

On the Sustainability and Transparency of Supplier Payments: How Name-and-Shame Shortens Payment Periods in the Supply Chain

Btissam MONCEF

bmoncef@iscparis.com

Andrew ZYLSTRA

azylstra@iscparis.com

Summary

In many supply chains, suppliers suffer from longer payment periods due to increased risks of bankruptcy, job cuts and reduced innovation. Policy makers are concerned by long payment periods because supplier problems may lead to higher unemployment, increased welfare payments, lower innovation in the country and lower collection of taxes. This article studies whether policy makers can influence one key payment term, payment periods, using the name-and-shame policy. Our panel data analysis suggests that name-and-shame can incite firms to reduce payment periods. This study contributes to the debate about the sustainability and transparency of payment practices and the tools that policy makers can employ to reduce payment periods.

Key words: supply chain management, sustainability, transparency, trade credit, name-and-shame

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1. Introduction

"There is only one thing that allows us to move forward, and that is transparency. If we consider that everything can be settled behind closed curtains, where the strongest dominate the weakest, this period is over."

"The (lengthy) payment periods mean that today, in our country, it is the SMEs that are the leading banks of large groups. This explains why, all too often, business failures occur when economic fundamentals are sound. [...] There is a balance of power that is not balanced."

Emmanuel Macron's speech on payment periods, 7 October 2015

These statements indicate that payment periods were a major concern of policy makers about firm bankruptcy risk resulting from overly long payment periods, prompting the Minister of Finance, Emmanuel Macron, to heighten enforcement of regulations concerning payment terms using soft instruments available to policy makers. For this purpose, a name-and-shame policy was launched one month later in November 2015 to encourage firms to pay suppliers faster and thus make supply chains more sustainable.

In Europe and the USA, 80% of firms provide trade credit financing at the time of sale (Wilson and Summers 2002; Tirole, 2006). In contrast to the name and shame policy intended to reduce payment periods, the accounting literature suggests lengthy payment periods indicate good management of a firm's cash flow (Wu et al., 2019). Credit analysts consider that paying longer reflects astute handling of a firm's suppliers. Some financial textbooks argue that buyers should encourage suppliers to offer the most generous credit terms they can, including long payment periods (Li et al., 2019). In gaining longer payment periods, buyers lower their own capital allocation and transfer the cost of capital to suppliers while reducing capital allocations from their balance sheets (Seifert et al., 2013; Wu et al., 2019). Deferred payment is a popular form of trade practice in supply chains (Chen et al., 2019) between buyers and suppliers and is referred to as trade credit. For our purposes, we define trade credit as the allowed delay in payment for the purchase of products and is considered as near-term and interest-free financing for supply chains with limited funding (Shi and Zhang, 2014; Zhan et al., 2019). Trade credit and the risk it carries for enterprises has mainly been investigated in finance, accounting, and marketing, but it has received comparatively little attention in operations (Siefert et al., 2013). This lack of attention is even more noteworthy when we consider that financial flows are at the heart of operations management and more particularly the literature exploring the interface of operations and finance (Nigro et al., 2021). The aim of this research is to contribute to filling this gap.

The issue of payment periods may be construed as purely a contractual matter between two parties if it were not for two supply chain sustainability issues (Cowton and San-Jose, 2017; Kouvelis and Zhao, 2018; Huang, 2021). First, the extension of payment periods may end up decreasing supplier liquidity, increasing supplier exposure to external financial shocks (Wuttke et al., 2013). In this vein, a study of Boissay and Gropp (2007) suggests that firms with limited capital transfer more than a fourth of liquidity shocks to their suppliers. The suppliers' financial situation is in turn weakened and increases not only their risk of bankruptcy but also increases the probability they will take steps to address this heightened bankruptcy risk by taking pre-emptive actions such as cutting staff and paying their own suppliers later. The increased risk

may even negatively affect borrowing costs. This heightened exposure of suppliers can have several financial knock-on effects for their own suppliers and for other stakeholders (Cowton and San-Jose, 2017), such as employees (job losses and wage cuts), local and national governments (unemployment payments, unpaid taxes, social costs, etc), equity investors (loss of capital and capital gains) and clients (loss of product warranties).

The second supply chain sustainability issue is the nature of the relations between the supplier and the buyer. When the relationship is not one of equals, but rather the buyer has more power than the supplier, which is usually the case, then the issue of sustainable practices becomes important (Schleper et al., 2017). When negotiating a contract, suppliers are more likely to win a contract over competitors and maintain existing buyer-supplier relationships if they offer longer payment periods (Wilner, 2000). The advantage for buyers is that their suppliers indirectly grant them interest-free loans. These outcomes result in part from the unequal power in buyer-supplier relationships.

