

## Article

# Do Energy Prices Put the Tourism Sector at Risk?

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**Abstract:** This paper studies the effect of a shock in the hospitality sector, namely the energy price increase, with stated preference methods and performs the subsequent analysis with a mixture of quantitative and qualitative tools. The hospitality sector is very important and is the backbone of the tourism industry worldwide. We designed and administered two semi-structured anonymous questionnaires that were sent randomly to recipients for completion. One questionnaire investigated tourists' behavior, visit and their stay and their spending intentions, whereas the second questionnaire investigated the hoteliers/managers estimations and beliefs on energy price increases and whether or how this price increase would have an effect on tourists' behavior and their visit, stay and spending intentions in the destination. Through two surveys, we collected answers to questions for three consecutive years—2021: representing the past/before the energy crisis, 2022: the present/the time of the crisis breakout and 2023: the future/after the crisis outbreak. Overall, a lower tourist expenditure is found for the future due to the energy price shock, but there are no significant differences between the answers of the two groups. Our results are insightful for tourism policy makers, hoteliers and managers and particularly those economies that rely heavily on tourism, e.g., island economies.

**Keywords:** energy prices; hospitality; risk; survey; tourism



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## 1. Introduction

Energy is a crucial input for most sectors of an economy, not least tourism, because all productive processes are almost infeasible without energy use. Tourism is a dynamic economic sector worldwide and it is one of the most important sectors for some countries, particularly island economies or developing countries. More specifically, tourism contributes to a significant portion of the GDP in Greece, Iceland, Cyprus, Spain, Mexico, Portugal and Croatia. The contribution of tourism to the Greek economy for the year 2019 was around 20%, this is one of the top values across the world; for Iceland it was 22% (Adamopoulou et al. 2022). In 2020, the tourism sector employed more than 250 million people, or one in every twelve workers globally. On average, tourism generates 5% of total tax revenue, 11% of global consumer spending, 7% of total investment and 33% of the world's services trade (Kirylov et al. 2020).

As a result of the industry's globalization, tourism businesses have grown rapidly on a global scale in order to enhance their market share and profitability. Globalization has, however, also exposed businesses to a wider range of global hazards. As a result, the tourism sector is quite susceptible to external forces and impacts in the broader operational environment (Ritchie 2004). The accessibility of energy is crucial to the current tourism business model. Previous studies have demonstrated that the tourism sector is fuel-driven and extremely energy-intensive because of its inherent transport component (Becken 2008).

Overall, changes in energy prices may have a direct impact on consumer spending through one of four mechanisms. First, higher energy prices are anticipated to reduce customers' discretionary income, thus consumers will have less income to spend on other

needs after paying their energy bills. Second, by raising concerns about the direction that energy prices will go in the future, fluctuating energy prices may also discourage consumers from making long-term purchases of consumer durables. Third, even if consumer decisions are reversible, consumption may decline as a result of energy price shocks, as consumers build up their reserve funds for contingencies. Fourth, energy-intensive durables will see their consumption fall significantly more than other durables (Edelstein and Kilian 2009). To put this in a numerical context, households in Europe typically spend just over 10% of their total expenditure on energy-related goods (Ari et al. 2022).

In conjunction with the whole world, tourism was seriously affected by COVID-19, which prevented tourists' mobility and contact due to protective lockdown measures. When the COVID-19 alarm subsided, economies then had to face the inflationary pressures and the production shortages of critical inputs. Before the COVID-19 turmoil had subsided, a new shock hit most economies worldwide, which came from energy disruptions due to the Russian–Ukrainian war and accelerating high inflation. Due to globalization and technological advances, the tourist industry may be able to rebound from crises, shocks and disasters more quickly today than it did in the past.

Historically, energy crises and inflation have had a wide range of consequences on the entire economy. The price of production inputs increases as a result of energy price increases. Then, the prices of the goods increase and this raises the core consumer price index (CPI) (Huang and Huang 2009). The causes and effects of the oil price increase are unequally distributed because the worldwide trading of oil is a geographic and political issue too. Europe has historically seen some of the worst consequences of rising oil and energy prices due to the continent's significant reliance on oil and gas (Bjørnland 2022). Additionally, it becomes clear from the calculated welfare consequences that an increase in food and energy prices would either result in a significant rise in compensation costs or a decline in consumer welfare, both of which would be difficult to cope with for households with low incomes (Huang and Huang 2009).

Regarding gas prices, which are the most important reason for the current energy crisis, those had been far more stable than oil prices during the past twenty years; however, this started to change in the second half of 2021 (Gros and Shamsfakhr 2022). Therefore, inflation is rising as a direct result of the higher energy prices, which results in a reduction in consumer spending. This situation is causing a justified concern among all stakeholders (Hu 2022).

Therefore, the purpose of this paper is to examine the current and potential effects of rising energy prices on the tourism industry as they become perceived by hotel managers and travelers. It pursues this through two questionnaires and an analysis based on both qualitative and quantitative tools. This study is innovative, since there has previously been no similar piece of research on how energy prices affect the tourism industry from both the standpoint of customers and producers. The main goal of this research is to show how and to what extent the rising cost of energy has affected the hospitality sector, as well as how consumers have responded to these changes and what risks this response has to the hospitality sector. This piece of research will throw light onto critical questions such as whether there are differences in the estimations of the future between tourists and hoteliers and what parameters seem to affect tourists' expenditure and travel decisions? The answers to these questions will equip hoteliers/managers with informed preparations about future tourist arrivals and foremost will contribute to their making informed profitability estimations and investment plans. Furthermore, it will enrich the bibliography with estimations about the effects of energy shocks on the hospitality or tourism industry. If stakeholders are prepared about the precise magnitudes of future tourist arrivals and tourist expenditure, they will also target their marketing initiatives in those places and perform actions that are most promising for future revenue, profit growth and development.

The remainder of the paper is structured as follows: Section 2 hosts the literature review. Section 3 demonstrates the methods and the results. Section 4 provides the discussion of the results, and Section 5 concludes the paper.

## 2. Literature Review and Background Knowledge

Oil has been the main energy production fuel for quite a long time. Oil prices have fluctuated since its first discovery and use in the 1800s in the USA. Due to it being the main fuel for most economies and production processes, together with its scarce nature, oil's price has fluctuated based on demand and supply forces and much later, based on oligopoly decisions about its price. The prices always went down when more oil quantity was injected into the market through new discoveries, e.g., North America, Russia, etc. Since energy is a critical production input, necessary for all processes, when energy prices increase, so do the prices of all goods through an inflationary pressure. Since the establishment of the Organization of Petroleum Exporting Countries (OPEC) in 1973, the price of oil has been increased many times.

