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**TAX STABILISATION, TRADE AND POLITICAL
TRANSITIONS IN FRANCOPHONE WEST AFRICA OVER
120 YEARS**

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Tax Stabilisation, Trade and Political Transitions in Francophone West Africa over 120 years

Jens Andersson

Abstract

Contemporary African fiscal systems are usually portrayed as being subject to significant instability, which has negative consequences for public spending and development. However, this paper documents significant long-term fiscal stabilisation in Benin, Côte d'Ivoire, Niger and Senegal as measured by reductions in tax revenue instability and the responsiveness of tax revenue to trade over a 120-year period. This historical process of long-term fiscal stabilisation in francophone West Africa has not been properly acknowledged in the contemporary fiscal policy literature that tends to focus on recent decades. Moreover, it is shown qualitatively and econometrically that this fiscal stabilisation has been accompanied with a long-term reduction in the volatility of trade, a change in tax composition away from trade taxes to indirect domestic taxes, and major shifts in development policy paradigms. This points to the value of studying African fiscal systems over long periods of time to identify relationships not apparent from a short-term perspective and understand the intricate mechanisms and dynamics that characterize the development process.

Introduction

It is a well-documented phenomenon that tax revenue in developing countries is more volatile and responsive to economic shocks than in developed countries (Gavin & Perotti 1997; Kaminsky et al. 2004; Talvi & Végh 2005; Afonso et al. 2010). Such fiscal volatility has negative consequences for public spending and ultimately for long-term social and economic development (Broadberry & Wallis 2017). While good comparative data is scarce, Sub-Saharan Africa is particularly affected by instability of tax revenue given low incomes and levels of economic diversification (Ebeke & Ehrhart 2012). However, there is great diversity among African fiscal systems both between countries and over time (Mkandawire 2010). While the existing data shows that tax volatility has fallen in recent decades in francophone West Africa, so far it has been unclear if this fall is part of a long-term historical trend or a recent phenomenon. In fact, new evidence suggests that the former may be the case, as the fiscal systems of these countries appear to have undergone considerable strengthening coupled with economic expansion during the long 20th century (Andersson 2017). It remains to be tested whether these gains have translated into a measurable reduction in tax instability and, if this is the case, what factors have been the main drivers of stabilisation. Such analysis would enable putting the current fiscal situation in francophone West Africa into a historical and comparative perspective that can contribute to a better understanding of the potential for further fiscal stabilisation, and hence improved development prospects, in these countries.

The aim of this paper is thus to investigate the long-term behaviour of tax instability in francophone West Africa. The paper first addresses the question whether tax instability has fallen or risen in the long-term and then turn to investigating how changes in instability may be explained. Such analysis is made possible through two main innovations. The first innovation is the use of a unique set of recently assembled time-series data of consistent and comparative annual data on fiscal outcomes and economic variables for four countries in francophone West Africa; modern-day Benin, Côte d'Ivoire, Niger and Senegal covering a period of some 120 years, thus spanning both the colonial and independent periods (1893–2010). The second innovation is the application of econometric techniques from the contemporary fiscal policy literature to this historical data, which allows for investigating the evolution of fiscal instability from early colonization until today using established quantitative methods.

The four countries represent highly relevant cases for the long-term study of fiscal systems, since they share French colonial history and institutions, in addition to a common currency and membership in the West African Economic and Monetary Union. These commonalities make it relevant to study the countries as a group to

tease out common patterns, while recognizing the uniqueness of each country. The main contribution of the paper is to give a historical perspective on the current state of tax revenue instability and economic volatility more broadly in French-speaking West Africa, but it also addresses wider issues related to the periodization of African economic history and tax policy regimes. Moreover, it contributes to the broader literature on the fiscal capacity of the state, by demonstrating that tax revenue volatility and responsiveness are central, but often neglected, aspects of state capacity and proposes measures and approaches for such study in a historical context.

Previous literature

As mentioned in the introduction, the contemporary fiscal policy literature shows that tax revenue in developing countries tends to be more volatile than in developed countries and be more responsive to economic fluctuations, implying that tax revenue in developing countries is more countercyclical than in developed countries (Gavin & Perotti 1997; Kaminsky et al. 2004; Talvi & Végh 2005). From a strictly Keynesian point of view this countercyclicality may seem appropriate, as taxes fall during ‘bad’ times and increase during ‘good’ times to even out the economic cycle. In addition, a high elasticity of tax revenue to growth shows that governments can generate revenue from economic growth. However, it has been shown that tax revenue volatility also generates political competition to spend the windfall in good times, which produces procyclical public spending (hence reinforcing the business cycle) in the absence of appropriate fiscal allocations mechanisms (Talvi & Végh 2005). Such spending volatility has been found to be detrimental to growth and welfare, principally by influencing negatively public spending (Ebeke & Ehrhart 2012). Seen from this perspective tax volatility is thus detrimental to social and economic development.

There are three main explanations to the higher volatility of tax revenue in developing countries relating to economic structure, tax policy and politico-institutional factors. The first explanation attributes tax revenue volatility to the more volatile tax base of developing countries, which in turn is due to greater dependence on the agricultural sector and commodity exports reliant on volatile world market prices (Bleaney et al. 1995). The second explanation is based on the fact that developing countries tend to have higher shares of trade taxes in their tax mixes, because of the structure of their economies and since trade taxes are less costly to collect than domestic taxes (Bleaney et al. 1995; Seelkopf et al. 2016). This dependence on trade taxes generates fiscal volatility by tax systems more vulnerable to changes in the trading environment. The third explanation concerns the revenue

effects of political and institutional factors, including the capacity of the tax administration (Besley & Persson 2013). This explanation has been more fully explored for spending volatility than taxation, as revenue can be expected to be more of an automatic reaction to economic output compared to spending (Afonso et al. 2010). Nevertheless, short-term discretion can also be an influential factor on the revenue side, e.g. in relation to electoral cycles (Ehrhart 2013). Agnello and Sousa (2014) show that government revenue volatility is lower in more populous countries with more democratic and stable regimes. This is in line with influential arguments that emphasize institutions as ultimate explanations to economic stability (Acemoglu et al. 2003; Broadberry & Wallis 2017).

