

Pallan, Hayley

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Do investors care about consumption taxes? Evidence from equities in advanced and emerging economies

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Do Investors Care About Consumption Taxes? Evidence from Equities in Advanced and Emerging Economies

Hayley Pallan
Geneva Graduate Institute

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Chemin Eugène-Rigot 2
P.O. Box 136
CH - 1211 Geneva 21
Switzerland

Do Investors Care About Consumption Taxes?
Evidence from Equities in Advanced and Emerging Economies

Hayley Pallan*[†]

4 December 2021

Abstract

This paper examines whether investors react to consumption taxes. Despite the near global adoption of VAT policies, relatively little is known regarding the investor response to VAT changes. In an event-study setup, using a new dataset of daily equity returns and precise dates of tax policy announcements across 20 countries between 1990 and 2014, I find heterogeneous responses: in advanced economies, equities react negatively to an announcement regarding a consumption tax increase, while in emerging markets, equities react positively to similar announcements. In emerging economies, the positive response to consumption tax increases is amplified in times of worsening macro-indicators, such as higher fiscal deficits and inflation. This result holds using both country-level index returns and firm-level equity returns. Furthermore, in emerging economies, the equity returns of high-debt firms respond more positively to VAT increases. Overall, the results suggest that investor sentiment in emerging economies is positive in response to VAT increases. This may be due to the expectation that fiscal prudence will prevent increases in interest rates, which would be particularly damaging for countries with deteriorating macro-conditions and firms with high levels of debt.

Keywords: Fiscal Policies, Financial Markets, Macroeconomic Conditions, Corporate Debt

JEL codes: H3, E6, G1

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[†]PhD Candidate, Graduate Institute Geneva. Contact: hayley.pallan@graduateinstitute.ch

1 Introduction

Value-added taxation (VAT) has been adopted by over 150 countries as of 2021.¹ Despite increased adoption of VAT there remains a gap in understanding the response of firms, and in particular *investors*, to changes in VAT policies. This paper contributes towards better understanding the relationship between investor sentiments and VAT.

I examine how stock markets respond to consumption tax policy changes. Addressing this question requires an empirical approach that isolates the policy change and the investor response. Using a novel dataset consisting of tax policy announcement dates and reform characteristics, daily firm-level equity-returns and daily country-level index returns covering 20 countries between 1990 and 2014, I find that investors do react to VAT policies. In advanced economies, an announcement of increasing VAT lowers equity returns or has a null effect, as one might expect from theory and previous empirical work.² On the other hand, in emerging markets, I find the response to an increase in VAT is positive and statistically significant.

The general result, that VAT increases have a positive relationship with emerging economy stock markets, is further supported by the inclusion of macroeconomic control variables and their interactions with tax policy announcements. I find that in times of worsening fiscal indicators (e.g., a decline in the fiscal balance), markets react even more positively to VAT increase announcements. These findings provide support to the idea that investors care about fiscally-prudent policies, especially in countries where fiscal variables are deteriorating. This interaction effect result is present for the emerging market countries included my sample, consistent with the idea that macroeconomic assessments incorporating fiscal space measures are important.³

I also find that consumption tax policy announcements have different impacts along the distribution of inflation, with greater inflation being associated with a larger positive stock market response in emerging economies. The role of inflation here provides additional support to the conclusion that fiscally-prudent tax policies may be a signal of future stability when the economic situation is particularly precarious (i.e. when fiscal space has deteriorated or when inflation is high). These interaction effects are policy-relevant, especially for less-developed countries which require domestic revenue mobilization to achieve financing needs, however, at the same time, there is concern that

¹The rise of and support for VAT is well-documented. Comprehensive surveys of the literature on VAT at different points in time include Metcalf (1995) and Keen (2009).

²Jacob et al. (2019) find that VAT increases lead to reduction in investment, due to the VAT incidence borne by firms.

³For example, Kose et al. (2017) introduce a comprehensive database on measures of fiscal space, and finds that fiscal space in non-advanced countries had not recovered following the financial crisis.

high taxes may deter investors. This paper provides evidence that fiscal-prudence, in the case of VAT, can generate a positive market reaction which may contribute to greater economic stability.

Firm-level regressions using daily raw returns for the same set of 20 countries between 1990 and 2014 confirm the country-level regression results: emerging market equities respond positively to VAT increase announcements, while there is a weak and negative relationship between such announcements and equities for advanced economies. Robustness checks at both the country and firm level, such as including VAT implementation dates in addition to VAT announcement dates, and including corporate tax announcements, confirm my original findings. Firm-level cumulative abnormal return regressions provide additional support for the positive equity return response to VAT increase announcements in emerging economies.

Another dimension I explore is the role of firm-level characteristics in the response to VAT policy announcements. The role of firm-level debt, assets, employees and profitability are examined. I find that firm-level variables play a more important role in determining equity returns in emerging economies compared to advanced economies. Specifically, I find that both long-term debt and short-term debt play a crucial role in the financial market response to VAT policies. For example, at higher amounts of debt, firms in emerging markets respond more positively to VAT increases. Both this result on corporate debt and the results on the role of macro-economic conditions suggest that fiscally-prudent policies are associated with expectations that such policies will prevent interest rate hikes. As an increase in interest rates would be particularly damaging for countries with deteriorating macro-conditions and firms with high levels of debt, VAT increases result in a positive reaction driven by those factors.

Related Literature First, I contribute to the literature on policy announcements and financial markets. Recent work in this area includes Wagner et al. (2018a) and Wagner et al. (2018b) on the impact of corporate taxation in the United States,⁴ and work on non-tax policy announcement impacts on firms (for example, Alfaro et al. (2017) on capital controls and Greenland et al. (2020) on trade).⁵ I use an event-study approach to assess the impact of VAT policies, however, this

⁴The event-study approach has been less often used to understand tax policies. Some recent examples include Wagner et al. (2018a) and Wagner et al. (2018b), which both assess the response of markets to various announcements regarding US tax reform and tariffs during Trump's presidency. One consistent aspect of the event-study literature tends to be that they focus on one country at a time. Some exceptions to this includes Girardi (2020) which examines how political election outcomes impact various high-frequency financial market measures, using a panel composed of many country-level indices, and Johannesen and Larsen (2016) which examines the impact of financial transparency legislation announcements and their stock market impact in 13 countries.

⁵While there is an increase in empirical work on policy announcement effects, this area of work dates back to earlier papers, one of which is Engel and Frankel (1984) who study the impact of money announcements on interest

approach is also broadly related to prior work on tax policy identification.⁶ I depart from the literature on policy announcements and financial markets by assessing the financial market impact of VAT policies, which to the best of my knowledge, has not been explored in a cross-country, high-frequency setup.

Second, I contribute to the literature on the impact of VAT policies. While there has been much work on the impact of VAT for revenues (Keen (2007)), VAT for prices (Benedek et al. (2015)) and VAT for other macroeconomic outcomes (such as Dabla-Norris and Lima (2018) on the response of output and employment or Alavuotunki et al. (2019) on the impact for inequality), there is relatively little on the intersection between VAT and investor sentiment. Recent work such as Jacob et al. (2019) assesses the impact of consumption taxes for investment using firm-level financial statements with a focus on the Netherlands. Other research on VAT and investment includes Chen et al. (2019) which investigates VAT reform in China and Djankov et al. (2010) which focuses on corporate taxation and investment while controlling for VAT. I depart from this literature by focusing on the relationship between VAT and investor sentiment, using country-index returns and firm-level equity returns.

Third, I contribute to the literature on policy timing and the role of initial conditions, at both the macro and micro levels. It is already established that the timing and composition of fiscal policies matter (Alesina et al. (2019)). Furthermore, prior research shows that initial macroeconomic conditions shape the impact of fiscal policies (Corsetti et al. (2012)). Similar to my paper, Gunter et al. (2018) find non-linear impacts of taxation which depend on the initial tax rates in a given country. I depart from the literature by specifically assessing the role of VAT policies and their financial market impact along the distribution of macroeconomic indicators and firm-level characteristics.

rates. Earlier, in King (1974), the potential impact of tax policy announcements for firms was highlighted: “In recent years governments have often announced tax changes in advance, and increasing attention is being paid to the use of announcements of future tax changes as a policy tool in its own right.”

⁶The typical approach to determining a tax policy shock has been by a VAR approach. Examples of this approach include Blanchard and Perotti (2002), Ramey (2011) and Mertens and Ravn (2013), among others. Narrative identification is also popular in understanding tax policy effects. For example, Romer and Romer (2010) distinguish between endogenous and exogenous tax policy changes based on the context of tax policy documents. One application of their approach is Cloyne (2013) using data for the United Kingdom. Similarly, Mertens and Ravn (2012) distinguish between anticipated and unanticipated tax changes. Benzarti et al. (2017) also use a narrative approach for VAT specifically and find asymmetric effects on prices. Carriere-Swallow et al. (2018) use a narrative approach to identify periods of fiscal consolidation. They then use this set of dates to understand the response of macroeconomic variables to the shift toward fiscal consolidation in a cross-country framework. Both Riera-Crichton et al. (2016) and Hebous and Zimmermann (2018) assess issues in tax shock identification.

Outline The remainder of the paper is organized as follows. Section 2 presents the data. Section 3 describes the empirical framework and related hypotheses. Results are presented and discussed in Section 4. Section 5 concludes.

2 Data

I compile a cross-country, firm, daily-level dataset, drawn from two key data sources: the IMF’s Tax Policy Reform Database (TPRD) and firm-level or country-index data from Datastream.

Tax Variables The TPRD contains tax policy announcement and implementation dates for 20 advanced and emerging economies, listed in Figure 1.⁷ Variables of interest from TPRD include the announcement date, implementation date of the associated announcement, tax type of the announcement⁸ (i.e. VAT), tax change direction (increase or decrease), and tax reform type (rate or base change). I only use VAT policy announcements that include full information (day, month and year of the announcement). I construct dummy variables for specific tax types on their announcement date.⁹

Equities Data I begin with daily price data for firms and each country’s accompanying daily market index between 1990-2014 (sourced from Datastream). I combine these daily data with the tax policy announcements data from TPRD. Figure 1 lists the countries recorded in the TPRD’s database along with the market index data.¹⁰ In my specification, I use a global index (MSCI World) to capture changes in global market factors which may impact domestic firms’ returns simultaneously with a tax policy announcement (or implementation date). Summary statistics for the equity returns data is in Appendix A.1.

Macroeconomic Conditions Various measures of fiscal space are retrieved from the World Bank’s Fiscal Space Database, which is described in detail by Kose et al. (2017). Reinhart et al.

⁷For more detail on this dataset see Amaglobeli et al. (2018). Note that the raw IMF TPRD dataset contains 23 countries. See Appendix A.2 for the number of tax changes per country used in my paper.

⁸Other tax policy types are included in TPRD. These are corporate taxation, personal income taxation, property taxation, excise taxation and social security taxes.

⁹In matching the binary indicators of VAT tax policy announcement types, I match each policy (which is country-day specific), to all firms in the dataset with the same country-day pair.

¹⁰These are countries for which announcement and implementation dates are available via the IMF’s TPRD. In addition to satisfying this requirement, these countries have all made both corporate income tax and value-added tax announcements in the period covered by IMF TPRD.

Figure 1. List of Country Indices

Country	Index Used	Country	Index Used
Australia	S&P / ASX 200	Greece	Athens Composite
Brazil	Bovespa	India	CNX NIFTY 50
Canada	S&P / TSX 60	Ireland	ISEQ SE
China	Shanghai 180	Italy	FTSE MIB
Czech Republic	Prague SE PX	Japan	NIKKEI 225
Denmark	OMXC20	Korea	KOSPI 200
Spain	IBEX 35	Mexico	IPC (Bolsa)
France	CAC 40	Poland	Warsaw General
Great Britain	FTSE 100	Portugal	PSI-20
Germany	DAX 30	Turkey	BIST 30

(2020)’s database contains several indicators on systemic crises. Inflation data is obtained from World Development Indicators. For additional information on these variables see Appendix A.3.

Firm-Level Variables At an aggregated level (quarterly or annual) I control for firm-level variables (see Appendix A.4). These firm-level characteristics include proxies for firm size (assets and employees) and various debt variables (short-term debt and long-term debt). Additionally, a measure for profitability is obtained (operating profit margin). Profitability is used in Jacob et al. (2019) as a proxy for price elasticities. The logic is that that profit margin is a proxy for market power, and firms with greater market power are assumed to have lower price elasticities of demand.

3 Empirical Framework and Hypotheses

Policy decisions and financial market responses may be reactions to surrounding economic conditions. In a simple OLS regression using low-frequency data of economic variables, endogeneity is a concern.¹¹ For example, using country-level annual data in an OLS setup, it is a challenge to convincingly say whether investment induces changes in tax policies, whether tax policies induce change in investment, whether some combination of other characteristics influences one or both of tax policies and investment, or whether there are interaction effects among the potential relationships described. To address these concerns, I propose an event-study framework to assess how investors respond to VAT policies.

