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EUROSYSTEM

Impact of COVID-19 on sectoral insolvency rates in Austria

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SUERF BAFFI BOCCONI E-Lectures
„Economic Forecasting during and after Corona“
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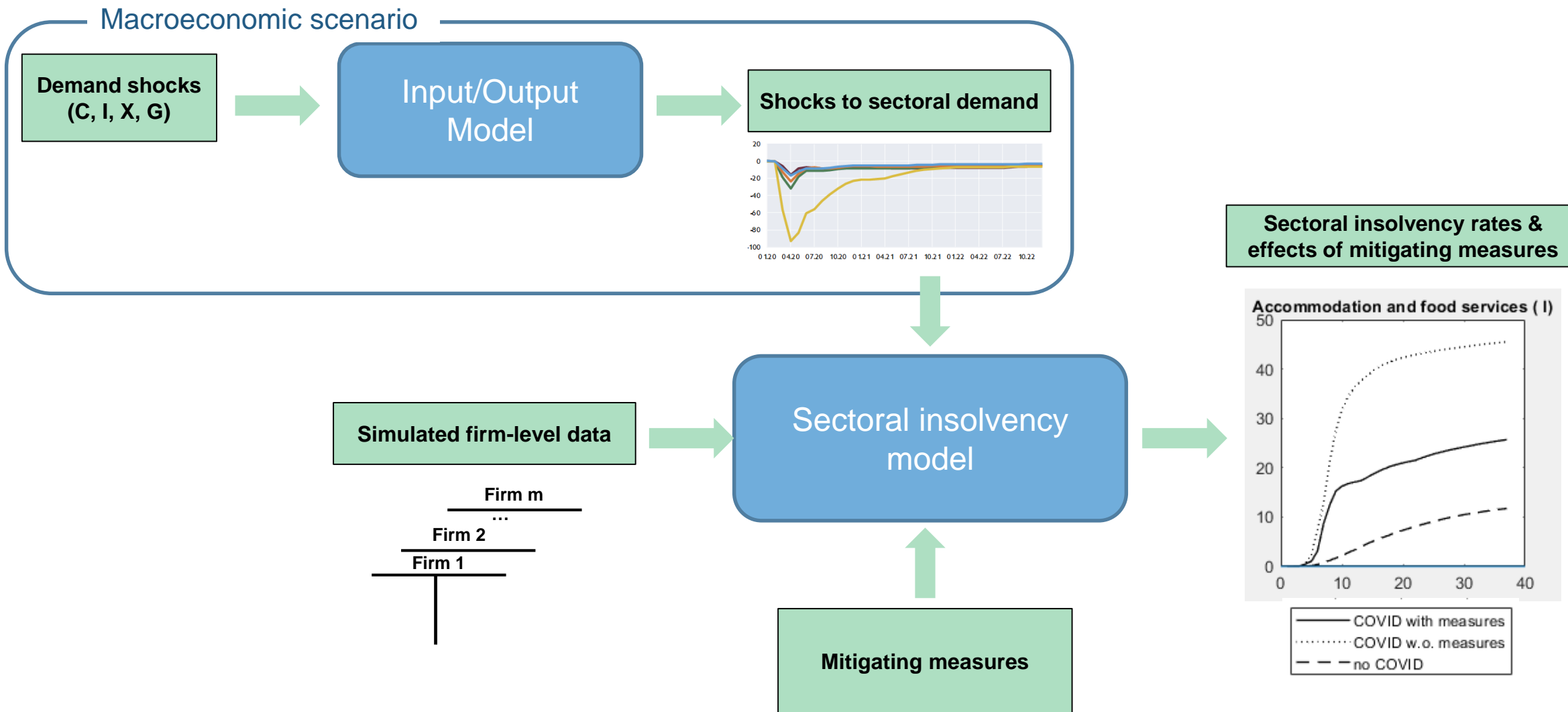
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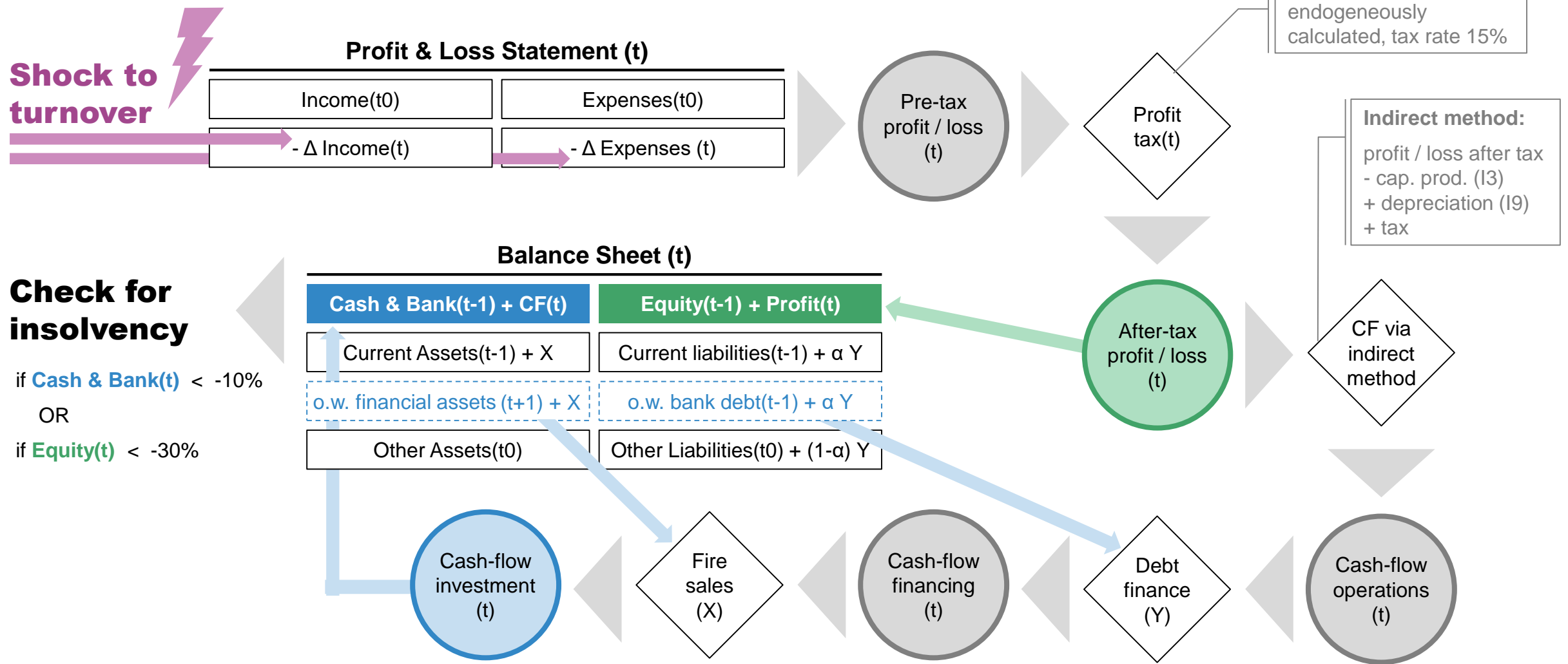
Introduction and Motivation

