Journal of
Risk and Financial Management

MDPI

Article

The Sectoral Effects of Value-Added Tax: Evidence from UAE Stock Markets

Anagha Ann Gopakumar [1], Avneet Kaur [1], Vikash Ramiah [1] and Krishna Reddy [2,*]

[1] Faculty of Business, University of Wollongong in Dubai, Dubai P.O. Box 20183, United Arab Emirates
[2] Postgraduate Business, Faculty of Business, Design, and Services Industries, Toi Ohomai Institute of Technology/Te Poking, Rotorua 3046, New Zealand
* Correspondence: krishna.reddy@xtra.co.nz

Abstract: This paper investigates the impact of 19 announcements pertaining to the introduction of value-added tax (VAT) in the United Arab Emirates (UAE) on equities listed on the Abu Dhabi Stock Exchange (ADX). Using a well-established event study methodology over the period 2015 to 2018, a sector-wise assessment of the value constructiveness or destructiveness of these announcements is conducted. In addition, an estimation of sector-wise changes in systematic risk following these announcements is provided. Significant sectoral differences in abnormal returns are observed with industries such as insurance and retail showing higher sensitivity. Certain announcements are identified as exerting more impact than others. The results document the outcome of the implementation of VAT and provide guidance to other countries in the Gulf region that plan to introduce VAT.

Keywords: value-added tax; abnormal returns; systematic risk

JEL Classification: G12; G14; H25

Citation: Gopakumar, Anagha Ann, Avneet Kaur, Vikash Ramiah, and Krishna Reddy. 2022. The Sectoral Effects of Value-Added Tax: Evidence from UAE Stock Markets. *Journal of Risk and Financial Management* 15: 429. https://doi.org/10.3390/jrfm15100429

Academic Editors: Gabriele Tedeschi and Rocco Caferra

Received: 4 July 2022
Accepted: 21 September 2022
Published: 26 September 2022

1. Introduction

In the current era of globalization and market integration, several taxation reforms are being implemented in both developed and emerging economies. For example, Kristjánsdóttir (2021) explains how higher value-added tax (VAT) can impact tourism demand in Europe. Taxation is a critical source of government revenues, integral to economic growth and development whereby a sound tax system consists of both direct and indirect taxes (Sahoo 2015). However, in most emerging economies, direct taxes play a limited role in terms of revenue generation for public-sector investments (Bird and Zolt 2005; Martinez-Vazquez et al. 2010). Consequently, emerging markets tend to have a heavy reliance on indirect taxation, such as value-added taxes or goods and services taxes (GST) (Martinez-Vazquez and Bird 2010).

In order to diversify its revenue base, the government of the UAE implemented VAT at the rate of 5% starting in January 2018. As a result, VAT collection (from the beginning of January until the end of August 2020) amounted to AED 11.6 billion, in comparison to the country's total excise tax revenue which was about AED 1.9 billion (Ministry of Finance 2020). The income generated from VAT contributes to the continued provision of high-quality public services and is consistent with the UAE's vision of 2021. The implementation of VAT is expected to enhance transparency in reporting and boosting business accountability, making internal documentation more robust and formalized in the UAE. On the one hand, the implementation of VAT is projected to have multiple positive effects, on the other, it is forecasted that it will have negative impacts across sectors as well. Our study aims at identifying the sectoral impact of the imposition of VAT. Therefore, this study aims to extend the prior literature by exploring the effects of VAT on the UAE, an emerging market which does not have a heavy reliance on indirect taxes.

This study has three major objectives. First, to find out if abnormal returns are associated with the announcements made in relation to VAT. Second, to identify the sector-wise effect of the announcements. Third, to document short-term and long-term changes in systematic risk.

This study makes the following contribution: to the best of our knowledge, this is the first study that investigates the effect of VAT on the UAE, as a result, the findings of this study contribute to the literature. In addition, the findings of this study provide valuable insight into the impact of VAT on the UAE and as well as to other countries that are thinking of introducing similar taxation policies. Furthermore, the findings of this study better inform researchers, practitioners, and policymakers, regarding the impact VAT will have on the revenue generation, economic development, growth, and investment.

The rest of the paper is formulated as follows: Section 2 provides a review of the existing literature dealing with the introduction of taxation in different countries and its various implications. Section 3 presents the research design and methodology of the study. Section 4 explores the data sets used for empirical analysis and provides a detailed discussion of the empirical results. Sections 5 and 6 show the results of robustness tests, behavioral finance extensions, and risk analysis, respectively. Based on the findings of this study, Section 7 provides concluding remarks and policy implications.

2. A Brief Look at the Literature

The introduction of the tax, whether it is direct or indirect, has implications for economic growth and investment. The efficient market hypothesis (EMH) states that markets react instantly to the arrival of any new information (Malkiel and Fama 1970), which means that any change in the tax regimes is expected to have instant market reactions. These reactions (which attract the interest of academics, practitioners, and policymakers) indicate tax effectiveness.

A value-added tax (VAT) is a transaction-based indirect tax placed on a product whenever value is added to that product. VAT, also called "consumption tax", is levied at each stage of the supply chain and is ultimately borne by the end consumer of the product. The registered businesses collect and account for the tax, thus acting as tax collectors on behalf of the government. The proponents of VAT see the flat rate, as opposed to confusing multiple rates, as conducive to reducing distortion in consumption and production. VAT is a source of government revenue, which is inflation-indexed and self-policed against tax avoidance or evasion (Warren 1993). The existing literature indicates that VAT is compatible with international trade, and thus avoids the cascading effects of indirect taxation (Alavuotunki et al. 2019). Conversely, the opponents of VAT argue that its heavy compliance and administrative costs and the potential inflationary effects on the economy. Warren (1993) reports the possibility of taxpayer resistance to the introduction of VAT for the first time. Nevertheless, the literature on the pertinence of VAT for emerging markets is limited and our paper aims to bridge this literature gap.

VAT has been criticized for its negative impact on corporate performance with a reduction in overall sales volume and consequent reduction in wealth (Ivkovic et al. 2005). From an economics perspective, Bird and Zolt (2005) discuss the regressive nature of VAT as it fails to correct for inequality. Furthermore, Emran and Stiglitz (2005) argue that the presence of a large informal sector in emerging economies casts doubt on the effectiveness of VAT in these economies whilst other researchers suggest that VAT indirectly taxes inputs and imports used by the informal sector (Keen 2008). Ebeke and Ehrhart (2012) postulate that indirect taxation stabilizes government tax revenues whereas Keen and Lockwood (2010) find evidence indicating that VAT has accelerated government revenue in emerging economies. Ufier (2014) contributes to this debate by showing that the implementation of VAT has led to higher levels of government spending, investments, and growth. Given the two sides of the same coin, the question of whether or not VAT improves economic wellbeing remains unanswered.

