

was the principal measure that was used to stop the pandemic. Very high numbers of flu cases and the death toll harmed the postwar economies and hindered their economic recovery. There are estimations that in countries that fought in the First World War the real GDP per capita declined on average by above 8%, while the Spanish flu reduced it by an additional 6% (Barro et al., 2020).

1.3. The beginning of the Covid-19 pandemic

The first scattered news about a new virus in the city of Wuhan (capital of Hubei province in the People's Republic of China (PRC) was spread in December 2019. At the beginning, due to the specific hierarchical state and party structure, the province and state officials played down any queries about the new disease. On January 3, 2020, the Chinese government decided to notify the World Health Organisation (WHO) that a “severe pneumonia of unknown aetiology” had been discovered in Wuhan (Mitchell, Sun, Liu, & Peel, 2020). The authorities, despite evident facts, maintained that the scale of the disease was limited. To show this social gatherings continued in Wuhan. On January 18, one such gathering attracted 40,000 families. Five days later (January 23) the eleven million population of Wuhan entered strict quarantine. However other Hubei province cities continued their unrestricted functioning. This path of events and lack of decisive, concentrated actions was a combination of the centrality bias, lack of transparency, contradicting messages and national pride. They all contributed to a sizable time lag in acknowledging both by the PRC authorities and the WHO that there had been “limited human-to-human transmission” in the city of Wuhan.

The time lag in announcing and designing effective anti-virus measures caused what is now called coronavirus to spread swiftly to other countries. The first case was recorded as early as January 14, 2020, in Bangkok, Thailand. Other cases soon were announced in neighbouring Hong Kong, Japan, Macau, South Korea and Taiwan. In February the first cases were signalled on other continents. In March the pandemic broke out in Northern Italy to spread rapidly on a massive scale throughout Europe and both Americas. Table 2 presents data on Covid-19.⁴

⁴ Data for the People's Republic of China, due to discrepancies in reporting, has not been included in the table. In the rest of the chapter, the analyses are focused on eight countries; Japan and the USA represent high-income economies. France and Germany are also advanced economies and play a key economic role in the EU. Italy and Spain suffered very much during the pandemic of 1918–1920 as in the time of Covid-19. These four countries belong to the Eurozone. Both Hungary and Poland belong to nations that incurred heavy losses due to Spanish flu and Covid-19. Hungary and Poland do not belong to the Eurozone.

In mid-November 2020, as the data on cases and the death toll shows, Covid-19 in its first eleven months is less alarming than the influenza pandemic that broke out at the end of the First World War. Interestingly, in the twenty first century again the USA, Italy, Spain and France recorded the highest numbers of cases and high death tolls (Table 2).

Table 2. Covid-19 cases in selected countries as of November 14, 2020

Location	Case – cumulative total (in 1,000)	Case –cumulative total (in 1,000) per 1 million population	Death toll (in 1,000)
Global	52,852,674	6,710*	1,295,328
France	1,862,666	28,536	42,628
Germany	751,095	8,965	12,200
Hungary	131,887	13,652	2,883
Italy	1,066,401	17,638	43,589
Poland	641,496	16,950	9,080
Spain	1,437,220	30,740	40,461
Japan	114,983	909	1,880
The USA	10,460,365	31,602	241,186

*own estimation.

Source: (World Health Organisation [WHO], 2020).

Initially, without any vaccine, countries had to follow standards of social distancing and thus introduce strict lockdowns. The lockdown inevitably froze sectors that relied on people's mobility the most. The drop in the aggregate demand of their economies was augmented by disturbances in the aggregate supply, stemming mostly from lockdowns in various spots in the global value chains. The PRC – a country from which the disease spread – due to its centrality, ability to impose strict lockdown measures, and stern surveillance of the population, was able to reduce the threat of further contamination and, so far, has not let the coronavirus hit the country's economy in the form of the second wave. According to the official PRC data its economy has returned to growth.

