A Brief Inquiry into the Evolution of Inflation During the Fall of Communism, Global Financial Crisis (2008-2009) and Covid-19 Pandemic

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Our research shows that major economic events (or shocks) do influence inflation. The positive correlation coefficients show that each of these shocks had repercussions on the inflation in the countries analyzed. This can be explained by the fact that economies, especially in the last two decades, became more interconnected, thus increasing the risk of spillovers. At the country level, differences in the levels of inflation can be explained, most likely, by the specific fundamentals of each economy or, perhaps, each region. The results may be biased by the rather specific circumstances that prevailed after the global financial crisis i.e. unconventional monetary policy measures and public support during the COVID-19. The last two events analyzed show that authorities can support aggregate demand, but if this stimulus is not paired with the necessary reforms to support the aggregate supply as well, then economic growth and resilience, together with a low and stable inflation, cannot be achieved.

1 Introduction

The debate on how much the COVID-19 pandemic has influenced inflation and the inflationary expectations in an interesting one, because the pandemic shock did not resemble a classic aggregate demand shock, for which monetary policy is equipped to deal with, but it further included an aggregate supply shock, usually attributed to the disruptions in the international supply chains (bottlenecks). Furthermore, the pandemic was studied rather from the perspective of the effects that the lockdown measures had on economic activity, the way the consumers' behavior changed, impact on various sectors of the economy and so on, but rather little research was dedicated to inflation during this period. Consequently, we consider that tackling the evolution on inflation during this period is an interesting topic. Furthermore, given the unique characteristics of the pandemic as an event, we add to the study two major events – the fall of communism in 1989 and the Global Financial Crisis from 2007– both of these falling under the same unique category such as the pandemic.

2 Literature review

The bulk of the literature review is related to the pandemic, given its importance, while for the other two shocks the relevant literature will be mentioned accordingly in their sections. Public entities, international financial institutions, the private sector as well as academia researched the effects of the pandemic, given the specific nature of the shock. In the following, we will look at some of this research, with the aim to include views from all of the entities mentioned in the previous paragraph. The effects of the COVID-19 shocks are analyzed in a number of papers. For instance, [1] shows that people's decision to limit consumption and work effort exacerbated the size of the subsequent recession. [2] at the short-run business cycle effects of the pandemic shocks and argue that the effects of negative sectoral supply shocks are stronger than those of

shocks to the sectoral composition of demand. [3] focus specifically on supply shocks and argue they can amplify the initial effect, thereby aggravating the recession. [4] consider that neither monetary policy nor fiscal policy by itself can protect the economy from extreme output contractions, thus a successful way to tackle a pandemic requires fiscal and monetary authorities to create space for each other. As debt rises, monetary stimulus creates fiscal space by setting favorable borrowing terms for the Government.

Not so much space is dedicated to the evolution of inflation during this period. Consequently, we start with a report from the [5] i.e. its Quarterly review from December 2021, in which it was studied how markets estimated the future inflation. The findings of the report suggested that, for the advanced economies, there seems to be a divergence between the views on inflation outlook of the markets and the central banks. The study looked at the evolution of yield curves in advanced economies and the guidance that central banks offered, most notably in respect to the unwinding of policy measures and the view that inflation was transitory. In the case of the emerging market economies, the report observes that rising energy prices and some pressures on the exchange rate exacerbated the inflationary pressures. Consequently, many central banks continued to rise the policy rates (Brazil, Chile, the Czech Republic, Russia) or began tightening (Colombia, Poland). We continue with a study from [6] targeting the inflationary developments in Europe. The study pointed out that the impact of the pandemic on inflation was uncertain, as the challenges it created could lead to more inflation, disinflation, or even deflation. The study correctly estimated that, in the beginning of the pandemic, disinflation has dominated, amid a mix of factors that affected both demand (lockdown measures, precautionary savings, reduced consumption etc.) and supply (bottlenecks in the international supply chains, the potential tendency to stockpile goods and the rise in the prices of some goods,

