

Legal reform and aggregate small and micro business bankruptcy rates: evidence from the 1997 Belgian bankruptcy code

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Received: 12 April 2006 / Accepted: 23 April 2007 / Published online: 4 July 2007
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Abstract Many Continental European countries recently reformed their bankruptcy legislations to stimulate reorganization and firm survival. We show that the Belgian 1997 bankruptcy code reform, which implemented several international best practice recommendations, significantly reduced aggregate small and micro business bankruptcy rates. However, using distributed lag models to control for the relationship between bankruptcy rates and macroeconomic variables such as real GDP growth, consumer confidence, inflation, etc., we find that the new code's impact is not the same for all types of companies. Specifically, while the beneficial effect of the reform is largely similar between small firms (i.e. stock corporations) and micro firms (i.e. partnerships), it is only significant in certain industries (manufacturing and trade). Overall, our results indicate that especially the measures taken to limit domino bankruptcy effects are likely to have had a substantial impact.

Our findings have several policy implications for the evaluation and modification of the bankruptcy system.

Keywords Bankruptcy reform · Aggregate bankruptcy rates

JEL Classifications G33 · E32 · K22 · L26

1 Introduction

During the last decade many countries in the European Union reformed their bankruptcy legislations (e.g. France, Germany, the UK, Spain, Finland, Italy). Several other EU members are planning comparable overhauls (e.g. the Netherlands). The goal of these reforms typically was to transform a 19th century framework, solely focused on liquidation, into a legislation encompassing both a reorganization and liquidation chapter as is the case in the US. Thereby legislators hoped to realize a more transparent and efficient system, which encourages reorganization as much as possible, as reflected in the European Commission's or the World Bank's guidelines for best practice bankruptcy procedures (EC 2003; World Bank 2001). This implies that changes to the bankruptcy system should have an effect on aggregate bankruptcy rates, defined as the percentage of liquidation type bankruptcies to the total company

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population (Liu and Wilson 2002; Cuthbertson and Hudson 1996; Vlieghe 2001).¹

All over Europe, the vast majority of bankruptcy cases concerns SMEs (cf. Hudson 1986).² Consequently, the reduction of the bankruptcy rates of small businesses should be an important issue in a bankruptcy reform. However, not all aspects of such an overhaul are necessarily beneficial or useful for smaller firms. The same holds true across different business sectors. This could be important, as some industries are more heavily represented in a country's economy than others. Preceding issues have so far received little attention in the literature. Moreover, empirical evidence on the impact of bankruptcy legislation reform on aggregate bankruptcy rates in a Continental European setting is not available. Because the bank based financial system in these countries is substantially different from the market based Anglo-Saxon environment, the impact of reforms in the former countries is not necessarily comparable to that of reforms in the latter. Furthermore this also begs the question about the effect on bankruptcy rates of the implementation of international best practice recommendations in Continental Europe. As discussed below, the main goal of this paper is to look into these issues by evaluating the

impact of legal reform on aggregate bankruptcy rates for different types of small and micro businesses in a typical bank based Continental European country, viz. Belgium.

Research on corporate failure focuses either on firm specific bankruptcy prediction³ or on modeling aggregate bankruptcy rates. In the latter type of work macroeconomic factors play an important role. Hudson (1986), Ilmakunnas and Topi (1999) and Liu (2004), among many others, find that general macroeconomic variables (such as GDP growth or business cycle indicators) are negatively related to aggregate failure rates. Also aggregate corporate birth rates (e.g. Hudson 1986, 1997; Johnson and Parker 1994) and inflation (Altman 1983; Wadhvani 1986, among others) prove to have an impact, but here the nature of the relationship may be either positive or negative. Specific empirical evidence on the impact of the macroeconomic environment on the failure of small and micro businesses is scarce. Chen and Williams (1999) examine state by state failure rates in the US and find that government assistance programs lower bankruptcy rates in high-technology industries. Everett and Watson (1998) use data on small Australian retail businesses and show that between 30% and 50% of failures are associated with economy wide factors. Using survey data Peterson et al. (1983) show that macroeconomic factors are the number two and three perceived reasons for small business failure in the US, while Sullivan et al. (1999) document that outside business conditions are the most mentioned reasons for filing bankruptcy. Similarly, for Belgium, credit data provider Graydon finds in its surveys that owners and managers of failed businesses as well as bankruptcy judges point to bad general economic conditions as a major cause of bankruptcy (Graydon Belgium 2002, 2003).

Next to the general macroeconomic environment, the impact of institutional factors on aggregate failure rates has been receiving more and more attention. In a recent study, Claessens and Klapper (2005) document that the use of formal bankruptcy around the world is related to design features of bankruptcy legislation. Furthermore, the research on the effects of institutional change confirms the important impact of legal reform on aggregate failure rates, at least for

¹ One could argue that a major goal of any bankruptcy system should be procedural efficiency. In this sense, a perfect bankruptcy system should strive for perfect filtering between viable companies which should be allowed to reorganize and non-viable companies which should be liquidated as soon as possible to reallocate its resources to a more profitable use (cf. White 1994). Nevertheless, reforms (including the Belgian one) often include many measures which are meant to prevent companies from ending up in the bankruptcy system at all. This means that if the key features of the reform function well, this should, *ceteris paribus*, be reflected by a decrease of the aggregate bankruptcy rate.

² This is a direct result of the importance of small businesses in the European economy: SMEs represent 99.8% of all companies (estimate for the European economic area + Switzerland; Source: European Commission 2003 Observatory of European SMEs). The EU's criteria for SME classification valid until Jan 1st, 2005 were: *Micro*: less than 10 employees (after Jan 1st, 2005: less than 10 employees, net income <2 million EUR, total assets <2 million EUR). *Small*: less than 50 employees, turnover <7 million EUR, total assets <5 million EUR (after Jan 1st, 2005: less than 50 employees, turnover <10 million EUR, total assets <10 million EUR). *Medium*: less than 250 employees, turnover <40 million EUR, total assets <27 million EUR (after Jan 1st, 2005: less than 250 employees, turnover <50 million EUR, total assets <43 million EUR).

³ See Altman and Narayanan (1997) for an extensive international survey on corporate failure prediction models.

Anglo-Saxon countries. For instance, Turner et al. (1992) show that the policies of the Thatcher government in the early 1980s strongly increased the business cycle sensitivity of corporate liquidations. Concerning the 1978 Bankruptcy Reform Act in the US, the empirical literature predominantly focuses on personal bankruptcies (Chapter 13 procedures), and documents that the procedure's use significantly increased after the introduction of the Act (e.g. Domowitz and Eovaldi 1993; Nelson 2000). In addition, Boyes and Faith (1986) find that the 1978 reform also increased the number of corporate bankruptcy filings. Fisher and Martel (2003) show that the 1992 Canadian bankruptcy reform stimulated the number of filed corporate reorganization proposals. Finally, concerning the UK's 1986 Insolvency Act, Cuthbertson and Hudson (1996) and Vlieghe (2001) find a significant decrease in the corporate liquidation rate after implementation of the reform. Liu and Wilson (2002) and Liu (2004) confirm this and indicate that the beneficial effect of the Act diminishes after about 4 years.