1.4. Conceptualization of the Covid-19 macroeconomic shock

As already noticed in Introduction *we are all Keynesians now*.⁵ The reason is simple; the scale of a negative economic shock stemming from Covid-19 is such that there is a consensus regarding the need of a massive intervention in national economies with the use of fiscal, monetary and direct control instruments. Without such economic policy actions, the economies will continue to be destabilized bearing heavy social costs threatening political stability (Chomsky, 2020; Gopinath, 2020; Kowalski, 2020, p. 42).

In this chapter a complete Keynesian SRAS/LRAS/AD model is used to outline the ways the negative shock hit the economies and to show potential implications of the use of reactive economic policy measures.⁶ The model corresponds to the IS/LM/BP concept (Abel, Bernanke, & Croushore 2016; Kowalski, 2013, pp. 20–22, 37–64;). It also allows for thinking about economic policy design in terms of the philosophy introduced by Jan Tinbergen (1952). The advantages of the SRAS/LRAS/AD model are such that it combines short and long-term considerations that are easily expressed in a graph form. In Figures 1, 2, 3, and 4 P stands for the price level and Y represents output, whereas Y_n is the full-employment level of output. The LRAS is the long-term aggregate supply. The LRAS schedule might be seen as the normal level of output being a function of labor, capital, and natural resources and total factor productivity. If any of these factors increase it will shift the LRAS schedule to the right.

The SRAS stands for short-run aggregate supply. It reflects a standard assumption, that in the short-run, *ceteris paribus*, prices are fixed and firms, within their capacity are able to produce and offer as much as their customers demand. The aggregate demand (AD) shows relationships between output demanded by agents, *ceteris paribus* and the price level. Any negative event or change for worse in customers' expectations will shift the AD to the left.

Figure 1 shows the initial simultaneous equilibrium between the long-term and short-term output and the aggregate demand. The equilibrium price level (P_0) and the natural level of output (Y_n) signal also that there is no new information that would change economic agents' expectations. Figure 2 presents the reaction of the model economy to a negative shock stemming from Covid-19. The growing

⁵ This is a paraphrase of “we are all monetarist now” that reflected popularity of Milton Friedman’s monetarist revolution that took minds of many macroeconomists in the 1970s. The phrase became broadly used thank to D. Laidler’s article *Monetarism: and interpretation and an assessment*, 1981.

⁶ There are other models that can be used to study economic policy options and challenges. A good example is Robert Mundell’s concept of *effective market classification* (Kowalski, 2013, p. 53–55).

