Commodity Exports and the New Zealand Dollar: Looking Beyond Commodity Prices

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Abstract

Revenue from commodity exports is driven by prices as well as volumes of commodity exports. However, associations of commodity currencies with the latter have been largely ignored; furthermore, previous analyses have focused predominantly on aggregated commodity indices, which mask the linkages between currency exchange rates and individual commodities. To address this gap, we examine the short- and long-run associations of the New Zealand dollar (NZD), a commodity currency, with export volumes of important commodities: dairy and casein products (DC); meat, wool, and by-products (MWB); and forestry products (FT). Trend-cycle decomposition reveals that, in the long run, the appreciation of the NZD is associated with rising commodity export volumes. Nevertheless, in the short run, the exports of DC and FT are negatively correlated with the NZD.

Keywords: Commodity Exports, Commodity Prices, Commodity Currencies, Common Trends and Cycles, New Zealand.

JEL Classifications: C32, F14, F31, F42

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1. Introduction

The sensitivity of the exchange rates of commodity currencies to fluctuations in world commodity prices is well-documented in the literature (Chen and Rogoff, 2003; Cashin, Céspedes, and Sahay, 2004; Lee and Chen, 2014; Powers, 2015). During commodity booms, commodity currencies appreciate, whereas commodity busts engender currency depreciation; different mechanisms, namely, the income effect, the Balassa-Samuelson effect, and adjustments in the terms-of-trade, have been used to illuminate the link between commodity prices and currency exchange rates. The role of export volumes is crucial too: the increase in demand for commodity exports, even in an environment of relatively stable, falling commodity prices can increase export revenues, which in turn may cause commodity currencies to appreciate.

The associations between commodity prices and currency exchange rates have been explored in depth in previous studies (Chen and Rogoff, 2003; Cashin, Céspedes, and Sahay, 2004; Bodart, Candelon, and Carpantier, 2012; West and Wong, 2014; Wadsworth and Richardson, 2017; Pedersen, 2018; Belasen and Demirer, 2019), whereas comovement between commodity export volumes and currency exchange rates (Bonato, Comber, and McDermott, 1999; Smith, 2004) has been largely ignored. Accordingly, to bridge this gap, we investigate the short- and long-run associations of the real exchange rate (RER) of the New Zealand dollar (NZD) with export volumes of New Zealand's major commodities.

There are three important reasons to study the NZD. First, the NZD is a commodity currency. New Zealand's export sector is dominated by primary products, the sale of which generates a significant proportion of the revenue earned from the export of all merchandise goods. Second, only three commodity categories—dairy and casein (DC), meat, wool, and by-products (MWB), and forestry (FT)—account for a significant proportion of the primary exports of New Zealand. Jointly, these industries generated 57% of the total revenue from exporting merchandise goods in 2018 (see Table I). Furthermore, the importance of these three commodities to the export sector is rising: this is evident in these industries' growing share of export revenue, which grew from 54% (during 2009–2013) to 57% (during 2014–2018). Thus, by focusing on the three key industries, we hope to provide important insights into the dynamics of the NZD and commodity markets.

Table 1. Revenue from Exports of Key Commodities of New Zealand in 2018

	DC	MWB	FT	Total Exports
Revenue	14,980,705	8,888,361	6,402,556	53,062,468
Share of Exports	28%	17%	12%	100%

Source: Statistics New Zealand; Table Reference: OTV002AA; June 2002 Quarter Base (=1000); $, Magnitude = Thousands.

The third reason is closely tied to the second: considering the relative stability of DC and FT export prices on the one hand and the notable growth in their export volumes on the other, we can explore whether the commodity sector, even in an environment of stable prices, may exert significant

influence over the RER of the NZD via export volumes. For instance, in the March 2019 quarter, due to a 19% increase in export volume, dairy revenue increased by 9.5% despite a 7.5% reduction in dairy prices (Statistics New Zealand, 2019). More generally, since 1990, while the prices of DC and FT have risen only modestly, their export volumes have registered considerable growth. On the other hand, the growth in the price of MWB has been marginally steeper than that in its export volume. According to UNCTAD (2013), higher volumes rather than prices have been the driving force behind higher dairy export values between 1992 and 2012.

