Information Sharing and Credit Outcomes: Evidence from a Natural Experiment*

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Abstract

We explore the effect of information sharing among lenders on credit outcomes in the unsecured consumer credit market. To advance in isolating the causal effect, we exploit a natural experiment in Colombia made possibly by the “fresh-start” provision of Law 1266/2008, which erased from Private Credit Bureaus detailed information about past defaults that had been settled exogenously sufficiently long before the Law’s enactment. Using a Differences-in-Differences approach, we find a significant decrease in debt issuance for clean borrowers who had not defaulted prior to the Law’s enactment, relative to borrowers whose negative information was not removed by the provision. After the negative information removal, clean borrowers are also found to switch banks at a lower rate and to issue less debt with pre-existing lenders, most likely because outside banks can no longer distinguish them from past default borrowers whose records were cleaned by the provision, and because the information removal increases the informational hold-up of inside banks. The evidence suggests that restrictions to information sharing generate efficiency costs from increased information asymmetry both between banks and borrowers, and between banks. These results bear on the informational efficiency of the consumer credit market, and the efficacy of regulating this market with restrictions to information sharing.

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In most modern market economies, formal financial institutions share information about potential borrowers through credit bureaus. These information registries collect, store and report information about borrowers, and help reduce information asymmetries in credit markets (see Pagano and Jappelli(1993)). Yet in practice, legal restrictions to information sharing across lenders through credit bureaus are prevalent worldwide (Bottero and Spagnolo(2011)). These restrictions are justified by policymakers on the basis that excessive information sharing can stigmatize individuals and thus hamper their ability to smooth their consumption by borrowing against future expected income.

In this paper we estimate the costs of information sharing restrictions on credit outcomes by exploiting the unexpected implementation of a “fresh-start” policy in Colombia, which removed from credit bureaus detailed information about past defaults that had been settled exogenously sufficiently long before the end of December 2008. This setting allows us to improve on identifying the efficiency value of borrowers’ credit histories -conditional on borrowers’ variation in expected income- relative to other work on this topic which focuses on time-invariant information sharing time-limits (Musto (2004)). Also in contrast to previous work, our focus here is on the effects of such restrictions on credit outcomes of good-standing borrowers with no defaults (and therefore no negative information to start with), which constitute the losing side of these regulations, but yet are are seldom mentioned in the policy justifications and mostly ignored in empirical work.

Theoretically, the effect of information sharing restrictions on credit outcomes varies across borrowers, and partly because of this, their welfare implications are not unambiguous. On the one hand, credit outcomes may improve for borrowers whose negative records are removed. Free from the stigma of default, borrowers whose defaults are removed from credit bureaus may experience a higher likelihood of issuing debt, as shown by Musto (2004). However, whether this increased access to credit is efficient or not will depend on how good a predictor of default is the history of past default occurrences. On the other hand, credit outcomes may deteriorate for clean borrowers who had not defaulted in their debt obligations prior to the imposition of information sharing restrictions. Information sharing restrictions may thus increase debt mis-pricing for clean borrowers by pooling their clean records with those granted by the restriction

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1There are other mechanisms that banks use to overcome these frictions such as requiring potential borrowers to pledge collateral in order to sort observationally equivalent loan applicants through signaling (e.g., Bester (1985, 1987); Besanko and Thakor (1987a, 1987b), Chan and Thakor (1987); Boot, Thakor, and Udell (1991a) or to induce discipline (e.g., Boot, Thakor, and Udell (1991b); Boot and Thakor (1994); Aghion and Bolton (1997); Holmstrom and Tirole (1997)). In practice, however, not all loans are easily backed by collateral. Individuals may not have enough tangible assets to collateralize, and poor protection of creditor rights may make seizing collateral unfeasible.

2In the United States, for example, the Fair Credit Reporting Act (FCRA) prescribes that a personal bankruptcy filing may be reported by credit bureaus for up to 10 years, after which it must be removed from the records available to lenders. This horizon is even shorter for other countries (see Jappelli and Pagano(2004) for more examples).
to borrowers who did default in the past, particularly if clean past records are a good predictor of credit worthiness. These restrictions can also exacerbate potential informational hold-up of clean borrowers by inside banks (i.e., those with whom the borrower already had an existing lending relationship), as the latter can exploit their informational advantage over outside banks whenever information restrictions hamper the ability of new lenders to distinguish creditworthy from outright bad borrowers. The efficiency effect of these restrictions is thus an empirical question, which depends on how good predictors of borrower’s future default behavior are credit records, and one which is hard to identify in the data as their adoption is often reflective of macroeconomic fluctuations.

There are three main characteristics of the “fresh start” provision in Colombia that allow us to advance in estimating the causal effect of information sharing restrictions on credit outcomes and assessing their efficiency effects.

First, only negative information at private credit bureaus - PCB (the vehicles that banks use to share information about past credit histories) was removed, whereas information at the Public Credit Registry was not (i.e., the database used by supervisory authorities to monitor the credit market). Because banks in Colombia have no alternative sources of information other than PCB, and can only observe credit reports from the latter granted explicit permission from potential borrowers (banks cannot hoard information of clients by accessing the full dataset from PCB at once), our use of the anonymized Public Registry data gives us full control over the information environment in this setting.