mainly fruits and vegetables). The study further stated that, at least in the medium term, inflation would likely remain subdued, albeit this estimation was made under significant uncertainty. One interesting statement is that, given the probability that this crisis can stimulate the production of strategic goods in the European Union (EU), the disinflationary effect of globalization might diminish. [7] of the Federal Reserve Bank of Saint Louis investigate the role of global supply chain disruptions in the Producer Price Index inflation across U.S. industries during the COVID-19 pandemic. In the same line with the study of [6], the authors find that a combination of demand and supply shocks played a significant role in transmitting the effects of supply chain disruptions to U.S. prices. The industries that relied on inputs from foreign countries are identified as experiencing large price increases due to the inability to keep up with demand. Another important observation is that whether the inflation caused by supply chain disruptions will be temporary (or not) will rest on the degree in which these disruptions will ease. In a paper by [8] a model to estimate the impact on various macroeconomic variables of the support measures implemented by the authorities as a response to the COVID-19 pandemic is built. The authors find that, using the case of the Federal Reserve, that if it had not intervened, output would have fallen significantly, as well as real wages and, as a result, inflation would have been even smaller than its actual values. In the case of Romania, the [9] notes in its Article IV report, that inflation declined in 2020, mostly due to the pandemic-induced disruptions, which affected the economic activity and the wage growth. However, in the initial months of 2021, inflation rose due to the liberalization of electricity prices, higher natural gas prices, and the rebound in global commodity prices. Furthermore, according to the latest press release from the [10] in 2021 as a whole, the annual inflation rate rose by 6,13% and 80 percent of this rise came from the increases in the prices of natural gas, electricity and fuel. [11] also finds that the increase of

international prices for raw materials can cause inflationary pressures with a negative impact on economic growth on Romania.

3 Research hypothesis and methodology

The objective of our research is to check if there is some correlation between the evolution of inflation in the three areas selected during these shocks. The first area includes countries from South Eastern Europe, respectively Albania, Bulgaria, Czech Republic, Hungary, Poland and Romania (the SEE area). The second area includes a selection of countries from South America, respectively Argentina, Brazil, Cuba, Mexico, Nicaragua and Venezuela (the SA area). Finally, the third group of countries was selected from Southeast Asia, respectively Brunei Darussalam, China, Indonesia, India, Cambodia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Timor-Leste and Vietnam (the SEA area). Data on the CPI inflation for the selected countries was collected from the World Bank, with some minor additions (especially for 2021) from other sources. The correlation coefficients were calculated using Excel.

4 Discussion of the results

For the SEE area, inflation after the fall of communism in 1989 rose to high levels in all of the countries analyzed in the next year. A particular discussion of the causes can be the case of Romania. The Romanian experience revealed that the causes of high inflation can be generally attributed to the dysfunctionalities of the communist economic system, mainly the structural imbalances between supply and demand, external deficit, fixed prices, low labor productivity etc. Given that the characteristics of the Romanian economy were comparable to those of the other communist economies analyzed, it is safe to assume that the problems that caused a high inflation in Romania right after the fall of communism were, more or less, the same in those other countries as well. Nevertheless, one can assume that this high inflation was an inherent in process of moving from a centralized economy to a (functional) market economy.

For the SA area, there were some issues with data availability for the period 1988 - 1992, so the only two countries analyzed here were Brazil and Mexico. For Brazil, inflation kept rather constant, given that it was already very high in that period, while for Mexico the trend was a downward one. From [12] we find out that inflation in three of the largest countries in the region (Argentina, Brazil, and Peru) was in quadruple-digits. In terms of causes, [13] points out that a cause for the very high level of inflation in SA during the 1990s were populist macroeconomic policies, usually in the form of government spending programs that could not be financed through taxes or borrowing and had to be financed by central banks printing money. Further measures such as wage and price controls and subsidies caused an economic crisis. [12] also mentions that one of the successful measures that were implemented in order to fight this very high inflation was the reformation of the central banks, in the sense of increasing their independence and, in particular, prohibiting them from financing the fiscal deficit.

