A First Peek at Firms' Cash Flow Dynamics in the Pandemic Year: A Lesson Learned?

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A First Peek at Firms' Cash Flow Dynamics in the Pandemic Year: A Lesson Learned?

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Abstract

Using a comprehensive database of financial data and data on public support, we aim at documenting the actual (and not predicted) effects of the Covid-19 pandemic on firms' liquidity. A drain of the non-financial corporations' liquidity was unprecedented and highly asymmetric across sectors. A simple descriptive analysis enables us to evaluate (partially) the effectiveness of support measures and to provide insights on how well-targeted support measures were from the sectoral perspective. Acting in concert, the governments and the European Union (EU) institutions concerned seem to succeed in preventing massive illiquidity (for now). Crisis measures were targeted mostly at firms with positive cash flow in the pre-pandemic year and ensured additional 3.4 percent of firms from the analysed sectors to sustain positive cash flow and 0.6 percent of firms to recover. Strikingly, the share of inactive firms decreased in 2020 compared to 2019, which might indicate that measures supported de facto dead companies. Considering the proportion of firms, the most vulnerable sector benefited most, but not when we think about a reduction in cash flow compensated for with direct grants. The approach "whatever is necessary" in a form of "flat" public support might thus lead to not optimally targeted beneficiaries.

Introduction

A fall in economic activity related to the pandemic was as unprecedented as was the drain of the non-financial corporations' liquidity. The pandemic containment measures and related costs, a drop in foreign and domestic demand, supply chain distortions, and uncertain economic, social and political circumstances, all contributed to an abrupt deterioration of cash flow dynamics. Avoiding (also) high social and economic costs of bankruptcies and illiquidity, the policy response was exceptional in size and aligned, horizontally (monetary policy, fiscal policy and macroprudential policy) and vertically (at a national and supranational level). The number of bankruptcies or closures of non-financial corporations in Slovenia only increased in the sector hit hardest by the pandemic, namely accommodation and food service activities (Bank of Slovenia, 2021).[1]

The shock was highly asymmetric with more than half of firms likely to experience liquidity shortages in the contact-intensive sectors such as the accommodation and food service activities, transports and arts, entertainment, and recreation, but less than 20 percent in utilities, information and communication and professional services sector (Demmou et al., 2021). A study of liquidity and solvency of non-financial corporations in 26 European countries by Ebeke et al. (2021) documents similar, yet more conservative, results. The complexity of production networks (motor vehicle industry), intangible-intensity and limited reliance on debt finance were also shown to weaken/strengthen the resilience to the shock posed by the pandemic.

Early literature focuses on the prediction of illiquidity of non-financial corporations with and without policy intervention, with estimated time needed to become constrained and the size of the liquidity gap. According to Demmou et al. (2021), up

[1] This is in part attributable to the government measures regarding bankruptcy proceedings in cases when the firm's insolvency is due to the declaration of the epidemic (Bank of Slovenia, 2021).

to 38 percent of firms in 14 analysed countries would face liquidity shortfalls in 10 months without government intervention. Direct payments to (at least partially) cover labour costs and debt moratorium policies seem to be most beneficial. Using a simple method based on firms' balance sheets, Schivardi and Romano (2020) predict illiquidity for the whole population of Italian firms, month-by-month. Around 200,000 companies were projected to be illiquid at the peak which gives rise to a liquidity shortfall of some 72 billion euros. It is assessed that due to government guarantees for bank loans, almost all firms would be able to cover their liquidity gap. Ebeke et al. (2021) showed that policy measures, if implemented as designed, would assist in reducing liquidity risk substantially. McGeever et al. (2020) and Demmou et al. (2021) additionally shed light on sectoral heterogeneity.

Another stance of literature tackles the fit between support supplied and support needed, considering size, instruments and sectors. Cirera et al. (2021) show that firms and sectors, which experienced a larger reduction in sales, were more likely to receive support, but also that firms not experiencing any shock received support. The recipients were mistargeted, most likely due to barriers to access policy support and the limited capacity of public institutions to target. The probability to receive support was lower for small firms, which were more susceptible to the shock, but less informed (Apedo-Amah et al., 2020). Bole et al. (forthcoming) also find evidence that support measures were inappropriately targeted when sectors are considered. They further observe that support measures do not compensate for the non-pharmaceutical interventions impact. Bircan et al. (2020) analyse how suitable are financial debt instruments to ease liquidity constraints of small and medium-sized enterprises (SMEs) in 16 emerging markets, and three Western European comparator countries. Firms' debt capacity is considered a crucial factor. According to the study, Slovenian SMEs are not in a most favourable position, having limited capacity for additional debt accumulation and low liquidity. The key concern raised relates to (potential) over-indebtedness and possibly mistargeted support measures.

The impact of economic policies on firms' liquidity and debt accumulation in Slovenia during the previous crisis episode is well documented by Bole et al. (2014). The authors analyse cash flow migration and illiquidity contagion of firms in bust, boom, and recovery episodes. It was shown that liquidity of non-financial corporations deteriorated sharply in the first years after the crisis and was slow to recover. Inability of banks to refinance foreign loans, reduction in informational capital ("ability of banks to evaluate future solvency of their clients"), because of high uncertainty and procyclical macroprudential policy intervention (most notably in the recovery period) lead to increased collateralization and credit rationing. This limited the access of non-financial corporations to needed liquidity and hindered their recovery. The opportunity costs of the suboptimal policy response, when timing, sequencing and calibration are considered, seem to be high.

In this paper, we analyse cash flow dynamics of the total population of Slovenian non-financial corporations. Following the methodology employed by Bole et al. (2014), cash flow status with and without policy measures in the year of the outbreak of the pandemic conditional on the cash flow status in the pre-pandemic year is studied. Using a simple descriptive analysis, we first document the actual and not predicted effects of the pandemic on firms' liquidity and performance. Second, the analysis enables us to evaluate the effectiveness of government (mostly) employment support through direct grants and to provide insights on how well-targeted support measures are from the sectoral perspective. In short, who the beneficiaries are. The evaluation is, however, partial since the epidemic was prolonged until 15 June 2021 in Slovenia, and a large part of the state aid which was approved and accounted for in financial statements for 2020, was paid out in 2021. Harmonized with our methodology, it has a positive effect on the cash flow only in 2021. Third, building upon the study by Bole et al. (2014) allows us to draw parallels to the Great Recession. The question of policy response and its horizontal and vertical alignment is addressed.