Second, the provision induced exogenous cross-borrower variation on information sharing restrictions that we can use to advance in isolating the causal effect of the information removal on credit outcomes. Specifically, negative information for borrowers that had settled their defaults before the end December 2007 was removed with immediate effect by the provision, whereas information on defaults paid closely after December 2007 were left initially unchanged at PCB. In removing negative default information for a substantial group of past default borrowers, the policy also indirectly affected “clean” borrowers who had committed no default prior to the end of December 2007 as banks could no longer distinguish the latter from the former. This group of “clean” borrowers is the main focus of this paper. The effect of the provision for “clean” borrowers will be confounded in the time series with the potential influence of other contemporaneous aggregate shocks; we therefore use borrowers that had settled their defaults closely after December 2007 (from January to September of 2008), temporarily unaffected by the removal of information, to construct a counter-factual. We use a Differences-in-Differences (DD) approach to assess the effects of the policy on credit outcomes of treated borrowers relative to control borrowers. The identification assumption is that the credit outcomes of borrowers in the treated groups and the control group would have evolved in a similar manner in the absence
of the information sharing restriction.

Third, the provision provides us with a unique opportunity to analyze, for any given treated borrower, the policy reaction of differentially-informed banks. By comparing the likelihood that a given borrower enters into a new lending relationship before and after information removal, we can better assess the value of soft (non-shared) information for inside banks with whom the borrower already had an existing relationship and for whom no effective change in the information set occurs (the inside bank is assumed to keep memory about the records of its own borrowers). The set-up also allows to explore whether there is evidence of informational hold-up by inside banks, by comparing credit outcomes for the same borrower across inside and outside banks before and after the provision.

We find a significant decrease in (relative) debt issuance for clean borrowers, consistent with the increased information asymmetry between these borrowers and outside banks. While we find that clean borrowers are indeed less likely to initiate a new lending relationship after the provision, the decrease in their debt issuance cannot be entirely explained by restricted access to outside debt: instead, debt issuance with inside banks also decreases. These results suggest that clean borrowers are also more likely to be informationally held-up by inside banks after the provision.

Our findings suggest that restrictions to information sharing generate efficiency costs by increasing information asymmetries between borrowers and clients, and also between lenders. This evidence bears on the efficacy of stimulating access to credit using these restrictions. In future versions of the paper we plan to explore the outcomes of other borrowers in the economy, in order to examine in more detail the welfare consequences of the provision.

This paper contributes to the literature that explores the impact of information sharing by lenders on credit markets (Pagano and Jappelli (1993), Padilla and Pagano (2000), Djankov et al. (2007), Jappelli and Pagano (2002), Warnock and Warnock (2008), Galindo and Miller (2001), Galindo and Micco (2007; 2010), Love and Milenko (2003), Musto (2004), Brown, Jappeli and Pagano (2009), Frisancho (2012), Hertzberg, Liberty and Paravisini (2011), Bos and Nakamura (2014)). Our paper differs from prior research in that we focus on one specific aspect of information sharing (long-lived negative information) and we exploit exogenous variation in the type of information available in credit bureaus using detailed loan-level data. In contrast, prior research (with the exceptions of Musto (2004), Frisancho (2012), Hertzberg, Liberty and Paravisini (2011) and Bos and Nakamura (2014)) uses cross-country differences in the development of PCB to examine the impact of information sharing on credit outcomes. The limitations of this type of approaches are several and well-known. Our paper is closest to Musto (2004) in topic; we complement his work by focusing on a setting where the effect of a fresh-start can be better identified from changes in borrowers’ future expected income. Our paper is closest to Bos and
Nakamura (2014) in setting, but we differ in focus: these authors study the effect of changes in retention time of borrowers’ credit histories (not the effect of fresh start policies) and we focus on the effect on clean borrowers, whereas their work focuses on the effect of individuals whose information is removed.

The rest of this paper proceeds as follows. Section 1 describes the institutional environment and the data, and provides a brief characterization of the information sharing system across lenders in Colombia. In Section 2 we build a stylized analytical framework motivated by the empirical setting to show theoretically how information sharing restrictions can affect credit outcomes. Section 3 outlines the empirical strategy; the results are presented in Section 4. Section 5 concludes.

1 Empirical Setting

1.1 Information Sharing in Colombia

Regulated, formal, financial institutions in Colombia are required by law to frequently record and report information on their loans. This information is collected on behalf of the government by the Public Credit Registry administered by the Superintendencia Financiera (FSO, Financial Supervision Office). The Registry collects loan-level information covering the formal financial system at a quarterly frequency. This information is confidential and is used by the FSO and by the Central Bank with regulatory, policy and research purposes.

Information sharing between formal lenders in the Colombian financial system has traditionally been done through Private Credit Bureaus (PCB), which started operating in Colombia in 1981. Given explicit written authorization from a prospective borrower (something usually included as part of the application process for a loan), a bank can obtain a “credit report” from a PCB. Credit reports usually include a credit score, together with detailed information on all current and past loans such as: originating bank, loan amount, loan type, value of collateral, repayment and default history, and the value of overdue payments. Information on the repayment history of utilities or mobile phone accounts is also included.

For a brief review of the recent history of PCB in the Colombian financial system, see CEMLA (2005). As of the start of 2013, there were three operating, nation-wide, PCB in the country: Datacrédito, CIFIN, and Procrédito. This legal requirement implies that it is not possible for any potential lender to get hold at once of the entire set of “credit reports” from PCB unless authorized by all borrowers in the economy. Apart from the information shared through PCB and the information gathered through a relationship, banks have access to few other sources of information for their credit evaluations.
Before 2009, the activities of PCB in Colombia were, by and large, unregulated and defaults appeared to be heavily penalized by the system. Indeed, in the event of default\(^5\), the average size (number) of borrower’s new loans fell on average 68.2% (64.8%) before the law. The lack of regulatory oversight led to a number of legal conflicts between borrowers and PCB. Borrowers often complained that by reporting the complete default history of all loans, even those that had been already repaid in full, PCB exacerbated the negative consequences of default. PCBs became known as “black lists”, and the perception of the public was that once in the black list, they would not be able to borrow at reasonable rates in the future, if at all. By 2008, a total of 12 unsuccessful attempts had been made to reform the PCBs since 1986, all of which failed to reach approval by either Congress or the Constitutional Court\(^6\).

