

The Extreme Price Variation of Food Commodities between Markets in Lebanon

MSBA325 Data Visualization and Communication

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Abstract

The present study experimentally investigates the difference in prices of the same basic food items between multiple supermarkets (within and between different regions), due to the Lebanese pound devaluation against the US dollar because of failed governmental policies throughout the years. Followed by multiple turbulent events (Lebanese revolution, Beirut Port Explosion, and the COVID-19 Pandemic). In this paper we will study whether the effect differs from one region to another, and whether there's a feasible solution that moderates any of these effects. Supermarkets are arbitrarily chosen to compare prices between them, and interviews are conducted with random citizens. The results show an irregular and inconsistent presentation of prices that are sensitive towards the exchange rate of the Lebanese pound especially when it is a devaluation. The proposed solution is based on developing a website and an application that not only shows the prices of the Basic Food Basket in well-known supermarkets (GDO - Great Organized Distribution), but also the prices set by the ministry of economy MOE. This proposition is heavily backed by the general director of the ministry Dr. Mohammad Abou Haidar, who will support the development of the website, and the primary field studies. An obstacle appears to exist as the exchange rate in the black market changes instantly while the prices of the ministry are updated on a monthly basis. In the next stage of this project, we will be focusing on solving this problem together with other technical difficulties.

Introduction

For the past 26 months, Lebanon has been struggling with an economic tragedy which is one of the worst globally since the mid-19th century according to the World Bank. The crisis rapidly grew ever since the Lebanese protests in October 2019 which were asking for a governmental change. The situation was exacerbated by the economic effects of the COVID-19 pandemic and by the massive port explosion on August 4, 2020. Lebanon's severe crisis which was blamed on the government's corruption and failure has led to massive impacts on the Lebanese currency causing extreme poverty, unemployment, medicine shortage, electricity shortage, fuel shortage, malnutrition and much more.

The tremendously indebted government failed to meet its debt payments causing a currency devaluation which lost more than 95% of its black market value according to the World Bank. The Lebanese pound whose dollar exchange rate in the black market had been pegged at 1,507 since 1997 reached 40,000 as of October 2022 marking almost a 2500% increase (**Exhibit 1**).

This catastrophic increase in the LBP rate came with countless economic impacts. The inflation rate reached an all-time high of 240% by January 2022. Food price inflation reached around 400% by June 2022 and the Consumer Price Food Index reached an all-time high of almost 1850 points in October 2022 based on the Lebanese government's Central Administration of Statistics. **Exhibit 2** shows the change of Food Price Inflation, Consumer Price Food Index and Dollar-Rate change over time until June 2022.

The Lebanese government subsidized vital imports such as fuel, wheat and medicine until the central bank ran out of money in March 2021 as stated by the Human Rights Watch in 2021. That is when residents started experiencing severe shortages. Fuel shortages caused electricity blackouts affecting the operations of hospitals, schools and bakeries and residents had to wait for hours in queues to grab their necessities of fuel and bread.

The economic crisis has had overwhelming consequences on the healthcare sector. According to the 2022 World Report of Human Rights Watch, shortages in medicine and medical equipment, drop in the wages of medical staff, and fuel and electricity shortages have caused not only permanent closures of hospitals, but also the deaths of several patients. For instance, the shortages in cancer medications threatened the lives of cancer patients who desperately searched for medicine. They resorted to the black market or importing from abroad via relatives or friends at costly prices in order for survival.

This unprecedented catastrophe and severe devaluation in the Lebanese currency pushed the Lebanese nation more into poverty. It has left the Lebanese people with unlivable wages. The official minimum wage in Lebanon decreased from \$450 to what is now worth \$35 per month (UNICEF, 2022). As a result, "a family's budget for food only is around five times the minimum wage", claims the Crisis Observatory of the American University of Beirut. Based on the UN estimations, around 78% of the population are living in poverty conditions and around 36% are living in *extreme* poverty conditions by March 2021 when the LBP dollar

exchange rate was only 10,000. These percentages are expected to be much higher today as the LBP rate has quadrupled since then.

