Rising Prices While Struggling: Financial Constraints and Price Setting of Non-Financial Firms

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Abstract

This paper investigates the interaction between financial constraints faced by firms and their price setting behavior. Based on Banque de France monthly business survey data and balance sheet data, we explore the the financial situation of firms and the adjustments of producer price they set. We found systematic differences in the frequency of price changes between financially constrained and unconstrained firms. When firms are financially constrained, they are characterized, on the one hand, by greater downward rigidity and, on the other, by greater upward flexibility.

Codes JEL: E31, E32, G30, G32
Keywords: producer price setting, firm financial constraints

1 Introduction

Price setting and, particularly, failures to efficiently adjusting prices, is a classic object of investigation in economics. The setting of producer prices, notably, has been elusive, due to scarsity of available data. However, understanding how firms decide to set their prices is of the utmost importance. Indeed, Ben Bernanke noted that a better understanding of the factors that determine pricing behavior of "price setters themselves, namely businesses" is one of the major unresolved issues for monetary policymakers.[1]

With soaring prices and firms struggling to cope with business challenges, the relationship between price setting of firms and their finances has attracted attention. This relationship has been recently investigated by several contributors. However, both theoretical and empirical results appear contradictory.

From a theoretical standpoint, the financial situation of firms could affect price setting for several reasons, potentially resulting in upward or downward rigidities or asymmetries of price adjustements. In the first instance, financial distress may basically alter the cost structure of firms: constrained firms may choose to adjust their prices upwards in order to pass on these costs to customers or increase their mark-up in markets with low price elasticity. The upward adjustment is likely to be amplified in times of crisis when financial constraints bite (see Gilchrist et al. [2017]). In the case of downward asymmetry, constrained firms basically cannot engage in market-share capture strategies via price cuts because they do not have the resources to accordingly increase their production capacity (see Balleer et al. [2017]).

From an empirical point of view, Gilchrist et al. [2017] show that the financial situation (and in particular, the liquidity) of US firms before the 2008 crisis had a significant impact on their pricing strategy during the crisis: less liquid firms (based on the ratio of the amount of cash and short-term investments to the company's total balance sheet) resorted to price increases, despite the decline in aggregate demand, in order to preserve their liquidity. Antoun de Almeida [2015] has also highlighted in Europe the existence of a positive relationship between financial constraints and sectoral inflation for

[1] June 2008 speach on "Outstanding issues in the analysis of inflation".

the PIGS countries of the Euro Area.

In this paper we investigate the relationship between price adjustments at the extensive margin (i.e., the frequency of price changes) and the finances of French manufacturing firms. Our analysis is based, on the one hand, on Banque de France monthly business survey data to gauge price setting of firms and, on the other, on their balance sheet data to assess their financial constraints. We found systematic differences in the frequency of price changes between financially constrained and unconstrained firms. When firms are financially constrained, they are characterized, on the one hand, by greater downward rigidity and, on the other, by greater upward flexibility.

Section 2 describes firms' financial situation and section 3 their price setting. Section 4 explores their interaction. Finally section 5 concludes.

2 Financial constraints of firms

In this section we explore the characteristics of firms and, in particular, their financial situation, based on their balance sheets data.

2.1 Balance sheet data

Our analysis focuses on a sample of about four thousand firms responding to the business survey almost continuously between 2010 and 2020, and for which balance sheet information is available in the FIBEN (FIchier Bancaire des ENtreprises in French) financial statement data base. The latter is based on fiscal documents, including annual balance sheet for firms with sales at least equal to 750 thousand euros, and contains detailed information on firms' activities and size.

Balance sheet information is enriched with some variables obtained from the Banque de France manufacturing business survey, which are mostly based on qualitative answers.

2.2 Firm characteristics in the manufacturing sector and their financial constraints

The average characteristics of firms in the manufacturing sector are reported in the first column of Table 1.[2] Over the period, firms have on average total assets of about 53 million euros and yearly revenues of 69 million euros. Both median total assets and revenues are though much below, about 13 and 19 million euros, respectively (see the third column of Table 1). Indeed, the distribution of assets and revenues across firms is very right-skewed, as there are fewer large companies than small firms. The mean leverage ratio (i.e., financial debt to total assets) is 22% and its median is 17%. The average and median operating cash flow (OCF) are 7% and 8%, respectively.

The mean (and median) rate of capacity utilisation is around 75%, implying that on average firms are exploiting three fourth of their production capacity.

Concerning demand and costs, on average firms increased their yearly revenues by 1% and the signs of the change in received orders and in commodity prices reported in Table 1 also suggest that both increase over the period.[3]

There are several different possible indicators of firms' financial constraints. Typically, the most constrained firms are small, indebted firms, with low self-financing capacity.

Indeed, small firms face larger information asymmetry and agency costs than larger firms, so that the cost of external financing is higher and access to financing more difficult. They have little or no access to market financing and are mainly financed by bank debt. Small firms are thus relatively more financially constrained than larger firms. The size of a firm can be defined in different ways. In section 4.2 we will proxy firm size with the natural logarithm of its total assets.

