

South African Reserve Bank Special Occasional Bulletin of Economic Notes

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South African Reserve Bank Special Economic Notes are a collection of descriptive and critical economic analyses with recommendations written for internal SARB discussion. They are written by staff members or fellows of the Economic Research Department and, on occasion, by consultants under the auspices of the SARB. They are released publicly on an occasional basis. This series features internal research on how oil price shocks generate second-round effects, with a specific focus on the 2026 oil price shock.

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The first- and second-round effects of supply shocks

Witness Simbanegavi and Mokgabiso Tshenkeng

Abstract

- Supply shocks propagate into inflation through direct, indirect and second-round effects, with second-round effects being the most important for monetary policy.
- The direct effects of supply shocks are easily identifiable in inflation data. Indirect and second-round effects are harder to detect in real time, partly due to staggered price adjustments or the long and variable lags in behavioural change.
- A historical decomposition (using a structural vector autoregression model) shows that second-round pressures have become smaller since around 2017.
- The current shock is large and persistent, presenting material risks that expectations could de-anchor, allowing the shock to become embedded in inflation.
- Given identification challenges, policy will be guided by informed judgement, drawing from experiences of prior supply shocks, analysis of pass-through of expectations to prices, and monitoring the speed and size of first-round effects.

1. Introduction¹

The orthodox macroeconomic view is that monetary policy is a demand-management tool, with the resultant implication that monetary policy should look through supply-side shocks (Bandera et al. 2023; Beaudry, Carter and Lahiri 2026). Yet, in emerging economies especially, supply shocks dominate inflation dynamics and drive inflation expectations (Coibion, Gorodnichenko and Kumar 2018). Even at a global level, supply shocks have become commonplace. In recent years, the global economy has experienced multiple and, often, overlapping supply shocks.² Climatic shocks and weather-related events are also expected to increasingly affect agricultural commodity prices, and thus inflation. This raises several questions for monetary policy. First, how do supply shocks propagate into inflation? Second, how can monetary authorities evaluate and quantify the pass-through effects of supply shocks to inflation? Third, how should monetary policy respond to inflationary pressures induced by supply shocks?

This note details how supply shocks may propagate to inflation and argues that central banks must *always be prepared* to respond to supply shocks. We use the phrase ‘always be prepared’ deliberately here. Often, supply shocks lead to relative price changes and generate only transitory inflation (a once-off increase in the price level) which monetary policy cannot do much about. However, under certain conditions, a supply shock can trigger a generalised

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¹ The authors are grateful to Nkhetheni Nesengani, Rudi Steinbach, Jeffrey Rakgalakane and Jean-Francois Mercier for their valuable contributions.

² These include the COVID-19 shock and its aftermath, the energy price shock due to the Russia-Ukraine war, and now the fuel price shock induced by the Middle East conflict.

increase in the price level – the type of inflationary pressure that monetary policy can effectively extinguish, as will be made clear below.

2. Supply shocks and inflation

How central banks should respond to inflation induced by a supply shock is anything but straightforward. First, regardless of its source, high and persistent inflation harms the economy and is widely disliked by economic agents. Second, in some cases supply-induced inflation eventually manifests as demand-pull inflation. We will revisit this point below. The immediate implication of these observations is that the optimal monetary policy response to an inflation shock should be informed by the expected size and persistence of the inflationary impulse rather than the source of the inflation shock (De Gregorio 2012).

There are at least three channels through which a supply shock may transmit to domestic inflation, namely the direct effect, indirect effects and second-round effects. We will illustrate these propagation mechanisms using the recent fuel price shock caused by the conflict in the Middle East.

With respect to the fuel price shock, the *direct effect* reflects the immediate pass-through of fuel price increases to surveyed inflation (pump prices rise almost instantly when Brent crude oil prices increase).³ Second, fuel prices may also feed into inflation through proximate goods and services – the so-called *indirect effects*. Producers may consider passing some of the fuel-induced costs on to the consumer. A good example is transport inflation, which is highly sensitive to fuel price movements.⁴ However, firms face a choice between passing cost increases on to consumers and absorbing these in margins to reduce the risk of demand or market share loss. Thus, there is uncertainty as to the size and timing of indirect effects. The direct and indirect effects constitute the first-round effects of a fuel (supply) shock and generate what is called cost-push inflation (see also Lane 2026).⁵ Direct and indirect effects mostly affect relative price movements and thus do not necessarily bring about generalised inflation.