In my paper, I restrict the “events” to VAT-related announcements which do not coincide with

¹¹See Romer and Romer (2010) for a description of empirical design concerns in studying tax policies and the use of narrative identification as an alternative approach.

other announcements. With these identified events, I am able to construct a dummy variable at the daily-country level indicating whether a specific day coincides with a VAT policy announcement. These dummies can be further categorized into four groups: VAT base increases, VAT base decreases, VAT rate increases, and VAT rate decreases. These binary variables (indicating event or no event) are my key variables of interest. Given that my variable of interest is country-time specific, the specifications presented in this section cluster by country-time and include fixed effects by countries, firms and time if possible.¹² There is autocorrelation in high-frequency market data (and spatial correlation given that there is a cross-section of countries included), which I address using Driscoll-Kraay standard errors.¹³

In this section I present the baseline specification, which can be further dis-aggregated by event types. A specification including macroeconomic variables and their interaction is presented, as well as a set of firm-level specifications.

Baseline Specification The baseline specification is the following:

$$ret_{jt}^C = \beta_0 + \beta_1 MSCI_t + \beta_2 VATinc_{jt} + \beta_3 VATdec_{jt} + v_j + \epsilon_{jt} \quad (1)$$

Country-level daily index returns (ret_{jt}^C) are regressed on a constant, MSCI returns ($MSCI_t$) and indicators of VAT policy announcements. $VATinc_{jt}$ is equal to one when in country j on day t there is a VAT increase announcement. $VATdec_{jt}$ is equal to one when in country j on day t there is a VAT decrease announcement. While the IMF's TPRD provides information on announcement and implementation dates of tax policies, I use announcements dates in the baseline specification as these dates are more likely to be unexpected than implementation dates, as tax policies are often discussed and debated in a rather publicly and over a long time-span.¹⁴ Finally, in Equation 1, country fixed effects (v_j) are included and ϵ_{jt} is the error term.

The hypothesis to be tested in estimating Equation 1 is that an increase in consumption tax will have a negative effect for firms if the tax incidence is shared between firms and consumers. The negative effect implies lower profits and thus, lower equity returns for investors. Empirically the hypothesis is in line with finding $\hat{\beta}_2 < 0$ and $\hat{\beta}_3 > 0$ in Equation 1. This hypothesis ignores the

¹²In some specifications I include MSCI returns, which does not vary between countries, so it is collinear with any time-related fixed effect.

¹³Further discussed in Appendix B.13.

¹⁴A robustness specification does include implementation dates in Appendix B.2.

distinction between base and rate changes.

In an extension of the baseline specification, I separate tax policy changes into base and rate changes:

$$ret_{jt}^C = \beta_0 + \beta_1 MSCI_t + \beta_2 VATinc_{jt}^{BASE} + \beta_3 VATdec_{jt}^{BASE} + \beta_4 VATinc_{jt}^{RATE} + \beta_5 VATdec_{jt}^{RATE} + v_j + \epsilon_{jt} \quad (2)$$

$VATinc_{jt}^{BASE}$ is equal to one when there is a VAT base increase announcement in country j on day t , $VATdec_{jt}^{BASE}$ is equal to one when there is a VAT base decrease announcement in country j on day t , $VATinc_{jt}^{RATE}$ is equal to one when there is a VAT rate increase announcement in country j on day t , and $VATdec_{jt}^{RATE}$ is equal to one when there is a VAT rate decrease announcement in country j on day t .

Rate and base changes may have different effects. If the consumption tax rate increases, and incidence is shared between firms and consumers, there is a negative effect for firm profitability (and equity returns), all else equal. This is line with finding that $\hat{\beta}_4 < 0$ $\hat{\beta}_5 > 0$ in Equation 2. If the consumption tax base broadens, the overall effect is ambiguous (that is, it is not clear to establish the signs of $\hat{\beta}_2$ and $\hat{\beta}_3$ a priori). The consequence for a firm's profitability and thus an investor's equity return would depend on whether the firm is included in the tax base expansion or whether the firm is already included in the tax base.¹⁵

Macroeconomic Conditions Specification In this version of the specification, the tax indicators are interacted with variables associated with macroeconomic conditions:

$$ret_{jt}^C = \beta_0 + \beta_1 MSCI_t + \beta_2 VAT_{jt} + \beta_3 VAT_{jt} \times MACRO_{jt} + \beta_5 MACRO_{jt} + v_j + \epsilon_{jt} \quad (3)$$

In Equation 3, country-level daily index returns (ret_{jt}^C) are regressed on a constant, MSCI daily returns ($MSCI_t$), a dummy for each type of policy announcement (VAT_{jt}), the policy dummy interacted with a macroeconomic variable which is country-time varying ($VAT_{jt} \times MACRO_{jt}$) and the macroeconomic variable separate from the interaction term ($MACRO_{jt}$). Country fixed effects are included (v_j). Equation 3 as shown, only has one policy dummy, interacted with one

¹⁵Unfortunately I cannot empirically make this distinction due to data constraints.

macroeconomic variable. In extensions of this specification, I include additional dummy variables and their individual interactions with a macroeconomic variable.

The macroeconomic conditions specification is useful to assess the role that country level variables have for stock market returns. Most importantly in this paper, Equation 3 provides an estimate of the relationship between VAT policy announcements and stock returns conditional on macroeconomic conditions, such as fiscal space measures. The purpose is to see whether the response of markets to VAT policy announcements depends on current conditions and in what way. The main result of interest from the specification is the following:

$$\frac{\partial ret_{jt}^C}{\partial VAT_{jt}} = \beta_2 + \beta_3 \times MACRO_{jt} \quad (4)$$

The value associated with Equation 4 is the amount by which stock returns increase with a policy announcement indicated by VAT_{jt} . Macroeconomic variables employed include several measures of fiscal space as defined and provided by the World Bank’s Fiscal Space database (Kose et al. (2017)), an indicator for systemic crises (Reinhart et al. (2020)), and inflation (World Development Indicators).¹⁶

The role of macro-conditions is ambiguous. It is debateable whether tax policies implemented under certain conditions should generate a positive or negative response. There are arguments for assuming both $\beta_2 > 0$ or $\beta_2 < 0$ in Equation 4. First, one would need to define the specific definition of macro-conditions. Empirically, I focus on the role of fiscal space indicators, an indicator of systemic crisis, and inflation. With less favourable conditions (i.e. systemic crisis) one might assume a tax increase will have an even more severe negative effect if the tax increase is perceived as a signal of distress. On the contrary, if a tax increase is interpreted as a signal of future fiscal prudence and more favourable future economic conditions, a positive effect may be reflected through equity returns.

This approach is related to empirical work by Corsetti et al. (2012) which assesses the spending multiplier under different conditions and Perotti (1999) which finds that the macroeconomic consequences of fiscal policies are conditional on whether it is a “good” or “bad” time.¹⁷ The macroeconomic conditions specification is also related to Vegh and Vuletin (2015), which assesses

¹⁶Initial VAT rates are also included from Vegh and Vuletin (2015)’s dataset, and their inclusion is motivated by Gunter et al. (2018) which finds non-linear effects to VAT policies, conditional on initial VAT rates. However, empirically the results that incorporate initial VAT rates with my dataset are not statistically significant and are not reported on further.

¹⁷Perotti (1999) distinguishes between good and bad times by constructing a dummy variable from debt and deficit data.

the cyclicity of tax policies in advanced and developing countries. In their paper, they find that developing countries tend to have pro-cyclical tax policies. Equation 3 tests the investor response to specific tax policies under particular macroeconomic contexts.

Firm-Level Specification The baseline firm-level specification is given below:

$$ret_{it}^F = \beta_0 + \beta_1 ret_{jt}^C + \beta_2 VATinc_{jt} + \beta_3 VATdec_{jt} + \Omega X_{ijt} + v_i + w_t + \epsilon_{ijt} \quad (5)$$

The daily return of firm i on day t (ret_{it}^F) is regressed on daily index returns of country j on day t (ret_{jt}^C), announcement indicators for specific VAT policies ($VATinc_{jt}$ and $VATdec_{jt}$), and firm-level characteristics such as profit margin, assets etc. (contained in matrix X_{it}). Firm and time fixed effects are included (v_i and w_t , respectively).

Another way to assess the overall response of stock markets to a tax policy announcements is to compute cumulative abnormal returns. The procedure applied is outlined Appendix B.10. To assess the impact on specific tax policy announcements the following specification is proposed:

$$car_{i,-w < t < -z} = \gamma_0 + \epsilon_i \quad (6)$$

The cumulative abnormal return associated with a given type of announcement (e.g. VAT increases) is generated over an event window defined as $-w$ days pre-event to $-z$ days pre-event $car_{j,-w < t < -z}$. This variable captures the cumulative abnormal returns associated with the returns of a specific firm i (which is listed on a specific country's stock market (j)) in response to a particular type of announcement made at time $t = 0$ in country j . Cumulative abnormal returns are regressed on a constant. The statistical significance of the constant terms indicates the statistical significance of the particular event-type for all firms affected (Dasgupta et al. (1998) and MacKinlay (1997)). For example, suppose the event-type for which cumulative abnormal returns are computed is a VAT increase. If one expects VAT increases to decrease cumulative abnormal returns, then the hypothesis associated with Equation 6 would be $\gamma_0 < 0$.

Firm-Level Characteristics Specification The baseline firm-level specification, accounting for the role of tax policy announcements along the distribution of firm-level characteristics is given below:

$$ret_{it}^F = \beta_0 + \beta_1 ret_{jt}^C + \beta_2 VAT_{jt} + \beta_3 VAT_{jt} \times FIRMVAR_{it} + \beta_5 FIRMVAR_{it} + \Omega X_{it} + v_j + w_t + \epsilon_{it} \quad (7)$$

Equation 7 builds on Equation 5, now including interaction terms between VAT announcements and firm-level characteristics. For example, *FIRMVAR* may denote firm-level long-term debt or firm-level assets. Therefore, the overall coefficient of interest is the following:

$$\frac{\partial ret_{it}^F}{\partial VAT_{jt}} = \beta_2 + \beta_3 \times FIRMVAR_{it} \quad (8)$$

This specification proposes an approach to test the role of firm-level characteristics and to further assess the robustness of the results from the baseline specification.

4 Results

The results are organized as follows. First, I present results that show heterogeneous effects of VAT policy announcements for advanced and emerging economy groups. This is a robust result, controlling for leads and lags around the announcement events. Second, I show that the emerging market effect appears to be driven by announcements regarding either the tax base or rate. The impact of VAT increase announcements are robust to the inclusion of macroeconomic control variables, and I provide evidence of an important role for fiscal space and other macroeconomic indicators in determining the response to VAT increases. Furthermore, the results are robust to similar estimations using firm-level equity returns, cumulative abnormal returns, and assessing the impact of VAT increases along the distribution of firm-level characteristics.

4.1 Baseline Results

Table 1 shows the results for Equation 1. In column (1) of Table 1 there appears to be no effect of VAT announcements regarding either an increase or a decrease. Both coefficients are statistically insignificant. However, separating emerging markets and advanced economies (in columns (2) and (3), respectively), we can see that equity indices in emerging markets react positively to VAT increase announcements and with a statistically significant coefficient. In contrast, the sample of advanced economies indicates no statistical significance and a negative coefficient on *VATIncrease*, which is more in line with the intuition that an increase in taxation decreases profitability. The

baseline results can be interpreted as quantitatively suggesting that country-level index returns increase by 2 percentage points on days when VAT increase announcements are made in emerging economies, *ceteris paribus*.¹⁸

Table 1. Baseline Announcement Effects on Index Returns

	(1) All	(2) EM	(3) ADV
MSCI Ret.	0.750*** (0.011)	0.701*** (0.027)	0.765*** (0.009)
VAT Increase	0.001 (0.003)	0.020** (0.009)	-0.003 (0.002)
VAT Decrease	0.001 (0.003)	-0.008** (0.004)	0.009** (0.004)
Observations	116,952	25,877	91,075
Number of groups	20	5	15
Country FE	Yes	Yes	Yes
DK SE	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed.

Robustness To test the robustness of the results shown in Table 1, which establish a positive and statistically significant relationship between VAT increase announcement and index returns in emerging markets, I estimate the following equation:

$$ret_{jt}^C = \beta_0 + \beta_1 MSCI_t + \sum_{k=-10}^{10} \eta_k L^k VATinc_{jt} + \sum_{k=-10}^{10} \gamma_k L^k VATdec_{jt} + \epsilon_{jt} \quad (9)$$

In equation 9, ret^C are daily country index returns and MSCI is a measure of daily global index returns. $VATinc$ and $VATdec$ are binary variables equal to one on the day of an announcement of an increase or decrease in VAT, respectively. L^k is a lag operator. The corresponding estimates are shown in Figure 2 and Figure 3 for increase and decrease events, respectively. Figure 2 shows that a VAT increase announcement has a positive and statistically significant coefficient on the day

¹⁸The average daily index return in the country-level daily dataset is 0.04%, for the sub-samples of emerging markets and advanced economies the average is 0.14% and 0.02%, respectively. The size of the announcement may also play an important role in influencing the stock market response. However, the size of the announced changes is not available in the data and for base changes this would be especially challenging to quantify. The direction of the effect is still informative by itself.

of the announcement (corresponding to Event Time = 0). Most days leading up to and following an announcement of this type do not have a positive and statistically significant coefficient. Figure 3 is the corresponding plot of coefficients for VAT decrease announcements, which shows that an announcement of this type has a negative and statistically significant coefficient, while controlling for trading days before and after the announcement. Overall, these figures confirm that in emerging markets announcements of VAT increases have a robust positive impact on stock market returns.