- In a OeNB project following the COVID-19 pandemic, we propose a methodology
 - to **forecast sectoral insolvency rates** of Austrian corporated firms and
 - to **assess the effectiveness of mitigating measures**
 - with a **sectoral insolvency model for Austria (SIMA)** based on **simulated balance-sheet data at the firm level** and a **macroeconomic scenario**
- **Basic idea of the insolvency model:** a macroeconomic scenario generates stress to firms. Over time, both **equity** and **liquidity** positions deteriorate, causing firm insolvencies if they fall under a threshold. Mitigating measures may help preventing insolvencies.
- The results (sectoral insolvency rates) serve the following purposes:
 - From a **macroeconomic perspective**, they can be used to assess the loss of productive capacities (potential output)
 - From a **micro and macro prudential perspective**, they are an important input to the estimation of credit default probabilities for the banking stress test
 - From a **fiscal policy perspective**, they provide an estimate of the costs of the measures

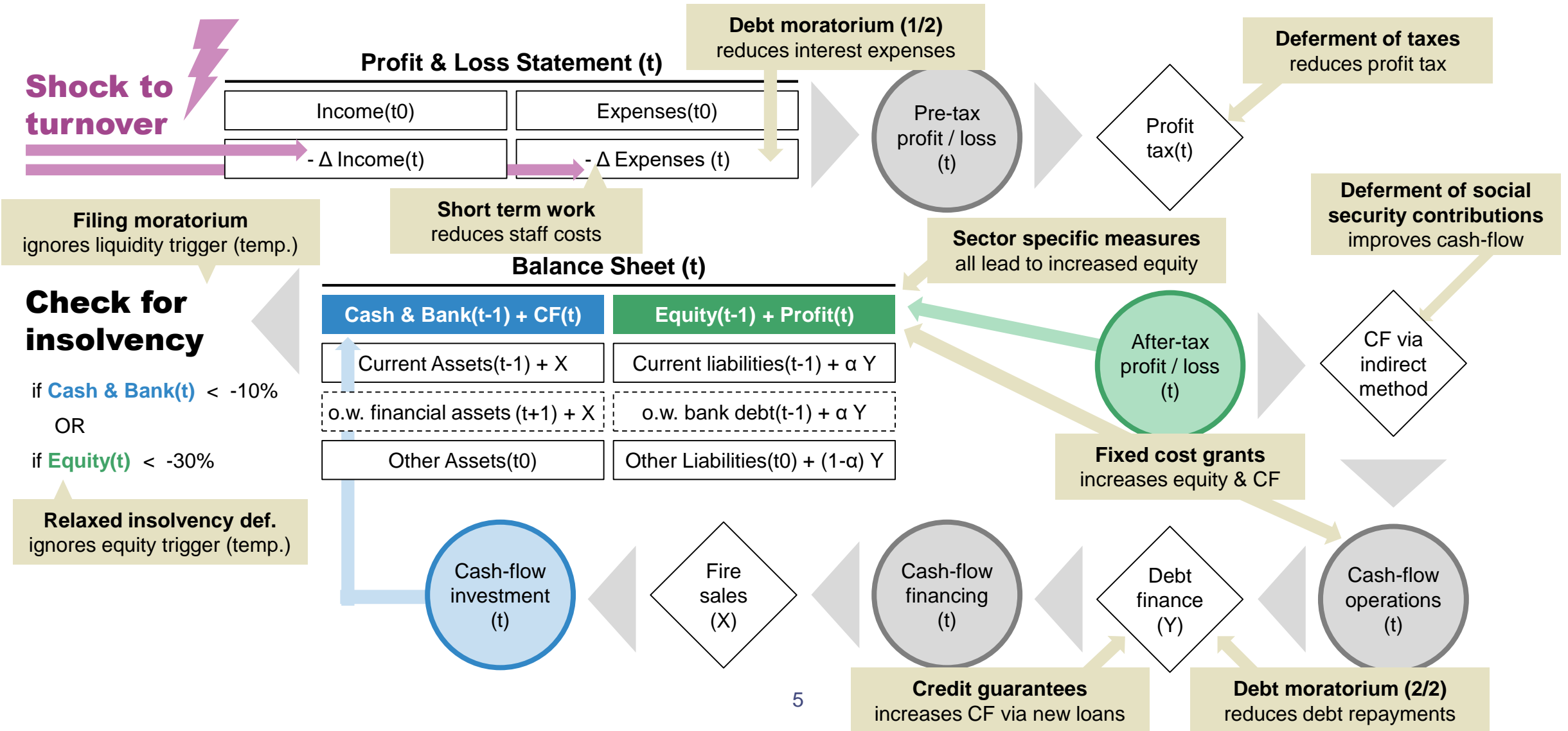
Overview of the methodology



Overview of the insolvency model without mitigating measures



Overview of the insolvency model with mitigating measures



Balance sheet data needed to implement the insolvency model

Balance Sheet

Cash & Bank (A7)	Equity (E)
Current assets (R13)	Current liabilities (R16)
Trade receivables (A3)	Current bonds (L11)
Other receivables (A41)	Current bank debt (L21)
Financial assets (A6)	Trade payables (L4)
Other Assets (A -A7 -CA)	Other Liabilities (L -E -CL)
Total assets (A)	Total liabilities (L)

