The impact of terrorism on tax enforcement effectiveness: a case study of the Basque Country and Navarre

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ABSTRACT
This paper analyses the impact of terrorism on tax enforcement effectiveness by focusing on the case of the Basque Country and Navarre. The reduced-form model shows that terrorism negatively affects tax enforcement set by the regional administration and, consequently, the way it is perceived by residents in this area. These results are tested by using Spanish surveys and other data sources, finding evidence of the negative impact of terrorism on tax enforcement as it is perceived by residents in the Basque Country and Navarre. In particular, this effect is stronger for entrepreneurs and liberal professionals. Instead, no significant impact for individuals resident in the rest of Spain is found.

KEYWORDS
tax enforcement; audit perception; fiscal externalities; terrorism

INTRODUCTION

Terrorism can impact aggregate economic outputs as well as specific sectors of activity representing more generally a cost for the economy of the affected countries (e.g., Enders & Olson, 2012). This negative economic impact is particularly relevant for countries or regions overwhelmed by terrorism (e.g., Abadie & Gardeazabal, 2003). Besides personal and material damage, terrorist activity induces a change in the risk perception of economic agents, impacting geographical mobility and population dynamics (Dreher, Krieger, & Meierrieks, 2011; Glaeser & Shapiro, 2002; Lozano-Gracia, Piras, Ibáñez, & Hewings, 2010; Sanso-Navarro, Sanz-Gracia, & Vera-Cabello, 2019) and leading to a permanent reduction in productive investments and consumption of goods (Abadie & Gardeazabal, 2008; Eckstein & Tsiddon, 2004). Additionally, the predatory financing system employed by terrorists may also impact the economy and its agents. In this light, one of the main forms of funding used by terrorist groups is that of extortion – the so-called 'revolutionary tax' paid by entrepreneurs and liberal professionals.[1] As a result of its impact on economic activity and the behaviour of economic agents, terrorism may also influence the design of fiscal and monetary policies, either as any other unpredictable shock would or as part of the policy-makers' endogenous reaction to terrorist activity. As the previous literature suggests (Gupta, Clements, Bhattacharya, & Chakravarti, 2004), terrorism can affect the fiscal accounts through three main potential channels: by disrupting real economic activity (gross domestic product – GDP); by distorting the composition of government spending; and by affecting the tax bases with negative consequences for tax revenues. While the evidence shows that terrorism has had little negative or no significant impact on GDP growth except in terrorism-plagued countries (see Gaibulloev & Sandler, 2019, for a survey) and demonstrates an increase in public spending to cover additional security needs (e.g., Hobijn, 2002; Gupta et al., 2004) with certain negative impact on the budget deficit (e.g., Eichenbaum & Fisher, 2004; Wildasin, 2002), very little has been said about the potential effects of terrorist activity on tax bases, tax collection and tax revenues.

The present paper contributes to this literature by analysing the presence of externalities in tax collection due to terrorism. Specifically, the Basque Country and Navarre are used as a case study to test the impact of terrorism on the effectiveness of tax enforcement policies, broadly intended as the capacity or effectiveness in enforcing tax compliance. The Basque framework[2] is particularly interesting to analyse because terrorism has been a constant plague in this area. Furthermore, the provinces belonging to this territory have a high level of tax autonomy, while the

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remaining Spanish provinces are mainly administered by a central tax agency. Terrorism can distort the behaviour of the economic agents residing and operating there by inducing them to reduce their investment and consumption or to move their residence in order to avoid the costs of terrorism. In this light, De la Fuente (1999) and Sanso-Navarro et al. (2019) provide evidence that migration contributes to explain the negative demographic effects of terrorism in the Basque Country. Figure 1 shows the presence of a negative correlation between aggregate investment in the Basque Country and Navarre and the level of activity of the terrorist organization ETA in terms of killings per year. This provides casual evidence of the negative impact of terrorism on the economic activity in these regions.

Given the negative economic shock induced by terrorism and the correspondent threat posed by the geographical mobility of tax bases, the regional tax authorities of the Basque Country and Navarre might have an incentive to counteract these costs by strategically employing their tax autonomy and alleviating tax pressure so as not to lose their tax bases. Owing to the direct/indirect damages to their businesses caused by terrorist activity and to the pressure of terrorist extortion, entrepreneurs and liberal professionals constitute a cluster within the population that is especially exposed to these costs. Tax enforcement policy is a flexible, adaptable instrument for selective intervention, which can be used to compensate this specific cluster of the population for the costs incurred.[3] In this regard, there is casual evidence that at least one Basque tax authority has exempted from fiscal inspections the tax returns of the entrepreneurs targeted by ETA.[4]

The objective of this paper is to determine whether regional tax autonomy in the Basque Country and Navarre can be employed to adjust tax enforcement as to compensate the negative effect of terrorism on tax bases. To do so, a reduced-form theoretical model is developed and empirically tested by using a data set based on survey results and other sources. The results of the theoretical analysis
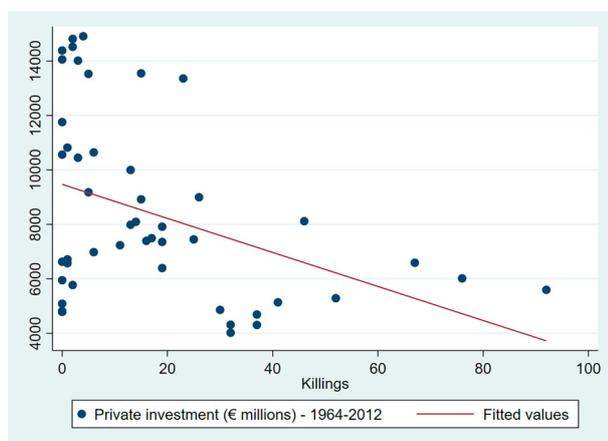
confirm the presence of externalities in tax enforcement due to the threat of the mobility of tax bases attributed to terrorism. The reaction function of tax enforcement to the costs of terrorism is derived and a negative sign is obtained that is also reflected in the way tax enforcement is perceived by residents in the region affected by terrorism. In order to corroborate this result, alternative measures of the costs produced by ETA's terrorist activity are employed and Spanish data based on surveys, in which respondents are asked to express their opinion about the authorities' tax enforcement effort, are used. Certainly the effectiveness of a tax enforcement policy largely depends on the way it is perceived by taxpayers in the sense that what matters about taxpayers' decision to evade is their perception of tax enforcement (e.g., Slemrod, 2007, 2019; Slemrod, Blumenthal, & Christian, 2001; and Kleven, Knudsen, Kreiner, Pedersen, & Saez, 2011 on the effect of differences in perceived audit rates on tax compliance). This perception is driven by two dimensions of the reality (Slemrod, 2019). Indeed, the tax administration can influence the reality as well as the perception of reality. On the one hand, it can increase the actual tax audit rate by, for example, hiring and training more auditors or more efficiently using the third-party information it routinely receives. On the other hand, it can also, for example, selectively disseminate information about its activities in order to increase taxpayers' perceived tax audit probability and foster their tax compliance. In this sense, Blank and Levin (2010) show that the US tax authority has deliberately used tax enforcement publicity to influence individual taxpayers' perceptions and knowledge about audit probability, tax penalties and the government's tax enforcement efficacy while taxpayers were preparing to file their annual individual tax returns. By estimating ordered response models, a significant and negative impact of terrorism on tax enforcement as perceived by individuals who reside in the Basque Country and Navarre is found. In particular, this impact is found to be stronger for entrepreneurs and liberal professionals, while no significant impact is found for individuals resident in the rest of Spain.

The paper is organized as follows. The next section provides a summary of the relevant literature. The third section sets the theoretical framework. The fourth section presents the empirical strategy. The results obtained from the empirical analysis are presented in the fifth and sixth sections. Finally, the seventh section concludes.

