

Defensive expectations. Reinventing the Phillips Curve as a Policy Mix

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The need for revisiting the Phillips Curve

- Low for long inflation, flattening Phillips Curve
- Non-observable variables tend to underperform in bad times
- Real time output gaps not useful for predicting inflation (Kangur et al. 2019); data revisions, forecast errors, judgement errors.
- *“(...) each measure of slack (...) cannot be observed directly because the potential (or trend) levels of economic variables are unobservable and time-varying. Some of them are subject to substantial ex-post revisions.(...) we need to be cautious when assessing economic slack. Monetary policy decisions need to be based on a wide array of economic indicators”.* (Luis de Guindos, ECB VicePresident).
- **To revise the Phillips Curve, we need first an alternative theory of consumption and saving during recessions and an observable measure of economic slack**

What is new

- An alternative theory of consumption, saving and inflation during and after an episode of income loss
- **Defensive expectations** replace rational expectations during a recession (when income falls)
- The **cumulative wage gap** replaces the output gap/the unemployment gap as the measure of economic slack in the Phillips Curve
- **Compensatory savings** replace precautionary savings during a crisis

Main point:

- Households will not spend more until they fully recover what they lost, as a measure of stock. **Inflation will not reach its target, after a crisis, until the cumulative wage gap is closed.**

1. Defensive expectations

- Defensive expectations (DE) are households' expectations to preserve or rebuild the wealth they had in the past.
- DE builds on sticky wages (Keynes, Fischer) and loss aversion (Kahneman and Tversky, Thaler).
- People have a strong preference for maintaining their wage levels.
- Loss aversion introduced by the prospect theory (asymmetric utility function of losses vs. gains)
- **DE main contribution: in a recession, the reference wage is the last peak wage in the past.**

Defensive expectations (cont.)

Different types of expectations, comparative view

	Adaptive	Rational	Quasi rational	Defensive
Motivation	Adaptation/ Indexation	Profit / utility maximization	Bounded profit / expected utility, value function	Loss aversion
Formation	Observations, experience	Analysis, forecast, perfect information	Reasoning, beliefs, prospects	Facts
Perspective on wages	Nominal wage rigidity	Real wage rigidity	Quasi-rigidity (flexibility introduced through wage fairness)	Nominal and real wage flexibility
Time span	Backward looking	Forward looking	Forward looking	Backward-looking
Financial markets	Volatile	Perfect	Frictions	Constrained

Defensive expectations (cont.)

- After a fall in income, people want to return to their previous wage level + to recover everything they lost as a measure of stock.
- **DE – central implication on price formation: Anchored inflationary expectations, which are now widely believed to have caused the low for long inflation, may have been just a by-product of under-consumption driven by the unmet DE.**
- DE are behind sluggish aggregate demand that follows recessions.
- Both monetary and fiscal policy can intervene to shorten the time needed for the DE to be met; the policy mix is relevant both in the short-run and in the long-run.

