

South African Reserve Bank

Occassional Bulletin of Economic Notes

OBEN/22/01



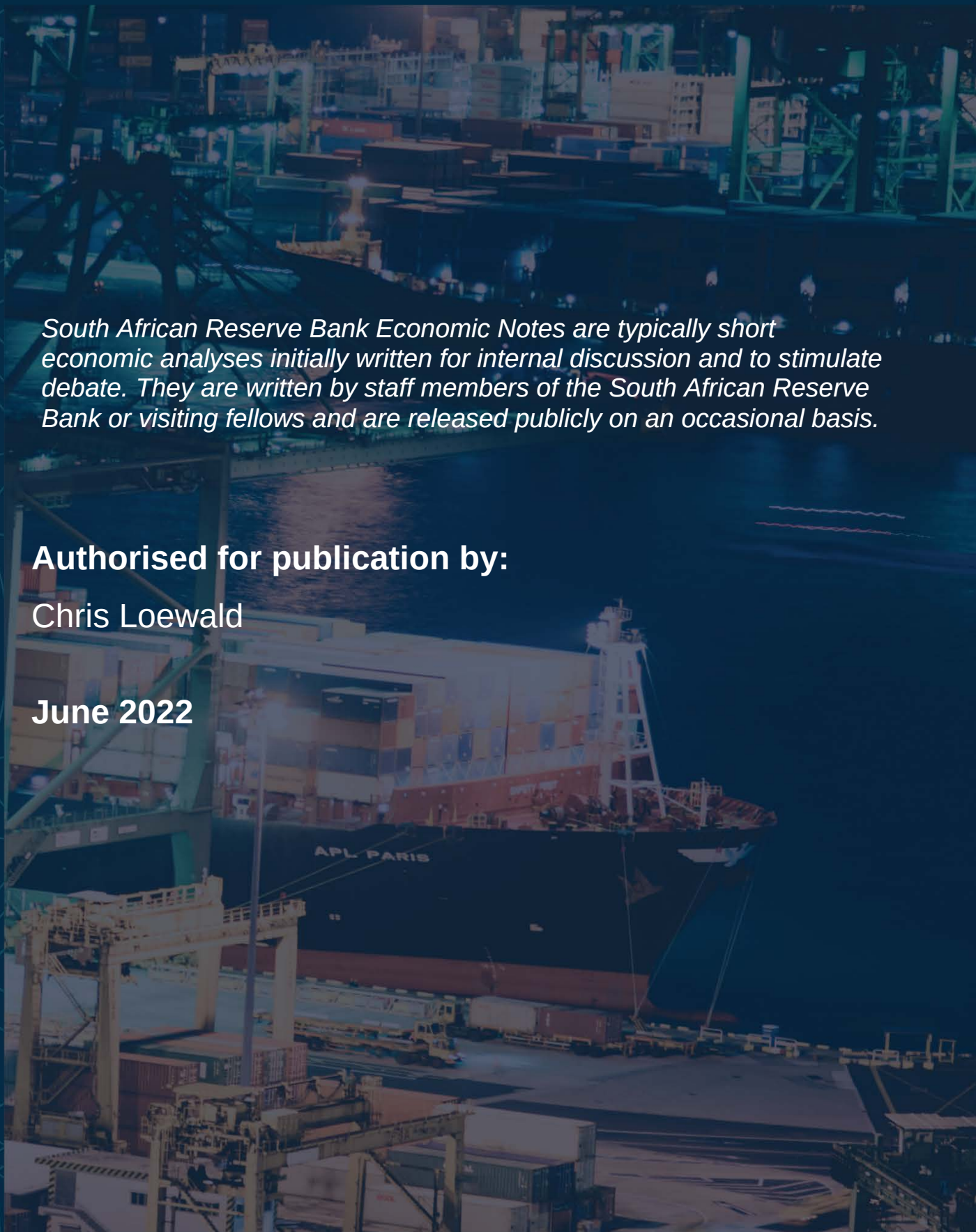
SOUTH AFRICAN RESERVE BANK

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Authorised for publication by:

Chris Loewald

June 2022



SARB Occasional Bulletin of Economic Notes

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Table of Contents

Contents

1. Surging commodity prices explain a lot
Theo Janse van Rensburg and Erik Visser
2. Should we worry about the high producer prices? Yes, but ...
Susan Knox, Palesa Mnguni, Pieter Pienaar and Witness Simbanegavi
3. Policy lessons from global retail CBDC projects
Nic Spearman
4. Revisiting EM economic development and convergence
Jean-François Mercier

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OBEN 2201* – April 2022

Should we worry about the high producer prices? Yes, but

Susan Knox, Palesa Mnguni, Pieter Pienaar and

Witness Simbanegavi

Abstract

Over the past two years, both global and domestic producer prices have risen markedly. This has raised concerns that the high producer inflation may eventually be passed onto consumer prices. This note compares producer and consumer price indices and the implications for pass-through of PPI to CPI inflation. We find strong co-movement between final PPI and goods CPI, but somewhat weaker co-movement with headline CPI. This suggests that some pass-through should be expected, particularly for the closely related baskets such as final PPI and goods CPI. However, the material differences between the indices, together with competition considerations, will serve to moderate pass through.

1. Introduction

Price stability is a core pillar for a sound macroeconomic framework and an enabler of economic growth. Central banks, particularly the inflation targeting ones like the South African Reserve Bank (SARB), routinely monitor price developments in the economy to inform monetary policy. Two prominent indicators of price inflation are the consumer price index (CPI) and the producer price index (PPI). Consumer price inflation captures the changes in the cost of living faced by final consumers while producer price inflation captures the “change in the prices of goods either as they leave their place of production or as they enter the production process” (OECD, 2006).¹ These prices have risen sharply globally as economies recover from the COVID-19 induced recession of 2020. For instance, the OECD’s combined PPI inflation rose to 15.5% in December 2021, reaching a multi-decade high (Figure 1).