Payment periods are a recurring issue for researchers in operations and for policy makers (Cowton and San-Jose, 2017; Schleper et al., 2017; Huang, 2019; Jiang et al., 2022). To illustrate the amounts involved, delayed payments between suppliers and buyers, called trade credit, accounts for 13% of total liabilities for U.S. manufacturing companies (Cao et al., 2018). Considering the importance of SMEs to the national economy and employment especially, many countries regulate firm financing mechanisms (Jiang et al. 2022). Governments have long sought to enforce sustainable behavior in supply chains via regulations (Chen et al., 2019) to reduce payment terms using several initiatives for decades (Cowton and San-Jose, 2017). For example, already in the 1970s the UK government required firms to report the number of days taken to pay suppliers in their annual reports. In 2011, the EU issued directive 2011/7/EU, which aimed to shorten payment periods between buyers and suppliers and to increase penalties for slow payers. More recently, European authorities launched proceedings against Italy in 2014 because of non-compliance with the European directive on late payments, which calls for payment delays of a maximum of 60 days (Cowton and San-José, 2017).

In addition to regulatory tools, governments have a variety of soft instruments (Brodzka et al., 2012) at their disposal to incite purchasing firms to adopt shorter payment periods. Name-and-shame is one soft policy instrument that governments can adopt to incite companies to reduce their payment periods. The intention of a name-and-shame strategy is to use the threat of public exposure to dissuade shameful actions (McKelvey and Grady 2008; Gustin, 2019). Name-and-shame has been used on many occasions to prompt companies to undertake actions that they would otherwise not want to do. For example, the US Security Exchange Commission and Environment Protection Agencies both post the names of guilty offenders on their web sites.

In the normal chain of events concerning relations between buyers and suppliers, the buyer places an order for goods and in due course the supplier delivers the ordered products. At this time, payment is due from the buyer to the supplier. This payment however does not usually take place immediately in most cases. Most suppliers extend some sort of trade credit to their buyers, allowing the buyers to defer payment until a later date (Jiang et al., 2022). To illustrate how widespread the practice of payment deferral is, Kouvelis and Zhao (2012) reports that 80% of US firms extend some sort of payment deferral to customers. Under ordinary circumstances, the payment deferral payment is either defined by national law or during negotiations preceding the firm order placement. The negotiations should take place between two equal parties and the payment deferral period would represent the fair balance of both parties' interests. In some cases however, the payment deferral period can become unfair to one party, usually the supplier. In this context, payment deferral means that the buyer receives an interest-free loan, reducing the capital financing of the buyer and with no risk. For the supplier however, the extended payment period engenders considerable costs and risk. The costs include having to finance the interest-free loan to the buyer, reduced capital available that could otherwise be

used for innovation and plant purchases. For instance, Murfin and Njoroge (2015) document that investment-grade clients extending payment delays by 1 month diminishes capex of suppliers by 1.2%, with diminished profits lasting up to 5 years. In addition, funding of working capital is more expensive, collections cost more and staff workloads increase significantly. The risks involved for the supplier include financial distress and bankruptcy. Connell (2014) reports that ending overly long payment delays in Italy, Spain and Portugal would cut the number of business closures by 1.5-3%, the equivalent of 124,000 to 248,000 more firms staying open each year. Therefore, late payment by buyers may have a dramatic influence on supplier costs and risks. However, only limited attention has been paid to this issue in the operations literature, despite it being a widespread practice that suppliers extend payment periods to buyers.

The purpose of this research is to examine the effectiveness of using name-and-shame as a soft policy instrument to encourage firms to shorten payment periods and thus behave more sustainably. Motivated by the facts aforementioned, this article aims to build on the existing works by examining the following issues:

- (1) how does name-and-shame impact payment periods in the supply chain?
- (2) And more generally, does transparency incite buyers to adopt more sustainable payment practices?

The contributions to the literature are threefold. First, most previous operations and finance interface stream of research, (Zhan et al., 2019; Kouvelis and Zhao, 2012; Lo Nigro et al., 2021; Jiang et al., 2022) study trade credit as an alternative source of financing for capital constrained firms and a coordination mechanism in the supply chain. This article enriches this literature by discussing the negative effects of trade credit and studying the impact of policy makers on reducing late payments effects generated by trade credit practice.

Second, existing research in the operations and finance interface has focused on the buyer and supplier perspective and neglects the role of policy makers (Hofmann and Zumsteg, 2015; Wuttke et al., 2013). This lack is surprising given the determinant role of a hitherto unconsidered stakeholder in payment terms, i.e. policy makers, in changing firm practices. Integrating the perspective of different stakeholders is an important step to address conflicts and sustainable issues concerning supply chain finance stakeholders and their relationships (Hofmann and Kotzab, 2010). This study considers policy makers' role in reducing long payment periods. Third, we show that in addition to hard policy instruments such as fines, the soft instruments of policy makers such as name-and-shame can incite firms to adopt a more sustainable behavior.

Our study also has managerial contributions. First, managers of buying firms should bear in mind the reputational costs that overly long payment periods can generate. Long payment periods may hurt the firm's reputation with clients and investors and this risk should be taken into account when considering the firm's purchasing policy.

From the standpoint of supply chain coordination, long payment periods hurt the relations between buyers and suppliers. If long payment periods are widespread, managers of buyer firms should negotiate contracts that are fair to suppliers to avoid jeopardising their financial health and risk profile.