The most indebted firms are also the most financially constrained, as the marginal cost of external financing increases with debt ratio and high

[2] All variables are winsorized at the 1st and 99th percentiles.

[3] The statistics on these variables result from qualitative answers to the business survey and cannot be interpreted in quantitative terms.

	Mean	Q1	Q2	Q3	SD	N.panel obs.
total assets (K euro)	53,283	4,674	13,233	40,919	125,110	31,454
revenue (K euro)	68,834	7,063	19,448	57,653	149,081	31,454
leverage ratio (%TA)	0.22	0.06	0.17	0.33	0.20	31,454
OCF ratio (%TA)	0.07	0.03	0.08	0.13	0.10	31,454
utilisation capacity rate (%)	75.12	67.00	76.67	85.00	13.60	30,199
Δ revenue	0.01	-0.06	0.01	0.08	0.15	30,768
Δ orders †	4.67	-8.33	4.17	16.67	20.70	31,118
Δ commodity price †	4.07	0.00	0.00	8.33	11.31	31,058

Table 1: Manufacturing firm characteristics.
Source: Fiben and Banque de France manufacturing business survey.
Note: The reported descriptive statistics of variables marked with a dagger (†) result from averages of firm qualitative answers to the business survey about variations of received orders and input commodity prices. Thus, they cannot be interpreted in quantitative terms.

debt reduces access to additional financing. We measure a firm's level of indebtness by its leverage ratio, defined as the ratio of financial debt to total assets.

Finally, the lower a firm's self-financing capacity, the more financially constrained it is. Indeed, its cash flow proxies the availability of internal resources, to invest in its productive capital, to pay dividends, and to repay its debts. As indicator of the availability of internal resources, we use the OCF, defined as the ratio of cash flow to total assets. Notice that leverage and OCF are negatively correlated, since the level of indebtedness of the company determines the amount of its interest charges and therefore affects its cash flow. While there exist other ways than exploiting internal resources to finance expenses, self-financing remains the most used financing method for a large majority of small enterprises. We choose OCF as our preferred measure of the degree of financial constraint for the analysis in section 4.1. In section 4.2 we will also control for other dimensions affecting the firm's ability to access additional external resources, like size and indebtedness.

3 Producer price dynamics and price adjustment behavior of firms

Over the period 2010-2020, the dynamics of industrial producer prices has shown two different trends: a steady and continuous increase between 2010 and early 2013, and a subsequent decline until early 2016 (see Figure 1). After a sudden drop with the Covid-19 crisis, they went back to rising again. The fact that industrial producer prices rose during the 2010-2012 period of sovereign debt crisis in the euro zone may be surprising. Macroeconomic explanations can be put forward, notably the rise in commodity prices. Microeconomic explanations, at the level of corporate behavior, may also have contributed.

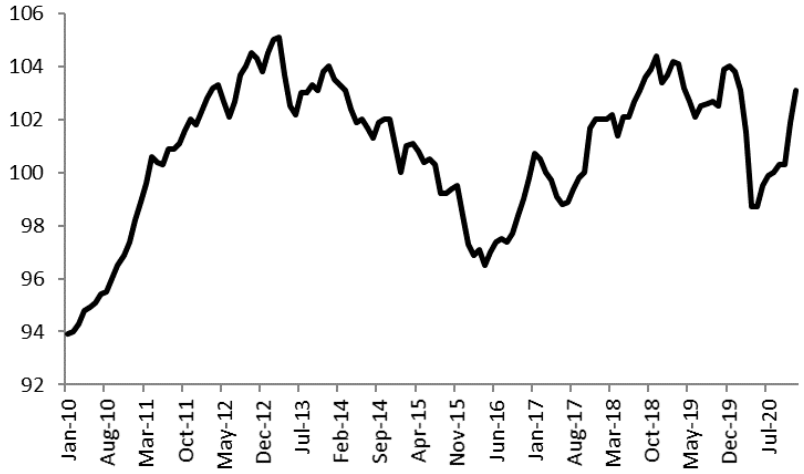


Figure 1: Dynamics of manufacturing prices in France (2010-2020). *Source: INSEE (series A10 BE). Industrial producer price indexes measure changes in the output prices of goods and services.*

This paper explores the possibility that firms' pricing behavior is affected by the financial constraints that they face. To this end, we used the monthly business survey conducted by the Banque de France, to refine this aggregate view and explore in detail pricing behavior of individual firms.