The huge inflation was directly reflected on the prices of basic food commodities in Lebanon ever since the start of the economic crisis in 2019. What is meant by basic food commodities is the minimum raw agricultural or animal products sufficient to satisfy the nutrition needs of an average household which comprise of:

- Cereals and Tubers (rice, wheat, corn, starch)
- Meat, Fish, Eggs and Seafood
- Dairy (milk, cheese, Labne)
- Oil and Fats
- Vegetables and Fruits
- Sugar and Salt

The slope of increase before 2021, however, was quite subtle due to the fact that food commodities were subsidized by the government back then. **Exhibit 3** shows the changes in prices of basic food commodities in the year 2020. As the Central Bank started to run out of resources to keep the subsidies, the government lifted them in March 2021. That is when the increase in prices of basic food commodities started to follow a much steeper slope as seen in **Exhibit 4 (2021) and Exhibit 5 (2022)**.

Due to the inadequate policy responses by the Lebanese government and due to the fact that Lebanon follows a free market economy, the problem of increased food prices started to worsen as not only are prices increasing, but now they are further inconsistent between markets in the different Lebanese regions. This adds an additional overwhelming problem to the many hardships Lebanese people are facing today.

This report will look at the impacts of the overlapping economic crisis that Lebanon has been enduring on the variation of prices of basic food items in different Lebanese regions and markets. Specifically, the study aims to (1) explore the difference in prices of basic food items in different Lebanese regions using data issued from the World Bank and World Food Programme Price Database, (2) propose an idea of a solution to the Ministry of Economy that will assist the Lebanese residents while buying basic food commodities in Lebanese markets, (3) test the effectiveness of the solution by analyzing the responses of Lebanese consumers and the General Director of the Lebanese Ministry of Economy to the proposition. Findings from the present study also provide evidence-based recommendations to enhance the proposed solution.

Problem Evidence

Lebanon has a free-market economy and follows a free-market pricing for most goods and services. While the government does not generally intervene in pricing of most food commodities, it does however issue policies and reports that are responsible for controlling and monitoring price fluctuations, analyzing markets and providing statistical reviews. In fact, the Ministry of Economy encompasses a department called “Center of Pricing Policies” that works directly on pricing policies based on the official site of the Ministry of Economy. The Technical Center for Pricing Policies is responsible for providing:

- A weekly report that shows price indicators for the basic food basket (vegetables, fruits, meat products, dairy products, eggs, cereals and tubers, oils and fats, canned products, miscellaneous products) to be used by markets and consumers as a reference
- A monthly report that displays a list of the cheapest foodstuff and consumer non-durable goods in specific supermarkets to be used by consumers as a reference
- A monthly report that shows the ten cheapest supermarkets in Beirut and Mount Lebanon, taking into consideration common goods, to be used by consumers as a reference
- A weekly report that shows the price index for vegetables and fruits called “Fattoush Index” which is issued only during the month of Ramadan.

According to the World Bank, food price fluctuations between Lebanese markets are caused by the Lebanese government’s “deliberately inadequate policy responses”. The Center of Pricing Policies had been functioning normally over the years, providing weekly and monthly reports and making routinely inspections around supermarkets, bakeries and fuel stations. This was all before the economic crisis which induced unbearable effects on the public sector employees whose wages have become unlivable. The collapse in the values of salaries has driven many skilled civil servants out of the public sector as the Director General of the Lebanese Ministry of Economy and Trade, Dr. Mohamad Abou Haidar has stated during our interview with him. In addition, the remaining employees started showing negligence, passiveness and procrastination in their work duties. As a result, most of the Center’s responsibilities failed as of 2020. The only task that remained active until today is the weekly food basket report.

In order to better understand the variation in prices between different markets and regions, we decided to explore two datasets that show prices of food products in different regions.

- The first dataset is issued from the World Bank and shows the change of prices (in LBP) of different food commodities and different categories (cereals and tubers, meats and poultry, dairy products, miscellaneous food, oil and fats, pulses and nuts, vegetables and fruits) in different Lebanese regions over time (between 2012 and 2022). Prices are specific for products between 2012 and 2021 and are aggregated over the different products for the year 2022.