Finally, in the SEA area, the majority of countries (Brunei Darussalam, Indonesia, India, Malaysia, Singapore, Thailand) experienced an upward trend in inflation. Data for Lao PDR was not included (given that it had a significant higher inflation than the rest of the countries) and for Cambodia, Timor-Leste and Vietnam, there was a lack of data. Nevertheless, it should be noted that during this period, many Southeast Asian countries, recorded an impressive economic growth, therefore maintaining these low levels of inflation can be considered an achievement.
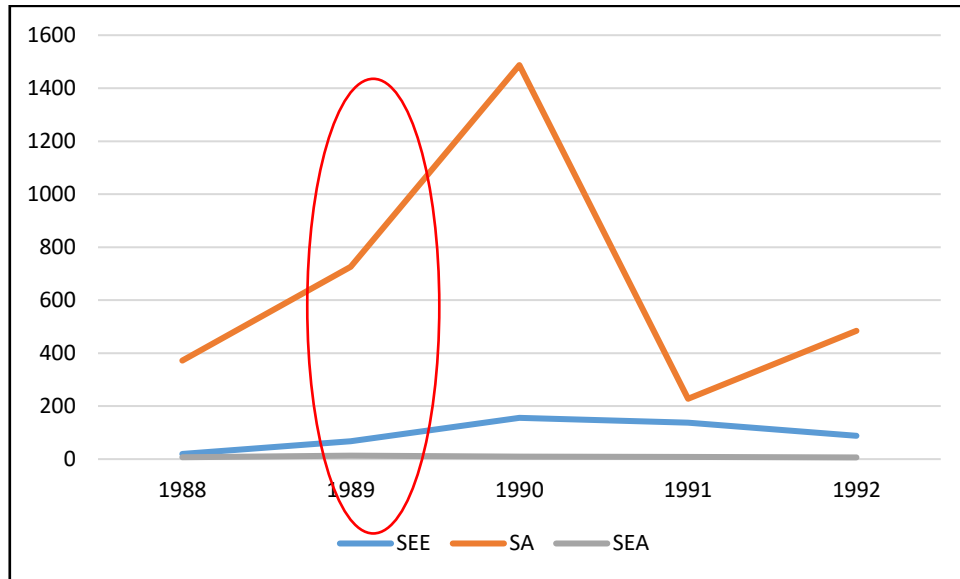
Fig. 1. The evolution of inflation between 1988-1992 in SEE, SA and SEA (average, selected countries)

Not surprisingly, the correlation coefficients between these regions show a positive correlation in inflation evolution during this period, albeit in a smaller degree with SEA. It is also worth mentioning that if the coefficients were calculated on a shorter period (i.e. 1989-1990, to observe the immediate effects of the shock), then their values would have converged towards 1 for SEE&SA and -1 for the SEA&SEE and SEA&SA. Details on the correlation coefficients between country level inflation (calculated not using averages, but yearly values) can be found in *Annex 1*.
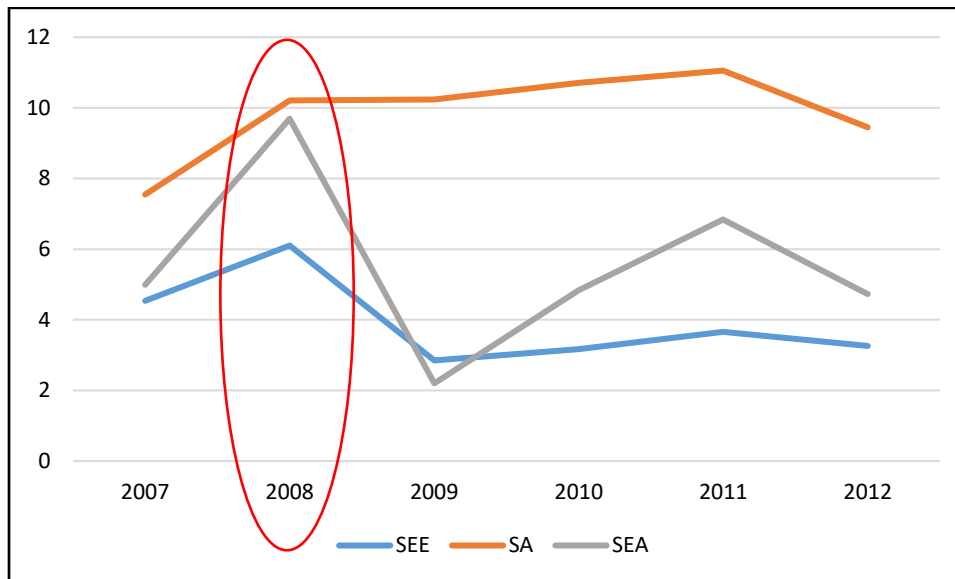
Table 1. The correlation matrix for the evolution of inflation between 1988-1992 in SEE, SA and SEA (average, selected countries)