### 1.2 The Reform of 2009: Law 1266/2008

#### 1.2.1 Generalities on Retention Times

On July 21st 2006 a new legislative project to regulate retention times of credit histories at PCB was filed in Congress for subsequent discussion and vote. For more than two years the project was debated in Congress and revised by the Constitutional Court. On December 31st, 2008, the legislative project was finally enacted as Law 1266/2008\(^7\). The law specified that information about past defaults (negative information) would no longer be shared indefinitely at PCB; instead, it would only be retained for four years counted from the date the obligation is settled by the borrower. Thus, the Law equally decreased the cost of future defaults across borrowers (limiting retention times) and removed information on all defaults settled by the end of December 2004. The Law did not affect either the records contained at the Public Registry or those held privately by individual banks about their current or former clients.

An additional modification to retention times for short defaults (unexpected as of the end of 2008) was introduced by Decree No. 2952 on August 6th, 2010. In particular, information on defaults lasting less than two years was to be retained at PCB for only twice the amount of time in default, thus making the four years established by Law 1266/2008 a -not necessarily reached- maximum period of retention. Several legislative modifications to the activity of information sharing in Colombia have been introduced after 2010; none of them have included changes to the regulation of PCB or to the retention times of negative information.\(^8\)

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\(^5\)The default event will be specifically defined below).

\(^6\)For a discussion of regulatory flaws and proposals at the time, see Miller and Guadamillas (2006).

\(^7\)The full history of the legislative project that eventually became Law 1266/2008 can be found (in Spanish) at: [http://www.congresovisible.org/proyectos-de-ley/por-la-cual-se-dictan/248/](http://www.congresovisible.org/proyectos-de-ley/por-la-cual-se-dictan/248/)

\(^8\)For example, Law 1581/2012 revisited similar topics as those of Law 1266/2008 regarding personal information other than financial and commercial records. See [http://www.sic.gov.co/drupal/sobre-el-habeas-data-financiero](http://www.sic.gov.co/drupal/sobre-el-habeas-data-financiero)
1.2.2 The Fresh-start Provision

Law 1266/2008 was one of the promises of the reelection campaign of then President of Colombia Alvaro Uribe-Vélez in 2006. A key component of the President’s political pledge was to offer some mechanism through which (at least part of) the negative information stored at PCB would be removed. As a result, Congress included in the final version of the law a “fresh-start” provision, which entailed the one-off removal of certain sufficiently old negative items (i.e. defaults) held at PCB. Although part of the political debate at the time, the exact features of the “fresh-start” provision were broadly unknown inasmuch as the provision was not included in the original legislative project filed in Congress in 2006.

The provision sought to partially remove negative information in credit histories originated in default events occurred after December 2004 (recall that all previous defaults were removed by the maximum retention time restriction). For the purposes of this paper, the key feature of the provision is that it was designed to affect differentially those negative items. In particular, only information on those defaults that had been settled sufficiently long ago (specifically, settled before December 31st, 2007) was immediately removed, provided the borrower was in good standing at the time of the enactment of the Law. Information on defaults settled after December 31st, 2007 was instead scheduled to be removed one year after settlement, provided the borrower was in good standing at the time of the enactment of the Law. Importantly, the provision required those borrowers whose default records were scheduled to be removed to remain in good standing after the information removal: in case of a relapse into default, all negative information would be restored as if the fresh start had not happened in the first place. The provision also encouraged borrowers to repay/settle their debts, by providing a transition period of six months during which any settled default would also be subject to the provisional rule of one year retention time. Once finished the transition period of six months, the system became regulated by the body of the law, and no more regulatory changes were scheduled.

Because the fresh-start provision was not included in the original legislative project, it is unlikely that borrowers could have self-selected to classify for the immediate removal of defaults, i.e., strategically chosen to settle accounts by the end of December 2007. While borrowers could take action to qualify for the provision within the transition period, i.e., from January 2009 un-

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9In May 2006, during the reelection campaign, the President declared: “in much the same way as we have offered pardon to guerrillas and paramilitaries for their crimes, it is fair that we give relief to all honest Colombians by removing those negative reports [from PCB]”. Although it can be argued that the reform of PCB was not the key item in the election campaign, the fact that the removal of negative information was put in similar terms than that of a potential peace process is a testimony of the perceived relevance of the issue for voters.

10The exact features of the provision became certain only after the full approval of the legislative project by the Constitutional Court, on October 16th, 2008.

11One issue that remained was the exact format that the PCB reports would follow, something which would be later specified in Decree 1727 of May 15th 2009.
til June 2009, removal of the negative information was only guaranteed one year after default settlement (that is, between December 2009 and March 2010). Hence, the fresh-start provision provides a unique opportunity to estimate the effect of information removal on short-term credit outcomes, using borrowers that settled their accounts closely after December 2007 (but before January 2009) to control for unobserved average changes in future expected income concomitant with the law.

1.3 Public Credit Registry on Consumer Credit

In order to assess the causal effect of the removal of negative information on credit outcomes, we use data from the above mentioned Public Credit Registry of the FSO. This Registry provides us with full control over the information environment, since no information was removed from its records (in stark contrast to the records held at PCB).