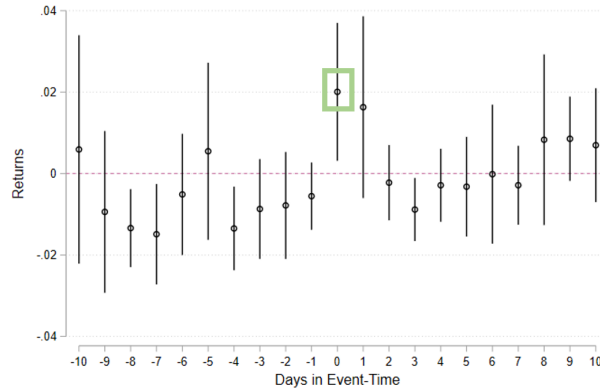
The asymmetry of the reaction to increase and decrease announcements (the estimated event coefficients are 0.02 and -0.08, respectively) is not surprising. Previous work has found asymmetric responses to VAT changes as in Benzarti et al. (2017), who find that consumer prices respond twice as much to VAT increases compared to VAT decreases. This is consistent with the results for emerging markets in Table 1. In emerging economies, I find that a VAT increase announcement is associated with a 2 percentage point increase in index returns. Asymmetrically, a VAT decrease announcement in emerging economies is associated with a 0.8 percentage point decrease in index returns. For advanced economies, the pattern is asymmetric in opposite directions as for emerging economies: VAT decreases have a positive association with stock market returns, while VAT increases have a negative coefficient (though not statistically significant).

The positive and statistically significant relationship between VAT increase announcements and market returns in emerging markets holds in a variety of robustness checks. For example, in Appendix B.1 I include corporate tax announcements and in Appendix B.2 I include VAT implementation dates. These appendices show that using both firm-level and country-level raw returns the general result is robust.¹⁹

Base and Rate Changes VAT increase announcements can be split into announcements that affect the tax base and announcements that affect the tax rate. Comparing results in Table 1 with results in Table 2 helps to understand the type of policy announcements which drive the response

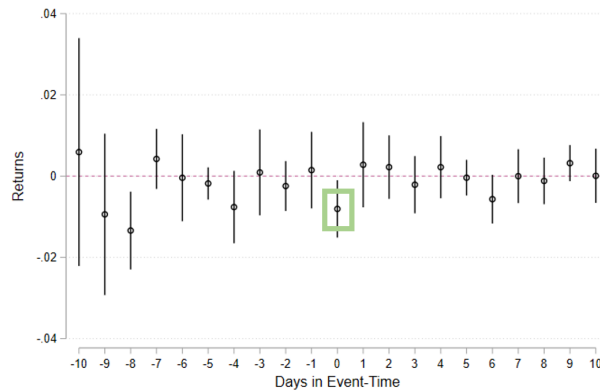
¹⁹There may be a few concerns regarding the baseline results which I address in the appendix. For example, one concern may be that the left-hand side variable is daily raw returns. For this issue, in the firm-level results section and in Appendix B.10 I generate abnormal returns and additional regressions find similar results. Another issue addressed in Appendix B.13 describes the approach to address autocorrelation across time and cross-sections. Finally, a separate concern may be the lack of impact found for corporate tax policy announcements. While the focus of this paper is on the impact of VAT, understanding the impact of corporate tax policy in emerging markets is an area for further research. One potential reason for the lack of a corporate tax effect compared to the VAT may be that VAT is seen as a more efficient type of tax and may send a particularly credible signal due to its efficiency and it being relatively difficult to evade (Pomeranz (2015)). In contrast, corporate income taxes may be easier to avoid through profit-shifting and administrative oversight in countries with less tax capacity resources. Arin et al. (2009) also looks at the stock market impact of tax policies, limited to three countries (Germany, Japan and the United States), and they find limited impact of corporate tax changes for the stock market.

Figure 2. Positive Reaction in EMs coincides with “Increase” Announcements



Notes: The figure plots the η_k coefficients from Equation 9. The x-axis is measured in event time, where event time equal to zero corresponds to the coefficient associated with the announcement date η_0 . The coefficient estimated for η_{-10} is plotted at event time equal to -10, η_{-9} is plotted at event time equal to -9, etc. 95-percent confidence interval bands for each point estimate are presented.

Figure 3. Negative Reaction in EMs coincides with “Decrease” Announcements



Notes: The figure plots the γ_k coefficients from Equation 9. The x-axis is measured in event time, where event time equal to zero corresponds to the coefficient associated with the announcement date γ_0 . The coefficient estimated for γ_{-10} is plotted at event time equal to -10, γ_{-9} is plotted at event time equal to -9, etc. 95-percent confidence interval bands for each point estimate are presented.

to specific policies. Table 2 estimates Equation 2 for the full sample, emerging market countries and advanced economies.

The results in column (2) of Table 2 are generally consistent with the results in the emerging markets column in Table 1. The main takeaway is that the VAT Increase response in emerging markets is driven slightly more by VAT base increases than VAT rate increases, as rate increases are not statistically significant. It is striking that the results are so different from the overall statistically insignificant coefficients of VAT policy announcements in advanced economies (shown in column (3) of Tables 1 and 2).

Differences between advanced economy and emerging market reactions are consistent with findings in the tax and development literature. In a survey on tax collection and developing countries, Besley and Persson (2014) explain that developing countries have relatively smaller tax bases than advanced economies. Related to the correlation between development and tax bases, Aizenman and Jinjark (2009) explain that VAT is a tax that can be classified as a ‘hard to collect’ tax. So as countries develop, they shift to taxes such as VAT, which may be an explanation for the distinct results found for emerging markets and advanced economies. More reasonably, the main point, which is developed further in section 4.2, is that emerging markets have less fiscal space, and expanding potential VAT collection may be interpreted by investors as a policy that can improve fiscal sustainability, and thus a better economic environment for future firm performance.

Baseline Summary The baseline results find that VAT increase announcements have a positive and statistically significant relationship with country-level index returns in emerging markets. The same relationship in advanced economies tends to be weak and negative. The positive financial market reaction in emerging economies is explored further below.

4.2 The Role of Macroeconomic Conditions

To assess the role of macroeconomic conditions for the stock market response to tax policies in emerging economies, I run several regressions which are shown in Table 3 (estimating Equation 3).

The Role of Fiscal Space In each column of Table 3, the dependent variable is country-level daily index returns. The regressors include MSCI daily returns, which are always positive and statistically significant as expected (an increase in global index returns is highly correlated with domestic index returns). Coefficients of main interest are the VAT announcement dummies and the

Table 2. Base and Rate Announcement Effects on Index Returns

	(1) All	(2) EM	(3) ADV
MSCI Ret.	0.750*** (0.011)	0.701*** (0.028)	0.765*** (0.009)
VAT Base Increase	0.008 (0.007)	0.021* (0.011)	-0.001 (0.006)
VAT Base Decrease	0.0020 (0.006)	-0.007*** (0.001)	0.014 (0.009)
VAT Rate Increase	-0.001 (0.003)	0.020 (0.013)	-0.004 (0.002)
VAT Rate Decrease	0.001 (0.004)	-0.008 (0.006)	0.007** (0.003)
Observations	116,952	25,877	91,075
Number of groups	20	5	15
Country FE	Yes	Yes	Yes
DK SE	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed.

interaction terms between these dummies and country-time varying fiscal variables. Each column then replaces “Fiscal Variable” with the measure specified at the top of each column (details can be found in the table notes). The variables used follow fiscal space definitions as described in Kose et al. (2017).²⁰

To interpret the interaction results, refer to Equation 4. Column (1) shows that on a day in which a VAT base increase is announced, daily country-index returns increase by $0.00385 - 0.00437 \times (CB)$, where CB is the cyclically adjusted balance (percent of potential GDP). At the mean of CB in emerging markets, which is -2.5, a VAT base increase is associated with an increase in daily index returns of 1.4 percentage points. Similar results are found for various measures of fiscal space in columns (2)-(4) of Table 3. The conclusion from columns (1)-(4) is that a VAT base increase is interpreted positively by investors, especially when fiscal space indicators are relatively low.

Figure 4 plots the marginal effects of a VAT increase conditional on the level of fiscal space. Overall, it shows that as fiscal space in emerging markets declines, the marginal effect of a VAT increase is more positive and statistically significant. For example, in panel (a) of Figure 4, when the fiscal balance as a percent of GDP is -10, a VAT increase announcement is associated with an

²⁰See Appendix A.3 for more information on the fiscal space variables used.

increase in equity returns of nearly 5 percentage points. The marginal effect of a VAT increase announcement diminishes as fiscal space improves, as the effect is statistically insignificant when the fiscal balance is zero. In contrast, in advanced economies, there is a null effect of VAT increases conditional on fiscal space, with point estimates moving in the opposite direction compared to the point estimates for emerging markets (in advanced economies the point estimates increase with improvements in fiscal space, while in emerging markets the point estimates decrease with improvements in fiscal space).

The Role of Inflation In light of renewed academic and policy interest in the interaction between fiscal and monetary policies (Bartsch et al. (2020) and Afonso et al. (2019)),²¹ I also provide evidence on the role of inflation for the financial market response to consumption taxes.²² These results are shown in Figure 5, with separate figures for emerging and advanced economies. These findings are similar to the conclusion regarding fiscal space and systemic crises - as the macroeconomic environment worsens (in this case with higher inflation), a VAT increase is associated with greater returns. These additional results with inflation provide support to the interpretation that investors expect fiscally prudent policies to prevent the need to increase interest rates, thus leading to greater financial market returns.

Robustness of Macroeconomic Conditions In a robustness check of the role of macroeconomic conditions, I estimate Equation 3 using a systemic crisis indicator from Reinhart et al. (2020). This test confirms that with an increase in VAT, when there is less fiscal space or a systemic crisis, there is a positive response in equity index returns. These results suggest that an increase in fiscally prudent policies “corrects” (to some extent) the negative effect of crises or deteriorating fiscal space, at least in the minds of investors. Results estimating Equation 3, replacing $MACRO_{jt}$ with a systemic crisis indicator can be found in Appendix B.5.²³ Additionally, I re-estimate the baseline macroeconomic conditions specification, using a composite indicator of VAT announce-

²¹Related work includes the differences between fiscal and monetary policy formulation. Examples of this literature include Leeper (2010) on “Monetary science, fiscal alchemy” and Frankel (2013) on the flipped view, “Monetary alchemy, fiscal science”. Blinder (2021) further adds to the discussion on the roles of fiscal and monetary policies in a recent speech at annual Jackson Hole Symposium. Overall, the increased discussion of monetary-fiscal interactions points to future research in this area.

²²To the best of my knowledge the role of consumption taxes and inflation has mostly been assessed in country-specific studies, and the focus is on the relationship between VAT and consumer-price pass-through. For example Carare and Danninger (2008) examines the link between VAT and inflation in Germany, while Benkovskis and Fadejeva (2014) examines the link in Latvia. One exception which takes a cross-country approach is Benedek et al. (2015)). As a result, it is unclear what my results might be directly comparable with in the literature.

²³The systemic crisis interaction effect is also apparent for the full sample and other country groups. While the fiscal space interactions are a particular case for emerging markets in the sample.

ments. These results can be found in Appendix B.6, and are broadly similar to the results shown in the main paper.