The paper is organized as follows. First section provides an (non-exhaustive) overview of monetary, fiscal and macroprudential policy actions at a national and supranational level. In the second section, we describe the data and empirical method. The third section is dedicated to discussion of the results with reference to the Great Recession and conclusion.

1 A review of policymakers' responses to the COVID-19 pandemic

The policy response to the Covid-19 pandemic was immediate and exceptional in its size. In anticipation of an unprecedented economic disaster, the sentiment towards austerity has turned on its head and the president of the European Commission, Ursula von der Leyen, underpinned that in a

Table 1. Macroprudential interventions.

	Slovenia			Slovenia	European institutions concerned
	boom 2007–2008	bust 2009–2010	recovery 2011–2013	Covid-19 pandemic 2020–2021	Covid-19 pandemic 2020–2021
capital buffers	0	2	0	1	−1
lending standards restrictions	1	0	0	−1	0
limits on credit growth and volume	0	0	−1	0	0
limits on large exposures and concentration	1	−1	0	0	0
liquidity requirements and limits on currency and maturity mismatch	0	0	0	0	−1
loan-loss provisioning	−1	1	2	0	−1
minimum capital requirements	1	0	0	0	−2
leverage ratio	0	0	0	0	−1
risk weights	0	0	0	0	−1
other measures	1	0	2	0	−1

Note: Macroprudential interventions; cumulative number of tightening actions (+1) less number of loosening actions (−1) in the indicated period.

Source: Macroprudential Policies Evaluation Database (MaPPED); Prašnikar et al., 2021; author's calculations

"Draghi way"[2]: "We will do whatever is necessary to support the Europeans and the European economy (European Commission, 2020a)."[3]

The European Commission acted promptly, focusing its activities mainly on providing the Member States with flexibility and financial resources to act. Since national budgets were anticipated to be the main source of fiscal stimulus, the Commission activated the general escape clause of the Stability and Growth Pact, allowing governments to "depart from the budgetary requirements that would normally apply under the European fiscal framework". It is expected to be extended through 2022. Under the Temporary Framework, which was adopted in just two days, amended five times, and extended until 31 December 2021, the approval process of state aid notifications was facilitated, and the rules were relaxed (e.g. extension of the ceilings for state aid and scope to recapitalization and subordinated debt measures).[4] Up to 200 billion euros were made available against a 25-billion-euro governments' guarantee to the European Investment Bank (EIB) and delayed repayments of loans were allowed for to avoid disruptions in funding and illiquidity of the non-financial corporations, especially SMEs. Further, 1,211 billion euros were secured through the 2021–2027 Multiannual Financial Framework and additional 807 billion euros through a temporary

recovery instrument NextGenerationEU, financed by borrowing at the EU level. Under the Recovery and Resilience Facility Slovenia is to receive 1.8 billion euros in grants and 705 million euros in loans (European Commission, 2020b).

The Eurosystem responded with an expansion in securities purchases and refinancing operations, the collateral terms changed. The participation in refinancing operations of Slovenia banks was yet lower than the euro area average. According to Bank of Slovenia (2020), this might be due to the excess liquidity and ample and growing non-banking sector deposits available (75.5 percent of total liabilities in June 2020). "Despite the risk of sudden withdrawals, this funding is more stable than wholesale funding and less subject to external shocks" (Bank of Slovenia, 2020).

In Table 1, we present a non-exhaustive overview of macroprudential policy during the pandemic. The cumulative number of macroprudential policy tightening actions (+1) less the number of macroprudential policy loosening actions (−1) is given. Shifts in macroprudential policy stance are shown by 10 categories, harmonized with the Macroprudential policies evaluation database (MaPPED) (Budnik & Kleibl, 2018). To enable comparison, we additionally present the policy response to the Great Recession, which was documented by Prašnikar et al. (2021). Table 1 shows that at the supranational

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[2] In the face of a sovereign debt crisis in 2012, Mario Draghi said "within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough" (European Central Bank, 2012).
[3] Following the Great Recession and excessive budget deficits resulting from it, many developed countries bet on fiscal consolidation policies. Only in 2013, Blanchard and Leigh (2013) proposed that the short-term multipliers in response to the fiscal consolidation during 2010 and 2011 were larger in size than previously believed.
[4] A similar framework was adopted following the 2008 financial crisis.

level the macroprudential policy requirements were eased. The banking regulators issued interpretations and guidance to ensure additional flexibility in the existing regulatory (CRR) and accounting framework (introduction of IFRS 9). The European Banking Authority (EBA) and the European Central Bank (ECB) alike postulated that "the application of support measures should not automatically lead to stricter prudential treatment of loans when the debtor's financial situation is not deteriorating. When banks approve a loan moratorium that meets the conditions for a general payment moratorium, this does not automatically require the reclassification of the exposure as forborne or defaulted." Favourable treatment introduced in the area of capital requirements for credit risk is also being applied (Bank of Slovenia, 2020; Bank of Slovenia, 2021).[5]

The ECB granted operational relief in the form of adjusting timetables, processes and deadlines for each individual bank, and more significantly, eased capital buffer and capital composition requirements.[6] Estimated capital relief amounted to 120 billion euros and "could be used to absorb losses or potentially finance up to 1.8 trillion euros of lending" (European Central Bank, 2020). Also, the national macroprudential authorities acted (or were expected to act) countercyclically opting to lower or fully release the countercyclical capital buffer, systemic risk buffer or other systemically important institutions buffer.[7] The Bank of Slovenia kept its macroprudential policy toolkit nearly unchanged. It entails macroprudential restrictions on household lending, the countercyclical capital buffer, which stood at zero already before the outbreak of the pandemic, the buffer for other systemically important institutions, a macroprudential liquidity measure (the gross loans to deposits flows[8]) and currently irrelevant macroprudential caps on deposit interest rates. Restrictions on profit distributions by banks and by leasing companies were introduced in April 2020 (amended in February 2021) and a temporary exclusion of a decline in income caused by the pandemic from the creditworthiness evaluation was allowed for (Bank of Slovenia, 2020; Bank of Slovenia, 2021).

