



IMF Working Paper

Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect

Rabah Arezki and Markus Brückner

IMF Working Paper

IMF Institute

Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect

Prepared by Rabah Arezki and Markus Brückner¹

Authorized for distribution by Marc Quintyn

September 2010

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper examines the effect that windfalls from international commodity price booms have on net foreign assets in a panel of 145 countries during the period 1970-2007. The main finding is that windfalls from international commodity price booms lead to a significant increase in net foreign assets, but only in countries that are homogeneous. In polarized countries, net foreign assets significantly decreased. To explain this asymmetry, the paper shows that in polarized countries commodity windfalls lead to large increases in government spending, political corruption, and the risk of expropriation, with no overall effect on GDP per capita growth. The paper's findings are consistent with theoretical models of the current account that have a built-in voracity effect.

JEL Classification Numbers: D74, D63, F32, Q33

Keywords: Commodity Windfalls; Net Foreign Assets, Polarization, Political Economy

Author's E-Mail Address: rarezki@imf.org; markus.bruckner@upf.edu

¹ International Monetary Fund (Arezki) and Universitat Pompeu Fabra (Bruckner). Contact e-mail: rarezki@imf.org; markus.bruckner@upf.edu. We thank Gian Maria Milesi-Ferretti for very helpful suggestions.

Contents

I. Introduction	3
II. Data	5
Commodity Revenue Windfalls	5
Polarization.....	6
Net Foreign Assets and Other Data.....	7
III. Estimation Strategy	7
IV. Main Results	8
V. Conclusion	11
References.....	12

Tables

Table 1. Summary Statistics	15
Table 2. Correlation Matrix	15
Table 3. Commodity Windfalls and Net Foreign Assets	16
Table 4. Commodity Windfalls and Net Foreign Assets	17
Table 5. Commodity Windfalls, Polarization, and Net Foreign Assets.....	17
Table 6. Commodity Windfalls, Polarization, and the Terms of Trade.....	18
Table 7. Commodity Windfalls, Polarization, and Private Investment	18
Table 8. Commodity Windfalls, Growth, Government Spending, and Corruption.....	19
Table 9. Commodity Windfalls, Polarization, and the Current Account.....	20

Appendix Tables

Table 1. The Terms of Trade, Polarization, and Net Foreign Assets.....	21
Table 1. List of Countries	22
Table 2. List of Commodities	24

I. INTRODUCTION

Standard intertemporal models of the current account predict that countries which experience temporary revenue windfalls from international commodity price booms should experience an increase in their net foreign assets (e.g. Obstfeld and Rogoff, 1995). However in practice, because a large share of these revenue windfalls often accrues to the government this key prediction may not hold -- there is the common pool problem that counteracts the standard consumption smoothing effect. Lane and Tornell (1998a) show that when there are multiple powerful groups that seek redistribution from the public budget a revenue windfall will lead to large increases in government spending, and thus, depending on the degree of polarization of the fiscal claimants, possibly induce a current account deterioration.² An important implication of the model in Lane and Tornell is that the relationship between wealth shocks and the current account is nonlinear. In particular, it may be negative in highly polarized countries.

This paper uses panel data for 145 countries during the period 1970-2007 to rigorously examine the relationship between wealth shocks from international commodity price booms and changes in countries' net foreign assets. A key advantage of the paper's panel approach is that it allows to examine the relationship between commodity windfalls and changes in net foreign assets based on exclusively the within-country variation in the data. The within-country approach makes the results more readily comparable to macro models, which are naturally about a within-country time-series relationship and, it also allows us to circumvent the potentially important cross-sectional omitted variables bias. A further important feature of the paper's empirical analysis is that, because the commodity export price index is constructed by interacting the fixed (i.e. time-invariant) country-specific export shares with the international commodity prices, the time-series variation in the export price index constitutes for most countries a plausibly exogenous source of wealth shocks.

The paper's first main finding is that the average marginal effect of commodity price windfalls on net foreign assets is positive but statistically insignificant. This is true for the impact effect as well as for lagged effects, and holds regardless of whether a static or dynamic panel data model is estimated. Moreover, there is also no significant average effect

² See also Lane and Tornell (1996, 1998b) and Tornell and Lane (1998) for further models on the voracity effect.

on changes in net foreign assets when distinguishing between price changes of minerals and hydrocarbon resources, which tend to be more persistent, and price changes of agricultural commodities, which tend to be more transitory. The paper's first main finding therefore stands in contrast with traditional intertemporal models of the current account. It is however consistent with the well-known Feldstein-Horioka (1980) puzzle that changes in savings do not feed one-to-one into the current account.

The paper's second main finding is that the marginal effect of revenue windfalls from commodity price booms on net foreign assets is significantly smaller in countries that are characterized by high levels of polarization. This cross-country heterogeneity in the relationship is so strong that in countries with very high levels of polarization commodity windfalls lead to a decrease in net foreign assets. On the other hand, in countries with low levels of polarization commodity windfalls lead to a significant increase in net foreign assets. While the increase in net foreign assets in homogenous countries can be well explained by standard intertemporal models of the current account, the acyclical average response, and, in particular, the negative response in highly polarized countries cannot.