This paper contributes to the literature on macro-economic determinants of aggregate bankruptcy rates, by documenting the impact of a legal reform on these rates for different types of small and micro businesses. Specifically, we separately examine bankruptcies in the most important industry groups (manufacturing, construction, trade and services) and the two dominant limited liability legal forms (partnerships and stock corporations). This stratification approach allows us to get a much clearer picture of the reform's impact, which turns out to be different across company types. We also link these differences to key features of the reform. In addition, ours is the first aggregate bankruptcy rate study that focuses exclusively on small and micro businesses. This focus is especially interesting because our empirical analysis concerns a relatively recent reform that implements several international best practice recommendations on bankruptcy legislation. Furthermore, as we use data from a typical Continental European country, viz. Belgium, the paper also documents the functioning of bankruptcy legislation in a bank-based economic system, while the existing literature almost exclusively examines reforms in Anglo-Saxon (market-based) economies. Previewing our main results, we find that the relationships between macroeconomic variables and bankruptcy

rates are not the same for all types of companies. Furthermore, the reform only succeeded in lowering bankruptcy rates in the manufacturing and trade industries, for both small and micro firms. By contrast, bankruptcy rates in other industries were not significantly affected. Our results indicate that especially the measures taken to limit domino bankruptcy effects are likely to have had a substantial impact. Overall, these results have several policy implications.

The remainder of the paper is organized as follows: Section 2 discusses the most important changes of the 1997 Belgian bankruptcy reform and their potential implications for bankruptcy rates across different groups of companies. Data, univariate statistics and methodological issues are discussed in Sect. 3. Section 4 reports the empirical results and Sect. 5 concludes.

2 The Belgian 1997 bankruptcy reform and aggregate bankruptcy rates

With its bankruptcy legislation of 1997, Belgium replaced existing rules dating back to 1853.⁴ In line with international best practice recommendations (e.g. from the European Commission or the World Bank), the new code introduced several mechanisms to encourage corporate rehabilitation (and hence reduce corporate liquidation rates). The three most important ones are discussed below.

The first novelty concerns the introduction of a formal reorganization procedure which has many features in common with legal reorganization rules abroad (e.g. the French 'redressement judiciaire', US Chapter 11 or the British administration procedure; see Kaiser 1996).⁵ A company that is granted reorganization protection receives creditor protection for up to 6 months. During that time a reorganization plan is worked out which has to be approved by the

⁴ The bankruptcy law of August 8, 1997 and the law on the reorganization procedure of July 17, 1997. Both came into effect on January 1, 1998 and will be referred to as the 'code' in the remainder of the paper. Some minor legal-technical issues were solved by the law of September 4, 2002 (effective as of October 1, 2002).

⁵ Formally, a reorganization code existed since 1887, and was updated in 1946. However this reorganization procedure had been in disuse for decades.

majority of creditors and the bankruptcy court. If a plan is confirmed, the company can stay under the court's protection for as long as 3 years. Throughout the procedure, the reorganizing firm's management is assisted and supervised by a court appointed administrator.⁶

Secondly, the new legislation also introduced an early warning system for financial distress through the creation of 'chambers of commercial research' as part of the bankruptcy courts. These units have to actively investigate the viability of firms within their jurisdiction. An investigation may be triggered by complaints from clients and suppliers, fiscal and social security administrations, or auditors, or be the result of the chamber's analysis of a company's financial statements. If the court decides that the problems could threaten a firm's continuity, it informs the management of its legal options, including a formal reorganization or bankruptcy procedure. However, these chambers have few opportunities to take action because of the limited amount of resources available to them.

Thirdly, a number of adjustments to the liquidation procedure were introduced to reduce the occurrence of domino effects, i.e., when suppliers are thrown into financial distress due to the bankruptcy of their clients (Kiyotaki and Moore 1997; Boissay and Monnet 2003). The main measure concerns the acknowledgement of retention of title for goods which have been delivered but not yet paid. In fact it is interesting to note that Belgium was the last country in the European Union (with the exception of Luxembourg) to implement this principle and make retention of title 'insolvency resistant' (Milo 2004). In terms of reduction of risk, this measure has two important dimensions. From the perspective of a firm's suppliers, it offers more security of receiving payment. From the perspective of the company itself, it reduces possible losses on its outstanding customer invoices, and is a substitute—at least to some

extent—for insurance on its portfolio of accounts receivables. As discussed below, this risk reduction may also alleviate credit rationing problems.⁷

The beneficial impact of preceding measures may differ according to the size of the firm. In particular, we would expect that the first two components of the reform discussed above are less beneficial for micro firms as compared to small companies. Specifically, a formal reorganization procedure typically entails costs of which the relative importance is inversely related to firm size (Branch 2002; Ravid and Sundgren 1998). *Ceteris paribus*, this is likely to deter micro firms from applying for reorganization. Furthermore, in view of their limited resources, the commercial research chambers are unlikely to focus much of their early warning activities on micro companies.

Concerning the anti-domino measures, it is not a priori clear what type of firm is likely to benefit most. In particular, as the retention of title offers more security to suppliers, it should improve the availability of trade credit. The findings in the literature suggest that, *ceteris paribus*, micro companies may benefit more as this form of credit is likely to be relatively more important to them (e.g. Berger and Udell 1998; Petersen and Rajan 1997). From the perspective of accounts receivables, this same retention of title reduces losses if clients do not pay. This could again be more beneficial for micro firms as they may be hit harder by a client's failure. However, as discussed above, retention of title also offers firms a form of insurance on their portfolio of accounts receivables. For companies in which these assets absorb a significant fraction of total assets, reduction of exposure on accounts receivables is an important element in loan decisions of banks, especially if the firm's financial health is mediocre. As bank credit is a more important source of funds for small firms as compared to micro companies (e.g. Berger and Udell 2002; Hughes 1997), this latter argument suggests that, in terms of alleviating credit constraints from banks, the retention of title offers the former group of firms more advantages.

⁶ Note that this part of the reform has in principle also entailed a reduction in the protection of privileged claimants (including e.g. mortgage holding banks, which are very important in Belgium's bank-based financial system). Specifically, the stay on the execution of privileges has been strengthened and a reorganization plan may be confirmed even if a privileged debt holder objects. In practice, these reductions of secured creditor rights are quite limited though and unlikely to significantly affect the latter's debt providing behavior.

⁷ Other changes comprise new procedures allowing for a quick start-up of a new company that continues all or part of the economic activities of the failed firm. In practice there prove to be many problems with the practical implementation of these new procedures and they are rarely used.

When comparing across industry groups, effects may differ as well. In particular, the creation of a formal reorganization procedure is likely to benefit the least those firms that have many assets that can be used as collateral. Specifically, although availability of collateral helps to obtain credit, Bergström et al. (2002) find evidence that when the company falls on hard times, secured creditors push for liquidation and are likely to oppose a reorganization plan.⁸ Relative to service companies, firms in trade, manufacturing and construction are likely to have more collateralizable assets, and hence, *ceteris paribus*, are more likely to meet with opposition of secured debt holders when they attempt to file for a reorganization procedure. By contrast, the measures taken in the framework of reducing domino effects should especially benefit trade and manufacturing firms. In view of their important inventories, companies in these industries should benefit most from the advantages of the introduction of retention of title (increased access to trade credit, better possibilities to reclaim unpaid sales and improved access to bank debt). Finally, *ceteris paribus*, one would not expect the creation of the chambers of early warning to impact differently across business sectors.