3.1 Businees survey data

We rely on data from the monthly business survey for the manufacturing industry conducted by the local branches of the Banque de France (*Enquête mensuelle de Conjoncture dans l'Industrie* in French).[4] Questions are asked over the phone to company managers before the third working day of the month following the period under review and mostly have multiple choice qualitative answers.[5]

Our analysis of price adjustment behavior is mainly based on the response of firms about the price variation of their most representative finished product (defined at the NACE4 level), with respect to the previous month.[6] Based on companies' qualitative answer, we build a monthly indicator variable *price change*, which is equal to 0, for a given month and firm, if the latter declares that there has been no price change, and to 1 otherwise. Similarly, we generate the indicator variable *price increase* equal to 0 if the firm declares that the price was stable or decreasing, and 1 if it increased. Symmetrically, the monthly variable *price decrease* is equal to 0 if the firm reports that the price was stable or increasing, and 1 if it decreased. Based on this monthly information, we calculate for each firm averages of each of these three variables each year, to proxy for each firm in a given year the monthly average frequency of price changes, increases, and decreases.

We focus on the 2010-2020 period, for which we can follow an almost balanced sample[7] of more than 4 thousand firms[8] in the manufacturing sector.

[4]We only keep firms whose main activity is manufacturing.

[5]The possible answers are given on a seven-point scale coded as follows: (i) large increase: 200, (ii) increase: 100, (iii) slight increase: 50, (iv) stable: 0, (v) slight decrease: -50, (vi) decrease : -100, (vii) large decrease: -200.

[6]See Loupias and Sevestre [2013] for more details. In sections 2 and 4 we also exploit the information about the monthly evolution of orders received and of commodity prices. These are aggregated by firm and year, calculating simple averages of answers. We also exploit the qualitative answer about the rate of capacity utilisation of the firm.

[7]We limit our reference sample to firms in the manufacturing sector for which we have price change responses for at least 9 months each year between 2010 and 2020, as well as balance sheets. While this choice limits the number of firms in the sample, it is crucial to avoid compositional effects. We also restricted the sample to firms with a 12 month balance sheet (98% of the firms for which balance sheet data are available), typically January to end of December.

[8]A firm is defined here as a legal unit, identified by a SIREN code.

3.2 Price dynamics in the manufacturing sector

Over the whole 2010-2020 period, each month on average 11.6% of firms change the price of their most representative finished product (see first column of Table 2). The median frequency of price changes is lower than the average (8.3% versus 11.6%). This is because some firms do not adjust their prices for several consecutive years. The frequency of price changes that characterizes the period 2010-2020 is in the low range of the average frequencies of producer price changes calculated in the past for France.[9] The order of magnitude of the median frequency of price changes is also consistent with the result of survey analysis obtained by Fabiani et al. [2006]: in France 66% of firms report changing their price at most once a year. For comparison, for the United States Nakamura and Steinsson [2008] compute a median frequency of 10.8% for prices of finished goods and 13.3% for intermediate goods between 1998 and 2005.[10]

We also calculate the average frequencies across firms of price increases and decreases. Each month, on average, 7.3% of firms raise their prices and 4.2% lower them. The preponderance of price increases over decreases is a stylized fact typical of microeconomic producer, as well as consumer, price dynamics.[11]

Figure 2 shows the evolution of the monthly frequency of price changes averaged across firms each year between 2010 and 2020 (black line), as well as its breakdown between price increases (red long dashed line) and price decreases (blue short dashed line). Between 2010 and 2012, a period characterized by the sovereign debt crisis in the Eurozone, manufacturing firms frequently changed their prices: 14.7% of prices changed each month (see the third column of Table 2). During this period, more than two-thirds of these

[9]The average frequency of price changes corresponding to transactions calculated by Gautier [2008] between 1994 and 2005 on the basis of INSEE data is similar to 13%. That calculated by Loupias and Sevestre [2013] between 1998 and 2005 on the basis of the Banque de France business survey is 18%. Vermeulen et al. [2012] find that in France 11% of the prices of goods, excluding food and energy, change each month.

[10]The one calculated by Dedola et al. [2019] for Denmark is 10%.

[11]See, for example, Gautier [2008] for producer prices and Berardi et al. [2015] for consumer prices in France.

	2010-20		2010-12	2013-16	2017-2020
Frequency (%) of:		SD			
price changes (mean)	11.6	16	14.7	10.4	10.6
(median)	8.3		8.3	8.3	8.3
price decreases (mean)	4.2	10	4.3	5.4	3.0
price increases (mean)	7.3	12	10.2	4.9	7.5
N.firms	4,234		3,122	3,401	3,265
N.panel obs.	31,454		8,501	11,353	11,600

Table 2: Frequency of firm price changes between 2010 and 2020.
Source: Banque de France manufacturing business survey.
Note: Statistics on the panel data, so that each observation has the same weight.

changes correspond to price increases (10.2%, that is, about 3 percentage points more than over the entire period), while 4.3% of firms decrease their prices.[12]

The dynamics of price adjustment are very different from 2013 to 2016. Only 10.4 percent of prices are adjusted each month (see the fourth column of Table 2). This echoes the results available for France for consumer prices showing that the frequency of changes decreases with the level of inflation (Berardi et al. [2015]). Table 2, in addition, shows that between 2013 and 2016 price decreases are more frequent than increases on average (5.4% versus 4.9%). This fact is atypical in the literature on microeconomic price dynamics,[13] but consistent with the results of Berardi et al. [2015] in periods of low inflation.[14]

[12]These dynamics are in line with the dynamics of the INSEE PPI index represented by Figure 1, which aggregates all price changes of individual firms. The business survey data do not allow us to quantitatively analyze the size of price increases and decreases, which contribute with the frequency of these adjustments to determine aggregate inflation. Nevertheless, Berardi et al. [2013] show that time variations in inflation come more from variations in the frequency of price changes than from variations in the size of price changes.