The available data shows that tax revenue volatility is higher in Sub-Saharan Africa than in other regions, and has been persistently high since the 1970s (Brun et al. 2006, p. 169). However, there is large variation within the continent as shown in Table 1, because of the diversity of fiscal systems in Africa (Mkandawire 2010). There has been a considerable fall in tax revenue instability in both francophone West Africa (WAEMU) and in East Africa (EAC) to low levels (0.05–0.06) in recent decades, which is comparable to the level of South Africa (0.05). In contrast, revenue instability grew in the SACU countries, due to substantial increases in volatility in Namibia, Lesotho and Swaziland.

Table 1 Volatility of tax revenue in Sub-Saharan Africa by trading area

Region	Number of countries	1981–1990	1991–2000	2001–2010
CEMAC	6	0.21	0.12	0.12
EAC	5	0.19	0.13	0.05
ECOWAS	6	0.25	0.18	0.11
SACU	5	0.09	0.09	0.12
WAEMU	8	0.12	0.12	0.06
Other	6	0.11	0.13	0.10
Total	39	0.16	0.13	0.09

Source: Author’s calculation using data from Mansour (2014). Note: Unweighted regional averages. Volatility is calculated as the standard deviation of the cyclical components of logged total tax revenue as percentage of GDP extracted using the Hodrick-Prescott filter (smoothing parameter 100). Angola and Zimbabwe are excluded for lack of data.

The literature that tries to test econometrically the three explanations of fiscal instability proposed above to better understand the determinants for these different outcomes within Sub-Saharan Africa is quite limited. In an early contribution based on a broader group of developing countries, Bleaney et al. (1995) show that tax

revenue instability was higher in open economies with low per capita income, high volatility in economic output and high inflation, but find no effect from the composition of taxes. Moreover, instability is shown to be higher in Sub-Saharan Africa than in other regions even when controlling for these factors, but the authors offer no satisfactory explanation for this.¹ The only more recent attempt to analyse tax revenue instability in Sub-Saharan Africa seems to be Ebeke and Ehrhart (2012), who find that tax base instability (measured by the volatility of GDP per capita) is positively correlated with tax revenue instability. In contrast to Bleaney et al (1995), Ebeke and Ehrhart also find that tax composition matters, as reliance on domestic indirect taxes have a stabilizing effect on tax revenue, while they find no effect on fiscal instability from political variables (conflict and elections). However, Agnello and Sousa (2014) do find a relationship between revenue volatility and democracy (positive) and political instability (negative) for a larger group of developing countries, in line with earlier evidence of a relationship between political instability and macroeconomic volatility (Aisen & Veiga 2008).

Given the close link between revenue and spending it also relevant to consider the results from studies focusing on the public spending side in Africa. This literature confirms the pro-cyclicality of African government spending, and the correlation between revenue and spending volatility and ultimately lower levels of public investment, even though one should be cautious about the causalities involved (Bleaney et al. 1995; Carmignani 2010; Lledó et al. 2011; Ebeke & Ehrhart 2012). Diallo (2009) finds a positive association between countercyclical government expenditure and democratic institutions. In contrast, Lledó et al. (2011) find no effect from political institutions or institutional quality, but rather suggestive evidence of how increased fiscal space resulting from aid inflows and lower external debt can have a counter-cyclical effect. Carmignani (2010) explains eloquently how low economic development and external constraints combine to constrain the fiscal space of African governments and increase pro-cyclicality:

Low incomes (and hence a small tax base) coupled with a large informal sector and inefficient tax administrations imply a high dependence of African countries on external resources to finance expenditure. The pro-cyclical pattern of external resources then makes it very difficult for the average African country to run fiscal policy counter-cyclically. Furthermore, in several countries, the fiscal policy space is further constrained by the adoption of fiscal rules that set target levels for the overall deficit and/or specific budget components. Many of the regional economic communities existing in Africa make use of these rules to drive the process of economic integration. [These rules] often prevent policymakers from adopting a counter-cyclical stance and actually encourage a pro-cyclical stance (p. 262).

¹ See Jerven (2011) on the difficulties of interpreting African ‘dummies’.

In sum, the existing cross-sectional literature indicates that the economic structure is a key determinant of fiscal instability in Africa, while there are mixed results about the composition of taxation. The support for the politico-institutional explanation is also mixed, which may be due to the internal and external constraints put on the fiscal space of African governments and the influence of political instability regardless of the regime. The next section develops the approach used in this paper to test these results in a long-term perspective.

Method

The first step is to document the historical evolution of fiscal volatility, which is relatively straight-forward. Let us express the relationship between tax outcome, tax base and tax rate as follows (Kaminsky et al. 2004):

$$\text{tax outcome} = \text{tax base} * \text{tax rate}$$

where *tax outcome* is the tax revenue, *tax base* is the underlying economic output on which tax is levied and *tax rate* is the rate of taxation determined by the government. The volatility is calculated as the standard deviation of the cyclical components for different time periods. This can be interpreted as the average change over the period in percent. The cyclical components of the logged variables are extracted by using the Hodrick-Prescott filter with smoothing parameter 100 as is usually recommended for annual series (see e.g. Gavin & Perotti 1997; Talvi & Végh 2005). Some critics are critical to the Hodrick-Prescott filter because it is less transparent than other approaches and there is a risk to filter out long term cycles, but it is still a commonly used method. The coefficient of correlation is used to describe how the relationship between cyclical components of tax outcomes and the tax base changes over the same time periods. A highly positive correlation implies a strong relationship between tax outcome and tax base.

The coefficient of correlation is a simple measure that gives a first indication of the short-term relationship between tax revenue and the tax base, but it does not allow for disentangling between different causes of tax volatility. Finding appropriate ways of doing so is subject to much debate in the literature. To understand the challenge involved, it is helpful to consider tax outcomes as a function of three different forces: responsiveness, persistence and discretion (Afonso et al. 2010). *Responsiveness* is the elasticity of tax revenue to output of the same year. *Persistence* is the degree of dependence of current revenue on its own past developments. *Discretion* is the consequence of exogenous political processes or extraordinary non-economic circumstances. It is a well-known fact that tax systems tend to be characterized by long-run persistence, or fiscal inertia (Bird 2013). Yet,

in the short-run tax revenue is generally considered to be more responsive to changes in economic output compared to government spending (Afonso et al. 2010). The problem is that it is empirically difficult to dissociate the revenue generating effects of variations in the tax base (responsiveness) from changes in the tax rate (discretion), primarily because they are determined at the same time, but also because changes in tax rates are empirically difficult to observe (see the discussions in e.g. Bleaney et al. 1995; Gavin & Perotti 1997). Consequently, the empirical focus in the literature has been on the relationship between tax outcomes and the tax base, while there has been no consensus on how to measure the discretionary component of fiscal policy (Fatás & Mihov 2003). Separating discretionary and non-discretionary effects ideally requires knowledge of a benchmark for economic output and the elasticities of tax outcomes to economic output, which are usually not available for developing countries (Gavin & Perotti 1997, p. 24). One solution is proposed by Blanchard (1990) who suggests that the output of the previous year should be used as benchmark. Building on this idea, Fatás and Mihov (2003) develop an econometric framework for separating out the discretionary components of fiscal policy. The idea is to distinguish between the part of fiscal policy that is determined as a response to economic output and the discrete component that is associated with political processes or extraordinary non-economic circumstances.

