, it has to be conceded that the structure of the economy in these countries is patently specific, and this concerns also the standard size of the business (practically no smaller or medium-sized businesses exist. This fact of course markedly influences the course of events which we term insolvency proceedings in the context of more standardly arranged economies. A further significant factor, then, is the fact that these are Islamic countries, and therefore states with a considerably different structure of financial institutions and generally with a different approach to banking. While banks are among the decisive creditors or are even the dominant creditor in the majority of the countries included in the sample, this does not apply in Islamic countries. Let us add in passing that Islamic banking does not recognize the cost of money in time, for interest is considered immoral. Therefore, banks for the most part do not lend in the sense of the word as we know it; they become the entrepreneur’s partner on the principle of *mudarabah* or *murábaha*, thus sharing the risk with the entrepreneur; or they provide services similar to leasing and so forth.

Table 2. Analysis of variance (5% significance level) – recovery rate

Source:	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	19,161.5	4	4,790.37	27.73	0.0000
Within groups	7,772.46	45	172.721		
Total (Corr.)	26,933.9	49			

(Source: own calculation)

Table 3. The averages of ind. groups, 95% confidence interval - recovery rate

Group	Count	Mean	Std. error (pooled s)	Lower limit	Upper limit
1	14	77.69	3.51244	72.6833	82.6881
2	9	47.59	4.38078	41.3498	53.8280
3	12	34.28	3.79387	28.8801	39.6865
4	8	81.29	4.64652	74.6700	87.9050
5	7	42.49	4.96734	35.4113	49.5601
Total	50	57.50			

(Source: own calculation)

Table 2 is an ANOVA (analysis of variance), in which the correspondence of mean values in all groups is tested. It here emerges that, at a 5% level of significance, the mean values of the individual groups diverge significantly from one another. Contrariwise, certain (albeit not perfect) homogeneity dominates within the groups. This shows the marked variance of the individual groups, which

is indisputably given on the one (decisive) hand by the existence of variance in the level of gross domestic product per capita (which we consider to be proof of institutional variance and variance at the level of enforceability of law); then on the other hand (secondary), cultural or specific divergences (here, in the given case, we can name the existence of exceptional natural wealth the above-mentioned issue of the Islamic banking system).

2.2. Cost

In the second series of calculations and analyses, we will focus on the problem of costs. In the passages that follow, we will speak in this connection of the level of costs in which these costs are expressed as a percentage ratio to the entire enforced sum within the context of insolvency proceedings.

We could consider the visual message of Figure 2 to be a surprise, as it seems at first glance that all five groups are actually very similar to one another. Matters are in fact more complicated, however. First and foremost, it is necessary to observe in this connection the gauge which the aforementioned percentages from the volume of the yield of the insolvency proceedings represent (in the given context we can speak of bankruptcy). The percentage approach is somewhat confusing, as the difference between, for instance, ten and fifteen percent is in no way fundamental on the graph, yet it is in fact a great and highly fundamental difference.

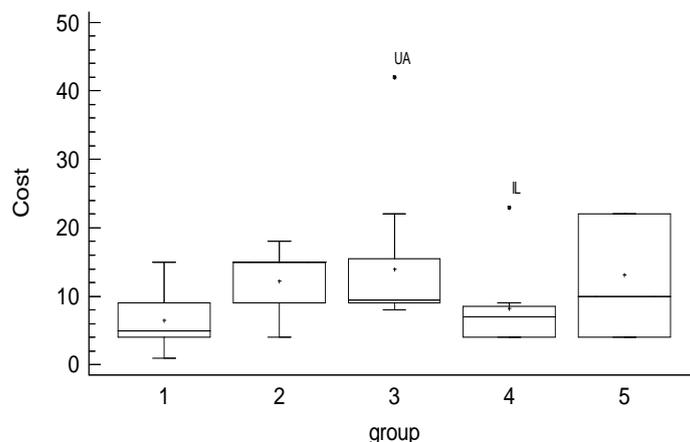


Figure 2. Cost in individual groups

(Source: data World Bank – IFC (2014), own calculation)

Yet we see once again especially the expected result – Groups 1 and 4 have the lowest costs, Groups 2 and 3 are above them, and Group 5 represents the set of countries with the largest layering of costs.

