Supplementary Materials

Civil conflict and firm recovery: Evidence from Côte d'Ivoire

A. Additional Tables and Figures

Table A1: Number of firms per year

	Panel A: All firms			Panel B: Cohort 2009		
Year	Total	Entry	Exit	Total	Entry	Exit
2006	3,392	266	491	2,123	91	-
2007	3,829	508	535	2,587	223	-
2008	4,654	634	693	3,556	319	-
2009	**5,071**	**844**	**959**	**5,071**	**663**	**819**
2010	8,196	892	1116	3,387	-	287
2011	10,411	904	1515	3,524	-	312
2012	12,945	2650	2572	3,260	-	333
2013	14,136	2451	3551	2,994	-	428
2014	17,106	3694	-	**2,896**	-	-

Total reports the total number of firms; Entry the number of new firms; and, Exit the number of exit firms

Table A2: Input dependence by sector

	Staff Cost				Managers				Wage Average			
	Mean	Median	SDev	%	Mean	Median	SDev	%	Mean	Median	SDev	%
Agriculture	0.14	0.10	0.13	0.21	0.59	0.02	1.84	0.25	3531	1640	4102	0.38
Fishing	0.31	0.31	0.02	0.50	0.08	0.08	0.01	0.50	4539	4539	3919	0.50
Extraction	0.21	0.19	0.16	0.50	0.18	0.17	0.15	0.50	10991	8146	11457	0.50
Manufacturing	0.19	0.13	0.22	0.37	0.18	0.05	0.48	0.21	3045	2057	3255	0.30
Electricity, gaz and water	0.15	0.10	0.14	0.10	0.28	0.26	0.21	0.33	3497	3709	1613	0.09
Construction	0.16	0.11	0.20	0.23	0.48	0.14	1.92	0.17	3373	2302	3469	0.38
Trade	0.09	0.05	0.13	0.26	0.31	0.10	0.75	0.23	3578	2297	3692	0.31
Hotels and restaurants	0.20	0.19	0.12	0.33	0.12	0.05	0.18	0.33	2411	1740	2321	0.35
Transport and communication	0.24	0.18	0.20	0.38	0.27	0.12	0.48	0.29	5114	3344	4718	0.34
Services to enterprises	0.28	0.23	0.22	0.35	0.36	0.15	0.86	0.30	4627	3085	4580	0.33
Education	0.31	0.28	0.23	0.36	0.28	0.03	0.76	0.23	1849	1372	1435	0.34
Health and social	0.17	0.14	0.14	0.38	0.24	0.05	0.40	0.29	2264	1751	1785	0.33
TOTAL	**0.19**	**0.12**	**0.20**	**0.31**	**0.31**	**0.09**	**0.92**	**0.25**	**36949**	**2315**	**3862**	**0.33**

Access to capital

	Debt ratio				Trade Credit				Financial cost				interest rate			
	Mean	Median	SDev	%	Mean	Median	SDev	%	Mean	Median	SDev	%	Mean	Median	SDev	%
Agriculture	0.80	0.77	0.53	0.25	0.14	0.18	0.58	0.38	0.001	0.012	0.958	0.95	0.022	0.001	0.045	0.88
Fishing	0.72	0.72	0.37	0.08	0.15	0.15	0.01	1.00	0.008	0.008	0.011	0.96	0.021	0.021	0.026	0.50
Extraction	0.59	0.41	0.63	0.15	0.14	0.03	0.24	0.75	0.000	0.000	0.000	0.93	0.003	0.000	0.006	1.00
Manufacturing	1.14	0.80	1.88	0.20	0.22	0.22	0.17	0.50	0.006	0.000	0.012	0.83	0.039	0.001	0.103	0.83
Electricity, gaz and water	0.67	0.75	0.35	0.09	0.37	0.33	0.06	0.00	0.023	0.014	0.019	0.67	0.040	0.012	0.052	0.67
Construction	1.15	0.79	1.94	0.12	0.19	0.16	0.17	0.52	0.007	0.000	0.017	0.79	0.029	0.000	0.097	0.82
Trade	1.05	0.78	1.57	0.16	0.27	0.32	0.18	0.43	0.007	0.001	0.016	0.78	0.043	0.002	0.109	0.75
Hotels and restaurants	1.49	0.92	2.11	0.23	0.13	0.04	0.16	0.68	0.008	0.000	0.021	0.83	0.006	0.000	0.017	0.83
Transport and communication	0.95	0.75	1.04	0.13	0.21	0.17	0.19	0.50	0.020	0.002	0.037	0.74	0.041	0.003	0.099	0.75
Services to enterprises	1.32	0.87	2.56	0.17	0.14	0.07	0.16	0.61	0.006	0.000	0.017	0.83	0.019	0.000	0.072	0.85
Education	0.94	0.81	1.06	0.35	0.12	0.01	0.16	0.63	0.004	0.000	0.018	0.88	0.012	0.000	0.044	0.89
Health and social	0.89	0.62	1.18	0.22	0.14	0.08	0.16	0.63	0.004	0.000	0.010	0.79	0.027	0.000	0.080	0.81
TOTAL	**1.11**	**0.80**	**1.84**	**0.18**	**0.20**	**0.17**	**0.18**	**0.52**	**0.007**	**0.000**	**0.018**	**0.81**	**0.032**	**0.000**	**0.093**	**0.80**

The table reports the mean value (columns "Mean"), median ("Median"), standard deviation ("SDev") and the percentage of firms with a dummy for each input equals to one ("%") for the seven inputs retained in the analysis and by industry. At the bottom, the global average (across industries) is provided in bold.

Table A3: Input usage, between-industry vs. within-industry variation

	All Observations		Cohort (all obs.)		Cohort (in 2009) W/out control		Cohort (in 2009) With control	
Input	R^2	Obs.	R^2	Obs.	R^2	Obs.	R^2	Obs.
Staff cost	0.081	71296	0.083	26055	0.075	4687	0.081	4684
Share of manager	0.007	72345	0.004	25870	0.004	4818	0.006	4818
Share of permanent workers	0.008	72346	0.006	25870	0.010	4818	0.011	4818
Average wage	0.005	70901	0.049	25336	0.050	4732	0.129	4732
Debt ratio	0.009	80428	0.008	27846	0.007	5147	0.004	5144
Trade credit	0.007	81369	0.035	28154	0.111	5186	0.002	5183
Financial cost	0.018	71327	0.021	25938	0.024	4660	0.023	4657
Interest rate	0.007	74720	0.010	26995	0.007	4874	0.037	4871

This table reports R^2 of the model explaining input usage (each row) in different specifications including industry dummies (and firm characteristics in the last specification). The first specification considers all observations available. The second specification considers all observations for firms operating in 2009 (cohort). The two last specifications consider firms operating in 2009 at this year. Both differ by the inclusion or not of firm level characteristics (nb. of employees, sales (in log), age (in log), foreign ownership, dummy for Abidjan and two dummies for legal status).