- The second dataset is issued from World Food Programme Price Database and shows the change of prices (in LBP) of specific food products in different Lebanese regions over time (between 2012 and 2022).

Before exploring the two datasets, we visited two supermarkets in Beirut in order to observe the differences in food prices. The variation in prices of the same food products was absolutely surprising. **Exhibit 6** shows the receipts of the two supermarkets.

The following YouTube link shows video of the observations we did in the two markets:

<https://youtu.be/cePlpmaMpYg>

Our data explorations go hand in hand with our observed hypothesis which reveals that “there exist extreme and unexplained variations in food prices around markets in different Lebanese regions”.

The variation in prices of different food commodities has been an existing situation for many years now in Lebanon. This situation has exacerbated ever since the beginning of the economic crisis in 2019 as the price control responses have become inadequate. **Exhibits 7 and 8** respectively show a comparison of specific food products between the different Lebanese districts in two consecutive years (2021, 2022).

We can notice that the variation in prices is highest in the last year (2022). The products that show the highest price variation between the different districts are beans, cheese, chickpeas, milk, oil, pasta, rice, sugar and wheat flour, most of which are basic food commodities.

Below we present the percentage difference of some food products between different Lebanese districts in 2022 (until October).

- The average price of a one kilogram bag of wheat flour in Mount Lebanon was 28,000 LBP whereas in Baalbak-El Hermel 10,000 LBP, recording a 95% difference.
- The average price of a 160 gram Akkawi cheese in the South was 60,000 LBP whereas in Akkar 40,000 LBP, recording a 40% difference for cheese.
- The average price of a can of powdered milk (2.5 kg) in Mount Lebanon was 325,000 LBP whereas in Akkar 210,000 LBP, recording a 40% difference for milk.
- The average price of a 3.6 Liter gallon of olive oil in the South was 500,000 LBP whereas in El Nabatieh 430,000 LBP, recording a 15% difference for oil.

And the list of unexplained price variations between districts just keeps growing and growing.

Finally, in order to further prove our hypothesis, we conducted interviews with random Lebanese residents walking on Beirut's seaside. When asked whether they were noticing price variations between supermarkets, most interviewees agreed that there exist obvious price variations of basic food commodities between different supermarkets. They added that this variation is not related to the location of the markets, for in many cases they have noticed

that even markets lying walking steps away from one another vary in food prices. This means that the price variations cannot be explained by the products' cost of transportation. It is only explained by the fact that there exists no governmental supervision.

Proposed Solution

After analyzing the huge difference in prices between different supermarkets and shops, we had to think of a feasible solution which can help both the consumers when buying their daily food products, and also the Ministry of Economy in its supervision over markets.

Knowing that we, as consumers, in the Lebanese market have no influence on the prices at all, we cannot tell whether the prices displayed in a specific supermarket are overpriced relative to others and relative to the official prices published on the Ministry's website.

Therefore, Lebanese consumers need to have access to an official report issued by the Ministry of Economy which displays the true prices of food commodities and is easily accessible and updated regularly. As a solution, we propose a website, which can later be developed into a mobile application, which shows customers the prices of the basic food products of various brands based on the Ministry's weekly reports across different supermarkets. This way, Lebanese consumers will be able to check the prices of products before they go shopping, and thus can tell which supermarkets are following the official prices specified by the ministry and which supermarkets are overpriced.

If a consumer finds that the price of a certain item is higher than that displayed on the website, they have the option to report this item in this specific supermarket directly using the hotline (and later on in the app), which would inform both consumers and the Ministry of real time prices in the market. This also aids in the Ministry's supervision over markets.

How did we design our website? Using WordPress software, we created our prototype website. We chose a WordPress CMS to work on the website since it does not require coding and can be easily edited (prices can be changed easily). We downloaded the xampp server to connect the database to it. Then WordPress was installed and pasted in the xampp folder, then in the htdocs. We started creating the home page and made it as a FrontPage for the website. In addition, we installed some plugins to help in designing the pages like Elementor and Envato Elements. We then installed a social media plugin to insert the social media icon to the site. Furthermore, we installed a plugin called "all in one WP migration" to export and import the data in case we want to launch it online instead of locally.