Adopting this approach, the following fiscal policy model is estimated for each of the four countries:

$$\log(\Delta Tax_{i,t}) = \alpha_i + \beta_i \log(\Delta Trade_{i,t}) + \gamma_i \log(\Delta Tax_{i,t-1}) + \delta_i \log(\Delta Trade_{i,t-1}) + \varepsilon_i Controls_{i,t} + \eta_{i,t} \quad (1)$$

where ΔTax is the annual change of real total tax revenue and $\Delta Trade$ the annual change of real total trade for country i at year t . *Controls* include inflation and past year's inflation to control for the possible effect on taxation of high-inflation periods and inflation squared for possible non-linear relationships, together with a time trend, following Fatás and Mihov (2003). The level of discretionary tax policy is measured by the standard deviation of the residual $\eta_{i,t}$, while the coefficient β_i is interpreted as the responsiveness of the tax system to changes in the tax base (in this case proxied for by international trade) (Afonso et al. 2010).

An issue when modelling the relationship between taxation and economic output is to deal with the endogeneity between the two variables. The early fiscal policy literature used simple OLS (Bayoumi & Eichengreen 1995; Gavin & Perotti 1997), but this may produce biased results because of endogeneity. There are several ways to tackle this problem, but more sophisticated methods do not always produce results that are very different from those coming out of simple OLS (Ilzetzki & Vegh 2008). This paper follows Bleaney and Halland (2014), who argue that when the

main objective is to estimate fiscal volatility, and it is sufficient to rely on simple OLS to estimate fiscal discretion.²

It should be noted that international trade is used here as a proxy for the tax base and not GDP as is commonly the case in the contemporary fiscal policy literature. There are three main reasons for this. First, international trade has been shown to be an important historical driver of the introduction of modern taxation (Seelkopf et al. 2016) and openness is consistently more strongly correlated with the most common measures of fiscal capacity than GDP (Bird et al. 2004). Second, African countries have been highly dependent on trade throughout both the colonial period and increasingly since independence, and the four countries studied here are no exceptions (Hopkins 1973; Adedeji & Williams 2007). Given the weakness of African economies they are highly vulnerable to trade shocks (Collier 2002). Rodrik (1998) argues that more open countries increase the size of the government to insure against external risk. Third, African GDP is lacking for the colonial period and trade is usually used as a second-best proxy for economic output (Jerven 2012; Prados de la Escosura 2012). To correct for major regime shifts that may imply a shift in the relationship between taxation and trade, the model is estimated alternatively for the full period, with a break at independence in 1960 and for three separate time periods – 1892–1930, 1931–1980 and 1981–2010. These three time periods correspond to broader historical economic and social policy regime shifts identified in the African historical literature, namely the shift from extractive colonialism to the ‘development era’ in the 1930s and the oil crisis and structural adjustment in the 1980s (Coquery-Vidrovitch 1976; Cooper 2002).

The last step is to assess explanations for tax revenue discretion. The following panel model is estimated in first differences for consecutive, non-overlapping, five-year periods between 1901 and 2010 (corresponding to 22 five-year periods):

$$\log(\Delta SDTax_{i,t}) = \alpha_i + \beta_i(\Delta Polinst_{i,t}) + \gamma_i \log(\Delta Sharetradetax_{i,t}) + \delta_i \Delta Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $SDTax$ is the standard deviation of $\eta_{i,t}$ from equation (1). $Polinst$ are two measures of political institutions – the current regime and regime shifts. $Sharetradetax$ is the share of trade taxes to total taxes. The $Controls$ are years of education, and the annual volatility of rainfall, oil price and GDP in France. This approach is close to that of Ebeke and Ehrhart (see also Bleaney et al. 1995; 2012), with the difference that non-overlapping windows are used. The model is estimated with Newey-West standard errors to account for heteroskedasticity and first-order autoregressive errors in the residuals.

² The use of two-year lagged values of trade as instruments for current trade, as proposed by Fatás and Mihov (2003), was attempted, but yielded wildly fluctuating estimates for fiscal discretion.

Variables and data

The descriptive statistics for the explanatory variables included in the tax revenue discretion model (equation 2) are shown in Table 2. The data is an unbalanced panel covering four countries and 113 years (1893–2010), except for Niger for which trade data is only available from 1929 onwards. The tax and trade data are from Andersson (2017), where it is fully presented with sources. In brief, the colonial data was compiled from various colonial budgets and reports produced by the French colonial authorities and linked to contemporary data bases, notably the economic and financial database of the Banque Centrale des Etats de l'Afrique de l'Ouest and Mansour (2014). The tax data is broken down by the main tax category – direct, trade and domestic indirect taxes. The trade variable is the sum of imports and exports. Inflation data is proxied by French CPI from Piketty (2010) for the colonial period (in the absence of any available historical African price data) and linked to national GDP deflators from the World Development Indicators after 1960.