Table A4: The global impact of the crisis on productivity

Panel A: Labor productivity (Value added per workers)								
	$Log(LP)$				$\Delta[Log(LP)]$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POST x CONFL	-0.0064**	-0.0025**	-0.0031**	-0.0026**	-0.0105**	-0.0026**	-0.0048**	-0.0024**
	(0.0008)	(0.0007)	(0.0007)	(0.0006)	(0.0014)	(0.0010)	(0.0008)	(0.0008)
Panel B: Panel B: Total factor productivity								
	$Log(TFP)$				$\Delta[Log(TFP)]$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POST x CONFL	-0.0068**	-0.0199**	-0.0182**	-0.0134**	-0.0092**	-0.0029	-0.0017	-0.0017
	(0.0015)	(0.0009)	(0.0009)	(0.0009)	(0.0030)	(0.0030)	(0.0034)	(0.0035)
Panel C: Value added								
	$Log(VA)$				$\Delta[Log(VA)]$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POST x CONFL	-0.0050**	-0.0006	0.0012†	0.0018**	-0.0079**	-0.0004	-0.0006	-0.0008
	(0.0008)	(0.0007)	(0.0006)	(0.0006)	(0.0013)	(0.0009)	(0.0008)	(0.0007)
Panel D: Number of workers								
	$Log(Workers)$				$\Delta[Log(Workers)]$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POST x CONFL	0.0007	0.0016**	0.0042**	0.0043**	0.0014†	0.0014**	0.0034**	0.0009*
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0007)	(0.0005)	(0.0005)	(0.0004)
Obs.	6,535	8,762	10,913	13,380	5,093	6,954	8,813	10,779
Firms	2,877	2,877	2,877	2,877	2,288	2,475	2,568	2,644
Obs. (Panel B: TFP)	3,249	5,262	5,497	6333	808	1,369	1,441	1,525
Firms (Panel B: TFP)	2,225	2,587	2,644	2,689	657	960	1,007	1,051
Year included								
2009	x	x	x	x	x	x	x	x
2010	x	x	x	x	x	x	x	x
2011	x	x	x	x	x	x	x	x
2012		x	x	x		x	x	x
2013			x	x			x	x
2014				x				x

The dependent variable is the logarithm of labor productivity (Panel A), total factor productivity (Panel B), value added (Panel C), the number of workers (Panel D). In columns (1) to (4), the dependent variable is expressed in logarithm and in difference in logarithm (growth) in columns (5) to (8). $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equals to the number of deaths per 100,000 inhabitants in the district after 2011. The years from 2011 to 2014 are included one by one as indicated at the bottom of the table. Firm-level and year fixed effects are included and standard errors are clustered at the firm-level. The number of observations and firms refers to the models in Panels A, C and D. Standard errors are clustered at the firm level, except in Panel B (bootstrapping with 500 replications because the dependent variable is a generated variable). †, *, and ** signal significance at the 10%, 5% and 1% levels, respectively.

Table A5: Heterogenous impact of the crisis, baseline results

	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POSTxCONF	-0.185**	-0.188**	-0.191**	-0.216**	-0.182**	-0.191**	-0.186**	-0.191**
	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
(POSTxCONF) x Log(EMPL)	-0.019**	-0.020**	-0.019**	-0.019**	-0.019**	-0.019**	-0.019**	-0.019**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Log(Sales)	0.012**	0.014**	0.012**	0.013**	0.012**	0.013**	0.012**	0.012**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Log(Age)	0.001	-0.000	0.001	0.002*	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Abidjan	-0.002	-0.011**	0.001	0.005	-0.004	-0.001	-0.002	-0.005
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
(POSTxCONF) x Foreign	-0.002	-0.002†	-0.002	-0.001	-0.002	-0.001	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x LimLiabilities	0.002+	0.001	0.003†	0.005**	0.002	0.002	0.002*	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x PublicCompany	-0.002	-0.004*	-0.002	0.002	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(POSTxCONF) x Agriculture	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
(POSTxCONF) x Fishing	0.007	0.002	0.008	0.008	0.008	0.007	0.007	0.007
	(0.007)	(0.008)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
(POSTxCONF) x Extraction	-0.018†	-0.018†	-0.017†	-0.019†	-0.017	-0.018†	-0.018†	-0.018†
	(0.011)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
(POSTxCONF) x Manufacturing	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Electricity	0.002	0.002	0.002	-0.002	0.002	0.002	0.002	0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
(POSTxCONF) x Construction	-0.003	-0.004	-0.004	-0.002	-0.003	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Trade	-0.013**	-0.016**	-0.013**	-0.013**	-0.013**	-0.013**	-0.013**	-0.013**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Hotels	0.012*	0.011*	0.013*	0.013**	0.012*	0.012*	0.012*	0.012*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
(POSTxCONF) x Transport	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x ServicesEnt	0.000	-0.001	0.001	0.001	0.001	0.000	0.000	0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Education	0.010*	0.010*	0.010*	0.012*	0.010*	0.010*	0.010*	0.010*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Social	0.003	0.001	0.004	0.006	0.004	0.004	0.003	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x StaffCost		0.503**						
		(0.040)						
(POSTxCONF) x Managers			-0.122**					
			(0.040)					
(POSTxCONF) x AverWage				-0.322**				
				(0.037)				
(POSTxCONF) x Debt					0.142**			
					(0.045)			
(POSTxCONF) x TradeCredit						0.100**		
						(0.037)		
(POSTxCONF) x FinCost							0.006	
							(0.041)	
(POSTxCONF) x IntRate								0.096*
								(0.040)
Combined effect	-0.185**	0.315**	-0.313**	-0.538**	-0.040	-0.091	-0.179*	-0.095*
Obs.	11178	11178	11178	11178	11178	11178	11178	11178
# firms	2347	2347	2347	2347	2347	2347	2347	2347
R^2 (within)	0.178	0.202	0.179	0.187	0.179	0.179	0.178	0.178

The dependent variable is the logarithm of labor productivity. $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equals to the number of deaths per 100,000 inhabitants in the district after 2011. Combined effect measures the point estimates for firm with input dummy equals to one (and associated statistical significance). Within estimator (firm fixed effect) is used. Standard errors are clustered at the firm-level. †, *, and ** signal significance at the 10%, 5% and 1% levels, respectively.

Table A6: Heterogenous impact of the crisis, total factor productivity

	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POSTxCONF	-0.090**	-0.101**	-0.094**	-0.115**	-0.087**	-0.095**	-0.082**	-0.092**
	(0.015)	(0.015)	(0.016)	(0.017)	(0.015)	(0.016)	(0.015)	(0.015)
(POSTxCONF) x Log(EMPL)	-0.007**	-0.008**	-0.007**	-0.008**	-0.007**	-0.007**	-0.007**	-0.007**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Log(Sales)	0.006**	0.007**	0.006**	0.006**	0.006**	0.006**	0.006**	0.006**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Log(Age)	-0.004**	-0.005**	-0.004**	-0.003*	-0.004**	-0.004**	-0.004**	-0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(POSTxCONF) x Abidjan	-0.002	-0.008	-0.000	0.003	-0.004	-0.001	-0.004	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
(POSTxCONF) x Foreign	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(POSTxCONF) x LimLiabilities	-0.001	-0.002	-0.001	0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(POSTxCONF) x PublicCompany	-0.007**	-0.009**	-0.007**	-0.005†	-0.007**	-0.007**	-0.008**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
(POSTxCONF) x Agriculture	0.013*	0.014*	0.013*	0.013*	0.013*	0.013*	0.013*	0.013*
	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)
(POSTxCONF) x Fishing	0.030**	0.019**	0.029**	0.027**	0.031**	0.029**	0.030**	0.029**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Extraction	0.024**	0.021**	0.023**	0.022**	0.025**	0.023**	0.024**	0.024**
	(0.008)	(0.005)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
(POSTxCONF) x Manufacturing	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Electricity	0.006	0.007	0.006	0.003	0.007	0.007	0.007	0.006
	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
(POSTxCONF) x Construction	0.002	0.002	0.002	0.004	0.003	0.003	0.002	0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
(POSTxCONF) x Trade	-0.008*	-0.010*	-0.008*	-0.008*	-0.007†	-0.008*	-0.009*	-0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Hotels	0.014**	0.013*	0.014**	0.015**	0.014**	0.014**	0.014**	0.014**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
(POSTxCONF) x Transport	0.002	0.001	0.002	0.002	0.003	0.002	0.002	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x ServicesEnt	0.002	0.001	0.002	0.003	0.003	0.002	0.001	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Education	0.012**	0.013**	0.013**	0.014**	0.012**	0.012**	0.012**	0.012**
	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
(POSTxCONF) x Social	0.011*	0.010*	0.012**	0.013**	0.012**	0.012**	0.011*	0.012*
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)
(POSTxCONF) x StaffCost		0.408**						
		(0.050)						
(POSTxCONF) x Managers			-0.079					
			(0.057)					
(POSTxCONF) x AverWage				-0.235**				
				(0.052)				
(POSTxCONF) x Debt					0.130*			
					(0.062)			
(POSTxCONF) x TradeCredit						0.084†		
						(0.047)		
(POSTxCONF) x FinCost							0.150**	
							(0.049)	
(POSTxCONF) x IntRate								-0.041
								(0.048)
Combined effect	-0.090**	0.307**	-0.173**	-0.350**	0.043	0.011	0.068	0.133
Obs.	4640	4640	4640	4640	4640	4640	4640	4640
# firms	2088	2088	2088	2088	2088	2088	2088	2088
R^2 (within)	0.138	0.161	0.139	0.146	0.140	0.139	0.141	0.138