The hypotheses from the preceding analysis are summarized in Table 1. They suggest that, depending on which of the legal changes dominates, the total impact of the reform on bankruptcy rates may differ across size classes and/or industry. We address these empirical questions below.

3 Data and methodology

3.1 Data and variables

Under Belgian accounting law, limited liability companies have an obligation to annually deposit

⁸ The role of secured creditors in the 1997 Reorganization Procedure is very important. Although they have no formal veto right against a reorganization plan, their approval is essential because secured creditors who do not approve the plan are not bound by its terms. This means that once the court protection period is over, these secured creditors can execute their claims in full, thus again jeopardizing the survival chances of the firm. Therefore, reorganization plans that are not supported by one or more of the major secured creditors are almost never confirmed by the court.

Table 1 Summary of hypotheses

Legal change	<i>Impact potentially most beneficial for</i>	
	Size	Industry
Formal reorganization procedure	Larger companies	Industries with low use of secured debt
Early warning system	Larger companies	–
Anti-domino measures (retention of title)	Smaller or larger companies	Industries with high use of inventories and trade credit

financial statements at the National Bank of Belgium (NBB). All of these companies are included in the NBB legal status database, which records the exact date of all start-ups, voluntary liquidations, mergers & acquisitions, bankruptcies, formal reorganizations, etc. On the basis of the information in the legal status database, for each quarter of the period 1986–2002, we calculate aggregate failure rates based on the number of companies that entered the liquidation type bankruptcy procedure in a specific quarter, and the total number of registered companies at the beginning of that quarter. It is important to note that our bankruptcy rate definition does not include reorganization procedure cases at the moment the latter procedure starts, as successful reorganizations either lead to survival as going concern or to a take over. Companies that fail to reorganize under the formal reorganization are typically transferred to the liquidation procedure and are included in our bankruptcy rate variables at that point in time.⁹ To

⁹ It should be noted that not including the formal reorganizations in the BR variables could influence our analysis if a substantial number of failing companies in the post-reform period would opt for such a procedure. However, few small businesses make this choice. According to the NBB database, only 382 small business reorganization procedures were initiated during our sample period (1998–2002), compared to 20,589 liquidation procedures. This means that the so-called ‘reorganization rat’ (i.e. the proportion of started reorganization procedures to the sum of all initiated procedures) equals only 1.82%. By comparison, for companies which Belgian accounting law classifies as ‘large’ (and which are not included in this study), 97 reorganization cases were opened during the same period, compared to 528 liquidation cases (i.e. a reorganization rate of 15.52%). Not surprisingly all results are robust for adjustment of the definition of the bankruptcy rate to include both liquidation and reorganization.

evaluate the impact of the bankruptcy reform on different classes of companies, we compute separate failure rates according to legal company type and industry classification.¹⁰

In terms of company size, Belgian accounting law only makes a distinction between two size classes of companies: 'large' and 'small'. Small companies have lower disclosure requirements (i.e. they can file 'abbreviated' financial statements, while large companies have to file highly detailed, 'complete' financial statements) and are subjected to less strict rules, for instance in terms of employee representation. Because our paper focuses on small businesses, we exclude all companies that file complete financial statements from the analysis (i.e. both from the nominator and from the denominator of the variables). This means that the companies we consider generally do not exceed the Belgian small/large distinction criteria: total assets of 3.125 million euros, operating revenue of 6.25 million euros, 50 full-time equivalent employees. Hence, on the basis of most internationally used criteria, all firms in our sample would be considered either small or micro sized. Because company level accounting data is not available for the earlier part of the sample period, we proxy for company size by distinguishing between the two dominant legal types of limited liability companies: partnerships (BVBA/SPRL) and stock corporations (NV/SA).¹¹ Partnerships are private companies with low capital requirements (minimum capital of 18,550 EUR, of which only 6,200 EUR needs to be available at formation) which are

managed by one or more officially appointed managers, usually partners. All shares are registered and have limited transferability.¹² Stock corporations have much higher capital requirements: a minimum of 61,500 EUR needs to be available at the date of incorporation. These firms are managed by a board of directors with at least three members. Shares can be registered or anonymous, and are freely transferable. In practice, micro firms are typically organized as a partnership; once the activities demand a larger amount of capital, firms tend to take the form of a stock corporation. Summary statistics for the different legal forms show that the proxy allows for a relatively good size break-up. Based on the latest version of the BelFirst database,¹³ the average total assets of a partnership equals 0.31 million euros, compared to 1.17 million for stock corporations. The average number of employees (excluding zero employee companies) is 8.22 for stock corporations and 3.32 for partnerships. By comparison, the 'large' companies excluded from this paper have average total assets of 52.1 million euros and 80.74 employees.¹⁴

As far as industry classification is concerned, following e.g. Harhoff et al. (1998), we apply a broad classification system which identifies four major industry groups: manufacturing, construction, trade (i.e. wholesale & retail) and business services (excluding financials). This ensures that the quarterly number of bankruptcies per industry group is large enough to avoid erratic movements in the bankruptcy rate.

Based on the literature discussed above, we select a number of macroeconomic variables that could be related to the corporate bankruptcy rate. A first group of variables are indicators of the state of the economy

¹⁰ The current version of the corporate event database available to us does not allow us to extend the sample period beyond 2002. However, as a robustness check, we have constructed alternative bankruptcy rate and birth rate series from statistics on stock corporations compiled by private data provider Graydon Belgium. Note that these series do not make a distinction between large and small companies, nor between different industries, but do allow extending the sample period up to 2006. Main results remain unchanged.

¹¹ Company level accounting data—including size information—is collected in the BelFirst accounting database, which contains highly detailed company level information but is not designed as a research database. One of the consequences of this fact is that records of companies that are no longer active (e.g. bankruptcies, mergers & acquisitions, voluntary liquidations, etc.) are completely deleted from the database after about 2 years (i.e. from the point of view of the database it looks as if they never existed). The missing data can be retrieved by using older versions of the database, but only back to the mid 1990s.

¹² To sell shares in a partnership, the authorization of at least half of the other partners (representing at least 75% of shares) is required.

¹³ Data for fiscal year 2004, based on financial statements of more than 81,000 stock corporations and 171,000 partnerships.

¹⁴ Using the 2 million euro total assets criterion recently set by the European Commission as an upper limit for micro companies, 68.4% of all micro companies would be partnerships and 81.1% of all small companies would be stock corporations. Applying a stricter cut-off value of 1 million euros in total assets as the boundary between small and micro business, implies that 72.0% of all micro companies would be partnerships and 74.3% of all small companies would be stock corporations.

as a whole: real GDP growth, the consumer confidence index (CCI), the NBB business cycle indicator and the OECD composite leading indicator for the euro zone countries. In addition, we include aggregate corporate birth rates, consumer price based inflation, and the return on the Belgian All Shares (BAS) stock index. The macroeconomic time-series data was collected from various official sources, including the IMF international financial statistics (consumer confidence index and GDP levels), Belgostat (inflation, NBB business cycle indicator and Belgian All Shares stock index) and the OECD (euro zone composite leading indicator). When relevant, the time series are seasonally adjusted using the Census X12 method. A concise overview of all variables and their definitions is given in Table 2.