Empirically, we test the effectiveness of name-and-shame as a policy tool using the case of France adopting a name-and-shame approach to shorten payment periods through transparency. In November 2015, the Minister of Finance, Emmanuel Macron, adopted a name-and-shame policy for long payment periods. He publicly named the companies with long payment periods. We adopt a panel data regression approach to evaluate the effectiveness of the name-and-shame policy. We find that the name-and-shame policy reduces payment periods, making name-and-shame an effective policy tool for inciting slow payers to pay faster and adopt more sustainable payment practices.

The remainder of the paper is organized as follows. In Section 2, we provide the conceptual background. In Section 3, we describe the empirical context and research methodology. Section 4 presents the results. Finally, in Section 5, we discuss and conclude the paper.

2. Conceptual background

2.1. Sustainability and long payment period practices in supply chains

The role of payment terms is to coordinate the supply chain (Heydari et al., 2017) and to optimize financial flows (Hofmann, 2005; Pfohl and Gomm, 2009) between buyers and suppliers. Payment terms are generally negotiated between buyers and suppliers at the time of purchase. The payment period, also called trade credit in this article (Huyghebaert, 2006) or payment delay (Wu et al., 2018), constitutes the buyers' deferment of payment to suppliers (Huyghebaert 2006). The payment period is one of the key payment terms and the focus of this article.

The upstream supply chain participants (e.g., suppliers, logistics service providers) have diverging interests from downstream supply chain participants (e.g., buyers) for payment periods. Suppliers want to be paid earlier, whereas buyers prefer longer payment periods (Tananbaum, 2011). For suppliers and buyers, the payment period impacts three key financial ratios: 1/ cash to cash cycle, 2/ working capital and 3/ cost of capital. First, the payment period accelerates or decelerates the cash to cash cycle. The cash to cash cycle reflects the time required, usually measured in days, between the date the company pays for its resources (accounts payable) and the date it receives payments (accounts receivable) (Hofmann and Zumsteg, 2015; Zhang et al., 2019). In other words, the cash to cash cycle measures the average number of days required to convert a euro invested in raw materials into a euro paid by buyers. The shorter the cash to cash cycle, the less cash is required to finance the cash to cash cycle. If a buyer takes longer to pay, then the supplier's cash to cash cycle lengthens and the buyer's cash to cash cycle shortens other things constant. Second, to finance the production and sales of goods and services, firms allocate capital. This capital is used during the normal operation of the firm and is called working capital. It represents capital tied up in operations. The longer the payment period, the greater the working capital allocated for suppliers and the lower the working capital of the buyer. Third, the capital used to finance the operation carries a cost called the cost of capital. This amount represents the return required by equity and debt investors for the firm to use their capital. To sum up, the longer the payment period, the longer the cash to cash cycle, the greater the capital allocated to working capital and the greater the returns required by equity and debt investors.

The operations literature on payment terms highlights how trade credit constitutes an alternative instrument for financing firms (e.g., Kouvelis and Zhao, 2012; Jing et al., 2012). Atanasova and Wilson (2003) suggests that firms with bank financing use trade credit to replace bank financing. Huang (2021) suggests that small and medium sized firms have insufficient working capital and limited access to capital markets resort more to trade credit.

In a sustainable supply chain context, payment term negotiations would be conducted between two equal parties, each bearing in mind their mutual interests. They would then reach a mutually acceptable agreement on how long the payment period is, alongside the other payment terms. Some research suggests that trade credit is a good financing instrument that benefits both buyers and suppliers (Aljazzar et al., 2018; Zhao et al., 2018). In this vein, Wang et al. (2020) suggests that trade credit can augment sales of suppliers/buyers in the supply chain. Likewise, Zhou et al. (2012) propose a model to illustrate that offering trade credit can increase the profitability of the whole supply chain. This stream of research suggests that mutually acceptable payment terms create a situation of win-win for both suppliers and buyers.

However, divergences in the perspectives of stakeholders can generate conflicts of interest (e.g. Hofmann and Kotzab, 2010) and lead to sustainability issues (Cowton and San-Jose, 2017). The mutually acceptable payment terms described above are rare and often limited to conceptual discussions (Hofmann and Zumsteg, 2015). All companies are constrained by financial objectives that incite them to pay late and collect early. When pursued too aggressively however, late payment and early collection (Bals, 2019) can lead to higher transaction costs in terms of credit risk, with capital costs being shifted around in the supply chain. So, if a buyer pays later a supplier, then there is reduced credit risk for buyers and higher credit risk for suppliers (Vazquez et al., 2016).

Several papers have explored how power issues hinder the adoption of mutually acceptable payment terms (e.g., Hofmann and Kotzab, 2010; Viskari and Kärri, 2012; Vázquez et al., 2016; Bals, 2019). Buyers generally have a better negotiating position than suppliers, meaning buyers have more power than suppliers, and can thus impose their conditions of longer payment periods on suppliers. In this vein, Horen (2007) shows that customers with considerable market power have a greater likelihood of receiving longer trade credit periods from suppliers. García-Teruel and Martínez-Solano (2010) suggest that smaller firms tend to finance larger firms. Lawrenz and Oberndorfer (2018) also find that larger firms are more likely to obtain trade credit. From the supplier's perspective, Randall and Farris (2009) state that suppliers often have to accept an increase in their own cash to cash if they aim to support their partners. These papers suggest overall that a power imbalance exists when negotiating payment periods in favor of buyers.