Given our focus, we consider only the chapter on consumer credit from the Public Credit Registry. It can be argued that, by its own unsecured nature, the screening of consumer loans makes a more intensive use of credit records than other, collateralized, types of credit, such as mortgage or commercial loans. In addition, when proposing the removal of negative information from PCB records, policymakers had in mind the relief of individual, natural borrowers, with a focus on consumer lending.

The consumer credit market in Colombia features three distinct type of lending activities: credit cards, auto loans and the so-called “free investment loans”. We focus on the latter, which (notwithstanding its name) is akin to the standard theoretical unsecured consumer loan. These loans feature variable interest rates: from one period to the next, average interest rates on debt may change either because borrowers secure fresh loans with different interest rates or because banks adjust interest rate as per specified in the lending contract.

The Public Credit Registry includes quarterly loan-level information on the date of origination, contract terms, rating and ex-post performance. For each borrower we have information on total bank debt, number of banking relationships, internal bank rating and repayment history.\textsuperscript{12}

The confidential character of the information limits the exercise of this paper to a random sample of borrowers for the period 2007:IV-2009:IV.\textsuperscript{13} On average for the period of study, the sample covers 57.72\% of the total stock of gross consumer credit in the consolidated balance sheet of

\begin{footnote}{12}{This rich database is similar to others used in empirical corporate finance and banking papers based on Latin American data (e.g., Ioannidou and Ongena (2010) for the case of Bolivia, and Hertzberg, Liberti and Paravisini (2011) for the case of Argentina, among others).}

\begin{footnote}{13}{In addition, the ID codes for borrowers and lenders are anonymized, in the sense that the database accessed by this investigation identifies borrowers and lenders with a code different to their legal ID. Therefore, it is not possible to identify individual borrowers or lenders by name using this database.}
the Colombian financial system. This includes non-balanced information for a total of 2,842,726 borrowers and 64 lenders over the length of the 9 quarters of analysis.

2 Theoretical Framework: Information Sharing and Credit Outcomes

In this section, we present a simple framework motivated by the features of our empirical environment. The purpose of the model is to rationalize the motivation of policy makers for imposing information sharing restrictions of the type discussed above and to provide a simple intuition regarding their predicted effects across the different types of borrowers in the market. Our main insight is that the effect of restrictions to information sharing depends on the accuracy of credit records in predicting credit worthiness. Low accuracy of negative information may generate informational hold-up of borrowers by inside banks if the latter have access to soft information with which to accurately distinguish borrower type. In such a scenario, inside banks create informational rents by exploiting debt mispricing in the outside credit market. Restrictions to information sharing can create gains for these borrowers by reducing the intensity of the informational hold-up. However, if credit records are accurate predictors of credit worthiness, restrictions to information sharing can negatively affect credit outcomes by increasing information asymmetries between banks and borrowers in the market. By the same token, the informational hold-up may worsen for clean borrowers, as inside banks take advantage of the inability of outside banks to distinguish them from bad borrowers. The latter is especially important for those borrowers who (before the imposition of restrictions) have maintained an unblemished credit history.

2.1 Set-Up

Consider an economy with a continuum of borrowers individually characterized by the pair \((\theta, \delta)\), where \(\theta \in \{g, b\}\) refers to the type of borrower (good or bad) and \(\delta \in \{c, s\}\) refers to the borrower’s summarized credit history (clean or stained). Assume the fraction of \(g\)-borrowers is commonly known to be \((1/2)\). The type \(\theta\) is the only determinant of the future probability of repayment of the borrower \((\theta = g\) having the larger repayment probability). At the same time, \(\delta\) is determined jointly by \(\theta\) and some “past luck shock” (e.g. past health shocks) that does not affect future repayment probabilities. In this fashion, \(\delta\) is an imperfect signal about \(\theta\). Specifically, we assume that the precision of this signal is determined by the parameter \(\pi\):

\[
\Pr(\theta = g \mid \delta = c) = \Pr(\theta = b \mid \delta = s) = \pi > 1/2
\]
We assume borrowers must participate in the consumer credit market in order to consume (perhaps because they receive their income after the consumption stage): not borrowing would imply zero consumption and an infinite marginal utility of consumption\(^14\).

In addition, there is a preestablished set of inside and outside banks for each borrower. Inside banks are defined as those with which the borrower has a preexisting relationship, and therefore may have an informational advantage over outside banks.

### 2.2 Benchmark equilibria

Consider an arbitrary credit outcome, \(y_i\) for borrower \(i\) (e.g., the stock of debt, the interest rate, the maturity of loans, etc.). The following benchmark equilibria will be useful:

1. Full Information: Assume that both inside and outside banks observe \(\theta\). In this case, both inside and outside banks will equally offer \(y_g\) to the \(g\)-borrower and \(y_b\) to the \(b\)-borrower \((y_g > y_b)\)\(^15\). This equilibrium, by fairly pricing each and every borrower is taken as the first-best outcome.

2. No Information: Assume no bank observes neither \(\theta\) nor \(\delta\). In this case, both inside and outside banks will equally offer \(\bar{y} = \frac{1}{2}y_b + \frac{1}{2}y_g\) to all borrowers \((y_g > \bar{y} > y_b)\). It is assumed that borrowers cannot feasibly signal their type to borrowers using alternative strategies (e.g. by posting collateral).