LITERATURE REVIEW

The literature on the economics of terrorism is vast and can be usefully classified into different areas of study, including the analysis of the impact of terrorism on aggregate economic output and on specific sectors of activity as well as the effect of terrorism on economic policies. In particular, an increasing number of papers focuses on the economic output consequences of terrorist activity for individual countries overwhelmed by terrorism (e.g., Abadie & Gardeazabal, 2003; Dorsett, 2013; Eckstein & Tsiddon, 2004; Eldor & Melnick, 2004). The main conclusion of these articles is that terrorism represents a cost for the

Figure 1. Relationship between investments and terrorist activity in the Basque Country and Navarre, 1964–2012.
Source: Author's own calculations from the IVIE and BBVA Foundation stock capital database (available at http://goo.gl/fbmGmG) and the Interior Ministry's database on terrorism.

economies of the countries affected, and that terrorist activities do reduce economic growth, particularly if they are concentrated in specific regions (e.g., Abadie & Gardeazabal, 2003; Dorsett, 2013; World Bank, 2002, 2003).[5] That terrorism represents an economic cost is confirmed by the literature analysing the effect of terrorism on specific economic sectors (e.g., Llussa & Tavares, 2007a, 2007b). In this regard, several articles show that terrorist attacks may be considered as idiosyncratic shocks associated with noticeable decreases in consumption and investment (e.g., Eckstein & Tsiddon, 2004), as well as in capital flows and trade across borders (e.g., Abadie & Gardeazabal, 2008; Bandyopadhyay, Sandler, & Younas, 2014; Bandyopadhyay, Sandler, & Younas, 2018; Nitsch & Schumacher, 2004), tourism (e.g., Buckley & Klemm, 1993; Drakos & Kutan, 2003; Enders & Sandler, 1991, 1996; Neumayer & Plümper, 2016), and airline demand (e.g., Ito & Lee, 2005).

Yet, the possibility that terrorist activity might have fiscal and monetary consequences has received only limited attention in the literature, although, as Wildasin (2002) notes, terrorist 'attacks are likely to trigger a complex series of simultaneous adjustments that reverberate throughout *the* entire system of private and public decision-making' (p. 3; added emphasis). In this light, Gupta et al. (2004) analyse the fiscal effects of armed conflicts and terrorism on 20 low- and middle-income countries. These authors empirically corroborate that terrorism negatively affects GDP growth and changes the composition of government spending by increasing military expenditure in response to additional security needs, accompanied by a negative effect on social public expenditure (health and education) and on the level of the public deficit. On the revenue side, they show that the fiscal accounts are affected only in terms of a reduction in real economic activity, but they do not show any significant effect of terrorism on the government revenue-to-GDP ratio.

Further contributions to this literature are made by various papers that deal with the fiscal and economic policy consequences of the terrorist attacks of 11 September 2001. Hobjin (2002) estimates that the economic impact of the 9/11 terrorist attacks in terms of US security policies are relatively small (0.35% of GDP in 2003) and they are unlikely to have major effects on the fiscal discipline of the government or on productivity in the private sector. Eichenbaum and Fisher (2004) and Wildasin (2002) argue that the large increase in military expenditures in the aftermath of 9/11 is not sufficient to justify the rise in the government deficit and the large fall in labour and capital tax rates. Thus, these papers suggest that isolated terrorist events have a significant but limited effect on fiscal policies. Further research is needed in this field and, seen from this perspective, the analysis of the impact of terrorism on fiscal policies in the Basque Country is particularly appropriate. Since this particular case is characterized by persistent terrorist violence over a long period of time, the potential impact of terrorism on fiscal policies might extend beyond the simple spending reaction to an unexpected but isolated economic shock.

Under the framework object of the analysis, tax authorities' incentive to counteract the negative impact of terrorism on tax bases originates from the threat of mobility. In this sense there is evidence that terrorism has a negative impact on population dynamics and mobility. Indeed, by generating uncertainty, stress and risk, terrorism indirectly and negatively impacts the utility of economic agents provoking a change in their behaviour and inducing them to escape from it. Evidence of such dynamics is provided by Dreher et al. (2011). By employing data of 152 countries for the period 1976–2000, these authors show that terrorism affects the cost–benefit considerations of the highly educated individuals in ways that make emigration more attractive. Similar results are provided by Sanso-Navarro et al. (2019) for the Basque–Navarrese context. In particular, their findings reflect the influence of migration on the negative demographic impact of the Basque conflict.

Given the case under study here, it is useful to refer to the literature that analyses the economic impact of terrorism in the Basque Country from a range of other different perspectives. On the output side, the economic consequences of ETA's terrorism have been accurately analysed by Abadie and Gardeazabal (2003). On the one hand, they estimate the macroeconomic impact of terrorism in the Basque Country using a synthetic Spanish region with the characteristics of the Basque Country, but in the absence of terrorism. Based on this comparison, the authors find a 10% average gap between Basque per capita GDP and the per capita GDP of a comparable synthetic region without terrorism. On the other hand, they use ETA's 1998–99 truce as a natural experiment to estimate the impact of terrorism on the stock markets, and they find that the stocks of firms with a significant share of their business activity in the Basque Country showed a positive relative performance during the truce period, and a relative negative performance when the truce ended. Abadie and Gardeazabal's (2003) results, together with Sanso-Navarro et al.'s (2019) findings, suggest that terrorism may have further externality effects on tax bases and, consequently, on Basque fiscal policies. This paper aims at filling this gap in the literature.

Buesa and Baumert (2013) describe ETA's financing system and its complex structural and economic network, but also illustrate the direct/indirect economic costs that ETA's terrorist activity has on the Basque economy. Again, their study clearly indicates that when terrorism is persistent in the Basque Country and Navarre the negative economic impact is substantial.

Finally, this paper shares some of the features of the literature on the economic policy impact of mafia-type organized crime (in particular, Alexeev, Janeba, & Osborne, 2003, 2004). The theoretical framework presented in these papers is particularly appropriate for describing the context analysed here because of the similarities between mafia-type organizations and the terrorist organization ETA, particularly with regard to the extorting of regular payments from businessmen and firms, but more generally in that they represent a constant threat to the economic stability of the affected regions. This literature has

emphasized the role of the mafia as an alternative tax collector and provider of public goods, such as protection and other services that facilitate a firm's underground activities, thus demonstrating the existence of externalities provoked by mafia on the tax collection process.

THE THEORETICAL FRAMEWORK

Here the paper seeks to identify the possible externality in tax administration due to terrorist activity and raise the main hypothesis for the empirical analysis. A simple framework is developed consisting of a federal state comprising two representative regions ($i = 1, 2$) of equal size in which the total population is normalized to 1. Region 1 is subject to the permanent threat of terrorist activity, while the other is not. Adhering to the most common approach in the literature (e.g., Shaw, Slemrod, & Whiting, 2010; Slemrod & Yitzhaki, 2002, 1987), the tax administrations is designed as revenue-maximizing agencies that set the tax enforcement rate $\beta_i \in (0, 1)$ in their regions. Here the focus is on the potential externality effect of terrorism on tax enforcement policies, and so attention is restricted to one tax instrument, β_i, while assuming the tax rates in the two regions to be exogenously set.[6] Individuals face an income tax on an exogenously fixed and normalized-to-one tax base and decide the share $\alpha \in (0, 1)$ of income to declare maximizing their utility. To ensure an interior solution, tax evasion is assumed to be costly for the individual. Since the effectiveness of a tax enforcement policy largely depends on the way it is perceived by taxpayers (e.g., Alm, 2000), it is assumed that the enforcement rate enters the individual's objective function through their perceived probability of being audited $\beta_i^e(\beta_i, X)$.[7] For simplicity, the individual's problem is not explicitly developed here, and the results of the standard literature are assumed (e.g., Allingham & Sandmo, 1972). The model consists of three stages:

- At the first stage, terrorist activity occurs in region 1 provoking an exogenous linear cost $E > 0$ borne by residents in this territory.
- At the second stage the regional tax authorities set the regional tax enforcement rate β_i.
- At the third stage individuals choose their region of residence.

The solution is provided by backward induction.

