

# International Commodity Prices, Growth, and the Outbreak of Civil War in Sub-Saharan Africa

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# Commodity prices and civil war?

- the timing of civil wars in Uganda, Rwanda, and Burundi appear to be related to fall in price of coffee, their biggest export
- is there evidence of a more generalized link between commodity export prices and civil conflict/war?
- can commodity price fluctuations be used to estimate the effects of economic growth shocks on civil conflict/war?

# Civil conflict onset and permanent shocks

$$\text{Probability}(\text{Onset}_{ct}) = a_{ct} + b * \text{Pricegrowth}_{ct}$$

- 
- country fixed effects
  - country-specific trends
  - year effects

# International Commodity Price Index

$$ComPI_{ct} = \sum_{i=1}^{19} P_{it} W_{ic}$$

AGRICULTURAL COMMODITIES: bananas, cocoa, coffee, cotton, fish, groundnuts, livestock, sugar, tea, tobacco, wood.

NATURAL RESOURCES: aluminium, copper, gold, iron, nickel, oil, phosphates, uranium.

*Sources: Deaton, 1999 JEP, UN ComTrade, IMF*

TABLE 1. Commodity Price Shocks and Civil War Onset

	<u>Civil War Onset</u>		
	(1)	(2)	(3)
	LS	LS	LS
Commodity Price Growth, t	-0.060* (-1.77)	-0.065** (-2.15)	
Commodity Price Growth, t-1	0.003 (0.13)	-0.048 (-1.25)	
Commodity Price Growth, t-2	-0.056 (-1.57)	-0.105** (-2.29)	
3-Year Commodity Price Growth			-0.060** (-2.15)
Country FE	No	Yes	Yes
Time Trends	No	Yes	Yes
Year FE	No	Yes	Yes
No. Observations	814	814	814

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war onset. *3 Year Commodity Price Growth* is the commodity price growth rate between  $t$  and  $t-3$ . \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

TABLE 2. Rainfall Shocks and Civil War Onset

	<u>Civil War Onset</u>	
	(1)	(2)
	LS	LS
Rainfall Growth, t	-0.036 (-1.61)	-0.006 (-0.29)
Rainfall Growth, t-1	-0.036 (-1.49)	-0.005 (-0.22)
Rainfall Growth, t-2	-0.028 (-0.76)	-0.017 (-0.56)
Country FE	No	Yes
Time Trends	No	Yes
Year FE	No	Yes
No. Observations	814	814

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war onset. \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

# Instrumental variables approach

- use commodity price growth as instrument for economic growth

Table 3. Economic Growth and Civil War Onset

	<u>GDP Per Capita Growth</u>		<u>Civil War Onset</u>
	(1)	(2)	(3)
	LS	LS	2SLS
3-Year Commodity Price Growth	0.025*** (3.42)		
GDP Per Capita Growth		-0.365** (-2.55)	-1.953** (-1.96)
Country FE	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. Observations	916	814	814

Note: The method of estimation in columns (1) and (2) is least squares, column (3) two-stage least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is per capita GDP growth, columns (2)-(3) civil war onset. The instrumental variable in column (3) is the commodity price growth rate between  $t$  and  $t-3$ . \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

# Direct effect of commodity prices on civil war onset?

- second instrument for growth and test for overidentifying restriction
- look at possible channels for direct effects

# Second instrument

OECD ExportDemandGrowth<sub>c,t</sub>

$$= \sum_{j \in OECD} \theta_{c,j} GDPGrowth_{j,t}$$

time-invariant export shares



Table 4. Export Demand, Economic Growth, and Civil War Onset

	<u>GDP Per Capita Growth</u>		<u>Civil War Onset</u>
	(1)	(2)	(3)
	LS	LS	2SLS
3-Year Commodity Price Growth	0.028*** (3.53)	-0.062** (-2.19)	
OECD Growth	0.010*** (10.53)	-0.006*** (-4.16)	
GDP Per Capita Growth			-0.803*** (-5.45)
Hansen J, p-value			0.1642
Country FE	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. Observations	916	814	814

Note: The method of estimation in columns (1)-(2) is least squares, column (3) two-stage least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is per capita GDP growth, columns (2)-(3) civil war onset. The instrumental variables in column (3) are the commodity price growth rate between  $t$  and  $t-3$  and OECD growth. \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

Table 5. Export Demand, Economic Growth, and Civil War Onset

	<u>Civil War Onset</u>	
	(1)	(2)
	2SLS	2SLS
3-Year Commodity Price Growth	-0.041 (-1.36)	
OECD Growth		0.011 (1.27)
GDP Per Capita Growth	-0.639*** (-5.68)	-1.867** (-2.02)
Country FE	Yes	Yes
Time Trends	Yes	Yes
Year FE	Yes	Yes
No. Observations	814	814

Note: The method of estimation is two-stage least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war onset. The instrumental variable in column (1) is OECD growth; column (2) commodity price growth between  $t$  and  $t-3$ . \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