It would here be apposite to note that the concept of costs in the given context includes only direct costs for insolvency proceedings, which include, for instance, the administrator's fee, costs for administration and maintenance of the property prior to its monetization, auction costs and further costs which are paid from the monetization and thus reduce the pay-out to the creditors. In other words, we can thus say that these are costs paid jointly by all the creditors. Neither creditors' transaction costs (costs for monitoring the receivable, for its enforcement, costs for legal representation and others), nor the state's costs connected with enforcing insolvency law (costs for the court system and also for the operation of the insolvency register and so forth) are included here.

As regards the interpretation of Figure 2, probably the most interesting space is shown in Group 5, where we see countries with very low costs and, contrariwise, economies with very high costs. These "bad states" include especially Qatar, Saudi Arabia and United Arab Emirates (UAE), whilst Qatar is among the absolutely wealthiest countries in the world and UAE among extremely wealthy countries. Only Saudi Arabia is in a poorer position in this sense, although still with a GDP per capita at a level of 25 thousand dollars, which is very high in a worldwide comparison. It especially transpires that the analysis of Group 5 demonstrates a lower-than-expected testimonial value of GDP per capita. It is, however, necessary to warn against over-simplification of the situation.

Even here it transpires that Arab oil-producing countries represent a special phenomenon, which, from the position of our standard perception of the business environment and enforceability of law can be comprehended only with difficulty. If we remind ourselves of the specific nature of Islamic banking, by which we were to some extent able to explain the low recovery rate in these countries, it is not entirely clear why this divergent financial mechanism should at the same time entail relatively high costs.

On the other hand, however, it applies that costs are defined as a percentage from monetization of the debtor's assets, and if investments are financed through a form of leasing (the *ijarah* principle), where an asset remains the property of the bank's until the return of the agreed amount, then it will necessarily occur that the debtor's assets will be low in the event of its default and bankruptcy. Then, however, even relatively cheap insolvency proceedings (from the perspective of absolute amount) have to be "costly" when expressed as a percentage against the debtor's monetized property.

As we can therefore see, it would not be adequate to accept from the results gained in the case of Group 5 truly clear and strong conclusions on the general environment in given countries. We can, however, in any event gather that these are states which represent an entity that is highly irregular and difficult to comprehend.

It transpires that the level of gross domestic product per capita need not necessarily have a relationship with the level of quality of insolvency proceedings, for there are exceptions to the thesis that it is precisely the gross domestic product per inhabitant that proves the institutional quality of a specific country, a specific state. Group 5 (Arab oil-producing countries) have a high level of gross domestic product per inhabitant; institutionally, however, these are states which defy entirely the economic tradition of developed countries and models based on their rules.

As regards analyses from the perspective of costs, Table 5 shows that the mean value at a 5% level of significance does not vary in any fundamental way. As we have already said, this is partially given by the gauge and very principle of marking with the aid of ratio to the whole.

Table 4. Analysis of variance (5% significance level) – cost

Source:	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	480.151	4	120.038	2.54	0.0527
Within groups	2126.33	45	47.2518		
Total (Corr.)	2,606.48	49			

(Source: own calculation)

Table 5. The averages of individual groups, 95% confidence interval – cost

Group	Count	Mean	Std. error (pooled s)	Lower limit	Upper limit
1	14	6.50	1.83715	3.88355	9.11645
2	9	12.22	2.29133	8.95893	15.48550
3	12	13.92	1.98435	11.09060	16.74280
4	8	8.25	2.43032	4.78876	11.71120
5	7	13.14	2.59812	9.44264	16.84310
Total	50	10.52			

(Source: own calculation)

2.3. Time

Logically, another surveyed quantity is time, i.e. the duration of insolvency proceedings as of filing the insolvency proposal through to a binding ruling thereon.

On the example of the length of insolvency proceedings in years, we can see the extent to which the hypothesis on the relationship between gross domestic product per capita and the quality of institutions need not be fulfilled, and this is shown to us once again by Arab oil-producing countries, i.e. Group 5, which in this comparison surpasses even post-communist countries that are not part of the European Union. Contrariwise, the speed of proceedings in the wealthiest countries in the world and Europe proves the hypothesis when the shortest duration of insolvency proceedings on average is here achieved.