Of course, nowadays there are other fuels and energy forms that contribute to the satisfaction of energy demand. Thus, natural gas plays a more important role and renewables are here to alleviate the excess demand of oil. However, energy commodities have always been sensitive to geopolitical conflicts and wars and producer or transit countries have imposed upstream advantages and energy shortages. In each energy crisis, the actors are different. In 1973, the Arab–Israeli (Yom Kippur) war; in 1979, the Iranian revolution; in 1990, the Gulf war, etc., are only some of the military conflicts that have caused energy shocks. The financial recession in 2008 has caused a collapse in price due to the reduced aggregate demand. In 2021, gas price increases are the primary factor driving energy price increases, but other secondary factors such as increasing coal and carbon costs, increased demand, weather conditions, modest renewable generation, dropping domestic gas production and some natural gas supply constraints caused by maintenance and the absence of funding in new production have also played a role in the energy shortages in Europe (ACER 2021). The conflict between Russia and the Ukraine has contributed to the escalation of this energy crisis (Bjørnland 2022).

As a result of the energy crisis and the largest gas supplier to the European market, being the Russian energy company Gazprom (a 35% market share), it has become increasingly hard for gas to reach the rest of Europe (ACER 2021). As a result of the large increase in the cost of imported fuels, which has also contributed to a dramatic increase in overall consumer expenses, inflation rates in numerous European countries have approached double digits (Ari et al. 2022). The situation of European inflation is not the same as in the US. Due to the more abundant shale gas production, the US is a net exporter; as a result of that, the US market is partially hedged. In addition, there is a lot of variation within the EU itself. Because some countries' consumer tariffs were based on wholesale prices, the cost of electricity for consumers varies widely across the EU (Gros and Shamsfakhr 2022).

Energy prices affect the hospitality sector too. The main utility expense for the hotel industry, accounting for around 60% of overall costs, is energy (Usman et al. 2020). In all hotel categories, with the exception of upper-upscale ones and all urban regions, the demand for tourist accommodation declines as gas prices increase. Hotels spend money on energy in the following categories, in the following descending order: ventilation, air conditioning, lighting (with TV and radio), kitchen, laundry, room heating and hot water (Upadhyay and Vadam 2015). Therefore, the energy dependence of the hospitality sector becomes more than evident and is a concern for hoteliers (Menegaki and Agiomirgianakis 2018; Menegaki and Agiomirgianakis 2019).

Besides the hotels themselves, energy prices cause concern for other sectors that work complementarily with hospitality. The transportation sector is narrowly connected to tourism and the latter cannot be implemented without the former. As a result, the accessibility of inexpensive transportation has a positive impact on global visitor flows (Becken 2011). However, the cost of jet fuel and crude oil substantially increased in 2021 and at the beginning of 2022, putting more pressure on airline finances (Walsh 2022).

As mentioned above, the increase in energy prices affects not only the hospitality sector but also the food and beverage sector, whose expenditure has been found to correspond to 17.24% of the daily tourist expenditure (Miljak et al. 2022). So-called food inflation

affects lower-income households more than higher-income households because a higher percentage of their income is spent on food, even though food only accounts for 14% of the overall consumer price index. It is noteworthy that along with alcohol and tobacco, food was the second-largest contributor to inflation in the euro area in October 2022 (Glauber and Smith 2022). Other aspects of tourism such as recreation and other general expenditures also suffer from the inflationary pressures caused by energy price increases. The frequency and length of leisure travel are strongly influenced by income. The projected reduction in income caused by increased oil prices will reduce foreign travel and redistribute flows. Additionally, the cost of tourism not only influences income but also the choice of travel destinations and the type of holidays that consumers take. Demand decreases as transportation costs rise, depending on how responsive the market is to price changes (Becken 2011).

Past studies on the effect that energy prices have on tourism have been performed by researchers such as Khanal et al. (2021); however, their research is quite different from ours. They studied the long-term cointegrating relationship between international tourist arrivals and primary energy consumption in Australia for the years 1976–2018 using gross domestic product, gross fixed capital formation, financial development and total population. They employed various cointegration tests and found that tourist arrivals, gross domestic product and financial development have a significant long-term cointegrating relationship with energy consumption. Our paper uses data from questionnaires for the most recent and consecutive years 2021–23, and we attempt to find and conceptualize differences before and after the energy shock of 2022. Additionally, we use survey data and not panel data and we derive our sample from a European country and not Australia, which has very different characteristics and tourism prospects.

Another study by Abbasi et al. (2021), explored the association between economic complexity index (ECI), tourism (TR), gross domestic product (GDP), gross domestic product per capita (GPC) and energy prices indices (EPI) on CO<sub>2</sub> using data from the top 18 countries from 1990 to 2019. Their results showed that any policy aimed at ECI, TR, GDP, GPC or EPI has a considerable impact on CO<sub>2</sub>. Lastly, they suggested that economic complexity, tourism, GDP, GPC and energy prices could help alleviate the challenges caused by environmental degradation in high-economic-complexity countries. This study, despite containing two components such as tourism revenue and energy prices, seeks to answer different questions from our study. Additionally, this study employs different tools and a dataset that is quite different from ours. Our study uses both qualitative and quantitative tools from survey data for the most recent years 2020–23. The study by Abbasi et al. (2021) falls under the category of panel data modelling and analysis studies.

A third study, by Khanal et al. (2022), studied the long-term cointegrating relationship between tourism and environmental degradation. The authors employed the autoregressive distributed lag bounds test approach on data from 1976 to 2019 to obtain long-term and short-term cointegration and causal effects. They found that tourism obstructs the attainment of zero-carbon in Australia. Furthermore, they found that tourist arrivals, energy consumption and gross domestic product are significant contributors that have a positive and statistically significant long-term relationship with carbon emissions. This study is also quite different from ours for the same reasons that the previously mentioned studies were different: topic, methodology, data type, data span, etc.