[13]Fabiani et al. [2006], for example, report that in France, Portugal and the Netherlands price increases account for about 70% of price changes by firms.

[14]Berardi et al. [2015] show that the decrease in the frequency of consumer price changes when the inflation level was below 1% in France was mainly due to a decrease in the frequency of increases coupled with a more modest increase in the frequency of decreases. Moreover, they show that, compared to previous episodes of inflation below 1%, the 2013-2014 period of low inflation was characterized by significantly more frequent individual price declines.

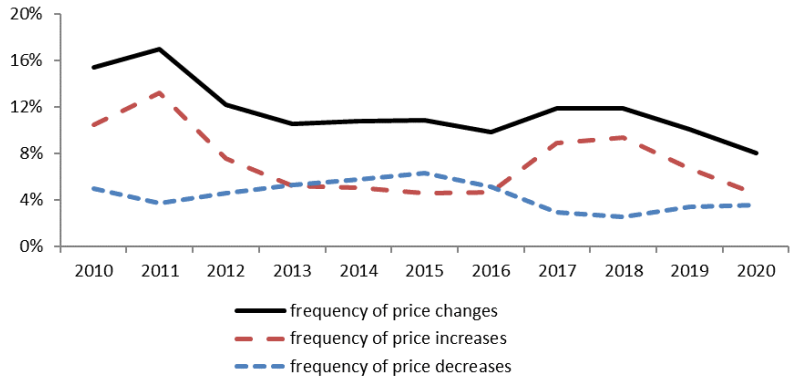


Figure 2: Annual average of the monthly frequency of price changes. *Source: Banque de France manufacturing business survey.*

After 2016, the frequency of price changes slightly rises. Indeed, though the frequency of price decreases drops to 3%, the rise of the frequency of price increases to 7.5% more than compensate the former.

We now turn to describing firm characteristics, mainly based on their financial statements. Then, section 4 investigates the heterogeneity of firm price adjustment, depending on their financial constraints.

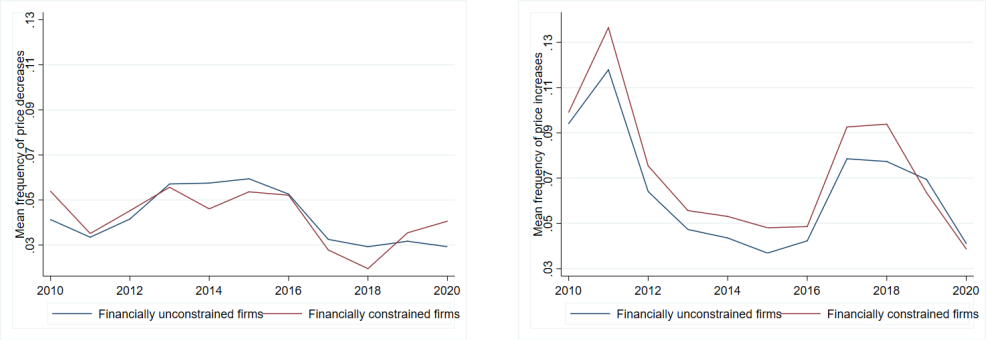
4 Financial constraints and price adjustment

Based on the microeconomic data described in the previous sections, we now investigate the interaction between firm financial characteristics and their price setting behavior.

Section 4.1 descriptively explores systematic differences in price adjustment for firms financially constrained and not, while section 4.2 econometrically investigates more in depth how the existence of financial constraints interacts with price setting, controlling for firm fixed effects, as well as for subsectoral time fixed effects.

4.1 Descriptive evidence

We start by descriptively exploring systematic differences in price setting behavior for firms financially constrained and not.