If we referred, in relation to the results of Group 5, to cultural differences of great significance and were thus able to explain the differences in recovery rate and at least partially also in cost, we would in the parameter of time arrive at a border which we could no longer interpret in a similar manner. The duration of insolvency proceedings should again be in such a relationship in proportion to GDP per capita, that the “higher the GDP per capita, the shorter the proceedings” rule of proportion (albeit with marked looseness in interpretation) should apply. Besides this, the data show this relationship, which is clearly visible in groups 1 and 4. Moreover – if we observed the “internal” relationships within Group 5 – we would here observe a situation where countries with the highest GDP per capita within the group have rather a longer duration of insolvency processes (and thus in the same way a lower yield and often higher costs) than countries with low GDP per capita within the group. We can, however, consider this to be a further confirmation of the fact that, besides all the above-mentioned specifics, the thesis of the institutional inadequacy of the entire group of these countries applies.

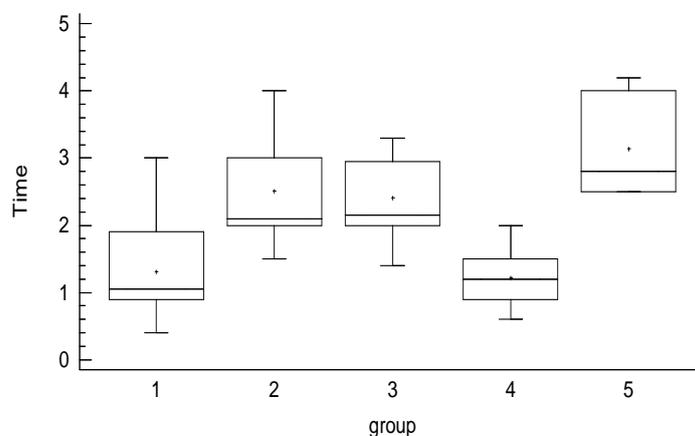


Figure 3. Time in individual groups

(Source: data World Bank – IFC (2014), own calculation)

Table 6. Analysis of variance (5% significance level) – time

Source:	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	24.8249	4	6.206210	14.24	0.0000
Within groups	19.6073	45	0.435719		
Total (Corr.)	44.4322	49			

(Source: own calculation)

Table 7. The averages of individual groups, 95% confidence interval – cost

Group	Count	Mean	Std. error (pooled s)	Lower limit	Upper limit
1	14	1.314	0.176416	1.06304	1.56554
2	9	2.511	0.220030	2.19775	2.82448
3	12	2.408	0.190552	2.13695	2.67971

4	8	1.225	0.233377	0.89263	1.55737
5	7	3.143	0.249491	2.78754	3.49818
Total	50	2.034			

(Source: own calculation)

3. Regression analysis

We undertook another regression analysis from the given data, with the aid of which we attempted to find reciprocal relationships between individual quantities describing insolvency proceedings by utilizing all information, i.e. data for all 50 countries (data: World Bank – IFC, 2014; AMECO, 2014).

$$\widehat{Recovery\ rate} = 86.932 - 0.815Cost - 14.377Time + 0.00025GDP_inh$$

(5.69) (0.27) (2.12) (0.000071)

with $R^2 = 0.73678$, $R^2_{adj} = 0.71962$, $F = 42.92$ Prob. = 0.0000, $DW = 1.6975$

It is clear from the equation that the Recovery rate is indirectly proportional to Cost and Time, and directly proportional to GDP per inhabitant. This means that if Cost increases by 1 %, the Recovery rate is lowered by 0.82 percent on average; an increase in the length of proceedings by a year lowers the Recovery rate by 14.5 % on average, and if GDP per capita increases by 1,000 dollars, the Recovery rate increases by 0.25 percent on average. In all cases, it is of course necessary to interpret the estimated parameters in such a way that we eliminate the influence of other variables.

If we analyse pair relationships, the strength of linear dependence between Recovery rate and Cost, measured by a correlative coefficient, is a moderately strong, indirectly proportional $r = -0.56$. We can register an indirectly proportional linear dependence in Recovery rate and Time, where $r = -0.78$. Contrariwise, a medium strong directly proportional linear dependence can be found in the case of Recovery rate and GDP per inhabitant, $r = 0.51$.