2. The cumulative wage gap

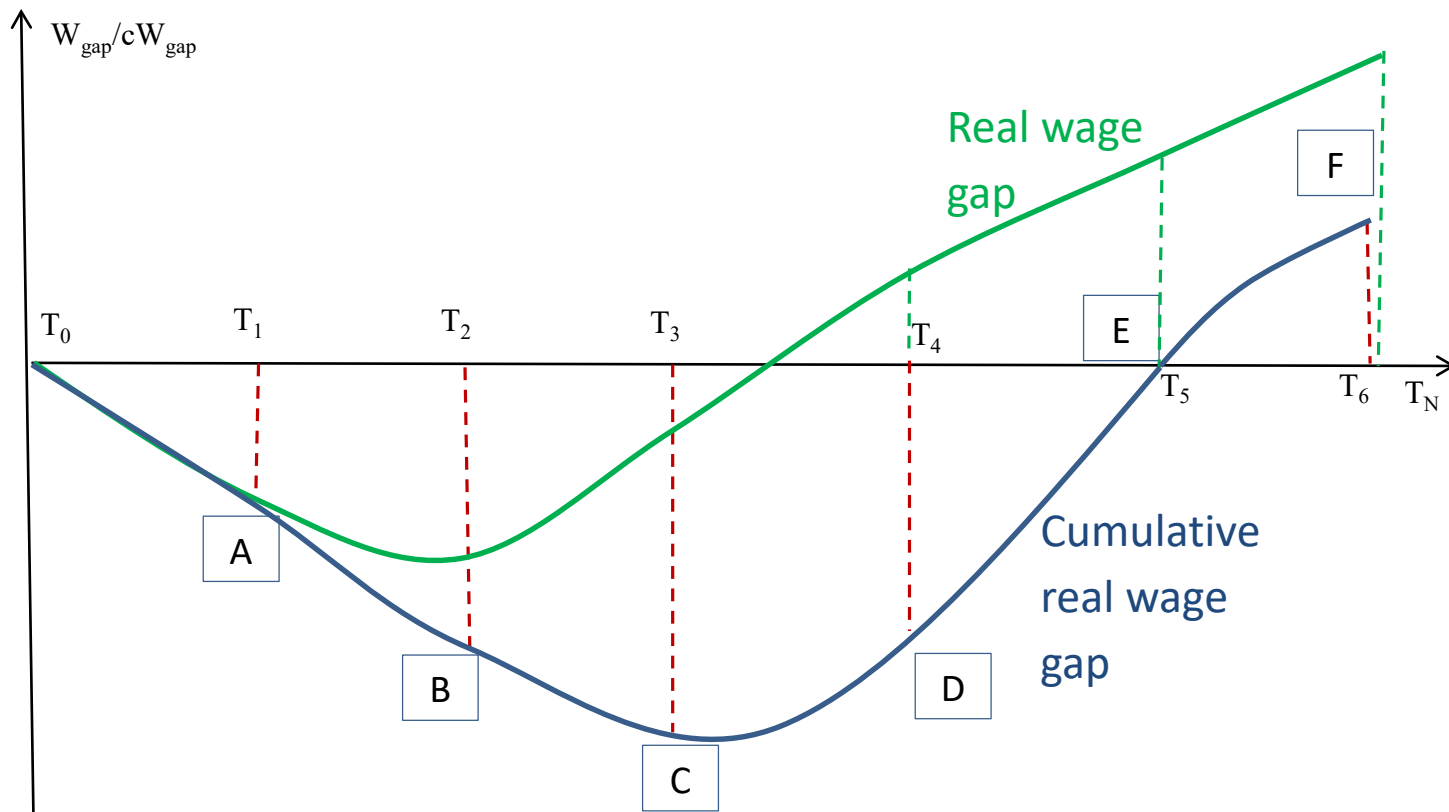
- Duessenbery (1952) – relative income hypothesis; Akerlof (1982) – reference wage.
- The extent of the downward nominal wage rigidity is sensitive to the choice of nominal wage measures. (Kuroda and Yamamoto, 2003).
- Plenty of empirical evidence of downward wage flexibility of monthly salaries (both real and nominal), unequally distributed among income groups – Aramaki (2019) for Japan; Elsby and Solon (2018); Grigsby, Hurst and Yildirmaz (2018) – for US; Doris, O’Neill, and Sweetman (2015) for Ireland and Park and Shin (2017) for South Korea .
- Stiglitz (2015): workers lose more in downturns than they make up in recoveries.

The cumulative wage gap (cont.)

- The cumulative wage gap is the cumulative difference between the current wage and the last peak wage in the past, adjusted for inflation.
- *Wage gap*: $W_{gap T_n} = W_{T_n} - W_{T_0}$
where $W_{gap T_n}$ is the real wage gap at time T_n , W_{T_n} is the real wage at time T_n , and W_{T_0} is the real wage at time T_0 , the peak value of real wage in the reference period.
- The cumulative wage gap (CWG) at time T_n is obtained by summing up all the wage gaps between the reference moment and time T_n

$${}^cW_{gap T_N} = \sum_{n=1}^N W_{gap T_n} = \sum_{n=1}^N (W_{T_n} - W_{T_0})$$

The cumulative wage gap (cont.)



The cumulative wage gap (cont.)

- CWG resembles other measures of economic slack used by the Phillips Curve: it is a measure of stock, and it calculates a deviation from equilibrium
- **CWG is a better measure of slack** (than output gap/unemployment gap) because:
 - it is observable/measurable and easy to calculate
 - it has higher frequency;
 - it is reliable (no revisions);
 - no information asymmetry;
 - it is not normative (there is no necessary condition for CWG to be zero at any time);
 - it measures slack on the demand-side