The majority of the studies on taxation focus on the economy-wide effects or social effects, often involving research methodology that depends on either economic theory (equilibrium and welfare analyses) and/or descriptive qualitative analysis (Liu and Lu 2015). One of the rare examples is Lakshmi and Alex (2018) who use the event study methodology to examine the reaction of Indian equity markets to the announcement of GST rates. In this sense, we find the literature on the reactions of the equity markets to the introduction of indirect taxes to be relatively sparse, especially in developing countries such as the UAE. Our paper contributes to this vein of the literature.

3. Research Methodology

A typical event study methodology has been used to conduct the empirical analysis, as described by Brown and Warner (1985) and Ramiah et al. (2013). The methodology has three main elements: (i) estimation of abnormal returns, (ii) testing the robustness of the results, and (iii) analyzing changes in short-term and long-term risk.

Abnormal and cumulative abnormal returns are estimated following each of the selected 19 announcements, whereby the daily returns are calculated by finding the first natural logarithmic difference in stock prices. Hence,

$$DR_{it} = In\left(\frac{SPI_{it}}{SPI_{it-1}}\right) \tag{1}$$

where DR_{it} is stock i's daily return at time t, SPI_{it} is stock i's price index at time t and SPI_{it} is stock i's price index at time $t-1$. Following Ramiah et al. (2013), daily returns are adjusted using asset pricing models to calculate ex-post abnormal returns using an event window of 245 days before and 15 days after the event. This gives

$$AR_{it} = R_{it} - E(R_{it}) \tag{2}$$

where,

$$E(R_{it}) = \beta_0 + \beta_i\left(\widetilde{r}_{mt} - \widetilde{r}_{ft}\right) \tag{3}$$

Abnormal returns are further classified by sectors, following the GICS classification criteria, to obtain sector-wise abnormal returns, which are calculated as

$$AR_{it} = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{4}$$

Following the calculation of abnormal returns, the parametric t-test of significance is conducted on these sector-wise returns to find out if they are significantly different from zero. The t statistic is calculated as

$$t_{AR_{It}} = \frac{AR_{It}}{SD(AR_{It})} \tag{5}$$

where $SDAR_{It}$ is the standard deviation of abnormal returns. An important assumption of the parametric test is the normality of abnormal returns.

The three possible outcomes hypothesized are positive abnormal returns $(AR_{it} > 0)$ negative abnormal returns $(AR_{it} < 0)$ and zero abnormal returns $(AR_{it} = 0)$. The outcome of a positive abnormal return indicates that the demand for the underlying stock has risen or the supply of this stock has fallen. This indicates that VAT legislation if favorable to a particular sector will increase the demand for the stocks in that sector. On the other hand, the outcome of a negative abnormal return indicates that the demand for the underlying stock has fallen or the supply of this stock has risen. This means that VAT legislation if unfavorable to a particular sector will decrease the demand for the stocks in that sector. Finally, the outcome of zero abnormal return indicates no demand or supply changes

following an announcement, meaning that the announcement has no impact on the value of underlying equity.

The efficient market hypothesis (EMH) implies an instant reaction of the market to the arrival of new information, which is reflected in stock prices immediately. However, there exists a possibility of under or overreaction from market participants. Extending this notion to a relatively smaller and illiquid market such as the UAE, an event window of 245 days before and 15 days after the event is used to estimate cumulative abnormal returns (CAR), in line with Ramiah et al. (2013). CAR2 and CAR5 are calculated to find out how quickly the market reflects the announcement. CARs and the associated t statistics are calculated as follows:

$$t_{CAR_{It}} = \frac{CAR_{It}}{SD(CAR_{It})} \tag{6}$$

$$CAR_{It} = \sum_{i=1}^{N} AR_{it} \tag{7}$$

Following the estimation of Ars and CARs, tests of robustness are conducted, starting with the Corrado (1989) non-parametric ranking test, which is intended to address the issue of the non-normality of abnormal returns. The primary concern is the effect of non-normality (positive skewness and high kurtosis), making parametric t statistics biased. Furthermore, asynchronicity, stock market integration, and spillover effects are controlled by using a CAPM model augmented by three market risk premia representing Asia $\left(\widetilde{r}_{mt}^{Asia} - \widetilde{r}_{ft}^{Asia}\right)$, US $\left(\widetilde{r}_{mt}^{US} - \widetilde{r}_{ft}^{US}\right)$ and Europe $\left(\widetilde{r}_{mt}^{Europe} - \widetilde{r}_{ft}^{Europe}\right)$. The influence of firm-specific information on abnormal returns is considered by identifying firm-specific information and excluding stocks with firm-specific information 15 days before and after the announcement date.

Following Ramiah et al. (2013), changes in short-term and long-term systematic risk are determined by fitting a CAPM with interaction variables that can capture these changes. The first risk model incorporates average changes in systematic risk when all of the 19 announcements are considered. An aggregate dummy variable (AD) is used to signify the announcements, where the variable takes the value of 1 on the announcement date and 0 otherwise. The first interaction variable is the product of AD and the market risk premium (a multiplicative dummy variable). Therefore, the model can be written as follows:

$$\widetilde{r_{St}} - \widetilde{r_{ft}} = \beta_S^0 + \beta_S^1\left[\widetilde{r}_{mt} - \widetilde{r}_{ft}\right] + \beta_S^2\left[\widetilde{r}_{mt} - \widetilde{r}_{ft}\right] * AD_t + \beta_S^3 AD_t + \widetilde{\varepsilon_t} \tag{8}$$

where r_{St} is the sectoral return at time t, r_{ft} is the risk-free rate at time t and $\widetilde{r}_{mt}$ is the market return at time t. AD is a dummy variable that takes the value of 1 on the announcement date and 0 otherwise. ε_t is the error term, β_S^0 is the intercept of the regression equation ($E(\beta_S^0) = 0$). β_S^1 is the short-term sectoral beta (that is, the average short-term systematic risk of the sector), β_S^2 captures the change in the industry beta (that is, changes in short-term systematic risk), and β_S^3 measures the change in the intercept. The estimated equation provides the aggregate effect of all 19 announcements on the Abu Dhabi stock market.