The first response of the Slovenian government to the Covid-19 pandemic was the law allowing the deferral of loan payments for at least 12 months for non-financial corporations, sole traders, farmers and private individuals. It was followed by nine fiscal stimulus packages, which amounted to almost 5 billion euros in the period until June 2021. Table 2 summarizes support measures and financial resources provided. Employment support accounted for roughly 36 percent, followed by measures to maintain liquidity, which amounted to 1.4 billion euros or 27.7 percent. Due to an extensive fiscal stimulus, the general government sector returned to a deficit of 7.7 percent of GDP in 2020 from a surplus of 0.4 percent in year 2019. The projected general government deficit in 2021 is 7.9 percent of GDP down from 8.6 percent owing to more favourable economic outlook. Also, in 2008 and 2009 the government acted countercyclically, but the intervention was less intensive (Republic of Slovenia Fiscal Council, 2021; Statistical Office of the Republic of Slovenia, 2021).

2 Data

Our empirical analysis draws upon the study of cash flow dynamics and illiquidity contagion of non-financial companies in Slovenia during the Great Recession by Bole et al. (2014). Using comprehensive databases of firm-level financial data and data on state aid and employing a simple descriptive analysis, we first document the effects of the pandemic on firms' liquidity and performance. Second, cash flow status with and without policy measures in the year of the outbreak of the pandemic conditional on the cash flow status in the pre-pandemic year is studied.

We use three sources of data in the empirical analysis. The first one is a comprehensive database of financial data provided by the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). The data encompasses the

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[5] "Transitional period for limiting the impact of IFRS 9 provisions on the regulatory capital of banks is being extended by two years (until the end of 2024), thereby mitigating any impact on bank lending capacity from a sudden significant increase in expected credit-loss provisions during the economic downturn caused by Covid-19 (Bank of Slovenia, 2020)." As an insight, after the first quarter of 2010, the Bank of Slovenia launched a process of accelerated implementation of stricter capital requirements (Bole et al., 2014).

[6] "Temporarily, banks are allowed to operate below the level of capital defined by the Pillar 2 Guidance, the capital conservation buffer and the liquidity coverage ratio." Furthermore, banks are also "allowed to partially use capital instruments that do not qualify as Common Equity Tier 1 (CET1) capital, for example Additional Tier 1 or Tier 2 instruments, to meet the Pillar 2 Requirements (P2R)" (European Central Bank, 2020).

[7] The countercyclical capital buffer was lowered or fully released in Belgium, Denmark, France, Germany, Slovakia, Ireland, Norway, Sweden, Iceland, Lithuania, and the UK. The macroprudential authorities in Estonia and Finland used other instruments at their disposal and reduced the systemic risk buffer rates to zero, while the Netherlands reduced the existing rates for three institutions. Finland and the Netherlands additionally opted to selectively reduce the buffer for other systemically important institutions (Bank of Slovenia, 2020).

[8] "A macroprudential measure known as gross loans to deposits flows (GLTDF) recommends that banks with a positive annual inflow of deposits by the non-banking sector should have an annual increase in lending to the non-banking sector (before impairment) that is not negative. Preventing the banks' excessive reliance on unstable sources of funding (Bank of Slovenia, 2020)."

Table 2. Covid-19 measures adopted by the Slovenian government.

Category	Description of measures	2020 March—December in million EUR	2021 January—June in million EUR
Covid measures		2,910	2,049
Measures to preserve jobs	The partial coverage of wage compensation during temporary lay-off (furloughing), the crisis bonus, the monthly basic income and relief from the payment of social security contributions for claimants who were unable to pursue their business activities, temporary cash assistance for job loss from the first day of unemployment until the lifting of the emergency measures.	1,137	639
Measures for the smooth operation of public services	Employee bonuses, control of the epidemic (protective equipment, etc.), measures in education, sport and culture, compensation for healthcare service providers.	508	728
Measures to maintain consumption and social position	A 200-euro voucher per adult and a 50-euro voucher per child in 2020 and an additional 100-euro voucher in 2021 to be spent in accommodation in Slovenia, solidarity bonus for various groups (e.g. from 130 to 300 euros for pensioners).	291	50
Other expenditure		67	111
Measures to maintain liquidity		906	466
Deferred and instalment payments of tax	The option of deferring tax liabilities for up to 24 months or paying liabilities in 24 monthly instalments. A two-month extension of the deadline for submitting the return for the personal income tax prepayment for business activities and the tax return, a three-month deferral of the payment of social security contributions for self-employed persons who have no other employees, the deferral of the prepayment of personal income tax on business activities for April and May 2020 (until April 2021).	219	18
Uncalculated and unpaid advance payments of corporate income tax liabilities		171	0
Reimbursement of fixed costs	The direct grants to all companies irrespective of their size and of the sector, which have suffered a decline of at least 30% in their revenue in the period between October and December 2020 compared to the same period in 2019. Also applies in first half of 2021.	0	296
Guarantees	Government guarantees for a moratorium on payments deriving from all liabilities under loan agreements for up to 12 months for non-financial corporations, sole traders, farmers and private individuals. Loans made from public funds, encompassing additional financing by SID banka and additional guarantees for loans and liquidity loans to SMEs by the Slovene Enterprise Fund, the guarantee scheme for corporates and the corporate debt repurchase mechanism.	192	140
Liquidity loans		305	66
Deferred payment of loan liabilities — SID Bank		19	0

Source: Republic of Slovenia Fiscal Council, 2021; Bank of Slovenia, 2020.