3.2 Descriptive statistics and univariate tests

A first intuitive glance at the potential impact of the bankruptcy reform can be obtained by plotting the failure rates through time. Figure 1 shows the evolution of the seasonally-adjusted quarterly small and micro business bankruptcy rate during the 17 years of the sample period (1986–2002), split up into a pre-and post reform period. The pre-reform period (period I) is additionally split up into the early years of the sample (period I_a: 1986–1991) and the years just preceding the reform (period I_b: 1992–1997).¹⁵

Immediately after the new code came into effect (January 1st, 1998), the overall failure rate substantially decreased, creating a clear visual break in the time series' evolution and ending an upward trend in failure rates. Part of this instantaneous impact must be attributed to adaptation problems: rulings got delayed as bankruptcy courts struggled to implement the new framework (hence the subsequent increase in failure rates during the second quarter of 1998).

The summary statistics in Table 3 show that over the total sample period a cumulative number of 53,652 firms failed. The table also reports median and mean quarterly bankruptcy rates for the total sample of all small and micro limited liability companies, and for each legal form and industry group sepa-

Table 2 Definition of variables

Variable	Description
ΔBR	1-Year change in quarterly small and micro business bankruptcy rate ^a (%)
ΔGDP	1-Year growth in real GDP (%)
ΔCYCLE	1-Year change in national bank of Belgium's business cycle indicator (points)
ΔCCI	1-Year change in consumer confidence index (points)
ΔEUROZONE	1-Year change in OECD euro zone composite leading indicator (%)
ΔINFL	1-Year change in inflation (%; based on consumer price index)
ΔSTOCKS	1-Year return on Belgian all share stock index (%)
ΔBIRTHS	1-Year change in quarterly corporate birth rate ^b (%)

^a Bankruptcy rate = $\frac{\text{number of filings for liquidation type bankruptcy}}{\text{number of companies in existence at end of previous quarter}}$

^b Birth rate = $\frac{\text{number of company formations}}{\text{number of companies in existence at end of previous quarter}}$

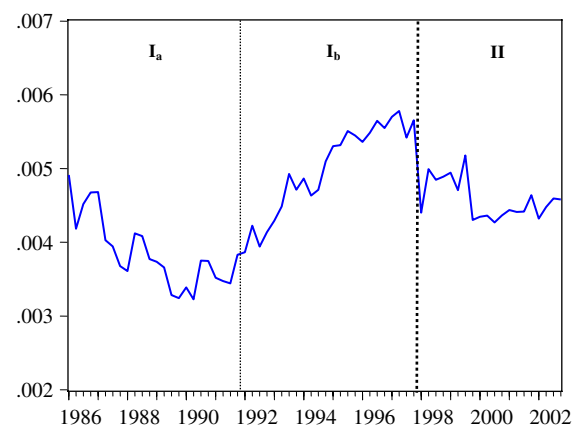


Fig. 1 Quarterly small and micro business bankruptcy rates. Notes: Aggregate quarterly bankruptcy rates for all small and micro limited liability companies; Seasonally-adjusted (Census X12—multiplicative); Period I (I_a: 1986Q1–1991Q4; I_b: 1992Q1–1997Q4): pre introduction of new bankruptcy code; Period II (1998Q1–2002Q4): post introduction of new bankruptcy code

ately. Notwithstanding the break in the time series at the time of the reform, median or mean failure rates are not lower in the 5 years post reform as compared to the preceding 12 years (period I versus period II; tests not reported in Table 3). However, bankruptcy rates do appear to be lower after the introduction of the code than during the years just before (period I_b

¹⁵ This split is only used to improve the informational content of the univariate statistics and plays no role in the time series analysis of Sect. 4.

Table 3 Summary statistics and univariate tests

	N of failing companies (cumulative; full period)	Median (<i>Mean</i>) quarterly bankruptcy rate					Equality tests	
		Full period	Period I 1986–1997	Period I _a 1986–1991	Period I _b 1992–1997	Period II 1998–2002	Across I _a , I _b and II	Between I _b and II
<i>Bankruptcy rates (BR)</i>								
All companies	53,652	0.4428%	0.4260%	0.3750%	0.5200%	0.4459%	33.907***	2.510**
		0.4472%	0.4429%	0.3855%	0.5003%	0.4575%	35.545***	2.953***
<i>BR by legal form</i>								
Stock corporations	17,747	0.3568%	0.3585%	0.2903%	0.4442%	0.3531%	44.806***	4.372***
		0.3630%	0.3642%	0.2928%	0.4355%	0.3602%	58.631***	5.828***
Partnerships	35,905	0.5058%	0.4653%	0.4216%	0.5675%	0.5223%	35.423***	1.497
		0.4995%	0.4887%	0.4284%	0.5490%	0.5255%	35.525***	1.379
<i>BR by industry group</i>								
Manufacturing	4,369	0.4395%	0.3313%	0.2444%	0.5082%	0.4727%	44.185***	1.355
		0.4019%	0.3714%	0.2510%	0.4918%	0.4751%	83.423***	0.739
Construction	5,796	0.4938%	0.4435%	0.3773%	0.5616%	0.5314%	33.976***	1.214
		0.4881%	0.4697%	0.3756%	0.5638%	0.5322%	31.629***	1.141
Trade	16,610	0.4402%	0.3315%	0.2624%	0.5195%	0.5349%	41.038***	0.577
		0.4298%	0.3866%	0.2809%	0.4923%	0.5336%	65.731***	1.460
Services	6,077	0.2132%	0.1717%	0.1407%	0.2239%	0.2611%	27.205***	1.756*
		0.2012%	0.1804%	0.1505%	0.2103%	0.2510%	24.865***	2.795***
<i>Macroeconomic variables</i>								
ΔGDP		2.3555%	2.4451%	3.4503%	2.3064%	1.8506%	8.057**	0.123
		2.4447%	2.6822%	3.4549%	1.9095%	1.8747%	5.120***	0.058
CYCLE		−7.3500	−8.9967	−5.4000	−9.9167	−4.6000	9.566***	2.675***
		−7.0093	−8.0659	−4.6514	−11.4806	−4.4733	8.005***	3.193***
CCI		−5.6667	−10.0000	−5.6667	−13.1667	1.5000	35.396***	5.303***
		−6.0392	−9.8611	−5.9583	−13.7689	3.1333	35.823***	8.127***
ΔEUROZONE		2.5710%	2.5940%	3.2489%	0.7341%	1.8997%	0.298	0.224
		1.8537%	1.8634%	2.2494%	1.4783%	1.8291%	0.274	0.278
INFL		2.0002%	2.2291%	2.5337%	2.1239%	1.6238%	3.530	1.567
		2.0602%	2.1767%	2.2599%	2.0936%	1.7801%	1.813	1.503
ΔSTOCKS		2.9516%	11.0930%	9.9998%	13.0175%	−3.6000%	5.950*	2.416**
		9.7689%	12.8920%	13.2308%	12.5532%	2.2273%	2.082	1.918*
BIRTHS _{All}		2.0455%	2.7582%	2.8171%	1.9717%	1.5342%	47.641***	5.102***
		2.2264%	2.5563%	2.8712%	2.2414%	1.5637%	85.104***	5.544***