What makes it particularly difficult for standard models of the current account to explain the negative effect of commodity price booms on the net foreign asset position in polarized countries is that in these countries private investment significantly decreased. Clearly, standard models can generate a decrease in the net foreign asset position following a commodity price boom if the boom is of permanent nature.³ But, in that case there should be also a strong increase in the country's private investment. The fact that in polarized countries private investment significantly decreased following a commodity price boom is a first indication that the voracity model developed in Lane and Tornell is consistent with the paper's empirical results.

As a further intermediate channel on the voracity effect of commodity windfalls in polarized countries, the paper documents that increases in the international prices of exported

³ Depending on other factors, such as for example the anticipation of the revenue windfall, the elasticity of substitution between tradables and nontradables, or the degree of precautionary saving a transitory revenue windfall from a commodity price boom can also generate a decrease in net foreign assets in the standard intertemporal model. See for example Svensson and Razzin (1983), Persson and Svensson (1985), Backus et al. (1994), Mendoza (1995), or Carroll and Jeanne (2009). But, investment and output usually increases in these models following a positive terms of trade shock. Empirical papers that have examined the relationship between the terms of trade and the current account include among others Milesi-Ferretti and Razin (1998), Loayza et al. (2000), Calderon et al. (2002), or Cashin and McDermott (2002). These papers focus on the average effect and do not investigate the role of polarization in determining the relationship.

commodity goods lead to large and statistically significant increases in government expenditures. These increases in government expenditures were associated with significant increases in corruption in polarized countries. Also GDP per capita growth did not increase significantly following the commodity windfall in these countries -- despite the significant increase in government expenditures. On the other hand, in homogeneous countries, where the commodity windfall led to a significant improvement in the current account, GDP per capita growth significantly increased following the commodity price boom.

In terms of measuring the power concentration of groups, an important feature of the paper's empirical analysis is the use of an ethnic polarization index. In contrast to a fractionalization index which is strictly increasing in the number of groups, the polarization index is largest when there are two groups which are of equal size. The polarization index therefore captures the fact that power struggles are maximized when there are two equally powerful groups that lobby (or fight) for resources.⁴ As the number of groups increase, the polarization index decreases. This is an important characteristic of the polarization index because a key result of the Lane and Tornell voracity model is that the voracity effect is largest when there are two powerful groups, and diminishes as the number of groups increase.

The remainder is organized as follows. Section 2 describes the data. Section 3 explains the estimation strategy. Section 4 presents the main empirical results. Section 5 concludes.

II. DATA

Commodity Revenue Windfalls

To capture revenue windfalls from international commodity price booms, the paper constructs a country-specific international commodity export price index:

$$ComPI_{i,t} = \prod_{c \in C} Com Price_{c,t}^{\theta_{i,c}}$$

where $ComPrice_{c,t}$ is the international price of commodity c in year t , and $\theta_{i,c}$ is the average (time-invariant) value of exports of commodity c in the GDP of country i . Note that this

⁴ See for example Esteban and Ray (1994, 1999) or Montalvo and Reynal-Querol (2005a,b).

multiplicative functional form, where the international commodity prices are weighted by the average value of exports of commodity c in the GDP of country i is motivated by log-linearizing GDP ($=C+I+G+NX$), and taking the total derivative with respect to the international commodity export prices.

This yields that $\Delta \text{LogGDP}_{i,t} = \sum_{c \in C} \tau_{i,c} \Delta \log(\text{Com Price}_{c,t})$, where $\tau_{i,c}$ is the steady-state share of commodity export c in the GDP of county i .⁵ To the extent that $\theta_{i,c}$ is a reasonably good approximation for $\tau_{i,c}$ it follows that $\Delta \text{LogGDP}_{i,t} \cong \sum_{c \in C} \theta_{i,c} \Delta \log(\text{Com Price}_{c,t}) = \Delta \text{LogComPI}_{i,t}$

The data on annual international commodity prices are for the 1970-2007 period from UNCTAD Commodity Statistics. Data on the value of commodity exports is from the NBER-United Nations Trade Database. The commodities included in the commodity export price index are aluminum, beef, coffee, cocoa, copper, cotton, gold, iron, maize, oil, rice, rubber, sugar, tea, tobacco, wheat, and wood. In case there were multiple prices listed for the same commodity a simple average of all the relevant prices is used.

Polarization

Data on ethnic polarization are from Montalvo and Reynal-Querol (2005a,b). The Montalvo and Reynal-Querol polarization index is constructed as:

$$Pol_i = 4 \sum_{r=1}^N \sum_{k \neq r} \pi_{ir}^2 \pi_{ik}$$

where π_{ir} is the proportion of people who belong in country i to group r . Formally, this polarization index measures the normalized distance of a particular distribution of groups from a bimodal distribution. The index is maximized when there are two groups which are of equal size. The index emphasizes therefore that conflict tensions are greatest when there are two equally powerful groups.