This imbalance of power in the negotiations between buyer and supplier often shows up in the press. In 2016, the British press revealed that Tesco knowingly delayed payment to suppliers in order to improve its own financial situation. These late payments were a widespread problem with Tesco that affected a wide range of suppliers. The delayed payments impact suppliers financially and hurt some suppliers' relationships with Tesco (Simpson, 2016). More recently, Amazon was accused of "institutionalized theft over late payments" in 2019 (Hipwell, 2019). By abusing its dominant position, small suppliers were forced to comply with long payment periods (sometimes up to 90 or 120 days) and unfair dispute mechanisms.

The sustainability concerns arising from the power imbalance between buyers and suppliers can lead to significant social and economic harm for stakeholders. In this light, Murfin and Njoroge (2015) show that longer payment periods by large retailers are associated with lower investment at the supplier level. The longer payment periods may even lead to increased bankruptcy risk (Wu et al., 2019). Furthermore, the bankruptcy risk can prompt suppliers to cut staff, limit innovation, lengthen payment periods with suppliers, etc. (Song et al., 2020). In addition, second and later tier suppliers can also face similar issues as first-tier suppliers. In turn, employees of these firms can face layoffs, wage cuts, etc. Finally, the government can collect less taxes and must pay unemployment insurance for the laid-off employees and health costs, etc. This significant social and economic harm can prompt policy makers to take action (Cowton and San-Jose, 2017).

2.2. The use of name-and-shame and policy makers

Policy makers have tried to address the issue of long payment periods for many years. They do so because the negative outcomes we describe above are so widespread and the power situation sometimes so imbalanced that only policy makers have the necessary instruments to incite companies to respect regulatory payment periods. Payment periods are usually regulated with

finer but sometimes payment practices can still stray from regulations because the fines may not suffice to enforce payment periods.

In order to encourage better compliance with payment period regulations, some countries have resorted to soft instruments (Brodzka et al., 2012) with the aim of exposing publicly those who have failed to pay on time. Name-and-shame is one instrument that policy makers may use to resolve situations of unsustainable behavior in other contexts. For example, the Dutch Authority for Financial Markets posts the names of companies and persons who have received public warnings and administrative sanctions on their web sites (Van Erp, 2010). Greece, Ireland, Portugal, Spain and the UK use name-and-shame for tax defaulters (Olivares, 2019). In the United States, the Securities Exchange Commission (SEC), the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) post offenders' lists on their web sites (Van Erp, 2010).

Name-and-shame consists of disclosing publicly the names of companies and people that are guilty of unsustainable behavior. The disclosure is aimed at three different audiences, consumers, firms and investors. A consumer-oriented disclosure strategy is based on the idea that disclosing the offenders' names can help consumers make more sustainable decisions and perhaps enable consumers to do business with other firms. In this context, name-and-shame acts as a tool to incite consumers to become responsible for their purchases and make them a tool to influence firm behavior. Consumers have been shown to be sensitive to sustainable supply chain management practices, and this sensitivity improves sales performance (Fan et al., 2021). Name-and-shame can also be aimed at firms. Public disclosure can improve compliance with existing regulations through incentives such as aversion to bad media coverage and reputational harm. From this standpoint, the underlying logic of name-and-shame is deterrence. Public disclosure of offending firms contributes to compliance either by specifically discouraging offenders in the future or by widespread deterrence of companies (Van Erp, 2010). An investor-oriented disclosure strategy is based on the idea that disclosing the offenders' names can incite investors to avoid offending companies or to prompt companies they invest in to behave more sustainably. So name-and-shame may act as a tool to mobilize consumers, firms and investors to prompt companies to comply with regulations and behave more sustainably.

Although the literature highlights the causes and negative outcomes of trade credit and its negative outcomes for all stakeholders in the supply chain, it fails to study what policy makers can do to incite companies to settle faster. Cowton and San-Jose (2017) argue that trade credit is a concern of commentators and policy makers that set regulations to speed payment in the supply chain. Our paper attempts to study empirically the effectiveness of name-and-shame as a tool for policy makers to incite companies to settle on time. This study contributes to the literature by studying the impact of name-and-shame on shortening buyer payment periods to suppliers.

To sum up, this study assumes payment periods lengthen because firms believe that the benefits of the unsustainable behavior of slow payment exceed the costs, including fines, the most severe administrative punishment that can be imposed by policy makers. The benefits of longer payment periods for buyers include lower cost of capital and less working capital. Name-and-shame works as a soft instrument that potentially induces reputational costs for firms with excessively long payment periods. Prior to the implementation of the name-and-shame policy, firms find the cost of slow payments reasonable enough to pay slower. The implementation of the name-and-shame policy makes the costs of slow payment exceed the benefits of slow payment, prompting firms to pay suppliers faster. The costs of name-and-shame include investors of the shamed firms concerned about diminished brand equity, loss of clients, greater difficulties in staffing and tougher financing terms. Furthermore, even for firms that are not named and shamed, the existence of a name-and-shame soft instrument may deter them from

paying slow. We therefore expect that firms either directly or potentially exposed to name-and-shame will behave more sustainably by shortening their payment periods, either because they are paying too slowly or because they are worried about being named and shamed in the future.