Stage 3: The decision as to which region to reside in

This section employs the notion of 'home attachment' (Mansoorian & Myers, 1993, 1997) to model the problem at stage 3. At this stage, individuals compare their indirect utility function in the two regions in order to decide where they wish to reside. It is assumed that $n \in (0, 1)$ indexes the individuals by measuring the non-pecuniary (psychic) benefit they derive from living in region 2 and that individuals are uniformly distributed between 0 and 1.[8] The preferences of individuals n with respect to location can be described thus:

$$V(n) = \begin{cases} U_1^* + a \times (1 - n) - E & \text{if } n \text{ lives in region 1} \\ U_2^* + a \times n & \text{if } n \text{ lives in region 2} \end{cases}$$

(1)

where $U_i^* = U_i^*(1 - \alpha^*(\beta_i; t_i))$ represents the (pecuniary) indirect utility function of an individual residing in region $i = 1, 2$;[9] t_i is the tax rate exogenously fixed in region i; and $a \in (0, +\infty)$ is a parameter representing the cost sustained by an individual when moving away from their home region. This means that the taxpayer's utility from living in their own region increases with the cost of mobility. In this light, a acts as a weight: if the costs of mobility are low (high), then the relative importance that the taxpayer assigns to the psychic part of the utility function, with respect to the pecuniary function, is low (high). In equilibrium, the marginal individual, that is, the one indifferent to residing in either region 1 or 2, is identified by $n = n_1$ such that:

$$U_1^* + a \times (1 - n_1) - E = U_2^* + a \times n_1. \quad (2)$$

Since $\int_0^{n_1} dn = n_1$, n_1 also represents the population resident in region 1 in equilibrium:

$$n_1 = n_1(\beta_1, E; a, t_1, t_2, \beta_2) = \frac{1}{2} + \frac{U_1^* - U_2^* - E}{2a}. \quad (3)$$

The population in region 2 in the migration equilibrium is:

$$n_2 = \int_{n_1}^{1} dn = 1 - n_1 \quad (4)$$

Stage 2: Regional administrations set tax audit policies

At this stage, the regional tax authorities simultaneously set the tax enforcement rate by maximizing their objective function. As in previous studies (Cremer & Gahvari, 2000; Durán-Cabré, Esteller-Moré, & Salvadori, 2015), it is possible to show that regions engage in a mobility-based competition and consequent race to the bottom in audit rates.[10] However, unlike in these contributions, horizontal competition in tax enforcement is not fair in this model because of the presence of the externality produced by the terrorist organization in region 1 that reduces the tax authorities' ability to set β_1. The problem of tax authority in region 1 is then:

$$\begin{aligned} \underset{\beta_1}{\text{Max}} \quad & R_1(\beta_1, E; a, t_1, t_2, \beta_2) = n_1 \times r_1 \\ & = \left(\frac{1}{2} + \frac{[\theta_2 - \theta_1 + g_2 - g_1] - E}{2a} \right) \times [\theta_1 - d(\beta_1)], \end{aligned}$$

where $\theta_1 \equiv t_1 \times [\alpha + (1 - \alpha) \times \tau \times \beta_1]$ is defined as the effective tax rate in region 1; $d(\beta_1)$ represents the tax administration cost such that $d'(\beta_1) > 0$, $d(\beta_1)'' > 0$; and $r_1 \equiv (R_1/n_1) = [\theta_1 - d(\beta_1)]$ is the unitary tax revenue. Tax authority in region 2 faces the symmetric

problem. The first-order conditions (FOCs) of these problems are then:

$$\frac{\partial r_1}{\partial \beta_1} = -\frac{2a}{U_1^* - U_2^* - E + a} \times n'_{1\beta_1} \times r_1 > 0 \quad (5)$$

$$\frac{\partial r_2}{\partial \beta_2} = \frac{2a}{U_2^* - U_1^* + E + a} \times n'_{1\beta_2} \times r_2 > 0 \quad (6)$$

The left-hand sides of both equations (5) and (6) represent, for each region, the marginal benefit of increasing β_i, while the right-hand sides represent the corresponding marginal cost. In particular, since $n'_{1\beta_1} < 0$ and $n'_{1\beta_2} > 0$, the marginal cost is positive in both cases. If we examine the denominator on the right-hand side of both equations, it can be seen that the presence of costs related to terrorism (E), by affecting n_1 and n_2, increases the marginal cost of tax enforcement in region 1 while relaxing it in region 2. Consequently, the optimal level of β_1 (β_2) turns out to be lower (higher) than in the absence of terrorism. In other words, at this stage, given the exogenous level of a, t_1 and t_2, the tax administration of region 1 has to compensate for the costs of terrorism by relaxing its enforcement of existing tax legislation.

The equilibrium

Multiple equilibria are possible, and for simplicity $t_1 = t_2 = t$ is assumed. It is possible to show that in equilibrium, $\beta_1 < \beta_2$ as long as $E > 0$. Depending on the capacity of the tax authority in region 1 to maintain the individuals indifferent to living in either region 1 or 2, given the level of E, it is then possible to describe the migration equilibrium as follows:

$$\begin{aligned} n_1 &< \frac{1}{2} < n_2 \quad \text{if } U_1^* < U_2^* + E \\ n_1 &= n_1 = \frac{1}{2} \quad \text{if } U_1^* = U_2^* + E \end{aligned} \quad (7)$$

Applying the inverse function theorem to equation (5), the reaction function of β_1 is derived with respect to E in order to determine the nature of the externalities in tax administration due to the cost of terrorism:

$$\begin{aligned} \frac{\partial \beta_1}{\partial E} &= -\frac{n_{1E} \times r_{1\beta_1}}{R_{1\beta_1\beta_1}(\beta_1, E; a, t_1, t_2, \beta_2)} \\ &= -\frac{-(1/2a) \times r_1\beta_1}{R_{1\beta_1\beta_1}(\beta_1, E; a, t_1, t_2, \beta_2)} < 0 \quad (8) \end{aligned}$$

The first term of the numerator is the marginal loss of population in region 1 due to the costs of terrorism and it is negative; the term $r_{1\beta_1}$ is the marginal unitary tax revenue that is positive under the FOC. According to the second-order condition of the administration's problem, the denominator of equation (8) is negative. The slope of the reaction function is then negative. Thus, equation (8) shows that the cost of terrorism (E) causes a negative externality on tax enforcement set by the regional administration.

The individual perceived enforcement $\beta_i^e(\beta_i, X)$ positively depends on the actual tax enforcement rate and,

consequently, it follows that:

$$\begin{aligned} \frac{\partial \beta_1^e}{\partial E} &= -\frac{n_{1E} \times r_{1\beta_1}}{R_{1\beta_1\beta_1}(\beta_1, E; a, t_1, t_2, \beta_2)} \times \frac{\partial \beta_1^e}{\partial \beta_1} \\ &= -\frac{-(1/2a) \times r_{1\beta_1}}{R_{1\beta_1\beta_1}(\beta_1, E; a, t_1, t_2, \beta_2)} \times \frac{\partial \beta_1^e}{\partial \beta_1} < 0 \quad (9) \end{aligned}$$

The next section tests this result empirically.

THE EMPIRICAL FRAMEWORK

The theoretical model developed in the previous section advances an interesting result that requires empirical investigation. Terrorism operates as a negative externality on tax administration by constraining the tax authority's ability to enforce existing tax legislation in the region affected by terrorism. Because of individual mobility and thanks to tax autonomy, the tax authority reacts to the higher costs of terrorism being borne by taxpayers by reducing the level of tax enforcement so as not to lose tax bases (equation (8)). The perceived tax enforcement is a function of the information that individuals have on the actual enforcement policy. More precisely, individuals' perception of tax enforcement positively depends on the actual tax enforcement. Thus, by impacting the actual policy, terrorism also affects tax enforcement as it is perceived by individuals, this being lower the higher the costs related to terrorism (equation (9)). With the aim of testing these theoretical predictions, tax enforcement as it is perceived by individuals in Spain is employed here as a dependent variable. This section also describes the empirical strategy employed to identify the changes in this variable that are due to the externality produced by terrorism in the setting of the actual policy. In particular, the aim is to isolate this effect from those changes determined by other structural factors that may alter the real tax enforcement or the individual component of the perceived enforcement. Indeed, the perceived tax enforcement might also vary due to the variation of individual personal characteristics. Thus, in the absence of data on tax enforcement policies performed by tax authorities at the regional level, individual perceptions of tax enforcement, once filtered by potential confounders, can play the right role as a measure of tax enforcement effectiveness. In this light, as suggested in the introduction, the perceived tax enforcement can be used as a direct proxy for the effectiveness of the actual policy, since what matters about the decision to evade is taxpayers' perception of the tax audit probability. If taxpayers' perceived probability of detection increases, the tax authority's capacity or effectiveness to enforce tax compliance is boosted. Therefore, taxpayers' mobility also depends on the way they perceive tax policies, including tax enforcement.