Variables in Monte Carlo Simulation

Variables calculated as shares

Variables currently not used

<Variable Name> (<BACH Code>)

Profit & Loss Statement

Turnover (I1)	Cost of inputs (I5)
Changes in inventories (I2)	External input (I6)
Capitalised production (I3)	Staff costs (I7)
Financial income (I42)	Operating charges (I81)
Other income (I4 -I42)	Financial expenses (I83)
	Other expenses (I8 -I81 -I83)
	Depreciation (I9)
	Interest expenses (I10)
	Tax (I11)
Total income (It1)	Total expenses (It2)

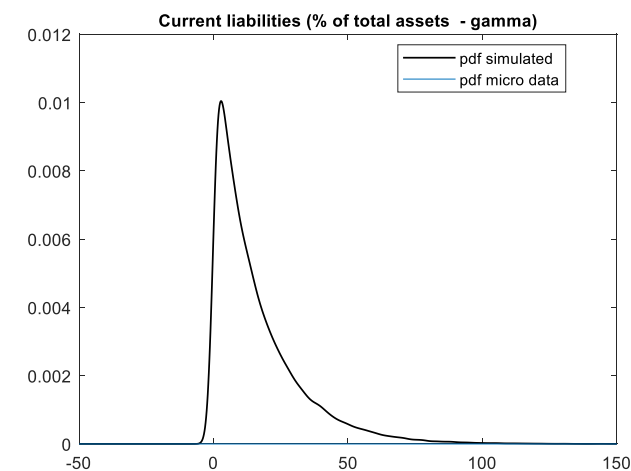
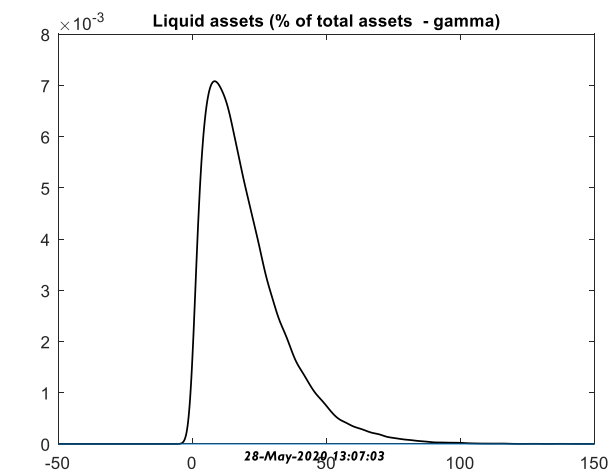
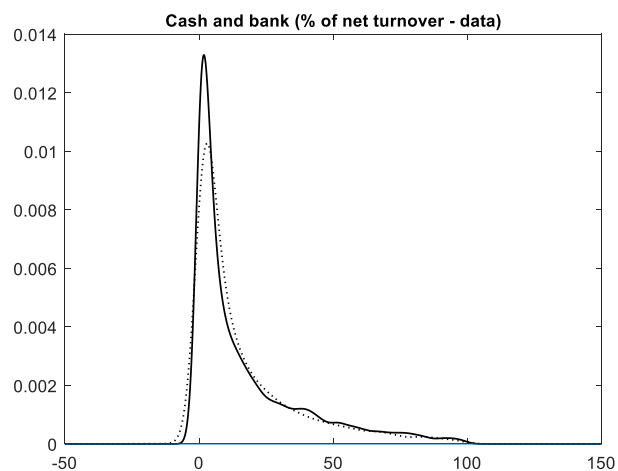
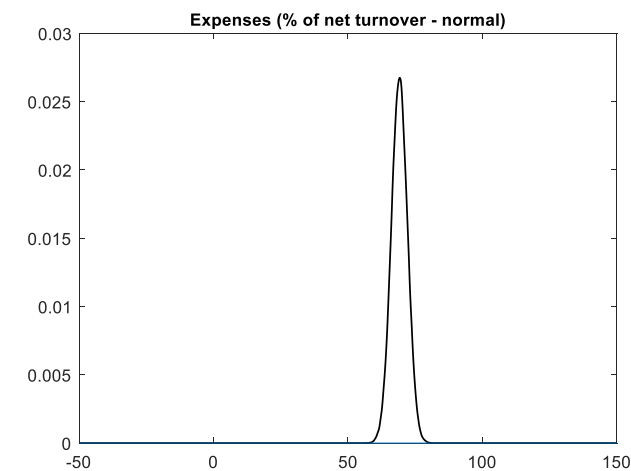
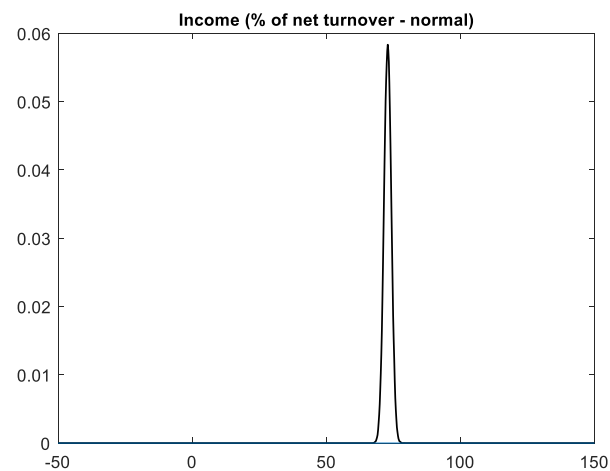
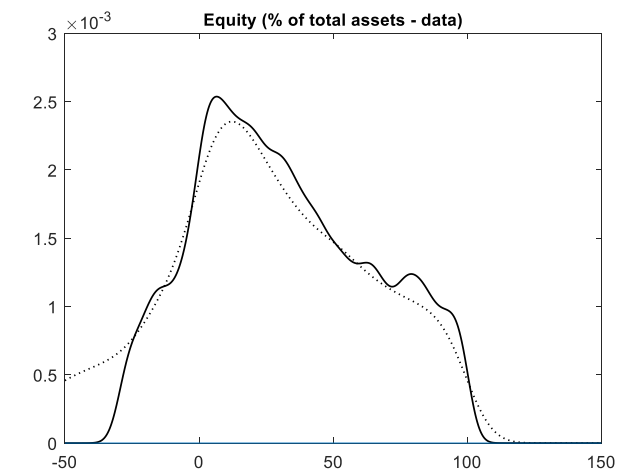
A Monte Carlo method to simulate firm-level balance sheet data