The dependent variable is the logarithm of total factor productivity. $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the region after 2011. Combined effect measures the point estimates for firm with input dummy equals to one (and associated statistical significance). Within estimator (firm fixed effect) is used. Standard errors are clustered at the firm-level. †, *, and ** signal significance at the 10%, 5% and 1% levels, respectively.

Table A7: Input reliance and its impact on value added and the number of workers

Panel A: Value added (in log)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.261**	0.061	-0.207**	0.174**	0.128**	0.117**	0.189**
	(0.037)	(0.038)	(0.034)	(0.045)	(0.034)	(0.038)	(0.035)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 (within)	0.083	0.076	0.080	0.078	0.077	0.077	0.079

Panel B: The number of workers (in log)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	-0.241**	0.182**	0.119**	0.023	0.029	0.115**	0.092**
	(0.025)	(0.025)	(0.026)	(0.028)	(0.025)	(0.028)	(0.029)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 (within)	0.356	0.348	0.344	0.341	0.341	0.344	0.343

The dependent variable is the logarithm of value added in Panel A and the logarithm of workers in Panel B. $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the district after 2011. Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm-level. * and ** indicate significance at the 5% and 1% levels, respectively.

Table A8: Evolution of the value added and workers according to dependence to high-skilled workers

	Log(Value added)				Log(Workers)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All firms								
POST x CONFL	-0.00512***	-0.000668	0.00125*	0.00187***	0.000631	0.00163***	0.00351***	0.00386***
	(0.000819)	(0.000736)	(0.000699)	(0.000697)	(0.000386)	(0.000368)	(0.000392)	(0.000399)
Panel B1: High dependence before the crisis (manager dummy=1)								
POST x CONFL	-0.00313	0.00188	0.00390**	0.00526***	0.00369***	0.00479***	0.00675***	0.00758***
	(0.00192)	(0.00175)	(0.00168)	(0.00159)	(0.000738)	(0.000683)	(0.000718)	(0.000744)
Panel B2: Low dependence before the crisis (manager dummy=0)								
POST x CONFL	-0.00579***	-0.00162**	0.000257	0.000534	-0.000582	0.000339	0.00218***	0.00232***
	(0.000880)	(0.000778)	(0.000733)	(0.000755)	(0.000451)	(0.000434)	(0.000466)	(0.000468)
Panel C1: High dependence before the crisis (average wage dummy=1)								
POST x CONFL	-0.00321***	0.000788	0.00247**	0.00316***	0.00292***	0.00429***	0.00769***	0.00827***
	(0.00115)	(0.00114)	(0.00108)	(0.00109)	(0.000632)	(0.000597)	(0.000638)	(0.000661)
Panel C2: Low dependence before the crisis (average wage dummy=0)								
POST x CONFL	-0.00650***	-0.00171*	0.000304	0.000908	-0.000834*	-0.0000912	0.000838*	0.000998**
	(0.00114)	(0.000963)	(0.000919)	(0.000914)	(0.000487)	(0.000464)	(0.000488)	(0.000489)
Year included								
2009	x	x	x	x	x	x	x	x
2010	x	x	x	x	x	x	x	x
2011	x	x	x	x	x	x	x	x
2012		x	x	x		x	x	x
2013			x	x			x	x
2014				x				x

The specification is the same as that employed in Table 4, except dependent variables. The dependent variable is the logarithm of value added in columns (1) to (4) and the logarithm of total workers in columns (5) to (8) . In Panel A, we display results for all firms. In Panel B1/2, we display results for firms relying more (resp. less) on managers. In Panel C, we classify firms according to the value of average wage. Standard errors are clustered at the firm-level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A9: Evolution of the share of managers and average wage

	Share of managers				Average wage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All firms								
POST x CONFL	-0.00469***	-0.00342***	-0.00312***	-0.00292***	-9.269***	6.045***	-3.098**	-3.090**
	(0.000348)	(0.000303)	(0.000292)	(0.000305)	(1.270)	(1.257)	(1.282)	(1.251)
Panel B1: High dependence before the crisis (manager dummy=1)								
POST x CONFL	-0.0154***	-0.0138***	-0.0134***	-0.0134***	-8.339***	-6.502**	-3.661	-4.512
	(0.00120)	(0.00101)	(0.000954)	(0.00101)	(2.916)	(2.791)	(2.814)	(2.827)
Panel B2: Low dependence before the crisis (manager dummy=0)								
POST x CONFL	-0.000990***	0.000246**	0.000565***	0.000822***	9.820***	5.463***	2.934**	2.576*
	(0.000125)	(0.000115)	(0.000118)	(0.000118)	(1.381)	(1.384)	(1.420)	(1.363)
Panel C1: High dependence before the crisis (average wage dummy=1)								
POST x CONFL	-0.00469***	-0.00265***	-0.00237***	-0.00189***	-23.96***	-24.66***	-25.87***	-26.74***
	(0.000375)	(0.000341)	(0.000332)	(0.000331)	(3.108)	(2.949)	(3.010)	(2.968)
Panel C2: Low dependence before the crisis (average wage dummy=0)								
POST x CONFL	-0.00470***	-0.00386***	-0.00358***	-0.00352***	-1.232	11.76***	9.349***	9.676***
	(0.000510)	(0.000439)	(0.000421)	(0.000444)	(0.837)	(1.045)	(0.964)	(0.909)
Year included								
2009	x	x	x	x	x	x	x	x
2010	x	x	x	x	x	x	x	x
2011	x	x	x	x	x	x	x	x
2012		x	x	x		x	x	x
2013			x	x			x	x
2014				x				x

The specification is the same as that employed in Table 4, except dependent variables. The dependent variable is the share of managers in columns (1) to (4) and the average wage in columns (5) to (8) . In Panel A, we display results for all firms. In Panel B1/2, we display results for firms relying more (resp. less) on managers. In Panel C, we classify firms according to the value of average wage. Standard errors are clustered at the firm-level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A10: Robustness checks (1) - Location

Panel A: Firms outside Abidjan							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.376*	-0.221+	-0.196+	0.143	0.062+	-0.095	0.205
	(0.112)	(0.135)	(0.107)	(0.141)	(0.063)	(0.115)	(0.167)
Obs.	1076	1076	1076	1076	1076	1076	1076
R^2 (within)	0.172	0.171	0.171	0.172	0.171	0.171	0.172
Panel B: Weigthed observations per number of firms in each locality							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.596**	-0.158**	-0.408**	0.148*	-0.090*	-0.027	-0.142**
	(0.047)	(0.050)	(0.044)	(0.059)	(0.043)	(0.050)	(0.048)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 (within)	0.213	0.185	0.195	0.184	0.184	0.183	0.184