Table 3. *List of variables and calculation.*

Variable	Calculation of the variable
Financial debt	(Long-term financial liabilities + Short-term financial liabilities) /Total assets
Operating liabilities	Short-term operating liabilities/Total assets
Operating receivables	Short-term operating receivables/Total assets
Collateral	(Land + Buildings + Other equipment and machinery) /Total assets
Operating cash flow	(Operating profit - Operating loss + Write-offs in value) /Total assets
Operating cash flow without support measures	(Operating profit - Operating loss + Write-offs in value - State aid[11])/Total assets
Manufacturing	A dummy variable with the value 1 if a company is categorized in manufacturing segment (section C of NACE Rev.2)
Construction	A dummy variable with the value 1 if a company is categorized in construction segment (section F of NACE Rev.2)
Utilities	A dummy variable with the value 1 if a company is categorized in utilities segment (sections D, E of NACE Rev. 2.)
Non-vulnerable services	A dummy variable with the value 1 if a company is categorized in non-vulnerable service segment (sections K, L, M, N of NACE Rev. 2.)
Vulnerable services	A dummy variable with the value 1 if a company is categorized in vulnerable service segment (sections G, H, I, J, R, S, T of NACE Rev. 2.)
Cash flow status	A categorical variable with the value 0 if a company is inactive,[12] 1 if it has operating cash flow <0, 2 if it has operating cash flow >0
Cash flow without support measures	A categorical variable with the value 0 if a company is inactive, 1 if it has operating cash flow without support measures <0, 2 if it has operating cash flow without support measures >0

total population of non-financial companies, liable to report under the Companies Act for national statistics purposes. That is 68,125 limited and unlimited liability companies (including listed companies) after the formal reorganization of the status of a company, economic interest groupings and main offices of foreign business entities[9] in 2020, 67,178 in 2019, 66,749 in 2018, and 66,470 in 2017. Based on the list of companies at the beginning of bankruptcy, liquidation[10] or termination, also provided by AJPES, the database was supplemented (updated) by 546 observations in 2021, 964 in 2020, 1,205 in 2019, 1,259 in 2018, and 1,210 in 2017. The data on the state aid to mitigate the effects of the pandemic were retrieved from ERAR, an application for the portrayal of public money use in the Republic of Slovenia.

To categorize companies in segments, we draw on the study by Bole et al. (forthcoming), which evaluates the Covid-19 support measures to alleviate the cost of social distancing at a sectoral level. The authors consider two main characteristics, determining the economic losses of a particular sector and consequently classification, namely essentiality of the sector and the ability to organize work from

home. Utilities and manufacturing are sectors not susceptible to a large demand shock and were deemed essential, thus could stay open despite the policy of constrained social mobility. A large demand shock due to the policy of constrained social mobility is common to a third segment of service sector, which includes inessential (e.g. hospitality, arts) or essential sectors (e.g. transportation). Other service sectors were affected by the policy of constrained social mobility but had the ability to organize work from home. Taking into account non-pharmaceutical mitigation measures, we could categorize companies in five homogenous segments: manufacturing, construction, utilities, non-vulnerable service segment and vulnerable service segment. The manufacturing segment covers all companies with economic activities in section manufacturing of NACE Rev. 2. The second analysed segment construction includes companies classified in section construction. Utilities encompass sections electricity, gas, steam and air conditioning supply, as well as water supply, sewerage, waste management and remediation activities of NACE Rev. 2. The non-vulnerable service segment comprises all companies with economic activities

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[9] Banks, insurance companies, stock exchange, investment funds and certain other financial and investment companies that do not use the accounting standard for companies are not included.
[10] Companies in insolvency proceedings (bankruptcy, liquidation) are not required to submit annual reports.

classified in sections: financial and insurance activities, real estate activities, professional, scientific and technical activities, and administrative and support service activities. The fifth segment is the vulnerable service segment, and it includes firms from economic activities in section wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities, information and communication, arts, entertainment and recreation, other service activities, and activities of households as employers. Agriculture, forestry and fishing, mining and quarrying, government sectors (O-Q) and activities of extraterritorial organisations and bodies are excluded from the analysis.

Table 3 documents definitions and calculation of variables. In the second column of Table 3, with calculations of the variables, we use item names identical to the ones in the original AJPES database.

3 Results

3.1 Performance of companies

In Table 4, we present descriptive statistics for the main variables by segment for the period 2018—2020. Financial debt, short-term operating liabilities, short-term operating receivables, collateral, operating cash flow and operating cash flow without support measures are documented for manufacturing, construction, utilities and both service segments separately at the first-lower quartile (p25), median (p50) and third-upper quartile (p75). Also, the number of observations is given.

Table 4 and Figs. 1—5 make it evident that support measures prevented a huge drop in cash flow for all quartiles of firms and all segments, but failed to prevent its worsening (except for utilities), when only direct grants are considered. A median firm in the vulnerable service sector recorded a decline in cash flow by 29 percent. Without policy intervention, the cash flow would decline by more than 50 percent for the firms mentioned, 42 percent for a median firm in the non-vulnerable service sector, 36 percent in construction and 27 percent in manufacturing. Taking into account the extent to

which support measures were able to sustain cash flow, the median firm of the most vulnerable segment benefited the least in relative terms compared to other segments. The firms with stronger cash flow position (upper-quartile firms) proved to be more resilient to the shock across all segments. A decline in cash flow was at 13—16 percent without measures and at 6—9 percent with measures. As already evident vulnerable service segment firms were indeed hit hardest, even more so when the firms in the lower quartile are considered. Their cash flow from operations was negative (-0.6 percent of the total balance sheet sum) already in the pre-pandemic years and with the pandemic it additionally deteriorated (-2.8 percent with support measures and -4.9 percent without). A quarter of non-vulnerable service sector firms with the weakest cash flow exhibit a similar pattern, apart from a milder drop in the pandemic year. The solvency of these two subsegments might be endangered. Prior to the pandemic, manufacturing firms had stronger cash flow compared to construction and services, but did not prove more resilient to the shock. Considering a reduction of cash flow in terms of percent of balance sheet sum, a lower-quartile manufacturing firm followed a lower-quartile vulnerable service segment firm. The cash flow was rather stable in 2019 compared to 2018 for all quartiles of firms and all segments.