Considering the fact that the aggregate model may cancel out the effects of opposite outcomes and to understand the effects of each of the individual 19 announcements, an individual dummy variable (ID) is used for each announcement, taking a value of 1 on the announcement date and 0 otherwise. The second risk model allows for the identification of the effect of each announcement on the sectors. The 19 interaction variables are obtained by multiplying the individual dummy variables by the market risk premium, whereby the coefficients of these interaction variables incorporate changes in short-term systematic risk following each of the 19 announcements. The model is specified as follows:

$$\widetilde{r}_{St} - \widetilde{r}_{ft} = \beta_S^0 + \beta_S^1\left[\widetilde{r}_{mt} - \widetilde{r}_{ft}\right] + \sum_{g=1}^{N} \beta_{S,n}^2 \left[\widetilde{r}_{mt} - \widetilde{r}_{ft}\right] * ID_{gt} + \widetilde{\varepsilon}_{it} \tag{9}$$

The additive dummies, which incorporate the change in intercept, are removed as individual dummy variables may be highly correlated. Changes in long-term systematic risk are examined by estimating Equation (9) after modifying the dummy variables, such that they take a value of 0 before the announcement date and 1 thereafter. Finally, a set of econometric diagnostics tests are conducted in order to ensure the validity of the results. Following Ramiah et al. (2013), the Chow test for the structural break, following each of the announcements, is applied to all regressions. The Wald test is used to check for redundant variables. To control for autocorrelation and to correct for ARCH effects, both of which are likely to be present due to the use of daily data, AR and MA terms, as well as GARCH specifications, are used to enhance the validity of the results and the conclusions drawn from them.

4. Data and Empirical Results

As previously indicated, the Abu Dhabi stock market is chosen for this study. Daily data on ADX-listed companies' stock prices as well as market returns, regional and world indices are obtained from DataStream, while the risk-free rate is obtained from The Central Bank of UAE (2018) website, over the period January 2016 to September 2018. The ADX general index (ADXGI) is the proxy for the UAE market.

The listed companies under different industries are banks, beverages, construction, financial services, fixed-line telecommunications, food and drug retailers, food producers, gas, water and multi-utilities, general industrials, general retailers, healthcare equipment, household goods and home construction, industrial engineering, industrial transportation, life insurance, mobile telecommunications, non-equity investment instruments, non-life insurance, oil and gas producers, pharmaceuticals, real estate investment and services, real estate investment trusts and finally, travel and leisure. The news pertaining to the introduction and implementation of VAT in the UAE is sourced from the official website of the UAE Government as well as the website of Deloitte UAE and Ernst and Young UAE. Table 1 displays the 19 announcements related to VAT, that are investigated in this research paper, numbered from 1 to 19. A brief description of the nature of the announcement, the date of occurrence, and any other relevant information is provided.

The first few events involve the initial publication of VAT-related information by the UAE and the initial meeting of GCC nations with an agenda of VAT implementation in their respective countries. The following events are related to the establishment of the UAE Federal Tax Authority, formal VAT legislation, the opening of VAT registrations, and descriptions of VAT treatments of selected industries. The date of implementation of VAT in the UAE is 1 January 2018, which is considered an event. Six other events are also investigated, including the removal of the UAE from the European Union's tax haven blacklist on 24 January 2018 and the publication of more industry-specific VAT guides, and special VAT treatments.

The results obtained from the estimation of abnormal returns confirm the proposition that the selected VAT-related announcements have a significant impact on equity returns for a considerable number of sectors. Most sectors document significant negative abnormal returns in response to the range of different announcements, on the first trading day following the announcement, while other sectors consistently document either positive or mixed significant abnormal returns. Out of the entire sample of 23 sectors, 14 recorded no significant abnormal returns on the first trading day following the announcement—this number falls further to only two when cumulative abnormal returns are considered. As illustrated in Table 2, the proportions of sectors having significant negative, positive, mixed, and no abnormal returns are 22%, 9%, 9%, and 60%, respectively, whereas those recording significant negative, positive, mixed and no cumulative abnormal returns are 13%, 26%, 52%, and 9%, respectively. In terms of abnormal returns, the majority of the impacted sectors exhibited negative reactions, while more mixed reactions were observed at the level of cumulative abnormal returns. Similar to Emran and Stiglitz (2005), Keen (2008) and

Kristjánsdóttir (2021) who contributed to the debate around informal and tourism sectors, we show an extended list of sectors that are affected by VAT.

Table 1. Announcements related to Value-Added Tax in the UAE.

Announcements Number	Event Date	Nature of Announcements
1	3 May 2016	UAE Ministry of Finance publishes new information regarding VAT (Deloitte 2018)
2	16 June 2016	Meeting of Gulf Cooperation Council countries about GCC Value-Added Tax (EY 2016)
3	24 October 2016	Establishment of Federal Tax Authority in the UAE (Deloitte 2018)
4	15 February 2017	Agreement on Value-Added Tax Signed by GCC countries (Deloitte 2018)
5	16 March 2017	Approval of Federal Tax Procedures Law by UAE Federal National Council (Deloitte 2018)
6	1 August 2017	Text of Federal Tax Procedures Law Released in the UAE (Deloitte 2018)
7	27 August 2017	UAE Releases Domestic Value-Added Tax and Federal Tax Authority Website
8	8 October 2017	Registration for Value-Added Tax Open
9	28 November 2017	Final Value-Added Tax Executive Regulations Published
10	7 December 2017	Value-Added Tax Treatment of Selected Industries Announced by UAE Federal Tax Authority (Deloitte 2018)
11	13 December 2017	Value-Added Tax Industry Guides Published (Deloitte 2018)
12	19 December 2017	Contracts Silent on VAT—Action before 1 January 2018
13	1 January 2018	Start of Implementation of Value-Added Tax
14	10 January 2018	List of VAT Designated Zones and Zero-Rated Medicines Published by the UAE (Deloitte 2018)
15	24 January 2018	UAE Removed from European Union's Tax Haven Blacklist (Deloitte 2018)
16	11 March 2018	Real Estate VAT Guide Published in UAE (Deloitte 2018)
17	29 May 2018	Special VAT Treatments to Certain Industries Published by Federal Tax Authority (Deloitte 2018)
18	21 June 2018	Amendment of VAT Application to Cap Fees of Banks (Deloitte 2018)
19	29 July 2018	Guide on VAT Treatment of Designated Zones, Treatment on Entertainment Service Input Tax (Deloitte 2018)

Table 2. Reaction of different sectors to VAT-related announcements.

	AR		CAR	
Reaction	**Number**	**%**	**Number**	**%**
Negative Reaction	5	22%	3	13%
Positive Reaction	2	9%	6	26%
Mixed Reaction	2	9%	12	52%
No Reaction	14	60%	2	9%
Total	23	100	23	100

Table 3 reports the estimated abnormal returns that are statistically significant on the first trading day following the VAT announcement. Statistically significant negative reactions are exhibited by five sectors: beverages, financial services, healthcare equipment and services, food and drug retailers, and pharmaceuticals. It can be observed that when a VAT-related announcement involves a lower tax rate or no tax for a certain industry or anything favorable compared to the general expectations, the sector shows a positive abnormal return. On the other hand, when the VAT-related announcement involves a higher tax rate or tax introduction for a certain industry or anything unfavorable compared to the general expectations, the sector shows a negative abnormal return.