The dependent variable is the logarithm of labor productivity. $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the district after 2011. Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm-level. †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A11: Robustness checks (2) - Dependent variable

Panel A: Labor productivity measured as value added per permanent worker							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.477**	-0.093*	-0.283**	0.142**	0.092*	0.023	0.133**
	(0.039)	(0.039)	(0.036)	(0.047)	(0.036)	(0.041)	(0.037)
Obs.	11171	11171	11171	11171	11171	11171	11171
R^2 within	0.139	0.116	0.123	0.117	0.116	0.115	0.117

Panel B: Labor productivity measured as value added per total payroll							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.240**	0.016	0.021	0.110**	0.026	0.017	0.044*
	(0.021)	(0.022)	(0.019)	(0.022)	(0.019)	(0.020)	(0.019)
Obs.	11028	11028	11028	11028	11028	11028	11028
R^2 within	0.053	0.032	0.033	0.036	0.033	0.032	0.033

Panel C: log of profit							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.148*	-0.022	-0.220**	0.051	0.178**	0.281**	0.158**
	(0.061)	(0.060)	(0.056)	(0.070)	(0.056)	(0.059)	(0.058)
Obs.	7922	7922	7922	7922	7922	7922	7922
R^2 within	0.053	0.032	0.033	0.036	0.033	0.032	0.033

Panel D: Gross operating surplus divided by sales							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.093**	-0.002	-0.022*	0.042**	0.019*	0.006	0.021**
	(0.013)	(0.010)	(0.009)	(0.011)	(0.009)	(0.009)	(0.007)
Obs.	11112	11112	11112	11112	11112	11112	11112
R^2 within	0.040	0.028	0.029	0.030	0.029	0.028	0.029

Panel E: Return on assets							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.094**	-0.002	-0.009	0.348**	0.098**	0.019	0.063+
	(0.031)	(0.035)	(0.032)	(0.053)	(0.031)	(0.029)	(0.034)
Obs.	11044	11044	11044	11044	11044	11044	11044
R^2 within	0.012	0.011	0.011	0.024	0.012	0.011	0.011

The dependent variable is defined in the heading of each panel. $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the district after 2011. Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm-level. †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A12: Robustness checks (3) - Interest variable; crisis definition and placebo test

Panel A: Dummy based on median							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.535**	-0.166**	-0.334**	0.131**	0.089**	0.0404	0.111*
	(0.037)	(0.037)	(0.041)	(0.037)	(0.038)	(0.045)	(0.048)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 within	0.207	0.181	0.188	0.179	0.178	0.178	0.178
Panel B: Continuous measure for input							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.0566**	-0.0017*	-0.0000**	0.0008*	0.0132**	0.0196	0.0127+
	(0.0078)	(0.0007)	(0.0000)	(0.0004)	(0.0037)	(0.0312)	(0.0072)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 within	0.223	0.178	0.194	0.178	0.180	0.178	0.178
Panel C: Including 2008 in pre-crisis period							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.428**	-0.135**	-0.330**	0.154**	0.075*	0.004	0.075*
	(0.034)	(0.036)	(0.035)	(0.041)	(0.033)	(0.036)	(0.037)
Obs.	13530	13530	13530	13530	13530	13530	13530
R^2 within	0.171	0.158	0.169	0.155	0.153	0.153	0.150
Panel D: Including 2010 as a crisis year							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.576**	-0.160**	-0.420**	0.190**	0.165**	-0.009	0.138**
	(0.042)	(0.045)	(0.040)	(0.047)	(0.041)	(0.043)	(0.043)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 within	0.303	0.280	0.291	0.281	0.281	0.279	0.280
Panel E: Placebo test							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	-0.041	-0.014	-0.010	0.077	0.052	0.047	-0.029
	(0.046)	(0.051)	(0.044)	(0.052)	(0.040)	(0.041)	(0.043)
Obs.	5852	5852	5852	5852	5852	5852	5852
R^2 within	0.041	0.038	0.038	0.043	0.041	0.041	0.043

The dependent variable is the logarithm of labor productivity defined as value added per worker in all specifications. In Panels A and B, the measure of input dependence is modified (dummy based on median value in the industry in Panel A and continuous measure in Panel B). In Panel C, the pre-crisis period is extended to 2008. In Panel D, 2010 is considered as a crisis year. In Panel E, a placebo test is implemented (see Section 5.3). $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the district after 2011. Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm-level. †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A13: Robustness checks (4) - Definition of credit exposure

Panel A: ACLED data (Nb of deaths per 100,000 inhabitants)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.563**	-0.127**	-0.307**	0.170**	0.093*	-0.006	0.123**
	(0.044)	(0.045)	(0.044)	(0.054)	(0.042)	(0.049)	(0.046)
Obs.	11178	11178	11178	11178	11178	11178	11178
Panel B: Absolute number of deaths (NCI data)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.0566**	-0.0017*	-0.0000**	0.0008*	0.0132**	0.0196	0.0127+
(POSTxCONF) x Input	0.448**	-0.095*	-0.244**	0.127**	0.090*	0.003	0.100*
	(0.039)	(0.039)	(0.038)	(0.044)	(0.038)	(0.041)	(0.039)
Obs.	11178	11178	11178	11178	11178	11178	11178
Panel C: Absolute number of deaths (ACLED data)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.551**	-0.124**	-0.302**	0.166**	0.094*	-0.004	0.121**
	(0.043)	(0.044)	(0.043)	(0.053)	(0.042)	(0.048)	(0.045)
Obs.	11178	11178	11178	11178	11178	11178	11178
Panel D: Number of events (ACLED data)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.468**	-0.112**	-0.258**	0.131**	0.100**	0.013	0.117**
	(0.040)	(0.040)	(0.040)	(0.046)	(0.039)	(0.042)	(0.040)
Obs.	11178	11178	11178	11178	11178	11178	11178
Panel E: Treatment dummy (NCI data)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.583**	-0.143**	-0.348**	0.165**	0.107**	0.012	0.157**
	(0.044)	(0.045)	(0.044)	(0.055)	(0.040)	(0.049)	(0.046)
Obs.	11178	11178	11178	11178	11178	11178	11178
Panel F: Treatment dummy (ACLED data)							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(POSTxCONF) x Input	0.587**	-0.153**	-0.332**	0.171**	0.108**	0.010	0.153*
	(0.044)	(0.046)	(0.044)	(0.056)	(0.041)	(0.049)	(0.046)
Obs.	11178	11178	11178	11178	11178	11178	11178