To further support the interpretation that financial market investors care about a country's fiscal situation, in Appendix B.7 I show the impact along the distribution of interest payments as a share of total revenue. These results show that index-returns respond more positively to VAT increases as the interest payments of a government increase. In contrast, VAT decreases have a larger negative impact on index-returns along the distribution of interest payments. In comparison to similar announcements, in advanced economies there is no statistically significant response of financial markets along the distribution of interest payments. These results provide a robustness check for the general role of fiscal space for financial market responses in emerging markets.²⁴

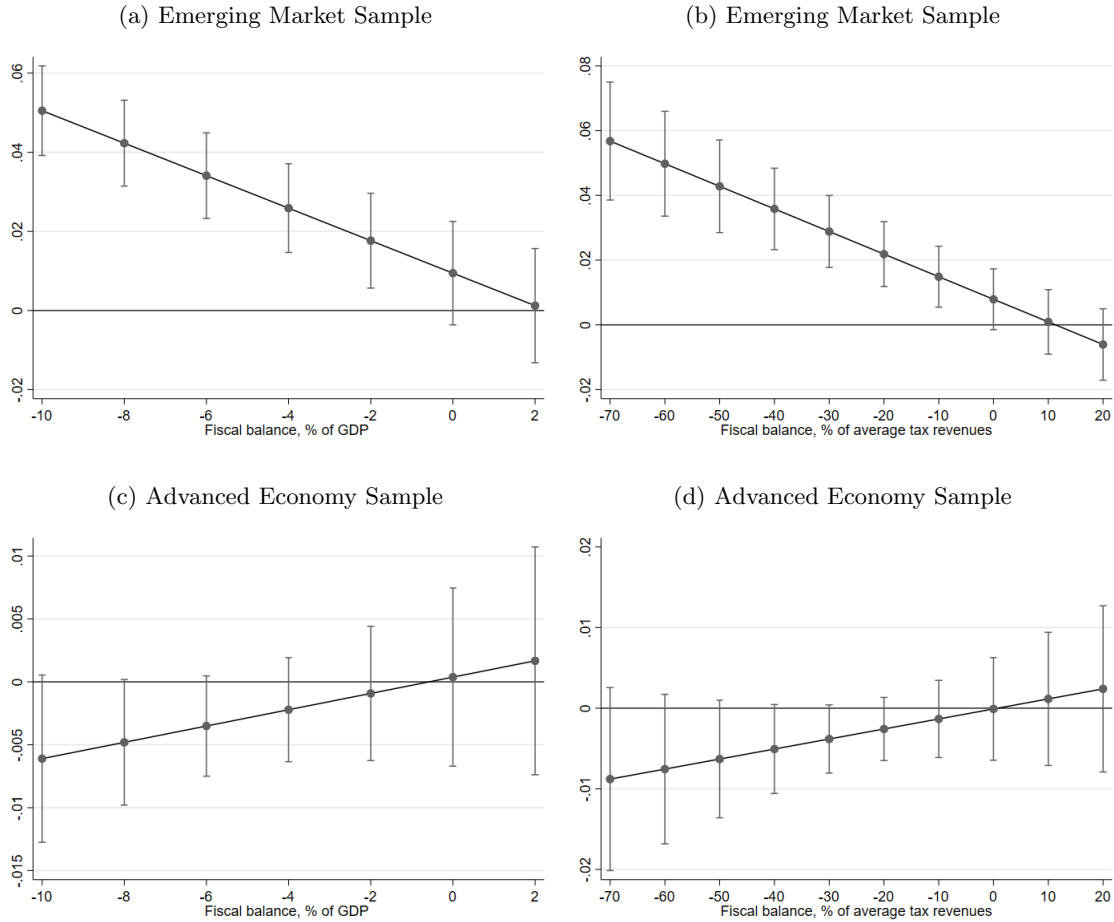
²⁴Further results are shown along the distribution of export growth in Appendix B.8. There I show that in countries with higher export growth, VAT increases generate a more positive stock market reaction in emerging economies, compared to emerging economies with lower export growth.

Table 3. Interaction Effects with Fiscal Conditions in Emerging Markets

	(1) CB	(2) FB	(3) FBT	(4) PB
MSCI Ret.	0.720*** (0.026)	0.720*** (0.026)	0.720*** (0.026)	0.720*** (0.026)
VAT Base Increase	0.004** (0.002)	0.006*** (0.002)	0.005*** (0.002)	0.008*** (0.002)
VAT Base Decrease	-0.005*** (0.001)	-0.006*** (0.001)	-0.005*** (0.001)	-0.007*** (0.001)
VAT Rate Increase	0.026 (0.023)	-0.008 (0.006)	-0.013*** (0.005)	0.058 (0.040)
VAT Rate Decrease	-0.005 (0.008)	-0.007 (0.008)	-0.007 (0.008)	-0.008* (0.005)
VAT Base Increase × Fiscal Variable	-0.004*** (0.000)	-0.004*** (0.000)	-0.001*** (0.000)	-0.007*** (0.000)
VAT Base Decrease × Fiscal Variable	0.001*** (0.000)	0.001*** (0.000)	0.000* (0.000)	-0.002** (0.000)
VAT Rate Increase × Fiscal Variable	2.78E-03 (0.006)	-0.016* (0.009)	-0.003*** (0.000)	-0.017 (0.014)
VAT Rate Decrease × Fiscal Variable	9.44E-04 (0.0008)	0.000 (0.0010)	1.34E-06 (0.0002)	-0.0031 (0.0020)
Fiscal Variable	7.15E-5 (0.000)	-6.00E-6 (0.000)	3.42E-6 (0.000)	1.71E-4*** (0.000)
Observations	23,532	23,532	23,532	23,532
Number of groups	5	5	5	5
Country FE	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each column includes a unique measure of fiscal space, whose coefficient is estimated separately (Fiscal Variable) and interacted with tax policy announcements (policy × Fiscal Variable). CB is the cyclically adjusted balance (percent of potential GDP), FBT is the fiscal balance (percent of average tax revenues), FB is the fiscal balance (percent of GDP), and PB is the primary balance (percentage of GDP). Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Country FE are included. Driscoll-Kraay standard errors are computed.

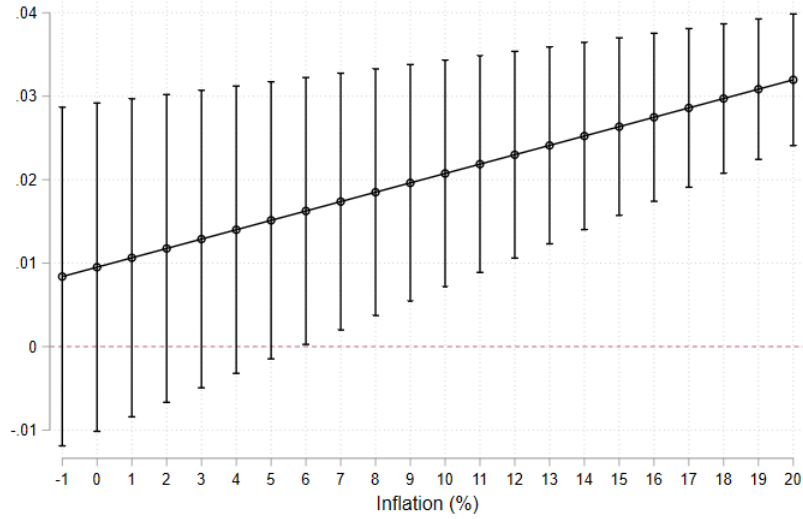
Figure 4. Marginal Effects of VAT Increase Announcements across Fiscal Space



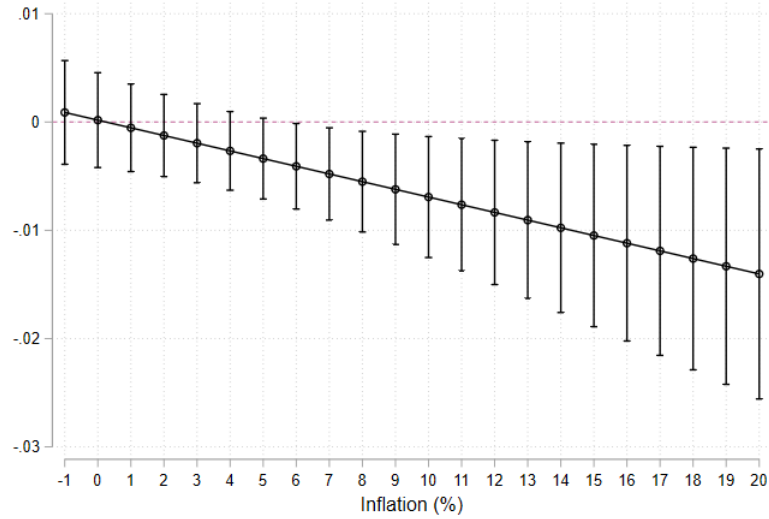
Notes: These figures show the marginal effects of a VAT increase at specific values of fiscal space measures (from estimating Equation 3). 95-percent confidence bands are presented. Panel (a) plots the marginal effects using the emerging market sample and fiscal balance as a percent of GDP as the fiscal space variable. Panel (b) plots the marginal effects using the emerging market sample and fiscal balance as a percent of average tax revenue as the fiscal space variable. Panel (c) plots the marginal effects using the advanced economy sample and fiscal balance as a percent of GDP as the fiscal space variable. Panel (d) plots the marginal effects using the advanced economy sample and fiscal balance as a percent of average tax revenue as the fiscal space variable.

Figure 5. Marginal Effects of VAT Increase Announcements across Inflation

(a) Emerging Market Sample



(b) Advanced Economy Sample



Notes: These figures show the marginal effects of a VAT increase at specific values of inflation (from estimating Equation 3). 95-percent confidence bands are presented. Panel (a) plots the marginal effects using the emerging market sample along the distribution of inflation. Panel (b) plots the marginal effects using the advanced economy sample along the distribution of inflation.

4.3 Firm-Level Results

This section confirms the role of VAT increases in emerging markets, using firm-level specifications. The firm-level data allow for the inclusion of more controls (such a firm-level debt and assets) and fixed effects (for firms and time). In this section I also present evidence on the impact of tax policy announcements along the distribution of firm-level characteristics.

Baseline Firm-Level Results Table 4 shows the estimation results on the full sample, advanced economies and emerging markets. Columns (1)-(3) include regressors for VAT increase announcements and VAT decrease announcements. The key results found using country-level data holds: VAT increase announcements have a positive and statistically significant relationship with daily firm-level equity returns in emerging markets (column (3)), which is in contrast to the statistically insignificant coefficient estimated for advanced economies (column (2)). These results are robust to country-by-country regressions for most emerging markets included in the sample.²⁵

Table 4. Firm-Level Results

	(1) All	(2) ADV	(3) EM
Market Ret.	0.766*** (0.0466)	0.805*** (0.0160)	0.673*** (0.1380)
VAT Increase	0.002* (0.0011)	0.001 (0.0012)	0.005** (0.0020)
VAT Decrease	-2.00E-5 (0.001)	-0.003 (0.002)	4.44E-4 (0.001)
Observations	6,154,009	5,099,000	1,055,009
R-squared	0.187	0.179	0.229
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
DK SE	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes

Notes: The dependent variable is the daily firm-level equity return. Market returns vary by country and time. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Firm and time FE are included. Driscoll-Kraay standard errors are computed.

²⁵See table of results in Appendix B.9. Again, results for advanced economies are much more heterogeneous, as can be seen in country-by-country regressions using firm-level equities returns in the same Appendix Table B.8.

Abnormal Returns Results Cumulative abnormal return results provide additional evidence on the different responses to tax announcements for equities in emerging and advanced economies. Table 5 shows estimation results for Equation 6. The dependent variable is cumulative abnormal returns.²⁶ Cumulative abnormal returns are computed for each event type and firm, over an event window around t equal to zero.

Table 5. Cumulative Abnormal Returns around VAT Base Increase Announcements

Panel A: Emerging Markets					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	0.00145 (0.0022)	0.00387** (0.0017)	0.00361** (0.0014)	0.001 (0.0014)	0.000741 (0.0010)
Observations	732	732	732	732	732
Panel B: Advanced Economies					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	0.000245 (0.0014)	-0.00200** (0.0010)	-0.00230*** (0.0008)	-0.00053 (0.0008)	-0.000831 (0.0006)
Observations	1,894	1,894	1,894	1,894	1,894
Panel C: All Countries					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	0.00058 (0.0012)	-0.000362 (0.0008)	-0.000653 (0.0007)	-0.000102 (0.0007)	-0.000393 (0.0005)
Observations	2,626	2,626	2,626	2,626	2,626

Notes: The dependent variable is the cumulative abnormal return (CAR) associated with VAT base increase announcements. Results are shown in three panels showing results for emerging markets, advanced economies and all countries. Each column corresponds to a different event window (the estimation window is held constant at 60 days, centered around the event). Column (1) shows results using a 5 day event window centered around the event. Column (2) shows results using a 3 day event window centered around the event. Columns (3) and (4) both use 2 day event windows, including the lead and the lag of the event date, respectively. Column (5) includes the abnormal return associated with the event only (event window equal to the event day uniquely). Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5 shows results for emerging markets, advanced economies, and the full sample. For each of these samples, various event windows are estimated and used as the dependent variable. The associated estimation window is held at 60 days (the period ranging between 90 days pre-

²⁶Running the specification with cumulative abnormal returns is similar to running a t-test on abnormal returns to test the statistical significance of an event.

event and 30 days pre-event). Cumulative abnormal returns are regressed on a constant, where the constant captures the response of abnormal returns to a particular type of announcement.²⁷ In Table 5 the announcement type is a VAT base increase. These results show that a VAT base increase announcement in emerging markets has a positive and statistically significant impact on cumulative abnormal returns in smaller event windows (see Panel A, columns (2) and (3)). That a larger event-window loses statistical significance (as in column (1) which displays results for a 5-day event window), suggests the impact of the announcement is isolated tightly around the announcement date and is not anticipated.

Table 6. Cumulative Abnormal Returns around VAT Rate Increase Announcements

Panel A: Emerging Markets					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	0.00537** (0.0027)	0.00528** (0.0021)	0.00446** (0.0018)	0.00333** (0.0017)	0.00251** (0.0012)
Observations	449	449	449	449	449
Panel B: Advanced Economies					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	-0.000922 (0.0009)	-0.00233*** (0.0007)	-0.00183*** (0.0006)	-0.00112* (0.0006)	-0.000627 (0.0005)
Observations	2,728	2,728	2,728	2,728	2,728
Panel C: All Countries					
	(1)	(2)	(3)	(4)	(5)
	5-day EW (-2,+2)	3-day EW (-1,+1)	2-day EW (0,+1)	2-day EW (-1,0)	1-day EW (t=0)
Constant	-3.27E-05 (0.0009)	-0.00125* (0.0007)	-0.000944* (0.0006)	-0.000494 (0.0006)	-0.000184 (0.0004)
Observations	3,177	3,177	3,177	3,177	3,177

Notes: The dependent variable is the cumulative abnormal return (CAR) associated with VAT rate increase announcements. Results are shown in three panels showing results for emerging markets, advanced economies and all countries. Each column corresponds to a different event window (the estimation window is held constant at 60 days, centered around the event). Column (1) shows results using a 5 day event window centered around the event. Column (2) shows results using a 3 day event window centered around the event. Columns (3) and (4) both use 2 day event windows, including the lead and the lag of the event date, respectively. Column (5) includes the abnormal return associated with the event only (event window equal to the event day uniquely). Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

In contrast, Panel B of Table 5 shows results for advanced economies, where the impact of

²⁷Appendix B.10 contains additional details on how abnormal returns are constructed in this paper.