Consumer price inflation has also risen sharply with the January 2022 inflation recording 7.5% in the US, 5.5% in the UK and 5.1% in the eurozone. For selected emerging markets the average PPI rose to 12.9% in November 2021, surpassing the high reached in 2008 during the global financial crisis (GFC) (Figure 2). In South Africa intermediate PPI inflation soared to 23.1% in December 2021, before moderating to 21% in January 2022. Final PPI inflation rose to 10.8% in December, its highest level in over a decade, before slowing marginally to 10.1% in January 2022.² CPI inflation has risen sharply since the second half of 2021,

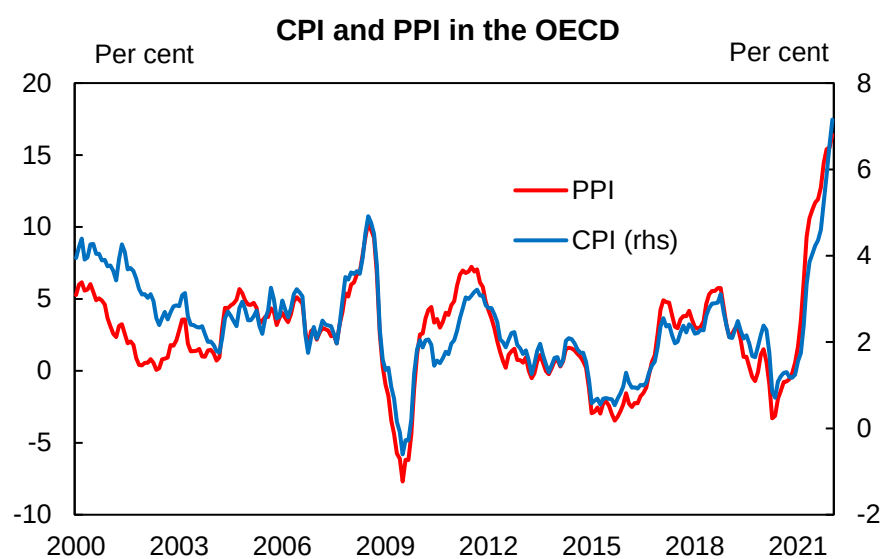
¹ Methodological Guide for Developing Producer Price Indices for Services 2006. OECD

² Intermediate PPI inflation measures the rate of change in input prices at the intermediate production stage. This is distinct from the final PPI inflation which captures the change in the prices of products sold as output by producers.

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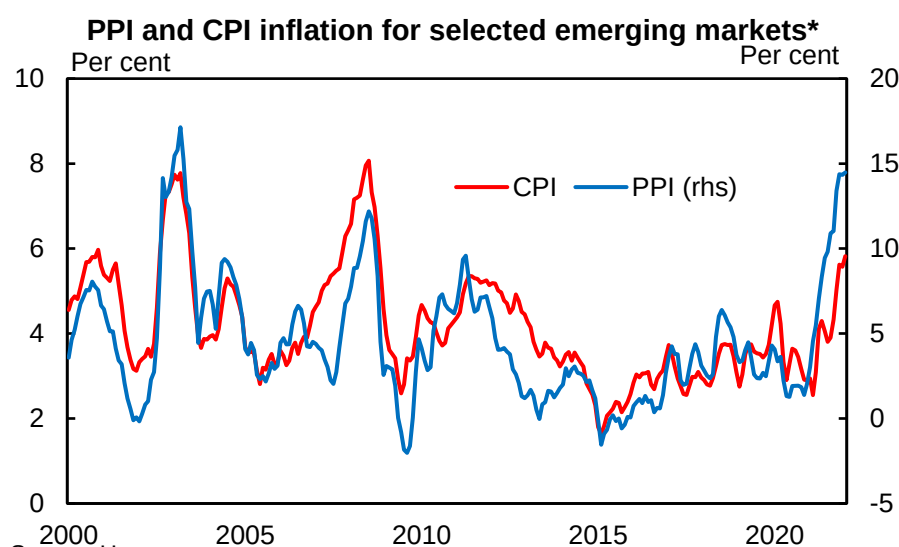
reaching 5.9% in December 2021, the highest level since March 2017, before moderating slightly to 5.7% in January 2022.

Figure 1



Source:OECD

Figure 2³



Source: Haver

*EMs: South Africa, China, Hungary, Poland, Thailand, Uruguay

The marked acceleration in PPI inflation is to some extent a result of the low base created in 2020 but there are also fundamental drivers. Various inputs, particularly commodities, have experienced sharp price increases since the onset of the pandemic, reflecting large shifts in demand for goods, and supply chain bottlenecks.⁴ For instance, there have been mismatches in demand and supply because of the staggered re-opening of economies and supply chains'

³ The selection of emerging market countries is based on the availability of long time series data for both CPI and PPI indicators for comparator countries.

⁴ In the most recent period, oil and grains prices rose sharply, further adding to producer inflation pressures.

inability to recover quickly enough to meet the surge in demand. The shift in consumer demand towards goods, supported by the generous fiscal stimulus measures in advanced economies has piled additional pressure on supply chains and boosted demand for commodities and other inputs.

This note analyses the relationship between PPI and CPI inflation in South Africa to shed light on the extent to which the elevated producer prices could serve as an indicator for the future trajectory of CPI. This should enable policymakers to better anticipate possible future changes in CPI inflation and thus fine-tune policy.

2. The nexus between producer and consumer price inflation

2.1 PPI vs CPI

Figures 1 and 2 above show a strong co-movement between PPI and CPI inflation. This co-movement raises the prospect of either both indices being driven by the same underlying factors or a causal relationship between them. The question is whether the elevated PPI inflation is a precursor to higher future CPI inflation. Intuitively, rising input prices push production costs up along the entire production chain and should, eventually, pass through to consumer prices.⁵ For this reason, PPI inflation is often referred to as "pipeline inflation" with the implication that it should eventually be reflected in consumer prices.⁶ Indeed, the literature does find some support for the thesis that PPI inflation is a primary contributing factor to CPI inflation.⁷ South African studies have generally found a statistically significant causal relationship running from PPI to CPI.⁸

However, there are fundamental differences between these two inflation measures (section 2.3). Aside from energy prices such as oil, PPI typically measures only domestic prices, including exports. Although PPI does not explicitly measure imports, goods may contain imported components that form part of the production costs. These costs, however, cannot be disentangled in the final PPI. On the other hand, the CPI measures the prices of both domestic and imported consumer goods. In addition, government taxes and subsidies affect consumer prices but not producer prices. Furthermore, most PPI measures exclude services – a large share of the CPI.⁹ Not surprisingly, PPI and CPI can have divergent trends.

