WP/21/49

IMF Working Paper

Handle with Care: Regulatory Easing in Times of COVID-19

by Fabián Valencia, Richard Varghese, Weijia Yao, and Juan F. Yépez

INTERNATIONAL MONETARY FUND

 WP/21/49

IMF Working Paper

Strategy, Policy, and Review Department

Handle with Care: Regulatory Easing in Times of COVID-19

Prepared by Fabián Valencia, Richard Varghese, Weijia Yao, and Juan F. Yépez.[1]

Authorized for distribution by Martin Čihák

February 2021

Abstract

The policy response to the COVID-19 shock included regulatory easing across many jurisdictions to facilitate the flow of credit to the economy and mitigate a further amplification of the shock through tighter financial conditions. Using an intraday event study,this paper examines how stock prices—a key driver in financial conditions—reacted to regulatory easing announcements in a sample of 18 advanced economies and 8 emerging markets. The paper finds that overall, regulatory easing announcements contributed to looser financial conditions, but effects varied across sectors and tools. Financial regulatory easing led to lower valuations for financial sector stocks, and higher valuations for non-financial sector stocks, particularly for industries that are more dependent on bank financing. Furthermore, valuations declined and financial conditions tightened following announcements related to easier bank capital regulation while equity valuation rose and financial conditions loosened after those about liquidity regulation. Effects from non-regulatory financial measures appear to be generally more muted.

JEL Classification Numbers: G01, G14, G28, E65

Keywords: Stock prices, policy announcements, financial conditions, capital, liquidity, COVID-19.Author's E-Mail Address: fvalencia@imf.org; rvarghese@imf.org; wyao@imf.org; jyepezalbornoz@imf.org

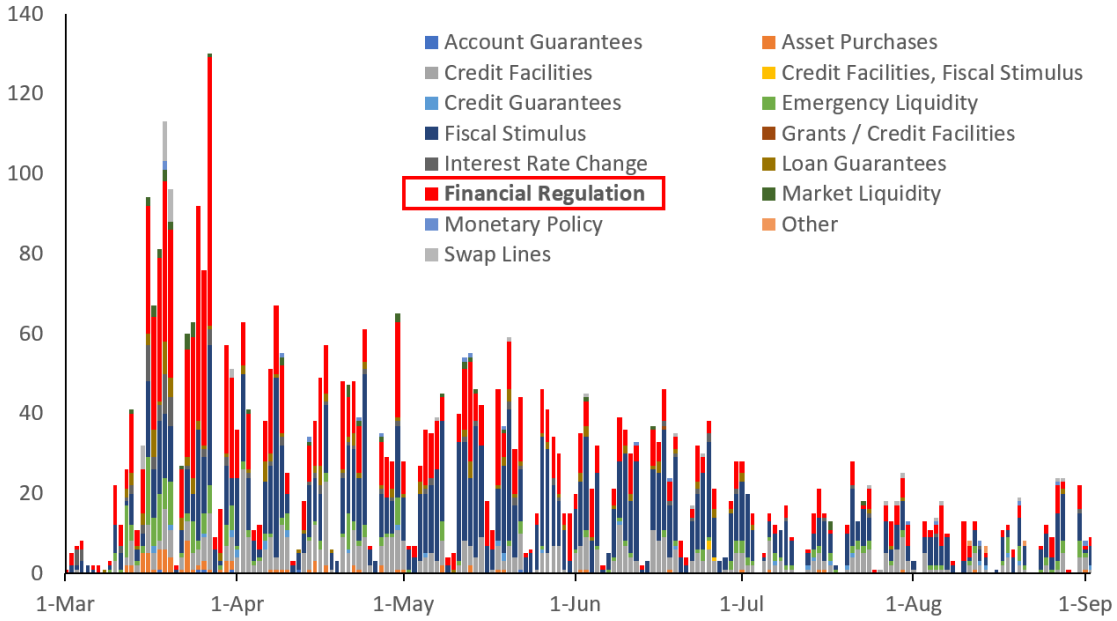
[1] We are grateful to Martin Čihák for helpful discussions. We also thank Gaston Gelos, Deniz, Igan, Divya Kirti, Luc Riedweg, Mario Catalan, Luisa Zanforlin, and seminar participants at the IMF for useful comments. All remaining errors are our own.

Contents Page

I. Introduction

Regulatory reforms implemented in the years after the global financial crisis allowed banks in many jurisdictions to enter the COVID-19 crisis with sizable capital buffers (IMF, 2020a). The Bank of International Settlements estimated that banks globally entered the crisis with roughly US$5 trillion of capital above their Pillar 1 regulatory requirements (Lewrick and others, 2020). The presence of these buffers and the exogenous nature of the COVID-19 shock allowed policymakers to embark on a significant easing of regulatory measures across jurisdictions as part of an unprecedented and wide-ranging policy support package (Figure 1).

Figure 1. Type and Count of Policy Responses to the COVID-19 Shock



Note: Each bar in the figure shows the number of interventions in a given day, by policy type, in response to the COVID-19 shock for all the 66 jurisdictions that are reported in the COVID-19 Financial Response Tracker (CFRT) by the Yale Program on Financial Stability.

Almost half of these financial regulation measures were prudential in nature and as such, their objective has been to ensure the flow of credit to the economy and mitigate amplification effects of the initial shock stemming from binding regulatory constraints.[1] But prior to the COVID-19 shock, most of the literature studying the effects of financial regulation, in particular prudential policy, had focused on episodes of regulatory tightening (Araujo and others, 2020), resulting in relatively less understanding about the effects of easing. Relaxation mea-

[1] A prudential regulatory policy is implemented ex ante (before a shock) to mitigate risks and increase resilience to shocks. In this regard, policies such as asset purchases programs, loan payment holidays, and emergency liquidity schemes are non-regulatory or crisis management financial policies.

sures following the COVID-19 shock offer a unique opportunity to shed light on the effects of regulatory easing and expand the knowledge in this area.

Against this backdrop, this paper contributes to the literature on financial regulatory policy by analyzing the effects of regulatory easing (mainly prudential policy) on financial conditions during COVID-19. Given the key role of stock prices in driving global financial conditions, the paper employs an intraday event study framework to estimate the response of stock prices to regulatory easing announcements. The initial set of information on financial policy announcements comes from the Yale COVID-19 Policy Tracker (CFRT). This initial list is first refined by restricting the sample to isolated policy announcements (i.e., excluding announcements that are part of a policy package or occur within the same day as other policy announcements or measures) that are financial in nature, and further augmented by collecting the precise hour for each relevant announcement. This step seeks to ensure the results can be attributed to the measure in question, which becomes more difficult to disentangle when the measure is part of a package. This process identifies 240 financial policy announcements—regulatory and non-regulatory related—from 42 jurisdictions from February 1 and July 31, 2020. [2]

Event studies have been commonly used in economics, including to measure the impact on the value of a firm in response to a change in the regulatory environment (Schwert, 1981). The efficient-markets/rational-expectations hypothesis' posits that security prices reflect all available information (see Muth 1961; Fama 1970; and Fama 1976). Therefore, if regulation has implications for the value of equities, the effects of regulation are impounded into prices at the time when they are first anticipated. From an econometric identification point of view, an event study allows also the possibility of isolating specific announcements over narrow time windows in order to mitigate reverse causality and simultaneity concerns.

The identification strategy employed in this paper, built around hourly stock price data, relies on the implicit assumption that financial policies are unlikely to be adjusted instantaneously to changes in stock prices within the same hour. Since the design and implementation of financial policy measures typically take more than just hours, and the empirical framework accounts for returns just prior to the announcements, the high frequency identification approach substantially mitigates any reverse causality concerns. By computing returns around a narrow window, this approach reduces the influence of other news on the estimates. The analysis also controls for global and country-specific covariates that could affect stock returns jointly with announcements, and hence could lead to mismeasurement. These include overlapping announcements occurring at the same time in any other jurisdiction, all announcements on the same day occurring in systemic jurisdictions (i.e. China, Euro Area, Hong Kong S.A.R., Switzerland, United Kingdom, and United States). The event study is implemented using the local projection method proposed by Jordà (2005) and estimates the response of MSCI sectoral stock returns to these policy announcements.

Beyond statistical identification, the focus on stock prices allows also to examine the role of regulatory relaxation in mitigating adverse asset price dynamics that follow a severe negative

[2] As it will be explained in Section III, only 26 jurisdictions are included in the analysis due to data limitations.

shock. These dynamics lead to asset price externalities and amplification of asset price spirals resulting from binding borrowing constraints (see for instance, Bernanke and Gertler 1989; Kiyotaki and Moore 1997; Mendoza 2010; Jeanne and Korinek 2010; Brunnermeier and Sannikov 2014; and Bianchi and Mendoza 2018). By relaxing regulatory constraints and facilitating the flow of credit in the economy, the expectation is that these externalities are mitigated. Yet this simple logic offers only one perspective, that of the positive effects of the policy actions on financial conditions, for a given level of banks' underwriting standards.

In practice, the effect of these policy announcements on stock prices depends also on how investors perceive these announcements to influence banks' risk-taking incentives. For example, an optimistic investor would expect that higher credit provision to non-financial firms would translate into higher future cash flows for banks from their assets, consequently increasing their equity value. On the other hand, a pessimistic investor could expect excessive risk-taking by financial sector firms through increasing leverage or weakening underwriting standards, which could cloud the prospects for future cash flows for financial firms.