Table 3. Statistically Significant Abnormal Returns.

Sector	Announcement Number	Date	AR	t-Statistic	Controlling for Market Integration		Non-Parametric Tests
					AR	t-Statistic	Corrado Ranking Test
			Negative Reaction				
Beverages	5	16 March 2017	−0.0350 ***	−3.6055	−0.0360 ***	−3.6973	−1.725
Financial Services	16	11 March 2018	−0.0127 **	−2.1487	−0.0143 **	−2.3909	−1.6587
Healthcare Equipment and Services	5	16 March 2017	−0.0787 ***	−3.7614	−0.0727 ***	−3.4989	−1.6854
	6	1 August 2017	−0.1069 **	−2.7034	−0.1002 **	−2.5370	−1.6454
Food and Drug Retailers	7	27 August 2017	−0.0349 **	−2.1262	−0.0350 **	−2.1319	−1.6854
	18	21 June 2018	−0.0557 **	−2.8718	−0.0549 **	−2.8137	−1.6454
Pharmaceutical and Biotechnology	5	16 March 2017	−0.0525 **	−2.2891	−0.0945 ***	−3.4054	−1.6854
	8	8 October 2017	−0.0671	−2.4884	0.0454	−0.0010	+0.9526
			Positive Reaction				
General Retailers	11	12 December 2017	0.1050 ***	4.2630	0.1036 ***	4.1992	+0.7120
Non-equity Investments	5	16 March 2017	0.0036 ***	5.8056	-8.472×10^{-6} ***	−5.0349	+0.0066
			Mixed Reaction				
Industrial Engineering	4	15 February 2017	0.1212 **	2.7861	0.1207 **	2.7421	+1.6587
	9	28 November 2017	0.1392 ***	3.3889	0.1473 ***	3.5726	+0.6461
	14	10 January 2018	0.1123 **	2.8732	0.1104 **	2.8222	+1.6454
	19	29 July 2018	−0.0786 **	−2.1171	−0.0756 **	−2.0199	−1.5655
Non-life Insurance	1	3 May 2016	−0.0112 **	−2.4912	−0.0076 **	−2.0994	+1.6587
	5	16 March 2017	0.0103 **	2.1174	−0.0084	−2.5835 **	−0.1265

***, ** signify statistical significance at 1%, 5%, respectively.

For instance, the beverages sector experienced negative abnormal returns following announcement 5, whereby Federal Tax Procedures Law was approved. Indications about

the rise in prices produced by the beverages industry are also reported (Eisenhauer and Principe 2009). Following this event, a fall in consumption of these products is expected and thus a negative reaction is reported. A similar argument may be put forward for the significant negative results observed in food and drug retailers as well as pharmaceuticals (which sell several non-essential drugs).[1] The case of healthcare equipment and services, however, is interesting because the products are mostly priced inelastic (Eisenhauer and Principe 2009) and typically must have no reaction to announcement 6 related to the release of VAT legislation. However, the possibility of higher costs of new investments and subsequent emphasis on maintenance and upgrades instead of buying new machinery may be a possible explanation for this phenomenon. Finally, the negative reaction of the financial services sector, which is dominated by investment companies, may be attributed to the higher cost of the services due to VAT imposed on the services fee or commission, both of which have the ability to claw deeply into the returns from the investments.

As reported in Table 3, statistically significant positive reactions are exhibited by two sectors, non-equity investments, and general retailers. The positive abnormal returns on general retailers arising in reaction to announcement 11 (industry guides to VAT) may be explained intuitively by the fact that the majority of the goods sold by them are characterized by inelastic demand, essential goods that people would continue purchasing irrespective of price increases or decreases due to VAT (Eisenhauer and Principe 2009).

In the case of non-equity investments, positive abnormal returns due to announcement 5 (approval of laws governing VAT) may be attributed to the higher perceived risk of equity investments due to different VAT implications and impacts for different sectors and their underlying equities, which need not necessarily be rewarded with commensurate returns. The equity owned by individuals through the shares of investment/financial services companies also exhibits negative returns as indicated in the previous section. In contrast, fixed-income securities seem to offer a much safer investment, with returns commensurate to the risk assumed and no VAT charged in any form on these investments.

As reported in Table 3, statistically significant positive and negative (mixed) reactions are documented in two sectors: industrial engineering and non-life insurance. For non-life insurance, the large negative abnormal returns due to announcements 4, 9, 14, and 19 signify the increased cost of insurance premium required to be paid due to the imposition of VAT, which may cause some people to opt-out of all non-compulsory insurance and use self-insurance if the need arises.

Surprisingly, the industrial engineering industry shows mixed results to the announcements, which may be attributed to prior knowledge of the event—that is, an information leak that cannot be captured even by the estimation of cumulative abnormal returns prior to the event date. Thus, the abnormal returns fail to provide a true picture of the sectoral reaction to the events. Since they are inconclusive, the interpretation of these results is thus not of interest to the scope of this study.

As stated earlier, 14 out of the 23 sectors did not show any significant abnormal returns on the first trading day following VAT-related announcements. These include the banking sector, construction, fixed-line telecommunication, food producers, gas, water and multi-utilities, transport, general industrials, household goods and home construction, life insurance, mobile telecommunications, oil and gas, real estate investment and services, real estate investment trusts and finally, travel and leisure. However, it must be mentioned that while some of these sectors show no abnormal returns following the first day after the announcement, statistically significant cumulative positive and negative abnormal returns are observed in most of the following subsequent announcements. These are examined in more detail later on.

The two industries that show an absolute reaction in terms of both abnormal and cumulative abnormal returns are general industrials and oil and gas producers. The general industries have been protected by the government by the imposition of no or conditional VAT since they are necessary for infrastructure development as well as domestic manufacturing. For oil and gas producers, VAT has little impact since most of their

products and services (such as transportation using oil) are tax-free, except the purchase of petroleum at pumps. As the majority of their products are exported, the reaction depends on the taxation systems of the importing countries. Moreover, in both the domestic and international markets, oil and natural gas are almost demand inelastic due to their importance in electricity generation, transportation, and several other uses. The failure of VAT to impact this industry is thus rightly justified.

5. Robustness Tests and Behavioral Finance Extensions

The results of the Corrado ranking robustness test, corresponding to the statistically significant estimates of abnormal returns, are reported in Table 3. It can be observed that the Corrado ranking robustness tests support 10 out of 16 significant abnormal returns. The only consideration here may be the inadequacy of small sample properties of this robustness test (Ataullah et al. 2011), along with the fact that it can only be applied to check the robustness of abnormal returns in a one-day window (due to incremental bias, this test cannot be applied to cumulative returns). Additionally, the test fails to account for the magnitude of abnormal returns but merely gives the direction (Ataullah et al. 2011). In the presence of these limitations, not much weight is given to these results, even though they are generally supportive of the previous findings.