Note the polarization index differs from the well-known fractionalization index. The fractionalization index is defined as:

$$Frac_i = 1 - \sum_{r=1}^N \pi_{ir}^2$$

⁵ Note that the effect of changes in the international commodity prices on C, I, G, are neglected for simplicity.

A key property of the fractionalization index is that, in contrast to the polarization index, it is strictly increasing in the number of ethnic groups. Intuitively, the fractionalization index measures the probability that two randomly selected individuals in a country will not belong to the same group. For further discussion on fractionalization vs. polarization with an application to conflict, see Montalvo and Reynal-Querol (2005a,b).

Net Foreign Assets and Other Data

Annual data on net foreign assets are from Lane and Milesi-Ferretti (2007). Real GDP per capita data, private investment, and government expenditure data are from the Penn World Tables, version 6.3 (Heston et al., 2009). Data on the terms of trade are from WDI (2010). And data on corruption and expropriation risk are from Political Risk Service (2010). Tables 1 and 2 provide some summary statistics on these variables.

III. ESTIMATION STRATEGY

To examine the effects that commodity revenue windfalls have on net foreign assets and other key variables of interest the following econometric model is estimated:

$$\Delta NFA_{i,t} = \alpha_i + \beta_t + \gamma(\Delta ComPI_{i,t}) + u_{i,t}$$

where α_i are country fixed effects that capture time-invariant country-specific unobservables and β_t are year fixed effects that capture common year shocks. $u_{i,t}$ is an error term that is clustered at the country level. NFA_{it} is the share of net foreign assets in GDP and $\Delta ComPI_{it}$ is the log-change of the international export price index.

As a baseline regression, the paper estimates the average marginal effect that commodity windfalls have on net foreign assets in a world sample. Cross-country differences in how polarization affects the relationship are examined by splitting the sample into different groups based on countries' polarization. As a robustness check on whether the heterogeneity is driven by other factors the paper also estimates interaction models where the international commodity price index is interacted with other variables that could possibly induce cross-country differences in the relationship.

IV. MAIN RESULTS

Table 3 presents estimates of the average marginal effect that commodity price revenue windfalls have on the change in net foreign assets. Column (1) shows pooled least-squares estimates that are based on cross-sectional as well as within-country data variation. In column (2) country fixed effects are included to capture cross-country unobservable differences that are driving both the size of the commodity revenue windfall and the change in the country's net foreign assets. Column (3) adds year fixed effects to control for global shocks such as for example the world business cycle or political events such as the end of the Cold War that could affect both the overall yearly change in net foreign assets and the change in international commodity prices.⁶ The main result is that revenue windfalls from international commodity price booms have a positive but statistically insignificant effect on the net foreign asset position. And, there continues to be a positive but insignificant effect when adding further lags and leads of the commodity price index (columns (4) and (5)), or when controlling for lagged changes in net foreign assets (columns (6) and (7)).

A possible reason for the insignificant response of the net foreign asset position is that the time-series dynamics of many of the international commodity prices are highly persistent (see the Data Appendix Table 3). Table 4, columns (1) and (2) show however that there continues to be an insignificant effect of commodity revenue windfalls on the net foreign asset position when distinguishing between mineral and hydrocarbon commodity prices (which tend to be very persistent) and agricultural commodity prices (which tend to be more transitory). Column (3) also shows that there is no significant average effect of commodity revenue windfalls on countries' net foreign assets positions when excluding potentially large commodity exporting countries (i.e. countries that produce more than 3% of the world commodity supply for a given commodity good).⁷

The results change substantially when grouping countries according to their levels of polarization. Column (1) of Table 5 shows that there is a highly significant positive average effect of revenue windfalls on the net foreign asset position in countries that are in the bottom

6 Both the country and year fixed effects are jointly highly statistically significant yielding a p-value of 0.000.

7 The excluded countries are Algeria, Australia, Brazil, Canada, China, Colombia, Cuba, Denmark, Dominican Republic, Egypt, Finland, France, Indonesia, India, Iraq, Iran, Kenya, Kuwait, Liberia, Libya, Malaysia, Mauritius, Mexico, New Zealand, Nigeria, Norway, Pakistan, Philippines, Russia, Saudi Arabia, Sweden, Singapore, South Africa, Sudan, Thailand, Turkey, Uganda, United States, United Kingdom, United Arab Emirates, and Venezuela.

25th percentile of the cross-country polarization distribution. Column (2) shows that the effect of commodity windfalls on the net foreign asset position is also positive in the group of countries that are in the bottom 50th percentile. But the coefficient is quantitatively smaller and statistically only significant at the 10% level. Moving to the top 50th percentile (column (3)) the effect of commodity windfalls on the net foreign asset position is statistically insignificant and quantitatively only about 60% of the size of the estimated average marginal effect of the bottom 25th percentile. Moving to the top 25th percentile (column (4)) the average marginal effect is also statistically insignificant and only about one-tenth of the estimated average marginal effect of the bottom 25th percentile.