This paper finds that news about regulatory easing led to a statistically significant reduction in financial sector stock returns in the hour immediately after the official announcement. This result could be a sign that investor sentiment towards the financial industry soured as markets priced in increased risk taking resulting from these policies.[3] Against this backdrop, it could be argued that investors, expecting inefficient credit expansions in response to regulatory easing and other policy support, may perceive an increase in the risk of a crash down the road, thus responding negatively to announcements on impact. This interpretation could be particularly fitting in the current environment given the magnitude and unprecedented nature of the COVID-19 shock, in which facilitating credit flows could come at the expense of deteriorating underwriting standards and increasing the risk of lending to zombie firms. [4] Contrary to the response from financial stocks, excess returns for non-financial stocks increased following the announcements of regulatory easing. Moreover, this increase was particularly larger in industries that depend more on bank credit indicating regulatory easing may have facilitated greater flow of credit to the economy through banks. These results point towards an emerging tradeoff stemming from the ongoing regulatory easing—policies introduced to facilitate credit availability may come at the expense of additional stress on the financial sector.

In terms of policy composition, the analysis shows that markets reacted negatively to announcements related to easier bank capital regulation and positively to those about liquidity regulation. For liquidity-based regulations, the effects on financial stock returns is negligible while the positive effect on non-financial stocks is positive and significant. The negative reaction to the easing of bank capital regulation was not limited to financial sector stocks—valuations of non-financial stocks were also lower after easing of capital require-

[3]Previous studies have shown that higher (lower) bank capital is beneficial (detrimental) for bank shareholders, particularly during crisis episodes (Berger and Bouwman 2013; Cappelletti and others 2020; and Huang, de Haan, and Scholtens 2020). This result is also consistent with a strand of literature showing that credit expansions predict bank equity crash risk (Baron and Xiong 2017; and Gandhi 2018).

[4]Based on the historical relationship between bankruptcies and unemployment in the United States, Greenwood, Iverson, and Thesmar (2020) show that the pace of business bankruptcy can be expected to increase by 140 percent relative to their 2019 level.

ments. As shown in (Elenev, Landvoigt, and Van Nieuwerburgh, Forthcoming), bank shareholders can gain from tighter bank capital regulation, as higher capital requirements force banks to shift their capital structure to equity. In this regard, looser capital requirements would have an opposite effect (i.e., reduce equity valuations for banks). Also, in line with recent studies that look at the effect of financial policies on stock prices during the pandemic (Sever and others 2020; and Demirgüç-Kunt, Pedraza, and Ruiz-Ortega 2020), the analysis finds that non-regulatory financial measures (e.g. asset purchases, government credit guarantees, and emergency liquidity programs) did not have a statistical significant effect on equity valuations.

Overall, these results are consistent with the broad evolution of stock prices of financial firms vis-à-vis those of non-financial corporations since the onset of the crisis, whereby the former have significantly underperformed broad stock market indices (Demirgüç-Kunt, Pedraza, and Ruiz-Ortega 2020 for a detailed description of bank stock underperformance).

One caveat with high-frequency intraday event studies is that, while they can help with statistical identification, they cannot say much about the validity of the results beyond the window of observation. Therefore, to assess the economic significance of the effects estimated through the event study, we extend the analysis through the use of PVARs. Specifically, we construct impulse-response functions (IRFs) of financial condition indices (FCIs) to regulation policy announcements. Given the lack of intraday FCIs, estimating the impact of regulation on financial conditions within a system is a more suitable approach, with the PVAR framework capturing possible feedback effects from movements in FCIs to regulatory decisions[5]. The results are consistent with the intraday analysis, showing that the easing of liquidity regulations supported FCIs while on the other hand the easing of capital regulations caused FCIs to tighten in a 30 day window following the announcement. The effects of liquidity and capital announcements on FCIs was particularly large in emerging market economies.

From a policy perspective, the findings suggest that the net effect of regulatory easing on financial conditions appears overall positive in the near term. At the same time, market reactions signal tradeoffs down the road, which can be interpreted as consistent with expected increased risk-taking, deterioration in underwriting standards, or continued lending to zombie firms by financial sector firms. These tradeoffs vary across tools, with a drop in equity returns mostly associated with easing of capital-related prudential regulation. In designing a road map for the roll-back of regulatory support, these results could suggest rolling back capital related regulations first to help rebuild buffers, once the recovery is on a firm footing. This of course implicitly assumes that the effects detected in this paper carry through symmetrically. If this is the case, the unwinding of regulatory easing should be done gradually to reduce the risk of a sudden tightening of financial conditions.

This paper contributes to three strands of literature. First, it is one of the first studies to explore the impact of regulatory announcements in response to COVID-19 on domestic finan-

[5]The economic impact of regulatory actions is likely to be observed over longer time horizons, therefore the assumption of strict exogeneity of regulation to market developments is likely to be violated when the window of analysis goes beyond a day.

cial markets using a sample of emerging markets and advanced economies. At the time of this draft, Demirgüç-Kunt, Pedraza, and Ruiz-Ortega (2020) is the only other study examining the same issues. This paper differs from the former in that the analysis relies on intraday data, which strengthens identification. Moreover, this paper looks at the effects of regulatory measures both on financial and non-financial industry level equity returns and overall financial conditions, to better document the transmission of policies. Along with the PVAR estimates, this allows the paper to provide a better sense of the macroeconomic relevance of these measures.

Second, this paper is related to a strand of literature that analyses the impact of policies (mainly fiscal and unconventional monetary policy announcements) deployed during the pandemic using event studies (e.g., Arslan, Drehmann, and Hofmann 2020; Gormsen and Koijen 2020; Sever and others 2020). These studies, however, do not investigate financial regulatory policies. Moreover, they are either specific to a certain jurisdiction or focus on a small sub-sample of EMs. This paper uses instead a broad sample of emerging markets and advanced economies using hand-collected intraday data leveraging the Yale's CFRT.

Third, the paper contributes to the growing literature on the effects of news conveyed in policy communication, by looking at regulatory announcements, while most of this literature has focused mainly on news about monetary policy (e.g., Cieslak and Schrimpf (2019); Gürkaynak, Sack, and Swanson (2005)).

The remainder of the paper is structured as follows. The next section presents the empirical strategy. Section III describes the database used for the event study and section IV documents the paper's main findings. A battery of robustness checks are presented in section V. Section VI concludes.

II. Empirical Strategy

This paper employs an event study framework to empirically examine the effect of regulatory easing announcements on stock returns. The identification strategy is built on three key elements. First, the analysis focuses exclusively on isolated events—those that are neither part of a package nor within the same day of any other announcements.[6] Second, it utilizes high-frequency hourly data to build a narrow intraday window around the announcement (one hour before and three hours after the announcement). The inclusion of the one hour prior to announcement return is to account for the fact that all information known up to that moment is expected to be already priced in by the markets. The high-frequency identification also mitigates reverse causality concerns as it is unlikely that prudential norms are systematically adjusted in response to hourly stock price movements. Finally, a tight event window makes it more feasible to control for all possible confounding external events, somewhat reducing simultaneity concerns. Specifically, all overlapping announcements occurring at the same

[6]However, announcements of policy packages consisting of similar prudential measures (e.g., packages reducing capital risk weighting factors and provision requirements) are included.

time in all other jurisdictions and all regulatory announcements from systemic jurisdictions are accounted for in the empirical framework.

The empirical exercise starts by computing the dependent variable—cumulative excess sectoral equity returns. Excess return for sector i in jurisdiction c at time t is computed as the difference between the return of MSCI sectoral indices and the overall market return in a jurisdiction as depicted in equation (1) below.[7]

$$ExcessReturn_{i,c,t} = SectorReturn_{i,c,t} - MarketReturn_{c,t} \qquad \forall h \tag{1}$$

The choice of sectoral return as the dependent variable is to aid the focus of analysis on the effects of asset price movements on financial conditions—given it being more representative of the economy as opposed to individual firm level return. The excess returns are further accumulated from one hour prior to the announcement to different horizons— that is hours after the announcement with the announcements occurring at h=0 (see equation (2)).

$$CumulativeExcessReturn_{i,c,t+h} = ExcessReturn_{i,c,t+h} - ExcessReturn_{i,c,t-1} \qquad \forall h \tag{2}$$

With the cumulative excess returns on hand, the event study is implemented using Jordà (2005) local projections method. The local projection method allows for estimation of the cumulative excess stock return in response to a regulatory easing announcements at various horizons within the chosen window. Specifically, the analysis follows the baseline specification of the following form.

$$CumulativeExcessReturn_{i,c,t+h} = \beta_h Announcement_{c,t} + \delta_h X_{i,c,t} + \alpha_{c,h} + \gamma_{i,t,h} + \varepsilon_{i,c,t+h} \qquad \forall h \tag{3}$$

The key explanatory variable of interest, $Announcement_{c,t}$, is the event dummy that takes a value of one at the hour of the announcement, and zero otherwise. The announcement hour is obtained by rounding the exact event time stamp obtained from official documents, news articles, or social media accounts to the closest full hour.