In order to perform the analysis, a data set based on the information provided by surveys and data from different Spanish sources is constructed. Specifically, data from the 1994–2015 waves of the survey 'Public Opinion and Fiscal Policy',[11] conducted annually and released by the Spanish Centre of Sociological Research (Centro de Investigaciones Sociológicas – CIS), are used. This repeated cross-section survey reports information on subjective perceptions of

the fiscal policies, publicly provided goods and services, and other aspects of the tax system in Spain. Socioeconomic information about the respondents and their province of residence is also included in the survey data. In order to define the dependent variable, the following question is employed: Do you think that the tax administration is currently taking many/quite a few/a few/very few steps in its efforts to fight tax evasion?,[12] which remains unchanged over the period 1994–2015. For any respondent i in province j in survey year t, the answer to this question is coded into the variable β_{ijt}^e, which is scaled from very low (1) to very high (4) according to the answer. Thus, by defining β_{ijt}^e as an ordinal dependent variable measuring the latent actual perceived tax enforcement of individuals (β_{ijt}^e), one can design an ordered response model (e.g., Greene, 2002, p. 736; Wooldridge, 2002, pp. 504–9) to test the hypothesis raised in equation (9):

$$\beta_{ijt}^{e*} = \mu Truce_{jt} + \pi Truce_{jt} \times Foral_{ijt} + \rho Foral_{ijt} + \boldsymbol{Y_{ijt}\psi}$$

$$+ \boldsymbol{X_{jt}\alpha} + \vartheta_j + \tau_t + \varepsilon_{ijt}$$

$$\beta_{ijt}^e = \begin{cases} 1 & \text{if } \beta_{ijt}^e \leq \omega_1 \\ 2 & \text{if } \omega_1 < \beta_{ijt}^{e*} \leq \omega_2 \\ 3 & \text{if } \omega_2 < \beta_{ijt}^{e*} \leq \omega_3 \\ 4 & \text{if } \beta_{ijt}^{e*} > \omega_3 \end{cases} \tag{10}$$

The coefficients as well as the cut-points in equation (10) are estimated through an ordered probit model by means of maximum likelihood techniques. In order to measure the costs generated by ETA's terrorist activity, an approach is employed that is standard in the literature (e.g., Abadie & Gardeazabal, 2003), and is based on the use of information about ETA's truces and ceasefires.[13] A dummy variable equal to 1 is constructed for the years in which a truce was announced and implemented by ETA. Specifically, $Truce_{jt}$ is defined as being equal to 1 if a ceasefire were announced and implemented by ETA in province j during the survey year t, that is, during a period within the 12 months before the implementation of the survey.[14] This variable indirectly measures the costs of ETA's activity in terms of the threat to personal security and provincial stability; and the coefficient μ measures its impact on the perceived tax enforcement.

According to the theoretical model, terrorism should negatively impact tax enforcement and its perception in the areas most affected by terrorist activity in Spain, namely, the four provinces belonging to the foral autonomous communities of the Basque Country and Navarre. Thus, an interaction term between $Truce_{jt}$ and $Foral_{ijt}$ – a dummy variable equal to 1 for residents in the foral provinces – is employed and the correspondent coefficient π is expected to be positive.[15] This term picks up the differential effect of terrorism on perceived tax enforcement in the foral communities with respect to common regime provinces. Similarly, the overall impact of terrorism on perceived tax enforcement in foral provinces is also expected to be positive. This effect is represented by the linear combination between the interacted and the uninteracted terms that is the derivative of the latent perceived tax enforcement

with respect to the variable $Truce_{jt}$ if $Foral_{ijt}$ is equal to 1 (i.e., the estimated sum of coefficients $\mu + \pi$). In order to control for the residual effect of being resident in a province belonging to the foral financing system on the perceived tax enforcement, the variable $Foral_{ijt}$ not interacted is also included.

According to the assumption of the theoretical model, the perceived tax enforcement is a function of the information that individuals have on the actual enforcement policy. In particular, actual tax enforcement and the individuals' perception of it are expected to be positively related. In order to disentangle the changes in perceived tax enforcement due to the externality produced by terrorism in the setting of the actual tax enforcement from those changes determined by other structural factors that may alter the real tax enforcement, included in vector $\boldsymbol{X_{jt}}$ is information on contextual variables that directly affect the setting of the enforcement policy and provincial fixed effects (ϑ_j) are employed. In this way, one is implicitly controlling for the structural component of the actual policy. Specifically, vector $\boldsymbol{X_{jt}}$ controls for per capita provincial GDP, provincial population and also includes dummies for rightist central government, country electoral cycle, leftist regional government and regional electoral cycle.

In the theoretical model, it has also been assumed that the perceived tax enforcement is a function of individual personal characteristics. In order to account for the individual component of perceived enforcement, the vector of variables $\boldsymbol{Y_{ijt}}$ collects information on relevant personal and social characteristics that are likely to influence the individual's perception of the risk of being audited. These variables are also extracted from the survey Public Opinion and Fiscal Policy. Specifically, the vector includes controls for sex, age, level of education, civil status, job market status (including dummies for employed people, retired people and individuals employed in the public sector) as well as respondents' political views (including dummies for leftist voter, nationalist voter and a set of dummies for the political parties that respondents declared to vote for). The vector also includes a dummy for the main contributors to households' income (heads of household), a dummy identifying entrepreneurs or liberal professionals with employees (self-employed), and a control for the size of the municipality of residence of the respondents. Finally, common time effects (τ_t) are included to account for common time trends, such as the aggregated component of the economic cycle at the national level, while ε_{ijt} is the error term.

As emphasized in the introduction, Basque and Navarrese entrepreneurs and professionals constitute the cluster of individuals that are most affected by the costs of terrorism, as a result of their exposure to blackmailing and due to the potential direct and indirect costs caused to their businesses. This makes these self-employed workers a specific target for potential tax enforcement cutbacks by the foral tax authorities. Therefore, it is suspected that terrorism may have a stronger impact on the perceived tax enforcement of self-employed workers resident in the Basque Country and Navarre. For this reason, equation (10) is extended by further interacting the term

$Truce_{jt} \times Foral_{ijt}$ with the dummy SE_{ijt}:

$$\beta_{ijt}^{e*} = \gamma Truce_{jt} + \xi Truce_{jt} \times Foral_{ijt} +_t \eta Truce_{jt}$$
$$\times Foral_{ijt} \times SE_{ijt}$$
$$+ \varphi SE_{ijt} + \lambda Foral_{ijt} + Y'_{ijt}\sigma + X'_{it}\alpha$$
$$+ \vartheta'_j + \tau'_t + \epsilon_{ijt}$$

$$\beta_{jit}^{e} = \begin{cases} 1 & \text{if } \beta_{jit}^{e*} \leq w_1 \\ 2 & \text{if } w_1 < \beta_{jit}^{e*} \leq w_2 \\ 3 & \text{if } w_2 < \beta_{jit}^{e*} \leq w_3 \\ 4 & \text{if } \beta_{jit}^{e*} > w_3 \end{cases} \quad (11)$$

Analogous with what is explained above, the coefficient η is estimating the differential effect of terrorism on perceived enforcement of self-employed people resident in a foral province and the correspondent overall effect is given by the estimated sum of coefficients $\gamma + \xi + \eta$. It is expected that both are positive and significant. In order to facilitate the interpretation of the magnitude of the coefficients and as a robustness analysis, one also collapses the dependent variable

in equations (10) and (11) into a binary variable taking a value of 1 if the individual declares a relatively high perceived tax enforcement ($\beta_{jit}^{e} \in \{3, 4\}$), and 0 otherwise, and the coefficients are estimated through a probit model.