Financial debt variable is especially relevant, when assessing the ability of non-financial corporations, which are not able to sustain positive cash flow from operations, to access debt finance. This includes the instruments made available by the government. According to Bircan et al. (2020), Slovenian SMEs have little room for additional debt. Debt was already on the rise throughout the whole observed period in manufacturing, construction, and services (both non-vulnerable and vulnerable sectors), apart from manufacturing in the pandemic year. The median and upper quartile levels of financial debt in manufacturing decreased to 11.9 percent and to 35.2 percent of the total balance sheet, respectively. Manufacturing firms indeed reported a decrease in demand for bank loans for

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[11] The data on state aid was retrieved from ERAR and represents the state aid in the form of direct grants paid to the non-financial corporations in 2020 rather than the state aid approved for the year 2020. The latter is presented in the profit and loss account in the AJPES database, but after a thorough inspection significant discrepancies were found in the application of the standard 15. According to Note 1 to the Slovenian Accounting Standard 15 (Official Gazette of the Republic of Slovenia, No. 63/20), "organizations that will obtain any state aid … for the containment or elimination of the consequences of the Covid-19 epidemic, must record the state aid received under other operating revenues (Pojasnilo 1, 2020)". This would correspond to the item AOP124 Subsidies, grants, allowances, compensation, and other revenues associated with products and services in our database. Instead of AOP124, the accurate data on state aid paid to the non-financial corporations in 2020 are used as a proxy for Covid-19 support measures. The state aid paid indeed has a direct effect on liquidity in contrast to the state aid approved. It should, however, be noted that, conceptually, this differs from our approach to evaluating cash flow status, where we assume that firms generate their cash inflows (outflows) from their sales (costs) rather than from their short-term operating receivables (short-term operating liabilities) and cash.

[12] Inactive firms are defined as firms at the beginning of bankruptcy, liquidation, or termination.

Table 4. Financial and intercompany debt, cash flow with and without state aid and potential collateral.

		Manufacturing			Construction			Utilities			Non-vulnerable service segment			Vulnerable service segment		
Year		2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
Total number of companies	N	8,153	8,189	8,328	7,134	7,219	7,511	945	938	928	19,901	20,074	20,226	27,521	27,636	28,003
Cash flow	p25	0.018	0.021	0.002	0.000	0.000	−0.001	0.011	0.009	0.015	−0.003	−0.005	−0.011	−0.005	−0.006	−0.028
	p50	0.089	0.088	0.074	0.073	0.076	0.063	0.086	0.085	0.089	0.045	0.045	0.035	0.055	0.055	0.039
	p75	0.166	0.162	0.150	0.165	0.165	0.152	0.150	0.157	0.167	0.142	0.140	0.131	0.148	0.146	0.133
Cash flow without support measures	p25			−0.002			−0.009			0.012			−0.021			−0.049
	p50			0.064			0.049			0.086			0.026			0.027
	p75			0.141			0.140			0.165			0.120			0.123
Financial debt	p25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	p50	0.119	0.127	0.119	0.043	0.069	0.075	0.237	0.230	0.185	0.019	0.029	0.033	0.080	0.097	0.109
	p75	0.343	0.357	0.352	0.270	0.298	0.315	0.595	0.569	0.531	0.373	0.392	0.410	0.408	0.422	0.456
Short-term operating receivables	p25	0.107	0.097	0.093	0.131	0.115	0.107	0.020	0.018	0.015	0.031	0.029	0.027	0.054	0.053	0.061
	p50	0.225	0.211	0.202	0.350	0.330	0.301	0.085	0.083	0.086	0.173	0.166	0.149	0.206	0.201	0.196
	p75	0.413	0.398	0.377	0.623	0.601	0.564	0.281	0.280	0.274	0.432	0.429	0.391	0.440	0.433	0.416
Short-term operating liabilities	p25	0.120	0.112	0.108	0.138	0.132	0.126	0.024	0.026	0.028	0.042	0.039	0.035	0.109	0.104	0.094
	p50	0.244	0.226	0.219	0.331	0.312	0.301	0.112	0.109	0.113	0.181	0.175	0.162	0.280	0.270	0.252
	p75	0.458	0.430	0.427	0.586	0.561	0.548	0.328	0.311	0.299	0.442	0.419	0.403	0.563	0.546	0.533
Collateral	p25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	p50	0.078	0.092	0.090	0.000	0.000	0.000	0.060	0.056	0.069	0.000	0.000	0.000	0.000	0.000	0.000
	p75	0.385	0.390	0.384	0.090	0.113	0.121	0.568	0.540	0.531	0.046	0.051	0.052	0.101	0.115	0.122

Source: AJPES, 2021; author's calculations

investments in the first half of 2020 (Bank of Slovenia, 2020). Utilities segment firms, which had the highest level of financial debt, deleveraged in the observed period. The level of financial debt of highly indebted firms (third quartile) in the vulnerable service sector increased most by 3.6 percentage points in the pandemic year. Also, the survey data provided by the Bank of Slovenia show that accommodation and food service activities sectors, classified in vulnerable service segment, increased their indebtedness most. A median and an upper quartile construction segment firm increased their indebtedness in 2019 as well as in 2020, most likely due to the favourable real-estate market conditions.

As anticipated, manufacturing and utilities firms have higher available collateral and thus higher capacity to borrow in the times of crisis than firms from construction and services. More than a half of the companies from construction, non-vulnerable service segment and vulnerable service sector had no collateral available, and only one quarter of companies had collateral higher than 12.1 percent, 5.2 percent, and 12.0 percent of total assets, respectively.

Almost uniformly across the distribution, short-term operating liabilities declined for firms from all segments in the observed period. Short-term operating liabilities, which could be understood as an alternative source of finance, rose only for utilities segment firms in the lower quartile in the pandemic

year. With the pandemic, the process of deleveraging slowed down in manufacturing, construction, and for the upper-quartile firms in services. Service sector firms with lower intercompany indebtedness decreased their indebtedness towards suppliers at a higher pace after the outbreak of the pandemic. Across the whole distribution, construction firms depend on the intercompany debt most. A rather high level of operating liabilities was evident also for firms from the upper quartile in vulnerable service segment firms.

Analysing short-term receivables, a similar pattern of decreasing level of receivables can be observed. A drop following the outbreak of the pandemic was especially pronounced for the upper-quartile firms in manufacturing and non-vulnerable service segment firms, and for the half of the firms with higher level of short-term receivables in construction. Considering net receivables (short-term receivables less short-term operating liabilities), vulnerable service segment of the first quartile decreased their net borrowing positions, as opposed to an increase in other segments. Except in utilities, net lenders managed to decrease their positions in the pandemic year.