What explains this asymmetry in the relationship? Table 6 shows that commodity price revenue windfalls had a significant positive effect on the terms of trade in the group of countries with high and low degrees of polarization. Therefore, it is not the case that changes in the international commodity prices had no significant effect on the terms of trade in polarized countries. In fact, Panel A of Appendix Table 1 shows that through their effects on the terms of trade commodity windfalls had a significant positive effect on the net foreign asset position in the group of countries with low polarization and an insignificant effect in the group of countries with high polarization. Panel B of Appendix Table 1 also shows that similar results are obtained when directly regressing the change in the net foreign assets on the change in the terms of trade.⁸

Table 7 provides a first explanation for the difference in the relationship between revenue windfalls and net foreign assets. The table shows that while in highly polarized countries private investment significantly decreased following the revenue windfall, in the group of countries with very low polarization private investment significantly increased. Standard models of the current account readily predict the significant increase in private investment following the commodity boom (e.g. Obstfeld and Rogoff, 1995). But, they cannot predict the significant decrease. On the other hand, the voracity model of Lane and Tornell does predict a significant decrease in private investment in polarized countries. In these countries, the revenue windfall leads to voracious fiscal redistribution that in turn lowers the government's overall financing position. The deterioration in the government's overall financing position implies in turn that the government has less resources available to

⁸ Because within-country changes in the terms of trade are also driven by within-country changes in the quantities of commodity goods produced, using directly the terms of trade in least squares estimation may be problematic. This is because changes in economic conditions in the country can affect both, the terms of trade and changes in the countries' net foreign assets and therefore lead to an endogeneity bias in the least squares estimation.

compensate lenders in the case of default. For the capital market to clear private investment has to decrease therefore.

To explore further this voracity channel, Table 8 reports estimates of the effect that commodity price revenue windfalls have on GDP growth, government expenditures, corruption, and the risk of expropriation for the above and below median sample polarization group. Column (1) of Panel A shows that, consistent with investment response documented in Table 7, there is negative albeit insignificant effect of commodity price revenue windfalls on GDP per capita growth in the high polarization sample. Panel B shows on the other hand that in the low polarization sample commodity price revenue windfalls had a significant positive effect on GDP per capita growth. Also consistent with the voracity model, column (2) shows that there is a significant increase in government expenditures in the above median polarization group while in the below median polarization group the response in government expenditures is insignificant. Furthermore, columns (3) and (4) of Panel A show that in the above median polarization group corruption and the risk of expropriation significantly increased, while Panel B shows that in the below median polarization sample corruption and the risk of expropriation did not increase significantly.

An important robustness check that goes beyond these intermediate channels is whether the heterogeneity in the effect that commodity revenue windfalls have on net foreign assets survives when controlling for other alternative factors that can drive the cross-country parameter heterogeneity. One obvious control variable that can possibly drive cross-country parameter heterogeneity is fractionalization. As discussed in Section 2, the fractionalization index is strictly increasing in the number of groups while the polarization index is maximized when there are two groups which are of equal size.

Column (1) of Table 9 shows that the marginal effect of commodity price revenue windfalls on net foreign assets significantly decreases in polarization when controlling for a possible interaction effect between commodity revenue windfalls and fractionalization. The interaction estimate in column (1) implies that in the most polarized countries a revenue windfall had a significant negative effect on the net foreign asset position. Consistent also with the Lane and Tornell voracity model, column (1) shows that the fractionalization interaction term is significantly positive. This means that revenue windfalls had a stronger positive effect on the net foreign asset position in countries where there are many different groups.

Column (2) of Table 9 shows that the nonlinearity in the relationship is not due to the polarization and fractionalization index possibly picking up a diminishing or increasing returns effect of commodity windfalls on net foreign assets. In addition, column (3) documents that there continues to be a significant negative interaction effect between

commodity price revenue windfalls and polarization when controlling for differences in the relationship that are due to countries being debtor or credit countries.⁹ Finally, column (4) adds to the regression an additional interaction effect between commodity revenue windfalls and cross-country differences in per capita GDP, to allow for a possible difference in the relationship between rich and poor countries. The main result is that the polarization interaction continues to be negative and statistically significant at the conventional confidence level.

V. CONCLUSION

This paper showed that the positive effect of revenue windfalls from international commodity price booms on countries' net foreign asset positions is significantly decreasing in cross-country differences in polarization. Standard intertemporal models of the current account have difficulties in explaining this result, in particular, because in highly polarized countries the revenue windfall led to a significant decrease in both private investment and the current account. On the other hand, the non-representative agent model developed in Lane and Tornell (1998) that generates a voracity effect is consistent with the paper's finding of a negative response in both the current account and private investment in polarized countries. The paper showed that consistent with the voracity model the revenue windfall led to a large increase in government expenditures and corruption in polarized countries, while in the homogeneous countries government expenditures and corruption did not increase significantly.