3. Context, methodology and variables

3.1. Context

The failure of EU and French policy makers to improve payment periods

To deal with the issue of slow payments between buyers and suppliers at the European level, several European Directives have been implemented (2000/35 of 29 June; 2011/7 of 16 February). The Directives aim to deal with the issue of long payment periods, in particular for small and medium sized enterprises (SMEs) (Cowton and San-José, 2017). The main measures of 2011/7 Directive are:

- setting a standard payment period of 30 days;
- establishing a maximum payment period of 60 days
- creation of penalties for late payment.

EU member countries are expected to gradually come into line with these measures considering their own contextual specificities. The French Law on the Modernisation of the Economy (LME), introduced in 2009, imposes a maximum payment period of 60 days, 45 days from the end of the month beginning from date of issue of the invoice. Thirty-five derogations (sector agreements) have allowed businesses that otherwise would have run into severe difficulties to benefit from more flexible, gradual conditions.

To come into line with the directive, The Hamon Act of 17 March, 2014 is an extension of the LME Law toughening penalties for companies that fail to meet the 45-day payment periods. It aims to improve business cash flows by introducing both a maximum payment period for summary invoices and dissuasive administrative penalties applicable in the case of non-compliance with payment terms.

However, despite these measures, payment periods continued to lengthen. At the end of July 2015, the Observatory of Payment Periods noted the increase of payment periods, with payment periods hitting a 10-year high, rising 11.7% over 1 year (reaching 13.6 days of delay on average equivalent to 3.87 billion euros). In its 2015 report, the Observatory of Payment Periods explains this lengthening of payment periods with three reasons. First, low firm cash flows were cited as the main cause of these lengthening payment periods. The second reason cited was the higher rate of insolvency of buyers. Furthermore, the lower cash flow and higher insolvency rates occurred amid a further decline of economic conditions in France in 2015.

Name-and-shame in France

The sizable lengthening of payment periods prompted the Minister of Finance Emmanuel Macron to take action. During the annual negotiations between business representatives and the government, the Minister of Finance announced the implementation of the name-and-shame policy in July 2015 to punish companies that pay their suppliers late. The scheme was implemented in November 2015. France is the only country to implement this policy of name-and-shame for slow payers in Europe as far as we know. The name-and-shame concerned the publication of the names of firms fined for the worst offenses and the amount of the fines.

The government stated at the time that the goal of the name-and-shame policy was the only effective strategy given the context. The goal was clearly to incite companies to pay faster to avoid damaging the companies' reputations. The government's name-and-shame policy was not accompanied by higher fines on companies relative to those set out in the Hamon Act of 2014, which removes the possibility of higher fines influencing our research methodology.

Furthermore, only firms with the highest fines were to be named to serve as an example, hoping to incite other firms to change their payment behavior.

Despite the government's announcement in July 2015 of the forthcoming implementation of the name-and-shame policy, payment periods continued to lengthen (see Figure 1). The press conference on 23 November 2015 announced the imminent release of the public list of companies subject to the name-and-shame policy alongside the fines. The first list of late payers and the amount of the fines was released the following day on 24 November 2015. The announcements were accompanied by significant press coverage in most major French news outlets. Among these companies, Numericable-SFR and Airbus Helicopters were imposed the maximum penalty of 375,000 euros. In September 2016, a second list of 16 companies and the amounts of the penalty was published. Among these companies were Air France, Etam and Alstom Grid.

3.2. Data analysis

Methodology and variables

To test the effect of name-and-shame on payment periods, we conduct an empirical study based on publicly listed French firms. To do so, we draw data from Compustat, which is a broad database of accounting and market information on both active and inactive companies produced by Standard & Poor's. The database is widely used by academics, investors and analysts. To construct a sample of French firms, we begin by downloading quarterly accounting and stock market data of all listed companies that are available in the database. We focus on quarterly data because the higher frequency of quarterly data compared to annual data enables more granular analysis of the effect of the name-and-shame soft policy on company outcomes. Firms with negative sales or total assets are removed. We focus on a sample period of 5 years dating from 1 January 2013 to 31 December 2017 or 20 quarters for our main results. The result is an unbalanced, cross-sectional time-series panel with 8,110-year observations of 520 French firms. We use the accounting and market data to construct the natural log of *days receivable* variable, the dependent variable for this research, the name-and-shame indicator variable to test the effect on account receivables as well as all control variables. Table 1 describes the variables used in this research and relevant literature.

We define Q1 2016 as the start of the name-and-shame event because the initial list of name-and-shame firms was released on 25 November 2015. We reason that any changes firms made to payment periods between 25 November 2015 and the end of 2015 in response to name-and-shame would take effect too late for the firms to make significant changes in their accounting procedures for them to be visible in Q4 2015 financial data.

