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## How does terms-of-trade behavior shape international financial integration in primary-commodity exporting economies?



Almukhtar Saif Al-Abri\*

Department of Economics and Finance Sultan Qaboos University, PO Box 20, Alkod, Muscat 123, Oman

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## ABSTRACT

This paper presents empirical evidence suggesting that the volatility, trend-growth, and shock-duration of terms-of-trade (TOT) are important drivers of the degree and composition of international financial integration (IFI). Our results are based on a panel of 55 primary-commodity exporting countries during 1980–2007. The findings reveal that TOT trend-growth has larger impact on IFI compared to TOT volatility. Also, higher TOT volatility is robustly associated with greater cross-holdings of foreign assets and lower cross-holdings of foreign liabilities. Another notable finding is that longer duration of TOT shocks seems to shift IFI towards equity assets.

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### 1. Introduction

Over the last three decades the developing countries have become more financially globalized<sup>1</sup>. However, the degree and speed of this development is not uniform across the developing countries (Chinn and Ito, 2008; Kose et al., 2009a; Lane and Milesi-Ferretti, 2007). To date, little research has been done to understand the drivers of financial globalization across the developing countries, as research investigating this issue has been largely confined to the developed countries (for example, Furceri et al., 2011; Lane, 2000; Lane and Milesi-Ferretti, 2008)<sup>2</sup>. The diversity of economic structures, institutional environments, and level of country risk between developed and developing countries warrant a new consideration of the determinants of financial globalization.

\* Tel.: +968 24142942; fax: +968 24414043.

E-mail address: [asalabri@squ.edu.om](mailto:asalabri@squ.edu.om) (A. Saif Al-Abri).

<sup>1</sup> The literature uses “financial openness” and “international financial integration” interchangeably with financial globalization. Financial openness usually refers to *de jure* measures of legal restrictions of cross-border capital flows, while international financial integration refers to volume-based *de facto* measures of stocks and flows of cross-border assets and liabilities (Chinn and Ito 2008; Lane and Milesi-Ferretti, 2007; Miniane, 2004; Quinn, 2003).

<sup>2</sup> A related literature considers the determinants of international capital flows. Broto et al. (2011) has also examined the determinants of volatility of capital flows in emerging markets. Terms-of-trade volatility has also been found to affect changes in capital flows. Blattman et al. (2007) find a negative effect of terms-of-trade volatility on capital inflow during 1870–1940 for a large sample of developed and developing countries. Calvo et al. (2004) find that negative terms-of-trade shocks increase the likelihood of a sudden stop in capital inflows and financial crises.

A common feature of most developing countries is the dominance of a few primary commodities in their exports. The empirical literature suggests that developing countries are fundamentally more exposed to TOT fluctuations (Cashin et al., 2004a; Hausmann et al., 2006). Adverse shocks to a country's TOT not only disrupt the economy's growth, but may also introduce some level of instability. For example, Mendoza (1995) and Kose (2002) find that TOT shocks account for at least half of the output volatility in developing countries. Although TOT volatility is a key determinant of macroeconomic performance in a majority of the developing countries, the empirical evidence suggests that there are wide differences across these countries in terms of TOT volatility, trend, and shock persistence. For example, Cashin et al. (2004b) find the TOT shock persistence to vary widely across 42 Sub-Saharan African countries.

In light of this inherent heterogeneity of TOT fluctuations and IFI in developing countries, it is important for trade and financial policy development to investigate the role of TOT fluctuations in shaping IFI. The anticipation is that the findings of such a study would provide more meaningful and robust understanding of the response of cross-holdings of foreign assets and liabilities to TOT fluctuations. This would help the developing countries determine the sustainability and likelihood of future trends in IFI. In particular, the findings of this paper can be used as guidelines in designing more effective capital controls and other domestic policies in order to enhance the stability of their international investment positions and attract more productive financing.