3. Compensatory saving

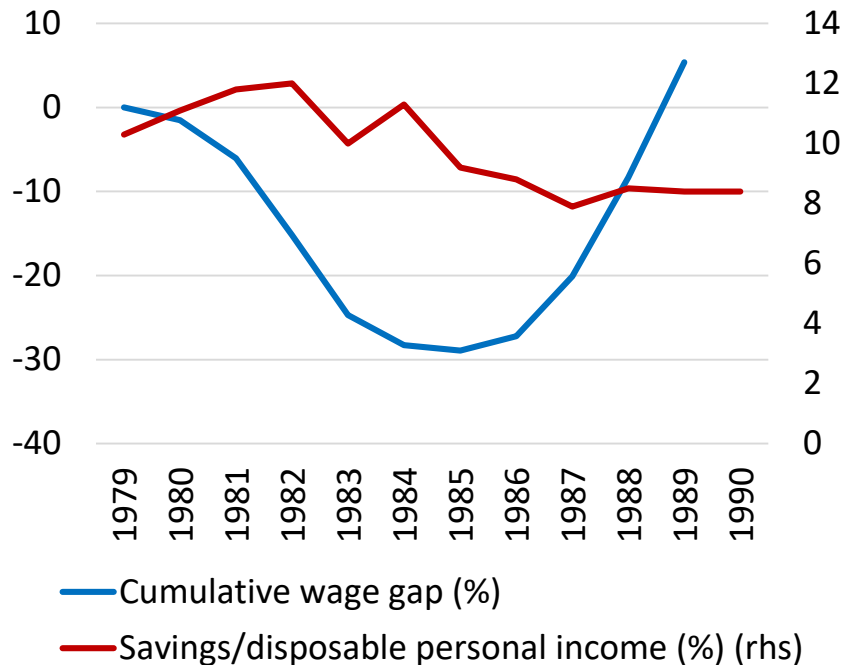
- The compensatory saving is the saving made to compensate a loss of wealth that has already happened.
- This is different from precautionary saving which is driven by uncertainty.
- **A new motive for saving during and after recessions: makeup for a loss. This is the only backward-looking type of saving.**
- As people are loss-averse, when their income falls, they will save more and spend less in order to compensate for that loss (the cumulative wage gap).
- There is no consumption smoothing (contrary to permanent income/life-cycle hypothesis).

Compensatory saving (cont.)

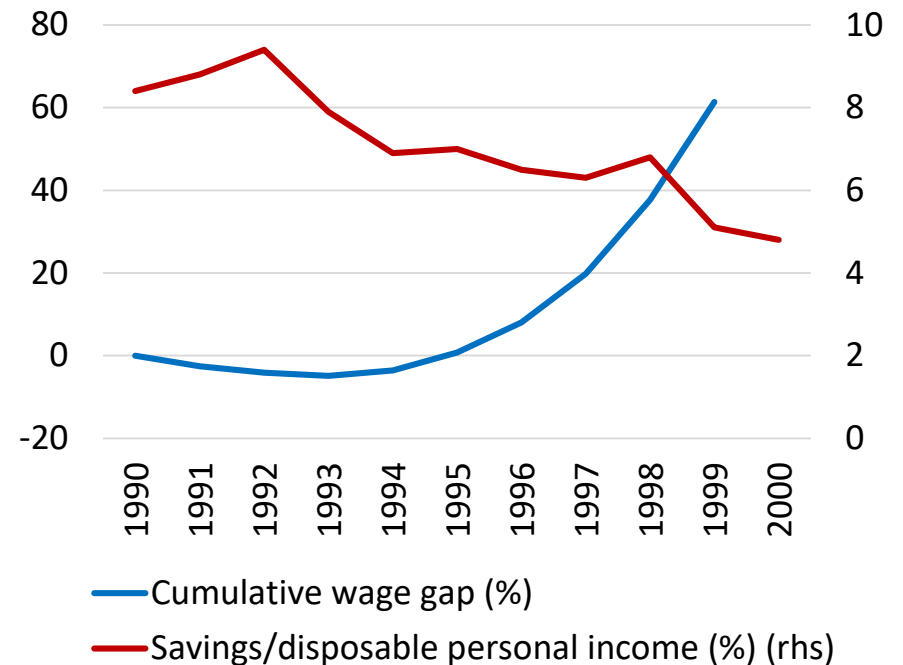
- **Lower income, higher savings** – counterintuitive, but there is some literature support...:
- Minsky (1986) – an income loss increases the savings ratio, and a higher savings ratio leads to lower inflation; Dynan (2009) - saving rises by 3 to 5 cents for every dollar of lost wealth in the United States; Mody, Ohnsorge and Sandri (2012) - higher savings to offset a loss in the stock of wealth.
- ...and plenty of empirical evidence in both advanced and developed economies

Compensatory saving (cont.)