With the exception of the dependent variable, the indirect proxy of the costs of terrorism ($Truce_{jt}$) and of the individual personal characteristics discussed above, the other variables are obtained from the following statistical sources. The provincial per capita GDP and the provincial population are provided by the Spanish National Institute of Statistics (INE). The dummies identifying the government in office and elections are based on information extracted from the electoral database of the Spanish Ministry of the Interior. Table 1 reports the summary statistics.

MAIN RESULTS

Table 2 reports the results of the model expressed in equation (10). More precisely, column 4 presents the results obtained estimating equation (10) by means of an

Table 1. Summary statistics.

Variable	Measurement unit	Observations	Mean	SD	Minimum	Maximum
Key variables						
Perceived tax enforcement	Ranking	47,497	2.35	0.81	1	4
Truce	Dummy	54,558	0.48	0.50	0	1
Individual characteristics						
Female	Dummy	54,558	0.51	0.50	0	1
Age	Years	54,547	46.33	18.14	18	99
Married	Dummy	54,514	0.39	0.49	0	1
Head of household	Dummy	54,558	0.46	0.50	0	1
Worker	Dummy	54,558	0.45	0.50	0	1
Retired	Dummy	54,532	0.45	0.50	0	1
Public employee	Dummy	54,558	0.18	0.39	0	1
Self-employed (SE)	Dummy	54,558	0.16	0.36	0	1
Foral	Dummy	54,558	0.07	0.25	0	1
Municipality size	Ranking	54,558	3.24	2.14	0	7
Nationalist	Dummy	54,558	0.07	0.25	0	1
Left	Dummy	54,558	0.02	0.12	0	1
Social context characteristics						
Rightist central government	Dummy	54,558	0.50	0.50	0	1
Per capita provincial gross domestic product (GDP)	€ per capita	54,558	21,824.99	6410.42	9314.08	60,220.40
Population	Thousands	54,558	2094.38	2011.32	90.70	6461.97
National electoral cycle	Dummy	54,558	0.27	0.45	0	1
Leftist regional government	Dummy	54,558	0.37	0.48	0	1
Regional electoral cycle	Dummy	54,558	0.27	0.45	0	1
Alternative measures for the cost of terrorism						
Killings_province	Units	54,558	0.26	1.05	0	10
Monetary_Com	€ millions	54,558	4.43	3.01	0.50	12.91
Extortion_(Foral)	€ millions	53,415	0.12	0.81	0.00	10.42

Note: Not shown are descriptive statistics for the set of dummies representing the political parties that respondents declared to vote for in the interest of space as they are a large number of dummies. These descriptive statistics are available from the author upon request.

Table 2. Impact of terrorism on perceived tax enforcement (PTE), 1994–2015: interaction Foral.

	PTE (ordered probit models)				PTE01 (probit)
Dependent variable	(1)	(2)	(3)	(4)	(5)
Truce	0.031	0.039	0.031	0.037	0.003
	(0.665)	(0.825)	(0.656)	(0.790)	(0.066)
Truce × Foral	0.156***	0.154***	0.193***	0.191***	0.173***
	(3.881)	(3.777)	(4.729)	(4.592)	(3.411)
Foral	−0.180***	−0.192***	−0.353***	−0.360***	−0.332***
	(−3.871)	(−4.056)	(−5.715)	(−5.770)	(−4.305)
Self-employed (SE)		0.064***		0.065***	0.051*
		(2.748)		(2.794)	(1.890)
Municipality size		−0.006*		−0.007*	−0.001
		(−1.783)		(−1.946)	(−0.215)
Nationalist voter		0.006		0.001	−0.020
		(0.142)		(0.028)	(−0.401)
Left		−0.042***		−0.042***	−0.069***
		(−3.951)		(−3.959)	(−5.460)
Female		−0.023**		−0.023**	−0.032**
		(−1.987)		(−1.987)	(−2.269)
Age		0.001***		0.001***	0.002***
		(3.478)		(3.535)	(5.344)
Head of household		−0.012		−0.013	0.003
		(−0.978)		(−1.027)	(0.213)
Married		0.001		0.001	0.005
		(0.117)		(0.120)	(0.346)
Employed		0.009		0.009	0.003
		(0.677)		(0.718)	(0.211)
Retired		−0.002		−0.002	−0.024
		(−0.124)		(−0.107)	(−1.161)
Public Employee		−0.001		0.000	−0.015
		(−0.059)		(0.014)	(−0.931)
Per capita provincial gross domestic product (GDP)			−0.000***	−0.000***	−0.000**
			(−3.740)	(−3.547)	(−2.250)
Provincial population			0.000***	0.000***	0.000***
			(4.277)	(4.486)	(3.668)
Rightist central government			0.198***	0.211***	0.251***
			(5.694)	(6.052)	(5.722)
National electoral cycle			0.176***	0.168***	0.146***
			(4.858)	(4.652)	(3.375)
Leftist regional government			0.020	0.018	0.025
			(1.163)	(1.068)	(1.171)
Regional electoral cycle			−0.006	−0.008	−0.006
			(−0.436)	(−0.557)	(−0.358)
Linear combinations					
Truce + Truce × Foral	0.187***	0.193***	0.223***	0.228***	0.176**
	(3.18)	(3.25)	(3.76)	(3.79)	(2.54)
Observations	47,497	47,382	47,497	47,382	47,382
Log-likelihood	−55,099.008	−54,731.406	−55,082.804	−54,714.936	−30,490.425
Wald chi^2 (all variables)	3388.040	3851.748	3430.826	3894.658	3552.437
p-value	0.000	0.000	0.000	0.000	0.000

Table 2. Continued.

Dependent variable	PTE (ordered probit models)				PTE01 (probit)
	(1)	(2)	(3)	(4)	(5)
$R^2_{M\&Z}$	0.08	0.09	0.08	0.10	0.12
R^2_{Count}	0.46	0.46	0.46	0.46	0.62
AIC	110,348	109,676.8	110,323.6	109,651.9	611,98.85
BIC	111,005.6	110,614.8	111,016.3	110,624.9	621,54.34

Note: z-statistics are shown in parentheses; $*p < 0.10$, $**p < 0.05$, $***p < 0.01$. Each model includes YEAR and PROVINCIAL fixed effects. Models 2, 4 and 5 also include a set of dummies for the political parties that respondents declared to vote for. $R^2_{M\&Z}$ is McKelvey and Zavoina's R^2; R^2_{Count} is the proportion of correct predictions; AIC, Akaike's information criterion; BIC, Bayesian information criterion.

ordered probit model including all the control variables. Columns 1–3 estimate more parsimonious ordered probit models where just some of the explanatory variables are included. Table's 2 structure is coherent with the filtering process presented in the estimation strategy. Specifically, column 1 reports, by way of a baseline estimation, a model without including personal characteristics of the respondent (Y_{ijt}) and contextual variables (X_{jt}); columns 2 and 3 include alternatively Y_{ijt} and X_{jt} as control variables. Fixed effects at a provincial level and time effects are included in any specification. The different number of observations is due to coverage of the CIS surveys for the relevant questions; all the available observations are used in every regression. Using the interpretation given for the latent variable, it is possible to interpret the estimated coefficients in terms of the marginal effects of the regressors on the latent perceived tax enforcement β^{e*}_{jit}.[16] Finally, the coefficients presented in column 5 represent the results of the probit model obtained redefining the endogenous variable in a dichotomous way.