$X_{c,t}$ vector of global and country-specific covariates that control for any confounding factors that could affect stock returns, and hence could lead to mismeasurement of the economic impact of the announcements. These include overlapping announcements occurring at the same time in any other jurisdiction, all announcements on the same day occurring in systemic jurisdictions (i.e. China, Euro Area, Hong Kong S.A.R., Switzerland, United Kingdom, and United States), and lagged return of the excess return measure. The first two control variables ensure that the results capture only the effect of domestic policy announcements by

[7] Section V presents robustness exercises using alternative equity return measures.

controlling for global developments. The third and final control—lagged cumulative excess return— is included so that the local projections are asymptotically valid in the presence of non-stationary data (Montiel Olea and Palgborg-Møller, 2020).

α_c and $\gamma_{i,t}$ are country and sector-time (sector-hour) fixed effects respectively. Country fixed effects control for any unobservable time-invariant country characteristics. More importantly, sector-time fixed effects control for all possible time-varying sector-level shocks. The sector-time fixed effects is a critical element in the identification strategy given the differential impact of COVID-19 shock across sectors over time.

Restricting the events to isolated announcements, utilising a narrow intraday event window, the choice of control variables, and the fixed effect combination provides an empirical framework that substantially mitigates endogeneity and omitted variable bias concerns when estimating the impact of announcements. The local projection method estimates provide the effect of announcements on impact and up to one hour later. β_h, proxies the economic impact of announcements and is the coefficient of interest. Therefore, β_0 and β_1 would capture the response of stock prices to announcements on impact and an hour after the announcement.[8] A positive (negative) coefficient would imply excess returns increased (decreased) following announcements.[9]

In addition, the empirical strategy also accommodates heterogeneity across types of instruments used by policymakers by disaggregating announcements by policy instruments – regulatory announcements (relaxation of capital regulations and liquidity measures) and non-regulatory announcements (credit support programs, emergency liquidity schemes, and other financial measures).

III. Data

This section discusses the construction of the database of financial regulatory announcements that allows to exploit high frequency (i.e. intraday) data. This approach pins down the precise hour in which a specific announcement was made and subsequently estimate stock excess returns around the announcement, which is an advantage relative to the existing datasets of financial sector policy announcements that typically present data at a daily frequency. This section also presents (i) a descriptive statistics on equity markets returns, (ii) a measure for sectoral bank-finance dependence, and (iii) a detailed description of the sample used in the empirical analysis.

[8]The impulse response horizon does not go beyond one hour, as announcements typically occurred in the hour prior to markets closing, hence a larger horizon would entail going to the next trading day.

[9]The same specification is used to estimate the impact of announcements on financial stock price indices. In this case, equation (3) collapses to the following one sector form, where the sector-time fixed effect is replaced with time fixed effects.

$$CumulativeExcessReturn_{c,t+h} = \beta_h Announcement_{c,t} + \delta_h X_{c,t} + \alpha_{c,h} + \gamma_{t,h} + \varepsilon_{c,t+h} \qquad \forall h \tag{4}$$

A. Financial Regulatory Announcements

Using the COVID-19 Financial Response Tracker (CFRT) from Yale University, financial policy announcements are identified from February 2 until July 31 2020. The CFRT database collects and visualizes an array of policy responses during the pandemic, providing the links to the official communiques made available in the regulators' websites, with nearly an universal coverage. The announcements include all policy actions, including the deployment of fiscal stimulus, monetary policy actions, asset purchase programs, credit facilities from multilateral institutions, and financial regulatory changes.

This paper extends the CFRT from Yale University by classifying the announcements by whether they are financial in nature and categorizing these policy actions by whether they constitutes a relaxation of a financial regulation.[10] As a next step, announcements are also classified into sub-categories of regulatory policies such as changes in capital and liquidity requirements, limits on exposure, concentration, loan-to-value ratios, and postponement of financial reporting. Some of the capital regulation announcements were intended for financial firms to use the flexibility embedded in the regulatory frameworks (for instance the release of countercyclical capital buffers), therefore these measures are excluded from the analysis since they do not constitute a regulatory easing. Also, given that the focus of this paper is on regulatory easing, announcements of lower capital requirements that were accompanied by restrictions on dividend distributions are also excluded form the analysis. For completeness, non-regulatory financial announcements (such as emergency liquidity support, asset purchase initiatives, credit guarantees, and loan payment holidays) are also recorded.

Due to the scale and rapid developments of the pandemic, in several occasions regulators announced multiple policy measures in the same communiqué and/or during the same day.[11] In order to accurately identify the effects of financial measures and avoid confounding effects, financial announcements occurring on days in which other policy announcements were made (including fiscal, monetary, and/or other financial policy announcements) are dropped from the analysis. This in turn entailed parsing through all the announcements in the Yale's CFRT database in order to select only announcements of financial measures that occurred in isolation from other policy announcements.

Further, for the events identified, the Yale's CFRT database is expanded by hand-collecting the precise timing of each announcement from the official press release. If the intraday timestamp is not available in the official press releases, timestamps are obtained from announcements made through the social media accounts of national regulating agencies and/or local news reports, cross-checking all different sources where possible.[12] The choice of isolated

[10] A financial policy action is characterized as regulatory if it meets the taxonomy set forth in the joint IMF-World Bank staff position note on the regulatory and supervisory implications of COVID-19 for the banking sector (Narain and others, 2020).

[11] For example, the US Federal Reserve issued a communication on March 15, announcing the reduction of the reserve requirements to 0 percent; its commitment to purchase up to 500 USD billion in treasuries and 200 USD billion on mortgage backed securities; and encouraging banks to use their liquidity and capital buffers.

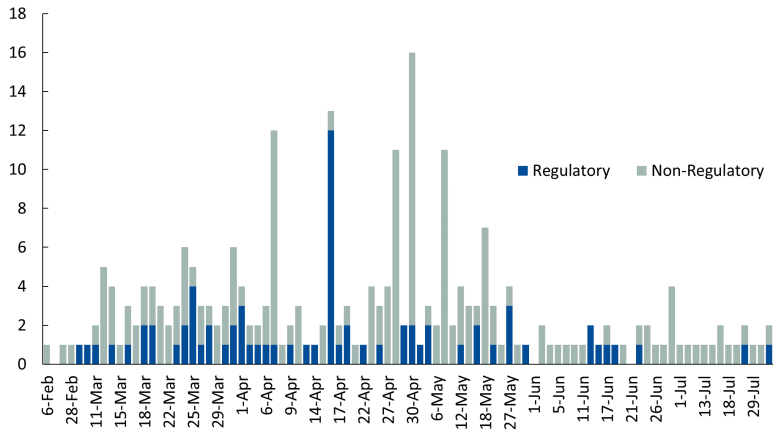
[12] In this case, the timestamp is obtained from the first instance of the announcement reported in news according to Factiva's global news database.

announcements and identification of the precise timing of announcements is key to the identification strategy.

In total, the database includes more non-regulatory announcements (172) than regulatory (68) (Table 1). Regulatory announcements consist mainly of loosening of capital regulations, while non-regulatory announcements are more evenly distributed between credit support programs, emergency liquidity schemes, and other financial measures. In terms of sequencing, regulators responded to the COVID-19 shock by easing liquidity regulations before capital requirements in around 70 percent of jurisdictions that used both policy tools.The occurrence of regulatory announcements is almost evenly distributed between emerging markets (32) and advanced economies (36). On the other hand, the non-regulatory measures were most commonly observed in advanced economies.

Most of the financial policy announcements occurred in the first half of the year, with an important clustering around March and April, the period which was the onset of the pandemic and when governments around the globe implemented drastic containment measures (Figure 2). In the second half of the year, these containment measures were relaxed and economic activity started to recover, which explains the scant number of regulatory relaxations in this period. If anything, non- regulatory financial measures were used more often in the second half of 2020, with these measures consisting mainly of extension of government credit guarantees and liquidity support programs.

Figure 2. Number of Financial Regulation Easing Announcements During the Pandemic



Source: Yale COVID-19 Policy Tracker (CFRT) and authors' calculations.