These results are reasonable, given the limitations of the robustness tests, along with the extremely small sample size of the industrial portfolio available for analysis after the exclusion of companies with firm-specific information during the 30-day window (15 days before and after the event). Since the event window is sufficiently wide, it is very likely that firms may make specific disclosures at this time, often related to the impending announcement or a discussion of the effects of released legislation on company operations and financials. This may, in turn, result in poor capturing of the true sectoral reactions to announcements, since these firms have to be removed from the sample and the results are obtained based on the much smaller sample of remaining firms.

As mentioned in Section 3, the tendency either to over or underreact to any event is common in emerging markets such as the UAE, thus allowing for a behavioral finance extension on the effect of VAT on different sectors. Under the conditions implied by the efficient market hypothesis, where market prices absorb all new information instantly, abnormal returns may appear on the first trading day following the VAT-related announcement, but not thereafter. The prevalence of significant cumulative abnormal returns in two- and five-day event windows will thus indicate market inefficiency and verify the presence of under-or overreactions. We find evidence to support the behavioral finance theory in the UAE stock markets. Following VAT-related announcements (1) significant negative cumulative abnormal returns are observed for three industries, (2) significant positive cumulative abnormal returns for six industries are identified, and (3) mixed significant positive and negative cumulative abnormal returns for 12 industries are documented. These results are reported in Table 4.

Table 4. Statistically significant negative and positive cumulative abnormal returns.

Sector	Announcement Number	Date	CAR2	t-Statistic	CAR5	t-Statistic
			Negative Reaction			
Financial Services	2	16 June 2016	−0.0316 **	−2.242	NA	NA
Fixed Line Telecommunications	2	16 June 2016	−0.0485 **	−2.6966	NA	NA
Industrial Transportation	17	29 May 2018	−0.0335 **	−2.3794	NA	NA
			Positive Reaction			
Banks	12	19 December 2017	NA	NA	0.0348 **	2.009
	15	24 January 2018	NA	NA	0.0425 **	2.3749
Food Producers	16	11 March 2018	NA	NA	0.0222 **	2.0801
General Retailers	11	13 December 2017	0.1045 ***	3.2511	0.1021 **	2.1766
	14	10 January 2018	0.1394 ***	4.0485	0.1368 **	2.6970
	16	11 March 2018	0.0668 **	2.1280	NA	NA
	19	29 July 2018	0.0841 ***	3.3331	NA	NA
Mobile Telecommunications	10	7 December 2017	NA	NA	0.04716 **	2.4096
Non-equity Investments	5	16 March 2017	0.0042 ***	3.9366	0.0058 ***	3.8436
Travel and Leisure	6	1 August 2017	0.0260 **	2.0374	NA	NA

***, ** signify statistical significance at 1%, 5%, respectively.

6. Risk Analysis

Another important question that the UAE government and equity investors are concerned about in relation to VAT announcements pertains to the uncertainties these announcements can breed within the economy. An answer to this question is provided by investigating the impact of VAT announcements on the short-term and long-term systematic risks of the 23 industries. Equations (8) and (9) are estimated to quantify changes in short-term systematic risk over the period 2015–2018. This results in this section provide additional evidence from the work of Lakshmi and Alex (2018).

The overall impact of all announcements on short-term systematic risk can be seen in the results displayed in Table 5 while the individual impact of each announcement on short-term systematic risk is shown in Figure 1. The sectors experiencing an increase in overall short-term systematic risk include financial services, fixed line and telecommunication, food and drug retailers, food producers, gas water multi-utilities, household goods and home construction, industrial engineering, non-equity investment instruments, non-life insurance and real estate investment and service. For instance, the beta of the food producers' industry was 0.110 before the announcements but increased by 2.640 to 2.75 following the announcements (Table 5). On the other hand, certain sectors experienced a decrease in short-term systematic risk, including banks, beverages, construction materials, general industries, general retailers, healthcare equipment and services, industrial transportation, life insurance, mobile telecommunication, oil gas producers, pharmaceuticals, and biotechnology, real estate investment trust and travel, and leisure. The major conclusion that can be drawn from these findings is that an industry effect is evident in the variation in risk following the VAT announcements. The outcomes can be positive, negative, or neutral.

Table 5. Aggregate change in short-term systematic risk.

Industry	Intercept	z-Statistic	Beta	Short-Term Change in Risk	z-Statistic	Short-Term Change in Intercept	z-Statistic
				Increase in risk			
Financial services	0.000	−1.520	0.376	0.159	0.581	0.001	0.625
Fixed line and telecommunication	0.000	−0.870	0.497	0.229	0.338	−0.003	−0.814
Food and drug retailers	0.000	0.334	−0.072	0.270	0.283	−0.007	−1.512
Food producers	0.000	−1.227	0.110	2.640 ***	24.220	−0.003	−2.547
Gas water multi-utilities	0.000	0.140	0.715	0.292	0.208	0.000	−0.039
Household goods and home construction	0.000	0.000	−0.010	0.111	0.062	0.000	0.009
Industrial engineering	−0.001	−0.816	0.134	0.887	0.822	0.014 *	1.841
Non-equity investment instruments	0.000	−1.634	0.001	0.010	0.088	0.000	0.001
Nonlife insurance	0.000	−1.164	0.094	0.322 **	2.095	0.000	0.194
Real estate inv. and service	0.000	−1.467	−0.360	0.325	0.591	0.000	−0.151
				Decrease in risk			
Bank	0.000	−1.089	0.338	−0.034	−0.142	−0.001	−1.106
Beverages	0.000 **	−2.061	0.019	−0.481 **	−2.734	−0.002	−1.259
Construction and materials	0.000 **	−2.077	0.380	−0.091	−0.192	0.001	0.649
General industries	−0.001	−0.419	−0.125	−0.901	−0.179	−0.001	−0.022
General retailers	0.001	0.663	0.027	−0.298	−0.366	0.003	0.591
Healthcare Equipment and services	0.001	1.086	0.007	−0.273	−0.345	−0.008	−1.255
Industrial transportation	0.000	1.055	0.483	−0.545	−0.963	−0.005	−1.659
Life insurance	−0.001	−1.014	0.145	−0.207	−0.009	0.001	0.009
Mobile telecommunication	0.000	−0.005	−0.014	−0.010	−0.026	0.000	0.025
Oil gas producer	0.000	−0.645	−0.017	−0.315	−0.252	0.002	0.448
Pharmaceuticals and biotechnology	0.000	0.369	0.187	−1.635	−0.707	−3.166	−0.347
Real estate investment trust	0.000	−0.989	−0.002	−0.114	−0.362	0.002	0.616
Travel and leisure	0.000	−1.215	0.346	−0.422	−1.303	−0.001	−0.358