In all models, the indirect proxy for the cost of terrorism ($Truce_{jt}$) significantly impacts the individuals' perceived tax enforcement in a way that is consistent with the theory. In particular, this variable has a significant impact on the perceived tax enforcement of individuals residing in the foral provinces – the interacted terms $Truce_{ijt} \times Foral_{ijt}$ and the corresponding linear combination with $Truce_{jt}$ are significant and positive in all the specifications – but it does not have any effect on the tax enforcement perceived by the rest of the individuals interviewed (the uninteracted terms $Truce_{jt}$ are not significantly different from zero). In other words, the tax enforcement as it is perceived by individuals residing in the foral provinces is significantly higher during periods of terrorist inactivity, while there are not significant differences in the perceived tax enforcement of individuals residing in the rest of Spain. Thus, this result suggests that while terrorism represents an externality in the tax-enforcement-setting process for the foral tax authorities, it does not impact at all on the setting of auditing policies in the provinces belonging to the common tax regime, which are administered by a central agency.

As for the other variables, it is found that the dummy variable $Foral_{ijt}$ is negative and significant. This result may well be evidence of the competitive behaviour of the foral provinces or, more generally, it might record a generally lower level of enforcement in the foral communities.

The entrepreneurs and liberal professionals (dummy SE_{ijt}) are found to report a higher perceived tax enforcement than that reported by the rest of the population, which makes sense because their probability of being audited is higher as they have more opportunities to evade taxes. Concerning the other survey control variables, it is possible to observe that the perceived tax enforcement tends to be lower in bigger municipalities, while it increases with the age of the interviewed person. The coefficients of left-wing voters and females are negative, which might entail a demand for stricter enforcement of the existing tax rules by these clusters. The coefficient of the per capita provincial GDP is negative. This result suggests that tax enforcement effectiveness tends to present on average a counter-cyclical trend.[17] Finally, the perceived tax enforcement is increasing in the size of provincial population and it tends to be higher in presence of rightist central governments and during electoral years.

Table 3 presents the results of the estimation of equation (11). Its structure replicates that of Table 2. The impact of ETA's terrorist activity on the perceived tax enforcement of the residents in the foral provinces is even stronger for the cluster of entrepreneurs and liberal professionals, as the interacted terms and linear combinations of interacted and uninteracted coefficients show. Finally, both Tables 1 and 2 include several indexes of goodness to fit (i.e., the log-likelihood; McKelvey and Zavoina's R^2; the R^2_{Count} measuring the proportion of correct predictions; Akaike's information criterion (AIC) and the Bayesian information criterion (BIC)) in order to guide model selection. These tend to indicate that the full ordered response model estimating equation (11) (column 4, Table 3) outperforms the other ordered response models and thus this is considered as the final model.[18]

Thus, the results of the analysis performed here show that in the presence of more intense terrorist activity, individuals residing in the foral territories perceive a lower level of tax enforcement. This confirms that the costs of terrorism do represent a negative externality for the foral communities. In particular, the impact of the cost of terrorism is significantly stronger for self-employed people, confirming that the foral tax authorities might find it convenient to react to the externalities attributable to terrorism by reducing tax enforcement in particular for this group of people.

As a robustness check, a multilevel version of both the complete ordered probit and probit models is also

Table 3. Impact of terrorism on perceived tax enforcement (PTE), 1994–2015: interaction Foral and self-employed (SE).

Dependent variable	PTE (ordered probit models)				PTE01 (probit)
	(1)	(2)	(3)	(4)	(5)
Truce	0.031	0.038	0.031	0.037	0.003
	(0.671)	(0.818)	(0.664)	(0.785)	(0.064)
Truce × Foral	0.144***	0.144***	0.181***	0.180***	0.168***
	(3.546)	(3.473)	(4.397)	(4.288)	(3.287)
Truce × Foral × SE	0.265*	0.258*	0.265*	0.258*	0.104
	(1.839)	(1.793)	(1.832)	(1.787)	(0.586)
Foral	−0.176***	−0.191***	−0.350***	−0.359***	−0.331***
	(−3.784)	(−4.023)	(−5.669)	(−5.750)	(−4.297)
SE	0.062***	0.057**	0.063***	0.058**	0.049*
	(2.698)	(2.442)	(2.746)	(2.488)	(1.781)
Municipality size		−0.006*		−0.007*	−0.001
		(−1.787)		(−1.950)	(−0.217)
Nationalist voter		0.005		0.000	−0.021
		(0.124)		(0.010)	(−0.406)
Left		−0.042***		−0.042***	−0.069***
		(−3.942)		(−3.950)	(−5.457)
Female		−0.023**		−0.023**	−0.032**
		(−1.982)		(−1.982)	(−2.267)
Age		0.001***		0.001***	0.002***
		(3.480)		(3.537)	(5.344)
Head of household		−0.012		−0.013	0.003
		(−0.980)		(−1.029)	(0.214)
Married		0.001		0.001	0.005
		(0.115)		(0.117)	(0.345)
Employed		0.009		0.010	0.003
		(0.716)		(0.758)	(0.224)
Retired		−0.002		−0.002	−0.024
		(−0.106)		(−0.089)	(−1.154)
Public Employee		−0.001		−0.000	−0.016
		(−0.076)		(−0.003)	(−0.937)
Per capita provincial gross domestic product (GDP)			−0.000***	−0.000***	−0.000**
			(−3.768)	(−3.550)	(−2.252)
Provincial population			0.000***	0.000***	0.000***
			(4.288)	(4.486)	(3.668)
Rightist central government			0.200***	0.211***	0.252***
			(5.754)	(6.064)	(5.726)
National electoral cycle			0.175***	0.168***	0.146***
			(4.830)	(4.649)	(3.373)
Leftist regional government			0.020	0.018	0.024
			(1.171)	(1.047)	(1.165)
Regional electoral cycle			−0.006	−0.008	−0.006
			(−0.446)	(−0.580)	(−0.364)
Linear combinations					
Truce + Truce × Foral	0.175***	0.182***	0.212***	0.217***	0.172**
	(2.97)	(3.05)	(3.56)	(3.59)	(2.46)
Truce + Truce × Foral + Truce × Foral × SE	0.441***	0.440***	0.477***	0.475***	0.276
	(2.94)	(2.93)	(3.16)	(3.15)	(1.50)

(Continued)

Table 3. Continued.

Dependent variable	PTE (ordered probit models)				PTE01 (probit)
	(1)	(2)	(3)	(4)	(5)
Observations	47,497	47,382	47,497	47,382	47,382
Log-likelihood	−55,092.665	−54,729.834	−55,076.315	−54,713.373	−30,490.254
Wald chi^2 (all variables)	3401.181	3852.951	3443.207	3895.547	3552.711
p-value	0.000	0.000	0.000	0.000	0.000
$R^2_{M\&Z}$	0.08	0.09	0.09	0.10	0.12
R^2_{Count}	0.45	0.46	0.46	0.46	0.62
AIC	110,339.3	109,675.7	110,314.6	109,650.7	61,200.51
BIC	111,014.5	110,622.4	111,024.9	110,632.5	62,164.77

Note: z-statistics are shown in parentheses; *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Each model includes YEAR and PROVINCIAL fixed effects. Models 2, 4 and 5 also include a set of dummies for the political parties that respondents declared to vote for. $R^2_{M\&Z}$ is McKelvey and Zavoina's R^2; R^2_{Count} is the proportion of correct predictions; AIC, Akaike's information criterion; BIC, Bayesian information criterion.