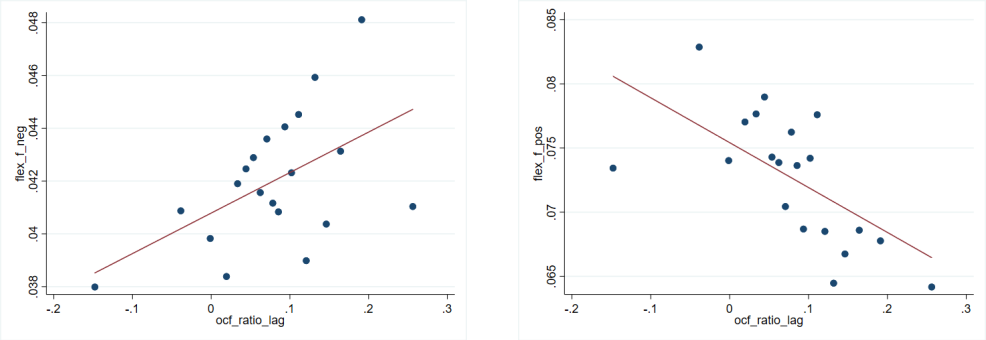


(a) Price decreases (b) Price increases

Figure 3: Differences in frequency of price decreases (left panel) and increases (right panel) for firms financially contrained (red line) and unconstrained (blue line), respectively. Financially constrained firms are defined by an OCF in the first quartile of the distribution in 2010. Financially unconstrained firms by an OCF in the last quartile of the distribution in 2010.
Source: Banque de France manufacturing business survey and Fiben.

First, we define firms' financial constraints in a simple and static way. That is, a firm pertains for the whole period to the so-called financially constrained group or unconstrained group. Firms with an OCF in the last quartile of the distribution in 2010 are in the financially unconstrained group, while those in the first quartile in the constrained group. Though the definition of financial constraints is over simplistic and does not vary over time in order to limit compositional effects, it reveals a structural difference in price adjustment behavior between financially constrained and unconstrained firms. Figure 3 plots the average frequency of price decreases (left panel) and increases (right panel) for financially constrained and unconstrained firms (red line and blue black line, respectively). The main message of this Figure is that constrained firms adjust their prices upward more frequently than unconstrained firms. They also tend to adjust their prices downward somewhat less frequently.

Second, we explore the relationship between lagged OCF and price setting. The binned scatterplots in Figure 4 represent the effect of financial constraints on price decreases (left panel) and increases (right panel). For each bin of lagged OCF ratio, a dot represents its mean frequency of price



(a) Price decreases (b) Price increases

Figure 4: Binned scatterplots of lagged OCF ratio and frequency of price decreases (lef panel) and increases (right panel), respectively, controlling for year combined with subsectoral (at NACE4 level) fixed effects.
Source: Banque de France manufacturing business survey and Fiben.

decreases or increases, respectively, controlling for time combined with subsectoral (at NACE4 level) fixed effects. The red line visually represents the population regression line of these simple regressions. The main message of this Figure is the asymmetric effect of financial constraints on price decreases (left panel) and increases (right panel). Indeed, constrained firms (that is, those with low lagged OCF ratio) are less likely to decrease their prices and more likely to increase them with respect to firms that are less financially constrained in a given year.

The suggestive evidence conveyed by Figure 3 and 4 is going to be explored further in the following section through an econometric analysis controlling for a wider set of firm characteristics and fixed effects.

4.2 Econometric evidence

In order to refine the descriptive evidence presented in the previous section about the relationship between firms' financial constraints and their decisions of price adjustment, we take now into account a wider set of firm characteristics and fixed effects and turn to an econometric analysis. We also drop the year 2020, to avoid the COVID-19 crisis period.

We start by estimating the following simple specification:

$$\Delta p_{i,t}^{\pm} = \alpha + \beta_1 OCF_{i,t-1} + FE_{s,t} + FE_i + \epsilon_{i,t} \quad (1)$$

where the dependent variable, $\Delta p_{i,t}^{\pm}$, is the extensive margin of price adjustment, i.e., the average monthly frequency of price (downward or upward) change of firm i in year t. Since price setting varies greatly from one product to another, we filter out sector s effects at an extremely fine level (NACE4 category in the sectoral classification) within the manufacturing industry. Sectoral fixed effects are combined with time fixed effects ($FE_{s,t}$).[15] We also control for firm fixed effects (FE_i).

The variable $OCF_{i,t-1}$ capture the lagged operating cash flow of firm i and represents our main proxy for financial constraineds. Columns (Ia) and (Ib) in Table 3 reports the estimated coefficients and SE for specification (1) for the frequency of price decreases and increases, respectively.[16]

Even within the same sector, we find significant heterogeneity in price adjustment behavior according to the degree of financial constraints of the firm and a marked asymmetry in upward and downward price adjustment behavior. Indeed, financially constrained firms, defined here as those with a lower operating cash flow available, are less likely to decrease their prices and more likely to increase them.[17] This is consistent with the intuition that the most constrained firms adjust their prices to generate short-term liquidity.

Quantitatively, if lagged operating cash flow diminishes by 1 percentage point, from its mean 7% to 6%, the frequency of price decreases also diminishes by 0.046 percentage points, from its mean of 4.2% to 4.154%, thus about 1%. In other words, more constrained firms implement less price decreases. The same decrease in the lagged operating cash flow is accompanied by a rise

[15] Antoun de Almeida [2015], for instance, provides an example of the importance of time varying factors affecting sectors, by taking into account the interaction between sectors and oil prices. Indeed, sectors that depend on oil as an input may have higher cash holdings to hedge against oil price fluctuations, and when oil prices rise, these sectors are more likely to increase prices due to higher input costs.