If we consider that the relationship could be negatively influenced by the reciprocal dependence between the explanatory variables, the so-called multicollinearity, then it is clear from the correlative table that this danger is not indicated, as the pair correlative coefficients between the explanatory variable reach a maximum value $r = 0.42$.

In the preceding considerations, we often encountered the problem of Group 5 (Arab oil-producing states) insofar as this group fundamentally defies the logic of the other countries included in the survey. Therefore, a justified question as to how the results of the regression analysis will look if we remove this group from the sample presents itself. The surveyed sample thereby decreases from 50 to 43 countries divided into four groups.

These groups, then, include the most developed states in the world (excluding EU countries, group 4), the most developed European Union states

(group 1), EU member countries with the characteristics of post-communist and European non-member states with post-communist characteristics. A significant attribute of the sample is that all its marginal values remain practically the same; only in the case of the time parameter do the two highest sample values fade in the form of 4.2 and 4.0 years of duration of insolvency proceedings (Kuwait, Oman), whilst the value of 4.0, however, is preserved by the continuing presence of the Slovak Republic. Otherwise, in none of the monitored categories (recovery rate, cost, GDP inh.) did the countries of Group 5 represent marginal values. In other words, it thus applies that the sample remains identical in this sense.

Nevertheless, its internal change occurs when the removed seven countries always represent states with an average or, rather, above-average GDP per inhabitant; at the same time, however, with a long duration of insolvency proceedings, with a low yield from these proceedings and, finally, with relatively substantial costs. The assumption, therefore, is that states with poorer quality of insolvency proceedings have disappeared from the (decreased) sample.

Perhaps surprisingly at first glance, the results of the analysis of the decreased sample do not show any fundamental or marked changes as against the original sample. With more careful analysis, however, we do in fact see several differences which prove the thesis of the relationship between GDP per inhabitant and the quality of insolvency proceedings. It seems, however, that the elimination of seven specific states which are exceptional within the sample, but which at the same time do not demonstrate marginal values, changes the general results only relatively slightly.

From the new equation, (absolutely identically to the original equation).

$$\widehat{Recovery\ rate} = 86.600 - 0.736Cost - 14.783Time + 0.000253GDP_inh$$

(7.16) (0.32) (2.85) (0.0000)

with $R^2 = 0.7265$, $R^2_{adj} = 0.7055$, $F = 34.54$ Prob. = 0.0000, $DW = 1.6774$, it follows that the Recovery rate depends indirectly proportionally to Cost and Time, and directly proportionally to GDP per inhabitant.

However, the already mentioned differences can be found in specific relationships. It now applies, for instance, that if the Cost increases by 1 %, the Recovery rate decreases on average by 0.74 percent (in the original non-decreased sample, this is 0.82 percent). The shift is logical; if we have eliminated countries with relatively high costs ranging from 4 percent (two countries), over a quite high 10 percent (two countries) through to a truly highly marked above-average 22 percent (three countries), then the influence of Cost on Recovery rate falls. That 22 percent quite significantly approaches the maximum which directs the group of Arab oil-producing countries as a whole towards the above-average area (the mathematical group average is 13.4 percent, the mathematical average of the entire aggregate of countries is 10.8 percent) in the Cost parameter.

The second impact on the results is also obvious. Increasing the duration of proceedings by a year (i.e. increasing Time by a year) leads to a reduction of the Recovery rate by 14.8 percent (in the original sample it was 14.4 percent).

Narrowing the sample generally increased the quality of the countries in terms of the results they achieve in insolvency proceedings, i.e. fewer “bad” states remained in the sample. This applies for the Cost category, but also for the Time category. It must therefore apply that in these “better societies” lengthening the duration of proceedings by a year (Time) has a worse impact on the Recovery rate. This parameter was “diluted” by the Arab oil-producing countries in the same way as was the Cost parameter.

We could expect that a greater shift would occur in those relationships of quantities where the model works with the GDP per inhabitant data, but not even here do we observe a particularly fundamental shift. It applies that if the GDP per capita increases by 1,000 dollars, the Recovery rate increases on average by 0.253 percent (whereas in the entire sample it was 0.25 percent).

Even now it applies that in all cases it is naturally necessary to interpret the estimated parameters in such a way that we eliminate the influence of the remaining variables.

We once again resort to an analysis of pair relationships. The strength of linear dependence between Recovery rate and Cost, measured by a correlational coefficient is a moderately strong indirectly proportional $r = -0.6$.