Table 4. Impact of terrorism on perceived tax enforcement (PTE), 1994–2015 – alternative measures for terrorist activity: Interaction Foral

Dependent variable	PTE (ordered probit models)			
	(1)	(2)	(3)	(4)
Truce	0.037			
	(0.790)			
Truce × Foral	0.191***			
	(4.592)			
Killings_province		0.011		
		(1.425)		
Killings_province × Foral		−0.041***		
		(−3.100)		
Monetary_Com			−0.017	
			(−0.731)	
Monetary_Com × Foral			−0.017**	
			(−2.573)	
Extortion_(Foral)				−0.028***
				(−3.225)
Foral	−0.360***	−0.222***	−0.163**	−0.167**
	(−5.770)	(−3.850)	(−2.489)	(−2.500)
Linear combinations				
Truce + Truce × Foral	0.228***			
	(3.79)			
Killings_province + Killings_province × Foral		−0.029***		
		(−2.77)		
Monetary_Com + Monetary_Com × Foral			−0.034	
			(−1.42)	
Observations	47,382	47,382	47,382	46,379
Log-likelihood	−54,714.936	−54,721.866	−54,722.942	−53,582.507
Wald chi^2 (all variables)	3894.658	3884.386	3882.081	3737.452
p-value	0.000	0.000	0.000	0.000
$R^2_{M\&Z}$	0.10	0.09	0.10	0.09
R^2_{Count}	0.46	0.46	0.46	0.46
AIC	109,651.9	109,665.7	109,665.9	107,385
BIC	110,624.9	110,638.8	110,630.1	108,346.9

Note: z-statistics are shown in parentheses; *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Each model includes individual characteristics, contextual-level characteristics, and YEAR and PROVINCIAL fixed effects. $R^2_{M\&Z}$ is McKelvey and Zavoina's R^2; R^2_{Count} is the proportion of correct predictions; AIC, Akaike's information criterion; BIC, Bayesian information criterion.

Table 5. Impact of terrorism on perceived tax enforcement (PTE), 1994–2015 – alternative measures for terrorist activity: interaction Foral and self-employed (SE).

Dependent variable	PTE (ordered probit models)			
	(1)	(2)	(3)	(4)
Truce	0.037			
	(0.785)			
Truce × Foral	0.180***			
	(4.288)			
Truce × Foral × SE	0.258*			
	(1.787)			
Killings_province		0.011		
		(1.428)		
Killings_province × Foral		−0.040***		
		(−3.044)		
Killings_province × Foral × SE		−0.019		
		(−0.333)		
Monetary_Com			−0.017	
			(−0.731)	
Monetary_Com × Foral			−0.020***	
			(−2.949)	
Monetary_Com × Foral × SE			0.016*	
			(1.740)	
Extortion_(Foral)				−0.028***
				(−3.141)
Extortion_(Foral) × SE				−0.026
				(−0.933)
Foral	−0.359***	−0.222***	−0.160**	−0.166**
	(−5.750)	(−3.846)	(−2.436)	(−2.475)
SE	0.058**	0.066***	0.061***	0.067***
	(2.488)	(2.841)	(2.612)	(2.831)
Linear combinations				
Truce + Truce × Foral	0.217***			
	(3.59)			
Truce + Truce × Foral + Truce × Foral × SE	0.475***			
	(3.15)			
Killings_province + Killings_province × Foral		−0.028***		
		(−2.70)		
Killings_province + Killings_province × Foral + Killings_province × Foral × SE		−0.047		
		(−0.84)		
Monetary_Com + Monetary_Com × Foral			−0.037	
			(−1.55)	
Monetary_Com + Monetary_Com × Foral + Monetary_Com × Foral × SE			−0. 021	
			(−0.85)	
Extortion_(Foral) + Extortion_(Foral) × SE				−0.054***
				(−1.92)
Observations	47,382	47,382	47,382	46,379
Log-likelihood	−54,713.373	−54,721.769	−54,721.465	−53,582.224
Wald chi^2 (all variables)	3895.547	3884.729	3884.808	3738.088
p-value	0.000	0.000	0.000	0.000
$R^2_{M\&Z}$	0.10	0.09	0.10	0.09

(Continued)

Table 5. Continued.

	PTE (ordered probit models)			
Dependent variable	(1)	(2)	(3)	(4)
R^2_{Count}	0.46	0.46	0.46	0.46
AIC	109,650.7	109,667.5	109,664.9	107,386.4
BIC	110,632.5	110,649.3	110,638	108,357.1

Note: z-statistics are shown in parentheses; *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Each model includes individual characteristics, contextual-level characteristics, and YEAR and PROVINCIAL fixed effects. $R^2_{M\&Z}$ is McKelvey and Zavoina's R^2; R^2_{Count} is the proportion of correct predictions; AIC, Akaike's information criterion; BIC, Bayesian information criterion.

performed (e.g., De Leeuw & Meijer, 2008; Goldstein, 2011; Hedeker, 2008), which confirms and reinforces the results of the main analysis. These results are reported in Appendix B in the supplemental data online. As a further robustness check, ordered logit and logit models are also estimated, obtaining results congruent with the main analysis.[19] A final robustness check consists of a placebo test that furthers the analysis on the provinces of Madrid and Barcelona. These have also been frequent targets of ETA's attacks, but terrorism is not expected to operate as a negative externality on tax enforcement there. This is confirmed by the analysis presented in detail in Appendix C in the supplemental data online. Indeed, the placebo test corroborates the main hypothesis of the paper that the reaction on the part of the tax administration is a result of the combination of tax autonomy and permanent threat of terrorism.

FURTHER RESULTS: ALTERNATIVE MEASURES OF THE COST OF TERRORISM

This section performs an additional robustness analysis by employing three different direct measures of the costs of terrorism alternative to the indirect proxy $Truce_{jt}$.[20] Specifically, it employs as a measure of the aggregate costs of terrorism the pecuniary compensation for the damages caused by ETA provided by the Spanish Ministry of the Interior[21] on a national and an annual basis.[22] Alternatively, the section employs a variable collecting information on the number of fatalities attributed to ETA in any Spanish province/year and, thus, directly identifies the costs generated by ETA in terms of the threat to personal security and provincial stability.[23] Finally, it employs an estimate of the total revenues obtained by ETA through the extortion of the 'revolutionary tax' in the foral provinces. This estimate is obtained by Buesa and Baumert (2013) employing documents seized from ETA by the Spanish anticorruption prosecution agency and, therefore, it is likely to be downward biased and measured with error. This variable is set as being equal to zero for the rest of the country and, consequently, no interaction term is calculated. Since all these variables directly measure the cost of terrorism, a significant negative coefficient for the interacted terms and linear combinations of interacted and uninteracted terms are expected.

Table 4 presents the results of the estimation of equation (10) employing these alternative direct proxies

of the costs of terrorism. Each model includes individual characteristics, contextual-level characteristics, provincial fixed effects and time effects. Column 1 replicates the results presented in column 4 of Table 2 employing the variable $Truce_{jt}$; the other models substitute this variable by one of the above-mentioned direct measures of the costs of terrorism. The results of these models are qualitatively equivalent to those obtained when employing $Truce_{jt}$ as the interacted terms and linear combinations of interacted and uninteracted coefficients show. This corroborates the previous analysis.

Finally, Table 5 reports the results of the estimation of equation (11) employing these alternative variables. The structure replicates that used in Table 4 and includes the additional interactions with the dummy for self-employed. The main result still holds for any specification while, in this case, the impact of terrorism on the perceived tax enforcement does not seem to be stronger for the cluster of self-employed in the foral provinces.

CONCLUSIONS

This paper has analysed within an asymmetric federal framework the impact of externalities due to terrorism on tax enforcement effectiveness measured in terms of perceived tax enforcement. According to the reduced-form model, by acting as a negative shock to the economy and thus altering individuals' incentives to reside in their home region, terrorism constrains the tax authority's ability to set tax enforcement policies in the affected region. The lower regional effectiveness in enforcing tax compliance is reflected in lower taxpayers' perceived tax enforcement. This hypothesis has been tested for the Basque Country and Navarre within the Spanish framework. By employing surveys as well as data extracted from other statistical sources, ordered response models whose outcomes corroborate the theory have been estimated.

The results of the empirical analysis show that terrorism negatively and significantly impacts the perceived tax enforcement of individuals residing in the Basque and Navarrese provinces, with a more marked effect on self-employed workers. No significant effect is reported for the residents in Spanish common-regime provinces, where the main taxes are administered by the central government. Thus, terrorism acts as a negative externality on the effectiveness in enforcing tax compliance only in the provinces where it represents a substantial and persistent

cost that may significantly affect the residents' incentives to move. This is the main contribution of the paper.