VAT base increase announcements has a negative and statistically significant impact on cumulative abnormal returns. Not surprisingly, pooling all countries in the sample as shown in Panel C, the results are not statistically significant. Table 6 shows a similar table restricted to VAT rate increases. The general pattern is similar: in emerging markets there is a positive response, while in advanced economies there is a weak or negative response.

Overall, the regressions with raw returns (in Table 4) and cumulative abnormal returns (in Table 5) show that there are heterogeneous investor responses to VAT announcements. These results are in line with country-level regressions, which confirms there are differences in the stock market response to consumption tax announcements between advanced economies and emerging markets.

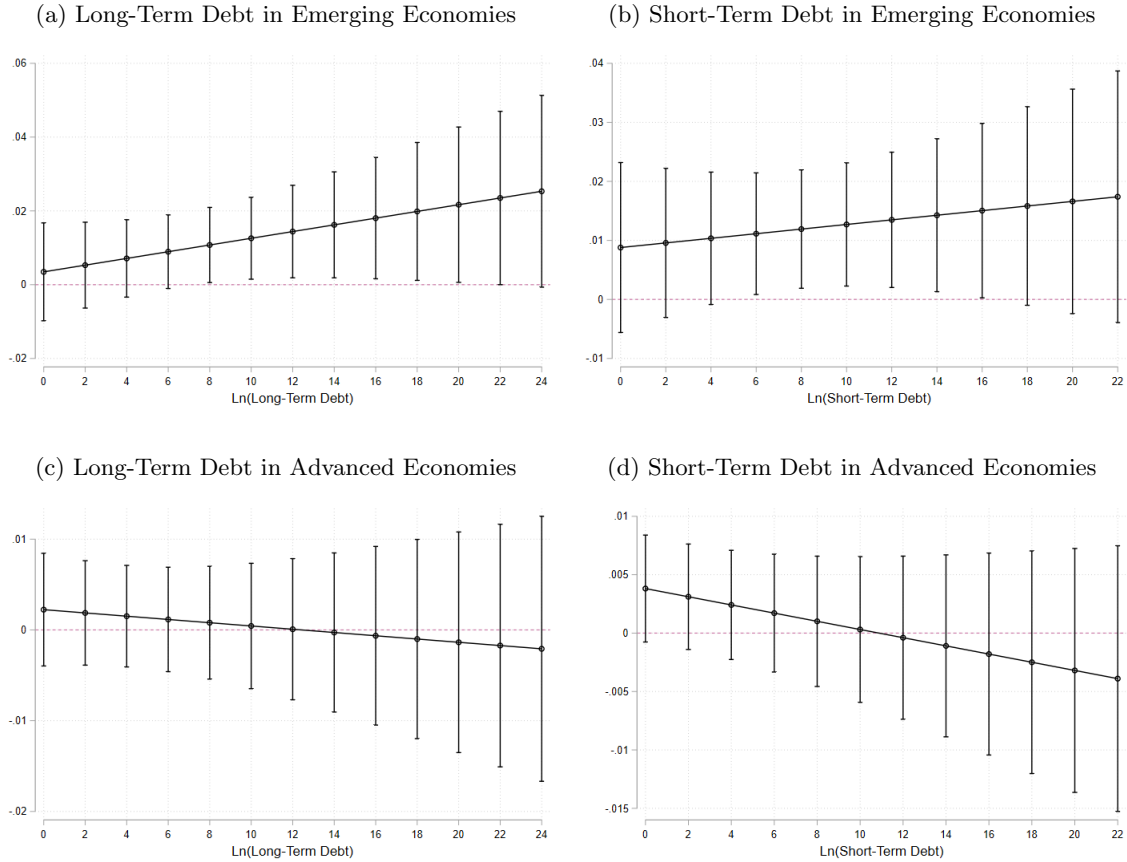
The Role of Corporate Debt In assessing the role of tax policies along the distribution of firm-level characteristics, I proceed by incorporating a measure of firm size (assets or employees), leverage (short and long term debt) and profitability (operating profit margin). I find that there is a larger stock market return in response to VAT increases for firms with higher levels of either short-term or long-term debt in emerging economies (Figure 6, panels (a) and (b)).²⁸ In contrast, and in line with the evidence presented in this paper, there is no statistically significant impact of VAT increases in advanced economies along the distribution of firm-level debt variables (Figure 6, panels (c) and (d)). These results, specifically for emerging markets, may be relevant for policy-makers concerned with the impact of policies in the context of high levels of corporate debt (Aldasoro et al. (2021)).²⁹ As a robustness check, I further check how financial and non-financial firms respond to VAT increases, finding that the the financial market response to VAT announcements and the role of corporate debt are driven by non-financial firms (Appendix B.12).

The general pattern of a positive response in equity returns following a VAT increase announcement in emerging markets is consistent with analysis implemented using country-level data. While the results are not always statistically significant once firm-level interaction effects are incorporated, the general trends support the direction of the effect found using country-level indices.

²⁸I also test the role of firm size (Appendix B.4) and the role of profitability (Appendix B.5).

²⁹Research on the role of corporate debt and its macroeconomic effects has received renewed interest (some recent examples include Brunnermeier and Krishnamurthy (2020) and Jordà et al. (2020)), however work on the impact of corporate debt for the macro-economy dates back to earlier work (for example, Lamont (1995)).

Figure 6. Marginal Effects of a VAT Increase along the Distribution of Firm Debt



Notes: These figures show the marginal effects of a VAT increase announcement at specific values of firm-level indebtedness, measured as the logarithm of long-term debt and short-term debt separately. These estimates are from estimating Equation 7. 95-percent confidence bands are presented.

5 Conclusions

This paper contributes to the academic and policy debate on tax policy reactions. Specifically, this paper asks whether investors respond to VAT policy announcements. The dataset consists of daily-level country index and firm-level equity returns, and tax policy announcements dates, across 20 countries from 1990 to 2014. I find that VAT announcement effects are heterogeneous. In advanced economies, the relationship between VAT increase announcements and equity returns is statistically insignificant or negative. In emerging markets, a positive and statistically significant relationship between increasing VAT and stock returns is a robust result.

The emerging market equity response is driven by economies in more precarious macroeconomic

situations and firms with higher debt levels. This reaction may be due to the expectation that fiscal prudence will prevent increases in interest rates. Therefore, fiscal prudence would be expected to particularly benefit countries with deteriorating macro-conditions and firms with high levels of debt.

In terms of policy, this paper highlights different policy impacts in advanced and emerging economies. Specifically relevant for policy-makers is the finding that both VAT base and rate changes elicit a financial market response. With this finding in mind, policy-makers should consider ways to increase the base and rate of taxation. Additionally, initial macroeconomic conditions play an important role in determining the financial market impact of new tax policies. As a policy-maker in charge of tax reform or in handling the policy response in a time of fiscal stress, an assessment of fiscal space should influence the policy direction. Furthermore, this paper shows that the impact of VAT policies are conditional on firm-level debt. An additional policy implication of this result is that an understanding of firm-level issues in the economy should contribute to specific policy proposals. Overall, incorporating an assessment on the macro and micro conditions of the economy (i.e. both sovereign debt and corporate debt) may provide policy insight in designing tax reform, which may be crucial for macroeconomic stability. This relates to recent findings that credible fiscal policies are important (IMF (2021)).

There are a few caveats to mention. First, less-developed countries are not included. This is due to the availability of daily stock market information and precise tax policy announcement dates. Future work may address this gap, and assess whether the response in developing countries differs from emerging markets. Second, I have focused on VAT policies here. A future direction of research would be to better understand the impact of tax policy reform composition, when multiple types of taxation are included. Specifically, I find a limited response to corporate taxation, which may be due to the fact that in theory, VAT is designed to be effective with relatively little administrative capacity (due to third-party enforcement and a natural paper-trail). In contrast, effective corporate taxation requires administrative oversight and may be less effective due to profit-shifting opportunities and lack of administrative capacity which is worse in emerging and developing economies. Thus, VAT may be a more “credible” tax policy which generates more revenue than other forms of more-avoidable taxation. This area could be further explored. Finally, this paper is limited to the financial market impact of tax policies, which may be disconnected from the real economy and not reflective of distributional consequences.

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A Data Appendix

A.1 Summary Statistics

This section presents additional tables which summarize the data. Return statistics should be interpreted in the following way: in Table A.1 the average daily equity return in advanced economies is 0.05%.

Table A.1. Firm-Level Return Statistics

ALL	Obs	Mean	Std. Dev.	Min	Max
Equity Ret.	6,470,676	0.0006029	0.0281151	-1	8.868512
Market Ret.	8,375,144	0.0004086	0.0177215	-0.5	1
MSCI Ret.	8,691,811	0.0002161	0.0094977	-0.0706315	0.0952324
EM	Obs	Mean	Std. Dev.	Min	Max
Equity Ret.	1,204,812	0.0010961	0.0300004	-0.9000238	4.140561
Market Ret.	1,507,105	0.0013646	0.0283076	-0.5	1
MSCI Ret.	1,656,908	0.0002175	0.0098223	-0.0706315	0.0952324
ADV	Obs	Mean	Std. Dev.	Min	Max
Equity Ret.	5,265,864	0.00049	0.0276645	-1	8.868512
Market Ret.	6,868,039	0.0001988	0.0143834	-0.1494352	0.1599253
MSCI Ret.	7,034,903	0.0002158	0.0094196	-0.0706315	0.0952324

Table A.2. Country-Level Return Statistics

ALL	Obs	Mean	Std. Dev.	Min	Max
Market Ret.	116,952	0.0004962	0.0181179	-0.5	1
MSCI Ret.	127,102	0.0002175	0.0093853	-0.0706315	0.0952324
EM	Obs	Mean	Std. Dev.	Min	Max
Market Ret.	25,877	0.0014292	0.0280906	-0.5	1
MSCI Ret.	32,016	0.0002212	0.0093711	-0.0706315	0.0952324
ADV	Obs	Mean	Std. Dev.	Min	Max
Market Ret.	91,075	0.0002311	0.0140363	-0.1494352	0.1599253
MSCI Ret.	95,086	0.0002163	0.0093901	-0.0706315	0.0952324

A.2 VAT Policy Announcements

Table A.3. Number of Announcements by Country

	VAT Increases		VAT Decreases
Australia	1	Brazil	1
Brazil	1	China	9
Canada	1	Czech	1
China	2	France	1
Denmark	1	Germany	1
France	2	Greece	2
Germany	1	India	1
Greece	5	Ireland	1
India	1	Japan	1
Italy	1	Korea	1
Japan	1	Poland	4
Mexico	1	Portugal	1
Poland	9	Spain	1
Portugal	1	Turkey	2
Spain	2	UK	1
Turkey	1		

Notes: For more information see Amaglobeli et al. (2018), which is an introductory paper to the IMF's Tax Policy Reform Database.

A.3 Macroeconomic Conditions

Table A.4. Macro-Level Variables

Variable	Definition
CBY	Cyclically adjusted balance, percent of potential GDP
DFFB	Fiscal balance, percent of average tax revenues
FBY	Fiscal balance, percent of GDP
FDSH	Gen. govt. debt held by nonresident, percentage of total
PBY	Primary balance, percentage of GDP
SECNRES	Debt sec. held by nonresidents, percentage of total
SC	Systemic Crisis Indicator (1 or 0, 1 if systemic crisis)

Notes: All fiscal variables in the above table come from the World Bank Fiscal Space Dataset (Kose et al. (2017)), version Fall 2020. The systemic crisis indicator (SC) is from Reinhart et al. (2020).

Table A.5. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CBY	108473	-3.697203	3.406284	-27.65978	4.488434
DFFB	108473	-18.82706	18.39783	-127.9007	23.15417
FBY	108473	-3.802812	3.663412	-32.03	5.02
FDSH	66530	33.02118	18.29886	1.482068	85.73158
PBY	108473	-0.7892446	3.550621	-29.712	6.478
SECNRES	53360	3.112079	2.779258	0.0187019	14.06482
SC	105020	0.1291944	0.3354166	0	1

Notes: Variables are defined as in Table A.4

A.4 Firm-Level Variables

Table A.6. Firm-Level Variables

Variable	Definition
OPM	Operating Profit Margin
DTA	Long-Term Debt to Assets
ASSETS	Total Assets
ROA	Return on Assets

Notes: These variables were retrieved from Datastream. They vary by firm-quarter or firm-year.

Table A.7. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Operating Profit Margin	6175229	2.818318	236.77	-27663.16	387.9
Assets	6339575	1.40E+007	7.12E+008	1	7.68E+010
Long Term Debt/Assets	5743136	45532.69	4228033	3.81E-007	6.22E+008
Return on Assets	5930180	3.982171	8.140602	-211.87	329.63

B Results and Robustness Appendix

B.1 Corporate Tax Announcements

This section shows that the main result of a positive base broadening effect in emerging markets is robust to the inclusion of indicators for corporate tax policy announcements.