To measure manager response to name-and-shame, we focus on the average days receivable period and not the average days payable period for four reasons. First, the goal of the law is to ensure that SMEs are paid on time. Thus, we argue that measuring from the supplier's point of view is more suitable. Second, the accounts payable accounts of French firms contain payments due to French and other EU member firms. The receivables data of French firms however concerns only firms located in France and the payments that are received. The law concerns France only, so the accounts receivable data is more suitable. Third, SMEs are more sensitive to payment periods and the loser in negotiations with a power imbalance, so it makes the research more focused on the variable of interest for name-and-shame. Fourth, receivables are in line with our theoretical framework.

Regression model

Our main regression model takes the form of a panel data set. Given the panel structure of our data, we control for firm-level and time effects in our models (Greene, 2007).

(Equation 1)

$$LnDays\ Receivable_{i,q} = \beta_0 + \beta_1 After_q + \beta_{2-9} Controls_{i,q} + F_i + T + \varepsilon_i$$

where i is the firm identifier and q the quarter. The dependent variable *LnDays_receivable* is a firm level metric that expresses the natural log of the amount of days receivable as a percentage of sales and is then multiplied by 90 to reflect the number of days in a quarter. *After _{t}* is a binary variable equal to 0 for the period before the name-and-shame event (for the quarters from 1 January 2013 to 31 December 2015) and 1 for after the name-and-shame event (for the quarters from 1 January 2016 to 31 December 2017). The estimated coefficient β_1 of the variable *After* is the coefficient of interest because it is associated with aggregate firm reaction to the name-and-shame event. A positive β_1 would indicate an increase in the payment period after name-and-shame and a negative β_1 would indicate a decrease in payment period after the name-and-shame event. F_i is the firm fixed effect and T represents the time fixed effect and $Controls_{i,q}$ is the vector of firm level control variables and \sum_i is the error term.

Control variables

We include many quarterly control variables in our analysis to account for firm-level effects that may explain variances in days receivable other than the name-and-shame event. *Size* is the log of total assets. *Earnings* is net income before extraordinary items. *Gross profit* is gross profit(loss) standardized by net sales. *Leverage* is long term debt standardized by total assets. *Cash* is cash and short-term investments standardized by total assets. *Cogs* is cost of goods sold standardized by total assets. *Inventory* is total inventory standardized by sales. More information is available in Table 1 concerning how the variables are calculated and relevant literature.

Variable operationalization

Table 1 - Variables

Variable	Definition	Relevant literature
Main variables		
<i>LnAccounts receivable</i>	Natural log of the ((ratio of trade receivables standardized by sales) x 90)	Zhang, Zhang & Pei 2019
<i>After</i>	Binary variable indicating period as 0 before name -and- shame event and 1 after name-and-shame event.	
Control variables		
<i>Size</i>	Firm size measured as the natural log of total assets	Zhang et al. (2019)

<i>Earnings</i>	Net income before extraordinary items	Modi and Mishra (2013)
<i>Gross profit</i>	Gross profit (loss) per quarter, standardized by net sales	El Ghoul and Zheng (2016)
<i>Leverage</i>	(Long-term debt), standardized by total assets	Zhang et al. (2019)
<i>Cash</i>	Cash and short-term investments standardized by total assets	Love et al. (2007)
<i>Cogs</i>	Cost of goods sold standardized by total assets	Mishra et al. (2013)
<i>Inventory</i>	Total inventory standardized by sales	Yang and Birge (2018)

Results

Table 2 provides descriptive statistics regarding our sample. The mean of the natural log of *days receivable* is 4.17, or 95.5 days, in line with (Zheng et al, 2019). The average firm size is 5.74 and the average earnings is 31.2. To test the validity of the variables used in the regression model, Table 2 shows the Pearson correlation between the metrics in our model. None of the control variables shows high correlations with our dependent variable *days receivable*.

Table 2 Descriptive Statistics

	Mean	SD	Days receivable (ln)	Size	Earnings	Profit margin	Leverage	Cash	Cogs
<i>Days receivable (ln)</i>	4.17	.82	1.000						
<i>Size</i>	5.74	2.45	-0.041*	1.000					
<i>Earnings</i>	31.2	220.44	-0.030*	0.275*	1.000				
<i>Profit margin</i>	.39	2.01	0.018	0.038*	0.009	1.000			
<i>Leverage</i>	.16	.18	-0.015	0.132*	-0.011	-0.146*	1.000		
<i>Cash</i>	.16	.15	0.001	-0.307*	-0.054*	0.015	-0.130*	1.000	
<i>Cogs</i>	.15	.15	-0.315*	-0.112*	-0.045*	-0.087*	-0.119*	-0.055*	1.000
<i>Inventory</i>	.96	14.84	0.097*	0.008	-0.005	0.202*	0.031*	-0.007	-0.025*

Significance at 5% level *

To gain a better idea of underlying trends, we first graph the trend of payment periods in days in France for the period of our sample. Figure 1 shows the time trend of *average days receivable* for French firms. Figure 1 highlights the increasing trend in *days_receivable* before the name-and-shame event and the declining trend after the name-and-shame started. We see a sharp rise in *days receivable* in the period prior to the beginning of the name-and-shame. This suggests anecdotally that the name-and-shame impacted French firm payment practices. However, this anecdotal interpretation could hide other unobservable factors that may have affected *days receivable* on either side of the name-and-shame event in Q1 2016. We therefore pursue other methods to address this possibility.