The website now shows the official prices of basic food products in the Lebanese market which are regularly updated by the Ministry of Economy whenever a significant change in the LBP exchange rate occurs. It also displays the prices of these same products in different Lebanese supermarkets. It is important to note that this is not the final website but only a proposed idea since it only shows prices of products in two supermarkets (A and B).

We are working on involving Lebanese consumers in our website where they can report the price of any product in a specific shop or supermarket and present it on the website so that

other consumers can see the prices of the same product in different shops. Hence, they will be able to choose the cheapest place to buy from. We also hope to develop the website idea into a mobile application, which is a proposition heavily backed by the Ministry of Economy. How did we come up with this solution? In Lebanon, there are laws that protect consumers from monopoly and from overpricing. However, as with many other laws, the government is unable to strongly implement these laws and monitor the prices of the supermarkets especially in the areas that are far from Beirut. For that, and similar to what the Ministry of Public Health is currently doing, we decided to launch a website and a mobile application which are easily accessible by all the Lebanese consumers and which are administered by the Ministry of Economy in order to display the true prices of all food commodities in Lebanon. Therefore, Lebanese customers will be able to know the price of any product before heading to the market. This will help them plan what they will buy according to their budget and save them from the trading schemes.

As stated earlier, the Ministry of Economy has a limited number of employees. Thus they will not be able to monitor the prices in all the Lebanese shops. A better way for monitoring prices in different supermarkets would be to include consumers in the process by giving them the chance to report prices directly on our website. This means that consumers will act as data collectors and supervisors at the same time, and thus can contribute to the success of this project. Now, the ministry will be able to track the overpriced supermarkets and take the necessary measures.

The following YouTube link shows a screen recorded video of our website which is only the first version of our proposed idea.

<https://youtu.be/HLqXguQN20c>

Solution Validation

The application concept we came up with to tackle the problem needed to be validated in order to be put into action. Without predicting the potential and capability of our future solution idea in terms of how much it will be able to solve the problem, it would be purposeless. We needed means to check if our ideology could in fact lead to a change in the real world or it is only a theory on a piece of paper. Therefore, we decided to take the opinions of two parties which consisted of first, the potential future users of our application, which are the Lebanese citizens in general, by understanding if they are actually willing to use it and taking information of whether it could lead to a change in their lives and to the country in general. Second, we wanted to assess the practicality and the feasibility of the concept by a professional in the field. Therefore, we interviewed the General Director of the Lebanese Ministry of Economy and Trade, Dr. Mohamad Abou Haidar.

The following YouTube links show the interviews we conducted with the two parties:

<https://www.youtube.com/watch?v=F1VKu28Rxe4>

<https://youtu.be/gJs6J9Usnto>

In the streets of Beirut, we went down asking random people about the issue. Males and females, young and old, married and single, we wanted to see if this problem is being faced by the people in general without taking into account a specific constant or a condition. Our questions were basic and straightforward. We first asked people about how much they spend, on a monthly average, on the basic food commodities such as rice, flour, oil, milk, bread, sugar, salt and many more. All of the answers were above 1,000,000 LBP which is way higher than the average that was prior to 2019.

We then asked the people if they are finding a variation in the prices of basic food commodities between different markets whether it is a mini market, supermarket or a mall. They also answered, with complete despair on their faces, that they find extreme price variations between different markets, sometimes for the same item and the same brand. We then proposed our solution and asked if they are willing to use it once it becomes available, and if it could lead to a change. Their responses were very affirmative and supportive with the idea. The majority stated that they are willing to use the application. Based on their claims, they believed that the concept could have several advantages. First, it will allow them to spend less on food commodities based on the right pricing of each item. Second, it will unify the prices among supermarkets and stores as a result of competition. So, consumers will not feel the need to go longer driving hours to reach certain supermarkets. Instead, they could visit any, because the price of supermarket A would almost be equal to that of B and to that of C and so on. Third, they will be able to track down and calculate their expenses in a better and more efficient way, instead of getting surprised by unexpected prices. Moreover, consumers will be knowledgeable of the accurate pricings of each supermarket and if a certain market appears to have abnormal increase in the pricing, consumers can report that to the ministry which is legally authorized to deal with the issue.