⁵ T E Clark, 1995. 'Do producer prices lead consumer prices?', *Economic Review*, Federal Reserve Bank of Kansas City 80(Q III), 1995, pp 25–39.

⁶ Moreno, R. 2010. Some issues in measuring and tracking prices in emerging market economies. BIS Paper No. 49.

⁷ José Sidaoui, Carlos Capistrán, Daniel Chiquiar and Manuel Ramos-Francia (2009). "On the predictive content of the PPI on CPI inflation: the case of Mexico". BIS Papers No 49. See also Jonathan Weinhagen (2002). "An empirical analysis of price transmission by stage of processing". *Monthly Labour Review*.

⁸ See for instance Zerihun Gudeta Alemu (2011). "Causality links between consumer and producer price inflation in South Africa". *Applied Economics Letters*.

⁹ In South Africa services constitute about 51% of the CPI basket.

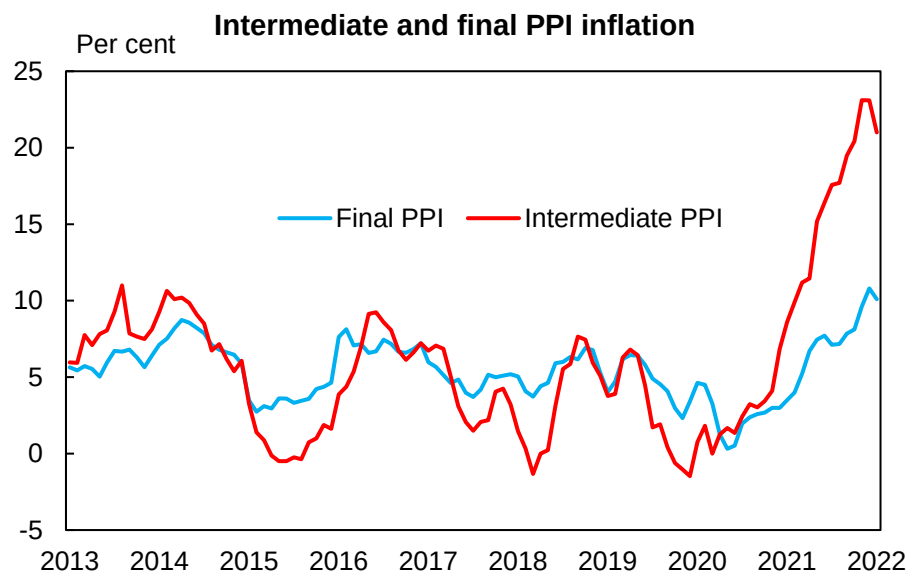
Consequently, pass-through of PPI to CPI inflation is typically much weaker than implied by the production chain view.^{10,11}

2.2 Intermediate and final (headline) PPI

Unlike the CPI inflation which is monolithic (only measured at the point of final consumption), PPI inflation can be measured at the intermediate production stage (intermediate PPI) or at the final goods production stage (final PPI). The final PPI basket is larger and consists of 181 products compared to the intermediate PPI basket which has only 35 commodities.

Figure 3 shows that the intermediate PPI inflation is generally more volatile (presents larger swings) compared to the final PPI inflation, and occasionally enters deflation territory. Since October of 2020, intermediate PPI inflation has accelerated sharply, reaching a high of 23.1% in both November and December of 2021, before moderating slightly to 21% in January 2022. The final PPI has also accelerated over the same period, but not as markedly, causing a widening gap between these two series.

Figure 3



Source: Stats SA

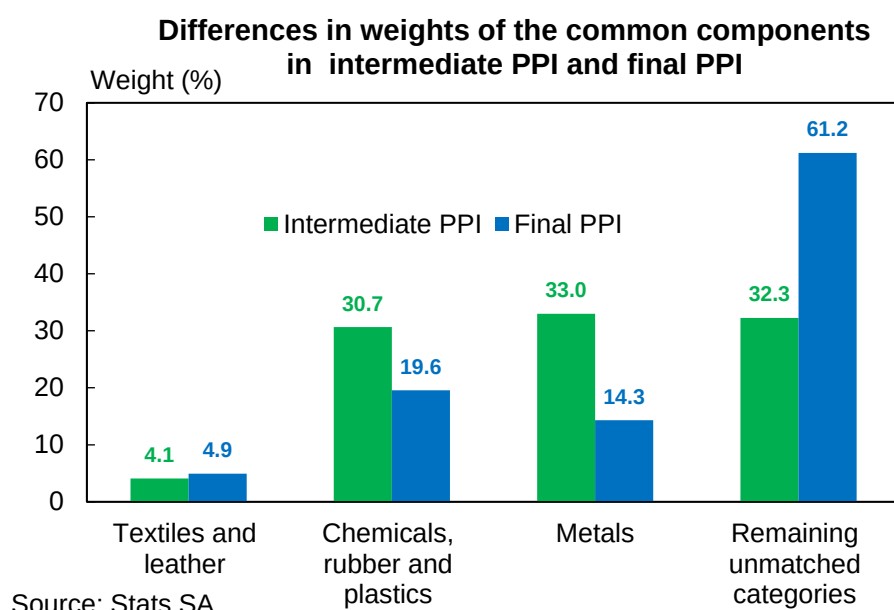
The higher volatility of, and sharper acceleration in, intermediate PPI inflation can in part be explained by the sharp price movements in large weight constituent items, mostly related to commodities. Similarly, the divergence between the intermediate and the final PPI can also be explained by the differences in the weights of the main components as well as the composition of the baskets. Figure 4 crudely matches the common broad categories between the two baskets. The intermediate PPI is comprised of six main sub-components of which

¹⁰ Ü Volkan and E Ugur, 'The relationship between consumer price and producer price indices in Turkey', International Journal of Academic Research in Economics and Management Sciences, 3(1), 2013, pp 205–222.

¹¹ Blomberg and Harris (1995) and Clark (1995) conclude that the producer price index does not have significant predictive power on future consumer price index.