Another strand of recently published work deals with the environmental degradation caused by tourism in general or by the hospitality sector in particular. Energy, in those studies, is only examined in terms of CO<sub>2</sub> emissions and temperature increases through which the climate change phenomenon is aggravated. Examples of these studies are Xu et al. (2023), Li et al. (2021) and several others. Our paper's focus is beyond these studies. Studies such as the one by Majumdar (2021), which studies hospitality after the shock of COVID-19 are more in line with our current research approach. The latter study also uses surveys to investigate the aftermath of COVID-19 in the Indian hospitality sector. To the best of our knowledge, none of the studies so far have investigated the topic we focus on in

our research. Therefore, our paper is unique in its investigated topic, methodology, data type and update.

### 3. Methodology

Our study is based on results from two semi-structured questionnaires. One questionnaire (TQ: Tourists Questionnaire) was completed by the tourist sample and the other (HQ: Hoteliers Questionnaire) was completed by the sample of hoteliers/managers. The questionnaires contained several common questions and the answers were examined and measured both with qualitative and quantitative tools. Our study collected data for three consecutive years:

- 2021 represents the past; it is before the energy crisis; the required data for that year have been realized;
- 2022 represents the present; at the energy crisis; the required data have or have not been realized;
- 2023 represents the future; after the energy crisis outbreak with the effects persisting; the data have not been realized, they are personal estimations with an error possibility.

The TQ investigates and compares: (1) the stated days of vacation in 2021, 2022 and 2023, (2) the stated number of family members travelling in 2021, 2022 and 2023, (3) the stated/perceived change in vacation characteristics between 2021 and 2022 and the subsequent change of vacation characteristics between 2022 and 2023, (4) the stated vacation expenditure in 2021, 2022 and 2023, (5) the stated total length of stay in 2021, 2022 and 2023, (6) the stated type of accommodation in 2021, 2022 and 2023, (7) the stated mode of transportation in 2021, 2022 and 2023 and (8) the duration of stay in the destination in 2021, 2022 and 2023, the type of accommodation, the mode of transportation and vacation eating out characteristics in 2021, 2022 and 2023 and, last but not least, the participants were asked three filter questions that would inform current research about the respondents' valuation of a hotel using energy saving practices, respondents' disturbance feelings from the position of wind turbines on mountains (this question would interrogate the attitude of respondents towards renewable energy) and whether respondents used energy saving practices in their own households or other personal activities (this question would also interrogate whether the respondents were active energy conservators).

Similarly, the HQ investigates and comprises: (1) tourist accommodation characteristics (e.g., hotel, resort, apartment, Airbnb, etc.), star quality, etc., (2) the stated % increase or decrease in the number of hotel guests arriving in 2021, 2022 and 2023, (3) the stated length of guest stay in 2021, 2022 and 2023, (4) the stated tourist expenditure of the guests in 2021, 2022 and 2023, (5) the hoteliers' opinion on how the energy crisis affected their business, (6) the hoteliers' answer on the energy saving practices their businesses have adopted and (7) the hoteliers' use of other environmentally friendly practices.

Overall, the paper examines whether there was a significant change in tourism behavior in the year 2022 (compared with 2021) and in the year 2023 (compared with 2021 and 2022) and this whether this change can be attributed to energy price increases. Thus, the null hypothesis is: there is no change due to increased energy prices, versus the alternative hypothesis is: there is a change due to increased energy prices. Our research was based both on quantitative and qualitative data. Qualitative data were acquired through the open questions in both questionnaires, where research participants answered in a free style with their own sentences and justifications. The rest of our analysis was based on both exploratory analysis and regression estimations on magnitudes that have both statistic correlation and theoretically meaningful relationships among them.

Therefore, we will estimate various models of the equation form  $y = f(x_1, x_2, x_3, \dots)$  with multiple regression. These models will be allocated with one for the tourist sample and one for the hotelier sample. Based on the nature of the data we collected, we will use the tourists' expenditure as a dependent variable in the tourism sample and the guest arrivals as a dependent variable in the hoteliers' sample. The independent variables  $x$  values were derived as the most important parameters describing the answers to the rest of

the questions in the questionnaire and that were found to present significant correlations and theoretical underpinnings with the tourism demand parameters.

#### 4. Results and Discussion

This section consists of three sub-sections: Section 4.1 describes the tourist sample both in a qualitative manner and a quantitative one. The latter is implemented with descriptive analysis and a multiple regression analysis approach. Section 4.2 describes the hotelier sample both in a qualitative manner and a quantitative one. The latter is implemented with descriptive analysis and a multiple regression analysis approach. Section 4.3 provides the overall discussion of the results from both models.

##### 4.1. The Tourists' Sample Results

Beginning with the demographic characteristics of the tourist sample, 58% of the respondents were female and 42% were male. The sample is also adequately balanced with respect to age. The allocation of respondents to the various age group was as follows: "18–29" (43%), "30–39" (28%), "40–49" (20%) and "50–59 and older" (9%). This allocation is shown in Figure 1.

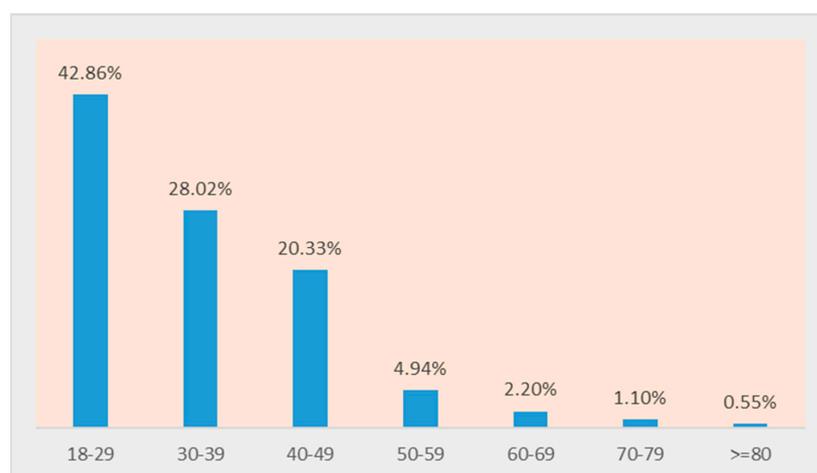


Figure 1. The distribution of respondents' ages in the tourists' questionnaire.

Two other demographic parameters that were recorded in the TQ are income and education. A percentage equal to 28% stated that they belonged to the income group from EUR 10,000–19,999, 19% stated they belonged to the income group "below 5000€", 12% stated an income in the group of "20,000–29,999€", 7.6% stated an income of "40,000€ and above" and 5.5% stated an income in the group, "30,000–39,999€". Apparently, as also depicted in Figure 2, the sample is sufficiently balanced in the income parameter.