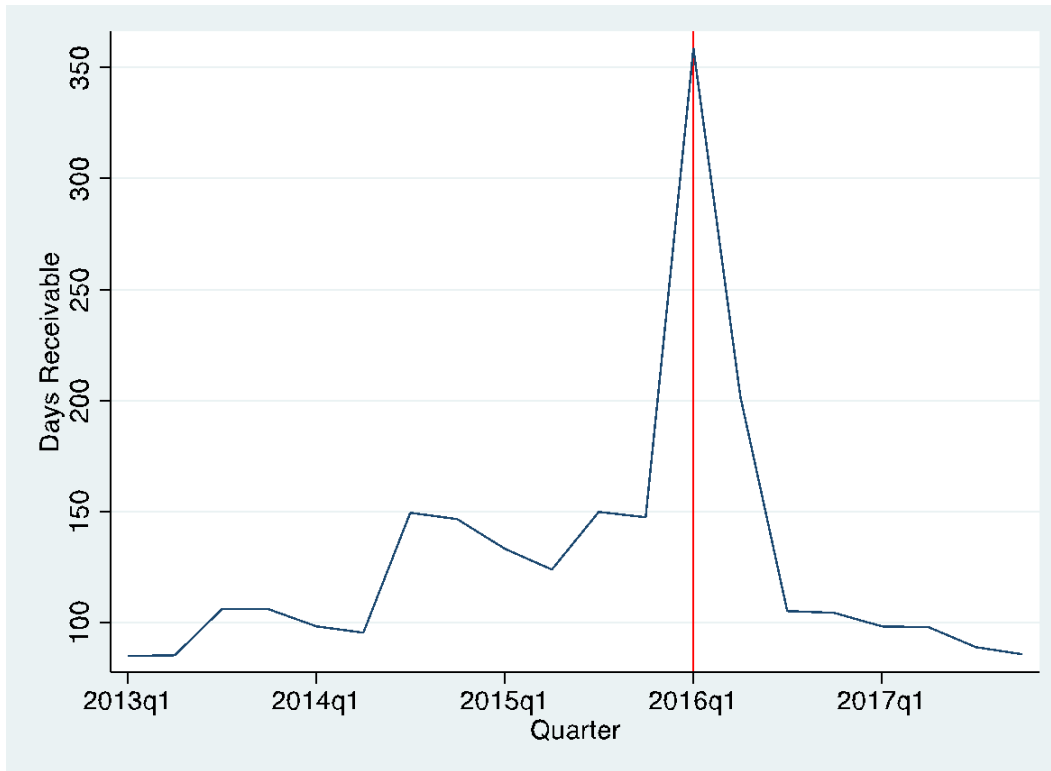


Figure 1: Average Days Receivable by Quarter from 2013 to 2017 in France

To overcome this shortcoming, a panel data estimator is used to evaluate the effect of the name-and-shame policy on French firm account receivables. This panel regression allows us to better assess the impact of the name-and-shame policy while ruling out other alternative explanations.

We estimate equation (1) with a panel data estimator including time and firm fixed effects to assess the impact of the name-and-shame event. Results are reported in Table 3. We see that our variable of interest *After* shows a negative value of -0.051 ($p < 0.01$), suggesting that the name-and-shame policy has a significant explanatory power for *LnDays receivable*. This result supports our assertion that the name-and-shame policy influenced French firm payment periods.

Table 3: Panel data regression results

	<i>LnDays receivable</i>
<i>Size</i>	0.092*** (0.018)
<i>Earnings</i>	0.000 (0.000)
<i>Gross profit</i>	-0.001 (0.002)
<i>Leverage</i>	0.100*** (0.035)
<i>Cash</i>	-0.832*** (0.060)
<i>Cogs</i>	-1.567***

	(0.059)
<i>Inventory</i>	0.005***
	(0.000)
<i>After</i>	-0.051***
	(0.019)
<i>Constant</i>	3.992***
	(0.102)
Observations	8,110
Adj. R-squared	0.1467
Firm Fixed Effect	Yes
Year Fixed Effect	Yes
F-stat	108.6
P-value (F)	0.00

*** p<0.01

Robustness tests

Unobserved time-invariant variables can influence the firm's strategy (Barton and Gordon 1988). We therefore use fixed effects to control for unobserved time-invariant firm-and industry-specific effects (Srinivasan and Hanssens 2009) in our main model. To account for heteroscedasticity and serial correlation, clustered errors are introduced that control for both of the issues. In addition, we test the robustness of our results using a difference-in-differences approach as an alternative estimation approach for our main results. The name-and-shame policy became effective in the first quarter of 2016, which we define as $t=0$. Our pre-period covers three quarters before the beginning of name-and-shame. Our post-period includes the first three quarters for which name-and-shame is effective (Q1, Q2 and Q3 of 2016).