Table 2 Descriptive statistics - Variables included in the estimation of the volatility of tax revenue discretion (in levels)

Variable	Obs	Mean	Std. Dev.	Min	Max
sd Tax (full period)	82	0.101	0.055	0.009	0.270
sd Tax (break 1960)	82	0.097	0.054	0.010	0.269
sd Tax (breaks 1930 and 1980)	82	0.095	0.051	0.013	0.228
Regime change	88	1.170	1.416	0	5
Political regime	88	-5.543	4.849	-9	8
Trade tax share	88	0.418	0.194	0	0.828
Years school	88	0.996	1.049	0.01	4.58
sd Petrol price	88	0.164	0.117	0.006	0.378
sd Rainfall	88	0.165	0.081	0.019	0.348
sd French real GDP	88	0.042	0.047	0.005	0.171

The measure of political instability is constructed by first creating a dummy variable for each year and country and then counting the number of years where the dummy takes the value one by non-overlapping five-year period. For example, if three out of five years are coded as instable in a country, the variable is given the value 3 for that five-year period. The yearly dummy is given the value one if in that year the country was exposed to a world war or major regime change. During the colonial period, all countries are given the same dummies in the following years: 1905

(creation of the federation of French West Africa), 1914–18 (First World War), 1939–45 (Second World War), 1946 (new constitution of the French Fourth Republic), 1956 (Loi Cadre) and 1958 (Constitution of the French Fifth Republic and abolishment of the Federation of French West Africa) and 1960 (independence), while stability is assumed for the other years.³ For the period 1961–2010, the outcomes differ between countries. The regime change data for the period after 1960 is taken from the *Regtrans* variable of the Polity IV Project dataset version 2015. The definition of a regime change is a three-point change or more in the Polity variable occurring within three years or less. Both regime change years and years within a regime transition period are coded as one. The overall expectation is thus that there is a positive relationship between tax revenue discretion and political instability.

The other political variable is the political regime measured by the *Polity2* variable that ranges between -10 and +10 for the years 1960–2010. The Polity project uses a three-part categorization of regimes into ‘autocracies’ (-10 to -6), ‘anocracies’ (-5 to +5), and ‘democracies’ (+6 to +10). There is no Polity data for the colonial period. Since properly recreating such data is beyond the scope of this paper a simple procedure has been followed as above with the same scores assigned to all the countries. For the period before 1946 a score of -9 was assigned given the authoritarianism of colonial governments (see Acemoglu et al. 2003 for a similar argument). From 1946 the score is changed to -6 to reflect the new French constitution that allowed local populations to elect local representatives. Finally, the last three years of colonial rule, 1957–1959, are coded ‘0’ as the Loi Cadre of 23 June 1956 introduced universal suffrage to the colonies. If the political regime variable is significant, which is uncertain according to the previous literature, a negative relationship is expected with tax discretion.

The next independent variable is the share of trade taxes to total taxes, as a measure of the composition of taxes. Since trade taxes are likely to be more volatile compared to direct and domestic indirect taxes, the expectation is that the share of trade taxes is positively correlated with tax discretion.

Human capital is another potential correlate with tax volatility discretion. In this paper, human capital is measured by estimates of years of schooling from the Lee and Lee Long-Run Education Dataset (the *tyr* variable). Ebril et al. (2001) argue that schooling can be considered a proxy for the sophistication of administrative capacity and find that VAT yields less revenue in less literate economies. Under the

³ This is obviously a simplification in that the colonial regime varied between colonies. For example, the inhabitants of the so-called Quatre Communes in Senegal were entitled to elect a representative to the French Parliament for much of the period before the Second World War.

assumption that the proper enforcement of more advanced taxes reduces volatility, a negative association may be expected between education and tax discretion.

The country rainfall data comes from the World Bank's Climate Change Knowledge Portal (data available for 1902–2010). The four case countries are highly dependent on rain-fed agriculture (Svendsen 2009), why erratic rainfall is likely to influence agricultural production negatively and thus increase tax revenue volatility. Oil prices are from Jacks (2013). Oil prices are commonly included in analysis of fiscal variables as representing exogenous economy-wide shocks (Fatás & Mihov 2003). International oil prices can also be a proxy for the movement of prices in other agricultural and commodities of historical and contemporary importance to the four countries since the volatility of the various prices to some degree are correlated.⁴ The last control is the volatility of French GDP from Piketty (2010). Broadly it may be expected that economic output in France has some impact on the West African economies, given the common colonial past and tight monetary, commercial and political ties after independence. In addition, in the fiscal policy literature the GDP growth of the main trading partners has been suggested as an instrument for national GDP growth to overcome the endogeneity between taxation and economic output, even though Lledó et al (2011) find this instrument to be weak for Sub-Saharan Africa. Yet, a positive correlation between French GDP volatility and African tax discretion can be expected.

Historical tax revenue volatility in the four countries

The variation in tax revenue volatility between African countries in recent decades was shown in Table 1 above. The short-term variations presented in Figure 1 for the four West-African countries indicate, unsurprisingly, that this diversity is also true for long-term volatility trends. The panels show that the volatility patterns are different between countries and over time. There are also some common trends that are of particular interest here. In three of the countries (less obvious for Niger) volatility appears to be lower in the second half of the century than in the first half. This is confirmed in Table 3 that presents the volatility of tax revenues and its main components split by 1960, which was the year of independence from France. The volatility of tax revenue was for almost all countries and tax instruments lower after 1960 than before 1960, except for direct taxes in Benin and Niger. This is an important finding and puts current concerns about volatility in poor countries in

⁴ For the period 1901–2010 the coefficient of correlation between the volatility of the oil price and the price of some central commodities for the four countries were the following: rice 0.52, phosphate 0.40, cotton 0.78, palm oil 0.42, coffee 0.39 and peanuts 0.52. Only cocoa shows no relationship with the oil price (-0.09).

perspective; instability was even more pronounced historically and has fallen over time, despite there being no absence of destabilizing exogenous and domestic shocks in more recent periods.