[16] Standard errors are robust and clustered at the firm level.

[17] This asymmetry contrasts with the empirical results of Balleer et al. [2017], who show in Germany that financially constrained firms adjust their prices upward and downward more frequently than unconstrained firms. Firms are categorized as constrained or unconstrained based on their responses to a credit access survey.

of the frequency of price increases of 0.053 pp, from its mean of 7.3, so also almost 1%.

The same conclusion is suggested by the estimated coefficients reported in columns (IIa) and (IIb) of Table 3, respectively for the frequency of price decreases and increases, where a number of controls $X_{i,t-1}$ and $Z_{i,t}$ have been added to specification (1). In particular, in specification (2) we control for the lagged natural logarithm of total assets, which proxies for firm size. It could be also interpreted as proxying financial constraints, since small firms typically have a harder time getting external financing. Moreover, we control for the lagged log difference of sales and the log difference of purchases over the lagged natural logarithm of sales. Finally, we exploit some qualitative variables (whose coefficients can't be intepret quantitatively, though): the lagged variation of orders received, the variation of commodity prices used in the production and its lagged value, as well.

$$\Delta p^{\pm}_{i,t} = \alpha + \beta_1 OCF_{i,t-1} + \gamma X_{i,t-1} + \zeta Z_{i,t} + FE_{s,t} + FE_i + \epsilon_{i,t} \qquad (2)$$

The estimated coefficients for the control variables reported in columns (IIa) and (IIb) of Table 3 suggest that smaller firms, like firms with lower operating cash flow, are less likely to decrease their prices and more likely to increase them.[18] Quantitatively, a 50% decrease in total assets would diminish the frequency of price decreases by 0.371 percentage points (from around the mean 4.2 to 3.8) and increase the frequency of price increases by 0.509 percentage points (from around the mean 7.3 to 7.8).

Moreover, firms whose sales and orders, on one hand, as well as cost of purchases and of commodities in their production, on the other hand, have increased, are also less likely to decrease their prices and more likely to

[18]The fact that larger firms decrease their prices more often is in line with the literature on U.S. PPI (Goldberg and Hellerstein [2009]). The same authors find that larger firms also increase their prices more often, in contrast with our result. However, they also find that, while the frequency of price decreases raises with firm size in all sectors, this isn't the case for price increases. Moreover, Fabiani et al. [2006] suggest that in the several EU countries larger firms review their price more often, though not in France. However, there is no distinction drawn about price increases and decreases.

increase them. These results seem consistent with the intuition that, when demand and costs are rising, price setters are more inclined toward increasing their prices than decreasing them.

Frequency (%) of :	price decreases		price increases	
	(Ia)	(IIa)	(Ib)	(IIb)
lagged operating cash flow ratio	4.575***	4.671***	-5.276***	-5.927***
	(0.925)	(0.957)	(1.155)	(1.158)
lagged (ln) total assets		0.742**		-1.018***
		(0.309)		(0.372)
lagged Δ sales		-0.791*		1.457***
		(0.432)		(0.495)
Δ purchases over lagged (ln) sales		-19.312***		15.904***
		(3.413)		(3.986)
lagged Δ orders		-0.013***		0.017***
		(0.003)		(0.004)
Δ commodity price		-0.123***		0.327***
		(0.008)		(0.011)
lagged Δ commodity price		-0.028***		0.066***
		(0.007)		(0.008)
Firm FE	yes	yes	yes	yes
Sector x Year FE	yes	yes	yes	yes
N.firm clusters	3,623	3,623	3,623	3,623
N.obs.	25,065	25,065	25,065	25,065
R^2	0.49	0.50	0.51	0.56

Table 3: Financial characteristics and price adjustment flexibility (2010-2019): benchmark
Source: Banque de France manufacturing business survey and Fiben.

We then enrich specification (2) with an additional possible proxy of firms' financial constraints, as follows:

$$\Delta p^{\pm}_{i,t} = \alpha + \beta_1 OCF_{i,t-1} + \beta_2 Lev_{i,t-1} + \gamma X_{i,t-1} + \zeta Z_{i,t} + FE_{s,t} + FE_i + \epsilon_{i,t} \quad (3)$$

where Lev_{t-1} is the lagged leverage ratio of financial debt to total assets and the vectors $X_{i,t-1}$ and $Z_{i,t}$ include the same controls as before.

Table 4 suggests that the main result of the previous specification is robust. More indebted firms are significanly less likely to decrease price

(see column (Ia) and (IIa) in Table 4). A higher lagged leverage ratio is also accompanied by more price increases (see column (Ib) in Table 4), though the estimated coefficient looses significance once our main measure of financial constraints, lagged OCF, is included (see column (IIb) in Table 4).