Supply shocks can, and often do, surface underlying inflation pressures. For instance, shocks to fuel prices are likely to lift the inflation expectations of households, firms and workers, resulting in behavioural changes that may instigate second-round effects (Bank of England 2026). A behavioural shift is more likely the larger the size of the shock and the more persistent it is. For example, large cost shocks have been found to shift firms from time-dependent pricing to state-dependent pricing, resulting in more frequent price increases as firms seek to re-align margins (Cavallo, Lippi and Miyahara 2024; Reis 2026).⁶ This increases the speed with which the cost shock transmits to consumer prices (Bunn et al. 2026). Similarly, a behavioural shift

³ In South Africa, fuel prices are adjusted at the beginning of each month and, as a result, an increase in fuel prices is reflected fully in the consumer price inflation survey in the same month.

⁴ After averaging 0.3% over the 12 months ending March 2026, transport inflation jumped to 4.7% in April and to 10.6% in June 2026.

⁵ Cost-push inflation occurs when rising production costs, such as wages, raw materials or energy, lead firms to raise prices to mitigate against margin compression. Unlike demand-pull inflation, which stems from excess aggregate demand, cost-push inflation originates on the supply side of the economy.

⁶ Time-dependent pricing occurs when firms adjust prices at predetermined intervals, while state-dependent pricing occurs when firms adjust prices in response to economic conditions. More frequent price adjustments may reflect staggered price increases or shifting inflation expectations or both.

is likely when economic agents are more attentive at the time of the shock or when the commodity whose price has risen is more salient (Coibion, Gorodnichenko and Kumar 2018).⁷

Second-round effects of a supply shock manifest primarily through wage growth and shifts in inflation expectations, with likely feedback effects to firm pricing. Workers facing an income squeeze (or expectations of real wage erosion) from rising inflation may ask for wage increases, which, if granted, present a new cost shock to businesses as well as a potential demand shock (Vogtlin 2025).

A cost shock can feed into inflation expectations through the information channel⁸ and the experience channel (Vogtlin 2025). The information channel allows expectations to lift much quicker and, to the extent that agents act on their expectations, inflation expectations may become self-fulfilling (Bryan, Meyer and Parker 2015; Coibion, Gorodnichenko and Kumar 2018; Coibion and Gorodnichenko 2025). The experience channel is backward-looking, as agents adjust their expectations on the basis of lived experience.⁹ Firms with market power could also act opportunistically, raising their prices by more than would be warranted by the cost increase. Rising inflation and wage expectations may result in a wage-price spiral. A monetary policy response to a supply shock primarily seeks to prevent or minimise this cost-push pass-through effect by subduing demand.

Even if firms fully absorbed wage increases (i.e. no price response), second-round inflation effects could emerge as the higher wages may generate demand-pull inflation. This provides another rationale for a monetary policy response to a supply shock, the objective being to mute this demand channel to inflation.¹⁰

3. Why distinguish between first- and second-round effects?

The ex-ante ‘optimal’ monetary policy response to a supply shock depends on the policymaker’s assessed view of whether the shock will generate significant second-round effects (Beaudry, Carter and Lahiri 2026). As discussed above, direct and indirect effects are presumed to be temporary as they represent a once-off shift in the price level. Indeed, the reason why supply shocks present a greater challenge for monetary policy, compared with demand shocks, is because it is a priori uncertain whether the shock would generate persistent inflation pressure. It is only sustained inflation pressure that warrants a monetary policy response.

Part of the policy challenge stems from the fact that a negative supply shock is, by definition, contractionary and thus disinflationary. In particular, an oil price shock is equivalent to a negative productivity shock – it reduces growth and widens the output gap (Beaudry, Carter and Lahiri 2026; De Gregorio 2012). This should at least partially offset the inflationary effects of the oil price shock. A tightening of monetary policy in response to a supply shock thus further contracts economic activity (Barakchian and Crowe 2013).

⁷ The literature shows that food and energy price shocks are more salient in emerging economies (De Gregorio 2012).

⁸ Survey respondents become aware of the cost shock and therefore use this information when forming their expectations even before they experience the effects of the shock.

⁹ For firms, expectations would adjust following margin squeeze due to the fuel cost shock, while for workers, realised loss of purchasing power would open the prospect of wage re-negotiations.

¹⁰ Yet another rationale for policy to respond to supply shocks is signalling, whereby the central bank hikes the policy rate to communicate its commitment to keeping inflation low and stable (Leonard et al. 2026).