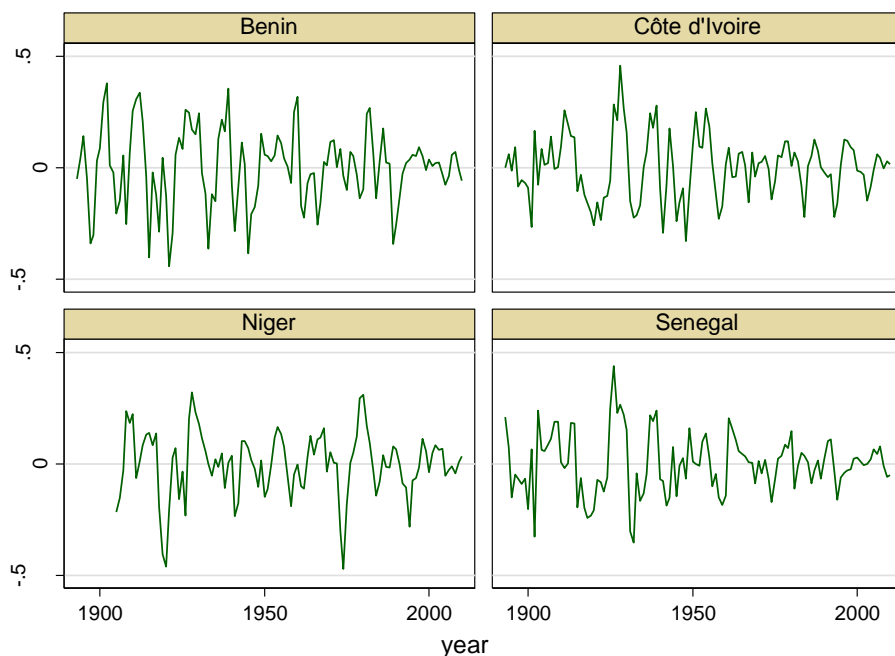


Figure 1 Volatility of tax revenue 1893–2010

Note: Cyclical component of logged total tax revenue is extracted using the Hodrick-Prescott filter (smoothing parameter 100).

The first immediate explanation to this fall in volatility can be gauged from the bottom of Table 3 and concerns the stabilisation of the tax base, expressed as a notable fall in the volatility of international trade for all the countries, most markedly in Niger and Côte d'Ivoire. After independence, Côte d'Ivoire became the most stable trade performer, which would seem surprising given its dependence on commodity exports and volatile coffee and cocoa prices. It is unclear if this long-term stabilisation of trade in West Africa has been properly reflected in the literature, which primarily has dealt with developed countries (Broadberry & Wallis 2017). Sub-Saharan Africa has been portrayed as endemically instable because of weak institutions, bad governance and commodity dependence (Collier 2002; Acemoglu et al. 2003). A long-term perspective instead highlights the stabilisation that African economies have gone through.

Table 3 Volatility and correlations of real tax revenue and trade

		Volatility			Correlation with trade		
		1893–2010	1893–1960	1961–2010	1893–2010	1893–1960	1961–2010
Total tax	Benin	0.17	0.20	0.12	0.70	0.75	0.54
	Côte d'Ivoire	0.14	0.17	0.09	0.62	0.65	0.40
	Niger	0.15	0.16	0.13	0.34	0.21	0.70
	Senegal	0.13	0.17	0.08	0.49	0.61	-0.18
	Total	0.15	0.18	0.11	0.57	0.61	0.44
Direct tax	Benin	0.21	0.20	0.22	0.21	0.15	0.37
	Côte d'Ivoire	0.20	0.24	0.14	0.08	0.05	0.27
	Niger	0.18	0.16	0.19	0.13	-0.06	0.43
	Senegal	0.24	0.31	0.10	0.21	0.27	-0.22
	Total	0.21	0.23	0.17	0.16	0.13	0.28
Trade tax	Benin	0.25	0.28	0.22	0.56	0.74	0.05
	Côte d'Ivoire	0.21	0.25	0.15	0.70	0.75	0.48
	Niger	0.34	0.43	0.26	0.43	0.46	0.45
	Senegal	0.17	0.19	0.14	0.48	0.64	-0.08
	Total	0.24	0.28	0.20	0.54	0.66	0.21
Domestic	Benin	0.32	0.39	0.23	0.33	0.31	0.40
indirect tax	Côte d'Ivoire	0.26	0.32	0.16	0.49	0.56	0.05
	Niger	0.27	0.37	0.21	0.11	0.04	0.32
	Senegal	0.37	0.48	0.11	0.13	0.15	-0.11
	Total	0.31	0.40	0.18	0.26	0.26	0.24
Total trade	Benin	0.24	0.30	0.15			
	Côte d'Ivoire	0.21	0.27	0.07			
	Niger	0.24	0.36	0.12			
	Senegal	0.18	0.22	0.11			
	Total	0.22	0.28	0.12			

Note: Volatility is calculated as the standard deviation of the cyclical components using the Hodrick-Prescott filter (smoothing parameter 100). In 'Total' the countries are pooled.

The other main explanation for the fall in volatility concerns tax policy and the behavior of individual taxes instruments. Direct taxes were overall more stable during the colonial period compared to trade taxes and domestic direct taxes, even though the difference between direct and trade taxation is not as large as one could

expect. This is consistent with the way direct taxes were levied at the time, as fixed head taxes regardless of economic conditions, while trade taxes were obviously more dependent on more volatile trade flows as is indicated in the table through the large correlation between trade taxes and trade during the colonial period (Frankema & van Waijenburg 2014).

Interestingly, after independence the levels of volatility between tax instruments converge. This convergence is driven by a reduction in the volatility of trade taxes, but even more so by a sharp fall in the volatility of domestic indirect taxes. The fall in domestic indirect taxes is very likely due to the broadened tax base of this type of taxation as it moved from being narrowly applied in the colonial period to including modern VAT. The introduction of VAT was relatively early in French-speaking West Africa compared to the rest of Sub-Saharan Africa – 1960 in Côte d'Ivoire, 1980 in Senegal, and 1986 in Niger. However, because of complex rate structures and exemptions these first-generation VAT's never met expectations, why Benin introduced a single-rate VAT with few exemptions in 1991 as part of a comprehensive tax reform (Ebrill et al. 2001, p. 70). However, the link between VAT and tax revenue is complex and context dependent. There is some evidence that VAT is more effective in open economies, presumably because it is convenient to collect VAT on imports (Ebrill et al. 2001, p. 45; Keen & Lockwood 2010). In that way, the introduction of VAT may serve to offset some of the reduction in the use of trade tax rates that has been fueled by trade liberalization (Seelkopf et al. 2016). This may explain the pattern in Table 3 that shows that while trade taxes were consistently more strongly correlated with trade during the colonial period, this was not necessarily the case from the 1960 onwards. For example, in Benin trade taxes were less correlated with trade than domestic indirect taxes (coefficient of correlation of only 0.05 for trade taxes compared to 0.40 for domestic indirect taxes), while in Côte d'Ivoire the situation was basically the reverse.

The coefficients of correlation between total tax revenue and trade for the two periods show that there was a fall in responsiveness to trade in three of the countries, most notably in Senegal where the relationship disappears completely after 1960. In contrast, taxes became strongly correlated with international trade after 1960 in Niger compared to very low correlation in the colonial period, testimony to the persistent vulnerability of the country.