Depending upon the industry, 70% to 95% of New Zealand's primary output is exported (NZ Foreign Affairs and Trade, 2019). Thus, the country's primary sector is heavily exposed to international markets, and changes in foreign demand for New Zealand's exports may significantly influence the exchange rate of the NZD. Additionally, the profitability of firms and farms in the commodity sector is impacted by the demand for commodity exports, not just their prices. Kamber, McDonald, and Price (2013) point out that both price and real effects should be considered to examine the impact of shocks on farmers' incomes. Specifically, if the demand for exports is inelastic (Smith, 2004), producers—expecting a steady demand for their products—would feel confident in scaling-up production to increase revenues and profits, even in an environment of volatile prices (Pindyck, 2004; Kamber, Nodari, and Wong, 2016). This underscores the importance of understanding trends in export volumes and their associations with exchange rate movements. A singular focus on commodity prices may lead to incorrect conclusions.

Furthermore, we analyse disaggregated, commodity-specific data to provide industry-specific insights instead of an aggregated view of commodity exports. Thus, we depart from several studies that have commodity indices, which may mask the behaviour of the underlying commodities (Chen and Rogoff, 2003; Cashin, Céspedes, and Sahay, 2004; Coudert, Couharde, and Mignon, 2015). Besides, indiscriminately choosing commodities, some of which may be irrelevant to the countries in question, may provide misleading information about the linkages between commodity markets and RERs (Bodart, Candelon, and Carpantier, 2012). The benefits of using disaggregated industry-level data have been shown in previous studies of currency exchange rates and trade balances of various countries (see Bahmani-Oskooee, Iqbal and Nosheen, 2016; Bahmani-Oskooee, Xu, and Saha, 2017), and commodity prices and currency exchange rates (see Smith, 2004; Wadsworth and Richardson, 2017; Pedersen, 2018; Belasen and Demirer, 2019).

The results of this study have important implications for policymakers and business stakeholders in non-commodity sectors. Granted that the commodity sector employs only 7% of New Zealand's workforce; however, it plays a pivotal role in the export-led growth strategy of New Zealand. On the other hand, the manufacturing and services sectors employ more than 85% of New Zealand's workforce, and the exports of these sectors are especially sensitive to exchange rate fluctuations (Smith, 2004). Thus, an appreciation of the NZD caused by rising exports of commodities may

depress the exports of the manufacturing and services sectors, adversely affect import-competing firms, and destabilise the labour markets.

Considering that RER dynamics are factored in the assessment of monetary policy decisions by the Reserve Bank of New Zealand (RBNZ), the exchange rate sensitivity of exports of non-commodity sectors, and the significance of the commodity sector to New Zealand's overall economy, it is vital to understand the interlinkages amongst commodity exports and the RER. We are not discounting the importance of commodity prices to currency RER dynamics. Rather, we are proposing that due consideration be given to the analysis of commodity exports as well to develop a more comprehensive view of the currency-commodity nexus. Although this analysis is specific to New Zealand, the results and rationale may be extended and applied to study the exchange rate movements of several commodity-exporting countries.

The remainder of this paper is structured as follows. Section 2 discusses the data analysed in this study. The empirical method is described in Section 3. In Section 4, we test for common cycles amongst the RER of the NZD and commodity exports and decompose these series into their trend and cyclical components. Section 5 concludes the paper.

2. Data

We use seasonally adjusted quarterly data from Q2 1990 to Q3 2018 on export volume indices of the three commodity categories: DC, MWB, and FT. The volume and price data are sourced from the Overseas Trade Indexes tables available on the Statistics New Zealand Infoshare website. The June 2002 quarter is selected as the index base. The RER of the NZD is represented by the real trade-weighted index (RTWI), which is an estimate of the value of the NZD relative to the currencies of 17 of New Zealand's most significant trading partners. The monthly data series on the RTWI is obtained from RBNZ, Reuters, NZFMA (RBNZ, 2019). The data are transformed into a quarterly frequency by calculating simple averages of the monthly data for each of the quarters during the entire sample period.