3.2 Cash flow dynamics

In Table 5, we document the cash flow migration of firms in the pre-pandemic years of 2018 and 2019, and in the pandemic year of 2020, drawing on the
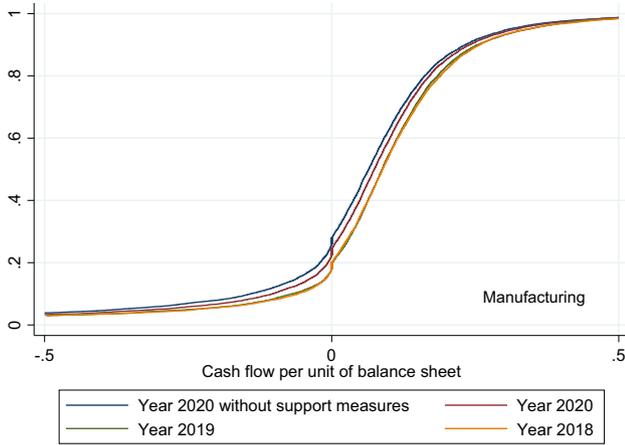
Fig. 1. Cumulative distribution of cash flow per unit of balance sheet with and without support measures in years 2018—2020. Source: AJPES, 2021; author's calculations.
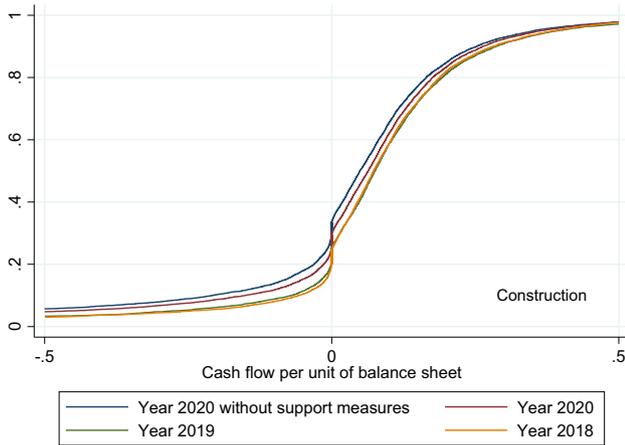

Fig. 2. Cumulative distribution of cash flow per unit of balance sheet with and without support measures in years 2018—2020. Source: AJPES, 2021; author's calculations.
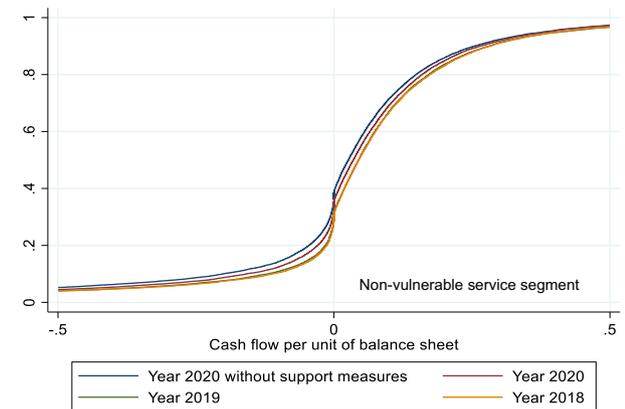

Fig. 3. Cumulative distribution of cash flow per unit of balance sheet with and without support measures in years 2018—2020. Source: AJPES, 2021; author's calculations.
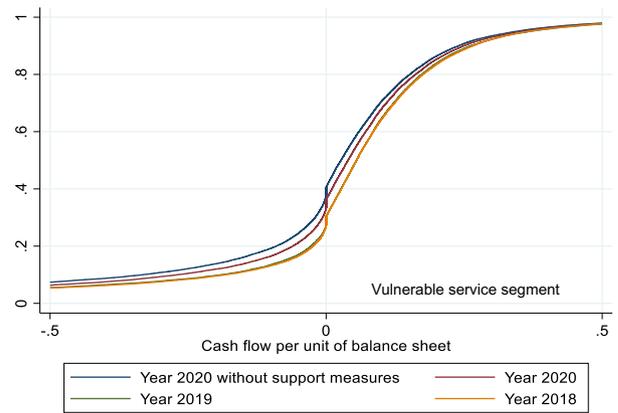

Fig. 4. Cumulative distribution of cash flow per unit of balance sheet with and without support measures in years 2018—2020. Source: AJPES, 2021; author's calculations.

methodology used by Bole et al. (2014). We show how the cash flow in the (current) year T is structured conditional on the cash flow in the previous year T-1. Based on liquidity position, we recognize three categories of firms in year T. First, firms which have positive cash flow (greater than zero), second, firms, which have negative cash flow (less than zero), and third, firms, which are inactive. In continuation, we call firms with positive cash flow in year T-1, which migrate to negative cash flow in year T, the "collapsing" firms, and firms with negative cash flow in year T-1, which improve their performance to positive cash flow in T, the "recovering" firms. The figures shown are in percent of the total number of companies by segment.

From Table 5, it is evident that the Covid-19 pandemic deteriorated liquidity of firms in all segments, but utilities. The segment proved to be
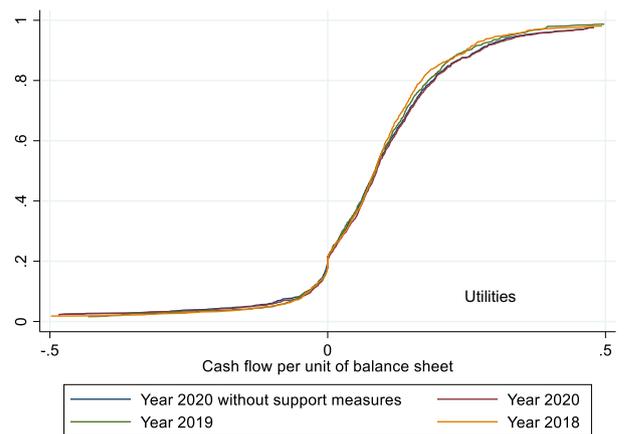

Fig. 5. Cumulative distribution of cash flow per unit of balance sheet with and without support measures in years 2018—2020. Source: AJPES, 2021; author's calculations.