Notes: Quarterly time series data from 1986Q1 to 2002Q4; Variables as defined in Table 2; Macroeconomic variables are only given in differenced format if this improves information content; Reported summary statistics are medians (*means in italics*); Tests for equality of medians across three sub-periods (I_a: 1986Q1–1991Q4, I_b: 1992Q1–1997Q4, II: 1998Q1–2002Q4): Kruskal-Wallis test statistics (χ^2 distributed); Tests for equality of medians between sub-periods I_b and II (I_b: 1992Q1–1997Q4, II: 1998Q1–2002Q4): Wilcoxon–Mann–Whitney *T*-statistics; Tests for equality of means across three sub-periods (I_a: 1986Q1–1991Q4, I_b: 1992Q1–1997Q4, II: 1998Q1–2002Q4): Anova *F*-statistics; Tests for equality of means between sub-periods I_b and II (I_b: 1992Q1–1997Q4, II: 1998Q1–2002Q4): *t*-test statistics

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

versus period II). This is confirmed by the equality tests in the right-hand columns of the table: Kruskal-Wallis tests show that all median bankruptcy rates are

significantly different across sub-periods I_a, I_b and II (*F*-test for means), while Wilcoxon tests show that the median bankruptcy rates are lower in the

post-reform period II as compared to period I_b (*t*-test for means) although this is only strongly significant for the total sample bankruptcy rate and for stock corporations. Table 3 also reports differences in median and mean failure rates across legal forms and industry groups. As compared to partnerships, failure rates are systematically lower for stock corporations. This is not surprising, in view of the differences in size, capitalization and governance requirements mentioned in the previous Section. Failure rates vary across industry groups as well. These differences are less stable over time, although, in general, construction has the highest failure rates and services the lowest.

Finally, the data on macro variables indicate that economic conditions also significantly varied over time.¹⁶ As these conditions may have an important impact on failure rates, this stresses the need to control for the former to get a clear picture of the reform's effect.

3.3 Methodology

In accordance with the standard methodology in the aggregate failure rate literature from Altman (1983) onwards, we assume that the corporate bankruptcy rate (BR) is a function of a number of macroeconomic variables, which can be expressed as a finite distributed lag (FDL) model:

$$BR_t = \alpha + \sum_{i=0}^k \beta_{1,t-i} X_{1,t-i} + \sum_{i=0}^k \beta_{2,t-i} X_{2,t-i} + \dots + \varepsilon_t \quad (1)$$

where k = maximum lag length; X = macroeconomic variable; ε = error term.

The direct estimation of such a model could involve multicollinearity problems between different lagged variables and is costly in terms of degrees of freedom. Both issues can be addressed by an Almon polynomial distributed lag (PDL) specification. It can

be shown that any β_i in Eq. 1 can be approximated by a polynomial of order m :

$$\beta_i = b_0 + b_1 i + b_2 i^2 + \dots + b_m i^m \quad (2)$$

Substituting Eq. 2 into Eq. 1 leads to:

$$BR_t = \alpha + \sum_{j=1}^l b_{j,0t} Z_{j,0t} + \sum_{j=1}^l b_{j,1t} Z_{j,1t} + \dots + \sum_{j=1}^l b_{j,mt} Z_{j,mt} + \varepsilon_t \quad (3)$$

where l = number of macroeconomic variables

$$Z_{j,0t} = \sum_{i=0}^k X_{j,t-i}$$

$$Z_{j,1t} = \sum_{i=0}^k i X_{j,t-i}$$

$$Z_{j,mt} = \sum_{i=0}^k i^m X_{j,t-i}$$

OLS will lead to best linear unbiased estimators in Eq. 3 as long as ε fulfils the standard least squares assumptions (Gujarati 1995). Individual β coefficients from Eq. 1 can then be calculated from the polynomials. The sum of these $\hat{\beta}$ s reflects the long run relationship between the macroeconomic variable and the bankruptcy rate. As most macroeconomic variables are integrated of order one (unit root), Eq. 3 is estimated in differences.¹⁷ Following common practice of measuring growth in macroeconomic indicators, all variables are expressed as 1 year changes. This should also help in eliminating any remaining seasonality issues.

4 Tests and results

Because macroeconomic variables are highly correlated through time,¹⁸ we first estimate distributed lag models that contain only one such variable. Next we

¹⁶ Note that, for brevity, only the overall birth rate is reported in Table 3. The birth rates for the different legal forms and industry groups show a similar downward trend. Part of this negative trend is due to the definition of the corporate birth rate as the number of new companies divided by the number of existing companies (which steadily increases through time). As all models are estimated in differences, this does not affect regression results.

¹⁷ Augmented Dickey-Fuller test results for all variables available upon request. An alternative estimation method would be the use of cointegration analysis and vector error correction models (cf. Liu and Wilson 2002). However, the relatively limited length of the time series could result in robustness issues.

¹⁸ Cross-correlograms available upon request.

Table 4 Relationships between bankruptcy rates and macroeconomic variables

Macroeconomic variable	No regime change			Regime change in 1998Q1		
	Σ lag coefficients	Adj. R^2	Chow test	Σ lag coefficients	CODE	Adj. R^2
Δ GDP	-1.3209** (2.468)	0.1126	7.216***	-1.6280*** (3.627)	-0.0463*** (3.831)	0.3169
Δ CYCLE	-0.0056*** (3.946)	0.1578	3.464***	-0.0050*** (3.303)	-0.0359*** (2.699)	0.2747
Δ CCI	-0.0051*** (4.880)	0.3279	1.423	-0.0044*** (3.570)	-0.0239** (2.011)	0.3705
Δ EUROZONE	-1.1652*** (4.172)	0.1590	3.272***	-0.9928*** (3.202)	-0.0318** (2.172)	0.2468
Δ INFL	-2.0883* (1.789)	0.1167	4.489***	-1.6911 (1.292)	-0.0405** (2.609)	0.2672
Δ STOCKS	-0.1862*** (3.291)	0.1733	3.949***	-0.1786*** (3.707)	-0.0355*** (2.812)	0.2808
Δ BIRTHS _{All}	-0.0927*** (2.841)	0.1239	3.896***	-0.0800** (2.122)	-0.0339** (2.015)	0.2278

Notes: Polynomial distributed lag (PDL) models; Variables as defined in Table 2; dependent variable: year-on-year change in quarterly total small and micro business bankruptcy rates; only cumulative lag coefficients reported; t -statistics based on Newey-West HAC standard errors in parentheses; Chow Breakpoint Test statistics for break in 1998Q1; left-hand panel: models without break adjustment; right-hand panel: models including jump dummy to control for code change (CODE)

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

build models containing multiple macroeconomic proxies to improve model fit while limiting correlation as much as possible.