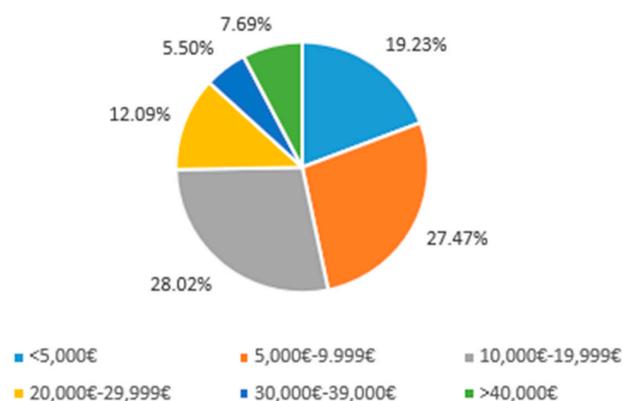
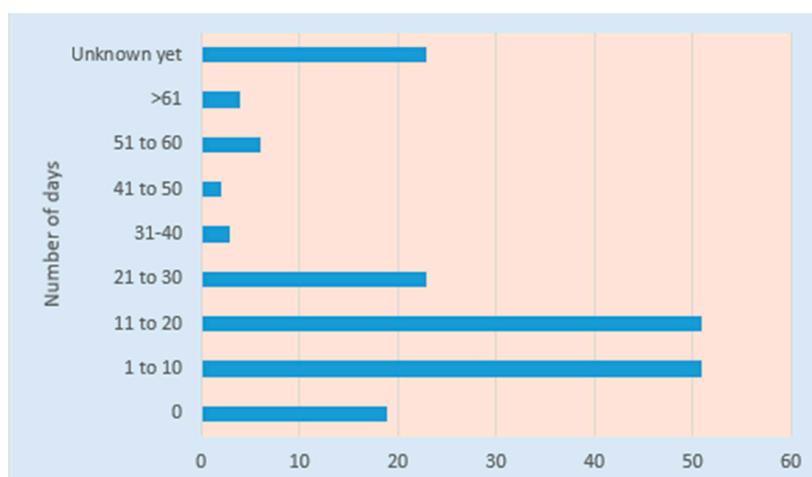


Figure 2. The distribution of respondents' incomes in the tourists' questionnaire.

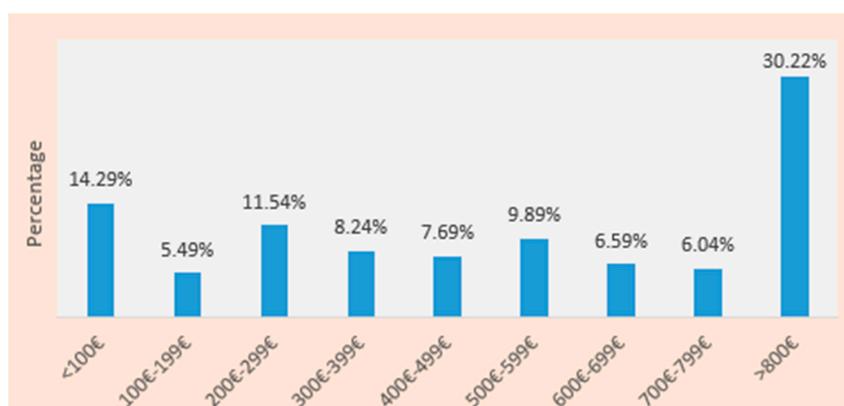
Regarding the respondents' education levels, 40% stated they had a bachelors' degree, 35% stated they had a master's degree, 15% stated they had graduated from high school, 6% stated they had received a Ph.D. and 3% indicated that they had graduated from other types of institutions, such as technical colleges.

The main part of the questionnaire gave important insights into how the tourists' consumption behavior was before the energy crisis outbreak and how it has been adapted after the crisis. The mean length of stay at the destination was calculated to be 17 days. In a more detailed presentation, 28% of respondents stated they had a stay length of 1–10 days, 28% of 11–20 days, 13% of 21–30 days, 13% answered "don't know" and 10% answered zero days. This allocation is shown in Figure 3. The answers for 2023 are not significantly different from the previous years and this is the reason we do not present them in separate figures.



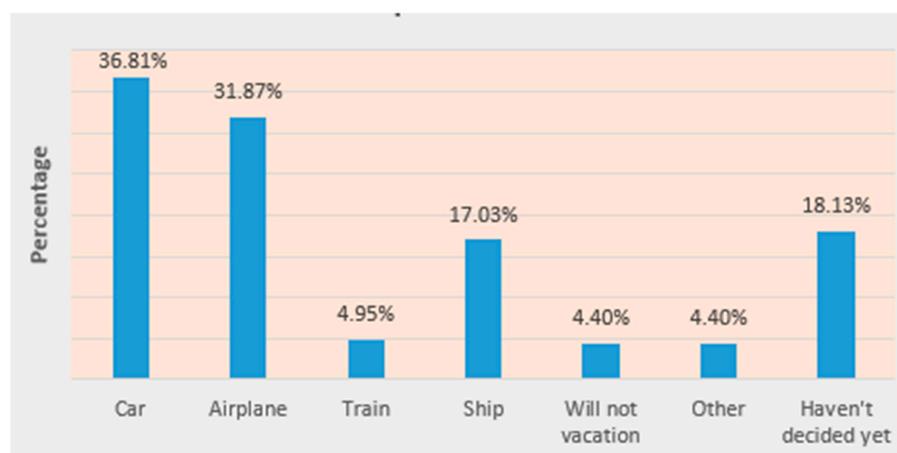
**Figure 3.** The allocation of intended length of stay among respondents in 2023.

Besides the length of stay, it is important to investigate the variables that describe the intention to spend and most importantly the size of the tourist expenditure for 2023. Thirty percent of respondents answered they would spend EUR 800, which was 31% higher than what was stated in 2021 and 4% higher than what was stated in 2022. Moreover, 14% answered they would spend less than EUR 100, 12% stated they would spend in the range EUR 200–299, 10% would spend in the range of EUR 500–599, 8% would spend EUR 300–399, 8% would spend EUR 400–499, 7% would spend EUR 600–699, 6% would spend EUR 700–799 and 5% would spend EUR 100–199. These answers did not change significantly across the three studied years (2021, 2022 and 2023). The expenditure frequency is shown in Figure 4.