Table 5. The cash flow migration matrix.

Year	Negative to inactive	Negative to negative	Negative to positive	Positive to inactive	Positive to negative	Positive to positive	Total number of companies
Manufacturing							
2018	0.87	10.32	6.23	0.56	6.79	75.24	7,693
2019	0.79	10.51	6.13	0.35	6.68	75.54	7,751
2020	0.53	11.43	5.64	0.27	11.00	71.13	7,867
H_0: p_{19} - p_{20} = 0	*	*			***	***	
2020 without support measures	0.53	11.89	5.19	0.27	14.22	67.90	7,867
H_0: p_{20} - p_{20w} = 0	−			−	***	***	
Construction							
2018	1.23	12.67	8.77	0.54	7.26	69.53	6,268
2019	0.95	11.80	6.86	0.60	8.89	70.90	6,330
2020	0.56	13.55	6.88	0.38	12.63	66.00	6,618
H_0: p_{19} - p_{20} = 0	**	***		*	***	***	
2020 without support measures	0.56	14.12	6.30	0.38	16.15	62.49	6,618
H_0: p_{20} - p_{20w} = 0					***	***	
Utilities							
2018	0.79	13.80	4.26	0.22	3.25	77.67	891
2019	0.56	13.23	4.60	0.22	4.82	76.57	892
2020	0.23	12.59	5.22	0.23	4.99	76.76	882
H_0: p_{19} - p_{20} = 0							
2020 without support measures	0.23	12.70	5.10	0.23	5.90	75.85	882
H_0: p_{20} - p_{20w} = 0	−			−			
Non-vulnerable service segment							
2018	1.02	19.25	9.42	0.55	8.22	61.54	18,482
2019	1.12	18.85	8.48	0.69	9.41	61.46	18,742
2020	0.90	20.26	8.29	0.49	12.35	57.70	19,084
H_0: p_{19} - p_{20} = 0	**	***		**	***	***	
2020 without support measures	0.90	20.86	7.69	0.49	15.23	54.83	19,084
H_0: p_{20} - p_{20w} = 0	−		**	−	***	***	
Vulnerable service segment							
2018	1.19	17.66	8.97	0.55	8.44	63.19	25,293
2019	1.15	17.46	8.46	0.53	8.97	63.43	25,454
2020	0.86	18.95	7.89	0.41	14.10	57.78	25,949
H_0: p_{19} - p_{20} = 0	***	***	**	**	***	***	
2020 without support measures	0.86	19.66	7.18	0.41	18.01	53.89	25,949
H_0: p_{20} - p_{20w} = 0	−	**	***	−	***	***	

Note: A two sample proportions test is used; ***, **, and * denote statistically significant values at 1, 5, and 10% on a two-tailed test, respectively.

Source: AJPES, 2021; author's calculations

resilient to the shock caused by the pandemic with an increase in the share of recovering firms and firms which were able to maintain positive cash flow with policy intervention. There was only a minor increase in the share of collapsing firms. Comparing the proportions of firms by category (e.g. positive to positive) with and without measures for years 2019 and 2020, policy intervention was shown not to have a statistically significant effect in helping firms from utilities to maintain their pre-pandemic liquidity position. In continuation, the utilities segment as a notable exception is excluded from the analysis.

The share of firms (overall) migrating to negative cash flow increased by 5.5 percentage points ($z = 21.17$, $p = 0.000$) to more than 30 percent in the pandemic year of 2020. Absent measures the share of firms with negative cash flow would surge by more than 9 percentage points to almost 35 percent. Already in the pre-pandemic year firms with negative cash flow accounted for more than one quarter of both service segment firms and even strengthened to 32.6 percent of non-vulnerable service sector and 33.1 percent of vulnerable service sector in 2020. Without policy intervention, additional 3–5 percent of companies in each segment would migrate to negative cash flow. This represents around 2,400 firms, 1,200 from vulnerable service sector. Despite minor differences across segments, the policy intervention seems to be targeted properly for the highest share (4.6 percent, $z = 10.90$, $p = 0.000$) of firms from the

vulnerable service segment, prevented from migrating to negative cash flow. Strikingly, the share of inactive firms did not increase in the year of pandemic. There was a decrease in the share of firms migrating to inactive from positive cash flow and negative cash flow alike. This could indicate that the Covid-19 measures sustained also de facto dead companies. The number of companies migrating from negative cash flow to inactive dropped by 37 percent in construction (-0.4 percentage points, $z = 2.56$, $p = 0.010$), 28 percent in manufacturing (-0.3 percentage points, $z = 1.95$, $p = 0.050$), 23 percent (-0.3 percentage points, $z = 3.23$, $p = 0.001$) in vulnerable and 22 (-0.2 percentage points, $z = 2.08$, $p = 0.037$) in non-vulnerable service sector.

After the outbreak of the pandemic, around 60 percent of firms (down from 65 percent) in the analysed segments were able to sustain positive cash flow. Positive to positive cash flow firms accounted for the lowest part of firms in both service segments (58 percent), followed by construction (66 percent) and manufacturing (70 percent) in 2020. Along the same lines, the share of firms migrating from positive to negative (the so-called "collapsing firms") was the lowest in manufacturing at 11 percent despite a marked increase in 2020. Collapsing firms accounted for 12.4 percent of the non-vulnerable service segment, 12.6 percent of the construction segment, and 14.1 percent of all firms in vulnerable service segment. Without policy intervention, additional 2−4 percent (see sixth column in Table 5) of companies from each sector would migrate from positive to negative cash flow or (potentially) to inactivity, and around one sixth of firms would be collapsing. Again, the highest share of firms from vulnerable service sector was able to sustain positive cash flow due to policy intervention. However, when the number of firms which are not able to sustain positive cash flow with measures is compared to the number of firms which are not able to sustain positive cash flow without measures, the lowest share of firms benefited.