In principle, first-round effects manifest in data almost immediately, while monetary policy operates with long and variable lags.¹¹ These considerations explain the widely accepted view that central banks should look through (the first-round effects of) supply shocks.¹² By contrast, second-round effects tend to self-sustain in the absence of a policy response. Understanding this distinction is key to optimal monetary policy design.

4. Identifying shock effects in data

Although the conceptual distinction between first-round and second-round effects is intuitive, identifying these effects in data remains a challenge. Whereas the direct effects of a fuel shock reflect almost immediately in surveyed inflation, indirect effects are harder to pin down as firms have a range of possible responses to a cost increase – from full cost absorption to staggered price increases to full pass-through to consumer prices. Staggering price increases makes it harder to identify the price increases purely as a result of the fuel shock as time passes due to confounding shocks. For instance, firms with market power may use a supply shock as a pretext to increase prices beyond what is justified by the cost shock (Leonard et al. 2026). In addition, the staggered increases may eventually overlap with second-round effects (if any), making them indistinguishable in inflation data.

The more pertinent question for monetary policy is how to identify or approximate the second-round effects of the fuel shock. For instance, can inspection of the core inflation basket help identify second-round effects in real time? While analyses of core inflation can explain the possible broadening and intensification of inflation pressures following the shock, and thus the risk of persistent inflation, they are unlikely to identify second-round effects directly. By definition, second-round effects are the outcome of behavioural responses to the direct and indirect effects of the (fuel) shock and therefore manifest over time.¹³ This, however, does not mean policy is hamstrung, as we argue below.

Second-round effects manifest in wage and inflation expectations dynamics (Vogtlin 2025). In South Africa, wage data are not collected at a high enough frequency (e.g. monthly) to support real-time assessment of second-round effects, partly due to nominal stickiness and multi-year wage settlements. However, inflation expectations data are available at a slightly higher frequency of once a quarter, and are a key input into the South African Reserve Bank's (SARB's) medium-term inflation projections. Because second-round effects are difficult to pin down in real time, policymakers must exercise judgement on their likelihood and magnitude to calibrate policy appropriately. These judgements are informed by the experiences of prior supply shocks, analyses of the pass-through of wage and inflation expectations to prices, and monitoring of the speed and size of first-round effects.¹⁴

¹¹ Some indirect effects may take longer to manifest in inflation data, especially where firms adopt time-dependent pricing or stagger price adjustments.

¹² Anecdotal evidence suggests that central banks, including the SARB, adopted a more cautious approach during the 2026 Middle East conflict-induced oil price shock – with many holding rates steady or implementing modest increases as they monitored the shock's transmission. This posture, however, benefitted from favourable initial conditions, where inflation was close to targets and policy was moderately restrictive.

¹³ Identifying second-round effects in the core basket requires isolating all the components of core inflation that are either directly or indirectly impacted by the fuel price shock and holding all the other price drivers (shocks) constant over the relevant period. These conditions cannot be met, especially in real-time analyses.

¹⁴ See Allison and Mavuma (2026), Steinbach and Morwane (2026) and Foresto, Reid and Vermeulen (2026).

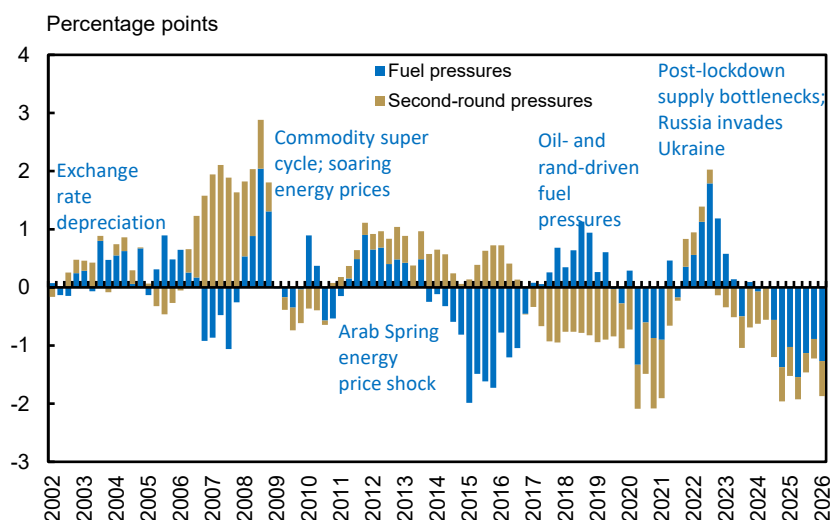
Because second-round effects are not observable in real time, policymakers face intra- and intertemporal policy trade-offs. The intra-temporal trade-off arises because tightening to contain inflation may further weaken activity. The intertemporal trade-off concerns the timing of a policy response: acting too early risks unnecessarily constraining activity if the shock proves temporary, while acting too late risks allowing inflation pressures to become more persistent, potentially requiring a stronger policy response later.