Table 1. Number of Financial Regulation Easing Announcements

Jurisdiction	Regulatory				Non-Regulatory			
	Capital	Liquidity	Other	**Total**	Credit Support	Emergency Liquidity	Other	**Total**
Argentina	0	1	0	**1**	3	0	1	**4**
Australia	2	0	0	**2**	0	0	0	**0**
Austria	2	0	0	**2**	2	1	2	**5**
Belgium	1	0	0	**1**	2	1	3	**6**
Brazil	3	2	0	**5**	5	3	2	**10**
Canada	0	1	0	**1**	0	5	0	**5**
Chile	3	0	0	**3**	2	2	0	**4**
China	1	2	1	**4**	2	0	0	**2**
Colombia	0	1	0	**1**	1	3	0	**4**
Estonia	1	0	0	**1**	0	1	0	**1**
Finland	1	0	0	**1**	2	1	1	**4**
France	1	0	0	**1**	1	1	3	**5**
Germany	1	0	0	**1**	1	1	2	**4**
Greece	1	0	0	**1**	2	1	2	**5**
Hungary	2	0	0	**2**	0	1	1	**2**
India	0	0	0	**0**	2	11	0	**13**
Indonesia	0	1	1	**2**	3	0	0	**3**
Ireland	1	0	0	**1**	2	1	2	**5**
Israel	1	0	0	**1**	0	1	0	**1**
Italy	1	0	1	**2**	2	1	4	**7**
Japan	2	0	0	**2**	0	4	3	**7**
Korea	0	1	2	**3**	3	2	3	**8**
Malaysia	1	1	0	**2**	1	0	0	**1**
Netherlands	1	0	0	**1**	1	1	2	**4**
New Zealand	1	1	2	**4**	0	3	0	**3**
Nigeria	1	0	0	**1**	0	0	1	**1**
Norway	1	0	0	**1**	1	4	0	**5**
Peru	0	1	1	**2**	2	1	0	**3**
Philippines	2	1	0	**3**	1	3	2	**6**
Russian Federation	0	1	0	**1**	4	0	1	**5**
Singapore	0	0	1	**1**	4	0	2	**6**
South Africa	1	0	0	**1**	0	1	0	**1**
Spain	1	0	0	**1**	2	1	3	**6**
Sri Lanka	1	1	0	**2**	1	1	0	**2**
Switzerland	1	0	0	**1**	1	1	1	**3**
Turkey	1	0	0	**1**	3	3	0	**6**
Ukraine	2	0	0	**2**	2	1	0	**3**
United States	3	1	2	**6**	3	5	4	**12**
Total	**41**	**16**	**11**	**68**	**61**	**66**	**45**	**172**

Source: Yale COVID-19 Policy Tracker (CFRT) and authors' calculations.

B. Stock Market Returns

The paper's second set of data relates to stock market performance. Intraday equity price indices is obtained from Bloomberg. In particular, hourly data is collected for Morgan Stanley Capital International (MSCI) Indices, both overall stock market indices and industry indices, from February 1 until July 31 2020. MSCI uses the Global Industry Classification Standard (GICS), which classifies companies into 11 sectors.[13] Financial sector stock price indices are available for all of the economies in the sample, but for some other indices data are incomplete and only available for a couple of non-financial sectors. In order to have enough cross-sectional variation in the non-financial sector indices, the sample is constrained to jurisdictions that have data on at least four of the following sectors: energy, information technology, health care, consumer staples, industrials, and materials.[14]

The analysis uses excess returns of sector-specific stock market price indices relative to their domestic market. This measure is constructed by subtracting the returns of sector i's overall stock market index from sector i's specific return (i.e., $ReturnSector_{i,t} - ReturnMarket_t$).[15] Table 2 shows some descriptive statistics for the excess returns for the financial and the non-financial sectors.

Financial industries around the globe, to varying degrees, have been under stress throughout the pandemic. The intraday excess return of financial sector stocks was on average -1.5 basis points, with almost 85 percent of the jurisdictions in the sample showing negative excess returns. On the other hand, the stock performance for non-financial industries was broadly in line with broad market returns, with excess returns on average being close to zero.

[13]The use of industry stock price indices over firm level data is to aid the focus of analysis on the effects of asset price movements on financial conditions—given that industry level indices are more representative of the economy as opposed to individual firm level returns.

[14]Results presented in the robustness check section show the effects of financial regulatory announcements on the unconstrained sample.

[15]As a robustness check, the exercise is also done with additional equity return measures. Results are presented in section V.C.

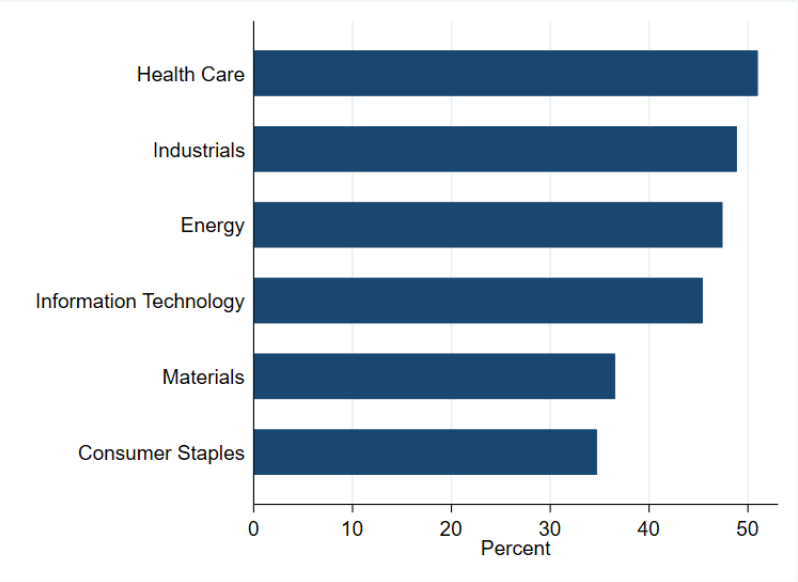
Table 2. Descriptive Statistics for Sectoral Excess Returns (in basis points)

Jurisdiction	Mean		St. Dev.		50th pctl		25th pctl		75th pctl	
	Financial	Non-Financial	Financial	Non-Financial	Financial	Non-Financial	Financial	Non-Financial	Financial	Non-Financial
Australia	-0.2	0.0	73.5	72.5	-0.9	0.2	-26.7	-29.3	25.4	29.3
Austria	-1.1	-0.3	41.3	77.1	0.0	0.0	-19.8	-33.6	17.7	29.2
Belgium	-2.6	1.7	46.0	55.4	0.0	0.0	-21.0	-20.9	15.9	24.2
Brazil	-2.2	-1.2	106.1	113.4	-2.0	-0.1	-54.7	-51.9	49.8	51.6
Canada	-0.4	0.5	25.0	59.1	-0.5	0.2	-13.3	-23.4	11.0	25.3
Chile	0.4	-14.7	51.2	164.0	3.0	-4.3	-27.2	-53.0	25.2	39.3
China	0.2	0.3	23.7	38.4	-0.2	0.1	-8.4	-11.5	6.6	11.3
Denmark	-2.5	-0.4	49.7	37.8	-2.2	0.0	-30.6	-17.7	25.1	16.5
Finland	-3.0	0.7	47.6	54.0	0.0	0.0	-24.0	-21.0	17.4	21.5
France	-2.2	0.6	42.9	42.1	-0.7	0.0	-21.9	-15.8	15.7	16.2
Germany	-0.5	0.4	28.5	30.1	-0.3	0.0	-13.8	-14.1	13.2	14.2
India	-1.2	0.0	39.6	38.4	0.0	0.0	-15.8	-16.5	12.2	15.0
Indonesia	-0.1	1.3	64.8	84.4	0.0	0.0	-19.4	-26.2	19.8	27.8
Ireland	-9.3	0.2	124.2	67.2	-1.0	0.0	-66.0	-26.3	48.2	25.5
Israel	-5.2	5.5	65.8	81.0	0.4	0.9	-29.8	-25.8	24.5	36.3
Italy	-0.6	-0.9	22.4	40.2	0.0	0.0	-13.4	-22.0	12.0	19.0
Japan	-0.5	0.0	22.8	23.0	0.0	0.0	-8.6	-6.9	6.4	7.0
Korea	-0.2	0.2	35.7	39.7	0.0	0.0	-16.3	-14.3	14.1	13.7
Malaysia	-1.6	1.6	24.5	42.5	0.0	0.0	-8.2	-9.4	4.8	11.3
Mexico	0.3	0.3	61.7	43.3	-1.4	1.2	-28.4	-20.3	30.7	21.1
Netherlands	-4.2	-0.1	67.7	45.4	-1.8	-0.1	-33.3	-17.7	25.0	17.7
Norway	-0.2	-0.2	34.8	49.0	0.0	0.0	-15.8	-19.3	16.0	18.2
Singapore	-0.4	0.8	13.9	44.4	-0.1	0.0	-7.7	-19.0	6.7	18.8
South Africa	0.7	0.3	51.2	84.3	1.1	0.0	-22.6	-35.7	24.5	37.1
Spain	-3.4	-1.9	50.4	68.0	-4.5	-2.6	-31.9	-31.4	24.3	26.9
Sweden	-0.4	0.2	20.8	38.7	0.0	0.0	-11.1	-14.7	9.1	14.5
Switzerland	-2.2	0.4	40.6	36.9	0.0	0.0	-18.0	-12.0	14.1	12.7
Thailand	-3.0	1.1	37.6	46.9	0.0	0.0	-17.8	-16.6	7.9	19.9
Turkey	-2.0	0.8	24.2	44.7	-1.6	-1.1	-13.6	-20.2	8.5	18.1
United Kingdom	-0.1	0.2	31.2	47.4	-1.7	0.4	-16.6	-20.0	15.6	20.6
United States	-0.1	-0.6	30.7	38.2	-1.0	-0.4	-17.0	-14.7	16.1	13.8

Source: Bloomberg Financial L.P. and author calculations.