Table B.1 shows the baseline estimation results, using country-level data when regressors for corporate tax increase announcements and corporate tax decrease announcement are included. The positive and statistically significant coefficient on VAT increase remains for emerging markets.

Table B.2 shows the baseline estimation results, using firm-level data when regressors for corporate tax announcements are included. Again, the positive and statistically significant coefficient on VAT increase appears robust.

Table B.1. Including Corporate Tax Announcements (Country-Level)

	(1) All Index Ret.	(2) AE Index Ret.	(3) EM Index Ret.
MSCI Ret.	0.748*** (0.0051)	0.763*** (0.0042)	0.699*** (0.0172)
CIT Increase	-0.00252 (0.0035)	-0.00104 (0.0028)	-0.00603 (0.0121)
CIT Decrease	-0.00248 (0.0019)	-0.00222 (0.0016)	-0.00339 (0.0062)
VAT Increase	0.00136 (0.0030)	-0.00317 (0.0024)	0.0211* (0.0111)
VAT Decrease	1.20E-03 (0.0031)	0.00893*** (0.0031)	-0.00723 (0.0075)
Constant	0.000334*** (0.0000)	0.0000647 (0.0000)	0.00128*** (0.0002)
Observations	116,952	91,075	25,877
R-squared	0.159	0.267	0.069

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT and CIT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed.

Table B.2. Including Corporate Tax Announcements (Firm-Level)

	(1) All Equity Ret.	(2) AE Equity Ret.	(3) EM Equity Ret.
Market Ret.	0.561*** (0.0011)	0.591*** (0.0012)	0.440*** (0.0027)
CIT Increase	-0.00307*** (0.0008)	-0.000468 (0.0009)	-0.00933*** (0.0016)
CIT Decrease	0.000431 (0.0004)	0.00047 (0.0005)	0.000202 (0.0007)
VAT Increase	0.00450*** (0.0008)	0.00134 (0.0009)	0.0101*** (0.0015)
VAT Decrease	7.82E-05 (0.0006)	0.00876*** (0.0011)	-0.00317*** (0.0008)
Constant	0.000485*** (0.0000)	0.000366*** (0.0000)	0.00100*** (0.0000)
Observations	6,470,676	5,265,864	1,204,812
R-squared	0.039	0.044	0.024

Notes: The dependent variable is the daily firm-level equity return. Market returns returns varies by country and time. Each VAT and CIT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country and time FE are included. Driscoll-Kraay standard errors are computed.

B.2 Implementation Dates

This section shows that the main result of a positive base broadening effect in emerging markets is robust to the inclusion of VAT implementation indicators. The result holds using both country-level data (in Table B.3) and firm-level data (in Table B.4).

Table B.3. Including Implementation Dates (Country-Level)

	(1) Market Ret. All	(2) Market Ret. ADV	(3) Market Ret. EM
MSCI Ret.	0.750*** (0.0106)	0.765*** (0.0103)	0.701*** (0.0230)
VAT Increase (Imp)	0.00532* (0.0030)	0.00425*** (0.0014)	0.00132 (0.0184)
VAT Decrease (Imp)	0.00058 (0.0040)	-0.00369 (0.0072)	0.00521 (0.0039)
VAT Increase (Ann)	0.000884 (0.0029)	-0.00333* (0.0020)	0.0199* (0.0114)
VAT Decrease (Ann)	1.16E-03 (0.0030)	0.00882** (0.0036)	-0.00831** (0.0038)
Constant	0.000331*** (0.0001)	0.0000623 (0.0001)	0.00127*** (0.0002)
Observations	116,952	91,075	25,877
Number of groups	20	15	5

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement or implementation occurs on a particular day in a particular country. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Country FE are included. Driscoll-Kraay standard errors are computed.

Table B.4. Including Implementation Dates (Firm- Level)

	(1) Equity Ret. All	(2) Equity Ret. ADV	(3) Equity Ret. EM
Market Ret.	0.561*** (0.0011)	0.591*** (0.0012)	0.440*** (0.0027)
VAT Increase (Imp)	-0.000771 (0.0011)	0.00272** (0.0013)	-0.00918*** (0.0020)
VAT Decrease (Imp)	0.00339*** (0.0007)	-0.000373 (0.0015)	0.00560*** (0.0009)
VAT Increase (Ann)	0.00458*** (0.0008)	0.00126 (0.0009)	0.0125*** (0.0015)
VAT Decrease (Ann)	-1.37E-04 (0.0006)	0.00876*** (0.0011)	-0.00366*** (0.0008)
Constant	0.000484*** (0.0000)	0.000366*** (0.0000)	0.000998*** (0.0000)
Observations	6,470,676	5,265,864	1,204,812
R-squared	0.039	0.044	0.024

Notes: The dependent variable is the daily firm-level equity return. Market returns returns varies by country and time. Each VAT variable is a dummy variable equal to one if the associated announcement or implementation occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed.

B.3 Heterogeneity in Advanced Economies

Table B.5. Announcement Effects on Index Returns (Europe)

	(1) Europe	(2) Europe W	(3) Europe E	(4) Europe S
MSCI Ret.	0.864*** (0.0129)	0.871*** (0.0156)	0.705*** (0.0260)	0.828*** (0.0151)
VAT Increase	-0.00378* (0.0023)	-0.000298 (0.0020)	-0.0035 (0.0045)	-0.00554** (0.0028)
VAT Decrease	0.00464 (0.0039)	0.00148 (0.0022)	0.0163** (0.0067)	-0.000716 (0.0039)
Constant	6.93E-05 (0.0001)	9.36E-05 (0.0001)	2.46E-05 (0.0002)	1.81E-05 (0.0001)
Observations	48,186	32,610	10,812	23,218
Number of groups	8	5	2	4
Country FE	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Europe in my sample includes Greece, Ireland, Czech Republic, France, Germany, Italy, Ireland, Poland, Portugal, United Kingdom and Spain. Columns (2), (3) and (4) split the European into 3 groups. Europe W includes Denmark, France, Germany, Ireland and the United Kingdom Europe E includes Czech Republic and Poland. Europe S includes Greece, Italy, Portugal and Spain. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed.

B.4 Europe and Sub-Europe Groups

These results show the heterogeneous effects of types of tax policy reform for country-level index returns in Europe. See table notes for country group composition.

Table B.6. Base vs. Rate Announcement Effects on Index Returns (Europe)

VARIABLES	(1) Europe	(2) Europe W	(3) Europe E	(4) Europe S
MSCI Ret.	0.864*** (0.0129)	0.871*** (0.0156)	0.705*** (0.0260)	0.828*** (0.0151)
VAT Base Increase	-0.000965 (0.0058)	0 0.0000	-0.00184 (0.0074)	0.00105*** (0.0003)
VAT Base Decrease	0.00655 (0.0095)	-0.00552*** (0.0001)	0.0312*** (0.0003)	-0.00430*** (0.0003)
VAT Rate Increase	-0.00440* (0.0024)	-0.000298 (0.0020)	-0.00433 (0.0056)	-0.00637** (0.0030)
VAT Rate Decrease	0.00383 (0.0038)	0.00381*** (0.0010)	0.0125* (0.0072)	0.000479 (0.0050)
Constant	6.93E-05 (0.0001)	9.36E-05 (0.0001)	2.46E-05 (0.0002)	1.81E-05 (0.0001)
Observations	48,186	32,610	10,812	23,218
Number of groups	8	5	2	4
Country FE	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed. Europe in my sample includes Greece, Ireland, Czech Republic, France, Germany, Italy, Ireland, Poland, Portugal, United Kingdom and Spain. Columns (2), (3) and (4) split the European into 3 groups. Europe W includes Denmark, France, Germany, Ireland and the United Kingdom Europe E includes Czech Republic and Poland. Europe S includes Greece, Italy, Portugal and Spain.

B.5 Systemic Crisis Interactions

Table B.7. Interaction with Systemic Crisis (Various Country Categories)

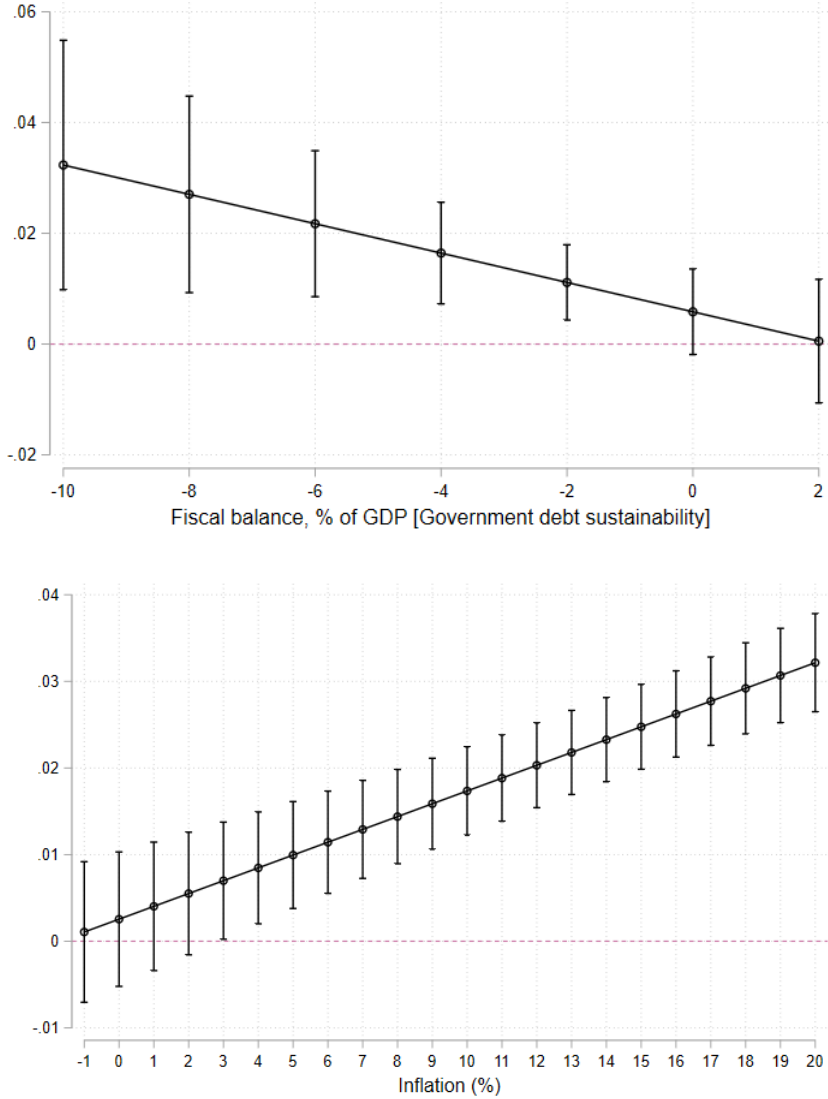
VARIABLES	(1) All	(2) EM	(3) ADV	(4) Europe	(5) Europe W	(6) Europe E	(7) Europe S
MSCI Ret.	0.750*** (0.0091)	0.701*** (0.0215)	0.768*** (0.0087)	0.864*** (0.0117)	0.880*** (0.0153)	0.767*** (0.0299)	0.828*** (0.0137)
VAT Increase	-0.000489 (0.0025)	0.0143* (0.0080)	-0.00361* (0.0021)	-0.00426* (0.0024)	-0.000304 (0.0019)	-0.00352 (0.0045)	-0.00713*** (0.0027)
VAT Decrease	-0.00132 (0.0031)	-0.00745** (0.0036)	0.00685* (0.0041)	0.00573 (0.0042)	0.00339*** (0.0002)	0.0133* (0.0075)	-0.000841 (0.0039)
VAT Increase X SC	0.0292* (0.0158)	0.0358*** (0.0080)	0.0105*** (0.0021)	0.0101*** (0.0024)	0 0.0000	0 0.0000	0.0136*** (0.0028)
VAT Decrease X SC	0.0128 (0.0097)	0 0.0000	0.00485 (0.0099)	-0.0107** (0.0042)	-0.0029 (0.0041)	0.00E+00 0.0000	0.00E+00 0.0000
SC	0.000121 (0.0003)	0.00151* (0.0009)	-0.000440** (0.0002)	-0.000636*** (0.0002)	-0.00031 (0.0002)	0.00E+00 0.0000	-0.000888*** (0.0003)
Constant	0.000355*** (0.0001)	0.00106*** (0.0001)	0.000130** (0.0001)	0.000135* (0.0001)	0.000149* (0.0001)	0.000128 (0.0002)	0.000158* (0.0001)
Observations	105,020	25,877	79,143	48,186	26,088	5,402	23,218
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AC	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT and CIT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. SC is a systemic crisis indicator equal to 1 in a systemic crisis and zero otherwise (source: Reinhart et al. (2020)). The country groups are as follows: in Column (1) all countries in the sample are used, in Column (2) emerging markets in the sample are used (these are Brazil, China, India, Mexico and Turkey), in Column (3) only advanced economies in the sample are used, in Column (4) the advanced economy sample is further restricted to only European countries, Columns (5) -(7) split the European sample regionally. The composition is described in Appendix B.4. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Country FE are included. Driscoll-Kraay standard errors are computed.