***, **, * signify statistical significance at 1%, 5%, 10%, respectively.

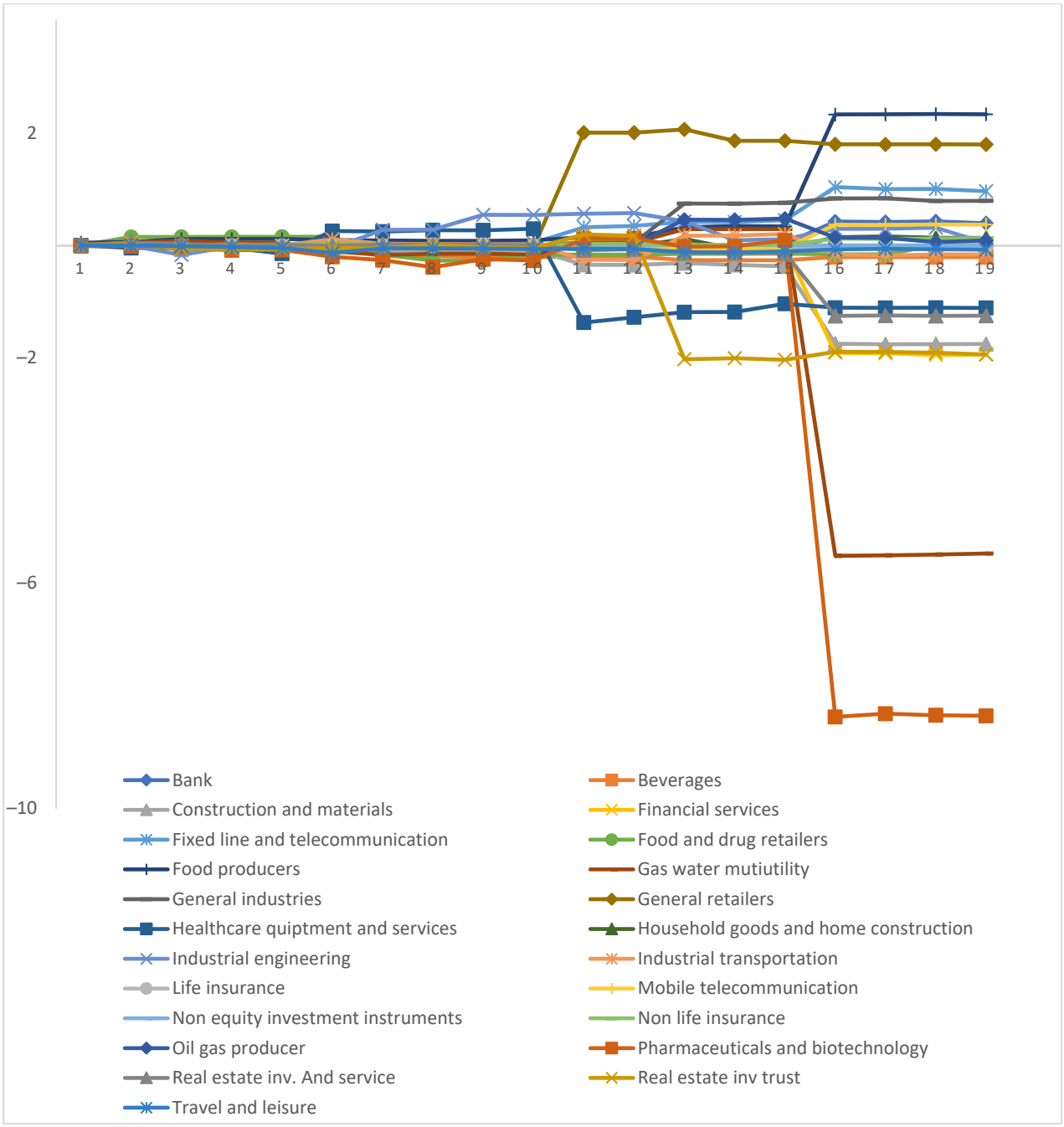

Figure 1. Short-term systematic risk based on individual events.

The analysis is further extended by disaggregating the effects of each announcement as represented by Equation (9), which allows us to identify changes in the short-term systematic risk originating from each announcement. Figure 1 shows the short-term impact on the beta values of 23 industries for the period May 2016 to August 2018 following the nineteen announcements. Initially, the beta values of these industries did not change much. However, significant variations in the short-term systematic risk of some industries are observed between December 2017 and May 2018. The major announcements during this period include the publication of the 'Value Added Tax Guides' on 13 December 2017, the start of implementation of VAT as of 1 January 2018, and the removal of the UAE from the European Union's tax haven blacklist.

A fall in the value of beta implies a decrease in short-term systematic risk, which in turn indicates some relief from VAT. On the other hand, the industries for which no VAT relief was provided, experienced a rise in systematic risk. Acknowledged by the UAE stock market is a strong impact of VAT implementation as well as the UAE's agreement to take measures to comply with the Common Reporting Standard (CRS) to facilitate the transparent flow of information with international partners as part of the agreement that removed the UAE from the "Tax Heaven" blacklist. As reported by Deloitte, "As part of the agreement that removed UAE from the blacklist, the UAE signed 113 additional agreements to avoid double taxation and a further eight to facilitate the exchange of information for tax purposes". An increase in the beta values is expected for industries associated with suspected money laundering. We observe that food producers and general industries experience systematic risk. A fall in beta is expected for industries that are more organized and digitalized—for instance, the sectors experiencing a decrease in systematic risk include pharmaceutical and biotechnology, gas, water and multi-utilities, real estate investment and services, and financial services.

When the long-term version of Equation (9) is estimated, we find that the long-term systematic risks of all industries were affected by at least one of the nineteen VAT-related announcements. Figure 2 provides a visual of how beta changes for each of the 23 industries following the nineteen announcements over the period of May 2016 to August 2018. If we consider the beta of these industries from May 2016 to 27 August 2017 (that is, up until event 7) we find that the systematic risk of these industries was stable.

Following the release of the Domestic Value-Added Tax and Federal Tax Authority Website on 27 August 2017, a variation in the beta of several industries is observed. Significant variations in beta values of different industries are also observed from 7 December 2017 to 1 January 2018, implying large degrees of uncertainty among industries during this period. These events include the VAT treatment of selected industries announced by the UAE Federal Tax Authority (2018), Industry guidelines on VAT published by the UAE and KSA, and the implementation of VAT, which began on 1 January 2018.