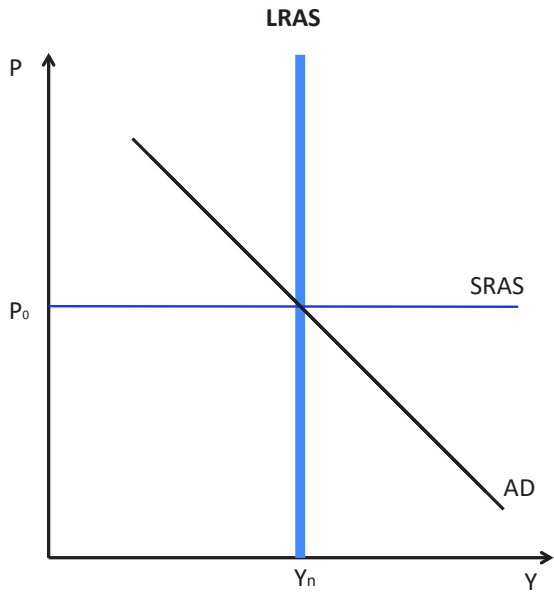


Figure 1. The SRAS/LRAS/AD model

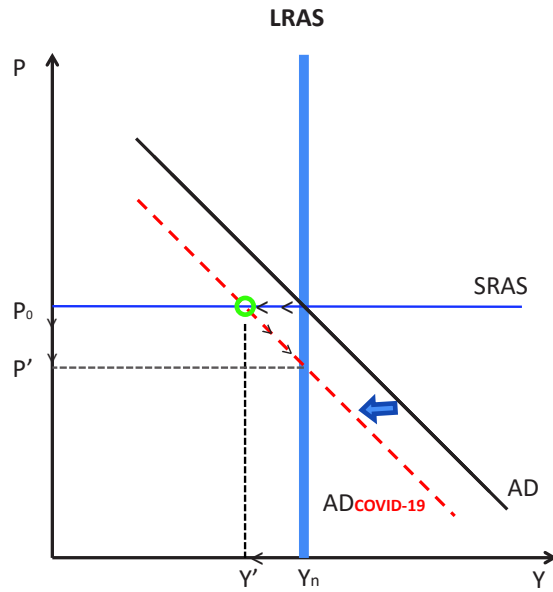


Figure 2. The first run reaction of the model economy to the Covid-19 shock

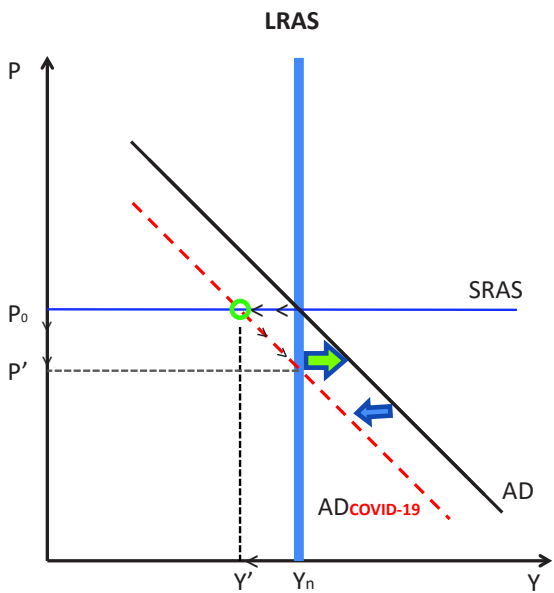


Figure 3. A perfectly fine-tuned stabilisation policy

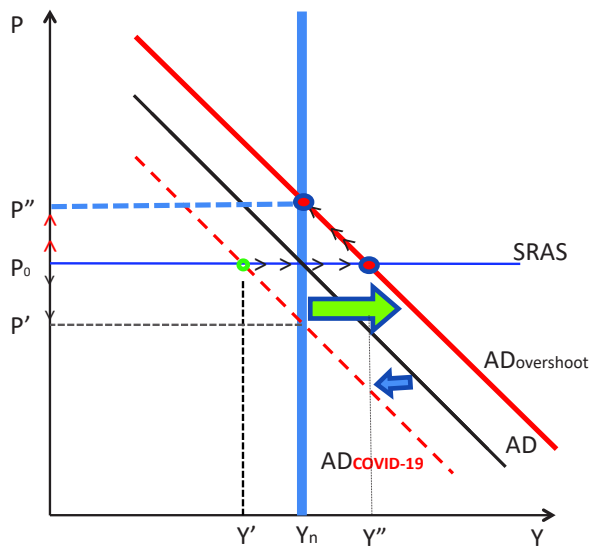


Figure 4. A case of the oversized stabilization policy package

Source: Own elaboration based on standard macroeconomic literature.