“chemicals, rubber and plastic products” and “basic and fabricated metals” account for around 64% of the basket. The weight of these components in the final PPI is much less, at about 34% of the basket. These differences imply that a given increase in a common component (e.g., metals) will have vastly different impacts on the two price indices.¹² Also, the large unmatched category means there are drivers of final PPI inflation that are potentially unrelated to, or of much less significance in, intermediate PPI inflation, thus rationalising the divergence between these two series.

Figure 4



The intermediate PPI closely correlates with global commodity prices (Figure 5)¹³. A similar picture emerges when one considers the main components of the intermediate PPI and the global industrial materials index (Figure 8). Commodity prices rose sharply since mid-2020 in response to the supply and demand dynamics created by the pandemic-induced lockdowns as well as fiscal support in the major advanced countries. On the supply side, logistics constraints and the resultant decline in inventories exacerbated input shortages, driving commodity prices higher. On the demand side, the sharp and skewed recovery in the demand for goods alongside a depreciated dollar also fuelled commodity markets. South Africa, as a commodity exporter, has benefitted from the robust commodity prices and terms of trade. However, the markedly higher global commodity prices have also been associated with sharply rising production costs in the domestic economy (Figure 6).

¹² The “basic and fabricated metals and chemicals components” have been largely responsible for the sharp rise in intermediate PPI inflation but their weights in final PPI (which are shown by the blue bars in Figure 6) are not as large, meaning that the contribution to final PPI inflation is more muted.

¹³ All IMF commodity indices are dollar-based.

Figure 5

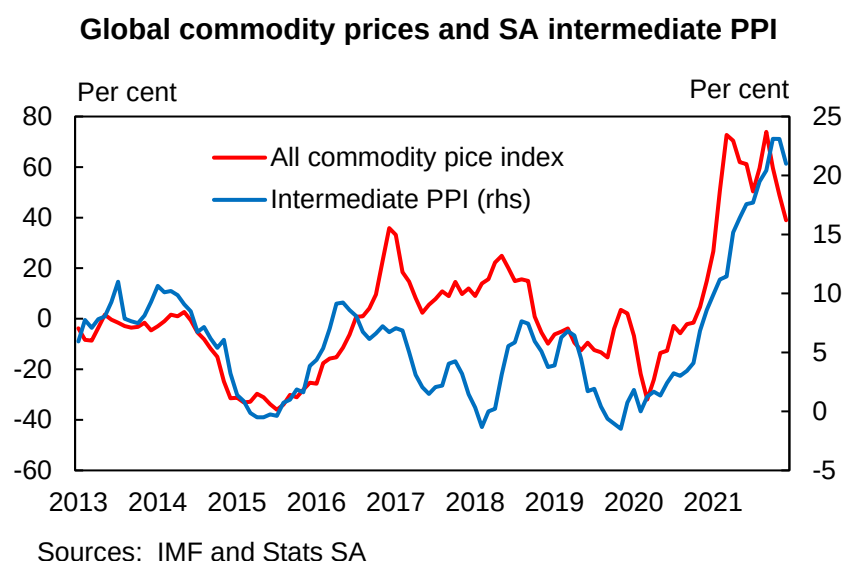
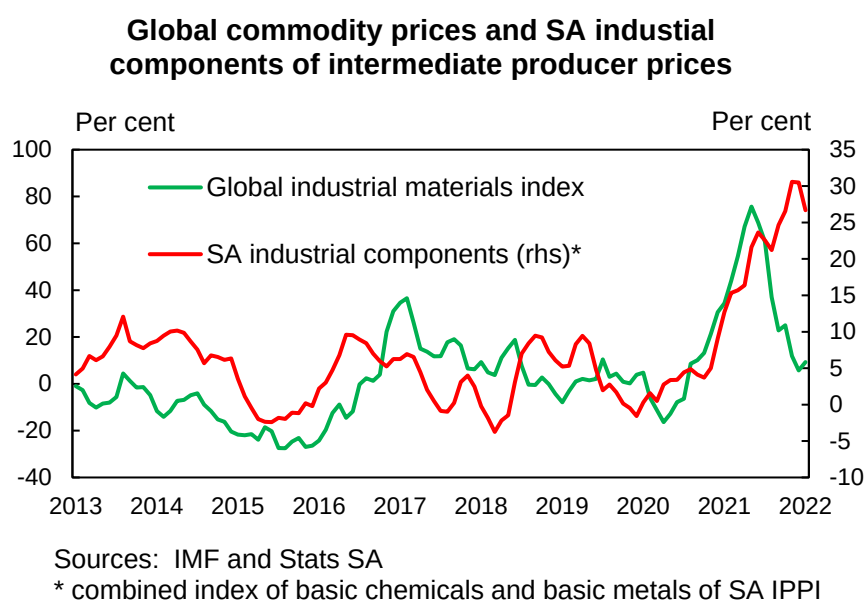


Figure 6

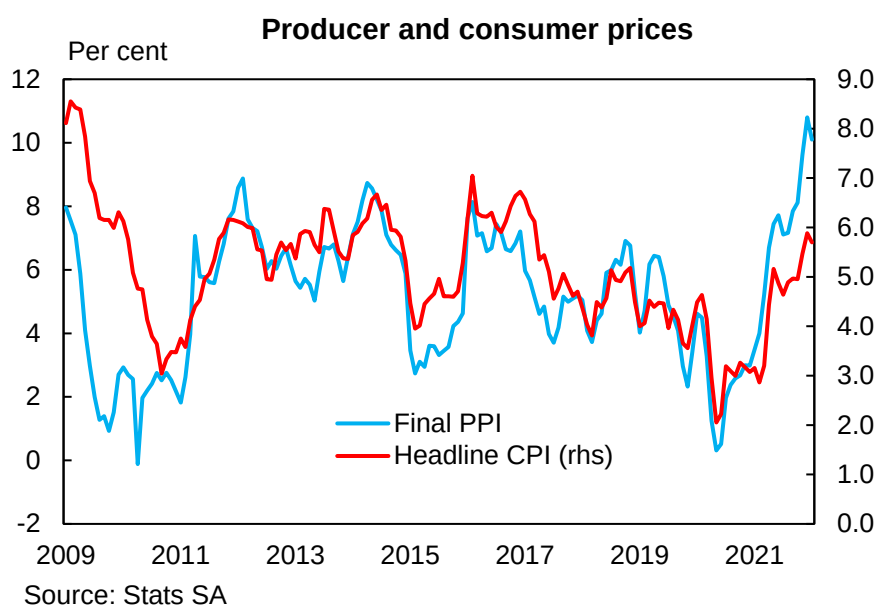


2.3 PPI and CPI

How well does final PPI co-move with headline CPI in South Africa? As discussed earlier, a stronger co-movement suggests that either the two series are driven by similar fundamentals or that one drives the other or both. Below we restrict ourselves to a qualitative analysis, leaving the assessment of causality to future work. Figure 7 shows that headline CPI and PPI are generally positively correlated, with stronger co-movement in some periods (e.g., between