Commodity price and the exchange rate series are plotted in Figure 1[1]. Some interesting patterns emerge from the data: although there is a general upward trend in commodity prices and the RER of the NZD during the entire sample period, they are characterized by unmistakable cycles of different lengths and amplitudes; more importantly, these cycles appear to be negatively correlated, especially between 1990 and 2008. The negative correlation is exemplified by the commodity price and RER dynamics during 2001. Since 2016, the RER of the NZD has declined whereas commodity prices have risen. Unsurprisingly, the correlations amongst the growth rates of commodity prices and the RER of the NZD are negative; specifically, the correlations of the price indices of DC, MWB, and FT with the RER of the NZD are -0.36, -0.58, and -0.46, respectively. The negative association

1 PDC, PMWB, and PFT denote the log-transformed price indices of DC, MWB, and FT products, respectively.

between the RER of the NZD and commodity prices was also noted by Kamber, McDonald, and Price (2013). This calls into question the assertion that rising commodity prices have driven the steady appreciation of the NZD during the last three decades.

On the other hand, Figure 2 shows that the commodity export volumes exhibit secular upward trends[2]. They also appear to co-move with the RER of the NZD in the long run. Despite such patterns and linkages, the overwhelming majority of the studies on the currency-commodity nexus continue to be focused on prices (Munro, 2004; Bodart, Candelon, and Carpantier, 2012; Wadsworth and Richardson, 2017), not on volumes.

The demand for the NZD may increase due to a rise in commodity prices, a rise in commodity exports, or both. Consider two scenarios, one in which prices remain stable, but demand rises, and another in which prices rise, but demand remains stable. Both scenarios would increase the demand for the NZD and exert upward pressure on its exchange rate. In the case of New Zealand, the former scenario is a more accurate representation of commodity market dynamics during recent years.