The 1960 cut-off was chosen for a first look at the data since clearly independence was a significant political regime shift in the four countries. However, it has been well documented that there was significant political and economic continuity over independence in francophone West Africa and that there were political and economic shifts during the colonial period (Coquery-Vidrovitch 1976; Cooper 2002; Jerven 2010). Consequently, the temporal pathway of volatility and the timing of the decline in volatility needs to be explored with more precision. Indeed, Figure

2 shows that volatility has been falling throughout the long 20th century, albeit again with significant variation between time periods and countries. Three common phases may be discerned, a slow fall in volatility until the 1950s, a sharp fall in the 1960s and 1970s, followed by a set-back in 1970s and 80s depending on the country, two decades of growing macroeconomic unbalances, volatile external environment and structural adjustment programs. The last two decades show another sharp fall in volatility, together with notable convergence between the countries. While volatility seems to increase around the First World War, there are no obvious destabilizing patterns in connection to the Great Depression, the Second World War or independence.

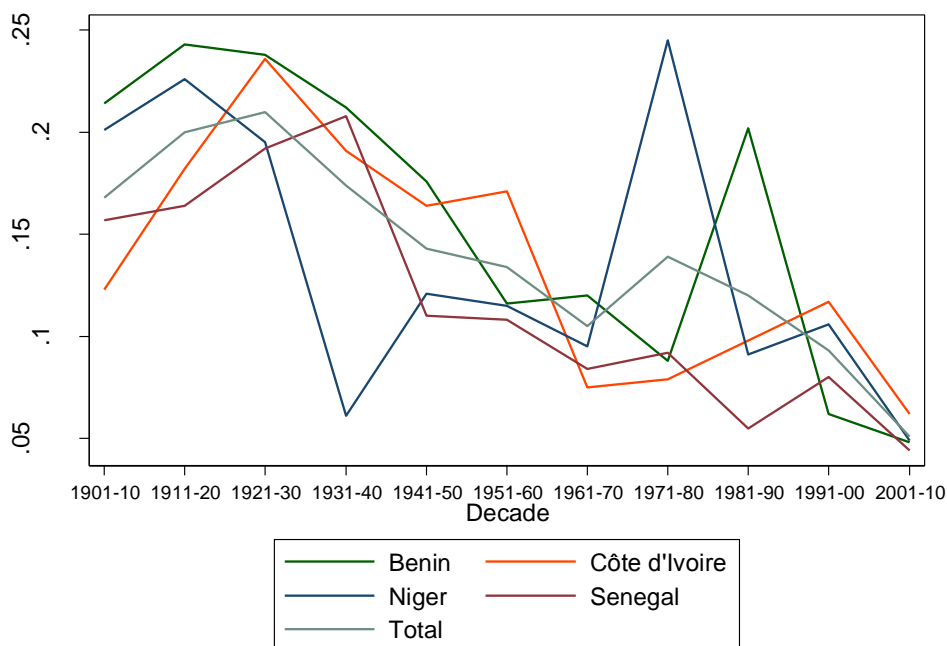


Figure 2 Tax revenue volatility per decade

Note: Volatility is calculated as the standard deviation of the cyclical components using the Hodrick-Prescott filter (smoothing parameter 100).

Figure 3 shows a similar diagram on international trade. The patterns that emerge are very close to those displayed in Figure 2, both regarding the long-term fall in volatility and the main phases of decline and reversal. The coefficient of correlation is indeed high between the tax and trade series for three of the countries (corr coefficient 0.7–0.8), except for Niger (corr coefficient -0.2). However, we have already noted that taxation and trade are determined simultaneously, and it is also

highly likely that the two variables are determined by other common and specific factors. Indeed, it is worth emphasizing that the 20th century was highly transformative in Africa, just as in other parts of the world, a fact that is sometimes forgotten in contemporary discussions on African development. The four countries experienced significant population growth, economic expansion, and social progress (Prados de la Escosura 2013). The state apparatuses expanded strongly and with them the fiscal systems (Andersson 2017). There is thus a compelling case to be made that this long-term development process was coupled with a long-term reduction of vulnerability of the four countries. In order to explore this transformative process, it is time to investigate more systematically the long-term determinants of tax revenue volatility.

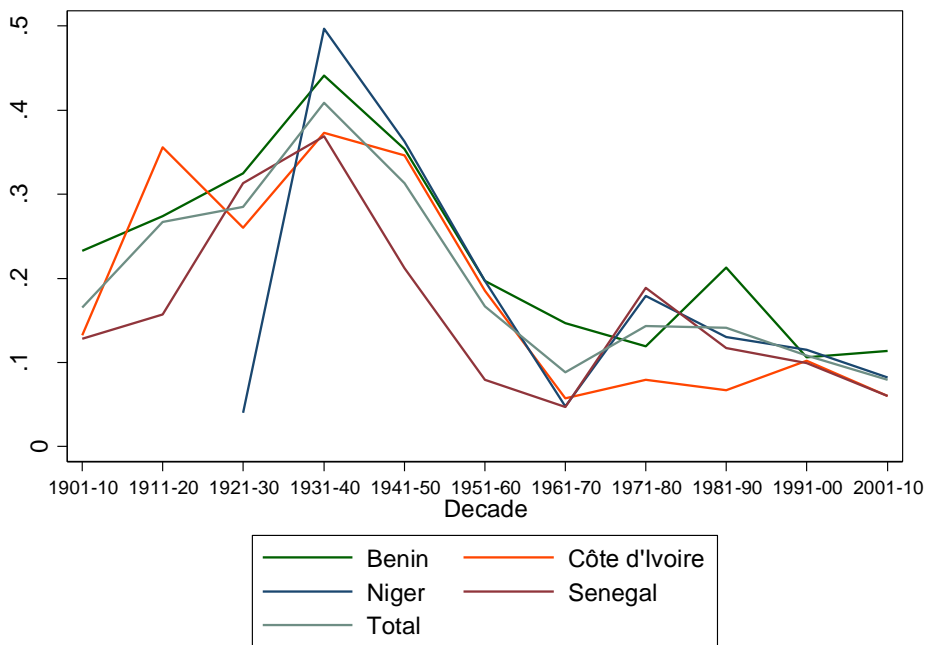


Figure 3 Trade volatility per decade

Note: Volatility is calculated as the standard deviation of the cyclical components using the Hodrick-Prescott filter (smoothing parameter 100).