2015 and 2018) than others (e.g., 2012-2014).¹⁴ The fact that final PPI and headline CPI do not consistently strongly co-move is not particularly surprising. Differences in the baskets and the weights of the various components of the baskets imply differentiated impacts from movements in the prices of any one component. Fundamentally, the construction of the indices is dissimilar.¹⁵ CPI includes a services component which makes up 51.3% of that basket while PPI does not have a services component.

Figure 7

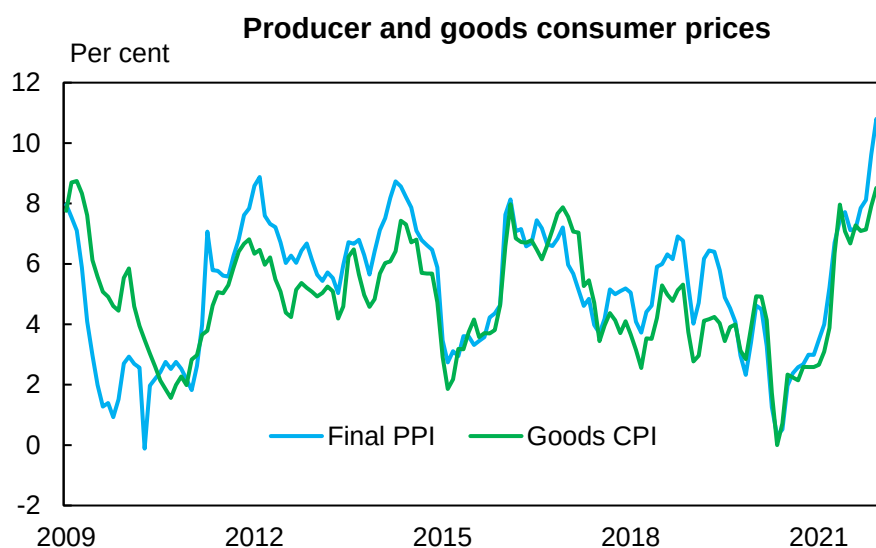


Given that PPI excludes services, it may be more instructive to compare final PPI to goods CPI rather than headline CPI. Differences, however, remain with respect to taxes and subsidies and the inclusion of imports in goods CPI as well as the inclusion of exports in PPI. Figure 8 shows that there is a stronger co-movement between these two series compared to headline CPI. Also, the correlation appears to have strengthened since 2020. Given the standard finding in the literature that PPI has predictive power over future CPI, we should expect the current strong increases in final PPI inflation to be followed by higher goods CPI inflation, but with incomplete pass through.

¹⁴ This contrasts sharply with Figure 1 for OECD indices.

¹⁵ RMB Markets Research. 10 May 2021. "Explaining the divergence between PPI and CPI". SA Macro Data Review and Preview.

Figure 8



Source: Stats SA

Differences in the weights of the coinciding constituent components partly explain the imperfect correlation between final PPI and goods CPI (Figure 9). The weight of final PPI is based on the value-add of products in the national accounts, while the weights of CPI are based on household consumption expenditures. For example, motor vehicles account for 12.6% in goods CPI but only 3.7% in final PPI, reflecting the large share of imported vehicles in goods CPI. Similarly, food accounts for 31.8% in goods CPI compared to 27.9% in final PPI. Resultantly, changes in the food component will be more pronounced in the goods CPI compared to the final PPI.¹⁶

¹⁶ Additionally, the price of the items in CPI basket includes VAT and excise taxes which means that changes in these will cause changes in the CPI with no corresponding movement in PPI. PPI reflects the actual revenue collected by a producer.

Figure 9

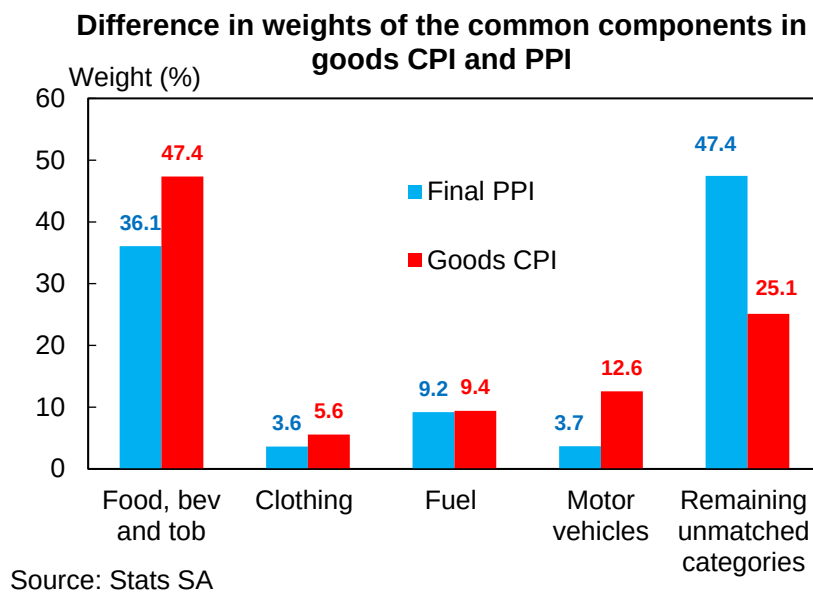
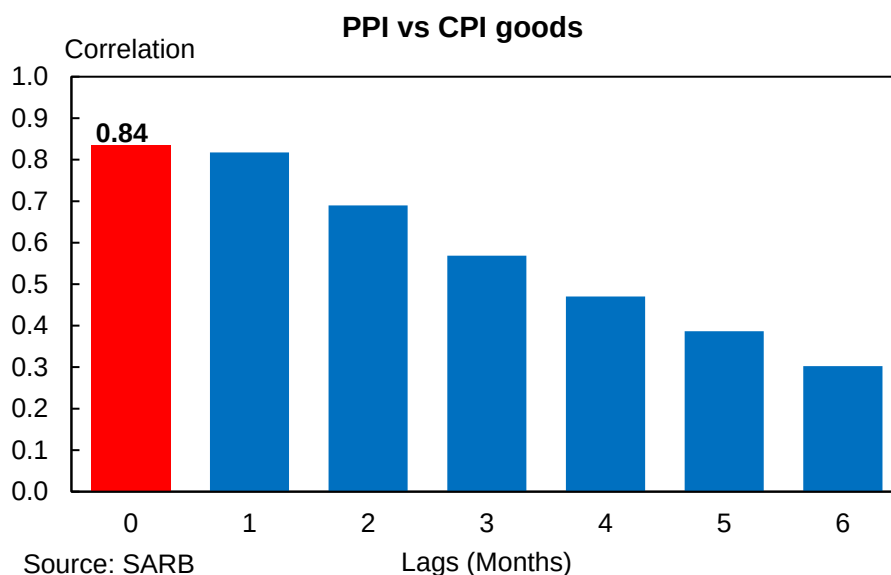