Wage adjustment episode, United States, 1979-1988



Wage adjustment episode, United States, 1990-1998

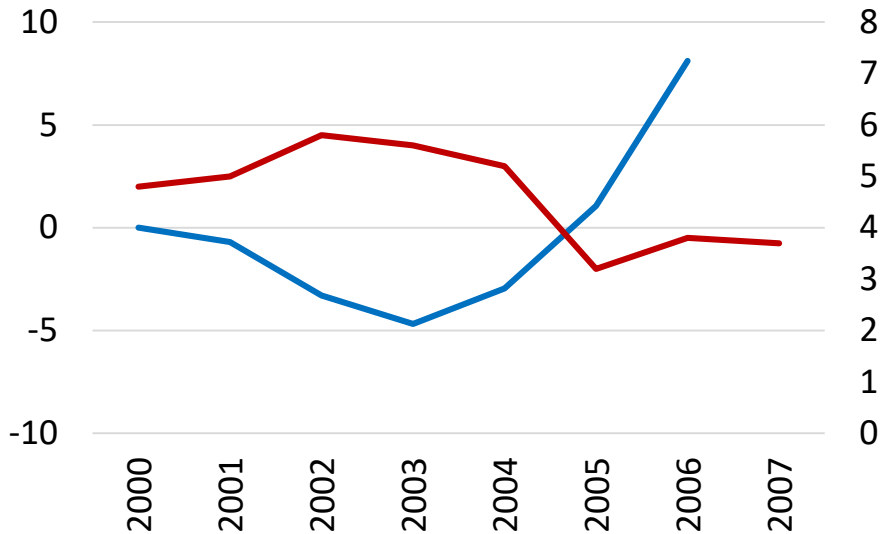


Source: US Bureau of Economic Analysis, author's calculations.

Voinea, Liviu. *Defensive Expectations. Reinventing the Phillips Curve as a Policy Mix*. Palgrave Macmillan, 2021.

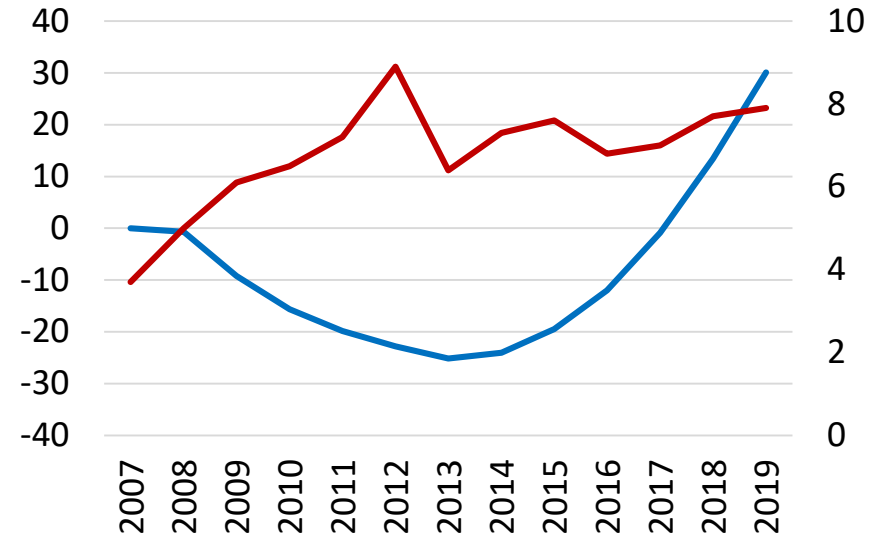
Compensatory saving (cont.)

Wage adjustment episode, United States, 2000-2005



— Cumulative wage gap (%)
 — Savings/disposable personal income (%) (rhs)

Wage adjustment episode, United States, 2007-2017



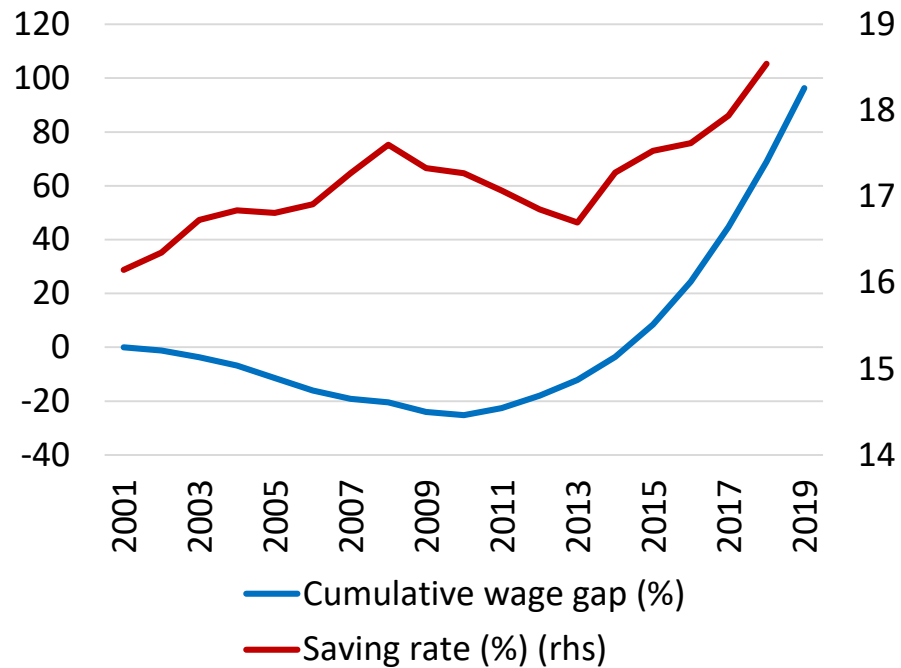
— Cumulative wage gap (%)
 — Savings/disposable personal income (%) (rhs)

Source: US Bureau of Economic Analysis, author's calculations.