B.6 Marginal Effects using Composite VAT Indicator

The results below show the marginal effect of a composite VAT indicator. These results reflect the results using separate indicators for increases and decreases. Here the composite indicator is equal to one when there is an increase announcement, equal to -1 when there is a decrease announcement, and equal to zero on days with no announcement. The results and patterns are similar to those using separate indicators in the main text.

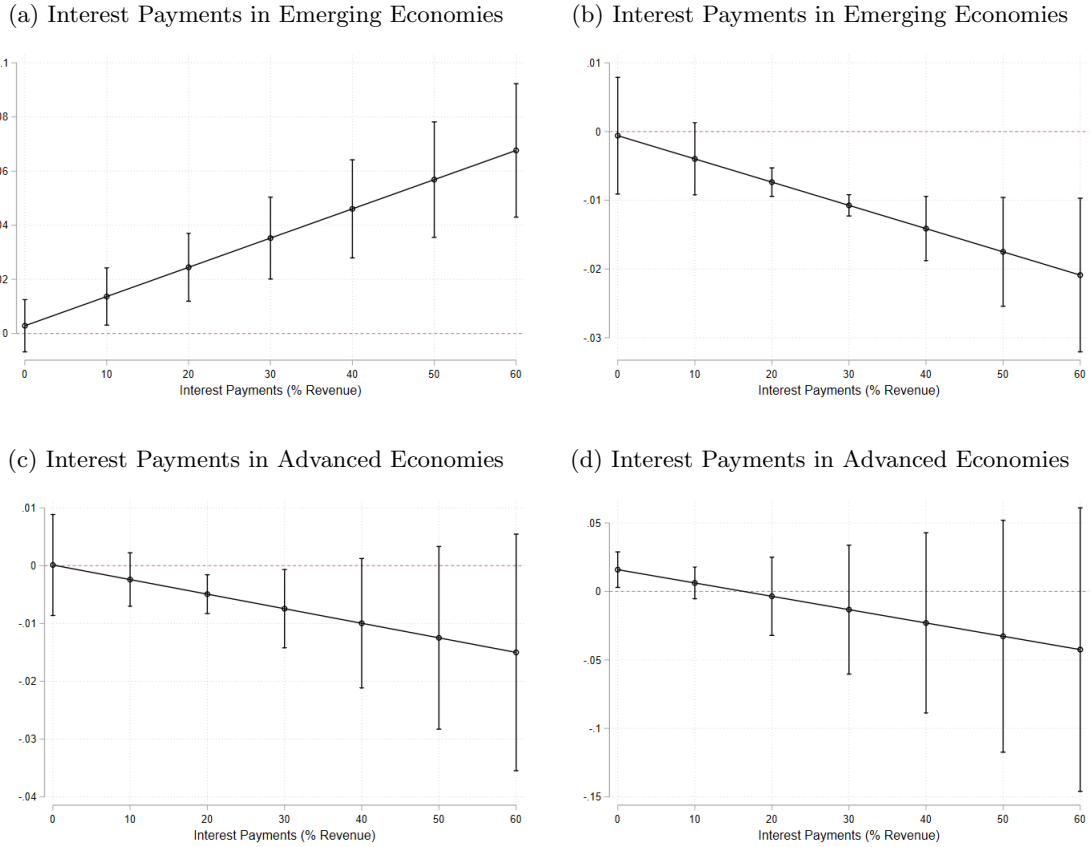
Figure B.1. Marginal Effect of VAT Announcements in Emerging Markets along Fiscal Space and Inflation



Notes: The change in country index returns (%) correspond to the y-axes.

B.7 The Role of Interest Payments and VAT Policy Announcements

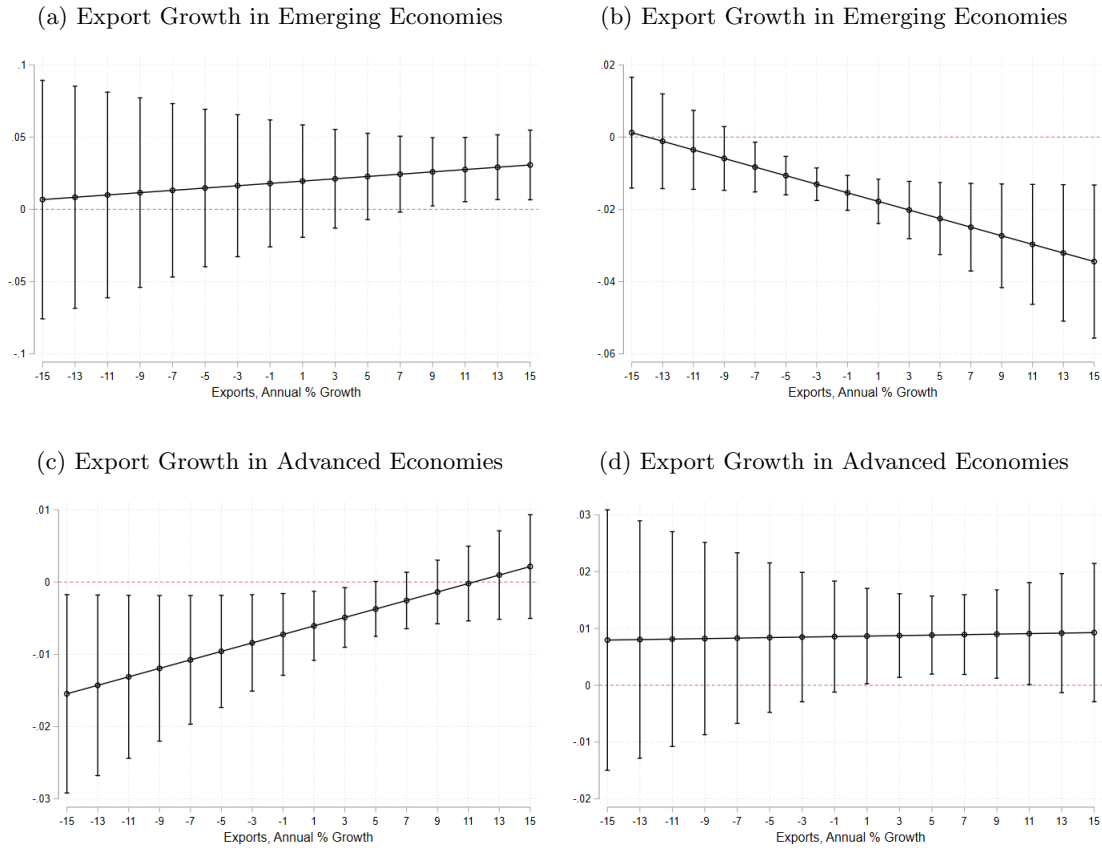
Figure B.2. Marginal Effects of VAT Announcements along the Distribution of Government Interest Payments



Notes: These figures show the marginal effects of a VAT increase announcement at specific values of government interest payments as a percentage of total revenues. These estimates are from estimating Equation 2. Panels (a) and (b) show results for a VAT increase and decrease, respectively, for emerging economies. Panels (c) and (d) show results for a VAT increase and decrease, respectively, for advanced economies. 95-percent confidence bands are presented.

B.8 The Role of Export Growth and VAT Policy Announcements

Figure B.3. Marginal Effects of VAT Announcements along the Distribution of Export Growth



Notes: These figures show the marginal effects of VAT announcements at specific values of country-level annual export growth. These estimates are from estimating Equation 2. Panels (a) and (b) show results for a VAT increase and decrease, respectively, for emerging economies. Panels (c) and (d) show results for a VAT increase and decrease, respectively, for advanced economies. 95-percent confidence bands are presented.

B.9 Country-by-Country Regressions

Table B.8. Firm-Level Results in Emerging Markets

	(1) Brazil	(2) China	(3) India	(4) Mexico	(5) Turkey
Market Ret.	0.391** (0.1660)	0.940*** (0.0146)	0.871*** (0.0164)	0.712*** (0.0238)	0.948*** (0.0142)
VAT Increase	0.0121*** (0.0029)	0.00408** (0.0018)	-0.00103 (0.0007)	0.00767*** (0.0015)	0.000450* (0.0002)
VAT Decrease	0.00214** (0.0010)	0.000932 (0.0013)	-0.00259*** (0.0000)		-0.00246 (0.0029)
Constant	0.000999*** (0.0002)	0.000351*** (0.0000)	0.000604*** (0.0000)	0.000367*** (0.0000)	0.000299*** (0.0000)
Observations	226,069	391,447	201,014	135,912	100,567
R-squared	0.129	0.316	0.236	0.203	0.516
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily firm-level equity return. Market returns vary by country and time, capturing the relationship between the domestic market and individual firms. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Firm and time FE are included. Driscoll-Kraay standard errors are computed.

Table B.9. Firm-Level Results in Advanced Economies

	(1) Australia	(2) Canada	(3) Czech	(4) Denmark	(5) France	(6) Germany	(7) Greece	(8) Ireland	(9) Italy
Market Ret.	0.760*** (0.0214)	0.684*** (0.0716)	0.940*** (0.0269)	0.806*** (0.0271)	0.895*** (0.0242)	0.813*** (0.0269)	0.829*** (0.0303)	0.515*** (0.0201)	0.543*** (0.0140)
VAT Increase	0.000509*** (0.0000)	0.000480*** (0.0002)		0.00199*** (0.0001)	-0.00322*** (0.0008)	-0.00514*** (0.0005)	-0.00115 (0.0033)		-0.000511*** (0.0000)
VAT Decrease			-0.00856*** (0.0006)		0.000218** (0.0001)	-0.00812*** (0.0001)	0.00118*** (0.0004)	0.00118*** (0.0002)	
Constant	0.000493*** (0.0000)	0.000575*** (0.0000)	0.000108*** (0.0000)	0.000345*** (0.0000)	0.000261*** (0.0000)	0.000128*** (0.0000)	0.000419*** (0.0000)	0.000842*** (0.0000)	0.000192*** (0.0000)
Observations	673,524	312,400	35,766	90,408	228,992	158,504	259,913	149,975	461,434
R-squared	0.064	0.074	0.333	0.206	0.331	0.319	0.217	0.023	0.11
Firm-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(7) Greece	(8) Ireland	(9) Italy	(10) Japan	(11) Korea	(12) Poland	(13) Portugal	(14) Spain	(15) UK
Market Ret.	0.829*** (0.0303)	0.515*** (0.0201)	0.543*** (0.0140)	0.926*** (0.0196)	0.786*** (0.0248)	0.801*** (0.0255)	0.824*** (0.0201)	0.805*** (0.0275)	0.865*** (0.0315)
VAT Increase	-0.00115 (0.0033)		-0.000511*** (0.0000)	0.00142*** (0.0004)		0.001 (0.0015)	0.00172*** (0.0002)	1.90E-05 (0.0017)	
VAT Decrease	0.00118*** (0.0004)	0.00118*** (0.0002)		-0.0140*** (0.0010)	0.00319*** (0.0004)	-0.000372 (0.0014)	0.00323*** (0.0000)	0.00183*** (0.0005)	-0.00237*** (0.0001)
Constant	0.000419*** (0.0000)	0.000842*** (0.0000)	0.000192*** (0.0000)	0.000236*** (0.0000)	0.000551*** (0.0000)	0.000506*** (0.0000)	0.000340*** (0.0000)	0.000239*** (0.0000)	0.000341*** (0.0000)
Observations	259,913	149,975	461,434	1,310,346	651,313	52,762	68,344	144,760	500,559
R-squared	0.217	0.023	0.11	0.326	0.196	0.247	0.241	0.268	0.218
Firm-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DK SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the daily firm-level equity return. Market returns returns varies by country and time. Each VAT and CIT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Country FE are included. Driscoll-Kraay standard errors are computed.