3. Partial Information - Credit histories: Assume no bank observes \(\theta\) but all banks observe \(\delta\). In this case, both inside and outside banks will equally offer \(y_c\) to the "clean" borrower and \(y_s\) to the "stained" borrower, where:

\[
\begin{align*}
y_c &= y_g \pi + y_b (1 - \pi) \\
y_s &= y_g (1 - \pi) + y_b \pi
\end{align*}
\]

\((y_g > y_c > \bar{y} > y_s > y_b)\) \hspace{1cm} (2)

In this context, the removal of negative information (that is, exogenously and unexpectedly converting all \(\delta = s\) realizations into \(\delta = c\), or equivalently, setting \(\pi = 1/2\) would unambiguously drive the decentralized outcome further away from the first best, making it equivalent to the case of no information discussed above.

\(^{14}\)Consumer credit contracts are assumed to follow the standard one-period, non-collateralized loan contract proposed by Livshits et al[2011]. In this case, the type \(\theta\) could be interpreted as a particular non-pecuniary cost of default.

\(^{15}\)Given that the credit outcome could well be the interest rate on debt, this inequality should be read as "\(y_g\) is more beneficial, or less onerous, than \(y_b\)".
Table 1: Equilibrium Outcomes

<table>
<thead>
<tr>
<th>Inside</th>
<th>Outside</th>
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<tbody>
<tr>
<td>(g, c)</td>
<td>y_c</td>
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<tr>
<td>(g, s)</td>
<td>y_s</td>
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<tr>
<td>(b, c)</td>
<td>y_b</td>
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<tr>
<td>(b, s)</td>
<td>y_b</td>
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Table 2: Equilibrium Outcomes, $\pi = 1/2$

<table>
<thead>
<tr>
<th>Previously...</th>
<th>Inside</th>
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<tr>
<td>(g, c)</td>
<td>$\bar{y}$</td>
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<td>(g, s)</td>
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<tr>
<td>(b, c)</td>
<td>$y_b$</td>
<td>$\bar{y}$</td>
</tr>
<tr>
<td>(b, s)</td>
<td>$y_b$</td>
<td>$\bar{y}$</td>
</tr>
</tbody>
</table>

2.3 Equilibrium with soft information

The equilibrium we propose in this paper is as follows. Assume only the inside bank observes both $\theta$ and $\delta$ for its own borrowers. The outside bank only observes $\delta$ for those borrowers with whom it does not have a preexisting relationship. This assumption can be justified on the grounds that there is a certain class of (soft) information that is collected by inside lenders through repeated interaction with borrowers, and which cannot verifiably be shared. Assume also that the inside bank offer to its own borrowers is a best response to the first move of the uninformed, outside lender. The equilibrium set of outcomes is given in Table 1.

In this case, inside banks can generate rents from their informational advantage by undervaluing the debt of borrowers with past occurrences of default that have valuable information, which are unobservable to the outside bank. Moreover, the debt of good (bad) borrowers will be under(over)-valued in the outside credit market. For instance, the fair outcome of $g$-borrowers is $y_g$, but the inside bank exploits the full rent that is permitted by the inability of the outside bank to observe the true type. In this fashion, inside banks will have incentives to exploit their informational advantage and undervalue good borrowers’ debt, thus holding good borrowers in a form of informational hold-up.

Now assume that, starting from this equilibrium, negative information is fully removed, thus reducing $\pi$ to $1/2$. The equilibrium set of outcomes is presented in Table 2.

Although $b$-borrowers’ credit outcomes from inside banks remain unchanged, the same outcomes for $g$-borrowers change depending on their default history. Specifically, $g$-borrowers
with a “clean” credit history are negatively affected by the information removal. This effect is likely to create a loss in efficiency, as this change is against the direction of fair pricing.

The intuition for the worse credit outcomes for group \((g, c)\) is that information asymmetries across banks and borrowers are exacerbated by the removal of information: outside banks can no longer distinguish lucky from unlucky borrowers, so they pool all borrowers when pricing the loans.

### 2.4 Summary of predictions

In a world where inside banks have no private information, restrictions to information sharing are inefficient as long as credit records are accurate predictors of credit worthiness. They lead to debt mispricing by intensifying information asymmetries between banks and borrowers. However, if inside banks know more about the true quality of borrowers than outside banks, the efficiency effect of such restrictions is not clear, even when credit records are accurate predictors of credit worthiness. The costs from increased bank-borrower information asymmetries may be offset by gains from net reductions in the cost of information asymmetries between inside and outside banks.

The predictions of the model regarding credit outcomes for borrowers with different credit histories is the theoretical motivation behind our choice of treatment and control groups. The “clean” treatment groups described above encompass both \(g\)- and \(b\)-borrowers. Assuming the proportion of \(g\)-borrowers is the largest in this group (clean borrowers are far more likely to be good), the causal effect of the removal of negative information is a deterioration in credit outcomes post removal. The “fresh start” provision is expected to negatively affect borrowers with impeccable credit histories.

### 3 Estimation and Descriptive Statistics

We exploit the cross-sectional variation induced by the December 2007 eligibility threshold to identify the causal effect of the information removal on credit outcomes. The provision removed negative information of borrowers that had settled their defaults before the end of December 2007. Consequently, it also affected borrowers with no prior defaults as their clean records became indistinguishable from those of past default borrowers who were given clean records by the provision. The interest here is on estimating the effect of the provision on those clean (in what follows, treated) borrowers. However, this effect will be confounded in the time series with the potential influence of other contemporaneous aggregate shocks. We use borrowers that had settled their defaults closely after December 2007 (from January to September of
temporarily unaffected by the removal of information, to construct a counter-factual control group. We take care to remove borrowers from the control group as soon as one year has passed since their payment, as their negative information is to be removed at that point by the rules of the provision. The pre-period (i.e., before the provision is implemented) corresponds to all quarters prior to 2009. Since by January 2010 all potential control borrowers have effectively been treated, the post-period is restricted to the first three quarters of 2009.