	SA	*SEA*	*SEE*
SA	1		
SEA	0.30809	1	
	0.49082	0.00807	
SEE	3	2	1

The Global Financial Crisis of 2007-08
The Global Financial Crisis (GFC) of 2007-08 was another major event in the recent history. Traditionally, the theory states that a drop in economic activity (or in economic growth) can cause a fall in prices (or at least slow their tendency to rise). The factors that concur to this observation range from a rise in the quantity of unsold goods, lower confidence in the economy and falling asset prices. Therefore, if a comparison is made with the previous case of the fall of communism, the intuitive conclusion that can be drawn is that the GFC should have caused a drop-in inflation, as economies should have been more robust at the time of the shock. This conclusion is supported by Figure 2 below. Albeit the drop-in inflation for the analyzed countries doesn't seem to be large, this was mainly because of the support measures that the major central banks (especially the Fed) implemented to support the financial sector and the economy. Such measures include lowering the policy rates to near zero, quantitative easing, asset purchase programs, forward guidance etc.

Fig. 2. The evolution of inflation between 2007-2012 in SEE, SA and SEA (average, selected countries)

What can be seen is that now the evolution of inflation from SA seems to be disconnected from those in SEE and SEA, most likely due to the specific fundamentals of the economies from these regions. Details on the correlation coefficients between country level inflation (calculated not using averages, but yearly values) can be found in *Annex 1*.

Table 2. The correlation matrix for the evolution of inflation between 2007-2012 in SEE, SA and SEA (average, selected countries)

	SEE	*SA*	*SEA*
SEE	1		
SA	-0.22815	1	
	0.85466	0.17474	
SEA	7	5	1

The COVID-19 pandemic
Inflation during the pandemic evolved as predicted by economic theories regarding demand/supply side shocks. The negative demand side shock caused by the lockdown measures and by the precautionary measures taken by the population (in the form of restraining spending in the face of the uncertainty regarding the evolution of the pandemic) caused a recession, which led to a decrease in inflation. Once the lockdown measures eased, and coupled with the authorities implemented significant support schemes (both monetary and fiscal), output bounced back, but various bottlenecks in the global supply chains put pressure on the supply side. It is worth mentioning that macroeconomic policies continued to support the economy, even if the recession, or at least the severe part of it, was gone. The monetary policy, for instance, remained accommodative during 2021, despite the signs of rising inflation, the latter becoming more entrenched, rather than just transitory.