B.10 Abnormal Returns

Setup Using firm-level data, I estimate abnormal returns associated with tax policy announcement using the following approach.³⁰ First, I estimate a market model for each event, where events are the dates of tax policy announcements:

$$r_{ijt} = \alpha + \beta x_{jt} + \epsilon_{ijt} \quad (\text{B.1})$$

Where r_{ijt} is the equity return of firm i in country market j , on day t , α is a constant, β is the coefficient on the country-level index return, x_{jt} , and ϵ_{ijt} is the error term. Equation B.1 is estimated over an estimation window preceding each event. The estimation window is 60 days, including the range 90 days before through to 30 days before the event (that is, the inclusive range $-90 < t < -30$). Abnormal returns are given by:

$$ar_{ijt} = r_{ijt} - \hat{r}_{ijt} \quad (\text{B.2})$$

Where r_{ijt} is the actual daily return of a given equity (of firm i , country j on day t) and \hat{r}_{ijt} is the fitted value from estimating Equation B.1. I generate two additional series. The first is the average abnormal return, which is the mean of all abnormal returns by country-day (suppose there are k firms in country j):

$$aar_{jt} = \frac{1}{k} \sum_{i=1}^{k=n} ar_{ijt} \quad (\text{B.3})$$

Next, I compute cumulative abnormal returns for a given event type (i.e. VAT base increases). In Equation B.4, the event window is denoted by the inclusive range $(-w, +z)$.³¹

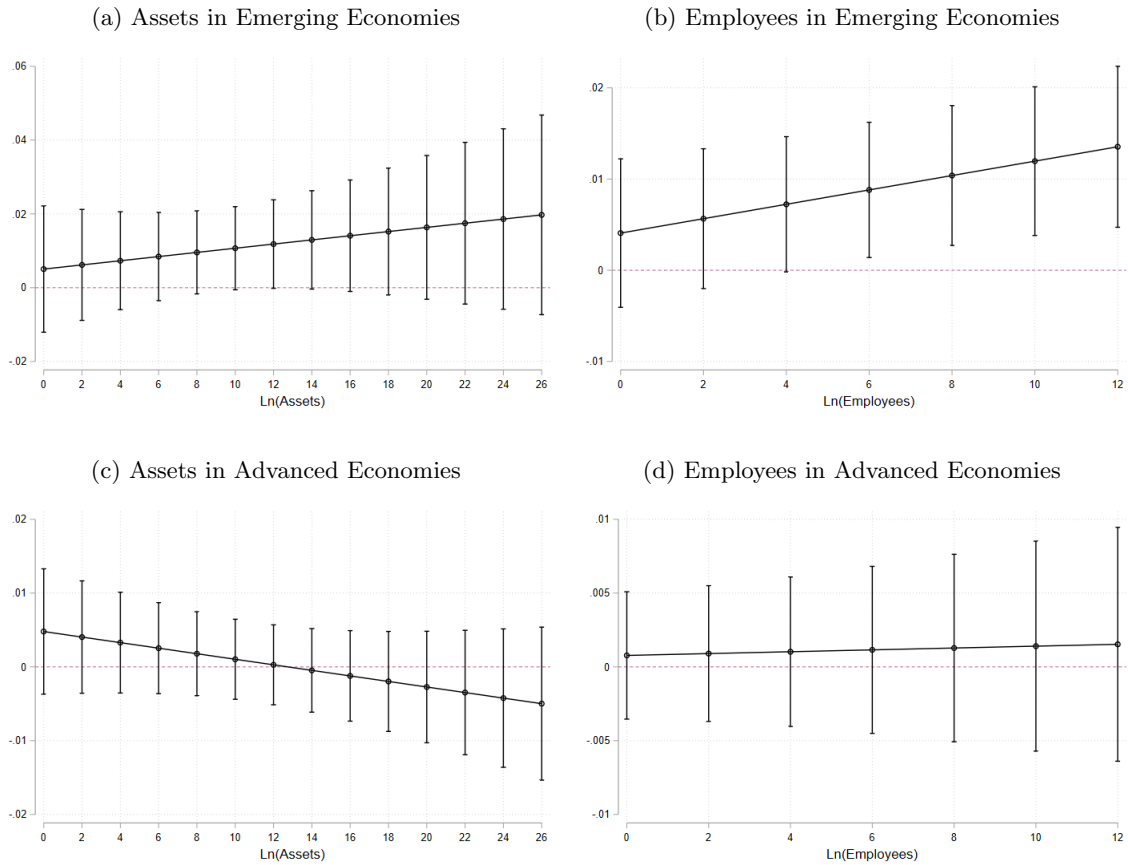
$$car_{ij} = \sum_{t=-w}^{t=+z} ar_{ijt} \quad (\text{B.4})$$

³⁰As described by MacKinlay (1997) and Campbell et al. (1998).

³¹The abnormal return for firm i in country j is similarly defined as $car_{ijt} = \sum_{t=0}^{t=0} ar_{ijt}$.

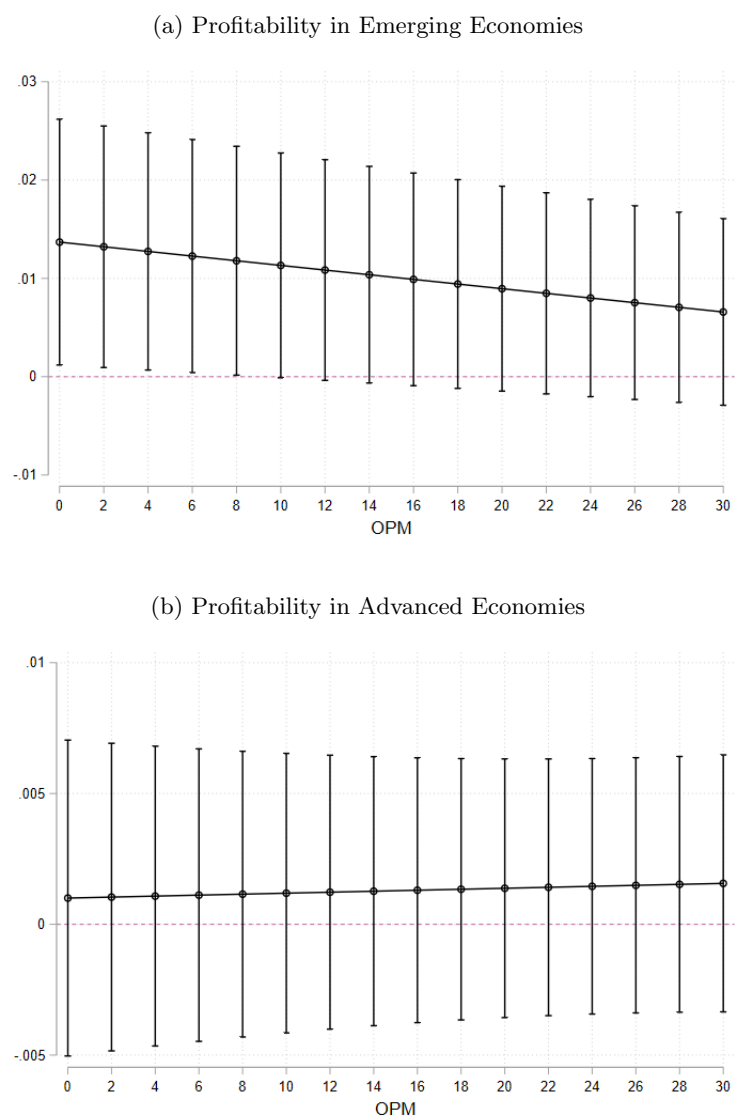
B.11 Additional Firm Characteristics

Figure B.4. Marginal Effects of a VAT Increase along the Distribution of Firm Size



Notes: These figures show the marginal effects of a VAT increase announcement at specific values of firm size, measured as the logarithm of firm-level assets and the logarithm of employees, separately. These estimates are from estimating Equation 7. 95-percent confidence bands are presented.

Figure B.5. Marginal Effects of a VAT Increase along the Distribution of Firm Profitability

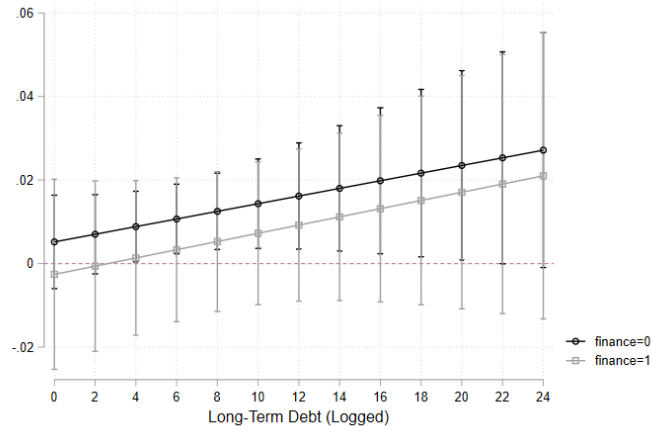


Notes: These figures show the marginal effects of a VAT increase announcement at specific values of profitability, measured as the operating profit margin. These estimates are from estimating Equation 7. 95-percent confidence bands are presented.

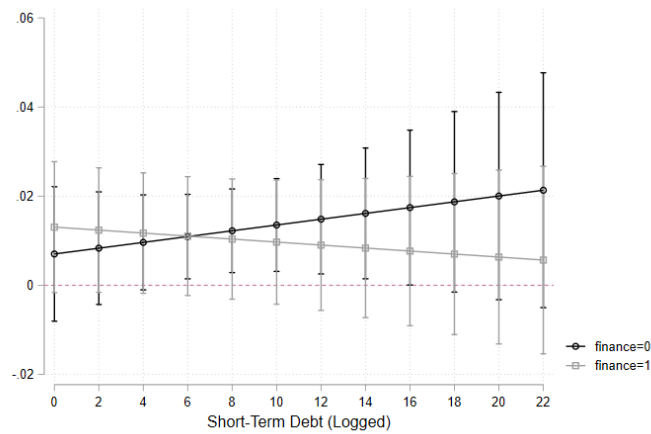
B.12 The Role of Corporate Debt for Non-Financial Firms and Financial Firms

Figure B.6. Marginal Effects of a VAT Increase along the Distribution of Firm Debt

(a) Long-Term Debt in Emerging Economies



(b) Short-Term Debt Emerging Economies



Notes: These figures show the marginal effects of a VAT increase announcement at specific values of firm-level debt. These estimates are from estimating Equation 7, including a triple interaction term with an indicator for whether or not a firm is in a financial sector or not. The financial sector classification is based on Datastream - those sectors labelled as Finance, Financial Services, Life Insurance and Non-Life Insurance are categorized as “finance = 1”, while all other sectors are categorized as “finance = 0”. 95-percent confidence bands are presented.

B.13 Standard Errors

Temporal correlation and spatial correlation with stock market data is a concern.³² In this paper I have addressed this using Driscoll-Kraay (DK) standard errors. DK standard errors account for a variance-covariance matrix with autocorrelation across space and time, and heteroskedasticity, as introduced by Driscoll and Kraay (1998).³³

In all cases, for the full sample, advanced economy sample and emerging markets sample, the incorporation of Driscoll-Kraay standard errors at various lags does not alter the statistical significance of the main results in my paper. Table B.10 shows the results of the same specification (Equation 1) where the only adjustment is to the fixed effects or variance-covariance matrix as indicated.

It is also encouraging that the main result³⁴ found using raw returns as the left-hand side variable (i.e. Table 1) and in Table B.10, is also found using both average abnormal returns and cumulative abnormal returns in the firm-level section of results (Section 4.3).

Table B.10. Alternatives

Advanced Economies	(1)	(2)	(3)	(4)	(5)	(6)
	Market Ret.	Market Ret.	Market Ret.	Market Ret.	Market Ret.	Market Ret.
MSCI Ret.	0.765*** (0.0042)	0.763*** (0.0042)	0.763*** (0.0105)	0.763*** (0.0103)	0.763*** (0.0103)	0.763*** (0.0108)
VAT Increase	-0.00314 (0.0024)	-0.00317 (0.0024)	-0.00317 (0.0020)	-0.00317 (0.0020)	-0.00317 (0.0020)	-0.00317 (0.0020)
VAT Decrease	0.00883*** (0.0031)	0.00893*** (0.0031)	0.00893** (0.0035)	0.00893** (0.0035)	0.00893** (0.0035)	0.00893** (0.0035)
Constant	0.0000628 (0.0000)	0.0000631 (0.0000)	0.0000085 (0.0004)	0.0000085 (0.0004)	0.0000085 (0.0004)	0.0000085 (0.0004)
Observations	91,075	91,075	91,075	91,075	91,075	91,075
Country FE		X	X	X	X	X
DK SE Lags			1	2	5	10
Emerging Markets	(1)	(2)	(3)	(4)	(5)	(6)
	Market Ret.	Market Ret.	Market Ret.	Market Ret.	Market Ret.	Market Ret.
MSCI Ret.	0.701*** (0.0172)	0.699*** (0.0172)	0.699*** (0.0205)	0.699*** (0.0210)	0.699*** (0.0228)	0.699*** (0.0255)
VAT Increase	0.0201* (0.0111)	0.0211* (0.0111)	0.0211** (0.0088)	0.0211** (0.0088)	0.0211** (0.0088)	0.0211** (0.0088)
VAT Decrease	-0.00817 (0.0076)	-0.00722 (0.0075)	-0.00722** (0.0036)	-0.00722** (0.0036)	-0.00722** (0.0036)	-0.00722** (0.0036)
Constant	0.00128*** (0.0002)	0.00128*** (0.0002)	0.0107** (0.0053)	0.0107** (0.0050)	0.0107** (0.0045)	0.0107** (0.0041)
Observations	25,877	25,877	25,877	25,877	25,877	25,877
Country FE		X	X	X	X	X
DK SE Lags			1	2	5	10

Notes: The dependent variable is the daily country-level index return. MSCI returns varies only by time, capturing time fixed effects and the relationship between global markets and the domestic market. Each VAT variable is a dummy variable equal to one if the associated announcement occurs on a particular day in a particular country. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Country FE are included. Driscoll-Kraay standard errors are computed in the columns indicated, with specific lags.

³²Salinger (1992) discusses issues related to standard errors and event studies.

³³This alternative followed Newey and West (1987), which focused on providing an estimator in the case of serial correlation and heteroskedasticity. Hoechle (2007) describes the Stata command “xtsc” which implements Driscoll-Kraay standard errors, noting that applying DK standard errors with small-T may not be appropriate. However small-T is not an issue in my paper, as I use daily data spanning nearly 25 years.

³⁴The main result: Emerging market equities respond positively to VAT increase announcements, compared to a negative or statistically insignificant response in advanced economies.