Ideally, the treatment and control groups should be constructed using data about credit histories directly extracted from PCB. Unfortunately, this information is confidential and only available under the same conditions imposed on lenders, that is, under the authorization of the borrowers whose information is to be collected. We therefore rely on the construction of individual credit histories from the Public Credit Registry data under the assumption that the latter closely resemble those in PCB databases. In other words, the confidentiality of PCB datasets forces the analysis to make several assumptions with regard to the behavior of PCB using data only from the Public Credit Registry.

An important consideration is the particular definition of default that will be employed throughout the econometric estimations below. In what follows, we will consider a borrower to be in a default state on a given loan when the latter is classified as rating “E”. According to regulation by the FSO, a loan must be categorized under rating “E” when the probability of default is considered to be $16. This default stain is assumed to be a permanent feature of the credit history of borrower $i$ except when altered by the fresh start policy intervention.

Note that we also restrict the analysis to borrowers who commit no defaults during 2009. The provision states that in the event of default (during 2009), a borrower’s negative records would be reinstated at the PCBs, and only removed after the new regime’s legal maximum retention time of four years. However, because treatment and control groups may have different default incentives (e.g., control borrowers may have stronger incentives not to default in order to qualify for the information removal), we also explore differences in financial distress during 2009 for treatment and control groups. For those specifications we remove the no-default-during-2009 restriction on the data, and instead consider all borrowers who classify in each of the groups according to their past default and default-settling behavior, regardless of their concurrent default status.

We note that several potentially interesting groups of borrowers are missing from the current analysis. First, borrowers whose information is removed, which roughly correspond to the stained borrowers in the analytical framework, have been left out of the analysis. These borrowers have been the subject of most prior empirical work, and our focus here is elsewhere.

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$^{16}$Our results will be submitted below to the robustness check of using a different category or several thresholds for the number of days in arrears as alternative definitions of default.
We also do not explore the credit outcomes of those borrowers who eventually classify for the provision because they cancel their past defaults after the provision is announced and during the grace period from January 2009 to June 2009. In future versions of the paper we may explore the credit outcomes of these potential treatment borrowers to examine in more detail the overall welfare consequences of the policy.

### 3.1 Cross-Section

Tables 3 and 4 present a summary of descriptive statistics at the end of 2008:IV (that is, right before the removal of negative information) for a number of variables that reflect credit outcomes and average contractual characteristics for both groups. The main variables of interest include:
1. Loans, which corresponds to the overall value of all loans obtained by a given borrower in a given quarter (loans are defined as financial obligations whose origination date is recorded to be within the previous 90 days),
2. Average interest rate, which corresponds to the weighted average of contractual (ex-ante) interest rate of loans originated within the previous 90 days,
3. Average loan maturity, defined as the weighted average of contractual (ex-ante) maturity of loans originated within the previous 90 days and
4. Average rating, defined as the weighted average of the rating of loans. The tables, as most of the empirical results presented below, employ rating “E” to characterize a default event (as described above) and construct the treatment and control groups of our empirical analysis.

The subsample includes 1,592,773 borrowers with an average total debt of 12.0m of Colombian pesos. The median borrower’s debt is 5.94m. Finally, Table 5 presents the evolution of the number of treated and controlled borrowers during our period of analysis.

As expected, clean borrowers look different from control borrowers in both, loan contract char-
Table 4: Descriptive Statistics: Control group

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Loans (mill. COP)</td>
<td>0.93</td>
</tr>
<tr>
<td>Total Debt (mill. COP)</td>
<td>10.1</td>
</tr>
<tr>
<td>Nr. of Lenders</td>
<td>1.37</td>
</tr>
<tr>
<td>Average Interest Rate (%)</td>
<td>22.78</td>
</tr>
<tr>
<td>Average Maturity (yrs)</td>
<td>2.85</td>
</tr>
<tr>
<td>Average Rating</td>
<td>1.89</td>
</tr>
</tbody>
</table>

Table 5: Number of individuals: Treatment and Control

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>60,766</td>
<td>59,600</td>
<td>47,307</td>
<td>32,432</td>
<td>25,641</td>
<td>23,696</td>
<td>22,633</td>
<td>22,532</td>
</tr>
<tr>
<td>Control</td>
<td>1,333,870</td>
<td>1,313,088</td>
<td>1,314,663</td>
<td>1,051,331</td>
<td>1,268,666</td>
<td>1,241,835</td>
<td>1,213,270</td>
<td>1,219,275</td>
</tr>
</tbody>
</table>

acteristics and risk ratings. These differences are a concern if they are the result of self-selection of borrowers into the provision along borrower characteristics that are related to changes in future credit demand such as changes in expected income. To be precise the concern would be that borrowers distort their repayment behavior in order to qualify for the provision. As claimed before, this is unlikely to have happened as the provision was only included in the final law and not in the legislative project which was announced before hand. In addition, because classification for the provision requires borrowers to be in good standing, the incentives to distort repayment for a control borrower, had there been any, remain in place after the initial information removal of January 2009 and until his/her information is erased. Once the information is erased and incentives disappear, by construction the borrower is no longer part of the control, and this potential issue is thus no longer relevant.

Perhaps a more important concern is instead that these differences also reflect differential pre-trends in debt issuance, which can bias our estimates. For example, since control borrowers have recently paid their defaults their debt may have entered a downward trend if their default settlement reflects a decision to exit the credit markets, or an upward trend if their default settlement gives these borrowers renewed access to credit markets. We control for these potential differences in the evolution of expected income, by allowing both groups of borrowers to have differential trends in the estimation. We explore more this possibility next.