In the pre-pandemic years, the percentage of collapsing firms in manufacturing was rather stable, but not in construction and services. Worsening of liquidity position was evident already in 2019 with an increase in the share of collapsing firms. The share of recovering firms, which migrate from negative cash flow in year T-1 to positive cash flow in year T, decreased in the observed period in all four segments, most notably in construction (see third column in Table 5). The recovery was further depressed by the pandemic in manufacturing and both service segments, though, negligibly for non-vulnerable service segment firms. Policy intervention enabled to at most 0.7 percent of firms ($z = -2.05$, $p = 0.040$) in the vulnerable service segment to migrate from negative to positive cash flow in the pandemic year.[13]

4 Discussion of the results with reference to the Great Recession and conclusion

As discussed in the introduction, Bole et al. (2014) analysed cash flow migration and illiquidity contagion of firms in Slovenia during the Great Recession. It was shown that liquidity of non-financial corporations deteriorated sharply in the first years after the crisis and was slow to recover. The share of firms which were able to sustain positive cash flow in 2009 plummeted by more than 8 percent and the decrease is comparable to the shock posed by the pandemic to the non-financial corporations' cash flows absent measures. The cash flow of non-financial companies continued to deteriorate for two years after the previous crisis emerged and the level of firms able to sustain positive cash flow had not yet reached the pre-crisis level in 2012, the last year included in the study. The policy response to the pandemic was considerably more decisive and ensured additional 3.4 percent of firms to sustain positive cash flow, 0.6 percent of firms to recover and a decrease in the share of inactive firms. As mainly companies with positive cash flow in the pre-pandemic year received support, this indicates to a well-targeted intervention but with a probable malfunction, i.e. sustaining de facto dead companies, which do not migrate to inactivity due to support received.

It should, however, be noted that the support measures included in the analysis are for the most part employment support measures, which indeed account for more than 35 percent of all public support to counter the pandemic-induced crisis but are not the only significant type of support. Accurate data on other types of support, e.g. the option of deferring tax liabilities for up to 24 months, relief from the payment of social security contributions, or debt moratoria on payments deriving from all liabilities under loan agreements for up to 12 months, are not available through ERAR, which only provides data on directly paid out grants by the date of payment. Since our methodological approach is based on the state aid paid and not approved, the

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[13] The rules prohibit state aid to firms in financial distress on 31st of December 2019.

policy measures are estimated to positively contribute to corporate liquidity also in 2021. For example, reimbursement of fixed costs was approved for the last quarter of 2020, but is only paid out in 2021. The effects of the policy intervention are thus underestimated in 2020 and are to be reflected in non-financial corporation's financial statements also in 2021 and in the following years. Another limitation of the study is related to the methodology used. A simple descriptive analysis falls short of providing an insight into the transmission mechanism behind it. One possible avenue for future research would thus be building an economic model to explain the transmission mechanism. Another recommendation for future research would relate to sectoral analysis, which is based on the criteria of essentiality and ability to work from home. Contact-intensity, complexity of the supply chain, intangible-intensity, reliance on debt finance and size would be equally relevant criteria for categorisation into segments.

Accounting for (only) directly paid out grants, a huge drop in cash flow for all quartiles of firms and all segments was avoided, but not worsening. A notable exception were utilities, which strengthened their cash flow position without and even more so with public support. The result is not statistically significant, but it still raises the question of mistargeting the beneficiaries. Cirera et al. (2021) find that firms not experiencing any shock received support. Another result of our study is equivalent, namely that sectors with a large reduction in sales or cash flow were more likely to receive support. Table 5 makes it evident that when we consider the proportion of firms which were prevented from migrating to negative cash flow, the highest share (number) of recipients in absolute terms was from the most vulnerable service segment. Also, the highest share (number) of firms from vulnerable service segment (4 percent) sustained positive cash flow due to support measures. However, when the number of firms which are not able to sustain positive cash flow with measures is compared to the number of firms which are not able to sustain positive cash flow without measures, the lowest share benefited. A median firm in the vulnerable service segment also recorded the highest decline in cash flow by 29 percent. Without policy intervention, the cash flow would decline by more than 50 percent and would be disastrous. The support measures compensated for a considerable part of a reduction in cash flow, but compared to other sectors for the lowest when a median firm is considered. The approach "whatever is necessary" in form of "flat"

public support might thus lead to suboptimally targeted beneficiaries.

With hindsight to the Great Recession, a question of disturbances in the provision of bank credit to the non-financial corporations to cover the estimated liquidity gap of 0.6 billion euros (cash flow from operations) remains. In the recovery period of the Great Recession, adverse developments in the non-financial corporations' sector liquidity could be in part attributed to erratic policy response (Bole et al., 2014). Procyclical macroprudential policy intervention intensified the process of collateralization and credit rationing and thus limited the access to needed liquidity and hindered recovery of the non-financial corporations. So far, it seems that the lesson has been learned. The governments and the European Union institutions concerned acted in concert to prevent massive illiquidity and bankruptcies. The policies are aligned and exceptional in size (intensity). For instance, macroprudential requirements across seven categories were eased at a supranational level and national macroprudential authorities were expected to act accordingly. The countercyclical capital buffer, which already stood at zero in Slovenia, was lowered or fully released in 11 European countries. The macroprudential authorities in Estonia, Finland and the Netherlands used additional instruments at their disposal, whereas the macroprudential authorities seem to be more conservative in Slovenia. The restrictions to profit distributions were introduced in April 2020, but otherwise the policy toolkit remained unchanged.

In the second quarter of 2020, banks reported, on balance, broadly unchanged credit standards in the euro area, but not in Slovenia. A tightening of credit standards and credit terms and conditions for loans or credit lines to enterprises at most banks followed the outbreak of the pandemic. According to the Bank of Slovenia (2021), reasons cited by banks were "the increased uncertainty brought by the pronounced downturn in the economy and the economic outlook caused by the Covid-19 pandemic, the worsening situation in certain sectors, and the change in the acceptable level of risk at the banks." Another tightening of credit standards by domestic banks followed in the third and fourth quarters of 2020. The reaction of Slovenian banks compares to the one in the previous crisis, when all the banks tightened their credit standards in the fourth quarter of 2008 and the first quarter of 2009, just milder.

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