Fig. 3. The evolution of inflation between 2019-2021 in SEE, SA and SEA (average, selected countries)

What can be seen is that now the evolution of inflation is positively correlated across all regions, which is consistent with the common developments that the pandemic caused i.e. lockdown measures, support measures and easing the lockdown. Details on the correlation coefficients between country level inflation (calculated not using averages, but yearly values) can be found in *Annex 1*.
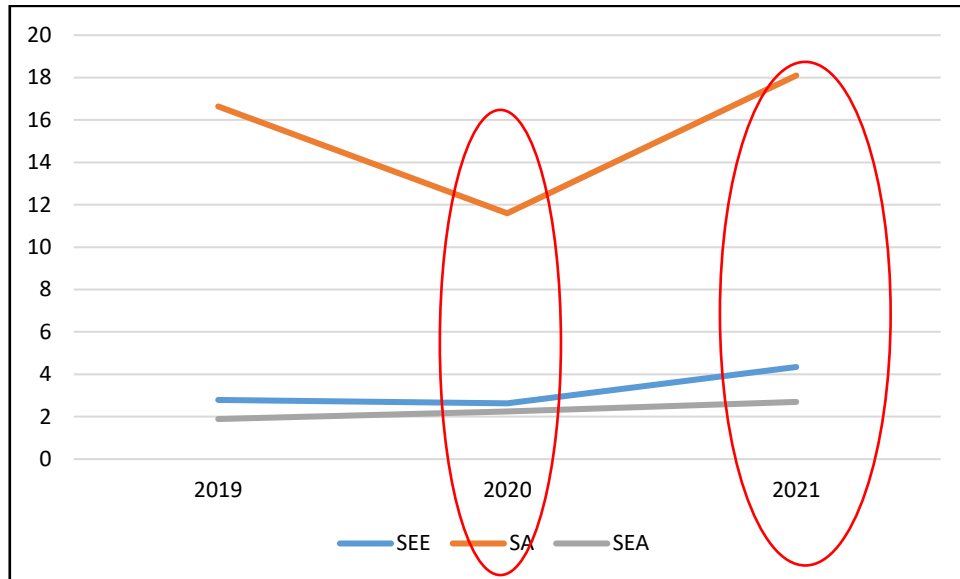
Table 3. The correlation matrix for the evolution of inflation between 2007-2012 in SEE, SA and SEA (average, selected countries)

	SEE	*SA*	*SEA*
SEE	1		
SA	0.73456	1	
SEA	0.86231 7	0.28983	1

5. Conclusion

Our research shows that major economic events (or shocks) do influence inflation. Inflation behaved as described in the literature, dropping in the case of a demand shock and rising in the case of a supply shock in all three events. Furthermore, as the positive correlation coefficients show, each of this shock had repercussions on the inflation in the countries analyzed. This can be explained by the fact that economies, especially in the last two decades, became more interconnected, thus increasing the risk of spill-overs. At country level, differences in the levels of inflation can be explained, most likely, by the specific fundamentals of each economy or, perhaps, each region. The results may be biased by the rather specific circumstances that prevailed after the global financial crisis, when unconventional monetary policy measures were implemented - lowering the policy rates to near zero, quantitative easing, asset purchase programs, forward guidance etc. and because of the public support granted during the COVID-19 pandemic. Finally, the last two events show that authorities can support aggregate demand, but if this stimulus is not paired with the necessary reforms to support the aggregate supply as well, then economic growth and resilience, together with a low and stable inflation, cannot be achieved.

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Correlation coefficients between country level inflation
(calculated using yearly values)

The fall of communism -1989

SEE area

	Bulgaria	Hungary	Poland
Bulgaria	1.00		
Hungary	0.82	1.00	
Poland	-0.37	0.17	1.00

SEA area

	Brunei Darussalam	China	Indonesia	India	Lao PDR	Malaysia	Philippines	Singapore	Thailand
Brunei Darussalam	1.00								
China	-0.70	1.00							
Indonesia	0.26	-0.55	1.00						
India	0.02	-0.65	0.84	1.00					
Lao PDR	0.01	0.79	-0.73	-0.92	1.00				
Malaysia	-0.20	-0.54	0.39	0.82	-0.86	1.00			
Philippines	0.16	-0.14	0.75	0.46	-0.14	0.02	1.00		
Singapore	0.85	-0.83	0.43	0.35	-0.21	0.20	0.40	1.00	
Thailand	0.76	-0.50	0.16	0.00	0.39	-0.11	0.44	0.90	1.00