Figure 10 shows the results of running correlations tests between the goods CPI and final PPI. The relationship between these measures appears to be largely contemporaneous with the strongest correlation being 84%, at the t_0 period. This suggests that both final PPI and goods CPI are being driven by common factors such as oil, rather than final PPI driving goods CPI or vice-versa. However, the correlation is also strong at lags of 1 and 2 months, where final PPI is leading goods CPI.

Figure 10



The high correlation co-efficient between final PPI and goods CPI is largely the result of the common items with large weights i.e., food, beverages and tobacco as well as petrol. These categories make up 56.8% of goods CPI and 42.4% of final PPI. Stripping out these goods, however, does not materially alter the relationship between the two series, barring the period of mid-2017 to mid-2019 (Figure 11). The co-movement over the sample is weaker with the correlation coefficient being only 52%. Again, the relationship is largely contemporaneous (Figure 12).

Figure 11

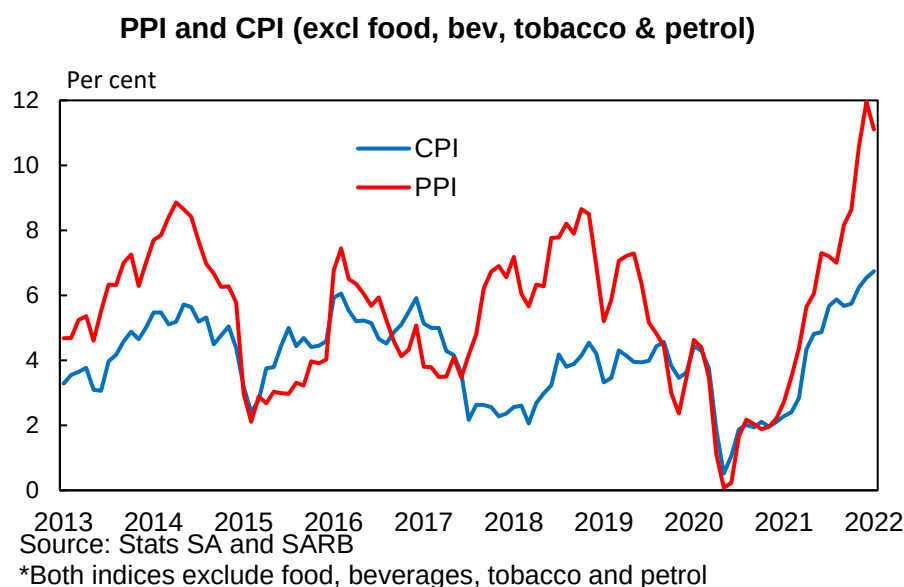
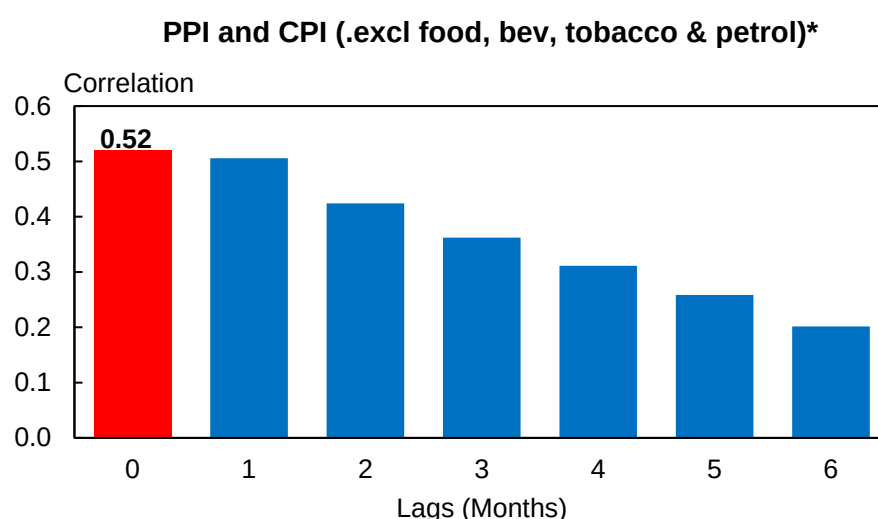