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Compensatory saving (cont.)

Wage adjustment episode, Germany, 2001-2015



Source: OECD, author's calculations.

Voinea, Liviu. *Defensive Expectations. Reinventing the Phillips Curve as a Policy Mix*. Palgrave Macmillan, 2021.

Compensatory saving (cont.)

- Savings rise invariably at the beginning of a negative income shock. They reach a maximum when the CWG reaches a minimum. Then, as the real wage increases above the initial peak level, the need for compensatory savings fades out. The CWG is still negative, but on an upward trend. At this inflection point the paradox of thrift applies.
- In a recession, saving is counter-cyclical. **When income falls, consumption is crowded out by the compensatory savings, which are backward-looking, hence insensitive to the evolution of the interest rate.**

Compensatory saving (cont.)

- Assumptions (for simplicity, but also reflecting reality for most wage-earners):
- Wage is the only source of income.
- Households either do not hold financial or real estate assets or do not use them as a buffer stock when an income loss occurs (from a monetary perspective, wealth equals income because there is no possibility to spend out of the existing wealth).
- Tight liquidity constraints: no access to credit in order to smooth consumption.
- Precautionary savings (including all forward-looking savings) remain constant during an episode of income loss (zero change) –during an episode of income loss, compensatory savings are additional to precautionary savings

4. Modelling the revisited Phillips Curve

- **The revised Phillips Curve is an empirical relationship between the inflation gap and the cumulative wage gap.**
- Use observable variables only; change the paradigm from flow to stock; allow the curve to be non-stationary
- **Our hypothesis is that the inflation rate stays below its target until the CWG closes, and that it increases above its target when the CWG becomes positive.**
- This hypothesis is validated using two different datasets: a panel for 35 OECD countries, over the last three decades, and a separate one for the US, over the last half century.

Modelling the revisited Phillips Curve (cont.)

- The CWG- Phillips Curve is written as follows:
- (1) $[\Pi_{gap T_n}]_N = f([cW_{gap T_n}]_N) + [\varepsilon_{T_n}]_N$
- where
 - $\Pi_{gap T_n}$ is the inflation gap at time T_n ,
 - $cW_{gap T_n}$ is the cumulative wage gap at time T_n ,
 - N is the period of time for which the Phillips Curve is evaluated, meaning the duration of each adjustment episode,
 - ε_{T_n} is the residual, which accounts for other variables influencing the inflation gap.

Modelling the revisited Phillips Curve (cont.)

- The inflation gap is defined as the deviation from the central bank's target:

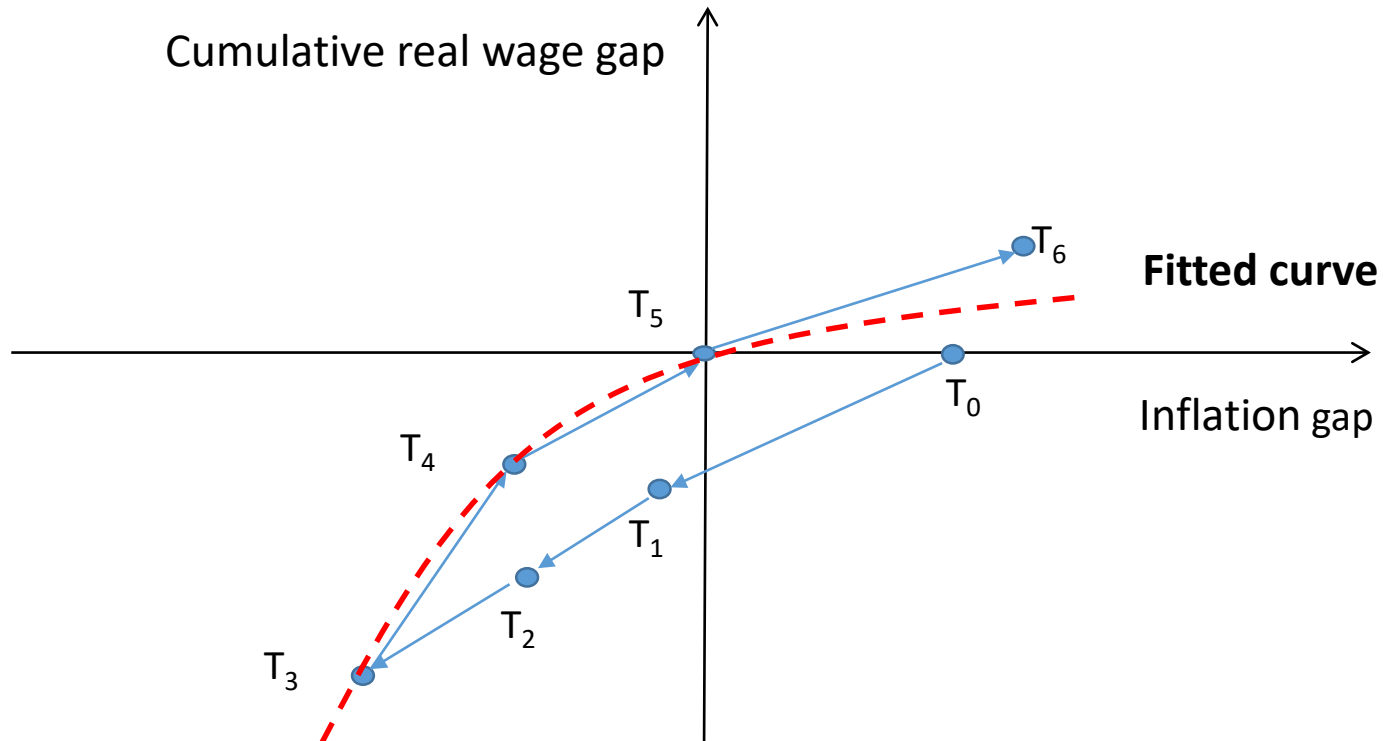
$$\Pi_{gap T_n} = \Pi_{T_n} - \Pi_{T_n}^*$$