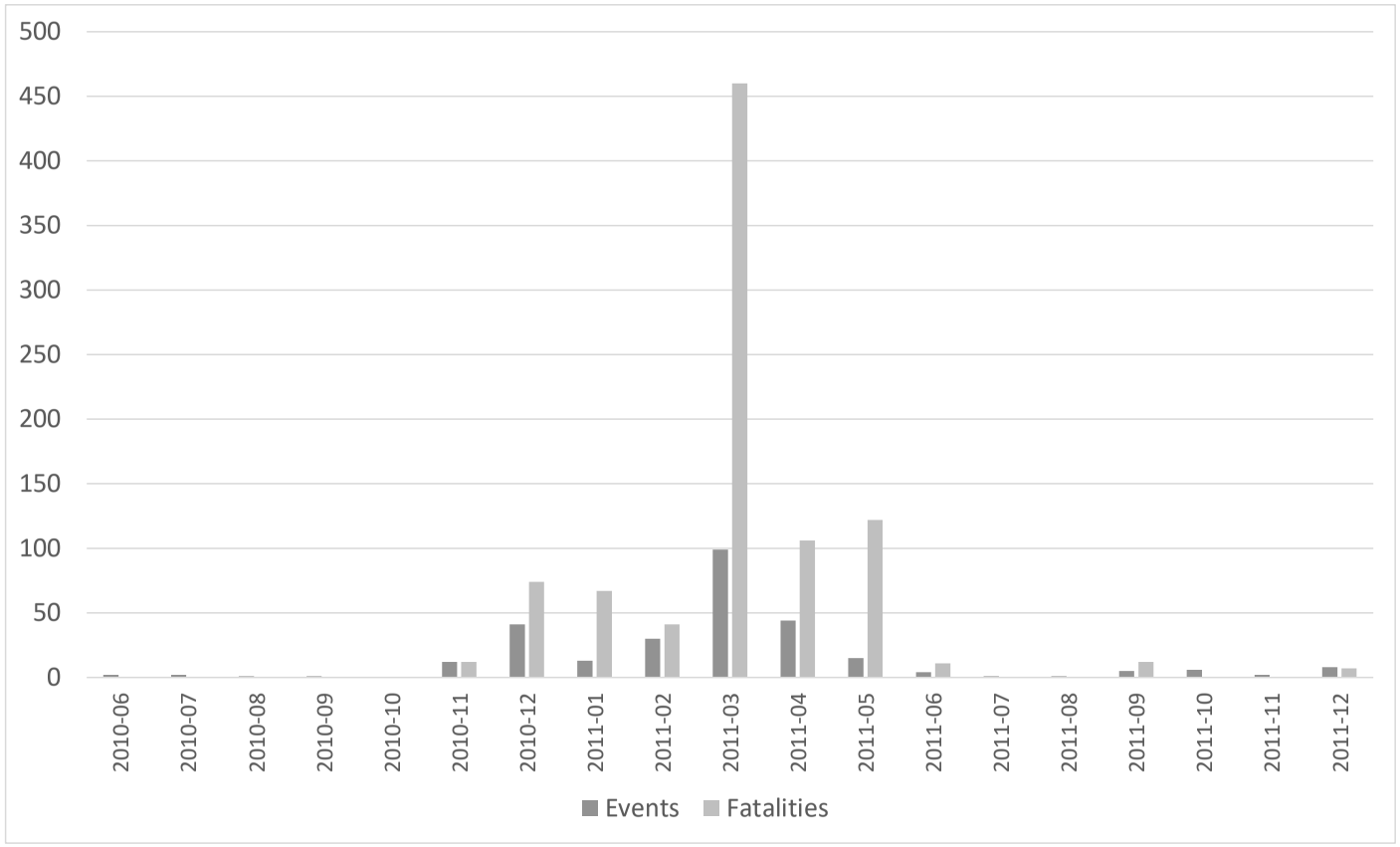
The dependent variable is the logarithm of labor productivity defined as value added per worker in all specifications. In Panel A, we employ ACLED data instead of NCI data. In Panels B and C, we exploit the absolute number of deaths per region (from NCI and ACLED respectively). In Panel D, we use the number of events (from ACLED). In Panels E and F, we create a dummy equals to one if a firm is located in region with at least one death (using NCI and ACLED data, respectively). Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm-level. †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A14: Robustness checks (5) - Econometric issues

Panel A: Value of labor productivity							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	8088.8**	-4212.0**	-6420.1**	-867.0	862.9	2998.6*	224.4
	(1823.7)	(1522.6)	(1638.0)	(1173.7)	(1302.1)	(1433.7)	(1398.3)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 within	0.088	0.085	0.086	0.083	0.084	0.084	0.083
Panel B: Inverse hyperbolic sine transformation							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.505**	-0.123**	-0.323**	0.143**	0.100**	0.006	0.096*
	(0.039)	(0.040)	(0.037)	(0.045)	(0.038)	(0.042)	(0.040)
Obs.	11178	11178	11178	11178	11178	11178	11178
R^2 within	0.088	0.085	0.086	0.083	0.084	0.084	0.083
Panel C: Inclusion of exiters							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.667**	-0.083	-0.258**	0.229**	0.150*	0.104	0.085
	(0.075)	(0.082)	(0.076)	(0.086)	(0.073)	(0.083)	(0.080)
Obs.	14749	14749	14749	14749	14749	14749	14749
R^2 within	0.090	0.083	0.084	0.083	0.083	0.083	0.083
Panel D: Sample selection							
Input →	Staff	Manager	Avg wage	Debt	Trade C.	FinCost	IntRate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
POST x CONFL	0.461**	-0.105**	-0.297**	0.160**	-0.085*	-0.016	-0.103**
	(0.037)	(0.039)	(0.035)	(0.044)	(0.035)	(0.038)	(0.036)
$\hat{\lambda}$	-0.073	-0.085	-0.052	-0.094	-0.113	-0.096	-0.086
	(0.127)	(0.129)	(0.128)	(0.129)	(0.129)	(0.129)	(0.128)
Obs.	10237	10237	10237	10237	10237	10237	10237
R^2 within	0.143	0.118	0.127	0.119	0.118	0.117	0.118

The dependent variable is the value of labor productivity defined as value added per worker in Panels A and C and the inverse hyperbolic sine in Panel B and D. In Panel A and B we add firms with a labor productivity which is null or negative. In Panel C and D, we consider exiters and set up their productivity to zero (or log(1) in Panel C) in the year of exit. In Panel E, a placebo test is implemented (see Section 5.3). $POST \times CONFL$ is a variable equal to zero before the crisis (e.g., 2011) and equal to the number of deaths per 100,000 inhabitants in the district after 2011. Within estimator (firm fixed effect) is used. In each column, interactions with firms' characteristics are included (but unreported). Firm fixed effect as well as control interactions are included but unreported. Standard errors are clustered at the firm level, except in Panel F (bootstrapping with 500 replications is used). †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively.

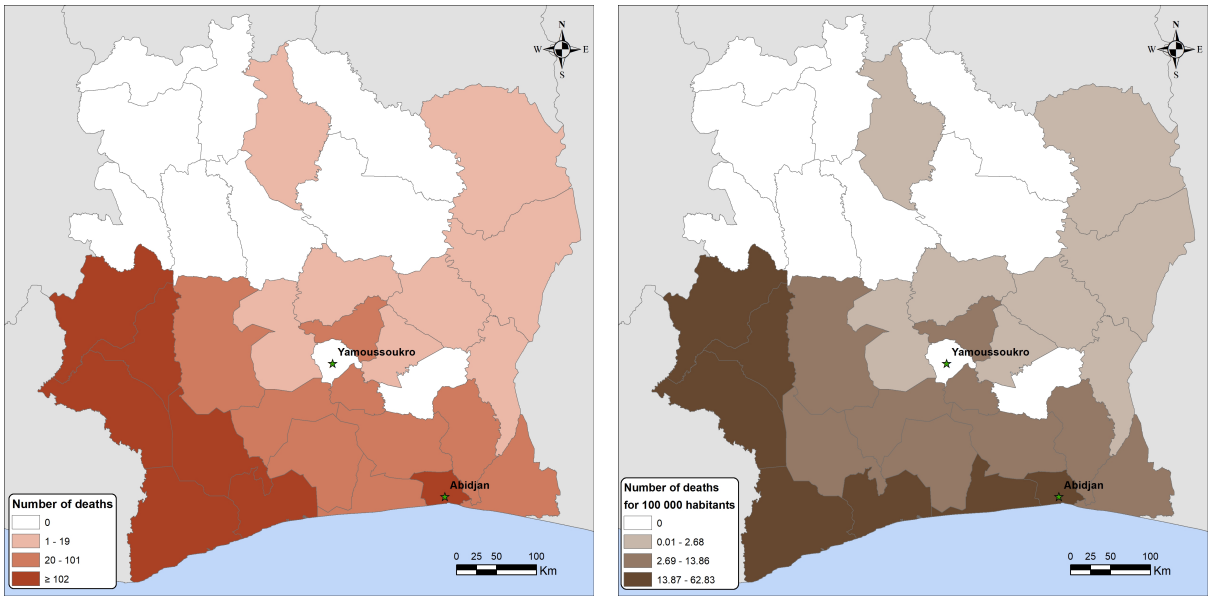
Figure A1: Number of fatalities and events from June 2010 to December 2011 (Source: ACLED)



Source: ACLED (authors' computation). Light grey refers to the number of fatalities and dark grey the number of events.