Figure 12



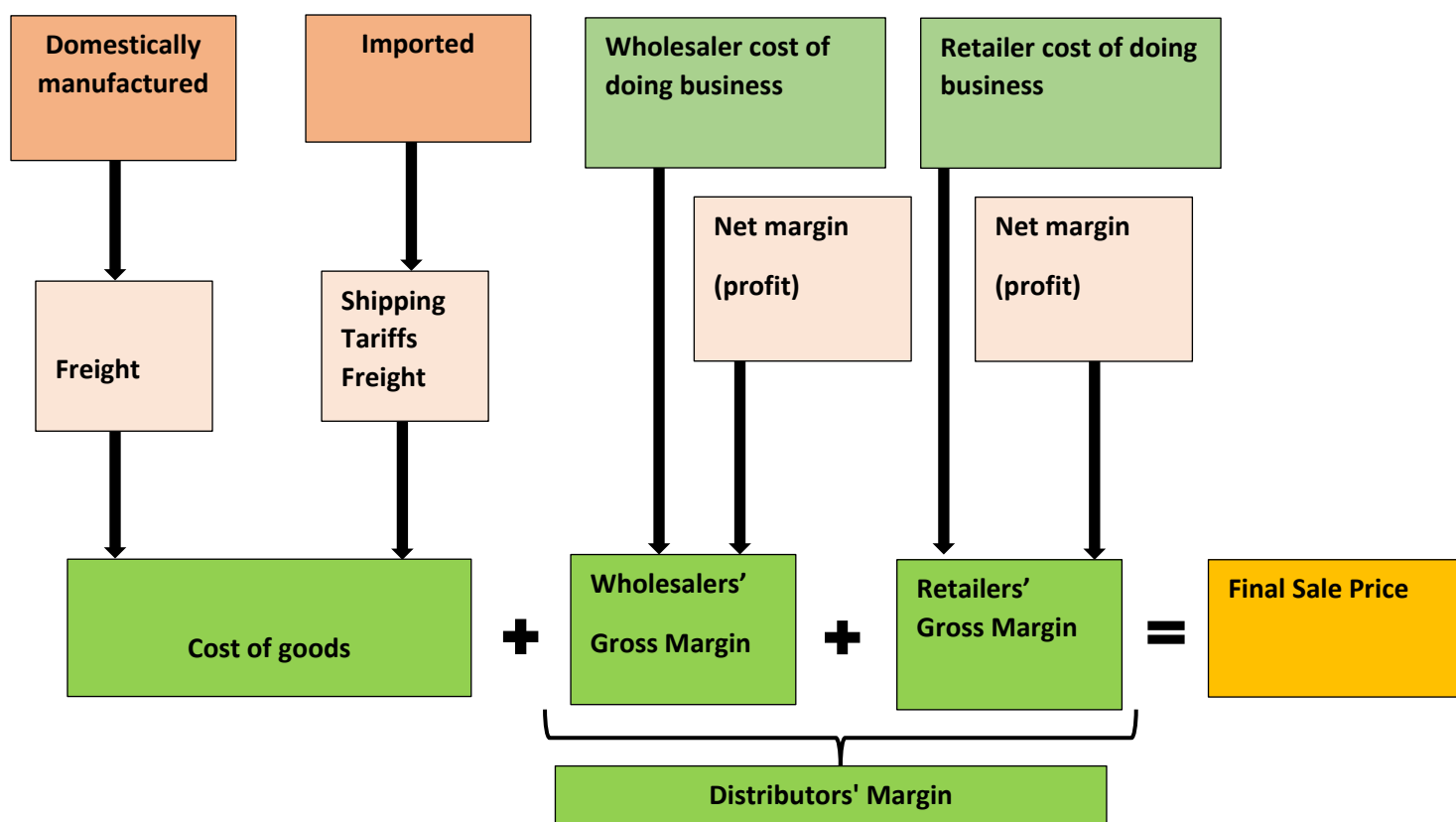
Source: SARB

*Both indices exclude Food, beverages, tobacco and petrol

3. Margin-squeeze as response to rising producer prices?

While the differences in the construction of the indices are important factors in explaining the incomplete pass-through from PPI to CPI observed in the literature, another key factor is the degree of competition in the economy or sector. Firms facing stronger competition may choose to absorb rising costs rather than passing the higher costs on to consumers and potentially losing market share.¹⁷ Figure 13 below represents a stylised process of how goods move from producers to retailers. The various costs impacting the different stages of this process, and the degree to which these costs can be absorbed at each stage or passed on to the next level, contribute to the divergence of producer and retail prices.

Figure 13: The Supply Chain for Retail Goods



Source: Reserve Bank of Australia

Survey data give some insights on gauging the pervasiveness with which manufacturers and retailers are experiencing higher input costs and whether they are passing these costs to consumers or absorbing them. Normalising the survey price measures along with headline

¹⁷ The competition effect (and cost absorption) is enhanced by operational efficiencies that allow firms to maintain lower mark-ups. While some local companies (e.g., in packaging industry, mining etc) have been able to benefit from surging prices of goods, downstream companies (e.g., food companies) have faced rising input costs. Morgan Stanley finds that these companies were able to absorb these costs because of cost-saving in other areas such as rent and perhaps modest wage growth.

inflation shows a close correlation between survey measures and hard data (Figure 14). Figure 15 shows that a net majority of 81% of respondents in the manufacturing sector reported that production costs quickened in 2021Q4 compared to a year ago (largely because of higher prices for raw materials). However, only 55% of respondents have reported to have increased selling prices. Interestingly, more manufacturing firms have been able or willing to pass some costs through to consumers during the pandemic period compared to 2019. This may reflect stronger demand during the recovery from the 2020 GDP contraction. It may also be that margin compression has reached a critical level given the long period of weak demand and thus cost absorption, leaving firms with no option but to pass some costs onto consumers. A similar trend is evident at both the wholesaler and retailer levels (Figures 16 and 17).