where:

- $\Pi_{gap T_n}$ is the inflation gap at time T_n ,
 - Π_{T_n} is the inflation rate at time T_n ,
 - $\Pi_{T_n}^*$ is the central banks' target at time T_n , or, in the absence of that, an average of long-time inflation.
- By introducing the inflation gap and cumulative wage gap equations, the revised Phillips Curve becomes:

$$[\Pi_{T_n} - \Pi_{T_n}^*]_N = f([\sum_{n=1}^N (W_{T_n} - W_{T_0})]_N) + [\varepsilon_{T_n}]_N$$

The revised Phillips Curve: cumulative real wage gap versus inflation gap



Source: Voinea, Liviu. *Defensive Expectations. Reinventing the Phillips Curve as a Policy Mix*. Palgrave Macmillan, 2021.

OECD estimation results

- 35 countries, 1990-2019, 2 measures: average wage, compensation of employees; panel estimation, country fixed effects
- 3 wage adjustment episodes (peak years are country specific): the '90s/early 2000/after GFC.
- Many countries not out of the 2nd adjustment episode
- For OECD countries, CWG was negative 75% of the time; for G7 – 88%.
- CWG explains more than one third of the inflation gap in the 1st wage adjustment episode and more than one quarter of it in the 2nd wage adjustment episode.
- Results are statistically significant and robust.
- There is a break in the slope: the inflation gap accelerates after the cumulative real wage gap closes. A fall of the cumulative real wage gap by 10% corresponds to a decline in inflation gap by 0.9%. A 10% increase of the cumulative real wage gap after it closes leads to an increased inflation gap by 2%.

US estimation results

- 1960-2019, BEA, 2 measures: total wage bill, compensation of employees
- 5 adjustment episodes: 1974-1978; 1979-1989; 1990-1999; 2000-2006; 2007-2019
- Similar coefficients and significance to OECD.
- A 10 percent change in the cumulative wage gap determines a 1.68 percent change in the inflation gap, in the same direction
- Different slopes before and after closing the CWG. As expected, much more powerful impact of CWG on inflation when CWG is negative, statistically significant at 1%.
- CWG has good predictive power for the inflation gap (first lag statistically significant).

5. Main take-aways and policy implications

- New measure of economic slack: the cumulative wage gap (CWG) – higher accuracy and higher frequency than output gap.
- Main finding: inflation remains subdued as long as the CWG remains negative.
- It takes much longer for the CWG to close than it takes for the real wage gap to close. **This explains the disconnect between inflation and wages**, if CWG is negative.
- When people face a negative income shock, they spend less and save more to compensate for their loss and to defend their previous wealth/income level. **This explains the apparent contradiction between higher savings and lower interest rates** – because the compensatory saving is backward-looking.

Main take-aways and policy implications (cont.)

- Central banks alone cannot take inflation back to its target – or at least not as fast as they hope to:
 - Cutting the interest rate would not increase consumption immediately, but could help by reducing the debt service;
 - Backward-looking savings will not be discouraged by lower interest rates;
 - Higher savings are deflationary in the short term, hence the apparent ineffectiveness of the monetary policy. Still, the higher the savings, the faster the recovery of the lost wealth.
 - QE supports asset prices, but in our model, assets cannot be liquidated during crisis; a positive indirect impact on keeping firms afloat, preventing job cuts and steeper negative CWG

Main take-aways and policy implications (cont.)