**Figure 4.** The allocation of intended tourism expenditure in 2023.

As aforementioned, the respondents were asked not only about the size of their intended expenditure after the energy crisis (in comparison with the previous two years) but also about their overall holiday habits and consumption patterns and how these would change due to the energy crisis and the increased prices that it has inflicted on all economic sectors. A total of 41% of respondents answered that they expected no change at all, 15% answered they would shorten their stay at the destination, 11% answered they would change the structure and allocation of their expenses at the destination, 10% answered that they would change towards a cheaper destination, 8% would change to fewer or cheaper activities and entertainment opportunities at the destination, 5% would change the type of holiday, 4% did not know yet, 3% would change their holiday accommodation type, 2% would change the number of family members participating in holidays, 2% would change their eating-out habits and 2% would change their transportation mode at the destination into a chapter one. Another sector where tourists stated that there might be a change in their consumption pattern is in their transportation decisions to, from and at the destination. A total of 11% will use multiple types of transportation, 37% will use a car, 32% will use an airplane, 17% will use a ship, 5% will use a train, 4% will use a motorcycle or other, 4% answered they will not go on holiday at all and 18% stated that they had not decided at the time they were asked. Overall, as far as transportation choices before and after the energy crisis, we did not confirm any significant changes or differences from the past two studied years and the allocation of 2023 is shown in Figure 5.

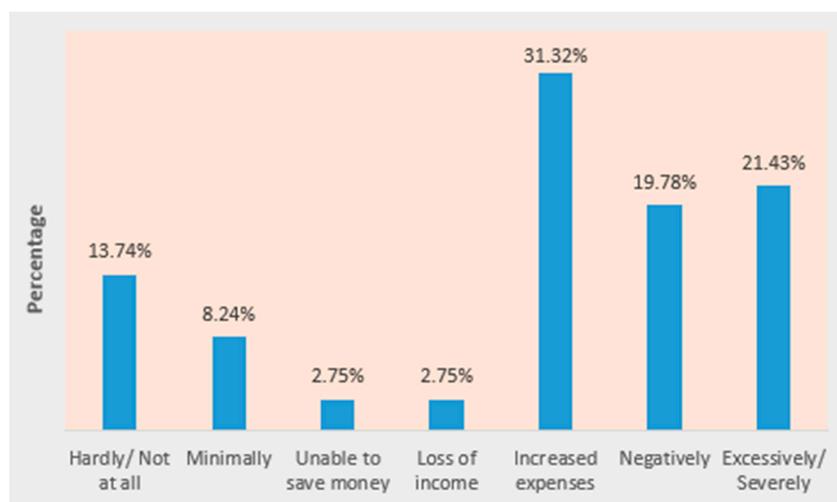


**Figure 5.** The distribution of stated preference for holiday transportation in 2023.

Other aspects of holidays that we investigated in terms of the effect that the increased energy prices might have on them were tourist eating-out habits and holiday activities. A total of 56% of respondents would select a tavern, 26% would select fast food, 26% would select take-out, 21% would select an a la carte restaurant, 12% would select a hotel restaurant and 4% would select the category “other”. The percentages of all eating out possibilities are lower for 2023 compared with previous years, whereas the category “other” has increased to about 32% (from around the 6.5% that it was in the previous two years). The increase in this category may be due to higher energy prices but it could also be due to the fact that the selection of a food place may be more flexible and more of last-minute decision, not necessarily one that a consumer takes a year earlier, particularly because of the uncertainty caused by ascending prices.

In open-ended questions with respect to the financial impact inflicted on respondents, 20% answered that they experienced no impact from the higher energy prices, whereas 80% stated they experienced various negative consequences. A total of 3% stated that they became unable to save money, 3% stated they had experienced a loss of income, 31% stated that their expenses had increased, 20% stated that they were negatively impacted and 21% identified themselves as having to cope with a severe financial impact (Figure 6).

As a result of the new economic situation after the energy crisis, respondents were asked about the consumption of items/habits they were going to forgo. A total of 64% said that they would be cutting down on clothing, shoes and accessories, 70% would cut down on furniture, appliances and decoration, 25% would cut down on personal care products, 35% would cut down on entertainment products, 41% would cut down on gym and sport memberships, 20% would cut down on vacation and trips and 1% would cut down on others.



**Figure 6.** Tourists' responses about the way higher energy prices have affected them (for 2023).

As a result of the new economic situation after the energy crisis, respondents were asked about the consumption of items/habits they were going to forgo. A total of 64% said that they would be cutting down on clothing, shoes and accessories, 70% would cut down on furniture, appliances and decoration, 25% would cut down on personal care products, 35% would cut down on entertainment products, 41% would cut down on gym and sport memberships, 20% would cut down on vacation and trips and 1% would cut down on others.

The increased energy prices were also found to affect energy saving attitudes at home. A total of 92% of respondents answered that they actively applied energy saving actions at home. A total of 35% of respondents stated they used energy saving or A+ appliances, 64% that they had installed LED lamps, 20% stated that they would refrain from using high-energy-consuming appliances, 10% would use solar panels for hot water production and 9% would use other energy saving solutions such as cooking methods with reduced energy consumption, smart plugs, motion sensors lights, etc.

#### Quantitative Analysis in the Tourists' Sample

Before starting the regression analysis, we performed a descriptive analysis and correlation. We identified high (>0.75) and significant correlations between tourism expenditure in 2022 and tourism expenditure in 2023, tourism expenditure in 2021 and tourism expenditure in 2022, the length of stay in 2022 and the length of stay in 2023 and eating out patterns in 2021 and eating out patterns in 2022. Additionally, other correlation patterns were found between income and education and income and tourism expenditure. Next, we estimated various models with multiple regression in the form  $y = f(x_1, x_2, x_3, \dots)$  but have kept only the one that gave significant and meaningful results; we have named this model as "the tourist's model" (Table 1), which is structured as follows:

**Table 1.** Results of the tourist’s model.

| Variable   | Coefficient | t-Statistic |
|--|-------------|-------------|
| Intercept  | 0.556       | 1.070       |
| Income   | 0.259       | 2.625 *     |
| Total days of summer vacation taken, 2023            | 0.207       | 4.142 *     |
| Total days of summer vacation taken, 2021            | −0.186      | −2.499 *    |
| Tourist expenditure 2021                             | 0.330       | 4.818 *     |
| Tourist expenditure 2022                             | 0.485       | 7.800 *     |
| COVID-19 affecting financial situation of respondent | −0.104      | −2.138 *    |
| Tourist accommodation type 2021                      | −0.125      | 3.266 *     |
| Tourist accommodation type 2023                      | 0.156       | −3.945 *    |
| R-Squared  | 0.746       |             |
| Adj-R-Squared  | 0.731       |             |
| N = 182  |             |             |

Note: Asterisks denote significance at 5%.