The long-term determinants of tax revenue discretion

The first step is to estimate the fiscal policy model specified in equation (1) that allows a dissociation between the trade and non-trade correlates of tax revenue. The results are presented in Table 4 for the whole period, using independence as a cut-off and by the three historical sub-periods mentioned above. The upper panel confirms the strong positive and significant correlation between tax revenues and trade for all the countries for the full period. The three-period repartition in the right-hand half shows that the tax-trade link largely breaks down after 1980, which indicates that other non-trade related determinants becomes more important for taxation. The lower panel shows that there was also a fall in the discretion component, in line with the fall in volatility measures shown above. This means that the fall in volatility cannot be attributed to the stabilisation of trade flows (i.e. the tax base) alone; there were other influential political, tax policy or wider economic factors at play.

Table 4 Results of the fiscal policy model

Responsiveness						
	1893–2010	1893–1960	1961–2010	1893–1930	1931–1980	1981–2010
Benin	0.491***	0.534***	0.393***	0.754***	0.432***	0.277**
Côte d'Ivoire	0.371***	0.368***	0.486***	0.459***	0.286***	0.252
Niger	0.157***	0.117*	0.379***	...	0.122*	0.236
Senegal	0.427***	0.553***	0.023	0.562***	0.470***	-0.01
Discretion						
	1893-2010	1893-1960	1961-2010	1893-1930	1931-1980	1981-2010
Benin	0.141	0.146	0.125	0.129	0.139	0.103
Côte d'Ivoire	0.121	0.140	0.081	0.118	0.128	0.056
Niger	0.106	0.100	0.090	...	0.113	0.064
Senegal	0.123	0.134	0.085	0.153	0.111	0.066

* p<0.10, ** p<0.05, *** p<0.01

These factors are explored by estimating equation (2). The relationship between tax discretion and the political variables introduced above are shown in Figure 4. The left-hand panel shows the expected negative relationship between tax revenue discretion and more democratic political regime (coefficient of correlation: -0.39), while the right-hand panel displays a weak relationship with the political instability variable (coefficient of correlation: 0.20). However, it is possible that the

association between taxation and political regime is spurious because of the presence of unit root in the series, why equation (2) is estimated in first differences with OLS using Newey-West standard errors. The results are presented in Table 5. Columns (1) and (2) show that both the measure for regime change and political regime are significant when included separately. When included jointly with the trade tax share, the significance of political regime disappears, but that of regime change remains significant. The coefficient for the trade tax share indicates a relatively strong association between tax revenue discretion and tax composition. None of the control variables introduced in column (4) are significant.

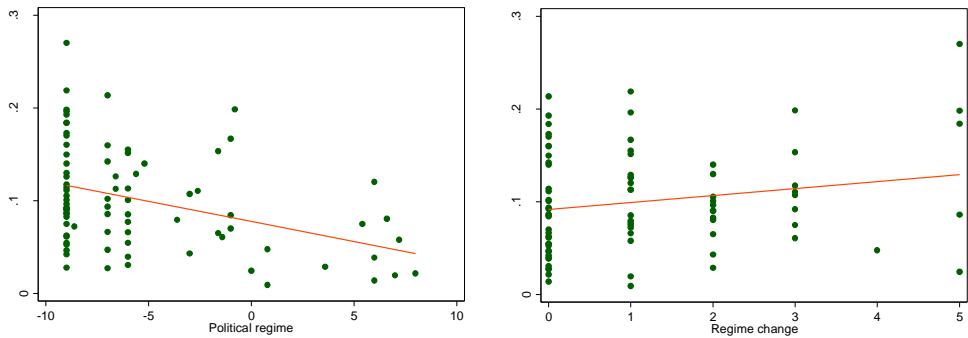


Figure 4 Tax revenue discretion and political factors

In order to explore how the main relationships change over time, columns (5) and (6) give estimates of the main model by the colonial and independent periods. This yields markedly different results between the two sub-periods. In the pre-1960 period the regime change remains significant, while in the post-1960 period the political regime becomes significant, while regime change and trade tax share become insignificant. The positive sign of the political regime coefficient (which is consistent across the columns) is somewhat surprising as it indicates that democratization is associated with increasing tax revenue discretion. The coefficient is small, but its sign could be explained by the differentiation of the variables, which turns the political regime variable in to a measure of political regime change like the regime change variable. Even though democracy as a regime may be associated with stability, the road of getting there (i.e. the process of democratization) may be bumpy. Another explanation is that politicians are more prone to interfering in fiscal policy in more democratic regimes.

Table 5 Results of the tax revenue discretion model

Dependent variable: sd Tax (full period) (ln)						
	(1)	(2)	(3)	(4)	(5)	(6)
	1901-2010	1901-2010	1901-2010	1901-2010	1901-1960	1961-2010
Regime change	0.121*** (0.000)		0.113*** (0.000)	0.0848*** (0.003)	0.140*** (0.007)	-0.0025 (0.972)
Political regime		0.0246*** (0.007)	0.0143 (0.419)	0.0136 (0.548)	0.0688 (0.159)	0.0180*** (0.000)
Trade tax share (ln)			0.458*** (0.000)	0.336*** (0.004)	0.545*** (0.000)	0.222 (0.620)
Years school (ln)				0.0558 (0.734)		
sd Petrol price (ln)				-0.103 (0.250)		
sd rainfall (ln)				-0.0679 (0.625)		
sd French real GDP				0.102 (0.230)		
Constant	-0.077*** (0.000)	-0.084*** (0.000)	-0.078*** (0.000)	-0.087** (0.028)	-0.112** (0.018)	-0.124* (0.093)
<i>N</i>	78	78	78	78	38	40

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The robustness of these results is tested using another variable of political instability that not only includes regime change and the two world wars as explained above, but also armed conflict from the UCDP/PRIO Armed Conflict Dataset version 4-2016 and coups d'états data from the Center for Systemic Peace. This increases the number of politically instable years after independence (the data from before 1960 remains the same). The coefficient of correlation between the regime change used in the baseline and the amended variable is 0.82 for the post-1960 period. The results are presented in Appendix 1. The only notable change in the results from the revised model is that the significance of the political regime variable falls to a 90% level in column (6). It is also possible that the war years are driving the results in the pre-1960 period, why a second robustness test is to exclude these years (i.e. the two five-year periods 1916–20 and 1941–45) from the model. However, this does not produce any significant changes compared to the baseline results as shown in Appendix 2.