Frequency (%) of :	price decreases		price increases	
	(Ia)	(IIa)	(Ib)	(IIb)
lagged leverage ratio	-1.571***	-1.039*	1.404*	0.701
	(0.592)	(0.608)	(0.720)	(0.741)
lagged operating cash flow ratio		4.276***		-5.660***
		(0.987)		(1.190)
lagged (ln) total assets	0.864***	0.793**	-1.146***	-1.052***
	(0.311)	(0.312)	(0.371)	(0.372)
lagged Δ sales	-0.311	-0.792*	0.822*	1.458***
	(0.418)	(0.432)	(0.475)	(0.495)
Δ purchases over lagged (ln) sales	-19.810***	-19.487***	16.450***	16.022***
	(3.418)	(3.421)	(3.989)	(3.991)
lagged Δ orders	-0.013***	-0.013***	0.017***	0.017***
	(0.003)	(0.003)	(0.004)	(0.004)
Δ commodity price	-0.123***	-0.123***	0.327***	0.327***
	(0.008)	(0.008)	(0.011)	(0.011)
lagged Δ commodity price	-0.028***	-0.028***	0.066***	0.066***
	(0.007)	(0.007)	(0.008)	(0.008)
Firm FE	yes	yes	yes	yes
Sector x Year FE	yes	yes	yes	yes
N.firm clusters	3,623	3,623	3,623	3,623
N.obs.	25,065	25,065	25,065	25,065
R^2	0.50	0.50	0.56	0.56

Table 4: Alternative measure of financial constraints.
Source: Banque de France manufacturing business survey and Fiben.

Table 5 reports the same results as the previous two tables, but standardizing all regressors. This allows to easily compare the relative importance of the independent variables. It suggests that, quantitatively, firm size is the most important determinant of price flexibility: larger firms are able to implement more price decreases and less increases than smaller firms, that are potentially more financially constrained. Lagged OCF ratio is the second most important factor: firms with low availability of operating cash flow, and are likely to be thus financially constrained, decide fewer price increases

and more price decreases. Quantitatively, if the operating cash flow of the previous year declines by one SD, the frequency of price decreases diminishes by about 0.4 SD, while the frequency of price increases rises by about 0.5 SD.

Frequency (%) of :	price decreases			price increases		
	(Ia)	(IIa)	(IIIa)	(Ib)	(IIb)	(IIIb)
std.lagged OCF ratio	0.434***		0.398***	-0.551***		-0.526***
	(0.089)		(0.092)	(0.108)		(0.111)
std.lagged leverage ratio		-0.309***	-0.204*		0.276*	0.138
		(0.116)	(0.120)		(0.142)	(0.146)
std.lagged total assets (ln)	1.144**	1.331***	1.221**	-1.569***	-1.766***	-1.621***
	(0.475)	(0.478)	(0.480)	(0.573)	(0.571)	(0.573)
std.lagged Δ sales	-0.123*	-0.048	-0.123*	0.226***	0.128*	0.227***
	(0.067)	(0.065)	(0.067)	(0.077)	(0.074)	(0.077)
std.Δ purchases over lagged (ln) sales	-0.342***	-0.350***	-0.345***	0.281***	0.291***	0.283***
	(0.060)	(0.060)	(0.060)	(0.071)	(0.071)	(0.071)
std.lagged Δ orders	-0.267***	-0.272***	-0.267***	0.348***	0.354***	0.348***
	(0.064)	(0.064)	(0.063)	(0.078)	(0.078)	(0.078)
std.Δ commodity price	-1.417***	-1.415***	-1.417***	3.755***	3.752***	3.755***
	(0.094)	(0.094)	(0.094)	(0.124)	(0.124)	(0.124)
std.lagged Δ commodity price	-0.333***	-0.334***	-0.334***	0.779***	0.780***	0.780***
	(0.078)	(0.078)	(0.078)	(0.096)	(0.096)	(0.096)
Firm FE	yes	yes	yes	yes	yes	yes
Sector x Year FE	yes	yes	yes	yes	yes	yes
N.firm clusters	3,623	3,623	3,623	3,623	3,623	3,623
N.obs.	25,065	25,065	25,065	25,065	25,065	25,065
R^2	0.50	0.50	0.50	0.56	0.56	0.56

Table 5: Financial characteristics and price adjustment flexibility: standardized variables.
Source: Banque de France manufacturing business survey and Fiben.

Table 6 show, beyond financial constraints, also production constraints may play a role in firm price setting decisions. Indeed, the estimated coefficient for the lagged capacity utilisation rate (CUR) reported in column (IIb) suggest that firms that are using a high percentage of their production capacity tend to increase their prices.