Tourist Expenditure 2023 =  $f(\text{income, length of stay 2023, length of stay 2021, tourism expenditure 2021, tourism expenditure 2022, COVID-19})$

All variables are significant with an absolute value of the t statistic higher than 2. The dependent variable entitled “tourist expenditure 2023” describes the tourist situation after the energy crisis. We expect that the tourist, due to the higher energy prices, will have lower disposable income. This translates into tourists only being able to afford cheaper destinations, cheaper accommodation and food and/or shorter stays at the destination. We observe a positive relationship between the tourist’s income and the tourist’s expenditure that will be experienced in 2023 (at the time of the questionnaire completion, 2023 was the future time).

Foremost, we observed a negative relationship between the length of stay in 2021 (the past—before the energy crisis) and the intended tourism expenditure in 2023. This shows that the participants stated that their future (after the energy crisis) will not be the same as their past (before the energy crisis). These two magnitudes appear to have a significant inverse relationship. Put differently, tourists who took holidays for more days in 2021 will tend to spend less (expenditure) for their holidays in 2023. This shows a clear change in expenditure patterns between the states “before the crisis” and “after the crisis”. This situation is not confirmed between the total number of vacation days taken in 2022 and the expenditure in 2023. This may be due to the fact that 2022 was the year of the energy crisis taking place and there was already an adaptation in the total number of holidays.

Conversely to the total number of vacation days, there are two magnitudes that are positively related to the tourist expenditure in 2023. These are the tourist expenditure in 2021 and the tourist expenditure in 2022. The coefficient for the 2021 variable is lower than for the coefficient in 2022; this unveils a stronger relationship between the present (the year 2022, which is the year when the energy crisis started) and the future (year 2023—after the crisis) than between the present and the past (year 2021, before the energy crisis). This also shows a decaying effect between the expenditure of the past and the expenditure in the future. In general, the information we received shows that the year the crisis started, (2022) will not be much different, in terms of tourist expenditure, than the future (2023).

In addition to this, the occurrence of COVID-19 is another fact that has changed the tourism industry. Although the pandemic crisis is beyond the scope of the current paper, we employed an instrumental variable named COVID-19 to describe the respondents’ attitudes towards the financial detriment COVID-19 brought to their tourism status. We found an inverse relationship between the financial detriment from COVID-19 and the tourist expenditure in 2023. This is well understood because the pandemic itself had already caused a different situation in all economic sectors, not least tourism, and this situation is newly augmented by the energy crisis. Our research results further quantify this accumulation of detriment and find that a 1% financial detriment caused by the pandemic reduces the tourist expenditure of 2023 by 0.1%. This might be a result of a cumulative

financial burden from which tourists have not yet recovered (at least in the period that this survey was carried out).

Regarding accommodation type in the year before the energy crisis and in the year of the energy crisis, this variable has a qualitative meaning that relates to the choice of the prevalent accommodation type during each year with future tourist expenditure. This relationship is inverse for 2021 and of the same sign for 2022. Given that the prevalent accommodation type was a hotel in 2021, this means that for tourists who stayed in a hotel in 2021, their expenditure in 2023 will be reduced. Contrary to the accommodation type in 2022, the selection of the prevalent accommodation type does not entail a reduction in the tourist expenditure but an increase.

#### 4.2. The Hoteliers' Sample Results

This sub-section follows a similar structure for the analysis of hotelier sample as Section 4.1 does for tourists. First of all, a descriptive analysis of the results is offered, followed by a regression analysis.

We begin the presentation of the hotelier sample with a selection of the most important demographic results. These results can explain the answers to other questions in the questionnaire. One result is about the education of hoteliers/managers: 46.15% of them had a degree in tourism/hospitality, 15% a degree in law, 15% in marketing and 24% of them had a degree in accounting or geotechnology. The education of hoteliers/managers is sometimes a signal for the problems the sector encounters. For example, [Menegaki \(2022\)](#) compared hoteliers' and museum curators' educational backgrounds and found a correlation in the hoteliers' lower educational background and their poorer understanding and appreciation of new technologies in hotels.

In terms of the characteristics of the tourist accommodation: 38% are three-star hotels, 30% are four-star hotels, 15% are five-star hotels and 8% are two-star hotels. Regarding the main part of the research, which encompasses the answers of hoteliers to questions about the effects of increased energy prices on tourism demand, the following was found. An increase in tourism arrivals was noted for both years, 2022 and 2023, at 10% and 15%, respectively. An increase in tourism night stays in 2023 was stated to be ranging from 1–10% (by 54% of the hoteliers) or 11–50% (by 31% of the hoteliers). As far as the open question posed to hoteliers about the guest's habit changes they expect in 2023, these answers were quite heterogeneous. A total of 54% of hoteliers expect higher demand for hotel goods and services. A total of 39% of hoteliers expect higher demand for excursions and transportation that will enable guests to go outside the hotel (apparently this is a result of COVID-19 lockdown restrictions). A total of 7.69% expect no changes, 15.38% expect an extension of the stay period, 7.69% expect that guests/tourists will tend to eat out more and 23.08% expect that guests/tourists will ask for everything to be perfect due to the higher prices being paid. This implies that hoteliers expect that guests will not understand that the increased cost is due to the price increase of an essential input to which little can be done on the part of hoteliers.

As far as the length of stay is concerned, this has a negative coefficient for the year 2022 and a positive for the year 2023. The inverse relationship between guest arrivals and the length of stay in 2022 shows that an increase in the length of stay in 2022 would mean a reduction in guest arrivals in 2023. This is meaningful because the year 2022 is the year that the energy crisis started. Thus, if tourists stayed longer in the destination, that would cost them a higher percentage of their income and the following year they might decide to offset this loss by reducing their travelling. On the other hand, the length of stay in 2023 does not appear to affect the guest arrivals in 2023.