3.2 Time-Series

Our main identification assumption is that the debt issuance of clean borrowers affected by the information sharing restrictions and of the control group would have evolved in a similar manner in the absence of the provision. Figure[1] shows evidence that validates this assumption for
Figure 1: Average (log) debt issuance

![Figure 1: Average (log) debt issuance](image)

our sample. It plots the time series of the average (log) debt issuance of treatment and control borrowers, before and after the last quarter of 2008 (vertical line) after which the information of default borrowers is removed from the market. Consistent with the identification assumption, average debt issuance of treatment and control borrowers follow parallel trends before the first quarter of 2009. After information removal, control borrowers’ debt issuance continues the pre-information-sharing-restriction trend, while clean borrowers’ debt issuance declines.

One preliminary observation can be derived from Figure 1. Clean (treatment) borrowers appear to be negatively affected by the restriction to information sharing. This is consistent with the analytical framework discussed in the previous section, and suggests the potential efficiency costs from increasing information asymmetries can be in practice non trivial. In Section 4 we explore whether these costs stem from increased information asymmetries across borrowers and lenders, or also across lenders, by exploring the differential effect of credit outcomes from inside and outside banks.

3.3 Differences-in-Differences Approach

The previous evidence suggests that credit outcomes of control borrowers represent a valid counter-factual for those of the treatment borrowers and provides a rationale for the DD esti-
mation based on the following borrower fixed-effects specification:

\[ y_{it} = \alpha_i + \lambda_t + \delta \times \text{Treatment}_i \times t + \beta \times \text{Treatment}_i \times \text{Post}_t + \epsilon_{it} \]  

(3)

The dependent variable is the credit outcome (e.g., debt) of borrower \( i \) at time \( t \). The right-hand side variables include borrower fixed effects, which capture any time-invariant unobserved heterogeneity across borrowers, and calendar quarter dummies, which account for all macroeconomic and aggregate shocks that affect credit demand and supply. The dummy \( \text{Treatment}_i \) is equal to one if borrower \( i \) is in the treatment group. The specification includes differential trends for the treatment and control group. Finally, the specification includes the interaction between the treatment variable and a dummy \( \text{Post}_t \) equal to 1 after December 2008.

The coefficient on the interaction, \( \beta \), is the DD estimate of the effect of information sharing restrictions, holding available borrower information constant. It measures how the difference between credit outcomes of treatment and control borrowers changes after the information removal.

Specification (1) is estimated on a 9-quarter panel (5 pre-information sharing restrictions, 4 post-information sharing restrictions). All standard errors are estimated allowing for clustering at the bank cross-time level to account for serial correlation in outcomes. Excluded for brevity, all the results are robust to clustering standard errors at the borrower level, and using alternative definitions of default (e.g., 90 days late and classification of loan to D category).

4 Results: Restrictions to Information Sharing and credit outcomes

We identify the effect of information removal on the subgroup of borrowers with clean records. In future versions of the paper, and in order to best examine general welfare effects, we may analyze the sub-samples of borrowers who (i) see their defaults immediately erased after December 2007, (ii) had settled their defaults before enactment of the law but only classify for the provision after January 2009, (iii) settled their defaults after enactment of the law (and before June 2009) thus endogenously classifying for the provision during the grace period, and (iv) those borrowers who remained in default after the enactment.

\(^{18}\) The inclusion of these trends follow Angrist and Pischke (2009); it implies that specification (3) is likely to underestimate any existing permanent effect of the intervention on growth rates of the credit outcome in question.

\(^{19}\) The database employed in this paper does not include borrower information that could be used as individual, time-varying controls in specification (3). Only individual, unobserved, fixed controls and group-level, time-varying controls are taken into account through borrower and time fixed effects.
Table 6: Estimated Effect of Information Sharing Restrictions

<table>
<thead>
<tr>
<th>Dep. Var.</th>
<th>Log Debt</th>
<th>Log Debt Issuance</th>
<th>New Loans</th>
<th>New Loans (Inside Banks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>-0.115**</td>
<td>-0.163**</td>
<td>-0.440**</td>
<td>-0.628**</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.040)</td>
<td>(0.192)</td>
<td>(0.180)</td>
</tr>
<tr>
<td>FE</td>
<td>Borrower, Quarter</td>
<td>Borrower, Quarter</td>
<td>Borrower, Quarter</td>
<td>Borrower, Quarter</td>
</tr>
<tr>
<td>N</td>
<td>10,107,280</td>
<td>8,168,120</td>
<td>10,180,844</td>
<td>10,040,094</td>
</tr>
<tr>
<td>Clustering</td>
<td>Bank $\times$ Time</td>
<td>Bank $\times$ Time</td>
<td>Bank $\times$ Time</td>
<td>Bank $\times$ Time</td>
</tr>
<tr>
<td>Nr. of Clusters</td>
<td>45 x 8</td>
<td>44 x 7</td>
<td>51 x 8</td>
<td>50 x 8</td>
</tr>
</tbody>
</table>

4.1 Debt Response to Information Sharing Restrictions

Table 6 shows the estimated effects of information sharing restrictions using specification (1). We use four different dependent variables: (log) debt, (log) debt issuance, (log) new loans and (log) new loans with inside banks. Consistent with Figure 1, the restriction on information sharing has a significant and negative effect on debt and debt issuance for clean borrowers. The point estimates indicate that a borrower’s debt declines by 11.5% after December 2008 (column 2). In the rest of the table we explore the potential explanation behind the effect on clean borrowers: it reflects a fall of net debt issuance (16.3%, column 3), and particularly of new loans (44%, column 4). Interestingly, the decrease in debt is especially sharp when conditioning the analysis to inside banks with whom the borrowers already have a lending relationship, and should thus not be affected by the information sharing restriction (62.8%, column 5). In Table 7 we explore the relative switching behavior of clean borrowers from inside to outside banks, and relative changes in the fraction of debt issued by outside banks to clean borrowers. We find that clean borrowers are less likely to switch banks after the imposition of information sharing restrictions (column 2), and they also raise a lower fraction of their debt from outside banks (column 3). These findings suggest that borrowers do not substitute inside debt for outside debt, which explains the overall fall in their total debt.