Figure 14

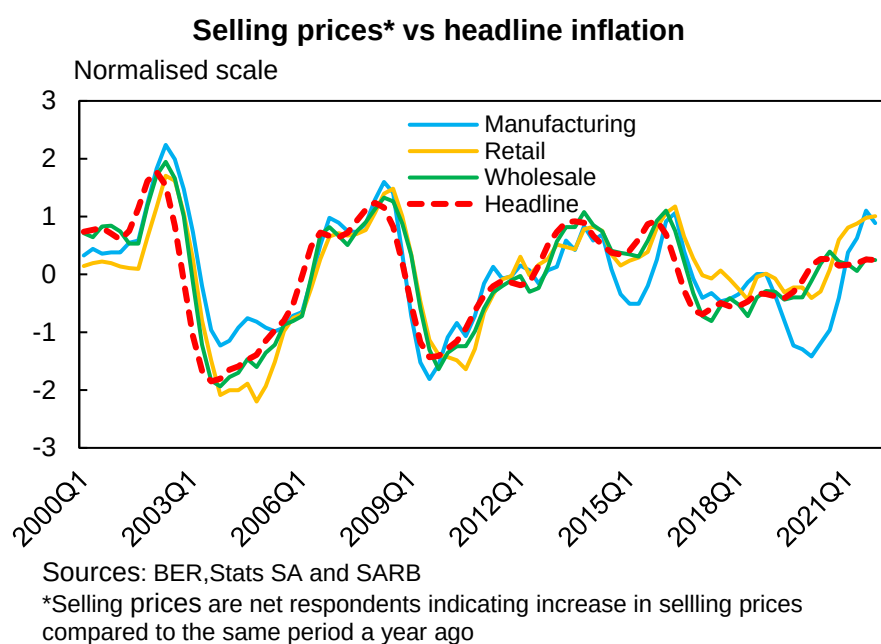


Figure 15

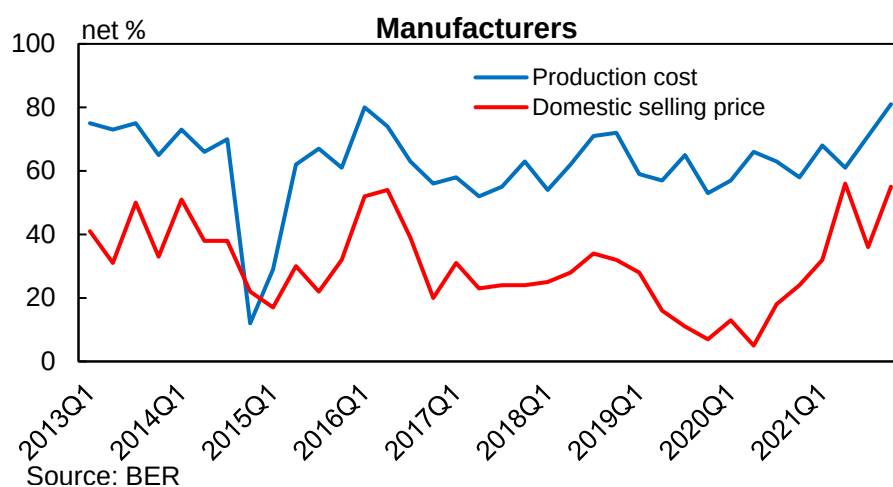


Figure 16

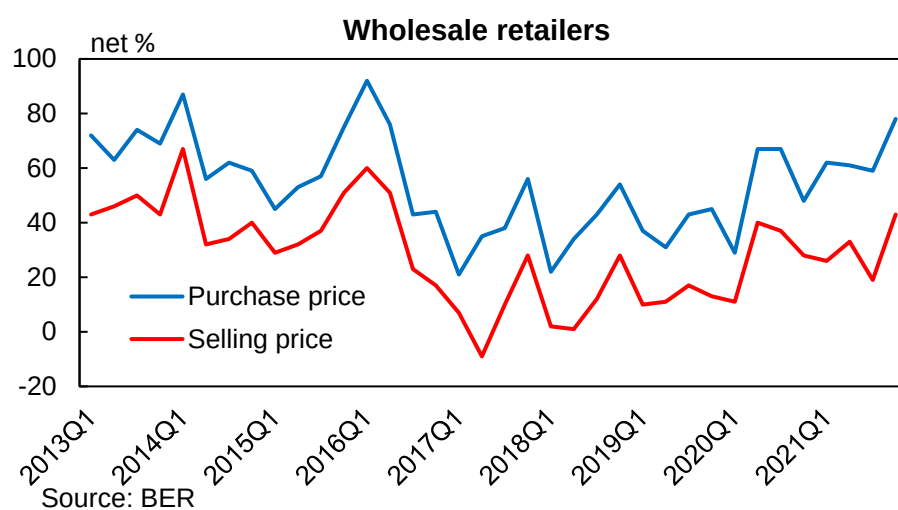
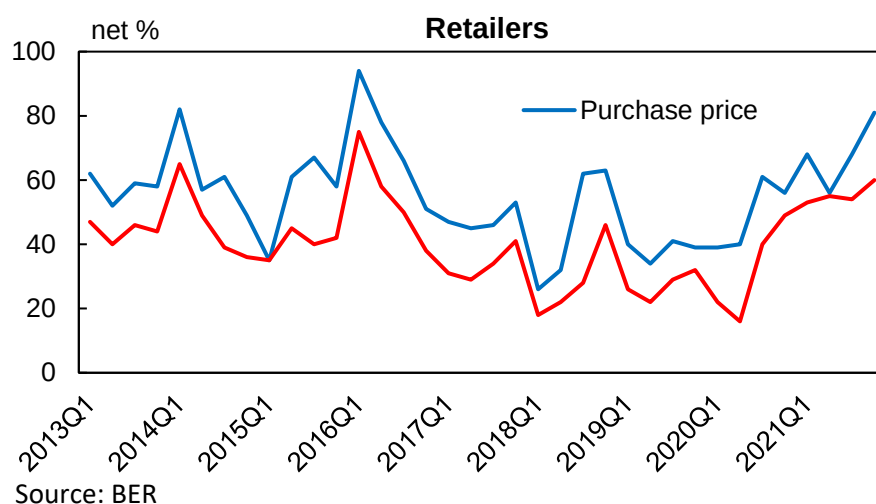


Figure 17



4. Conclusion

The sharp rise in PPI inflation over the past two years is causing some concern regarding the likelihood and extent of pass-through to consumer prices. The literature on the pass-through of PPI inflation to CPI inflation, and our qualitative analysis of the relationship between the two inflation measures, support the view that some pass-through should be expected, particularly when considering closely related baskets such as final PPI and goods CPI. However, the pass-through is intermediated by factors such as the degree of competition in consumer goods markets, the strength of consumer demand and the fundamental differences between the final PPI and the targeted headline CPI baskets. An additional concern, however, is the possibility that some sectors may have reached the limits to margin compression and may need to push through costs to the final consumer even if this comes at the expense of sales volumes.

Future research will quantitatively explore the relationship between PPI and CPI in South Africa. This should help shed further light on the degree of pass-through of producer prices to consumer prices, allowing for more precise conclusions.