The quality of stay is denoted by three variables in this model. One is the manager/hotelier specialization, the second is the number of hotel stars and the third is the environmentally friendly quality of the hotel. Guest arrivals in 2023 are higher when the manager/hotelier has a degree related to tourism studies and/or when the certified quality (through the star system) of the hotel is higher. This is understandable since it is more likely

for a hotel to have a higher quality when the hotelier/manager has undertaken studies in tourism and hospitality and knows the needs of the tourism sector and how these can be best addressed. Moreover, the allocation of stars takes place through an independent certification organization and therefore the quality that those stars represent is beyond doubt. Contrary to previous findings, we observe that the environmentally friendly quality offered by the hotel is negatively related to guest arrivals in 2023. This finding requires further investigation but it could be attributed to the fact that the environmentally friendly practices stated by the participating hotels suffer from both poor quality and quantity. The coefficients of the variables guest expenditure 2022 and guest expenditure 2023 both have a negative sign, showing a negative relationship between each one of them and guest arrivals. Therefore, if guest expenditure in each of the two years increases, the guest arrivals in 2023 will fall. This makes sense because guest expenditure erodes the disposable income and thus tourists have less income to spend on new arrivals.

The rest of the answers in the HQ are as follows: On average, hoteliers state that tourism expenditure increased by 5% between 2021 and 2022 and they expect a further increase at 11% between 2022 and 2023. More than 50% of hoteliers admit that energy price increases will have a detrimental effect on their business. A total of 92% of hoteliers had noticed those increases already, and 15% of them spoke about service time restrictions that will be due to high energy costs that cannot be absorbed by the business in any other way but through cutting down personnel. Furthermore, the number of hotels that do not apply energy saving practices appears to have been reduced to 15% from the 25% in 2021. This improvement can be attributed to the increased energy prices that have caused a lot of concern to hoteliers and caused them to install awnings, solar panels, LED lights, etc.

Before going onto the results of the regression analysis, we performed data exploration with correlation analysis and found high (>0.75) and significant correlations in the hotelier sample between the educational attainment of managers and tourist arrivals, the quality of stars and eco-friendly practices and the number of guests and the length of stay. Next, we have set up the so-called hoteliers' model, which is structured as follows:  $\text{guest arrivals 2023} = f(\text{length of stay 2022, length of stay 2023, tourism expenditure 2022, manager's education, hotel quality in stars, environmentally friendly quality, specialization of studies for managers, guest expenditure 2022, guest expenditure 2023})$ .

Each of the 13 participating hotels in the sample completed the questionnaire for three consecutive years, generating 36 observations. The independent variable in the hotelier sample was the number of guests arriving at the hotel (guest arrival). For the demand of a hotel's services to be high, there must be various applicable microeconomic and macroeconomic parameters. Room prices and other hotel service prices must correspond to the quality and amenities that the hotel offers and consumer's income, various market trends, etc. Given the information we had available from our HQ and our pursuit to unveil the effects of structural changes through the inflated energy prices after the energy crisis outbreak in 2022, we investigated guest arrivals as a function of the length of guest stay in 2021, the length of guest stay in 2022, the manager's education, the hotel quality, the environmentally friendly practices of the hotel, the guest's expenditure in 2022 and the guest's expenditure in 2023. All variables were significant, with the absolute t statistic higher than 2, and the model has a high R-squared. The results from the hotelier sample are shown in Table 2.

#### 4.3. Discussion

The main goal in the current piece of research was to find out whether and in what ways the energy crisis has impacted the tourism industry, with a particular emphasis on tourists' visits and spending habits and hoteliers' judgements and estimations. After observing the answers to the direct questions that were asked in both groups in the survey questionnaires, it became clear that both parties (tourists and hoteliers) had been impacted to some degree by the higher energy prices after the energy crisis.

**Table 2.** Results of the hotelier's model.

| Variable                            | Coefficient | t-Statistic |
|-------------------------------------|-------------|-------------|
| Intercept                           | 0.675       | 4.562 *     |
| Length of guest stay in 2022        | −0.076      | −2.639 *    |
| Length of guest stay in 2023        | 0.540       | 10.416 *    |
| Hotelier's/manager's specialization | 0.259       | 11.145 *    |
| Hotel quality in stars              | 0.323       | 14.519 *    |
| Environmentally friendly quality    | −0.236      | −3.083 *    |
| Guest's expenditure in 2022         | −0.079      | −3.698 *    |
| Guest's expenditure in 2023         | −0.179      | −4.548 *    |
| R-Squared                           | 0.99        |             |
| Adj-R-Squared                       | 0.98        |             |
| N = 36                              |             |             |

Note: Asterisks denote significance at 5%.

Particularly, more than 90% of hoteliers/hotel managers reported negative effects on their businesses, whereas 80% of the consumer participants (tourists) reported a variety of repercussions on their financial situation. Additionally, it is anticipated and already observed that, with regard to the hospitality industry, the average guest expenditure per stay in 2023 was stated to be higher than what it was in 2022, the year the energy crisis began. This expenditure increase can be attributed to either a shortening in the number of vacation days or to the general inflation and inflationary pressures on commodity prices that have inevitably affected the tourism sector.

For the tourists themselves, however, it appears there is little change in their expenditure between the studied periods. Additionally, the inflationary pressures were a result of the both COVID-19 pandemic, which brought economies to a production halt and caused shortages in many inputs and final products, and the Russian–Ukrainian war, which worsened the situation and sharpened the subsequent energy crisis.

Another point worth mentioning in the hospitality sector is the fact that, given how heavily the Greek tourism industry depends on inbound tourism, variations in the elasticity of consumption, preferences and patterns of consumption can have an impact on the fundamental characteristics of travel. These are the duration of the vacation, the expenditure amount, the synthesis of the tourism consumption basket, etc. When these characteristics reflect on the profitability of the tourism industry, these factors are quite important.

At the time the surveys were conducted, namely in the year 2022, the future period was assumed to be the year 2023. Thus, for the upcoming tourism season of 2023, hotel managers anticipated (based on the survey results) an increase in the number of guests (a 50% growth on average compared with the 2022 season), an increase in the number of days spent by guests in 2023 (growth equal to 225% compared with year 2022) and an increase in the amount of money spent by guests in 2023 (growth equal to 120%). These projections are encouraging for the recovery of Greek tourism from shocks and future growth.