Table 1. Covid-19 crisis versus the Global Financial Crisis

Feature	Covid-19 Crisis	Global Financial Crisis
Primary source of the crisis	Coronavirus (medical dimension, Chinese market)	Subprime mortgage segments (financial dimension, American market)
Primary nature of the crisis	Human, determined by the growing number of infections	Financial, mostly limited to the banking crisis
Direct transmission channels	Globally synchronized lockdowns (sudden stop in economic activity) Supply chain disruption Financial markets (sharp repricing with the increase of uncertainty, flight to safe assets, rush to liquidity) Credit market (lenders hold back on extending credit) Unemployment (increase in the risk of defaults)	Financial markets (dramatic fall of commodity prices, increased exchange rate volatility) Credit market and banking sector channel (global liquidity squeeze, problems of “mother” banking institutions) International trade (weaker global demand, FDI channel) Stock exchange market
Scale of the crisis	Global	Global (with dominance of highly developed countries)
Primary anti-crisis policy measures	Fiscal policy-related	Monetary policy-related
Anti-crisis policy nature	“Act fast and do whatever it takes” (Baldwin & Weder di Mauro, 2020)	“Whatever it takes” (Draghi, 2012)
Uncertainty level	Extremely high	Very high
Process	Crisis is immediately and completely spreading across the real economy, evaporating supply and demand simultaneously	Crisis was gradually spreading from the financial markets to the real economy (gradual contagion process)

Source: Own elaboration based on (Draghi, 2012; Baldwin & Weder de Mauro, 2020; Boissay & Rungcharoenkitkul, 2020; Fornaro & Wolf, 2020; OECD, 2020).

of factors such as the pathway of the pandemic, the intensity and efficacy of containment policies, the scale of the economies’ openness, the dependence of the economy on a particularly fragile industry, shifts in spending patterns, behavioral changes. These are uncertain factors that interact in ways hard to predict.

Establishing precise cause-and-effect relationships among these factors and observed trends, determining the direction of these relationships, and measuring their strength seems impossible at present and would be a task that well exceeds the framework outlined in this research proposal.

Hence, from a pragmatic point of view, the following assumptions could be formulated regarding the impact of Covid-19 on the macroeconomic level (Bofinger et al., 2020; Fornaro & Wolf, 2020; Kowalski, 2021):

- the real economic impact of Covid-19 is channeled through three different optics: a) manufacturing supply chains, b) services, including tourism and transportation, and 3) energy and commodity demand and prices,
- the financial market channel impact of Covid-19 includes both the insolvency phenomenon and credit crunch,
- the development of uncertainty (i.e., behavioral lens of analysis) is crucial in assessing the long-term impact of Covid-19 on business.

There is one important trade-off that must be stressed here (Gourinchas, 2020): “flattening the infection curve inevitably steepens the macroeconomic recession curve.” The social distancing policies are purposefully inducing an economic slowdown; hence, containment policies worsen the economic recession.

5.3. Central Bank’s anti-crisis policies: Tools

The Covid-19 pandemic significantly contributed to the increase in economic instability and – according to some economists and politicians – it will be the foundation of a deep economic crisis. It should not come as a surprise, therefore, that individual countries, – but also supranational bodies – are trying to intensify all possible anti-crisis measures. In the context of the Global Financial Crisis, it is the central banks that one of the most important “guardians of stability” and, therefore, even in the current crisis, it is the central banks on which eyes of many market participants are focused.

However, the active role of central banks in dealing with the Covid-19 crisis repercussions is not so obvious, due to their statutory restrictions. Originally, the primary function of central banks was a monopoly on the issuance of legal tender. Later, central banks began to be seen as guarantors of the stability of the monetary system, and after the introduction of inflation targeting in many countries, most agreed that the central bank’s objective should be price stability. Such an approach strongly limited central banks in terms of crisis policy. Hence, there increasingly appeared opinions and specific legislative measures that indicated possibility of imposing a financial stability objective on central banks. The question whether

there might be drawbacks to involving central banks in financial stability has arisen rather recently (Svensson, 2000; 2003; Padoa-Schioppa, 2003). The main argument against giving central banks any sort of responsibility in the area of financial stability is that the latter objective would not always align with the primary price stability objective, thereby leading to socially suboptimal monetary policy. To counter that argument, scholars often stress that financial stability and price stability do not conflict with each other and that, on the contrary, one cannot be achieved without the other (Schwartz, 1988; Bordo, Dueker, & Wheelock, 2000). The more broadly defined the purpose of the central bank, the wider the range of instruments available for the central bank in anti-crisis policy.