SA area

	Brazil	Mexico
Brazil	1.00	
Mexico	-0.30	1.00

The Global Financial Crisis of 2007-08

SEE area

	Albania	Bulgaria	Czech Republic	Hungary	Poland	Romania
Albania	1.00					
Bulgaria	0.31	1.00				
Czech Republic	0.12	0.86	1.00			
Hungary	-0.06	0.61	0.47	1.00		
Poland	-0.10	0.16	0.32	-0.55	1.00	
Romania	0.69	0.58	0.42	-0.15	0.32	1.00

SEA area

	Brunei Darussalam	China	Indonesia	India	Cambodia	Lao PDR	Malaysia	Philippines	Singapore	Thailand	Timor-Leste	Vietnam
Brunei Darussalam	1											
China	0.19	1.00										

Indonesia	0.85	0.66	1.00								
India	-0.30	-0.60	-0.45	1.00							
Cambodia	0.77	0.73	0.99	-0.48	1.00						
Lao PDR	0.05	0.93	0.57	-0.28	0.65	1.00					
Malaysia	0.59	0.81	0.90	-0.43	0.94	0.79	1.00				
Philippines	0.76	0.42	0.85	-0.07	0.82	0.46	0.86	1.00			
Singapore	0.18	0.76	0.61	-0.28	0.71	0.83	0.87	0.64	1.00		
Thailand	0.19	0.88	0.67	-0.29	0.77	0.95	0.85	0.56	0.92	1.00	
Timor-Leste	-0.33	0.79	0.17	-0.56	0.30	0.75	0.47	-0.02	0.70	0.71	1.00
Vietnam	0.45	0.74	0.77	-0.28	0.80	0.78	0.95	0.86	0.88	0.79	0.45	1.00

SA area

	Brazil	Mexico	Nicaragua	Venezuela, RB
Brazil	1.00			
Mexico	-0.19	1.00		
Nicaragua	0.08	0.22	1.00	
Venezuela, RB	-0.15	0.21	-0.50	1.00

The COVID-19 pandemic

SEE area

	Albania	Bulgaria	Czech Republic	Hungary	Poland	Romania
Albania	1					
Bulgaria	0.14	1				
Czech Republic	-0.29	-0.99	1			
Hungary	0.87	0.60	-0.72	1		
Poland	0.95	0.45	-0.58	0.98	1	
Romania	0.53	0.91	-0.97	0.87	0.77	1

SEA area

	Brunei Darussalam	China	Indonesia	India	Cambodia	Lao PDR	Malaysia	Philippines	Singapore	Thailand	Timor-Leste	Vietnam
Brunei Darussalam	1											
China	-0.81	1										
Indonesia	-0.99	0.71	1									
India	0.85	-0.38	-0.92	1								
Cambodia	0.79	-0.27	-0.87	0.99	1							
Lao PDR	0.96	-0.61	-0.99	0.96	0.93	1						
Malaysia	0.19	-0.73	-0.04	0.36	-0.46	-0.10	1					
Philippines	0.70	-0.99	-0.59	0.22	0.11	0.47	0.83	1				
Singapore	0.40	-0.86	-0.26	-0.14	-0.25	0.12	0.98	0.93	1			
Thailand	-0.10	-0.51	0.24	0.60	-0.69	-0.37	0.96	0.64	0.88	1		
Timor-Leste	0.27	-0.79	-0.13	-0.28	-0.38	-0.02	1.00	0.88	0.99	0.93	1	
Vietnam	-0.34	0.83	0.20	0.21	0.31	-0.06	-0.99	-0.91	-1.00	-0.90	-1.00	1

SA area

	Argentina	Brazil	Mexico	Nicaragua
Argentina	1			
Brazil	0.43	1		
Mexico	0.41	1.00	1	
Nicaragua	0.80	-0.20	-0.21	1