Although the dynamics of TOT are often the centerpiece in open economy models of international adjustment, theoretical models do not provide a clear guide to the effects of TOT volatility on IFI. We draw two hypotheses from the different strands of the literature. One hypothesis suggests that, to smooth domestic consumption and investment, countries with more volatile environments seek more financial integration with the rest of the world. In this case, greater fluctuations in TOT increase the level of international risk-sharing and IFI (Svensson, 1988; Obstfeld and Rogoff, 1996; Lane, 2001). On the contrary, international portfolio models suggest that higher volatility in TOT could result in fluctuations in real returns to foreign investment, which might deter foreign investors and, thus, lead to lower IFI (Devereux and Sutherland, 2009). Also, the classic risk-sharing model of Cole and Obstfeld (1991) suggests that TOT changes can act as an automatic stabilizer when they are negatively correlated to output fluctuations, reducing the motive for international risk-sharing. The empirical literature that attempted to verify the implications of these two hypotheses mostly concentrate on the effects of TOT volatility on capital flows (for example, Blattman et al., 2007; Broto et al., 2011; Eichengreen, 1996; Mendoza and Terrones, 2008). We deviate from this literature by examining the effects of TOT volatility, trend changes, and shock persistence on the size of different forms of cross-holdings of foreign assets and liabilities. As discussed in Kose et al. (2009a), the use of gross stocks is preferable to annual capital flows in measuring international integration, as the latter tend to be more volatile and prone to measurement errors. In addition, the use of gross stocks, compared to net stocks, provides a better measure of integration and efficient risk-sharing as it captures two-way interactions between economies with different risk portfolios.

The paper contributes to the literature by addressing the TOT–IFI nexus in a number of distinct ways. First, the paper focuses on a more homogenous panel and emphasizes the long-run nature of the relationship by taking 5-year non-overlapping windows of the data. Previous empirical studies were based on cross section samples (for example, Lane, 2000). Second, the relationship is analyzed using sub-measures of financial integration, including foreign direct investment (FDI - hereafter), foreign portfolio equity, and foreign debt. The association is also analyzed separately with respect to cross-holdings of foreign assets and foreign liabilities for these sub-measures. These detailed investigations provide deeper insights into the nature and channels of association of TOT movements and IFI. This is important because differences in the composition of foreign assets and liabilities have important effects on real activity (Bosworth and Collins, 1999), on the probability of sudden stops (Calvo, 2007), on banking and currency crises (Furceri et al., 2012), and on the real exchange rate volatility (Al-Abri, 2013).

Third, while previous studies mainly used TOT volatility as their only measure of TOT fluctuations, this paper employs two other measures of TOT fluctuations: trend-growth and shock-duration. The theoretical literature and the international evidence suggest that cross-country average growth rates depend on the mean and the variance of the rate of change of TOT (Blattman et al., 2007; Mendoza, 1997; Turnovsky and Chattopadhyay, 2003)<sup>3</sup>. Since the impact of TOT on cross holdings of foreign assets and liabilities should depend on the effects of the former on national income and savings (Devereux and Sutherland, 2009; Obstfeld and Rogoff, 1996), we include both the trend-growth and volatility of TOT in our empirical model. For the TOT shock-duration, the inter-temporal approach to the current account and the consumption smoothing behavior predict that if TOT shocks are short-lived then it is a sensible strategy to use external financing to smooth consumption. However, if TOT shocks are long-lived then relying on external financing is not sustainable and should eventually lead to long-term changes in consumption and saving (Cashin and McDermott, 2003; Obstfeld, 1982; Ostry and Reinhart, 1992). Thus, these studies suggest that the impact of TOT on IFI depends crucially on the expected duration of the TOT shock. The trend-growth is calculated using the smoothing procedure of Hodrick–Prescott (HP) filters. The shock-duration is measured using the “half-life” of shocks, as proposed by Andrews (1993). To our knowledge, no previous study has analyzed the impact of TOT trend changes and shock persistence on IFI or its sub-components. Fourth, the paper analyzes the possibility of non-linearities by allowing the impact of TOT volatility on IFI to vary with a number of factors including: trade openness, export diversification, financial development, economic development, and nominal exchange rate flexibility.

<sup>3</sup> Mendoza (1997) shows that TOT average growth and volatility are both needed for the model to be properly specified.

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