Data coverage for bank loan liabilities, however, is poor for most emerging market economies in the sample with data for over 90 percent of listed firms not available. Thus, the bank-finance dependence measure is based on US firms and is likely to be a lower bound (as explained in footnote 12), therefore it is treated as a structural characteristic of the corresponding industries (i.e. some industries are inherently more bank-dependent than others, irrespective of cyclical considerations). This measure allows the ranking of industries according to their reliance on bank finance and more importantly compute the stock market return of firms in sectors that are more dependent on bank-based finance relative to firms in sectors that are less bank dependent. Figure 3 plots the measure of bank dependence variable by GICS sectors included in the analysis. Healthcare sector has the largest reliance on bank finance at about 50 percent while consumer staples ranks the lowest among sectors at about 35 percent.

Figure 3. US Sectoral Bank-finance Dependence
(bank loans as a percent of total sector liabilities)



Sources: Bloomberg financial L.P. and authors' calculations.

C. Jurisdiction Sample

The final sample contains policy announcements for 26 economies (18 advanced economies and 8 emerging markets), for which stock market and policy data is available (Table 3). The sample accounts for 78 percent of global GDP. For this constrained sample there are 51 announcements related to the easing of prudential regulations and 133 announcements related to non-regulatory policies. The next section presents the paper's main results.

Table 3. Sample of Jurisdictions Used in the Analysis

Australia	Chile	India	Japan	Singapore	United States
Austria	China	Indonesia	Korea	South Africa	
Belgium	Finland	Ireland	Malaysia	Spain	
Brazil	France	Israel	Netherlands	Switzerland	
Canada	Germany	Italy	Norway	Turkey	

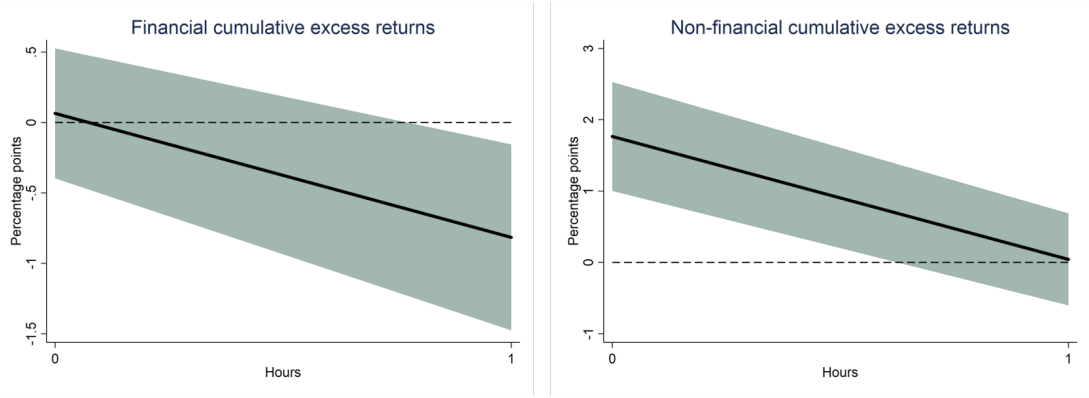
IV. Financial Policy Easing and Equity Market Reactions

This section presents the estimates from equation (3), corresponding to the cumulative responses over a one-hour horizon with the 90-percent confidence intervals based on Driscoll

and Kraay (1998) standard errors, which are robust with respect to heteroskedasticity as well as serial and cross-sectional correlation.

The market response to regulatory easing signals perceived trade-offs (Figure 4). The loosening of prudential policies leads to near a one percentage point decline in financial sector stock returns one hour after the announcement, with the effect being significant at the 90 percent level. The opposite is observed for non-financial equity returns, with stock prices outperforming aggregate indices immediately after the policy announcement. The net effect of regulatory easing on excess returns appears to have been overall positive.

Figure 4. Cumulative Impulse Responses of Excess Equity Returns to Financial Regulatory Announcements (Percentage points)



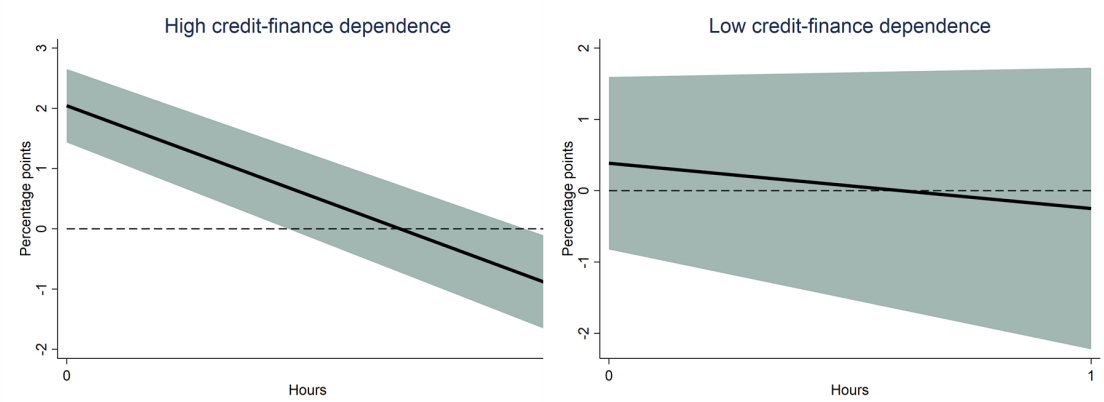
Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

The negative effect of regulatory news on financial sector returns is in line with recent findings in the literature (Demirgüç-Kunt, Pedraza, and Ruiz-Ortega, 2020). This negative response associated with the easing of financial regulations could be interpreted as markets seeing these measures leading to an increase in risk-taking (e.g. by increasing leverage or weakening underwriting standards) that could cloud the prospects for future cash flows for financial sector firms, leading to lower equity value. In essence, under this interpretation, investors could be expecting credit expansion under weaker underwriting standards. Under such interpretation, the results are also related to the findings in Gandhi (2018), who shows that a one percent increase in aggregate credit growth is followed by a nearly three percent decline in the excess return of bank stocks one year later. Baron and Xiong (2017) also document that credit booms are the best predictors for bank stock crashes.[16]

[16]This section shows effects on all financial sector firms include banks, insurance institutions, and other non-bank financial institutions. Section V.C shows that a similar response is observed when looking only at excess returns of bank stocks. The use of a financial industry stock price indices over bank level data is preferred as non-bank financial institutions are important in many jurisdictions and movements on the industry index would likely have a larger effect on overall financial conditions.

Markets perceive benefits accruing more among bank-dependent non-financial sectors. Figure 5 presents the response of excess returns for non-financial sector firms conditioning on the sector level measure of firms' dependence on bank-based financing discussed in the previous section. The sample is split into two groups. One group consists of industries with a high level of bank-credit dependence—above the 70^{th} percentile. The other group consists of industries at or below the 30^{th} percentile of the distribution of the bank-credit dependence metric (i.e., the share of total bank loans over total liabilities for firms in sector i). Following the announcement of prudential policies, equity excess returns react only in high bank-dependent sectors on impact.[17] As expected, equities for sectors that do not depend much on bank-finance were not significantly affected by these announcements.

Figure 5. Cumulative Impulse Responses of Excess Equity Returns of Non-Financial Industries to Financial Regulatory Announcements (Percentage points)



Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

Policy composition matters, with market reactions varying with the type of regulation announced. Table 4 summarizes the effects of financial policy announcements on sectoral excess returns by instrument type, for regulatory and non-regulatory financial measures. Equity excess returns drop after capital regulation easing announcements for financial and non-financial industries. [18] As explained before, the relaxation of capital requirements could lead to lower valuation for financial sector firms as markets expect increased risk taking by financial institutions. The decline in non-financial sector stocks is consistent with the interpretation of a potential credit crunch down the road. Excess returns on the financial sector

[17]The positive market response could be explained by the fact that the announced policies are expected to preserve the free flow of credit to cash-strapped firms, which in turn would allow them to maintain production, employment, and/or investment. Altavilla and others (2020) find that, in absence of easier prudential requirements put forward in Europe, the pandemic would lead to a significantly larger decline in firms' employment.

[18]The results remain virtually unchanged if announcements related to countercyclical capital buffers were to be included, reflecting possibly the expectations for the release of these buffers as they are part of the built-in flexibility in regulatory frameworks following Basel III.

decline immediately after capital announcements by 1.4 percentage points, and the effect being statistically significant at the 99 percent level. The loosening of capital requirements has also a large negative effect on non-financial equities.

This result is consistent with (Elenev, Landvoigt, and Van Nieuwerburgh, Forthcoming), which shows that bank shareholders can gain from tighter bank capital regulation, as higher capital requirements force banks to shift their capital structure to equity. In this regard, looser capital requirements would have an opposite effect (i.e., reduce equity valuations for banks). It can be argued that the negative equity price response to lower capital requirements could be driven by the information content of the policy action (e.g., the regulator signaling private information about the health of the financial system). However this interpretation would require that such information content works only through capital and not liquidity regulation, which is difficult to rationalize. [19] It is worth noting that financial institutions entered the COVID-19 crisis broadly in good health and with sizable buffers, therefore regulators lowering capital requirements could instead signal their confidence in the system (of its capacity to weather the shock).