We can register an indirectly proportional linear dependence in Recovery rate and Time, where $r = -0.78$, which is an indicator absolutely identical with the indicator for the entire original sample. Contrariwise, a somewhat different result than in the other sample, a medium strong directly proportional linear dependence, can be found in the case of Recovery rate and GDP per inhabitant, $r = 0.62$.

If we consider that the relationship could be negatively influenced by the reciprocal dependence between the explanatory variables, the so-called multicollinearity, then it is clear from the correlative table that this danger is not indicated, as the pair correlative coefficients between the explanatory variable reach a maximum value $r = 0.49$.

As we can see, upon exclusion of the Arab oil-producing countries, the new decreased sample is somewhat more compact, which is its most fundamental difference as against the complete variant (50 countries). We can nevertheless understand this as a confirmation of the hypothesis with which we have worked the whole time. It has transpired that one group of specific states, in which the GDP per inhabitant especially appears to be relatively high (whereas the efficiency of the insolvency system is low) cannot have a fundamental and fatal influence on the results of the mathematical analyses. At the same time this means that the outlined relationships between individual parameters apply not only even if asymmetrical states are eliminated from the sample, but contrariwise, they apply especially when it happens.

This naturally opens considerable room for discussion as to the manner in which to amend insolvency legislation and the entire insolvency system so that it may, in its efficiency and productivity, aid economic development. This discussion is broad and, in the Czech Republic for instance, is taking place on several levels. One of these is the assumption that truly precise adjustment of legislation is not

possible without precise knowledge in a given country of the real results of insolvency processes (Kislingerová, 2012; Smrčka, Arltová, 2014b). This would then entail the possibility of replacing qualified estimations, with which we have worked in this study, with real figures on the results of real events.

Other aspects of the problem, however, are likewise being discussed. For instance, significant discussion is taking place on the pre-insolvency phase, including the predictability of a debtor's bankruptcy, which is of great significance with respect to the definition of bankruptcy in the law and with respect to the possibility of subsequent property and criminal-legal prosecution of persons who, during a debtor's bankruptcy, give priority to their own gain regardless of the diction or even the logic of the law (Machek, 2013 or Čámská, 2016).

4. Conclusions

The study has attempted to apply certain statistical analytical methods to data from the area of insolvency proceedings in year 2014 and then draw certain conclusions on the basis of these analytical methods. These can be defined as follows: the hypothesis according to which GDP per inhabitant usually presents a high-quality instrument for defining countries which have a developed and well-functioning institutional structure has been confirmed. At the same time, it has been confirmed that there are exceptions to the rules, which include especially countries with exceptional natural wealth. Furthermore, it has been proved that despite this anomaly, there is a relationship between crucial data on insolvency proceedings and the level of GDP per inhabitant. It has also been proved that fundamental relationships between individual indicators on insolvency proceedings can also be compared reciprocally, when the Recovery rate is dependent on the length of proceedings and other circumstances.

In essence, the general hypothesis from which this work stems has been proved. The institutional quality of the economic environment is among the most fundamental prerequisites to achieve an efficient and productive economy capable of securing a significant level of wealth. It can be considered proven that countries in which high-quality results from insolvency proceedings are achieved – especially where creditors receive high yields from such proceedings – are those where we can observe a high GDP per inhabitant, which is a sign of an efficient economy.

Acknowledgment

This paper was written with the support of the Czech Science Foundation project No. P402/12/G097 DYME - *Dynamic Models in Economics*, further it is one of the outputs of the research project “*Insolvency of Companies with Virtual Headquarters*”, registered at Internal Grant Agency of Faculty of Business Administration of University of Economics, Prague under the registration number 309025.