Figure A2: Conflict intensity per district

Panel (a): National Commission of Investigation



Panel (b): ACLED

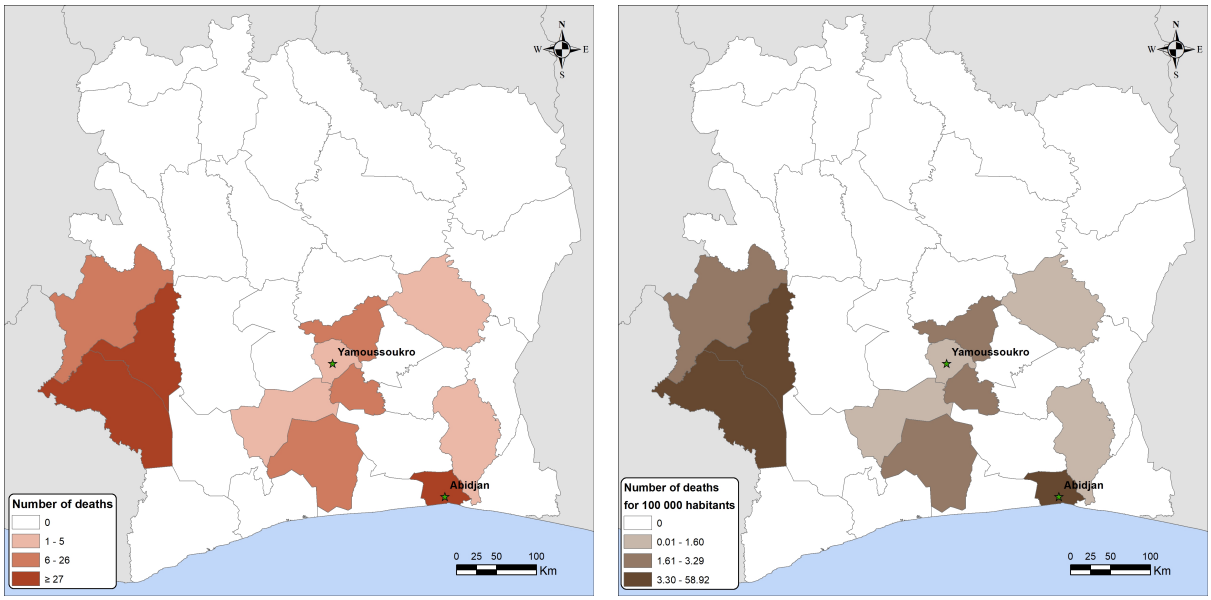
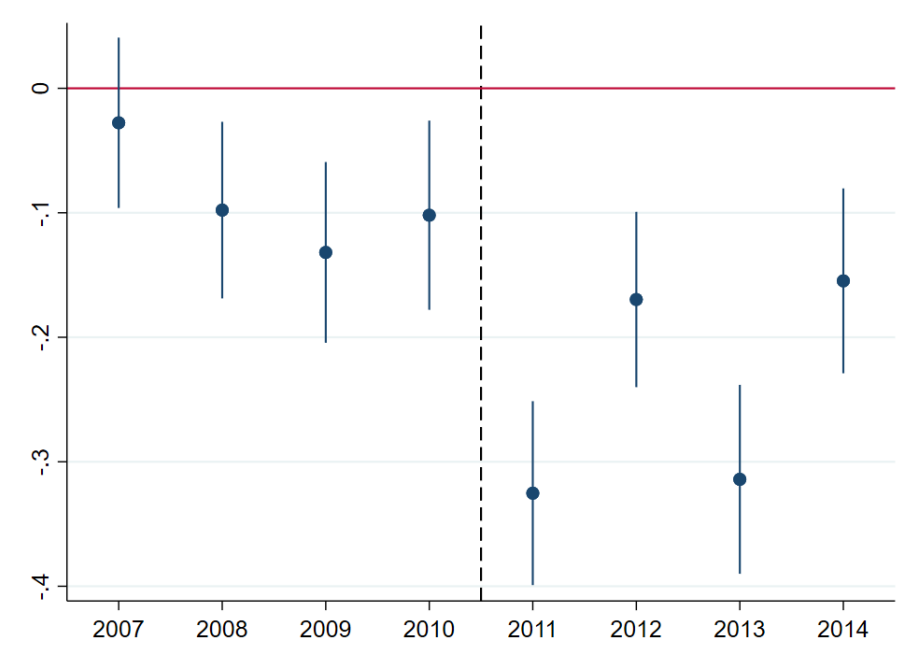


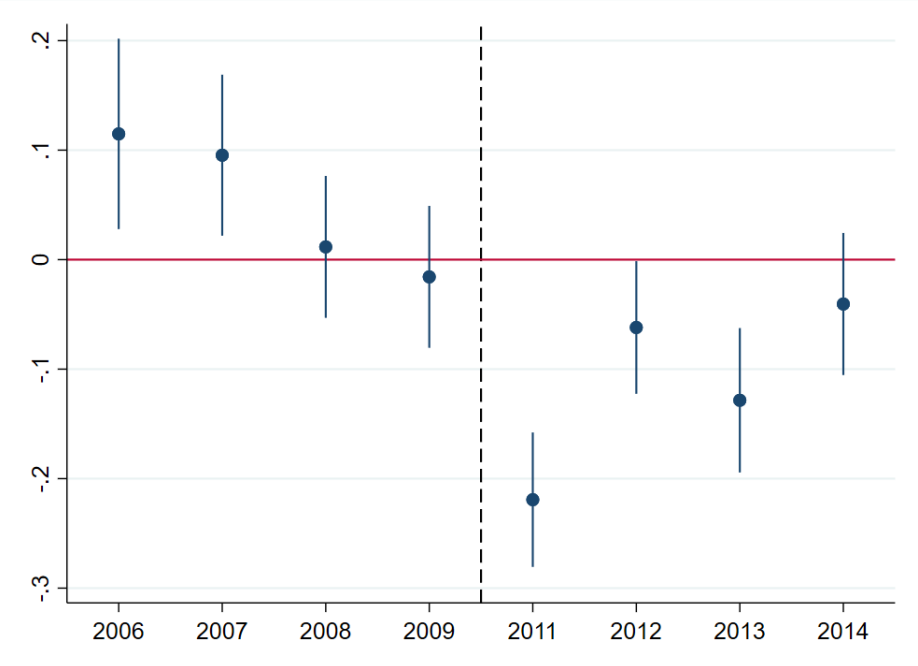
Figure displayed the absolute number of deaths (in left) and the relative number of deaths per 100,000 inhabitants (in right) per district in Cote d'Ivoire. Panel a) displays data from the NCI and Panel b) data from ACLED.