There is an overall positive market reaction to lower liquidity requirements, for which the effects on financial stock returns are small and not statistically significant while the effect on non-financial firms is largely positive and statistically significant. Announcements of looser liquidity requirements (e.g., change in liquidity coverage ratios) led to an immediate spike in excess returns in non-financial stocks by around 1.9 percentage points, an effect that is statistically significant at the 99 percent level. Given the temporary nature of the COVID-19 shock and the unprecedented scale of monetary policy support in several key jurisdictions, it comes as no surprise that markets had a relatively more sanguine view regarding liquidity risks (as compared to solvency risks).[20] Interestingly, non-regulatory financial measures (e.g. asset purchases, government credit guarantees, and emergency liquidity programs) did not significantly affect sectoral excess returns. This result is in line with recent papers that look at the effect of financial policies on stock prices during the pandemic (Demirgüç-Kunt, Pedraza, and Ruiz-Ortega, 2020; Schwert, 1981).[21] The lack of statistical significance for non-regulatory financial measures could be explained by the large degree of heterogeneity across measures in these group.

[19] Furthermore, regulators eased liquidity before capital regulations in around 2/3 of the jurisdictions included in the sample (see Section III). For these jurisdiction then, it is the loosening of prudential liquidity requirements that would have provided the negative information content.

[20] Although not reported, the effect of other regulatory policies (e.g. relaxation of loan-to-value requirements, postponement of financial reporting, and in some cases prudential capital flow measures) had a null effect on excess returns.

[21] Interestingly, Sever and others (2020) shows that global factors seem to have had a more significant effect on domestic stock markets. In particular, the quantitative easing announcement by the Federal Reserve supported EM stock markets.

Table 4. Impact of Financial Announcements on Excess Equity Returns (at t=0)

VARIABLES	(1) Financial	(2) Financial	(3) Non-Financial	(4) Non-Financial
Regulatory	0.064		1.765***	
	(0.281)		(0.465)	
Non-regulatory	0.083		0.177	
	(0.224)		(0.192)	
Regulatory_capital		-1.392***		-1.284**
		(0.454)		(0.498)
Regulatory_liquidity		0.665		1.908***
		(0.482)		(0.428)
Non-regulatory_liquidity		0.052		0.134
		(0.144)		(0.239)
Non-regulatory_other		-0.069		-0.110
		(0.148)		(0.112)
Observations	139	173	553	617
R-squared	0.668	0.597	0.546	0.534
Country FE	YES	YES	YES	YES
Time FE	YES	YES	NO	NO
Sector-Time FE	NO	NO	YES	YES
Dependent variabale	Excess Return	Excess Return	Excess Return	Excess Return

Note: Robust standard errors in parentheses. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

A. Regulation announcements and financial conditions

One caveat with intraday event studies is that, while can help with statistical identification, they cannot say much about the validity of the results beyond the window of observation. In order to judge economic importance of the effects of financial regulation easing, this section looks into how a regulation easing announcement shock, differentiating between liquidity and capital announcements, would affect financial conditions. Financial conditions summarize the cost of funding for firms and reflect the underlying price of risk in the economy[22]. Therefore, the large intraday equity price movements following the financial regulation announcements described in the previous section, could be economically important as stock prices have been key drivers of global financial conditions (IMF, 2020b). The exercise estimates the effect of regulation changes onto financial conditions by analyzing the responses of financial condition indices (FCIs) to regulation announcements using a panel VAR (PVAR) framework.[23]

[22] Adrian and Liang (2018), for example, argue that accomodative policies can create an intertemporal tradeoff between improving current financial conditions at a cost of increasing future financial vulnerabilities

[23] Given that the lack of intraday FCIs, the use of a PVAR framework is preferred over the local projection method, given that the PVAR allows to capture possible feedback effects from movements in FCIs to regulatory

The PVAR follows closely Towbin and Weber (2013) and captures the dynamic relationship of stock market returns and changes in FCIs in a sample of 24 economies with daily data from January 1 until July 31, 2020. The FCI index, constructed by Goldman Sachs, is available at a daily frequency and provides the largest country coverage. Following Burnside, Eichenbaum, and Fisher (2004) and Cavallo (2005) the policy announcement dates are embedded in the PVAR model. The regulation announcements are the same ones used in the previous sub-section, and described in detail in Section III. Interaction terms allow the model's coefficients to vary deterministically with the jurisdiction income classification (i.e. advanced economy or emerging market). The recursive interacted PVAR has the following form:

$$\begin{pmatrix} 1 & 0 \\ \alpha_{0,it}^{2,1} & 1 \end{pmatrix} \begin{pmatrix} Announcement_{i,t} \\ FCI_{i,t} \end{pmatrix} = \sum_{l=1}^{L} \begin{pmatrix} \alpha_{l}^{1,1} & 0 \\ \alpha_{l,it}^{2,1} & \alpha_{l,it}^{2,2} \end{pmatrix} \begin{pmatrix} Announcement_{i,t-l} \\ FCI_{i,t-l} \end{pmatrix} + U_{it}$$

where $Announcement_{i,t}$ is a dummy variable that equals to 1 on the day of the regulation announcement (and 0 otherwise); $FCI_{i,t}$ is the daily FCI estimated by Goldman Sachs. U_{it} is a vector of uncorrelated i.i.d. shocks. L denotes the number of lags. The coefficients $\alpha_{l,it}^{j,k}$ are allowed to vary deterministically as a function of the income level through the inclusion of an interaction term (a 0/1 dummy variable, which equals to 1 if the jurisdiction is an emerging market):

$$\alpha_{0,it}^{j,k} = \beta_{0,1}^{j,k} + \beta_{0,2}^{j,k} \times Income_i$$

Each equation in the system is estimated using ordinary least squares (OLS), with two lags, selected using the Schwartz Criterion. As the impulse responses are non-linear functions of the OLS estimates, standard errors are estimated using the bootstrap procedure proposed by Runkle (1987) summarized in Towbin and Weber (2013).

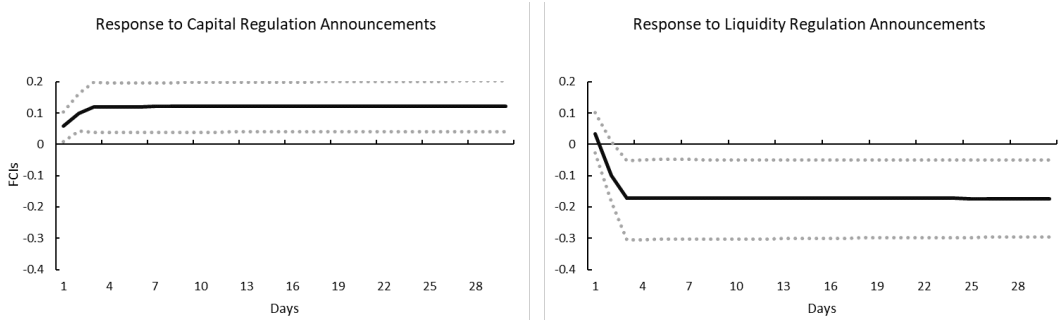
It is common in the literature on the effects of policy shocks based on VAR models to impose the restriction that outcome variables (e.g., output, inflation, etc.) react immediately to policy shocks, whereas policy variables do not react contemporaneously to other shocks in the system. This identifying assumption is the standard Cholesky decomposition with the regulation policy variable ordered first in the VAR. The analysis presented in this subsection employs the same identification strategy, as intricacies in the design and deployment of prudential measures would somewhat limit the contemporaneous reaction of regulation. This timing restriction is plausible given the use of daily frequency data in the analysis.

In line with the results from the intraday analysis using equity prices, the effects of regulatory easing announcements on FCIs vary depending on the type of policy measure (Figure 6). Announcements of lower capital requirements led to a tightening of FCIs on impact, with

decisions. Since the economic significance of regulation is likely to be observed over longer time horizons, the assumption of strict exogeneity of regulation to market developments is likely to be violated when the window of analysis goes beyond a day.

the effect peaking during the first 5 days after the announcement. Although the effect of lower liquidity requirements on FCIs is not statistically significant on impact, this type of regulation easing eventually led to a significant loosening of FCIs. Furthermore, the effects are highly persistent, which highlights the important economic implications that these type of regulations can have.

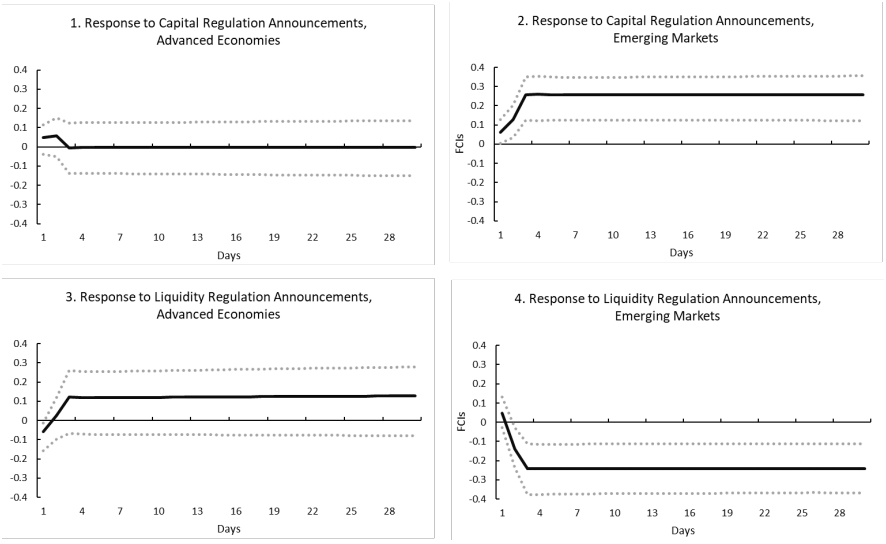
Figure 6. Impulse Responses of Financial Conditions to Financial Regulatory Announcements



Note: Impulse responses using a PVAR framework with a recursive ordering with regulation announcement dummies ordered first. Solid black lines represents OLS point estimate. Dashed lines are one standard deviation confidence bands. A positive (negative) value denotes a tightening (loosening) of financial conditions.