- It follows that fiscal policy is back as a relevant tool in the short-term.
- Monetary policy is not a panacea, and central banks are better equipped to take inflation down than up.
- Fiscal policy can and should support demand when CWG is negative.
- Policy actions should be filtered by the cyclical position of the CWG.

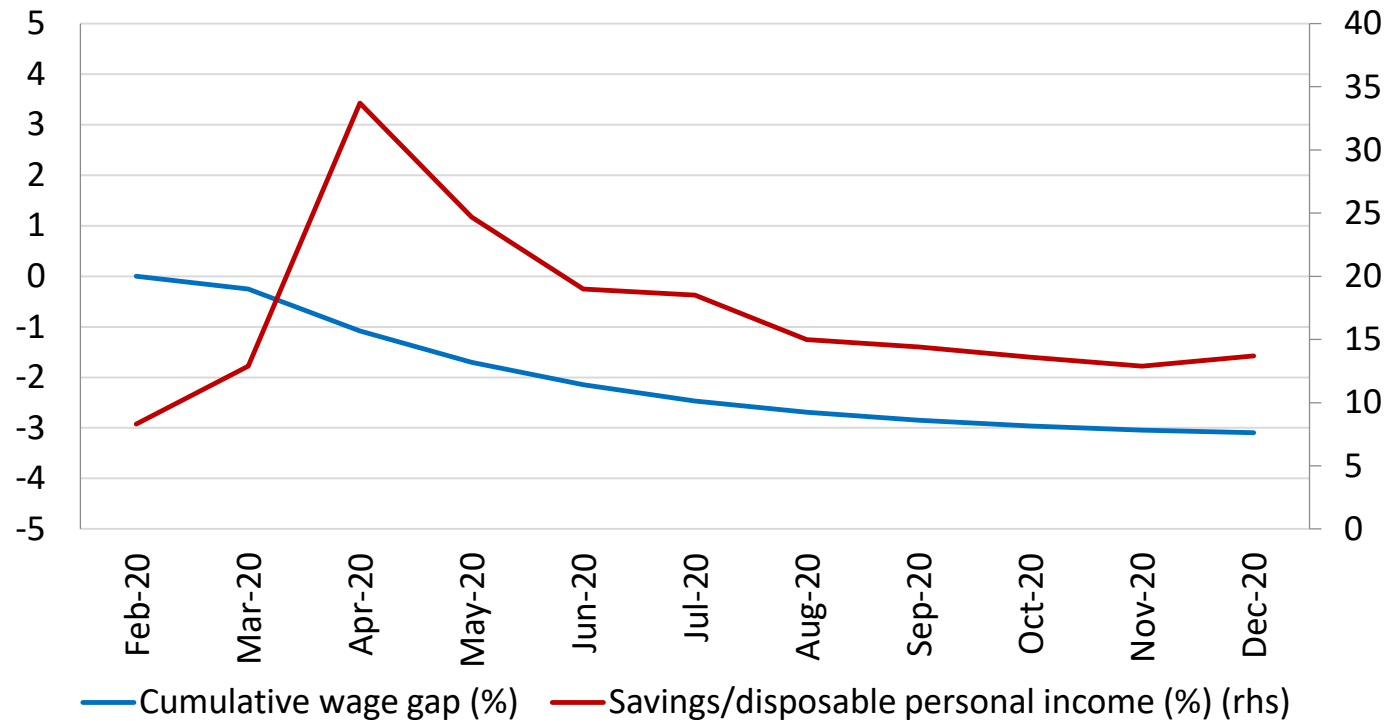
Main take-aways and policy implications (cont.)

- Many automatic stabilizers for positive CWGs (productivity constraints, progressive taxation, macroprudential limits).
- Negative CWGs are more frequent and last longer than positive CWGs.
- **The absent/insufficient automatic stabilizers for negative CWGs contribute to the formation of defensive expectations.**
- **We need automatic stabilizers for periods of negative CWGs:** minimum guaranteed income, a universal income, higher minimum wages, wage insurance, longer-lasting unemployment benefits, tax reliefs, longer notice period, etc..
- **The automatic stabilizers against downward wage flexibility would support aggregate demand, increase the efficiency of the monetary policy transmission mechanism, and contribute to a structural lift of inflation.**