Figure A3: Testing parallel trends (base year = 2006)



The figure plots coefficients estimates and confidence intervals of the following model: $Log(P)_{ijkt} = \alpha_i + \mu_t + \beta_t(\mu_t \times TREATED_k) + \varepsilon_{ijkt}$ where $TREATED_k$ equals to one if a firm is located in a treated region k. A threshold of 10 deaths per 100,000 inhabitants is employed to discriminate between low intensity and high intensity. Base year is 2006. Dash line separates pre- and post-treatment periods.

Figure A4: Testing parallel trends (base year = 2010)



The figure plots coefficients estimates and confidence intervals of the following model: $Log(P)_{ijkt} = \alpha_i + \mu_t + \beta_t(\mu_t \times TREATED_k) + \varepsilon_{ijkt}$ where $TREATED_k$ equals to one if a firm is located in a treated region k. A threshold of 10 deaths per 100,000 inhabitants is employed to discriminate between low intensity and high intensity. Base year is 2010. Dash line separates pre- and post-treatment periods.

B. Identifying false similar firms

To detect any possible irregularities, we consider six criteria: city, year of creation, sector, legal status, ownership structure and the time lag between two observations (inferior to two years). If two observations differ in at least four of the six criteria, we consider that the observations are indeed two different firms.

Let's consider the following firms (10001, 10002, 10003, and 10004) whose characteristics are shown in Table B1.

The first firm (id=10001) is a common observation in the dataset. In spite of a change in the ownership structure, we do not observe other changes that allow us to consider that the firm identified in 2010 is different from the firm operating in the following year.

The second identifier seems undoubtedly to refer to more than one different firms. We lack information in 2010 and 2011 and all characteristics have changed between 2009 and 2012. In our classification, we consider these to be two separate firms because more than 4 criteria have changed and we create a new identifier (20002) for the observations after 2012.

The more complex case covers the last two situations (id=10003; id=10004). Between 2011 and 2012, many characteristics of firm 10003 changed. However, we consider that the firm referred to is the same because only three criteria of six are different (year of incorporation, ownership, and sector). For the same reason, we consider the observations of firm 10004 recover two different entities because four criteria have changed (year between two observations, year of incorporation, ownership structure and industry).

Table B1: Example of firms with a similar identifier

id	year	year incorp.	city	ownership	legal	industry	final id
10001	2009	2005	Abidjan	foreign	Other	Trade	10001
10001	2010	2005	Abidjan	foreign	Other	Trade	10001
10001	2011	2005	Abidjan	local	Other	Trade	10001
10002	2009	1995	Bouake	local	Public company	Manufacturing	10002
10002	2012	2011	Abidjan	foreign	Limited L.	Construction	20002
10002	2013	2011	Abidjan	foreign	Limited L.	Construction	20002
10003	2010	2008	Abidjan	foreign	Limited L.	Manufacturing	10003
10003	2011	2008	Abidjan	foreign	Limited L.	Manufacturing	10003
10003	2012	2011	Abidjan	local	Limited L.	Construction	10003
10004	2008	1998	Abidjan	local	Limited L.	Manufacturing	10004
10004	2011	2003	Abidjan	foreign	Limited L.	Services	20004
10004	2012	2003	Abidjan	foreign	Limited L.	Services	20004

C. Estimation of the TFP

Suppose the production function is a Cobb-Douglas function in capital K_{it} and labor L_{it}, the total factor productivity (TFP henceforth) can be estimated using the log transformation:

$$y_{it} = \beta_k k_{it} + \beta_l l_{it} + \mu_{it} \quad \text{, with} \quad \mu_{it} = \Omega_{it} + \eta_{it} \tag{C1}$$

with y_{it} representing the logarithm of the firm's output i in period t, nd l_{it} and k_{it}, respectively constitute the logarithm of labor and capital. The residual component is a mix of the productivity shock observed only by the firm affecting decision-making (Ω_{it}) and the unexpected productivity shock that is by definition not observed by the firm (η_{it}). In this framework, we can estimate the TFP term if β_k and β_l are known.

Estimation of TFP with traditional methods raises several methodological problems (simultaneity and endogeneity problems) because the level of productivity and inputs are likely to be correlated (Olley and Pakes, 1996; Levinsohn and Petrin, 2003). Thus, the estimation by OLS poses a problem of simultaneity. In addition, the use of a balanced panel does not consider inputs and outputs, leading to selection bias, which results from the relationship between productivity shocks and the probability of bankruptcy or business interruption. In addition, these methodological challenges may be accentuated by the fact that the company's product choices may be related to their underlying productivity (Bernard et al., 2009). Also, most of the other traditional estimators (fixed effects, instrumental variables and generalized method of moments) used to overcome these endogeneity problems have not proved satisfactory in the case of production functions, particularly because of their underlying assumptions.

Faced with these methodological questions, several estimators (parametric and semi-parametric) have emerged. Among the semi-parametric estimators, Olley and Pakes (1996) (OP) and Levinsohn and Petrin (2003) (LP) propose a semi-parametric estimator that considers simultaneity biases (and selection biases in the case of the OLS estimator). Indeed, Olley and Pakes (1996) are the first authors to propose an estimation method that explicitly considers the problem of selection and simultaneity by using a dynamic model that considers firm behavior and idiosyncratic productivity shocks. They propose a semi-parametric estimator that solves the simultaneity problem by using the company's

investment decision to replace unobserved productivity shocks. Under Levinsohn and Petrin (2003), the invertibility condition is likely to be invalidated in the presence of imperfect competition in the production markets, whereas it has no effect on the monotonicity condition under the OL method. We use the method of Olley and Pakes (1996) to estimate the overall factor productivity of the firms in our sample. Unfortunately, we cannot use the LP method because we do not have data on intermediate consumption and because of the methodological problems mentioned above.

We briefly describe the OP method used in this paper. Olley and Pakes (1996) assume that firms decide at the beginning of each period whether to continue or to stop production. If a firm decides to stop participating in the market, then it will receive a liquidation value equal to ϕ. On the other hand, if the company chooses to remain in the market by continuing to produce, it will use its factors of production (labor, capital, etc.) and set its level of investment I_{it}. Thus, the firm's results are conditioned by its stated variables at the beginning of the period, namely the capital stock K_{it}, the level of productivity ϕ_{it} and the age of the company a_{it}. This model assumes that expected productivity is defined as a function of current productivity and capital, i. e., : $E[\Omega_{(i,t+1)}|\Omega_{it}, K_{it}]$ and the company's result depends on Ω_{it} and K_{it}.

This assumes that a firm will cease trading provided that its liquidation value ϕ is higher than its expected future returns. In other words, there is a threshold level of productivity ($\underline{\Omega_{it}}$) under which a firm decides to leave the market.

The semi-parametric estimation method proposed by Olley and Pakes (1996) allows for simultaneity and selection biases to be considered, unlike traditional methods. Its application involves using the investment decision function to control the correlation between the error term and the factors of production. This is based on the following underlying assumption: future productivity is strictly increasing (Ω_{it} follows a first-order Markov process) and firms that experience positive productivity shocks will invest more during this period, for any level of capital. The investment choice of the firm I_{it} also depends on productivity (Ω_{it}), capital (K_{it}) and the age of the firm (a_{it}). Assuming positive investment, then the inverse function of the productivity shock is:

$$\Omega_{it} = I^{-1}(I_{it}, K_{it}, a_{it}) = h(I_{it}, K_{it}, a_{it}) \quad \text{, with } \partial\Omega_{it}/\partial I_{it} > 0 \tag{C2}$$

The advantage of this function is control of the simultaneity bias. By substitution C2 in C1 we get :

$$y_{it} = \beta_l l_{it} + \phi(i_{it}, k_{it}) + \eta_{it} \tag{C3}$$

With $\phi(i_i t, k_{it}) = \beta_0 + \beta_k k_{it} + h(i_{it}, k_{it})$ and $\phi(.)$ is approximated by the second-order polynomial series in capital and investment. We estimate Eq. C3 by OLS. The estimated coefficients of the variable production factor (labor) are therefore unbiased because $\phi(.)$ makes it possible to control unobserved productivity. As a result, the error term is no longer correlated with the factors of production. However, Eq. C3 does not identify β_k.