Central banks worldwide are seeking to mitigate the immediate impact on real economy through traditional monetary policy measures, but also through some extraordinary monetary, financial and macroprudential measures. Currency devaluation, capital controls, and bail-in are the main tools available to national financial authorities, however there is no universal playbook. Basically, the tools used by central banks can be classified into three different policies, which are entirely made up of central bank policies but are assumed to have slightly differently defined main objectives:

- monetary policy focuses on the objective of price stability, i.e., the strict and direct control of money supply and the promotion of stable economic growth as an additional objective;
- external policy mitigates the effects of external economic shocks and using the exchange rate tool;
- financial policy (macro-prudential and micro-prudential) focuses on the stability of the banking sector and support for borrowers.

The use of tools of the above policies primarily depends on the institutional and legal solutions adopted, e.g., the participation of a country in a monetary union makes it impossible to use devaluation as a tool of anti-crisis policy and to prevent the spread of crisis on identified channels. The crisis triggered by the Covid-19 pandemic is not a classic financial or currency crisis, hence the actions taken by central banks are often unprecedented and, for the most part, significantly ahead of theoretical considerations in this area.

5.4. Methodology and results

The empirical analysis was based on k-means clustering analysis, which enabled us to identify groups of countries that followed similar solutions in response to the Covid-19 crisis. Clustering refers to grouping entities (here: countries) in such

a way that entities belonging to one group (cluster) display similar features and at the same time are different to those grouped in other clusters. First, we ran hierarchical cluster analysis based on Ward's minimum variance technique so as to name the appropriate expected number of clusters. The expected number of clusters is the number of groups that are optimum; any lower or higher number would mean that the objects are not properly categorized. Second, we applied k-means clustering analysis to identify which economies shared similar approach to monetary and fiscal policies during the pandemic. Both the Ward's minimum variance technique and the k-means clustering analysis were performed twice, once for monetary policy tools and, separately, for financial policy tools.

We based the study on two separate groupings, one that concerned monetary policy tools and the other that referred to financial policy tools. While the monetary policy aims to control the money supply and promote stable economic growth, financial policy focuses mostly on supporting the banking system stability, expanding access to capital, and providing borrowers with direct relief. Monetary policy must therefore be seen through the lens of macro-economic policies, while financial policies through the optics of sectoral and micro-economic policies.

In the monetary-based clustering analysis, we identified the following grouping factors:

- introduction of policy rate;
- introduction of central bank's liquidity support;
- introduction of central bank's swap lines;
- introduction of central bank's asset purchase scheme.

In the financial-based clustering we have applied the following grouping factors:

- introduction of capital buffers;
- introduction of liquidity buffers;
- introduction of adjustments to provisioning requirements;
- introduction of state loan or credit guarantees;
- introduction of restructuring of loan terms.

The study encompassed 29 countries, mostly European economies (16) and other economies that bear the impact on the global output. The grouping was made for 2 a priori identified clusters in each of the attempts. According to the variance analysis, the F-values for all factors included into the study were high, and therefore the factors reflected well on cluster breakdown. The results indicate that the aim of minimizing the within-cluster variance and maximizing the between-cluster variance was fulfilled and is presented in Table 2 below. The mean values for the identified clusters are presented in Table 3.