The relationship between financial constraints and frequency of price decreases and increases is not specific to a given period (see Table 7). In particular, the results do not show a significant difference in adjustment behavior between the period of the sovereign debt crisis (2010-2012) and the

Frequency (%) of :	price decreases		price increases	
	(Ia)	(IIa)	(Ib)	(IIb)
lagged operating cash flow ratio	4.671***	4.667***	-5.927***	-6.398***
	(0.957)	(0.974)	(1.158)	(1.183)
lagged (ln) total assets	0.742**	0.775**	-1.018***	-1.093***
	(0.309)	(0.314)	(0.372)	(0.384)
lagged CUR		0.002		0.019**
		(0.007)		(0.008)
lagged Δ sales	-0.791*	-0.882**	1.457***	1.274**
	(0.432)	(0.440)	(0.495)	(0.512)
Δ purchases over lagged (ln) sales	-19.312***	-17.938***	15.904***	17.053***
	(3.413)	(3.486)	(3.986)	(4.041)
lagged Δ orders	-0.013***	-0.013***	0.017***	0.015***
	(0.003)	(0.003)	(0.004)	(0.004)
Δ commodity price	-0.123***	-0.126***	0.327***	0.324***
	(0.008)	(0.008)	(0.011)	(0.011)
lagged Δ commodity price	-0.028***	-0.029***	0.066***	0.064***
	(0.007)	(0.007)	(0.008)	(0.008)
Firm FE	yes	yes	yes	yes
Sector x Year FE	yes	yes	yes	yes
N.firm clusters	3,623	3,569	3,623	3,569
N.obs.	25,065	24,304	25,065	24,304
R^2	0.50	0.51	0.56	0.56

Table 6: Financial and production characteristics and price adjustment flexibility.
Source: Banque de France manufacturing business survey and Fiben.

following period of easing of external financing conditions.

5 Conclusions

Using micro data about price adjustments and financial statements of manufacturing firms in France, we show that financial constraints and price setting interact. We find that there is an asymmetry in pricing behavior for constrained firms. Indeed, when firms are financially constrained, they are characterized, on the one hand, by greater downward rigidity and, on the other one, by greater upward flexibility. This behavior suggests that financially constrained firms seek to preserve their short-term liquidity by raising their prices.

This paper bridges between the literature on corporate finance and the

literature on producer price setting. It suggests that financial frictions are likely to have an influence on inflation dynamics in France. Therefore, like in Gilchrist et al. [2017], while without financial constraints during a crisis both output and inflation should go down, as in the classic Phillips curve, and a central bank could use one tool for both, with financial frictions inflation and output go in opposite directions. The divine coincidence fails to hold and central banks face a trade-off between inflation and output stabilization.

Frequency (%) of :	price decreases		price increases	
	(Ia)	(IIa)	(Ib)	(IIb)
lagged operating cash flow ratio	5.513***	6.033***	-5.458***	-4.620**
	(1.042)	(1.864)	(1.235)	(2.326)
lagged OCF ratio * crisis 2010-12	-2.460		-1.367	
	(1.510)		(1.801)	
lagged OCF ratio * 2010		-3.331		1.025
		(2.686)		(3.457)
lagged OCF ratio * 2011		-2.915		-4.547
		(2.399)		(3.482)
lagged OCF ratio * 2012		-2.446		-3.896
		(2.606)		(3.181)
lagged OCF ratio * 2013		-1.209		-2.190
		(2.644)		(2.890)
lagged OCF ratio * 2014		1.082		-0.059
		(2.642)		(2.878)
lagged OCF ratio * 2015		0.664		-3.022
		(2.720)		(3.030)
lagged OCF ratio * 2016		2.249		-0.358
		(2.592)		(3.012)
lagged OCF ratio * 2017		-3.070		-1.140
		(2.275)		(2.997)
lagged OCF ratio * 2018		-3.337*		0.584
		(2.027)		(3.001)
lagged (ln) total assets	0.669**	0.696**	-1.059***	-1.066***
	(0.308)	(0.312)	(0.375)	(0.377)
lagged Δ sales	-0.753*	-0.751*	1.478***	1.460***
	(0.433)	(0.434)	(0.496)	(0.498)
Δ purchases over lagged (ln) sales	-19.602***	-19.758***	15.743***	15.881***
	(3.415)	(3.416)	(3.990)	(3.989)
lagged Δ orders	-0.013***	-0.013***	0.017***	0.017***
	(0.003)	(0.003)	(0.004)	(0.004)
Δ commodity price	-0.124***	-0.123***	0.327***	0.327***
	(0.008)	(0.008)	(0.011)	(0.011)
lagged Δ commodity price	-0.028***	-0.028***	0.066***	0.066***
	(0.007)	(0.007)	(0.008)	(0.008)
Firm FE	yes	yes	yes	yes
Sector x Year FE	yes	yes	yes	yes
N.firm clusters	3,623	3,623	3,623	3,623
N.obs.	25,065	25,065	25,065	25,065
R^2	0.50	0.50	0.56	0.56

Table 7: Financial characteristics and price adjustment flexibility in different years.
Source: Banque de France manufacturing business survey and Fiben.

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