The empirical section below evaluates how historical fuel shocks have influenced expectations and wages (second-round channels) and ultimately headline inflation.

5. Historical incidence of fuel and second-round pressures in South Africa

In this section we model a structural vector autoregression (SVAR) using a recursive Cholesky identification scheme to quantify the contribution of fuel, wage and inflation expectations pressures to headline inflation in the South African economy. The recursive ordering is fuel prices, headline CPI inflation, two-years-ahead inflation expectations, average wage growth and the policy rate. This ordering treats fuel inflation as the most exogenous variable, while the remaining variables are ordered according to their assumed position in the transmission chain, with later variables restricted from responding contemporaneously to shocks that originate earlier in the system. The results capture *independent* unexpected movements (shocks) in each variable, rather than observed levels. Positive (negative) values indicate upward (downward) pressure relative to a model-implied path.¹⁵ A historical decomposition then traces the incidence of fuel pressures alongside wage and inflation expectations pressures (grouped as second-round pressures) over time. The model is estimated using quarterly data from 2001Q1 to 2026Q1.

Figure 1: Historical incidence of fuel and second-round pressures



Source: Statistics South Africa, Bureau for Economic Research, SARB.

¹⁵ A zero contribution from any of the shocks does not mean a zero effect on inflation; rather, it means the variable evolved broadly as predicted by the model and did not create additional inflationary pressure beyond the model-implied path (Read 2024).

The decomposition shows that the relationship between fuel and second-round pressures has varied over time. Elevated and sustained fuel price pressures, as was the case around major global oil price shocks in 2008, 2011 and 2022, have tended to coincide with more pronounced second-round pressures. In our framework, fuel and second-round pressures are separately identified, recognising that wage and inflation expectations pressures capture not just fuel price effects, but also a broad range of inflationary forces.¹⁶ Accordingly, fuel and second-round pressures need not consistently move together. The finding of persistent supply shock effects on headline inflation is consistent with Simbanegavi and Palazzi (2023), who find that core inflation reverts to headline inflation following supply shocks, confirming second-round effects in historical inflation.

Interestingly, since around 2017, second-round contributions have remained muted, and often negative. This period coincides with the SARB's stronger emphasis on keeping inflation at the midpoint of the target range (4.5%) and, more recently, at the 3% target. The more contained second-round pressures are consistent with better-anchored inflation expectations and increased policy credibility.^{17,18} Importantly, however, the current fuel shock has been both large and persistent, which sharply raises the risk that it may feed into wage and inflation expectations pressures. Although wage expectations have so far remained relatively anchored, the two-years-ahead inflation expectations have edged higher since the shock, and both could escalate further as the shock intensifies.

6. Conclusion

Understanding how supply shocks propagate into headline inflation is fundamental to monetary policy design. While direct and indirect effects capture much of the initial pass-through to inflation, the key policy concern is whether these pressures become embedded in wages and inflation expectations, resulting in wage-price spirals. A historical decomposition shows that sustained fuel price pressures are typically associated with pronounced second-round pressures. However, second-round pressures have generally been more contained since 2017, consistent with better-anchored inflation expectations and stronger monetary policy credibility. For policy, this highlights the importance of looking through the initial inflation impacts of an oil shock but remaining attentive to its transmission to detect emerging risks. The current fuel shock is large and persistent, heightening the risk that expectations could de-anchor. Monetary policy should lean against such pressures, guided by prior shock experiences and analyses of the pass-through of wage and inflation expectations to prices as well as of the speed and size of first-round effects.

¹⁶ These may include food price shocks, exchange rate shocks and high past inflation feeding into wage negotiations.

¹⁷ For instance, SARB analysis shows that the exchange rate pass-through rate has declined (SARB 2025). See Amaral, Foresto and Mosoma (2026) on the anchoredness of expectations.

¹⁸ The model has some limitations – for example, the assumption of a constant transmission mechanism. Future research could consider models such as time-varying parameter VARs, separate SVARs estimated over different periods and Markov-switching VARs.

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