To control for selection bias, an estimate of survival probabilities is made. We know that the probability of a firm's survival at period t therefore depends on productivity, age, and capital at t-1 (as well as to their squares and cross-products). Therefore, in our implementation, we estimate the probability of survival by fitting a probit model.

We use the method of Olley and Pakes (1996) using the method introduced by Yasar et al. (2008). This approach uses a bootstrap technique to group variables by treating all observations of an individual firm as a (sub)group.

The results obtained using Olley and Pakes (1996) and the OLS method are presented in Table C1.

Table C1: Production function parameters: OP and OLS estimations

Variables	Olley and Pakes	OLS
Labor	0.610***	0.630***
	(0.130)	(0.009)
Capital	0.419***	0.338***
	(0.428)	(0.005)
Age	0.012***	0.013***
	(0.001)	(0.001)
Trend	-0.038***	-0.033***
	(0.007)	(0.006)

Standard errors in parentheses.
In the OP model SEs are bootstrapped (250 rep)
*** Significant at the 1% level.

D. Accounting for sample selection

In a first step, for each year we estimate a selection equation using a standard probit as follows:

$$Pr(s_i = 1) = \Phi(\delta X_{ij(t_0)} + \mu C_{ij(t_0)}) \quad (\forall t = 0, \ldots, T) \tag{D1}$$

where s_i is a dummy equal to 1 if a firm survived in year t and 0 if not. $X_{ij(t_0)}$ and $C_{ij(t_0)}$ are variables included in the baseline model (input usage and firm characteristics). Ideally, we should include a selection variable that affects only the selection process (i.e., exit) but not the outcome (performance of survivors). However, we fail to find a relevant selection variable in our case. Results using the first step as displayed below in Table D1. It should be noted that input usage does not tend to alter the likelihood probability to exit, at the weak exception of Debt variable (which reduced exit probability but before, during and after the crisis). Among other factors, only the age is a strong determinants of exit both before, during and after the crisis. Enterprises operating under the status of limited liabilities are more likely to exit, except in the year of the crisis. The role of size is stronger before the crisis.

In a second step, we compute the inverse of the Mills ratio for each firm i for each year t as follows:

$$\hat{\lambda}_i = \frac{\phi(\hat{\delta} X_{ij(t_0)} + \hat{\mu} C_{ij(t_0)})}{\Phi(\hat{\delta} X_{ij(t_0)} + \hat{\mu} C_{ij(t_0)})} \quad (\forall t = 0, \ldots, T) \tag{D2}$$

where $\Phi(.)$ is the cumulative normal distribution function and $\phi(.)$ the normal density function.

Insofar as $\hat{\lambda}_i$ is computed for each period by running a probit model by period, we use a time-variant measure of the inverse of the Mills ratio ($\hat{\lambda}_{it}$) allowing us to include firm fixed effects as well as our crisis and post-crisis dummies. In a third step, we re-estimate the baseline model (Eq. 1) by adding the estimated inverse Mills ratio as covariates:

$$Log(P)_{ijkt} = \alpha_i + \mu_t + \beta_1(POST_t \times CONF_k) + \beta_2(POST_t \times CONF_k) \times X_{ij(t_0)} + \gamma \hat{\lambda}_{it} + \varepsilon_{ijkt} \tag{D3}$$

According to Wooldridge (1995), a simple test to detect sample selection is based on statistical significance of the inverse of the Mills ratio. Under the null hypothesis (absence

of bias) the coefficient is statistically equal to 0. If not, we need to correct for sample selection bias. In this case, we cannot use standard errors because $\hat{\lambda}_{it}$ is a generated variable. A simple way to get robust standard errors is by applying the bootstrapping method (Brownstone and Valletta, 2001).

Table D1: Determinants of exit per year

	Exit in				
Variables	2010	2011	2012	2013	2014
Usual firms' characteristics					
Log(EMPL)	0.120**	0.101*	0.089	0.032	-0.018
	(0.037)	(0.053)	(0.052)	(0.053)	(0.045)
Log(Sales)	0.023	-0.044	0.043	0.081*	0.102**
	(0.025)	(0.036)	(0.035)	(0.039)	(0.035)
Log(Age)	0.186**	0.264**	0.143**	0.240**	0.090
	(0.026)	(0.048)	(0.050)	(0.057)	(0.058)
Abidjan	-0.034	-0.121	-0.142	-0.140	0.057
	(0.088)	(0.132)	(0.136)	(0.130)	(0.117)
Foreign	-0.131*	-0.085	-0.055	0.088	0.113
	(0.051)	(0.088)	(0.082)	(0.088)	(0.081)
LimLiabilities	0.152**	0.220**	0.038	0.147	0.243**
	(0.053)	(0.094)	(0.078)	(0.077)	(0.075)
PublicCompany	-0.091	0.191	-0.069	-0.093	0.214
	(0.093)	(0.140)	(0.131)	(0.132)	(0.125)
Input mix					
StaffCost	-0.232**	-0.177	-0.144	0.152	0.115
	(0.087)	(0.123)	(0.111)	(0.142)	(0.135)
Managers	0.025	0.008	-0.159	0.027	-0.012
	(0.025)	(0.137)	(0.140)	(0.123)	(0.121)
AverWage	0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt	-0.014	-0.031*	-0.024**	-0.021*	-0.014
	(0.010)	(0.012)	(0.009)	(0.010)	(0.009)
TradeCredit	-0.223	-0.420	0.169	-0.458**	-0.321
	(0.137)	(0.343)	(0.425)	(0.196)	(0.333)
FinCost	10.70	-0.571	-1.143	3.441	-2.206
	(10.47)	(10.89)	(1.685)	(2.333)	(1.641)
IntRate	0.441	0.211	0.598	-0.821	0.180
	(0.347)	(0.783)	(0.945)	(0.596)	(0.686)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Obs.	4385	3941	3184	2987	2622
pseudo-R^2	0.05	0.07	0.05	0.06	0.04

The dependent variable is a dummy taken value one for firms that exit and 0 otherwise. Models is based on probit estimation run year by year. * and ** indicate significance at the 5% and 1% levels, respectively.

References

Bernard, A. B., Redding, S. J., and Schott, P. K. (2009). Products and productivity. *Scandinavian Journal of Economics*, 111(4):681–709.

Brownstone, D. and Valletta, R. (2001). The bootstrap and multiple imputations: harnessing increased computing power for improved statistical tests. *Journal of Economic Perspectives*, 15(4):129–141.

Levinsohn, J. and Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *Review of Economic Studies*, 70(2):317–341.

Olley, G. S. and Pakes, A. (1996). The dynamics of productivity in the telecommunications equipment industry. *Econometrica*, 64:1263–1297.

Wooldridge, J. M. (1995). Selection corrections for panel data models under conditional mean independence assumptions. *Journal of Econometrics*, 68(1):115–132.

Yasar, M., Raciborski, R., and Poi, B. (2008). Production function estimation in Stata using the Olley and Pakes method. *Stata Journal*, 8(2):221–231.