4.1 Models with a single macroeconomic variable

The results of polynomial distributed lag (PDL) models that express the relationship between a single macroeconomic variable and total small and micro business bankruptcy rates are reported in Table 4. The optimal lag length and the order of the polynomials were chosen on the basis of the Schwartz information criterion.¹⁹ To limit the size of the tables, we only report the sum of the lag terms' coefficients, which are indicators of the long run relationship.²⁰

The left hand panel of Table 4 reports models that do not take into account the possibility of a regime change. The results confirm that changes in macroeconomic variables are significantly linked to changes in small and micro business bankruptcy rates. Based on Newey-West HAC standard errors, the sum of the lag term coefficients proves to be significant for all seven models.²¹ The long run

relationship between all proxies and failure rates is negative. For stock market returns and the general state of the economy proxies—real GDP (Δ GDP), the NBB business cycle indicator (Δ CYCLE), consumer confidence index (Δ CCI) and the euro zone composite leading indicator (Δ EUROZONE)—this is in line with expectations. The negative relationship with inflation (Δ INFL) is consistent with e.g., Altman (1983) who argues that inflation helps companies survive by reducing competitiveness, and by passing higher input prices through to consumers.²² The negative sign for changes in the corporate birth rate (Δ BIRTHS) suggests that the positive multiplier effects of corporate births, discussed in Johnson and Parker (1994) (i.e. new company formations increase overall business activity and create opportunities) outweigh the negative ones (i.e. many companies fail during the first few years after start-up). Model fit, in terms of the adjusted R^2 , is lowest for the GDP

¹⁹ In general, a lag length of 8 periods and polynomials of order 3 result in the best fit.

²⁰ Individual lag results are available upon request.

²¹ Note that the fact that the sum of lag term coefficients is significant does not necessarily mean that all coefficients for individual lags are significant. Vice versa, individual lag terms can be significant even if the sum of lag terms is not.

²² As a robustness check, we also consider several interest rates: the average rate on long term (>4 years) corporate investment loans at the Société Nationale de Crédit à l'Industrie, the yield on long term government bonds (>8 years), the interest rate on 3 month treasury certificates and the real interest rate on 3 month treasury certificates. We find that the link between these interest rates and the total small and micro business bankruptcy rates is quite weak compared to the other macroeconomic series used in Table 4. Only the long run relationship with the nominal 3 month treasury yield is significant at the 10% level, although this appears to be largely due to its inflation component. The Chow breakpoint tests all indicate a structural break in the first quarter of 1998 and the CODE dummy is highly significant for all four models.

growth model (Δ GDP), and highest for the consumer confidence index model (Δ CCI). Next, Chow breakpoint tests to assess a possible structural break in the first quarter of 1998—when the new code came into effect—were run for each model. The Chow test statistics are highly significant for six out of seven models (null hypothesis is no structural break). Therefore, we add a jump dummy variable (CODE) which has a value of 1 after the new legislation came into effect. Results of the break-adjusted models are reported in the right-hand panel of Table 4.

The CODE dummy is significant for all models, and substantially increases model fit. Also note that the inclusion of the CODE dummy does not significantly change the lag coefficients' sums, which indicates that the basic relationships between the macroeconomic variables and bankruptcy rates are not very different before and after the reform.²³ Preceding findings thus imply that bankruptcy rates in the post reform period are lower than one would expect, given the macroeconomic conditions.²⁴

4.2 Models with multiple macroeconomic variables

Multicollinearity is an important issue in the construction of a model with multiple proxies for the state of the economy. We therefore estimate a model containing only one general macroeconomic indicator (the consumer confidence index, as Table 4 shows it leads to the best fit), supplemented by the corporate

birth rate, inflation and the jump dummy for the change of bankruptcy code. However, as a robustness check, models optimizing fit regardless of correlation have been estimated as well.²⁵ Findings are consistent with those reported. Because several of the macroeconomic variables of this study could also be used to model corporate births (see e.g. Hudson 1997), it can be argued that BIRTHS may not be completely exogenous in models with multiple macroeconomic series. To control for potential endogeneity issues w.r.t. BIRTHS, all models in the remainder of the paper are estimated with a two stage least squares (2SLS) estimation method with BIRTHS as endogenous variable and all other available variables as instruments.

The first set of findings is shown in Table 5. Column A reports the results if our model is used to explain overall small and micro business bankruptcy rates, while column B and C contain the findings for stock corporations and partnerships respectively. Column A confirms the results of Table 4: bankruptcy rates decline as consumer confidence (Δ CCI), inflation (Δ INFL) and corporate births (Δ BIRTHS) increase, while the CODE dummy remains highly significant with a negative sign. Columns B and C show a negative and highly significant CODE dummy too. The coefficients indicate a slightly stronger beneficial impact for stock corporations as compared to partnerships, but the difference is not statistically significant.²⁶

The adjusted R^2 s indicate that the aggregate bankruptcy rate of stock corporations can be better explained by macroeconomic conditions than those of partnerships, which is likely due to a greater importance of company specific failure causes in micro sized companies (e.g. lack of management expertise). It is also interesting to note that the failure rates of the two legal types react differently to macro conditions. Specifically, a rise in the stock corporation birth rate (Δ BIRTHS_{Stock Corporation}) leads to a lower bankruptcy rate of these firms, while this relationship is not significant for partnerships

²³ This partial structural break specification (i.e. allowing for a change in the intercept and assuming the other coefficients remained stable after the break) is the approach usually followed in the literature (see for instance Vlieghe 2001; Liu and Wilson 2002 or Liu 2004). The alternative is a pure structural break model, which has the advantage that it allows for all coefficients to change, but has the drawback of being very costly in terms of degrees of freedom. As a robustness check, we estimated pure structural break specifications for all models in the right-hand side of Table 4. Only the model for INFL shows a highly significant difference in PDL coefficients before and after the break. This is likely to be the explanation for the lack of significance of the sum of the lagged coefficients for Δ INFL in Table 4. More importantly, the CODE dummy remains significant in 6 out of 7 models.

²⁴ To give an idea of the impact in real terms, the median coefficient for the CODE dummy of -0.0355 corresponds to a decrease in the number of bankruptcies with 86.8 per quarter in the post reform period (i.e. an average reduction of 8.4% in the number of liquidation type bankruptcies).

²⁵ Available upon request.

²⁶ The same picture arises when univariate models (similar to those in Table 4) are estimated for each legal type separately (not reported). The Chow breakpoint tests point to a structural break in all stock corporation models and six out of seven partnership models. Moreover, the CODE dummy's coefficients systematically indicate a slightly stronger impact for stock corporations. The differences with the corresponding partnership models are not statistically significant though.