Conceptually, terrorism might represent an additional cost in terms of revenue losses for the Basque and Navarrese provinces if taxpayers' threat to move materializes in a significant way. Abadie and Gardeazabal's (2003) results are implicitly calculated net of this effect, and so they could be considered as a lower bound of the impact of terrorism on the Basque economy. Nevertheless, as a result of tax autonomy, the tax administrations in foral provinces may strategically use tax enforcement as an instrument to mitigate the mobility of tax bases and counteract the negative effect of terrorism on tax revenues and definitely on the economy. Certainly, this is not costless because a reduced capacity to uncover evasion in periods of more intense terrorist activity has also a negative impact on tax revenues, but this is likely to be significantly lower than the counterfactual revenue losses due to higher mobility of tax bases. The stable presence of the Basque Country and Navarre among the richest regions in Spain seems to be a casual (coarse) evidence of this. Furthermore, according to the results of the analysis, the tax authorities may well have compensated this negative enforcement revenue effect by setting higher tax enforcement during periods of relative inactivity of ETA. All in all, the paper confirms the evidence presented in related literature that tax enforcement (Durán-Cabré, Esteller-Moré, & Salvadori, 2018) and in particular tax autonomy in enforcement policies (e.g., Durán-Cabré et al., 2015, 2016) provide an additional instrument to tax authorities that may be employed for strategic interaction or to counteract negative shocks to the economy. Given that ETA announced its definitive dissolution in 2018, future research should investigate the impact of this event on the capacity of foral tax administrations to enforce tax compliance.

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NOTES

1. This is the practice of several terrorist organizations, including Euskadi Ta Askatasuna (Basque Homeland and Freedom – ETA) in the Basque Country (Buesa & Baumert, 2013; Leonisio, Molina, & Muro, 2017); the Provisional Irish Republican Army (IRA) (Silke, 1998); and the National Liberation Front of Corsica (FCLN) (Sanchez, 2008).

2. The Basque framework is referred to in a wider sense to include Spanish so-called foral autonomous communities of the Basque Country and Navarre. The foral community of the Basque Country comprises three provinces (Álava, Biscay and Gipuzkoa), while the foral community of Navarre coincides with the homonym province. For a more detailed description of the Basque framework and ETA terrorist organization, see Appendix A in the supplemental data online.

3. The previous literature on tax externalities has demonstrated that sub-central tax authorities may employ tax enforcement as an additional instrument for strategic interaction (Cremer & Gahvari, 2000; Durán-Cabré et al., 2015, 2016).

4. An investigation conducted in 2004 by the Spanish anticorruption prosecution agency, reported by Buesa (2011) and by the national press (e.g., Korta, 2004; Bornstein, 2004), reported that the tax authority of the Basque province of Biscay formally exempted from being audited the tax returns of a group of entrepreneurs and liberal professionals who had treated payments to the terrorist organization as deductions in their tax forms. The consequent fiscal opacity might further distort the taxpayers' incentives to resist extortion, particularly 'if the payments to terrorists are mentally accounted for as an additional tax and, furthermore, if you are confident of obtaining a tax deduction from the tax authorities' (Barbería, 2004).

5. Instead, cross-country and panel studies find mixed evidence for the macroeconomic effects of terrorism, showing that the average impact of terrorism on economic growth is either negative, but small in size (e.g., Blomberg et al., 2004; Tavares, 2004), or statistically insignificant (e.g., Gaibulloev, Sandler, & Sul, 2014).

6. Relaxing this assumption would not alter the results of the model, but it would add additional equilibria. Indeed, by being able to set two tax instruments, regions would compete in both instruments (Cremer & Gahvari, 2000;

Durán-Cabré et al., 2015) and theoretically may employ both of them in trying to compensate taxpayers for the cost of terrorism, although the use of statutory tax rates for this aim seems to be unlikely.

7. Where $(\partial \beta_i^e / \partial \beta_i) > 0$, $(\partial^2 \beta_i^e / \partial \beta_i^2) > 0$ and X is a variable exogenously collecting information about the individual and situational characteristics as well as the social context that might have an impact on the individual's perceived enforcement (e.g., Alm, 2000).

8. The psychic benefit from living in region 1 is then expressed as $(1 - n)$. Thus, individuals indexed by $n \in (0, 1/2)$ reside in region 1, while those identified by $n \in (1/2, 1)$ reside in region 2.

9. The direct utility function is defined as $U = [1 - t_i \times [\alpha + (1 - \alpha) \times \tau \times \beta_i^e(\beta_i, X)] - g(1 - \alpha)]$, where $(\tau - 1) > 0$ is the exogenous tax penalty per unit of tax evaded such that $\tau \times \beta_i^e(\beta_i, X) < 1$ and the function $g(1 - \alpha)$ represents the cost of tax evasion $(1 - \alpha)$, such that $g'(1 - \alpha) > 0$, $g''(1 - \alpha) > 0$, $g(0) = 0$, $g(1) \to +\infty$.

10. In particular, it is possible to show that β_1 and β_2 are strategic complements. For a formal derivation, see Durán-Cabré et al. (2015), in particular equation (6).

11. All annually released surveys are based on personal interviews conducted with a representative sample of 2500 Spaniards over the age of 18. For the complete contents of the survey, see the CIS website (http://www.cis.es).

12. The original question in Spanish is '¿Cree Ud. que, en la actualidad. la Administración hace muchos, bastantes, pocos o muy pocos esfuerzos para luchar contra el fraude fiscal?' (e.g., question 21 of survey no. 2994 released in 2013, as the numbering of the questions might change from year to year).

13. Apart from $Truce_{jt}$, three alternative direct proxies of ETA's terrorist activity have been employed: the number of fatalities attributed to ETA in any Spanish province/year; the total pecuniary compensation for the damage caused by terrorism provided by the Spanish Ministry of the Interior; and an estimation of the total revenues obtained by ETA through the 'revolutionary tax' in the foral provinces.

14. An announced truce is considered as being implemented by ETA in a specific province/year if during that period ETA did not claimed fatalities in that province. The possibility to let this variable vary not only over time but also across provinces is of particular interest for the analysis since in the territories belonging to the foral regime the tax authorities are appointed to operate at this level of government. Information on truces and on fatalities is extracted from the data set of the Spanish Ministry of the Interior.

15. Since the variable $Truce_{jt}$ is indirectly related to the level of terrorist activity, according to equation (9), its coefficient is expected to be positive and significant for foral communities.

16. The coefficients can always be interpreted as the marginal effects of the regressors on the latent variable, which is particularly useful in contexts such as that analysed here, where the latent variable can be given some easily interpretable meaning and it is not a mere modelling device (e.g., Wooldridge, 2002).

17. The issue of potential cyclicality of tax enforcement is theoretically analysed by Andreoni (1992) and empirically tested by Durán-Cabré et al. (2018). Their results confirm this prevailing counter-cyclical trend for Spain, but suggest that in the presence of a severe economic crisis, tax enforcement turns out to be pro-cyclical.

18. Probit models tend to outperform ordered response models, but since these models are based on a way the dependent variable was recoded into a binary one, they cannot be directly compared with the ordered probit models, and this is considered as a robustness check.

19. These results are available from the author upon request.

20. See note 13.

21. Compensations include personal as well as material damages. These data are extracted from the statistical report annually released by the Spanish Ministry of the Interior (for the 2013 report, see http://goo.gl/GEwg2R).

22. These data are aggregated at the national level and do not distinguish between the compensation paid out to the victims of ETA from that paid out to the victims of other terrorist organizations. Nevertheless, the author excluded data referring to the 2004 Al-Qaeda terrorist attack, and as 96.5% of the fatalities/injuries of terrorism in Spain are attributable to ETA, it seems these measures provide a reasonable approximation of the damage caused by ETA's activity.

23. This frequently used indicator has been criticized since it tends to underestimate the degree of terrorist activity (Frey, Luechinger, & Stutzer, 2007). As for $Truce_{jt}$, this variable is defined by considering the survey year, and it is extracted from the data set of the Spanish Ministry of the Interior.

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