⁹ Kraay and Ventura (2000) derive a theoretical model that shows that the relationship between terms of trade shocks and net foreign assets should be different in debtor and creditor countries.

REFERENCES

- Backus, D., P. Kehoe, and F. Kydland (1994). "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?" *American Economic Review* 84: 84-103.
- Calderon, C., A. Chong, and N. Loayza (2002). "Determinants of Current Account Deficits in Developing Countries." *B.E. Journal of Macroeconomics* 2 (1).
- Carroll, C. and O. Jeanne (2009). "[A Tractable Model of Precautionary Reserves, Net Foreign Assets, or Sovereign Wealth Funds.](#)" [NBER Working Papers](#) 15228, National Bureau of Economic Research, Inc.
- Cashin, P. and C. McDermott (2002). "Terms of Trade Shocks and the Current Account: Evidence from Five Industrial Countries." *Open Economies Review* 13: 219-235.
- Esteban, J., and D. Ray (1994). "On the Measurement of Polarization." *Econometrica* 62: 819– 851.
- Esteban, J. and D. Ray (1999). "Conflict and Distribution." *Journal of Economic Theory* 87: 379- 415.
- Feldstein, M. and C. Horioka (1980). "Domestic Savings and International Capital Flows." *Economic Journal* 40: 314-329.
- Heston, A., R. Summers and B. Aten (2009). "Penn World Table Version 6.3", Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.
- Kraay, A. and J. Ventura (2000). "Current Accounts in Debtor and Creditor Countries." *Quarterly Journal of Economics* 115: 1137-1166.
- Loayza, N., K. Schmidt-Hebbel, and L. Serven (2000). "What Determines Private Saving Around the World?" *Review of Economics and Statistics* 82: 165-181.

- Lane, P. and A. Tornell (1996). Power, Growth, and the Voracity Effect." *Journal of Economic Growth* 1: 213-241.
- Lane, P. and A. Tornell (1998a). "Are Windfalls a Curse? A non-representative agent model of the Current Account." *Journal of International Economics* 43: 83-112.
- Lane, P. and A. Tornell (1998b). "Why Aren't Savings Rates Procyclical in Latin America?" *Journal of Development Economics* 57: 185-199.
- Lane, P. and G. Milesi-Ferretti (2007). "The External Wealth of Nations Mark II. Revised and Extended Estimates of Foreign Assets and Liabilities." *Journal of International Economics* 73: 223-250.
- Milesi-Ferretti, G. and A. Razin (1998). "Sharp Reductions in Current Account Deficits: Empirical Regularities." *European Economic Review* 42: 897-908.
- Mendoza, E. (1995). "The Terms of Trade, the Real Exchange Rate, and Economic Fluctuations." *International Economic Review* 36: 101-137.
- Montalvo, J. and M. Reynal-Querol (2005a). "Ethnic Diversity and Economic Development." *Journal of Development Economics* 76: 293-323.
- Montalvo, J. and M. Reynal-Querol (2005b). "Ethnic Polarization, Potential Conflict and Civil War." *American Economic Review* 95: 796-816.
- Obstfeld, M. and K. Rogoff (1995). "The Intertemporal Approach to the Current Account." In *Handbook of International Economics*, vol. 3, G. Grossman and K. Rogoff (eds.). Amsterdam: Elsevier.
- Political Risk Service Group (2010). *International Country Risk Guide*. Online Database.
- Persson, T. and L. Svensson (1985). "Current Account Dynamics and the Terms of Trade: Harberger-Laursen-Metzler Two Generations Later." *Journal of Political Economy* 93: 43-65.

Svensson, L. and A. Razzin (1983). "The Terms of Trade and the Current Account: The Harberger-Laursen-Metzler Effect. *Journal of Political Economy* 91: 97-125.

Tornell, A. and P. Lane (1999). "The Voracity Effect." *American Economic Review* 89: 22-46.

Wooldridge, J. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Mass.: MIT Press.

World Bank (2010). *World Development Indicators* (Washington D.C., World Bank).

Table 1. Summary Statistics

	Mean	Std. Dev.	Min	Max	Obs.
ΔComPI	0.003	0.021	-0.092	0.485	5814
ΔNFA	-0.004	0.536	-19.931	21.967	5350
ΔTOT	0.088	0.216	-3.044	3.156	4936
ΔGDP	0.035	0.079	-1.107	0.985	6367
ΔGov	0.018	0.139	-2.135	1.719	6367
ΔCorr	-0.038	0.452	-3	3	2721
ΔExprop	0.078	1.181	-8	10	2721
Ethpol	0.508	0.251	0.017	0.982	4940
Ethfrac	0.438	0.281	0.009	0.958	4940