Splitting the sample into advanced economies (AEs) and emerging markets (EMs) shows that regulation easing had the largest impact in EMs (Figure 7). For both income groups, announcements related to lower capital requirements tightened FCIs on impact, however the effect the effect is short-lived and not statistically significant for AEs ((Figure 7, panel 1). In contrast, for EMs the effect of capital regulation announcements is very persistent, reaching its peak in the first week after impact (Figure 7, panel 2). Liquidity easing announcements loosen FCIs in AEs on impact, but the effect on FCIs turns statistically insignificant in the days after impact (Figure 7, panel 3). The effect is much larger and significant (both economically and statistically) in EMs, with announcements of lower liquidity requirements leading to a large and persistent loosening of financial conditions (Figure 7, panel 4).

Figure 7. Impulse Responses of Financial Conditions to Financial Regulatory Announcements by Income Group



Note: Impulse responses using a PVAR framework with a recursive ordering with regulation announcement dummies ordered first. Solid black lines represents OLS point estimate. Dashed lines are one standard deviation confidence bands. A positive (negative) value denotes a tightening (loosening) of financial conditions.

V. ROBUSTNESS

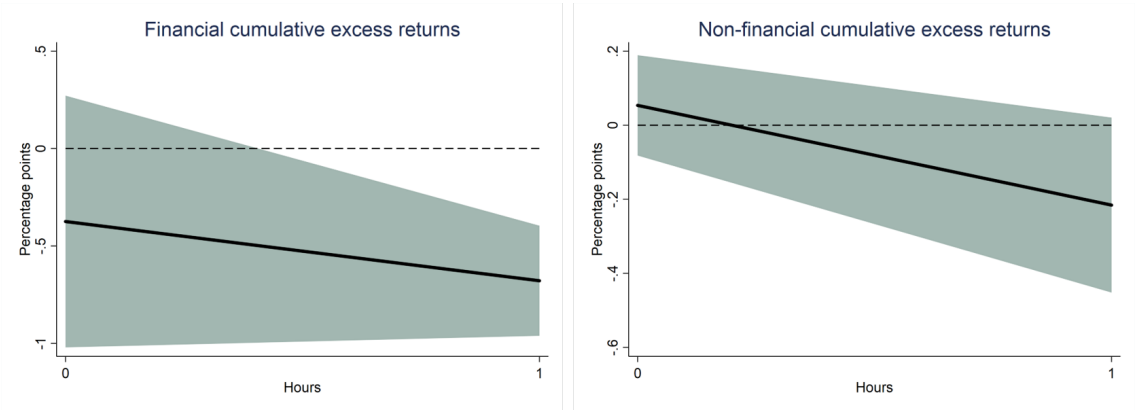
This section performs a battery of robustness checks comprising: (i) expanding the sample to include jurisdictions with at least one non-financial industry stock market index, (ii) using alternative measures of equity returns, and (iii) using bank-level stock returns instead of an aggregate financial sector index. All the results remain broadly unchanged.

A. Expanded sample

Figure 8 presents the responses of the excess stock market returns for the financial and non-financial sectors for an expanded sample, which includes all jurisdictions with at least one non-financial industry sector index. If anything, trade-offs intensify in the larger sample. The response of financial sector equity becomes more significant than in the baseline. For non-financial industries, the response is considerably more limited on impact, and becomes negative one hour after the announcement—albeit not significantly. These results suggest that the tradeoffs stemming from COVID-19 related financial regulations were more intense in jurisdictions with smaller and less liquid financial sectors. [24]

[24] Demirgüç-Kunt, Pedraza, and Ruiz-Ortega (2020) show that in jurisdictions that are not part of the Basel Committee on Banking Supervision, prudential measures are accompanied by large declines in banks' stock prices.

Figure 8. Cumulative Impulse Responses of Excess Equity Returns to Financial Regulatory Announcements, Expanded Sample (Percentage points)



Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

B. Alternative equity return measures

The results are also robust to using alternative metrics for equity returns. Figure 9 shows that equity prices, measures in hourly percent changes, declined by almost 2 percent in the hour after announcements of regulatory easing for financial sector firms. In line with the baseline results, equity prices for non-financial industries also significantly increase on impact.

Figure 9. Cumulative Impulse Responses of Equity Prices to to Financial Regulatory Announcements (Percent)

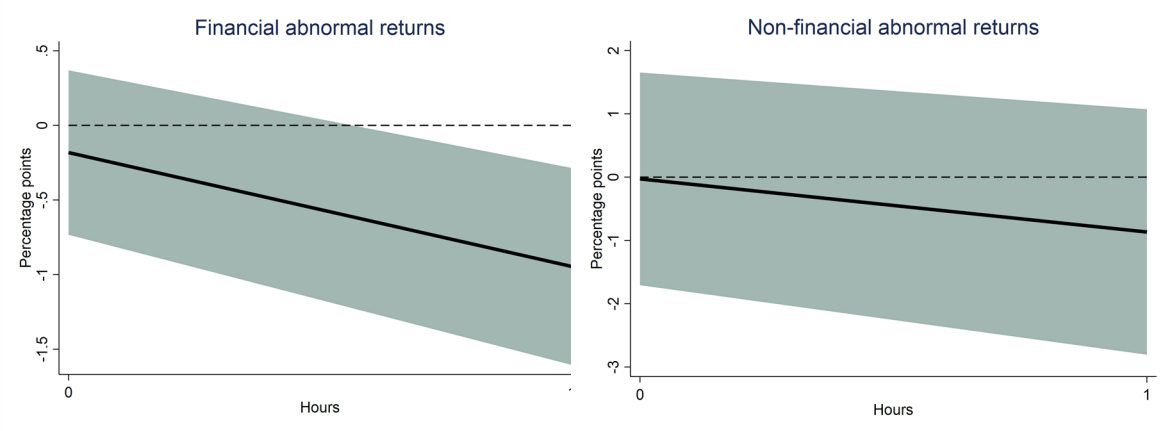
Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

Similar results are also obtained when the dependent variable is a market model for abnormal returns (figure 10). The accumulated abnormal returns are obtained by estimating the difference between realized returns and the expected returns implied by the following market model:

$$EquityReturn_{i,t} = \alpha_t + \beta_i MarketReturn_{i,t} + \varepsilon_{i,t} \tag{5}$$

where the error term $\varepsilon_{i,t}$ is the abnormal return for sector i at time t. In line with the baseline results, regulatory easing announcements lead to decline in abnormal returns in the hour after impact. However, explained in part by the large heterogeneity across industries and economies, the estimates for the effect of regulatory easing on the abnormal returns of non-financial firms are very noisy, resulting in very wide confidence bands around the OLS point estimates.

Figure 10. Cumulative Impulse Responses of Abnormal Equity Returns to to Financial Regulatory Announcements (Percentage points)

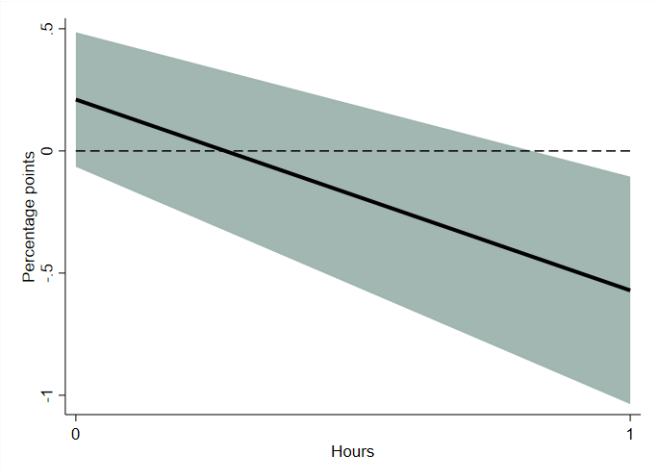


Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

C. Bank equity returns

Given that in some jurisdictions equities for non-bank financial institutions could be an important component in financial sector indices, we also isolate the response of banks, as these institutions are likely to be the ones most affected by changes in regulation. Figure 11 shows the average response of banks' excess stock return, with these being very similar to the responses of the financial equity indices used in the baseline specification (i.e. a significant negative excess return one hour after the announcement). These results suggest that the responses of financial sector equity indices were mainly driven by bank stock prices.

Figure 11. Cumulative Impulse Response of Bank's Excess Equity Returns to to Financial Regulatory Announcements (Percentage points)



Note: Impulse responses obtained using Jordà (2005) local projection methods. Solid black line shows OLS point estimates. Teal shades are 90% confidence bands.