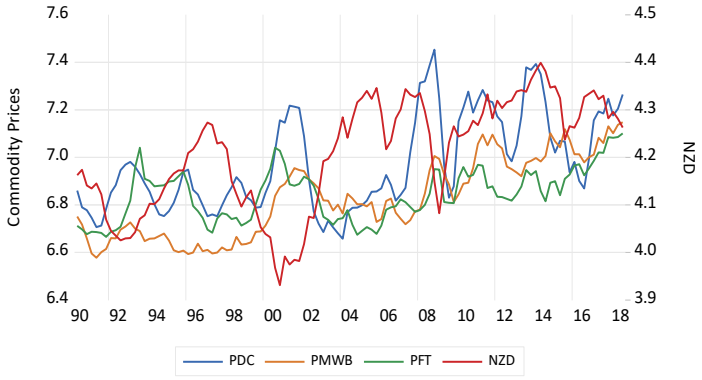

Figure 1. Commodity Prices and the NZD

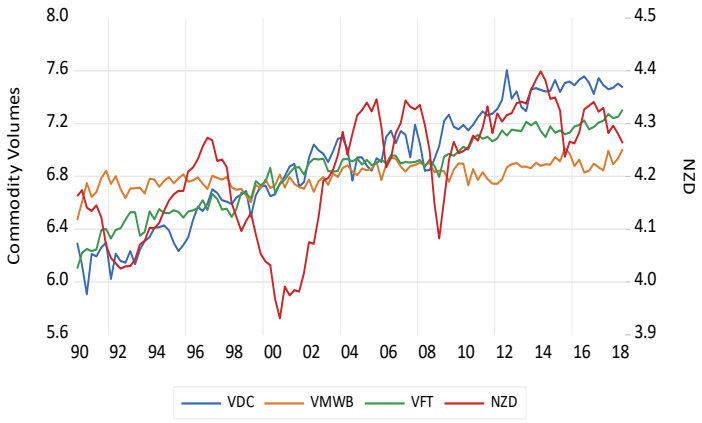

Figure 2. Commodity Export Volume and the NZD

2 VDC, VMWB, and VFT denote the log-transformed volume indices of DC, MWB, and FT products, respectively.

3. Method

Cointegration amongst a set $I(1)$ time series—that is those integrated of order 1—is indicative of long-run comovement amongst them. However, they may deviate from one another periodically. These deviations, which are pertinent to the short run, are called cycles. Thus, $I(1)$ series may comprise trends and cycles. The presence of a cycle in the first difference form of an $I(1)$ series implies the presence of certain features (Serletis and Rangel-Ruiz, 2004). The presence of common cycles amongst the first difference forms of multiple $I(1)$ series implies the presence of common features amongst them. Thus, a test for common cycles is essentially a test for common features amongst the series in question. While common trends, implied by cointegration, are appropriate for studying long-run comovement, common cycles provide insights into short-run comovement. Considering that many business and policy decisions are made with the short-to-medium run in perspective, understanding common cycles would be of interest to industry stakeholders and policymakers.

Vahid and Engle (1993) proposed a test for determining the number of common cycles given the presence of r cointegrating vectors amongst n series. According to Vahid and Engle (1993), the number of common cycles can be determined by testing for the significance of the canonical correlations amongst $\Delta x_t \; and \; (\beta' x_{t-1}, \Delta x_{t-1}, \Delta x_{t-2}, \dots, \Delta x_{t-m+1})$ where m is the chosen lag length of the vector autoregression (VAR) model. They demonstrated that "with r linearly independent cointegrating vectors, if x_t has common cycles, there can, at most, exist $(n-r)$ linearly independent cofeature vectors that eliminate common cycles" (Vahid and Engle 1993, pp. 345, Theorem 1). In other words, if there exist $r < n$ linearly independent cointegrating vectors, there can exist at most $s = (n-r)$ linearly independent cofeature vectors and $(n-s)$ common cycles. The range of the $(n \times s)$ matrix $\tilde{\beta}$ is referred to as the cofeature space. Also, there exists linear independence amongst the r cointegrating vectors and the s cofeature vectors.

The serial correlation common features and the common-trend and common-cycle frameworks lend themselves particularly well to the analysis comovement amongst different macroeconomic variables. Thus, it is unsurprising that these frameworks have been used to examine associations between a multitude of economic and financial time series (see Engle and Kozicki, 1993; Vahid and Engle, 1993; Basnet, Sharma, and Vatsa, 2015; Balcilar, Gupta, and Wohar, 2017; Vatsa, 2020; Vatsa and Basnet, 2020).

4. Empirical Evidence

Before discussing the cointegration results, we examine the stationarity properties of the logarithmic transformation of the RER of the NZD, and the three commodity volume indices using various unit root tests. The tests suggest that the series are non-stationary. The results are not reported in the interest of brevity; they are available upon request.

The optimum lag-length of the cointegration model is ascertained using the sequential likelihood ratio (LR) tests on the unrestricted Vector Autoregression (VAR) model consisting of the levels of the four series (Sims, 1980). Accordingly, starting at lag ten and decreasing the number of lags one at a time, the LR statistics are computed and compared to the corresponding 5% critical values. This is repeated until the first null hypothesis is rejected, and the lag-length consistent with the alternative hypothesis is chosen. The process immediately yields a lag length of nine; a VAR of order nine entails a vector error correction (VEC) model of order eight. We consider two specifications of the VEC model under the null and alternative hypotheses:

$$H_0: \Delta x_t = \alpha(\beta' x_{t-1}) + \sum_{i=1}^{p-1} \omega_i \Delta x_{t-i} + \epsilon_t, \quad (1)$$

$$H_A: \Delta x_t = \alpha(\beta' x_{t-1} + \delta_0) + \sum_{i=1}^{p-1} \omega_i \Delta x_{t-i} + \epsilon_t, \quad (2)$$

where $x_t = (nzd_t, vdc_t, vmwb_t, vft_t)'$ is a (4×1) vector, and $nzd_t, vdc_t, vmwb_t, and\ vft_t$ represent the logarithmic transformations of the RER of the NZD, and the commodity export volumes of DC, MWB, and FT, respectively; α is the vector of adjustment coefficients; ω_i represents the $(n \times n)$ coefficient matrices; and ϵ_t is the vector of innovations. We reject the null hypothesis and select the model under the alternative hypothesis: the LR statistic = 4.16 > $\chi^2_{(1)}$ with a critical value of 3.84. Both the λ_{trace} and the λ_{max} statistics indicate the presence of two cointegration relationships amongst the four variables. The results are presented in Table 2.