Table 2. Correlation Matrix

	ΔComPI	ΔNFA	ΔTOT	ΔGDP	ΔGov	ΔCorr	ΔExprop	Ethpol	Ethfrac
ΔComPI	1								
ΔNFA	0.040	1							
ΔTOT	0.327	0.090	1						
ΔGDP	0.027	0.055	0.371	1					
ΔGov	0.073	-0.025	0.057	0.237	1				
ΔCorr	0.018	0.014	0.072	0.023	0.026	1			
ΔExprop	0.022	0.023	0.097	0.083	-0.059	0.037	1		
Ethpol	0.045	0.001	-0.049	0.011	0.011	-0.011	0.042	1	
Ethfrac	0.053	0.015	-0.016	0.053	0.053	0.000	0.027	0.615	1

Table 3. Commodity Windfalls and Net Foreign Assets

	Δ NFA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	LS	LS	LS	LS	LS	LS	SYS-GMM
Δ ComPI	0.237 (0.58)	0.181 (0.39)	0.088 (0.17)	0.112 (0.22)	0.093 (0.19)	0.054 (0.10)	0.052 (0.08)
L. Δ ComPI				0.492 (1.51)	0.457 (1.44)		
L2. Δ ComPI				0.117 (0.45)	0.034 (0.16)		
F. Δ ComPI					-0.371 (-1.52)		
L. Δ NFA						-0.174 (-0.64)	-0.192 (-0.70)
Country Fe	No	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	No	No	Yes	Yes	Yes	Yes	Yes
Observations	4614	4614	4614	4518	4373	4469	4469
Countries	145	145	145	145	145	145	145

Note: The dependent variable is the change in the net foreign assets to GDP ratio. The method of estimation in columns (1)-(6) is least squares; column (7) system-GMM (Blundell and Bond, 1998). The t-values shown in parentheses below the point estimates are based on Huber robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 4. Commodity Windfalls and Net Foreign Assets

<u>ΔNFA</u>			
	Mineral and Oil Commodities Only	Agricultural Commodities Only	Excluding Large Commodity Exporters
	(1)	(2)	(3)
	LS	LS	LS
Δ ComPI	0.174 (0.31)	-0.856 (-0.26)	0.328 (0.39)
Country Fe	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes
Observations	4614	4614	3214
Countries	145	145	106

Note: The dependent variable is the change in the net foreign assets to GDP ratio. The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. The commodities used in column (1) for the international commodity export price index are aluminium, copper, gold, iron, and oil. The commodities used in column (2) for the international commodity export price index are beef, coffee, cocoa, cotton, maize, rice, rubber, sugar, tea, tobacco, wheat, and wood. Column (3) uses all commodities but excludes Algeria, Australia, Brazil, Canada, China, Colombia, Cuba, Denmark, Dominican Republic, Egypt, Finland, France, Indonesia, India, Iraq, Iran, Kenya, Kuwait, Liberia, Libya, Malaysia, Mauritius, Mexico, New Zealand, Nigeria, Norway, Pakistan, Philippines, Russia, Saudi Arabia, Sweden, Singapore, South Africa, Sudan, Thailand, Turkey, Uganda, United States, United Kingdom, United Arab Emirates, and Venezuela. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 5. Commodity Windfalls, Polarization, and Net Foreign Assets

<u>ΔNFA</u>				
	Ethpol <0.25 (Bottom 25th Percentile)	Ethpol <0.56 (Bottom 50th Percentile)	Ethpol >0.56 (Top 50th Percentile)	Ethpol >0.70 (Top 25th Percentile)
	(1)	(2)	(3)	(4)
	LS	LS	LS	LS
Δ ComPI	0.781*** (4.59)	0.600* (1.94)	0.481 (0.61)	0.081 (0.07)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	737	1916	1912	729
Countries	21	54	53	20

Note: The dependent variable is the change in the net foreign assets to GDP ratio. Δ ComPI is the log-change in the international export price index. The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 6. Commodity Windfalls, Polarization, and the Terms of Trade

	<u>ΔTOT</u>			
	Ethpol <0.25	Ethpol <0.56	Ethpol >0.56	Ethpol >0.70
	(1)	(2)	(3)	(4)
	LS	LS	LS	LS
ΔComPI	1.985*** (11.18)	2.783*** (6.66)	1.976*** (8.42)	1.568*** (4.26)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	644	1787	1707	722
Countries	18	51	53	21

Note: The dependent variable is the log-change in the terms of trade. ΔComPI is the log-change in the international export price index. The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 7. Commodity Windfalls, Polarization, and Private Investment

	<u>Private Investment</u>			
	Ethpol <0.25	Ethpol <0.56	Ethpol >0.56	Ethpol >0.70
	(1)	(2)	(3)	(4)
	LS	LS	LS	LS
ΔComPI	1.856*** (3.46)	0.877 (1.04)	-0.441 (-1.17)	-0.773*** (-1.96)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	778	2070	1912	729
Countries	21	55	58	23