VI. Conclusion

Despite the negative effect on financial sector stock prices, the effect of regulatory easing on non-financial sector equity returns appears overall positive, particularly in jurisdictions with large and liquid financial markets. Together with other policies, looser financial regulations helped contain amplification of the COVID-19 shock, at least in the near term. However, the market reaction signals important trade-offs and the need to handle these policies with care. There has been a generalized negative market reaction to easier bank capital regulation, possibly suggesting the expectation of increased risk-taking by financial firms. In contrast, news about financial regulation easing positively affected non-financial sector returns, with markets seeing these measures as being conducive to looser borrowing constraints and financial conditions for firms, supporting employment and production, at least in the near-term. The effects of looser regulations, and the difference between the effects of capital and liquidity regulation on financial conditions, is particularly large in emerging markets. This suggests that the downside risk from depletion of capital buffers is perceived to be significant while, on the other hand, liquidity regulation easing was successful in lowering funding costs and boosting earnings among financial sector firms in emerging markets.

In terms of composition, tradeoffs appear to be small for liquidity measures as equity prices increased in response to easier liquidity regulation for financial and non-financial firms. However, lower capital requirements led to a significant decline in equity prices for financial and non-financial industries alike. The analysis did not find statistically significant responses of stock prices to the relaxation of other financial regulations, such as concentration requirements or borrower-based measures, or non-regulatory financial measures. This could in part be explained by the larger heterogeneity among policy measures in this class. Finally, results

presented in this paper could help inform the design of plans to roll back regulatory easing, for instance by rolling back capital related regulations first to help rebuild buffers, once the recovery is on a firm footing. This of course implicitly assumes that the effects detected in this paper carry through symmetrically. If this is the case, the rollback of regulation should be gradual in order to prevent a sudden tightening of financial conditions.

While the regulatory response to the COVID-19 shock provides insights on how regulation could affect the financial system and the economy, caution should be exercised in drawing broader lessons applicable to future episodes when the shock might be of different, non-exogenous nature. As the crisis evolves more work on the effects of the recent regulatory easing will also help better understand its effects beyond the near term and inform possible regulatory reforms in the future, particularly with regards to the composition of regulatory capital buffers (e.g. conservation, countercyclical, etc.). Finally, additional work is also needed to understand the effects of specific non-regulatory financial policies (e.g., asset purchase programs), as the ambiguous effects of these measures (in this and other studies) could be a result of the bunching of different policies and strategies together.

REFERENCES

Adrian, Tobias, and Nellie Liang, 2018, "Monetary Policy, Financial Conditions, and Financial Stability," *International Journal of Central Banking*, Vol. 14(1), pp. 73–131.

Altavilla, Carlo, Francesca Barbiero, Miguel Boucinha, and Lorenzo Burlon, 2020, "The great lockdown: pandemic response policies and bank lending conditions," *CEPR Discussion Paper No. DP15298*.

Araujo, Juliana Dutra, Manasa Patnam, Adina Popescu, Fabian Valencia, and Weijia Yao, 2020, "Effects of Macroprudential Policy: Evidence from Over 6,000 Estimates," *IMF Working Paper No. 20/67*.

Arslan, Yavuz, Mathias Drehmann, and Boris Hofmann, 2020, "Central bank bond purchases in emerging market economies," Techn. rep., Bank for International Settlements.

Baron, Matthew, and Wei Xiong, 2017, "Credit expansion and neglected crash risk," *The Quarterly Journal of Economics*, Vol. 132, No. 2, pp. 713–764.

Berger, Allen N, and Christa HS Bouwman, 2013, "How does capital affect bank performance during financial crises?" *Journal of Financial Economics*, Vol. 109, No. 1, pp. 146–176.

Bernanke, Ben, and Mark Gertler, 1989, "Agency Costs, Net Worth, and Business Fluctuations," *American Economic Review*, Vol. 79, pp. 14–31.

Bianchi, Javier, and Enrique G. Mendoza, 2018, "Optimal Time-Consistent Macroprudential Policy," *Journal of Political Economy*, Vol. 126.

Brunnermeier, Markus K., and Yuliy Sannikov, 2014, "A Macroeconomic Model with a Financial Sector," *American Economic Review*, Vol. 104, pp. 379–421.

Burnside, C., M. Eichenbaum, and J. Fisher, 2004, "Fiscal Shocks and Their Consequences," *Journal of Economic Theory*, Vol. 115, pp. 89–117.

Cappelletti, Giuseppe, Aurea Ponte Marques, Carmelo Salleo, and Diego Vila Martin, 2020, "How do banking groups react to macroprudential policies? Cross-border spillover effects of higher capital buffers on lending, risk-taking and internal markets," *Eurpean Central Bank Working Paper Series*.

Cavallo, M., 2005, "Government Employment and the Dynamic Effects of Fiscal Policy Shocks," *Working Papers in Applied Economic Theory*, Vol. 2015-16.

Cieslak, Anna, and Andreas Schrimpf, 2019, "Non-monetary news in central bank communication," *Journal of International Economics*, Vol. 118, pp. 293–315.

Demirgüç-Kunt, Asli, Alvaro Pedraza, and Claudia Ruiz-Ortega, 2020, "Banking sector performance during the covid-19 crisis," *The World Bank*.

Driscoll, John C, and Aart C Kraay, 1998, "Consistent covariance matrix estimation with spatially dependent panel data," *Review of economics and statistics*, Vol. 80, No. 4, pp. 549–560.

Elenev, Vadim, Tim Landvoigt, and Stijn Van Nieuwerburgh, Forthcoming, "A Macroeconomic Model With Financially Constrained Producers and Intermediaries," *Econometrica*.

Fama, Eugene F, 1970, "Efficient capital markets: A review of theory and empirical work," *The journal of Finance*, Vol. 25, No. 2, pp. 383–417.

———, 1976, *Foundations of finance: portfolio decisions and securities prices* (Basic Books (AZ)).

Gandhi, Priyank, 2018, "The relation between bank credit growth and the expected returns of bank stocks," *European Financial Management*, Vol. 24, No. 4, pp. 610–649.

Gormsen, Niels Joachim, and Ralph SJ Koijen, 2020, "Coronavirus: Impact on stock prices and growth expectations," *University of Chicago, Becker Friedman Institute for Economics Working Paper No.2020-22*.

Greenwood, Robin, Benjamin Iverson, and David Thesmar, 2020, "Sizing Corporate Restructuring in the COVID Crisis," *National Bureau of Economic Research*, Vol. Working Paper 28104.

Gürkaynak, Refet S, Brian Sack, and Eric T Swanson, 2005, "Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements," *International Journal of Central Banking*.

Huang, Qiubin, Jakob de Haan, and Bert Scholtens, 2020, "Does bank capitalization matter for bank stock returns?" *The North American Journal of Economics and Finance*, Vol. 52, p. 101171.

IMF, 2020a, "Banking Sector: Low Rates, Low Profits?" *Global Financial Stability Report*, Vol. April.

———, 2020b, "Financial Conditions Have Eased, but Insolvencies Loom Large," *Global Financial Stability Report Update*, Vol. June.

Jeanne, Olivier, and Anton Korinek, 2010, "Managing Credit Booms and Busts: A Pigouvian Taxation Approach," *NBER*, Vol. Working Paper no. 16377, pp. Cambridge, MA.

Jordà, Òscar, 2005, "Estimation and inference of impulse responses by local projections," *American economic review*, Vol. 95, No. 1, pp. 161–182.

Kiyotaki, Nobuhiro, and John Moore, 1997, "Credit Cycles," *Journal of Political Economy*, Vol. 105, pp. 211–48.

Lewrick, Ulf, Christian Schmieder, Jhuvesh Sobrun, and Elod Takats, 2020, "Releasing bank buffers to cushion the crisis-a quantitative assessment," .

Mendoza, Enrique G., 2010, "Sudden Stops, Financial Crises, and Leverage," *American Economic Review*, Vol. 100, pp. 1941–66.

Montiel Olea, Jose L., and Mikkel Palgborg-Møller, 2020, "Local Projection Inference is Simpler and More Robust Than You Think," .

Muth, John F, 1961, "Rational expectations and the theory of price movements," *Econometrica: Journal of the Econometric Society*, pp. 315–335.

Narain, Aditya, Nigel Jenkinson, Alfonso Garcia Mora, Yira J Mascaro, Dirk Jan Grolleman, and Hee Kyong Chon, 2020, "COVID-19: The Regulatory and Supervisory Implications for the Banking Sector," *Joint IMF-World Bank Staff Position Note*.

Runkle, David E, 1987, "Vector autoregressions and reality," *Journal of Business & Economic Statistics*, Vol. 5, No. 4, pp. 437–442.

Schwert, G William, 1981, "Using financial data to measure effects of regulation," *The Journal of Law and Economics*, Vol. 24, No. 1, pp. 121–158.

Sever, Can, Dimitris Drakopoulos, Rohit Goel, and Evan Papageorgiou, 2020, "Effects of Emerging Market Asset Purchase Program Announcements on Financial Markets During the COVID-19 Pandemic," *IMF Working Paper, forthcoming*.

Towbin, Pascal, and Sebastian Weber, 2013, "Limits of floating exchange rates: The role of foreign currency debt and import structure," *Journal of Development Economics*, Vol. 101, pp. 179–194.