Table 2. Cointegration Tests

	NZD and Commodity Volumes		
Null Hypothesis	*Eigenvalue*	*Trace*	*Max*
$r = 0$	0.32	89.37*	41.02*
$r \leq 1$	0.25	48.35*	30.58*
$r \leq 2$	0.10	17.78	11.68
$r \leq 3$	0.06	6.10	6.10

$*$ indicates the rejection of the null hypothesis at 5% significance level.

The residuals are serially uncorrelated and normally distributed. From Equation (2), we obtain the following β matrix comprising the two cointegrating vectors; the fifth elements of the two rows represent constants. Normalizing the two vectors with respect to the RER of the NZD yields the following long-run equations:

$$nzd_t = -3.7vdc_t - 1.0vmwb_t + 6.0vft_t - 12.6 \quad (3)$$

$$nzd_t = 0.4vdc_t - 10.2vmwb_t + 0.2vft_t + 62.1 \quad (4)$$

Notwithstanding the presence of cointegration relationships amongst the four variables, it is possible that each of the coefficients may not be significant. Thus, we restrict the β matrix to examine the relationship between the variables in more detail. To this end, we consider the long-run relationship corresponding to the highest, most significant eigenvalue. As such, we test $H_0: \beta_{rk} = 0$, where $k = 1, 2, 3, and\ 4$, and $r = 1$, the cointegrating vector expressed in first row of β matrix.

Table 3. LR Test for Significance of Individual Variables

Null Hypothesis	$\chi^2_{(1)}$
$nzd = 0$	3.3*
$vdc = 0$	10.4**
$vmwb = 0$	1.04
$vft = 0$	10.4**

*(**) denotes significant at 10% (5%).

The results presented in Table 3 show that $vmwb_t$ is insignificant and does not contribute to the long-run relationship between the four variables. Thus, we re-estimate Equation (2) by excluding $vmwb_t$ to examine the short- and long-run associations between the remaining variables. In the interest of consistency, we adhere to the same approach that we have used to estimate the models above. The restricted form of Equation (2) comprising three variables is as follows:

$$\Delta x_t = \alpha(\beta' x_{t-1} + \delta_0) + \sum_{i=1}^{p-1} \omega_i \Delta x_{t-i} + \epsilon_t \quad (5)$$

where $x_t = (nzd_t, vdc_t, vft_t)'$ is a (3×1) vector. Once again, we find evidence of two cointegrating vectors implying the presence of one common trend. The normalized forms of the cointegrating vectors are presented in Equations (6) and (7).

$$nzd_t = -2.8vdc_t + 4.4vft_t - 14.6 \quad (6)$$

$$nzd_t = 1.8vdc_t - 2.9vft_t + 3.5 \quad (7)$$

It is inviting to interpret the coefficients of the cointegration relationships as the sensitivity of the RER of the NZD to various export volume indices; however, this interpretation would be unsuitable. In the presence of two cointegrating vectors, interpreting the coefficients of any one of them would be arbitrary, especially in the absence of a priori restrictions: the cointegrating vectors are not identified (Wickens, 1996). Therefore, we impose a set of zero restrictions within the two cointegrating vectors to identify the impact of individual export volume indices on the RER of the NZD. As such, we restrict the β matrix so that $\beta_{12} = \beta_{23} = 0$. Upon appropriately normalizing each of the equations to show the association between the RER of the NZD and the individual export volumes, we obtain

$$nzd_t = 0.01ft_t - 4.6 \quad (8)$$

and

$$nzd_t = 0.006dc_t - 4.6 \quad (9)$$

The coefficients 0.01 and 0.006 in Equations (8) and (9) can be interpreted as estimates of the long-run elasticity of the RER of the NZD vis-à-vis FT and DC export, respectively. Although the coefficients are positive—which indicates that an increase in export volume is associated with the appreciation of the NZD in the long run—their magnitudes are rather small.