Note: The dependent variable is the log of real investment per capita. ΔComPI is the log-change in the international export price index. The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

**Table 8. Commodity Windfalls, Growth, Government Spending, and Corruption
(Further Intermediate Channels)**

<u>ΔExpropriation</u>	<u>ΔGDP</u>	<u>ΔGov. Expenditure</u>	<u>ΔCorruption</u>	
Panel A: High Polarization				
	(1)	(2)	(3)	(4)
ΔComPI	-0.040 (-0.14)	0.240** (1.96)	1.965*** (3.45)	8.791* (1.73)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	1911	1911	1009	1009
Countries	53	53	46	46
Panel B: Low Polarization				
	(1)	(2)	(3)	(4)
ΔComPI	0.277*** (4.13)	0.469 (1.58)	-1.709* (-1.82)	-2.858 (-0.64)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	1916	1916	1033	1033
Countries	54	54	48	48

Note: The dependent variable in column (1) is the log-change of real per capita GDP; column (2) the log-change of real per capita government expenditures; column (3) the change of the ICRG corruption score (re-scaled so that higher values denote more corruption); column (4) the change of the ICRG risk of expropriation score (re-scaled so that higher values denote a higher risk of expropriation). The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. Panel A reports regressions for the sample of countries with above median polarization ($ethpol > 0.56$). Panel B reports regressions for the sample of countries with below median polarization ($ethpol < 0.56$). *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

**Table 9. Commodity Windfalls, Polarization, and the Current Account
(Alternative Interactions)**

	<u>Δ NFA</u>			
	(1)	(2)	(3)	(4)
	LS	LS	LS	LS
ΔComPI	0.714* (1.85)	0.780 (0.74)	-0.056 (-0.05)	-0.321 (-0.26)
ΔComPI*Ethpol	-3.682** (-2.18)	-3.686** (-2.21)	-3.040** (-2.13)	-2.673* (-1.84)
ΔComPI*Ethfrac	4.534** (2.32)	4.489** (2.07)	2.581 (1.32)	2.764 (1.46)
ΔComPI ²		-0.294 (-0.07)	0.925 (0.22)	1.563 (0.37)
ΔComPI*Debtor Country			1.603** (2.09)	1.897** (2.42)
ΔComPI*GDP p.c.				0.210 (1.12)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	3828	3828	3828	3828
Countries	107	107	107	107

Note: The dependent variable is the change in the net foreign assets to GDP ratio. ΔComPI is the log-change in the international export price index. The method of estimation is least squares; t-values (shown in parentheses) below the point estimates are based on Huber robust standard errors that are clustered at the country level. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Appendix

Table 1. The Terms of Trade, Polarization, and Net Foreign Assets

	<u>ΔNFA</u>			
	Ethpol <0.25 (1)	Ethpol <0.56 (2)	Ethpol >0.56 (3)	Ethpol >0.70 (4)
	Panel A: Two-Stage Least-Squares (IV is Δ ComPI)			
Δ TOT	0.417*** (7.68)	0.259*** (2.43)	0.157 (0.42)	-0.024 (-0.04)
First-Stage F-stat	124	44	65	32
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	639	1715	1610	651
Countries	18	50	47	19
	Panel B: Least Squares			
Δ TOT	0.173*** (2.76)	0.285*** (3.93)	0.308 (1.05)	-0.165 (-0.52)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	639	1715	1610	651
Countries	18	50	47	19

Note: The dependent variable is the change in the net foreign assets to GDP ratio. The method of estimation in Panel A is two-stage least squares; Panel B least-squares. The instrumental variable in Panel A is the log-change of the international export price index. *Significantly different from zero at 90 percent confidence, ** 95 percent confidence, *** 99 percent confidence.