Table 6. Another Look at Channels

	<u>Government Expenditure Share</u>	<u>Military Expenditure Share</u>	<u>Growth of Terms of Trade</u>	<u>Growth of Exports</u>	<u>Growth of Development Aid</u>
	(1)	(2)	(3)	(4)	(5)
	LS	LS	LS	LS	LS
3-Year Commodity Price Growth	0.011 (0.59)	-0.054 (-0.79)	0.115*** (5.09)	0.131*** (4.03)	0.096 (0.71)
OECD Growth	-0.001 (-0.49)	0.018 (0.50)	0.009** (2.49)	0.013** (2.13)	-0.001 (-0.26)
Country FE	Yes	Yes	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
No Observations	777	532	773	873	898

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable in column (1) is the growth rate of the share of government expenditure in GDP; the dependent variable in column (2) is the growth rate of the share of military expenditure in GDP; in column (3) the dependent variable is terms of trade growth; in column (4) the dependent variable is export growth; and in column (5) the dependent variable is the growth rate of (net) official development aid (ODA). *3 Year Commodity Price Growth* is the commodity price growth rate between  $t$  and  $t-3$ . \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

# Robustness

- excluding large commodity suppliers (more than 3% of world supply)
- agricultural vis-à-vis natural resource commodities

TABLE 7. Commodity Price Shocks and Civil War Onset

	<u>Civil War Onset</u>		
	(1)	(2)	(3)
	LS	LS	LS
	Excluding > 3% World Supply	Agriculture Only	Mining and Oil Only
3-Year Commodity Price Growth	-0.073** (-2.27)	-0.089** (-2.21)	-0.001 (-0.04)
Country FE	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. Observations	766	652	588

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war onset. Column (1) drops commodities from a country's (time-invariant) commodity basket if the country produces more than 3% of world supply of the commodity (see Appendix Table 1). Column (2) drops commodities from a country's commodity basket that are produced in the mining and oil sector, column (3) drops those commodities that are produced in the agricultural sector. \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

# Heterogenous effects

- democracies versus autocracies
- high versus low initial income

Table 8. Heterogeneity in the Effect of Commodity Prices On Civil War Onset

	<u>Civil War Onset</u>				
	(1)	(2)	(3)	(4)	(5)
	LS	LS	LS	LS	LS
3-Year Commodity Price Growth	-0.101** (-2.49)	-0.099** (-2.25)	-0.047* (-1.90)	-0.875** (-2.40)	-0.088** (-2.04)
3-Year Commodity Price Growth* Democracy [Polity IV]	0.074* (1.76)			0.067* (1.67)	
3-Year Commodity Price Growth* Democracy [Freedom House]		0.088* (1.72)			0.080 (1.59)
3-Year Commodity Price Growth* GDP79			0.053* (1.84)	0.045** (2.22)	0.026 (1.14)
Democracy	0.050 (1.56)	0.002 (0.08)		0.052* (1.64)	0.002 (0.09)
Country FE	Yes	Yes	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
No. Observations	749	689	814	749	689

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war onset. *Democracy [Polity IV]* is an indicator variable that is 1 if between  $t-1$  and  $t-3$  the country has a strictly positive Polity2 score, 0 if between  $t-1$  and  $t-3$  the country's Polity2 score was smaller or equal to 0, and missing if between  $t-1$  and  $t-3$  the country switched between positive to negative Polity2 scores. *Democracy [Freedom House]* is an indicator variable that is 1 if between  $t-1$  and  $t-3$  Freedom House classifies a country as free or partially free, 0 if between  $t-1$  and  $t-3$  the country is not free, and missing if between  $t-1$  and  $t-3$  the country switched from free or partially free to not free. *GDP79* is the difference between a country's log real per capita GDP in 1979 and the log of the 1979 sample average real per capita GDP. \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

What ends civil wars?

-- an analysis of civil war offset

TABLE 9. Commodity Price Shocks and Civil War Offset

	<u>Civil War Offset</u>	
	(1)	(2)
	LS	LS
3-Year Commodity Price Growth	-0.089 (-0.61)	-0.079 (-0.49)
OECD Growth		0.036** (2.13)
Rainfall Growth, t		-0.095 (-0.47)
Rainfall Growth, t-1		0.205 (0.73)
Rainfall Growth, t-2		0.036 (0.73)
Country FE	Yes	Yes
Time Trends	Yes	Yes
Year FE	Yes	Yes
No. Observations	102	102

Note: Method of estimation is least squares; t-values reported in parentheses are based on Huber robust standard errors that are clustered at the country level. The dependent variable is civil war offset. *3 Year Commodity Price Growth* is the commodity price growth rate between  $t$  and  $t-3$ . \* Significantly different from zero at the 90 percent confidence level, \*\* 95 percent confidence level, \*\*\* 99 percent confidence level.

# Conclusion

- commodity price downturns start civil wars in SSA
- so does a growth slowdown in main OECD trading partners
- is there a way to cushion these shocks?