- We use data from the **SABINA** (firm-level data) and the **BACH** (aggregated data) databases
- Due to the absence of sufficient data at the firm-level, we simulate a firm-level data set for corporated firms of **18 variables** for 17 NACE-1 sectors by means of a **Monte Carlo method in 2 steps**:
 - For our **six core variables**, we generate 100,000 draws from an **estimated multivariate distribution** that replicate the **marginal distribution for each variable** and the **correlation structure** between aggregated time series. For each variable, we estimate the marginal distribution based on the following data and distributional forms:

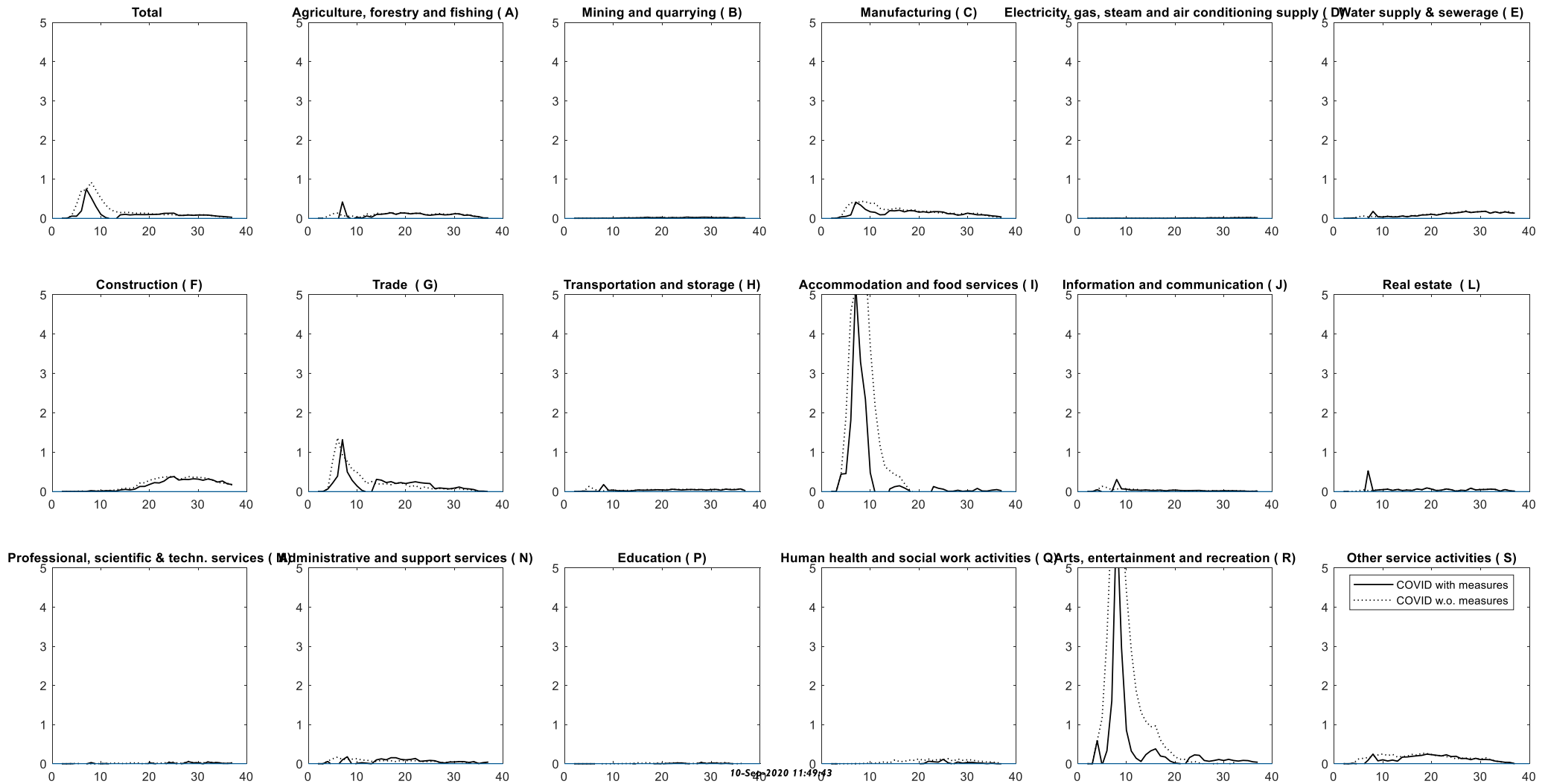
Variable	Source	Distribution	Remarks
Equity	SABINA	Firm-level data	Firm-level data available
Cash & bank	SABINA	Firm-level data	Firm-level data available
Total income	BACH	Normal	Estimated with data for first quartile and mean
Total expenses	BACH	Normal	Estimated with data for first quartile and mean
Current assets	BACH	Gamma	Estimated with data for first quartile and mean
Current liabilities	BACH	Gamma	Estimated with data for first quartile and mean

- The **remaining 12 variables** of the balance sheet and the profit & loss account are given as **shares** of the six simulated variables

Marginal distributions of the simulated data set : Accommodation and food service activities (NACE I)