Having established the presence of a common trend (which signifies long-run comovement) amongst commodity exports and the RER of the NZD, we turn our attention to the examination of the common cycles (or short-run comovement) amongst the variables. Following Vahid and Engle's

(1993) method, we ascertain the number of common cycles by testing for the significance of the canonical correlations. To this end, we utilize the following test statistic proposed by Vahid and Engle (1993).

$$C(m,s) = -(T-m-1)\sum_{i=1}^{s} ln(1-\rho_i^2), \quad (10)$$

where T is the number of observations, m is 1 less than the chosen lag length of the unrestricted VAR model, and ρ_i^2 are the squared canonical correlations. $C(m,s)$ has a χ^2 distribution with $s^2 + snm + sr - sn$ degrees of freedom. The test statistic along with the squared canonical correlations are presented in Table 4. The results indicate that one cofeature vector is present amongst the three variables. In other words, there are $n - s = 3 - 1 = 2$ common cycles. Thus, the variables exhibit long-run, as well as short-run comovement.

Table 4. Tests for Common Cycles

Null Hypothesis	ρ_i^2	$C(m,s)$ *d.f*	$C(m,s)$
s>0	0.55	24	30.8
s>1	0.42	50	87.2*
s>2	0.25	78	173.2*

* indicates the rejection of the null hypothesis at 5% significance level

Next, we decompose the trend and cyclical components of the three time series to illuminate their short- and long-run interlinkages. The decomposition framework used below allows us to examine the response of the commodity export volumes and the RER of the NZD to permanent and transitory shocks.

In the short run, variations in RERs are unrelated to commodity prices, even for commodity currencies (Powers, 2015). However, driven by common global factors, the relationship between the two may be stronger in the long run. Similar associations between commodity export volumes and the RER of the NZD may be present. Given that the effects of different factors on currency and commodity markets vary at different time horizons, understanding the short- and long-run associations is important.

4.1. Trend-Cycle Decomposition

Vahid and Engle (1993) noted that, in special cases, when the sum of linearly independent cointegrating vectors and linearly independent cofeature vectors is exactly equal to the number of variables, i.e., $r + s = n$, then the $(n \times n)$ matrix $B = \begin{bmatrix} \tilde{\beta}' \\ \beta' \end{bmatrix}$ is of full rank; thus, B^{-1} exists. Upon partitioning the columns of B^{-1}, i.e., $B^{-1} = \left[\tilde{\beta}^{-} | \beta^{-}\right]$ the trend and cyclical components can be recovered in the following way:

$$x_t = B^{-1}Bx_t = \tilde{\beta}^{-}\tilde{\beta}'x_t + \beta^{-}\beta'x_t = Trend + Cycle. \quad (11)$$

$\beta' x_t$ is serially correlated and I(0). Therefore, $\beta^{-}\beta' x_t$ represents the cyclical component. On the other hand, $\tilde{\beta}' x_t$ is a random walk and does not contain any cycles. Therefore, $\tilde{\beta}^{-}\tilde{\beta}' x_t$ represents the trend component.

In Section 4, we found one common trend and two common cycles amongst the three variables. As a result, the sum of the number of cointegration and cofeature vectors is equal to the number of variables, i.e., $r + s = 2 + 1 = 3$. Therefore, the matrix B (comprising the cointegration and cofeature spaces) has full rank. Next, we invert B, and in accordance with Equation (11), decompose the original series into their trend and cyclical components.