The findings likely reflect information asymmetry costs from restrictions on information sharing. The removal of negative information of stained borrowers pools together clean and stained borrowers, thus effectively depreciating the value of clean records for the former. This increased information asymmetry between lenders and borrowers negatively affects clean borrowers’ access to outside debt, which is consistent with the results in Table 7. The restrictions on information sharing should in principle not affect their access to inside debt, to the extent that removal of records from the PCBs does not really affect the information of inside banks (e.g., banks keep the original records of their clients when they downloaded them from PCB to evaluate the credit application, keep records of their own loans, and also likely posses soft information on the borrower). However, information sharing restrictions set incentives for inside banks to
Table 7: Estimated Effect of Information Sharing Restrictions

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Switch to Outside Bank Dummy</th>
<th>Share of Debt Issued by Outside Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta )</td>
<td>-0.057**</td>
<td>-0.051**</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Borrower and Quarter FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>( N )</td>
<td>10,180,844</td>
<td>10,077,879</td>
</tr>
<tr>
<td>Level of Clustering</td>
<td>Bank ( \times ) Time</td>
<td>Bank ( \times ) Time</td>
</tr>
<tr>
<td>Nr. of Clusters</td>
<td>8 x 8</td>
<td>51 x 8</td>
</tr>
</tbody>
</table>

take advantage of their informational advantage over outside banks. Increased information asymmetry between lenders can thus affect clean borrowers’ access to inside debt, which is consistent with the results in Table 6, particularly column (5).

### 4.2 Financial Distress

As noted before, classification for information removal required individuals to remain in good standing throughout 2009, and thus the treatment and control groups are constructed by imposing discipline in the post period. This is done by construction, following the rules of the provision that would trigger the restoring of negative information to PCBs in case of default. While all agents have incentives to remain in good standing to keep classifying for the provision, it is likely that the control groups have higher incentives to remain in good standing, as they have not benefited from the information removal while treated borrowers have. We test whether these potential differences in incentives materialize in differences in default rates across groups immediately after the end of 2007:IV. We follow Hertzberg, Liberti and Paravisini (2011) to estimate the following default specification which compares the default hazard rate of treated borrowers to control borrowers in a manner analogous to specification (3):

\[
1[\text{Default}_{it} = 1|\text{Default}_{it-1} = 0] = \lambda'_i + \delta' \times \text{Treatment}_i \times t + \beta' \times \text{Treatment}_i \times \text{Post}_t + \epsilon_{it} \quad (4)
\]

The left hand side variable is a dummy equal to zero as long as borrower \( i \) is in good standing, turns to one if default happens at time \( t \), and drops out of the sample afterwards. As in (3), the specification includes time dummies \( \delta' \), and the right hand side variable of interest is the interaction term \( \beta' \). The estimated coefficients on these interaction terms are shown in Table 8. Preliminary results suggest that borrowers in the treatment group do not experience significant changes in their probability of default after the imposition of information sharing restrictions. This result suggests that the patterns in Table 6 cannot be explained by endogenous self-selection of borrowers to keep qualifying for the provision after the initial removal of information during January 2009.
The evidence presented thus far suggests information sharing restrictions can generate efficiency costs by exacerbating information asymmetries between borrowers and clients and across lenders. These results bear on the informational efficiency of the consumer credit market and the efficacy of regulating this market with restrictions to information sharing. In future versions of the paper we may explore credit outcomes for borrowers whose records are removed both, immediately during the first quarter of 2008 and throughout 2009 as part of the provision, to better assess the effectiveness of the policy in reaching its desired objective. We may also explore the effect of the policy on other groups of borrowers, such as those that were encouraged to settle their defaults by the provision during the grace period, to better assess the overall welfare consequences of the policy.

5 Conclusions

We explore the effect of information sharing among lenders on credit outcomes in the unsecured consumer credit market. To advance in isolating the causal effect, we exploit a natural experiment in Colombia made possibly by the Fresh-Start provision of Law 1266/2008, which erased from Private Credit Bureaus detailed information about past defaults that had been settled exogenously sufficiently long before the law’s enactment. Using a Differences-in-Differences approach, we find a significant decrease in debt issuance for clean borrowers who had not defaulted prior to the law’s enactment, relative to borrowers whose settled defaults were not removed by the provision. After the information removal, clean borrowers switch banks at a lower rate and also issue less debt with pre-existing lenders, likely because outside banks can no longer distinguish them from past default borrowers whose records were cleaned by the provision, and because the information removal increases the informational hold-up of inside banks. The evidence suggests that restrictions to information sharing generate efficiency costs from increased information asymmetry both, between banks and borrowers, and between banks. These results bear on the informational efficiency of the consumer credit market, and the efficacy of regulating this market with restrictions to information sharing. In future versions of
the paper we will explore effects on other borrowers in the economy, and thus better assess the welfare consequences of these restrictions.

References


DEGRYSE, H., AND ONGENA, S. Distance, lending relationships, and competition. Journal of Finance 60 (2005), 231–266.