Results – Monthly insolvency rates with and w.o. mitigating measures



Results – Effects of the mitigating measures on insolvency rates

Impact on insolvency rates at the end of 2020	Insolvency rates 2020		thereof...		Effects of mitigating government measures									
	w.o. mitigating measures	with mitigating measures	"Normal" historical insolvencies	Impact of COVID crisis	Effects of all measures					Marginal effect of each measure				
				w.o. mitigating measures	with mitigating measures	Combined effects	Sum of marginal effects	Short-term work	Debt moratorium	Deferral of social security contributions	Credit guarantees	Fixed cost support	Packages for restaurants, hotels, culture	Relaxed insolvency law and filing moratorium
	%	%	%											
	(1=3+4)	(2=3+5)	(3)	(4)	(5)	(6=1-2)	(7=8+...+14)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Total	6.1	3.2	1.0	5.1	2.2	-2.9	-2.7	-0.9	-0.7	-0.6	-0.5	-0.4	-0.3	0.0
Agriculture, forestry and fishing (A)	1.4	0.1	0.2	1.2	-0.1	-1.3	-1.2	-0.2	-1.0	-0.1	-0.0	0.0	0.0	0.0
Mining and quarrying (B)	0.7	0.6	0.4	0.3	0.2	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	-0.0	0.0	0.0
Manufacturing (C)	6.7	3.2	0.8	5.9	2.4	-3.5	-2.8	-1.4	-1.0	-0.5	-0.2	-0.1	0.0	0.0
Electricity, gas, steam and air conditioning supply (D)	0.6	0.6	0.6	0.0	0.0	-0.0	-0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0
Water supply & sewerage (E)	1.6	1.5	1.0	0.6	0.5	-0.2	-0.1	-0.1	-0.1	-0.0	0.0	-0.0	0.0	0.0
Construction (F)	2.7	2.3	2.1	0.6	0.3	-0.3	-0.3	-0.1	-0.1	-0.0	0.0	-0.0	0.0	0.0
Trade (G)	10.2	6.4	0.9	9.3	5.4	-3.8	-3.4	-1.6	-0.8	-0.4	-0.7	-0.3	0.0	0.0
Transportation and storage (H)	3.9	3.5	2.1	1.7	1.3	-0.4	-0.4	-0.3	-0.1	-0.0	0.0	-0.0	0.0	0.0
Accommodation and food services (I)	24.0	8.7	1.8	22.2	6.9	-15.3	-14.7	-3.3	-2.8	-4.7	-2.5	-3.7	-4.2	0.0
Information and communication (J)	2.5	2.0	0.7	1.8	1.4	-0.5	-0.5	-0.3	-0.1	-0.1	-0.0	-0.1	0.0	0.0
Real estate (L)	0.7	0.0	0.3	0.4	-0.3	-1.3	-1.3	-0.0	-1.2	-0.0	-0.0	0.0	0.0	0.0
Professional, scientific & techn. services (M)	0.6	0.4	0.5	0.1	-0.0	-0.1	-0.1	-0.0	-0.1	-0.0	-0.0	-0.0	0.0	0.0
Administrative and support services (N)	5.3	2.8	1.6	3.7	1.3	-2.5	-1.9	-1.0	-0.9	-0.5	-0.0	-0.1	0.0	0.0
Education (P)	0.4	0.4	0.4	-0.0	-0.0	-0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	0.0	0.0
Human health and social work activities (O)	0.6	0.2	0.4	0.2	-0.1	-0.4	-0.4	0.0	-0.1	-0.0	-0.3	0.0	0.0	0.0
Arts, entertainment and recreation (R)	28.1	12.1	0.6	27.5	11.5	-16.0	-17.1	-5.0	-1.0	-2.4	-7.2	-3.9	-1.2	0.0
Other service activities (S)	5.4	3.1	0.8	4.6	2.4	-2.2	-1.9	-0.8	-0.9	-0.5	-0.0	-0.2	0.0	0.0

Source: Author's own calculations.

Danke für Ihre Aufmerksamkeit

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