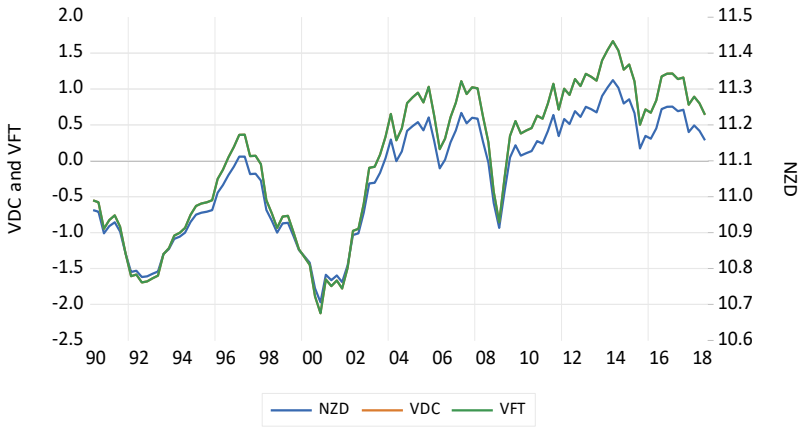

Figure 3. Trend Components of Export Volume and the NZD

The trend components of the three series plotted in Figure 3 exhibit strong positive comovement; given the presence of one common stochastic trend (implied by the rank of the cointegration space), this is unsurprising. Thus, in the long run, the rising commodity exports are accompanied by the appreciation of the NZD—this lends credence to the commodity-currency hypothesis apropos the long run. However, unlike the traditional view, which links the RER of the NZD to commodity prices, our results are based on the link between commodity exports and the RER of the NZD. Indeed, it is plausible that the common trend is a manifestation of a global-activity trend that may drive the rise in the commodity and non-commodity exports alike and cause the NZD to appreciate. However, considering that non-primary exports, which constitute approximately 24% of all exports have remained flat during the last two decades, it is reasonable to regard the NZD as a commodity currency.

The commodity-currency view, while befitting in the long run, may not provide a suitable explanation for the short-run association between the NZD and commodity exports. The short-run dynamics, which are captured by the cyclical components, are illustrated in Figure 4. The figure shows that the RER of the NZD is negatively correlated with DC and FT exports. It is conceivable that the dichotomous results for the short run on the one hand, and the long run on the other, are partially due to the differences in the degree of influence exerted by the capital markets at different time horizons.

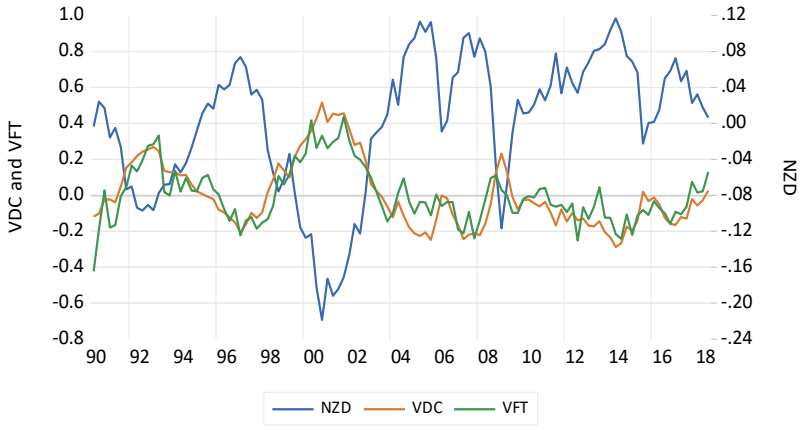

Figure 4. Cyclical Components of Export Volume and the NZD

Following the removal of capital controls and the adoption of a floating exchange rate regime in the mid-1980s, goods trade has comprised only a small proportion of currency market turnover for New Zealand (Munro, 2004). Accordingly, especially in the short run, the financial and capital account transactions hold sway over currency exchange rate movements, and it is the current account that adjusts to exchange rate fluctuations. For example, the appreciation of the NZD stimulates import demand, reduces foreign currency receipts, and increases the current account deficit. Therefore, periods of currency appreciation (depreciation) are associated with rising (falling) current account deficits—a pattern that is routinely observed in the case of New Zealand (Munro, 2004). Our results are consistent with these empirical regularities.

Nevertheless, like the trend components, the cyclical components of commodity exports are strongly and positively correlated with each other—this suggests that DC and FT exports respond similarly to cycle-generating innovations such as droughts that cause a transient decline in agricultural output (Kamber, McDonald, and Price, 2013), as well short-term capital flows prompted by interest rate differentials, changes in risk perception, and news. Also, given that the exports of both commodities are highly concentrated in China, which exposes them to shocks originating in the Chinese economy, positive correlations (in the short and the long run) stand to reason.