Table 2. Variance analysis

Factor	Between cluster	df	Within cluster	df	F-value	p
Monetary policy tools						
policy rate cuts	7.24	1.00	0.00	27.00		
central bank swap lines	1.33	1.00	3.43	27.00	10.47	0.00
central bank asset purchase scheme	1.42	1.00	5.61	27.00	6.83	0.01
central bank liquidity support	0.00	1.00	0.00	27.00		
Financial policy tools						
use of capital buffers	2.36	1.00	2.95	27.00	21.60	0.00
use of liquidity buffers	2.76	1.00	2.00	27.00	37.24	0.00
adjustments to provisioning requirements	2.36	1.00	2.95	27.00	21.60	0.00
state loan or credit guarantees	0.75	1.00	4.03	27.00	4.95	0.03
restructuring of loan terms	0.74	1.00	4.02	27.00	4.94	0.03

Note: In the case of the policy rate cuts and central bank liquidity support the within-cluster variance is 0, which does not allow for calculating the F-value.

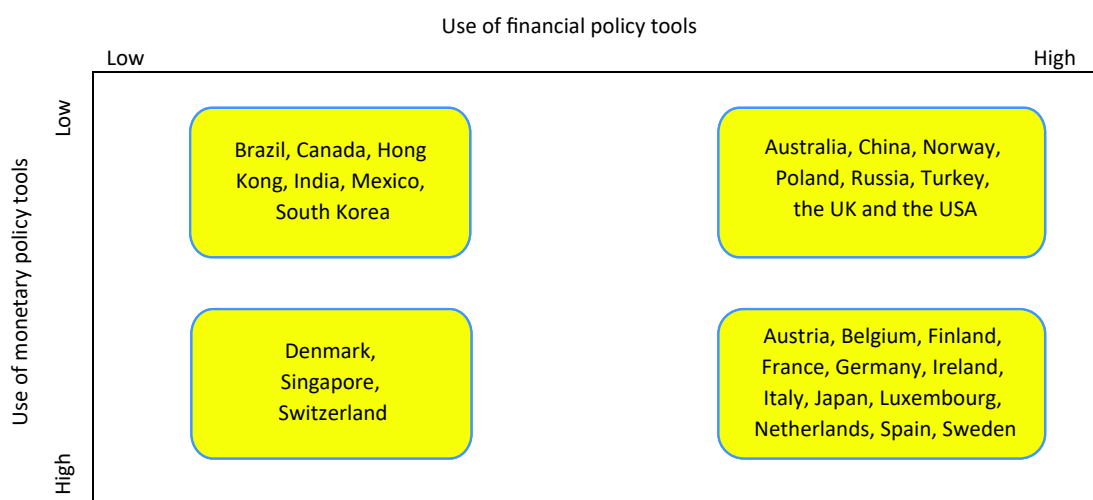
Source: Own elaboration.

The cluster analysis has created a matrix reflecting the scale of use of monetary and financial policy instruments by central banks worldwide in the context of the crisis triggered by the Covid-19 pandemic (cf. Figure 1). In the group of countries with low activity in both monetary and financial policy, there are the central banks of Brazil, Canada, Hong Kong, India, Mexico, and South Korea. In contrast, the central banks of Denmark, Singapore, and Switzerland are highly active in monetary policy (i.e., growth-enhancing measures) and low in financial policy. The situation is the opposite in Australia, China, Norway, Poland, Russia, Turkey, the United Kingdom, and the United States. This group of countries is dominated by instruments aimed at directly supporting the stability of the banking sector or borrowers. The relatively largest group of central banks are those that make extensive use of both monetary and financial policy tools. These countries include the Member States of the Economic and Monetary Union, Sweden, and Japan.

Table 3. Means for grouping measures in respective clusters

Variable	Cluster 1	Cluster 2
Monetary policy tools		
policy rate cuts	0.00	1.00
central bank swap lines	1.00	0.57
central bank asset purchase scheme	0.80	0.36
central bank liquidity support	1.00	1.00
Fiscal policy tools		
use of capital buffers	0.95	0.33
use of liquidity buffers	1.00	0.33
adj, to provisioning requirements	0.95	0.33
state loan or credit guarantees	0.90	0.67
restructuring of loan terms	0.90	0.56

Source: Own elaboration.

**Figure 1. Countries breakdown into clusters**

Source: Own elaboration.