Table 5 Bankruptcy rates and macroeconomic variables: by legal form

Variable	All companies A	Stock corporations B	Partnerships C
ΔCCI	−0.0032*** (2.654)	−0.0030*** (3.663)	−0.0035* (1.795)
$\Delta INFL$	−2.6678** (2.219)	1.0436 (0.612)	−3.4400*** (3.106)
$\Delta BIRTHS_{All}$	−0.0403 (1.184)	—	—
$\Delta BIRTHS_{Stock\ Corporations}$	—	−0.0366** (2.274)	—
$\Delta BIRTHS_{Partnerships}$	—	—	−0.0356 (0.631)
CODE	−0.0252*** (2.763)	−0.0370*** (3.819)	−0.0274** (2.453)
Intercept	0.0129** (2.097)	0.0088 (0.957)	0.0212*** (3.485)
Adj. R^2	0.4927	0.5765	0.3577

Notes: Polynomial distributed lag (PDL) models; Two Stage Least Squares (2SLS) estimation with $\Delta BIRTHS$ as endogenous variable and all other variables as instruments; variables as defined in Table 2; dependent variables: year-on-year change in quarterly small and micro business bankruptcy rates; only cumulative lag coefficients reported; *t*-statistics based on Newey-West HAC standard errors in parentheses

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

($\Delta BIRTHS_{Partnerships}$).²⁷ Consistent with the discussion above, a potential explanation may be found in the fact that the two types of legal forms attract different kinds of start-ups. Because of the higher entry requirements, availability of good business opportunities is likely to be relatively more important for the birth of stock corporations. Hence, in line with the multiplier reasoning in Johnson and Parker (1994), a high birth rate is associated with a lower failure rate for these types of firms. By contrast, because of the low capital requirements and the weak governance demands, failures shortly after company formation more than offset the beneficial effect of good business opportunities in the case of partnerships. Furthermore, changes in inflation ($\Delta INFL$), are only significantly negative for partnerships, which could indicate—consistent with preceding discussion—that the extra breathing room provided by rising inflation is relatively more important for micro companies. Finally, the impact of general economic conditions (ΔCCI) is comparable for both types of firms. In sum, and most importantly, the data show that both legal types benefit from the 1997 reform, and that, although small firms (i.e. stock corporations) may benefit more than micro companies

(i.e. partnerships), the difference is not statistically significant.

Table 6 shows the results when we the model the bankruptcy rates of the four main industry groups separately: manufacturing, construction, trade and services (columns D, E, F and G respectively).²⁸ Analogous to Table 5 the BIRTHS variables are industry specific, e.g., BIRTHS in the manufacturing model only captures the creation of manufacturing companies. BIRTHS can therefore also be interpreted as a general proxy for the economic conditions within the industry: the company birth rate is likely to be higher in industries where profits and future prospects are good. We find that the bankruptcy rate of all industries dwindles with improving consumer confidence (ΔCCI), but the impact is only significant for manufacturing and trade. A similar result holds for the birth rate ($\Delta BIRTHS$), but here the sum of the lag coefficients has only statistical importance for firms in the services industry group (G). More importantly however, the coefficients for the CODE dummy are only significantly negative in the manufacturing and trade industry models (D and F). For services, the CODE dummy is even positive, although insignificant. Hence, the evidence suggests that the beneficial impact on failure rates brought about by the 1997

²⁷ Models using only one lag structure (not reported) show that the sum of lag coefficients for corporate birth rates would even be significantly positive in the case of partnerships. For both legal forms, the short term lags (up to three or four quarters) are negative and the longer term lags are positive, but their relative importance differs.

²⁸ As for panel A of Table 5, models that optimize fit were estimated as well. This also allows for the fact that a macroeconomic series may better explain the bankruptcy rates for one industry than for others. Results for the CODE dummies are consistent with those reported here.

Table 6 Bankruptcy rates and macroeconomic variables: by industry

Variable	Manufacturing D	Construction E	Trade F	Services G
ΔCCI	−0.0038*** (3.463)	−0.0024 (0.878)	−0.0028* (1.662)	−0.0025** (2.385)
$\Delta INFL$	−0.2081 (0.062)	3.5017 (1.442)	−3.5724 (1.533)	1.1529 (1.097)
$\Delta BIRTHS_{\text{Manufacturing}}$	−0.0125 (0.099)	—	—	—
$\Delta BIRTHS_{\text{Construction}}$	—	−0.1390 (1.480)	—	—
$\Delta BIRTHS_{\text{Trade}}$	—	—	−0.1435 (1.536)	—
$\Delta BIRTHS_{\text{Services}}$	—	—	—	−0.0824*** (3.675)
CODE	−0.0581*** (3.239)	−0.0312 (1.072)	−0.0559*** (3.043)	0.0190 (1.407)
Intercept	0.0402** (2.385)	0.0104 (0.712)	0.0238* (1.792)	−0.0176 (1.459)
Adj. R^2	0.2034	0.0827	0.3641	0.3216

Notes: Polynomial distributed lag (PDL) models; Two Stage Least Squares (2SLS) estimation with $\Delta BIRTHS$ as endogenous variable and all other variables as instruments; variables as defined in Table 2; dependent variables: year-on-year change in quarterly small and micro business bankruptcy rates; only cumulative lag coefficients reported; t -statistics based on Newey-West HAC standard errors in parentheses

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

reform is completely attributable to its effect on only two of the four main industry groups. Taken together with our analysis in Sect. 2, these findings support the notion that especially the measures aimed at reducing domino effects are likely to be the major drivers of the reform's impact: firms in manufacturing and trade should be most capable of extracting significant benefits in terms of risk and credit constraint reduction, given their important use of trade credit to finance inventories and the fact that retention of title can easily be applied to their types of products. In fact, the preceding evidence does not support the idea of a beneficial impact of the formal reorganization procedure, as this would predict the opposite relationship: trade and manufacturing companies have a relatively high use of secured debt and should benefit the least. These results also shed light on the forces behind the beneficial impact of the reform on bankruptcy rates of small and micro firms documented above. Specifically, preceding findings and arguments suggest that the significance of the CODE dummy in the models of Table 5 is entirely driven by small and micro firms in manufacturing and trade. Table 7 offers direct evidence on this issue, as it splits up bankruptcy rates for each industry further according to the two legal forms.²⁹

Table 7 shows that indeed the CODE dummies are only significant (and negative) for small and micro companies in manufacturing and trade. For stock corporations the impact is stronger, although the difference relative to partnerships is not significant. In other industries the reform did not have any effect, for neither legal form. Overall the results are consistent with those in Tables 5 and 6. Again the adjusted R^2 show that bankruptcy rates of partnerships are harder to explain using macroeconomic variables. Improving consumer confidence (ΔCCI) reduces bankruptcy rates, but its impact tends to be stronger for stock corporations. Conversely, partnerships in the trade industry tend to benefit most from inflation ($\Delta INFL$). In sum, all empirical results are consistent with the hypothesis that the measures taken to stop domino effects likely are the main drivers of the decrease in bankruptcy rates, as only firms in manufacturing and trade benefit significantly. They also indicate that although firm specific elements are more important in explaining bankruptcy for partnerships, both small and micro companies in the former industries benefit from the reform.

4.3 Robustness checks

Next to the robustness issues discussed in the text and in notes 9 (definition of bankruptcy rates), 10 (sample period), 22 (controlling for interest rates), 23 (partial versus pure structural break models) and 28 (fit

²⁹ This split also corrects for possible problems in comparability of findings between stock corporations and partnerships due to differences in industry composition of these two firm types.