5. Conclusion

While export revenues are determined by commodity prices, as well as the volume of commodity exports, the literature on the currency-commodity nexus has mainly focused on the interlinkages amongst commodity prices and currency exchange rates; the relationships amongst the volume of commodity exports and currency exchange rates have received little attention. This has left a gap in the literature and yields an incomplete view of the currency-commodity nexus, especially in circumstances characterized by fluctuating exchange rates, relatively stable commodity prices, and rising export volumes. Moreover, most of the analyses have used aggregated data and indices, which mask the interrelationships between individual commodities and their linkages with currency

exchange rates. In this paper, we bridge this gap by examining the short- and long-run relationships amongst the RER of the NZD, and the export volumes of three significant commodities of New Zealand: DC, MWB, and FT. This is the first paper to test for a strong form of cyclical comovement based on serial correlation common features between exchange rates and commodity export volumes. We find evidence of positive, long-run comovement amongst the export volumes of DC and FT and the RER of the NZD; on the other hand, exports of MWB do not exhibit comovement with the other variables.

To gain deeper insights into the short-and long-run comovement amongst the RER of the NZD and commodity exports, we decompose them into their cyclical and trend components. The decomposition reveals that the long-run trends are strongly and positively correlated: the presence of a single common stochastic trend underscores the strength of their long-run association and suggests that commodity exports and the RER of the NZD respond similarly to permanent shocks. Thus, in the long run, rising export volume is associated with the appreciation of the NZD. This result lends credence to the commodity-currency view apropos the long run.

Regarding the short run, we find evidence of two common cycles. The cyclical components of DC and FT exports are strongly and positively correlated, i.e., they respond similarly to transitory shocks. However, they are negatively correlated with the RER of the NZD. These results are consistent with the asset-price view: due to the preponderance of financial and capital account transactions in aggregate currency turnover, it is the current account that adjusts to changes in the exchange rate. Accordingly, in the short run, appreciation of the NZD is associated with decreasing exports, rising imports, and increasing current account deficits. Hence, while the commodity-currency hypothesis appears to hold in the long run, it does not explain the short-run association between the RER of the NZD and commodity exports.

The ratification of the Comprehensive and Progressive Agreement for the Trans-Pacific Partnership (CPTPP), the EU-New Zealand Free Trade Agreement, rising incomes of Chinese consumers, and improvements in global economic growth are likely to have a positive impact on the exports-driven primary sector of New Zealand. Considering the strong long-run association between exports of key commodities and the value of the NZD, an appreciation of the latter is expected—this has important implications for stakeholders in the commodity sector. Since commodities are priced in USD, appreciation of the NZD would reduce the NZD-denominated prices and revenues for commodity-exporting firms. The appreciation of the NZD would also impact stakeholders in the services and manufacturing industries, especially given the relatively high sensitivity of their exports to exchange rate movements (Smith, 2004); a strong NZD may compromise the competitiveness of these industries in the global markets. Thus, domestic firms would benefit from incorporating information on, and forecasts of, commodity exports in their financial planning processes. Strategies to hedge risk arising from a potential long-run appreciation of the NZD by leveraging forward exchange options may be useful; diversification of business areas may also provide insurance against

the downsides of currency appreciation. Additionally, a strong NZD may contribute to dovish monetary policy in New Zealand. Accordingly, commodity export dynamics may also inform expectations regarding future interest rate movements.

We present a complementary approach for analysing the currency-commodity nexus. Our findings provide novel insights into the linkages between commodity exports (agriculture and forestry) and an important commodity currency (the NZD) in a land-based production economy. While New Zealand is comparatively small in the global marketplace, it has strong associations with commodity markets. Unsurprisingly, the NZD, with its value closely linked to its predominant exports, embodies important qualities of a commodity currency. While our results are specific to the NZD, they are relevant to other commodity-exporting countries that may be susceptible to changes in commodity markets and disruptions in global supply chains due to trade frictions: for example, Australia and Canada. We propose that future research considers a more comprehensive view of the commodity-currency nexus and extends its scope beyond the analysis of commodity prices.

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