Table 2. List of Countries

Country	ComExp/GDP	Ethpol	NFA/GDP
Algeria	5.23	51.39	-24.55
Angola	9.51	57.21	-154.2
Argentina	0.75	57.88	-19.84
Australia	2.48	49.18	-38.97
Austria	0.71	23.98	-12.24
Bahrain	15.29	56.93	77.52
Bangladesh	0.03	13.18	-33.72
Benin	1.22	43.64	-45.38
Bolivia	0.63	76.66	-77.38
Brazil	0.71	77.32	-32.96
Cameroon	4.01	57.56	-42
Canada	2.52	67.24	-31.08
Central African Republic	1.6	57.78	-50.49
Chad	0.82	66.47	-56.61
Congo, Dem. Rep.	2.51	58.59	-101.23
Congo, Republic of	8.66	67.37	-165.38
Costa Rica	1.63	42.04	-49.21
Cyprus	0.45	65.22	-10.01
Cote d'Ivoire	5.97	43.19	-95.16
Denmark	1.01	9.67	-26.95
Dominican Republic	1.64	72.54	-38.54
Ecuador	2.59	83.72	-72.06
Egypt	1.71	42.7	-38.88
El Salvador	1.88	27.91	-31.65
Ethiopia	0.54	77.79	-38.46
Fiji	4.31	92.98	-36.7
Finland	1.68	29.41	-35.03
France	0.63	29.44	1.78
Gabon	14.94	51.88	-55.15
Gambia, The	0.59	68.93	-76.76
Germany	0.62	22.74	9.48
Ghana	4.47	66.1	-48.57
Greece	0.72	18.61	-26.7
Guatemala	1.54	95.47	-10.07
Guinea	1.63	84.29	-78.13
Guinea-Bissau	3.1	53.19	-327.69
Guyana	13.4	81.33	-283.87
Haiti	0.55	20.7	-44.82
Honduras	1.96	42.96	-50.62
Hong Kong	0.14	6.6	132.28
Hungary	0.54	30.8	-61.6
Iceland	2.11	5.52	-49.15
India	0.16	34.82	-17.4
Indonesia	2.12	52.88	-44.41
Iran	4.07	59.84	10.26
Ireland	1.42	14.06	-31.9
Israel	0.29	54.77	-28.41
Italy	0.34	15.4	-6.8
Jamaica	2.69	60.02	-91.44
Japan	0.07	6.72	14.92
Jordan	0.08	98.24	-52.95
Kenya	1.37	38.13	-32.14
Korea, Republic of	0.33	2.78	-20.16
Kuwait	18.85	97.98	246.51

Table 2. List of Countries (continued)

Country	ComExp/GDP	Ethpol	NFA/GDP
Liberia	18.56	39.04	-782.1
Madagascar	1.29	1.67	-62.9
Malawi	2.77	73.59	-82.91
Malaysia	5.55	76.16	-30.81
Mali	1.12	41.99	-70.9
Malta	0.83	16.71	28.28
Mauritania	5.88	53.61	-146.83
Mauritius	2.9	80.31	-10.06
Mexico	0.95	65.36	-35.63
Morocco	0.11	89.74	-42.19
Mozambique	0.79	49.86	-119.29
Nepal	0.08	65.18	-11.41
Netherlands	3.04	21.37	5.32
New Zealand	1.88	36.58	-62.28
Nicaragua	2.72	68.09	-243.17
Niger	0.4	69.77	-54.25
Nigeria	7.52	40.36	-63.85
Norway	5.98	9.02	-3.66
Oman	13.87	40.78	7.44
Pakistan	0.29	69.76	-38.05
Panama	1.09	58.62	-106.04
Papua New Guinea	10.81	66.87	-77.14
Paraguay	1.33	30.96	-12.85
Peru	1.26	81.7	-50.66
Philippines	0.68	49.65	-49.26
Poland	0.3	9.92	-40.58
Portugal	0.32	1.99	-35.58
Rwanda	0.96	40.13	-22.9
Samoa	0.71	38.78	-37.29
Saudi Arabia	13.53	11.39	75.96
Senegal	0.27	55.96	-57.45
Seychelles	2.68	60.02	-65.56
Sierra Leone	0.64	66.63	-90.85
South Africa	0.66	71.78	-24.36
Spain	0.27	69.33	-19.48
Sri Lanka	1.25	74.93	-39.76
Sudan	1.06	69.94	-152.6
Sweden	1.81	33.68	-18.63
Tanzania	1.73	27.1	-71.14
Thailand	1.16	58.23	-32.1
Togo	2.01	67.33	-82.43
Trinidad & Tobago	9.04	84.17	-61.11
Tunisia	1.08	16.73	-89.46
Turkey	0.42	34.24	-23.2
Uganda	2.35	27.86	-34.67
United Arab Emirates	17.41	64	197.02
United Kingdom	1.01	57.06	-0.21
United States	0.34	69.13	-4.06
Uruguay	1.35	42.64	-22.17
Venezuela	5.41	75.79	-3.29
Yemen	11.85	6.35	-15.58
Zambia	7.77	60.63	-157.55
Zimbabwe	1.21	69.78	-41.61
Average	3.17	49.96	-50.38

Note: The table lists countries' average commodity export to GDP ratio, their average net foreign asset to GDP ratio, and their polarization index. All numbers have been multiplied by 100.

Table 3. List of Commodities

Commodity	AR(1) Coefficient (Standard Error)	Commodity	AR(1) Coefficient (Standard Error)	Commodity	AR(1) Coefficient (Standard Error)
Aluminium	0.62 (0.12)	Cotton	0.48 (0.15)	Rubber	0.84 (0.13)
Banana	0.53 (0.17)	Gold	0.89 (0.15)	Sugar	0.40 (0.09)
Beef	0.76 (0.07)	Iron	1.03 (0.08)	Tea	0.77 (0.07)
Cocoa	0.78 (0.07)	Maize	0.59 (0.30)	Tobacco	0.51 (0.19)
Copper	0.95 (0.12)	Oil	0.97 (0.06)	Wheat	0.67 (0.10)
Coffee	0.69 (0.12)	Rice	0.56 (0.17)	Wood	0.66 (0.06)