Table 7 Bankruptcy rates and macroeconomic variables: by legal form and industry

Variable	Manufacturing		Construction		Trade		Services	
	Stock corporations	Partnerships	Stock corporations	Partnerships	Stock corporations	Partnerships	Stock corporations	Partnerships
ΔCCI	−0.0001 (0.052)	0.0006 (0.227)	−0.0145* (1.754)	−0.0010 (0.336)	−0.0040** (2.452)	−0.0027 (1.296)	−0.0035*** (3.702)	−0.0013 (0.724)
ΔINFL	3.8553 (1.075)	−5.1355 (1.138)	3.2473 (0.537)	2.8937 (1.288)	1.3501 (0.440)	−6.0941** (2.293)	−0.3398 (0.233)	−0.1626 (0.089)
ΔBIRTHS _{Manufacturing}	−0.3395** (2.418)	0.0743 (0.385)	−	−	−	−	−	−
ΔBIRTHS _{Construction}	−	−	−0.0104 (0.048)	−0.1674* (1.946)	−	−	−	−
ΔBIRTHS _{Trade}	−	−	−	−	−0.1854* (1.667)	−0.1190 (0.960)	−	−
ΔBIRTHS _{Services}	−	−	−	−	−	−	−0.0377* (1.796)	−0.1030*** (3.559)
CODE	−0.0896*** (3.303)	−0.0603*** (2.793)	−0.0481 (0.929)	−0.0193 (0.826)	−0.0752*** (3.348)	−0.0434** (2.302)	0.0172 (0.676)	0.0060 (0.273)
Intercept	0.0069 (0.264)	0.0475*** (2.793)	0.0451 (1.343)	−0.0006 (0.047)	0.0239* (1.706)	0.0257 (1.561)	−0.0069 (0.676)	−0.0181 (1.141)
Adj. R ²	0.4366	0.2134	0.1024	0.0445	0.4062	0.2954	0.3627	0.0887

Notes: Polynomial distributed lag (PDL) models; Two Stage Least Squares (2SLS) estimation with ΔBIRTHS as endogenous variable and all other variables as instruments; variables as defined in Table 2; dependent variables: year-on-year change in quarterly small and micro business bankruptcy rates; only cumulative lag coefficients reported; *t*-statistics based on Newey-West HAC standard errors in parentheses

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

optimizing models), we ran several additional tests to evaluate the robustness of our findings. To limit the number of tables, results of these checks are not reported, but are available upon request.

First, we control for the fact that our results may be influenced by the sharp decrease of bankruptcy rates during the first quarter in the post-reform period, by including a pulse dummy with a value of 1 in 1998Q1 in our models. In most model specifications this pulse dummy is significantly negative, but adding it never affects the findings for the jump dummy CODE. No important changes in the coefficients of the control variables occur either.

Furthermore, to ensure that the differences in results across industry groups are not due to differences in relationships between our macroeconomic variables and the industry specific bankruptcy rates, we explore the use of several industry specific control variables. We first replace the economy wide business cycle indicator by the National Bank of Belgium industry specific indicator (which is available for the entire sample period, but only for the manufacturing, construction and trade industry groups). Next, we include separately the aggregate industry leverage ratio—defined as aggregate financial debt/aggregate total assets—and the aggregate industry interest coverage ratio—defined as aggregate operating income/aggregate financial expenses (aggregate financial statement data is only available for the manufacturing, trade and services industry groups, and then only from 1988 onwards).³⁰ In all of these models, findings remain similar while the CODE dummy continues to be only significantly negative for the manufacturing and trade industries.

5 Conclusions

Belgium reformed its bankruptcy legislation in 1997, adopting several international best practice recommendations. The data show that this reform has significantly reduced aggregate small and micro

³⁰ To transform the annual aggregate financial statement data into quarterly series we assume that the values change in a linear way throughout the year (for instance, the value for 2000Q2 is the average of the values of 1999Q4 and 2000Q4, the value for 2000Q1 is the average of 1999Q4 and 2000Q2, etc.). Alternatively, the same value could be used four times in a row. The latter approach leads to similar results.

business failure rates. However, after controlling for macroeconomic factors such as real GDP growth, consumer confidence, stock market returns, corporate birth rates, inflation, etc., we find that the favorable effect of the reform is not equally important for all types of companies. Specifically, we find that only firms in manufacturing and trade have benefited from it. It goes without saying that the total effect of any reform is the sum of many different factors that all contribute to some degree to the reform's impact. However, given (a) the fact that only the anti-domino measures are expected to be especially helpful for the industry groups that we find have benefited the most and (b) the very low usage of the formal reorganization procedure, it seems likely that only the measures aimed at limiting domino bankruptcy effects, such as the acknowledgement of retention of title for goods that have been delivered but not yet paid, have triggered a significant reduction in bankruptcy rates. Because of the important need for trade credit to finance inventories, their often substantial portfolio of accounts receivables, and the fact that retention of title can easily be applied to their type of products, firms in manufacturing and trade obtained opportunities to limit risks and alleviate credit constraints. In those industries both small and micro sized firms benefited from the reform. Although the impact on small firms (stock corporations) may have been somewhat stronger, the difference is not statistically significant. We find no evidence suggesting that the other two main measures of the reform, i.e., the creation of a formal reorganization procedure and an early warning system of financial distress, have meaningfully contributed to a reduction in bankruptcy rates of small and micro firms.

Our findings have several policy implications. First, the limited success and impact of the formal reorganization procedure suggests that the introduction of low cost, low formality alternatives (comparable to a 'pre-packaged' US Chapter 11) may be more suitable for small and micro firms,³¹ although the question could be raised whether or not formal reorganization bankruptcy is useful at all in a bank dominated, small business dominated economy (cf. Berkovitch and Israel 1999; Hege 2003). Second, the evaluation of the success or failure of a complex

legislative change requires sufficient detail. Analyses solely based on total failure rates without considering differences across types of companies and reform components may result in incomplete and even misleading findings. Third, legislators should clearly and precisely communicate their expectations regarding a reform's impact to all economic agents without raising expectations to an unwarranted level. Even though the empirical evidence shows that bankruptcy rates have declined significantly, the 1997 reform is often regarded as a failure in the financial press. The reform was originally presented as a global solution in which reorganization type bankruptcy would become the rule and liquidation type bankruptcy would be reduced to a method of last resort. In view of the paramount importance of small and micro firms in the Belgian economy, as well as other countries' experiences in this area, this was never a realistic scenario. As a result, the reform has been extensively criticized and has also suffered from an important loss of confidence in its effectiveness, which in turn—as shown by experiences abroad—may trigger a further decline in its effectiveness in practice. Finally, our empirical findings and preceding discussion imply that the design, the goals and the communication of any future amendments to the code should pay foremost attention to the possibly varying implications for different classes of companies.

Acknowledgments We would like to thank the National Bank of Belgium for database access and Dirk Heremans, Frederiek Schoubben, Linda Van de Gucht, Marc Deloof, Marco Becht, two anonymous reviewers and the editor (Marco Vivarelli) for useful comments and suggestions.

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³¹ A recommendation to this effect was recently made by a task force of the employer's organization VBO.

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