A fall in beta value is observed in the industries where the guidelines indicate some exemptions from VAT. For instance, a fall in the beta of the pharmaceutical and biotechnology industry is observed following the release of a report in which the healthcare and some other sectors are confirmed to have VAT reliefs. Similarly, a fall in beta is observed in the healthcare equipment and services industry, where a 0% VAT rate is announced for healthcare services, including vaccination and treatment of humans. A decrease in the value of beta for travel and leisure industries is also observed with an announcement of a 0% VAT rate for domestic and international transportation of passengers and goods.

On the other hand, we observe an increase in the beta values of some industries where the implementation of a basic 5% VAT is announced. These industries included oil gas producers wherein a VAT of 5% is implemented on oil and gas products, including petrol at the pump. A significant increase in the risk of the pharmaceutical industry is observed when the Final VAT Executive Regulations were published on 28 November 2017. This announcement clearly indicates that a 5% VAT rate will be applicable on (1) medicines and medical equipment not listed in the cabinet decision, and (2) other medical supplies and healthcare services that are not for treatment and are not preventive as opposed to the earlier announcement of VAT relief for the healthcare sector.

The announcement made on 10 January 2018 is about the list of VAT Designated Zones and Zero-Rated Medicines published by the UAE. This list includes areas (referred to as the free zone areas) that are subject to special rules for supplies of goods in relation to VAT. This created a negative sentiment among the general retailers and industries operating outside these free zones as measured by a significant increase in the beta value of general retailers and general industries. Following the publication of the real estate VAT guide as of 11 March 2018, a slight increase in the beta of the real estate sector is observed.

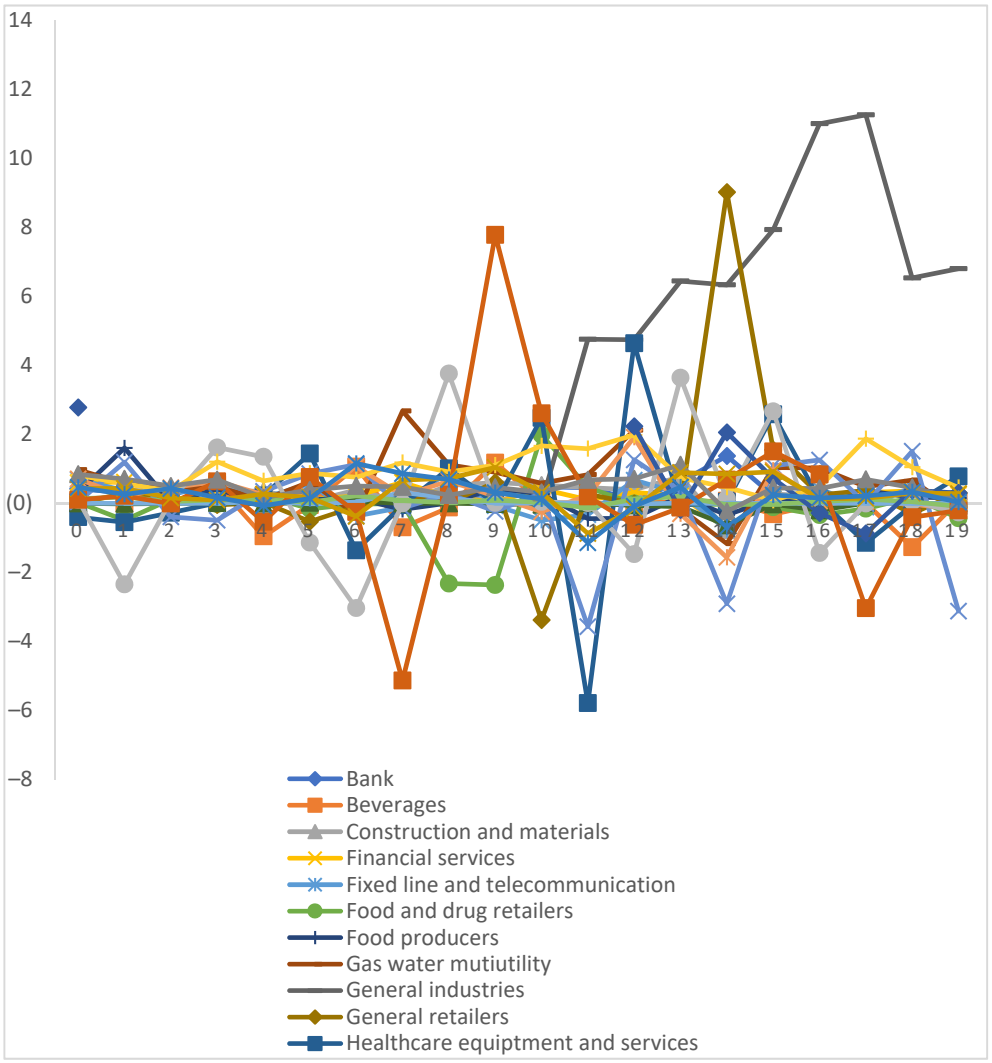

Figure 2. Long-term systematic risk based on individual events.

7. Conclusions

The objective behind the introduction of value-added tax (VAT) is to provide a source of income for the UAE government as well as a means for the diversification of sources of government revenue. In achieving such an objective, the intention is to minimize the impact on the real and financial sectors of the UAE economy.

This study documents the effects of the introduction of VAT in the UAE. The results show that some sectors are (1) positively affected, (2) negatively affected, (3) not affected, and (4) both positively and negatively affected.

These findings suggest that the UAE government ensured the sectors that are most critical to the UAE economy (namely, banking, oil and gas, and travel and leisure) experienced no effect from VAT implementation by not imposing any form of VAT on these industries. On the other hand, the produced goods and services industries have experienced positive reactions to VAT implementation mainly because price and demand are inelastic, that is, mostly essentials and basic goods are not affected significantly. In regards to those sectors that experienced mixed returns, it is not possible to conclusively state whether VAT had an overall positive or negative impact on the specific sector and is thus not of interest to the scope of this study. A few sectors have experienced purely negative reactions to the range of VAT-related announcements, the majority of these are not critical industries and mostly produce discretionary products that have price and demand elastic. Furthermore, the UAE

government has been able to promote some sectors through various initiatives (such as free zones) and stimulate competition within the market.

The findings of this study have implications for academics as the evidence is mixed in regard to different sectors. Therefore, we caution readers from generalizing the findings of this study as our data is based on a single country, the UAE, which has a very low or no tax regime, and the implications may vary when VAT is introduced in a high tax regime country. Future researchers could focus on the long-term effects of VAT on society and employment by undertaking country-level studies and country comparisons between similar countries adopting and not adopting a VAT, using more detailed data.