Based on our survey results, a percentage equal to 90% of the survey participants anticipate taking a vacation in 2023. In addition to this, 13% of the participants who stated that they would take a vacation did not know how many days they would be staying at the destination. The expenditure of visitors in 2023 remained at the same levels as the previous years, providing evidence that the holiday budget (for the majority of participants) was not declining but stayed the same, even though 80% of the respondents stated they had experienced a variety of financial impacts because of the energy crisis and general inflationary environment. This is one of the most important indicators suggesting the resilience (if not growth) of the tourism sector. Additionally, 80% of the participants answered that they would not miss out on their vacation due to this inflationary environment.

Besides the aforementioned findings, which reveal the resilience of the tourism sector, 92% of the respondents also indicated that they utilize some sort of energy-saving strategy or practice at home in order to lower their expenses and/or for other environmental protection reasons. Thus, this reveals that participants, in terms of energy use, behave

efficiently at home, and they appear to rationalize their consumption and expenditure at home, whereas also not changing their tourism travel pattern, frequency and habits.

Furthermore, it is worthwhile mentioning the common elements that the two questionnaires investigated and making some comparisons. For instance, the number of days of vacation is one of the common questions posed to both the tourists and the hoteliers. The tourists were asked to make an estimation for themselves and the hoteliers were asked to make an estimation about the intentions of their customers. The change between the three studied years, 2021, 2022 and 2023, was less sharp in the tourist sample. The deviation in the estimation of the hotelier sample may be attributed to the higher content of local customers. Almost 80% of participants in the tourist sample were national tourists, so the trends for international tourists are underrepresented and hence cannot be reflected in this piece of research. Another group of questions comprise the eating-out habits of tourists, the excursions they take in nearby places and the total effect of COVID-19 on their travel behavior. Both questionnaire results showed an increase in eating out and excursions, so the inflationary pressures of the energy price increase do not appear to be a reason for contraction. With respect to the COVID-19 questions, both groups of respondents stated that they expected a further relaxation of protective measures that would increase their travel behavior.

Finally, “tourism expenditure” is the subject of the third common bundle of questions in the two questionnaires. The average increase in guest spending per stay was anticipated to increase by about 120% in 2022 and 2023 as stated by hoteliers/managers. However, the participants in the tourists’ questionnaire generated a much more conservative answer of 4% about the tourism expenditure increase.

## 5. Conclusions

The current study focuses on the effects that energy price increases may have on the tourism sector. The focus on this sector is because it is an important sector for many economies around the globe and maybe the single most important sector for island economies. In particular, because tourism is considered to be a luxury good (Menegaki et al. 2020), usually purchased only after the basic human needs such as nourishment, accommodation, education and health have been satisfied, it is worth examining it separately and it is worth implementing this study.

However, increasing oil and fuel prices can have a substantial impact on the cost of living, not just for luxury items and services, such as cruise ship excursions and international travel, but also for essentials such as fast day trips to nearby or state parks (Oh and Hammitt 2011). We did not employ the much more detailed and technically demanding input–output analysis but opted for stated preference methods and, in particular, to employ two separate questionnaires (one for consumers and one for producers) in order to receive a more informed picture of the tourist economy. The increase in energy prices and the subsequent expansion of this to the whole economy has been aggravated by the Russian–Ukrainian war because energy is an essential input for economic production of all types; however, at the same time, we cannot ignore the starting point of the economy that was already perturbed by the COVID-19 crisis.

Lockdowns had already distorted consumption patterns and affected all businesses because of the shortage of various inputs that was created during the COVID-19 pandemic and the major changes that were caused in the labor markets. Based on the results from the two surveys on which the current paper is based, no significant decline will occur in the number of consumers who express interest in and/or actively plan their vacation in the present or future. The same resilience applies for the variable of tourist expenditure. Previous research concentrated primarily on hotels when examining the hospitality industry and neglected to consider other tourism accommodation options, which our study encompasses and hence gives a clearer picture of the question it attempts to answer.

Overall, the findings from this study show that major risks such as decreased sector revenue, fewer visitors and decreased consumption of tourism products (whether or not

caused by energy prices) are not generally anticipated in the samples we have used. As opposed to 2020 and 2021 (the former can be regarded as a summer season under COVID-19, whereas the latter can be regarded as a period inflicted with both shocks), as well as 2022 (the summer season where the primary outbreak of the energy crisis took place), all the aforementioned magnitudes on which we inquired through the questionnaires are expected to rise.

According to the analysis we implemented, the energy crisis had an impact on both the consumers and the businesses; however, the tourism industry recovered most significantly from COVID-19 and secondarily from the financial effects of the inflationary energy crisis, demonstrating resilience. Furthermore, it is also important to note that sustainable energy is a crucial element that governments should start to prioritize, both at the household level and the business level. All stakeholders will benefit from an enriched portfolio of green energy supply and those are governments, businesses and households.

It is prudent and pertinent for managers of tourist destinations to consider their current oil needs for tourism and plan for a future where oil is unavailable, prohibitively expensive or unbearable owing to climate change constraints. In light of potential future oil supply reductions, one essential part of this is minimizing the usage of fossil fuels when traveling to and inside the destination. Numerous tactics can be used at the destination level to help achieve this goal, including encouraging the use of renewable energy sources, reducing the demand for energy inputs (e.g., passive building), improving the transportation and lodging sectors' energy efficiency and more (Becken 2008).

#### *Limitations and Future Research*

It can be considered as a hard task, which if successfully completed is a significant achievement, to receive questionnaires completed from busy hoteliers and managers. However, as a point of further research, it would be interesting to focus on tourist accommodation with a more balanced clientele origin and be able to compare tourists of different nationalities who could answer our questionnaire with these terms and conditions. On the other hand, given that Greece is one of the countries that has suffered the financial consequences of a huge public debt, it has been under strict financial controls for a long time. On top of that, the COVID-19 pandemic and energy price increases have made the lives of all economic agents more difficult. However, it is surprising to witness statements from the surveys that do not predict reductions in tourist expenditure or tourist stays. Furthermore, a larger sample and more years of observation would have enabled us to work in a panel data framework. Naturally, it would also be very interesting to manage the separation of the shock effect between the COVID-19 and the war between Russia and the Ukraine. As it is, we treat the whole effect as energy shock, but the inflationary pressures has started due to the COVID-19 pandemic.

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