A third robustness check is to use alternative dependent variables, in this case tax revenue discretion estimated in two (1901–1960 and 1961–2010) or three periods (1901–1930, 1931–1980 and 1981–2010). In these split series volatility is lower in the later periods, because of a better fit of the estimates compared to the baseline. The results, which are shown in Table 6, present some differences relative the baseline. While the regime change remains significant for the full and pre-1960 periods, the political regime variable becomes largely insignificant and the significance of the trade tax share falls. This is likely to be due to the reduced variation of the alternative volatility measures.

Table 6 Results of the tax revenue discretion model – robustness check

Dependent variable:	sd Tax (break 1960) (ln)			sd Tax (break 1930 and 1980) (ln)		
	(1) 1901- 2010	(2) 1901- 1960	(3) 1961-2010	(4) 1901- 2010	(5) 1901- 1960	(6) 1961- 2010
Regime change	0.0978*** (0.004)	0.126*** (0.008)	-0.0196 (0.736)	0.113*** (0.000)	0.120*** (0.002)	0.0939 (0.338)
Political regime	0.0115 (0.481)	0.0760 (0.216)	0.0164* (0.081)	- 0.00980* (0.099)	0.0391 (0.406)	-0.0154 (0.344)
Trade tax share (ln)	0.357** (0.025)	0.349* (0.053)	0.259 (0.398)	0.353* (0.078)	0.352** (0.024)	0.240 (0.696)
Constant	- 0.0691*** (0.000)	-0.102** (0.030)	-0.109* (0.063)	- 0.0479*** (0.007)	-0.0620 (0.220)	-0.0775 (0.387)
<i>N</i>	78	38	40	78	38	40

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The model is estimated in first differences using fixed country effects and robust standard errors to correct for heteroskedasticity.

The results coming out of these tests of explanations for tax revenue discretion are highly ambiguous. For the full time period there is quite strong support for a positive association between tax discretion and the trade tax share and political instability, while there is very weak evidence of a relationship between tax discretion and political regime. However, during the post-1960 period it is difficult to find consistent results for any of the variables, despite that assumedly the political data is more precise than the estimates made in the early period. There are two somewhat conflicting interpretations that can be made about this. The first interpretation is that

the results point to the value of studying African fiscal systems over a longer time-period than is usually done in the cross-country literature, to identify relationships not apparent from a short-term perspective. The alternative interpretation focuses particularly on the 1960–2010 period and holds that the ambiguous results are largely in line with the equivocal effects of both tax composition and political variables already shown for contemporary data. However, these econometric ambiguities are only part of the findings of this paper, which also has documented a significant long-term fall in the volatility of both tax revenues and trade flows in the four West African countries. This stabilisation has been paralleled with reduced dependence on trade taxation and democratization. However, capturing these evolving relationships econometrically is a challenging task, which is only natural given the endogeneities, multiple relationships and dynamics that characterize the development process (Besley & Persson 2014a; Besley & Persson 2014b).

Conclusions

This paper documents significant long-term fiscal stabilisation in Benin, Côte d'Ivoire, Niger and Senegal as measured by a reduction in tax revenue volatility and the responsiveness of tax revenue to trade. This pattern of stabilisation has not been properly acknowledged in the fiscal policy literature that tends to focus on comparing Sub-Saharan Africa and other developing regions to developed countries using contemporary data. The evidence presented in this paper shows that all the three main explanations to tax revenue volatility in developing countries have merit when explaining the long-term pattern of stabilisation observed for the four West African countries. In terms of economic structure, there has been a fall in the volatility of trade flows as part of a long-term development process. In terms of tax policy, there has been a shift in the composition of tax revenue away from trade taxes to more stable domestic indirect taxes, notably through the introduction of the VAT. In terms of politico-institutional factors, the stabilisation occurred as extractive colonialism gave way to more development oriented policies and independence. The influence of the political regime is inconclusive in line with the theoretical and empirical literature. This points to the value of studying African fiscal systems over long periods of time to identify relationships not apparent from a short-term perspective and understand the intricate mechanisms and dynamics that characterize the development process.

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Appendix

Appendix 1 Robustness check: political instability instead of regime change

	(1) 1901- 2010	(2) 1901- 2010	(3) 1901- 2010	(4) 1901- 2010	(5) 1901- 1960	(6) 1961- 2010
Political instability	0.110*** (0.000)		0.100*** (0.001)	0.0720*** (0.006)	0.140*** (0.007)	0.0187 (0.712)
Political regime		0.0246*** (0.007)	0.0112 (0.560)	0.0118 (0.619)	0.0688 (0.159)	0.0143* (0.100)
Trade tax share (ln)			0.441*** (0.000)	0.324*** (0.002)	0.545*** (0.000)	0.203 (0.613)
Years school (ln)				0.0584 (0.707)		
sd Petrol price (ln)				-0.103 (0.216)		
sd rainfall (ln)				-0.0703 (0.591)		
sd French real GDP				0.111 (0.242)		
Constant	-0.079*** (0.000)	-0.084*** (0.000)	-0.077*** (0.000)	-0.087** (0.020)	-0.112** (0.018)	-0.122* (0.065)
<i>N</i>	78	78	78	78	38	40

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 2 Robustness check: war years excluded

	(1)	(2)	(3)	(4)	(5)	(6)
	1901- 2010	1901- 2010	1901- 2010	1901- 2010	1901- 1960	1961- 2010
Regime change	0.109*** (0.000)		0.0986*** (0.001)	0.0611*** (0.001)	0.126** (0.012)	-0.00252 (0.972)
Political regime		0.0274*** (0.002)	0.0170 (0.295)	0.0178 (0.389)	0.0756 (0.122)	0.0180*** (0.000)
Trade tax share (ln)			0.479*** (0.001)	0.346** (0.013)	0.595*** (0.000)	0.222 (0.620)
Years school (ln)				0.0617 (0.699)		
sd Petrol price (ln)				-0.102 (0.256)		
sd rainfall (ln)				-0.0840 (0.590)		
sd French real GDP				0.123 (0.170)		
Constant	-0.089** (0.011)	-0.123*** (0.000)	-0.094*** (0.002)	-0.108*** (0.000)	-0.148*** (0.000)	-0.124* (0.093)
<i>N</i>	71	71	71	71	31	40

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$