References

- AMECO (2014). *The Annual Macro-Economic Database*. Online: http://ec.europa.eu/economy_finance/db_indicators/ameco/index_en.htm.
- Arltová, M., Smrčka, L., Louda, L., Mateos-Planas, X. (2016). An attempt to compare the efficiency of insolvency proceedings in various countries in the world. *Journal of International Studies*, 9(2), pp. 25-47.
- Becerra. A. D., Androniceanu, A., Georgescu, I., (2016). Sensitivity and vulnerability of European countries in time of crisis based on a new approach to data clustering and curvilinear analysis. *Administratie si Management Public*, (27), pp. 46-61.
- Blazy, B. R., Chopard, B., Fimayer, A. and Guigou, J. D. (2009). Employment preservation vs. creditors' repayment under bankruptcy law: The French dilemma? *International Review of Law and Economics*, 31(2), pp. 126-141.
- Čámská, D. (2016). Accuracy of models predicting corporate bankruptcy in a selected industry branch. *Ekonomický časopis*, 64(4), pp. 353-366.
- Čámská, D. (2015). Impact of the Czech changing economic environment on bankruptcy models. *International Advances in Economic Research*, 21(1), pp. 117-118.
- Davydenko, S. A., Franks, J. R. (2011). Do bankruptcy codes matter ? a study of defaults in France, Germany, and the U.K., *The Journal of Finance*, LXIII(2), pp. 565–607.
- Ékes K. S., Koloszár, L. (2014). The efficiency of bankruptcy forecast models in the Hungarian SME sector. *Journal of Competitiveness*, 6(2), pp. 56-73.
- Kislingerová, E. (2012). Lack of insolvency – related information as a factor limiting the reform of the insolvency system. *Advances in Finance & Accounting*. Zlín, 20.-22.09.2012. Athény : WSEAS Press, pp. 180–185.
- Kislingerová, E., Arltová, M. (2013). Forecasting the number of insolvency petitions and bankruptcies for 2013-2014. *Proceedings of the 6th International Scientific Conference: Finance and the performance of Firms in Science, Education and Practice*, pp. 336-347.
- Lee, S. H., Yamakawa, Y., Peng, M. V. and Barney, J. B. (2011). How do bankruptcy laws affects entrepreneurship development around the world? *Journal of Business Venturing*, 26(5), pp. 505 – 620
- Machek, O. (2013). Long-term predictive ability of bankruptcy models in the Czech Republic: evidence from 2007-2012. *Central European Business Review* 3(2), pp. 14-17.

Mihalovič, M. (2016). Performance comparison of multiple discriminant Analysis and Logit Models in Bankruptcy Prediction. *Economics & Sociology*, 9(4), pp. 101-118.

Paseková, M., Fišerová, Z., Bařinová, D. (2016). Bankruptcy in Czech Republic – from the perspectives of debtors, creditors, and the judiciary, 2008-2013. *Journal of International Studies*, Vol. 9, No 1, pp. 180-191.

Popescu, G. H., Ciurlau, F. C. (2016). Can environmental sustainability be attained by incorporating nature within the capitalist economy? *Economics, Management, and Financial Markets*, 11(4), pp.7

Richter, T. (2008). *Insolvenční právo (Insolvency Law)*, ASPI Wolters Kluwer, Prague.

Schönfeld, J., Smrčka, L., Kislingerová, E. (2014). Skutečné výsledky insolvenčních řízení v ČR –předběžná zpráva výzkumného týmu. *Insolvenční řízení 2014: Hledání cesty k vyšším výnosům*. Prague, 20.05.2014. *Oeconomica*, pp. 118–132.

Smrčka, L., Arltová, M. (2014a). An analysis of the reciprocal dependence of economic maturity and the results of debtor bankruptcies in certain countries. *Recent Advances in Electrical and Electronic Engineering*, Florence, November 22-24, 2014. WSEAS Press, pp. 189-196.

Smrčka, L., Arltová, M. (2014b). Information technology in the area of insolvency proceedings. An example from the environment of the Czech Republic. *Proceedings of the Second International Conference on Advances in Computing, Communication and Information Technology*. Birmingham, 16.-17.11.2014. New York: pp. 84–88.

Smrčka, L., Arltová, M., Schönfeld, J., Louda, L. (2014). Parameters of insolvency proceedings in developed countries and their dependence on economic performance. *Advances in Environmental Sciences, Development and Chemistry*. Santorini Island, 17.-21.07.2014. pp. 345–352.

Smrčka, L., Schönfeld, J., Arltová, M., Plaček, J. (2014). The significance of insolvency statistics and the regression analysis thereof – the example of the Czech Republic. *WSEAS Transactions on Business and Economics*, 11, pp. 227–241.

World Bank – IFC (2014). *Doing Business 2014*. Washington, D.C.: World Bank.