In regard to other member countries in the Middle East, the findings of this study provide possible implications for VAT implementation in their jurisdictions. It is to be noted that VAT has the potential to have an inflationary effect on prices and wages, heavy compliance and administrative costs, and possible taxpayer resistance when introduced for the first time (Warren 1993).

Author Contributions: Conceptualization, methodology, formal analysis, investigation, resources, data curation, writing—original draft preparation, writing—review, and editing, were undertaken collaboratively and all authors have equally contributed. All authors have read and agreed to the published version of the manuscript.

Funding: The authors received no financial support for the research, or authorship, for this article.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The datasets generated during and/or analyzed during the current study are available from the corresponding author on request.

Acknowledgments: This paper was presented at the 1st Student Research Symposium held at the University of Wollongong in Dubai, Dubai, the United Arab Emirates on 20th December 2018. The authors wish to thank all the participants, Kashif Saleem and Huy Pham for their comments and support. Any remaining errors are our own.

Conflicts of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Note

[1] All essential drugs as indicated by the UAE Government's Approved List are VAT-free.

References

Alavuotunki, Kaisa, Mika Haapanen, and Jukka Pirttilä. 2019. The Effects of the Value-Added Tax on Revenue and Inequality. *The Journal of Development Studies* 55: 490–508. [CrossRef]

Ataullah, Ali, Xiaojing Song, and Mark Tippett. 2011. A Modified Corrado Test for Assessing Abnormal Security Returns. *European Journal of Finance* 17: 589–601. [CrossRef]

Bird, Richard M., and Eric M. Zolt. 2005. Redistribution via taxation: The limited role of the personal income tax in developing countries. *Journal of Asian Economics* 16: 928–46. [CrossRef]

Brown, Stephen J., and Jerold B. Warner. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics* 14: 3–31. [CrossRef]

Corrado, Charles J. 1989. A nonparametric test for abnormal security-price performance in event studies. *Journal of Financial Economics* 23: 385–95. [CrossRef]

Deloitte. 2018. Value Added Tax (VAT) in the GCC Alerts. Available online: https://www2.deloitte.com/ae/en/pages/tax/articles/vat-gcc-countries-updates.html (accessed on 24 March 2021).

Ebeke, Christian, and Helene Ehrhart. 2012. Tax revenue instability in Sub-Saharan Africa: Consequences and remedies. *Journal of African Economies* 21: 1–27. [CrossRef]

Eisenhauer, Joseph G., and Kristine E. Principe. 2009. Price Knowledge and Elasticity. *Journal of Empirical Generalisations in Marketing Science* 12: 1–20. Available online: https://www.empgens.com/article/price-knowledge-and-elasticity/ (accessed on 20 December 2021).

Emran, M. Shahe, and Joseph E. Stiglitz. 2005. On selective indirect tax reform in developing countries. *Journal of Public Economics* 89: 599–623. [CrossRef]

EY. 2016. GCC Ministers of Finance Meet to Approve Introduction of GCC VAT. Available online: https://www.ey.com/Publication/vwLUAssets/GCC_Ministers_of_Finance_meet_to_approve_introduction_of_GCC_VAT/$FILE/2016G_01656-161Gbl_Indirect_GCC%20Ministers%20of%20Finance%20meet%20to%20approve%20introduction%20of%20GCC%20VAT.pdf (accessed on 20 December 2021).

Federal Tax Authority. 2018. VAT Treatment on Selected Industries. Available online: https://www.tax.gov.ae/pdf/fta-industry.pdf (accessed on 26 December 2021).

Ivkovic, Zoran, James Poterba, and Scott Weisbenner. 2005. Tax—Motivated trading by individual investors. *American Economic Review* 95: 1605–30. [CrossRef]

Keen, Michael. 2008. VAT, tariffs, and withholding: Border taxes and informality in developing countries. *Journal of Public Economics* 92: 1892–906. [CrossRef]

Keen, Michael, and Ben Lockwood. 2010. The value added tax: Its causes and consequences. *Journal of Development Economics* 92: 138–51. [CrossRef]

Kristjánsdóttir, Helga. 2021. Tax on tourism in Europe: Does higher value-added tax (VAT) impact tourism demand in Europe? *Current Issues in Tourism* 24: 738–41. [CrossRef]

Lakshmi, B., and Rebecca J. Alex. 2018. Effect of GST Rate Announcement on Sectorial Indices of National Stock Exchange. *Indian Journal of Commerce and Management Studies* 9: 29–36. [CrossRef]

Liu, Qing, and Yi Lu. 2015. Firm investment and exporting: Evidence from China's value-added tax reform. *Journal of International Economics* 97: 392–403. [CrossRef]

Malkiel, Burton G., and Eugene F. Fama. 1970. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance* 25: 383–417. [CrossRef]

Martinez-Vazquez, Jorge, and Richard M. Bird. 2010. Value Added Tax: Onward and Upward? In *The Elgar Guide to Tax Systems*. Cheltenham: Edward Elgar Publishing. [CrossRef]

Martinez-Vazquez, Jorge, Violeta Vulovic, and Yongzheng Liu. 2010. Direct versus Indirect Taxation: Trends, Theory and Economic Significance. In *The Elgar Guide to Tax Systems*. Cheltenham: Edward Elgar Publishing. [CrossRef]

Ministry of Finance. 2020. Total VAT Revenues Amount to AED11.6bn from January until August 2020. Available online: https://wam.ae/en/details/1395302885097 (accessed on 5 September 2022).

Ramiah, Vikash, Belinda Martin, and Imad Moosa. 2013. How does the stock market react to the announcement of green policies? *Journal of Banking & Finance* 37: 1747–58. [CrossRef]

Sahoo, Abhimanyu. 2015. Goods and Services Tax(GST): A Step towards Indirect Tax Reforms in India. *Asian Journal of Research in Business Economics and Management* 5: 58. [CrossRef]

The Central Bank of UAE. 2018. EIBOR Rates. Available online: https://www.centralbank.ae/en/index.php?option=com_jumi&feleid=20&Itemid=59 (accessed on 23 February 2022).

Ufier, Alex. 2014. Quasi-experimental analysis on the effects of adoption of a value added tax. *Economic Inquiry* 52: 1364–79. [CrossRef]

Warren, Neil. 1993. The UK Experience with VAT. *Revenue Law Journal* 3: 75–99. Available online: http://epublications.bond.edu.au/rlj/vol3/iss2/1?utm_source=epublications.bond.edu.au%2Frlj%2Fvol3%2Fiss2%2F1&utm_medium=PDF&utm_campaign=PDFCoverPages (accessed on 26 June 2021).