6. Will inflation return from the dead?

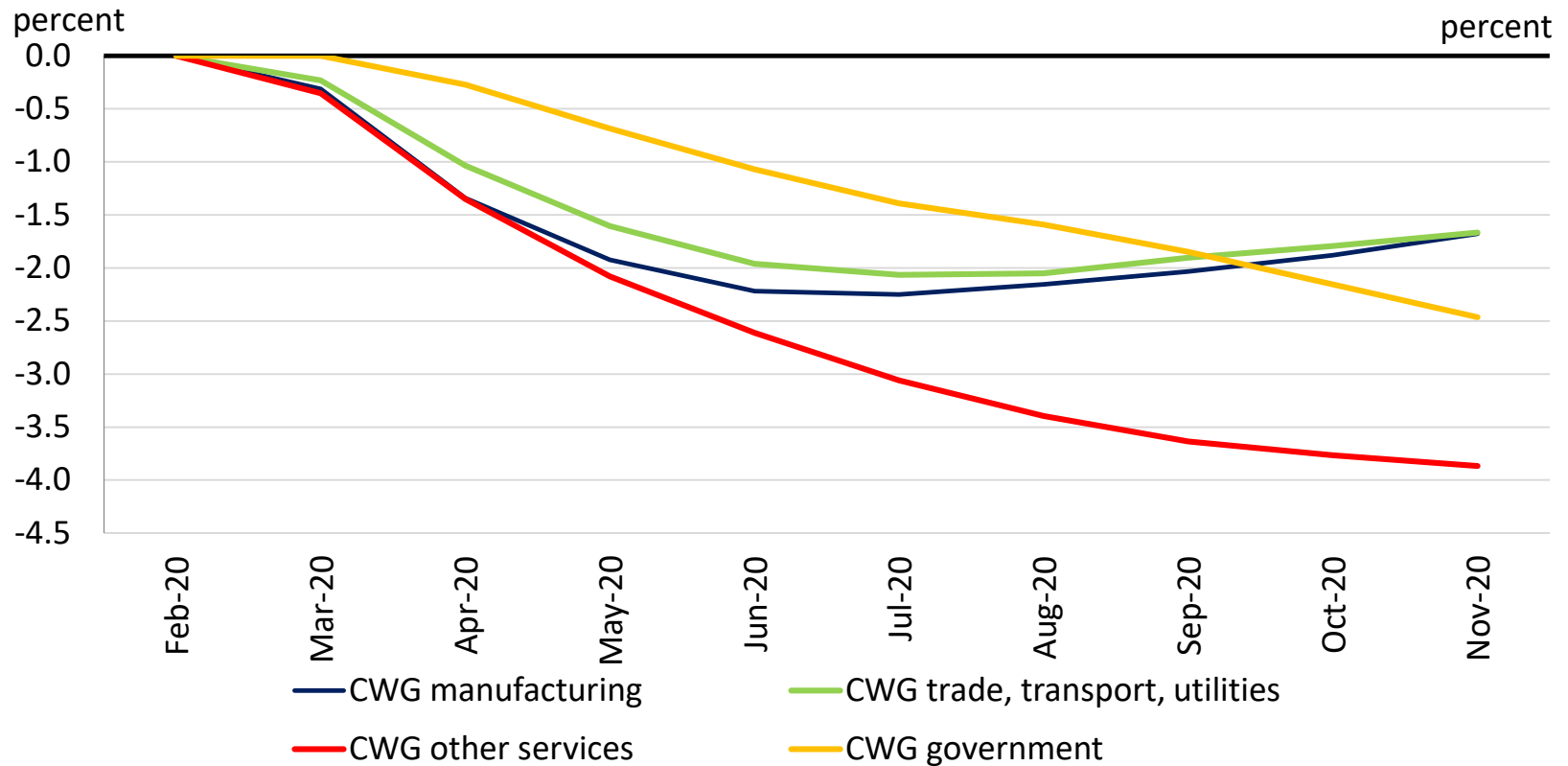
- In many countries, including some euro-area countries, the pandemic driven recession hit while the CWG was still negative since the GFC.
- In the US, the last peak was February 2020, a new wage adjustment episode started afterwards.
- Savings skyrocketed at the beginning of the new crisis.
- **The fiscal bazooka helped advanced economies contain the size of the negative CWG so far.** For the US, the negative CWG is only 3% of the annual compensation of employees (approx. 370 bln. USD as of Dec.2020) (vs. 25% in the GFC). For Germany, the negative CWG since February 2020 is only 1.7% of the annual compensation of employees.

Wage adjustment episode, US, February – December 2020



Source: FRED, author's calculations

Cumulative real wage gap, US, since February 2020 (compensation of employees/wages and salaries), monthly data, seasonally adjusted, annualized



Source: FRED, BIS, author's calculations

Will inflation return from the dead? (cont.)

- **YES, if and when the CWG is closed** (country-specific).
- As the CWG is much lower than in other recessions, and as it appears to have already reached the inflexion point, inflation may be on its way to bounce back and exceed its target (positive inflation gap) sooner rather than later.
- **It is critically important for the fiscal support not to be withdrawn and to target precisely those who lost most, and for the central banks to signal that they are comfortable with such fiscal support as long as the CWG is negative.**