We use the same sample as described in our main results and control variables. Our control group is listed German firms present in Compustat. We choose Germany due to the institutional resemblances between Germany and France (Antonioni, Guney and Paudyal, 2006). The sample of firms from Germany is not subject to the name-and-shame policy, making them suitable for our control group. Our main dependent variable is once again the average natural log of number of days receivable. We estimate the following model to run the difference-in-differences model with standard errors adjusted for clusters at the country level:

(Equation 2)

$$LnDays\ Receivable_{i,q} = \beta_0 + \beta_1 Treatment_q * Firm_country_{i,q} + \beta_{2-9} Controls_{i,q} + F_i + T + \varepsilon_i$$

where *French* is a dummy variable that equals 1 for firms located in France and 0 for firms in Germany. The dummy variable *Treatment* is equal to 0 for quarters before name-and-shame. For firms that are in France and where $t=1$, the *Treatment* variable is set to equal 1. β_1 is the coefficient of interest, which we expect to be negative. It represents the interaction of French firms and the time period after the start of name-and-shame. We include the same control variables as in the main model and include firm and time fixed effects.

The difference-in-differences estimation is built on the assumption that the control group of Germany and the treated group of France have parallel trends before the treatment. Our test of the parallel-trend assumption fails to reject the null hypothesis with a F-statistic of 0.258, suggesting the presence of parallel trends before the treatment. Furthermore, the difference-in-

differences methodology suggests that firms may adjust their behavior in anticipation of the name-and-shame coming into effect. The anticipation could bias the results. We therefore run the Granger causality test to ensure this is not a concern. Our results suggest that firms did not anticipate the name-and-shame policy with an F-stat of 0.256.

Table 4 shows the results of estimating Equation 2 using companies from Germany as a control group. As predicted, the coefficient B_I is significantly negative at -0.039 ($p < 0.01$). This result further supports our argument that French firms reduced their payment periods after name-and-shame began compared to the control group of Germany firms.

Table 4: Diff-in-diff of name-and-shame on payment periods

	<i>LnDays receivable</i>
<i>Size</i>	0.145** (0.069)
<i>Earnings</i>	-0.000*** (0.000)
<i>Gross profit</i>	0.000 (0.017)
<i>Leverage</i>	0.242 (0.198)
<i>Firm growth</i>	-1.031*** (0.168)
<i>Industry growth</i>	-1.383*** (0.241)
<i>Cash</i>	0.005*** (0.001)
<i>GDP growth</i>	0.145** (0.069)
<i>Interaction</i>	-0.039*** (0.013)
Constant	3.491*** (0.406)
Observations	4,291
Firm Fixed Effect	Yes
Time Fixed Effect	Yes
F-stat	243.2
p-value (F)	0.00

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4. Discussion and conclusion

We contribute to the literature in several ways. First, although studies of payment practices using empirical data have been found in the literature (Wu et al., 2019; Zhang et al., 2019),

slow payments to suppliers have long been studied from the buyer's perspective, highlighting their benefits. We consider in this study payment periods from both buyer and supplier perspectives. Second, the literature does not study whether the instruments of policy makers such as name-and-shame influence payment periods. As far as we know, this is the first empirical study to link payment periods and name-and-shame to sustainable and transparent supply chain payment practices. Third, this study contributes to the debate about the sustainability of payment practices and the tools that policy makers can employ to shorten payment periods. We show that name-and-shame is a suitable tool for reducing payment periods and that firms respond to name and shame by diminishing payment periods.

The literature in supply chain finance has long suggested that collaboration is a good tool to implement financing solutions with win-win outcomes for buyers and suppliers. However, a few recent articles (e.g., Cowton and San-José, 2017) highlight that larger firms benefit more from collaboration, and this despite the existing regulations. Smaller firms on the other hand have more difficulties obtaining financing and face major problems with their cash to cash cycle. This imbalance raises sustainability concerns concerning the power positions of buyers and suppliers. This study shows that even in supply chains, policy makers are a key stakeholder in ensuring sustainable outcomes in the supply chain relationships between buyers and suppliers.

Our theoretical contributions give rise to the following practical applications. First, the focus of supply chain finance should include other outcomes in addition to financial ones for buyers. Practicing supply chain finance is not a way to boost short-term profits. Managers should focus on long-term sustainability and address issues such as payment periods that affect the long-term viability of suppliers and all the negative outcomes that arise from risks related to viable, sustainable supply chain relationships.

The results shed light on the impact of recent policy actions undertaken in Europe to regulate payment terms and make payment practices more sustainable. Soft policy instruments such as name-and-shame can impact firms strongly. Managers should bear in mind the potential reputational costs to the firm of being impacted by the soft instruments of policy makers when setting payment periods.

This study is not without limitations. The study focuses on the payment period of French firms as a whole and does not consider how name-and-shame may differ by industry and sub-industry. Also, the empirical analysis combines buyers and suppliers. Furthermore, we do not consider how the three stakeholders that influence firm payment practices - investors, firms and consumers - may respond differently to name-and-shame policies. Future research could address these limitations.

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