All in all, people supported the idea and many claimed that they would be using the application without any doubt and believed that it would make a positive change in the pricing system in Lebanon.

On 25 November 2022, our team visited the director general of the Lebanese Ministry of Economy and Trade, Dr. Mohamad Abou Haidar. We interviewed Dr. Abou Haidar about how practical it is to do such an application and how much it could lead to change and the interview was recorded. We asked about his opinion regarding the extreme variations in the prices in the Lebanese market and if there are any inspectors from the ministry in the Lebanese market. He claimed that there are inspectors and supervisors that undergo frequent field visits in the Lebanese market, usually on a daily basis. However, the inspectors' number is low, according to Dr. Abou Haidar, being almost 50-60. He also stated that the ministry alone cannot do all the work in this crisis as it requires extra hands in terms of laws and logistics from other concerned parties in the government.

We also raised the concern about the lack of precise and inaccurate pricings among the citizens between different Lebanese markets and that there is a lack of unity in the prices. He stated that this is the most common problem. He added that there are many people that are taking advantage of the situation (dollarization) and this needs to be dealt with legally and this is the responsibility of the ministry of law.

We finally proposed the application concept and asked about its feasibility and its practicality. We also asked if the ministry is willing to support it. Dr. Abou Haidar claimed that this application would lead to a significant change in several aspects. First, this application will help fight corruption in terms of pricings because it will be directly synced to the ministry, so any abnormal pricings will be directly reported to the ministry and the issue will be transferred to the responsible authorities that are able to take any legal action. The ministry also is trying to work on implementing online services that protect consumers' rights along with the UNDP and other organizations. So, this application will be aligned with the goal of the ministry, since it is online-based. In addition to that, it will also play a huge role in controlling the pricings in the market since it substitutes the need for the huge number of employees and the human resources needed that, no matter how many, cannot roam around the entire supermarkets and stores in all the Lebanese regions. He also said that the complaints of the people will reach the ministry in a more efficient way, because they are via the application and therefore, the ministry can know about the concerns and the issues in a faster way.

Finally, Dr. Mohamad summarized the idea by being a "win-win situation" for both the ministry and the consumers. This is because it will fulfil the needs of the consumers by knowing the exact pricings of the items in any supermarket with a press of a button, will ensure that the rights of the consumers are protected, and will lead to the right selection of the place to be visited. It will also help the ministry in terms of protecting consumers' rights, censorship and supervision.

Conclusion

In summary, the study we conducted aimed to explore the difference in prices of basic food items in different Lebanese regions. The final results show that not only are Lebanese consumers going through hard times because of the inflation, but also that there exist unjustified price variations of food products between different stores.

Therefore, after validating the problem through real and tangible evidence by studying the effects of the economic crisis on the people in general and by exploring the data, we came up with a proposed solution concept for the Ministry of Economy. The proposed solution is a user-friendly website and an application that will assist the Lebanese residents while buying basic food commodities in Lebanese markets. The website shows the prices (issued by the ministry of commerce) of the most important commodities such as rice, flour, sugar and compares them to the prices of different markets all over the country.

Finally, testing the effectiveness and the potential of the solution concept was inevitable. This process started by collecting feedback from Lebanese consumers through interviews. The majority dared to speak up and described their pain by the extreme variation of the prices they are facing and the consequences that follow. Our solution was described as the pain-killer. The people's concerns reflected the severity of the problem we are tackling and what we effectively put up as an attempt to solve it.

The concept website was presented to the General Director of the Lebanese Ministry of Economy and again, the solution was validated and approved by the ministry by providing us the full support in order to create this website as soon as possible in order to help the people followed by the country in general.

Ending with a future perspective, we believe that this problem is crucial to be solved in the very near future because of the damage it is causing in several aspects ranging from economic, financial to social. We, the people and the ministry have bets that our application concept could be a positive game changer in this issue. Solving this problem marks one of the battles against corruption, and is an attempt to make this country perfect, again.

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Appendix

Exhibit 1: The following line graph shows the change of the Lebanese Pound exchange rate in the black market over time between December 2018 and November 2022.

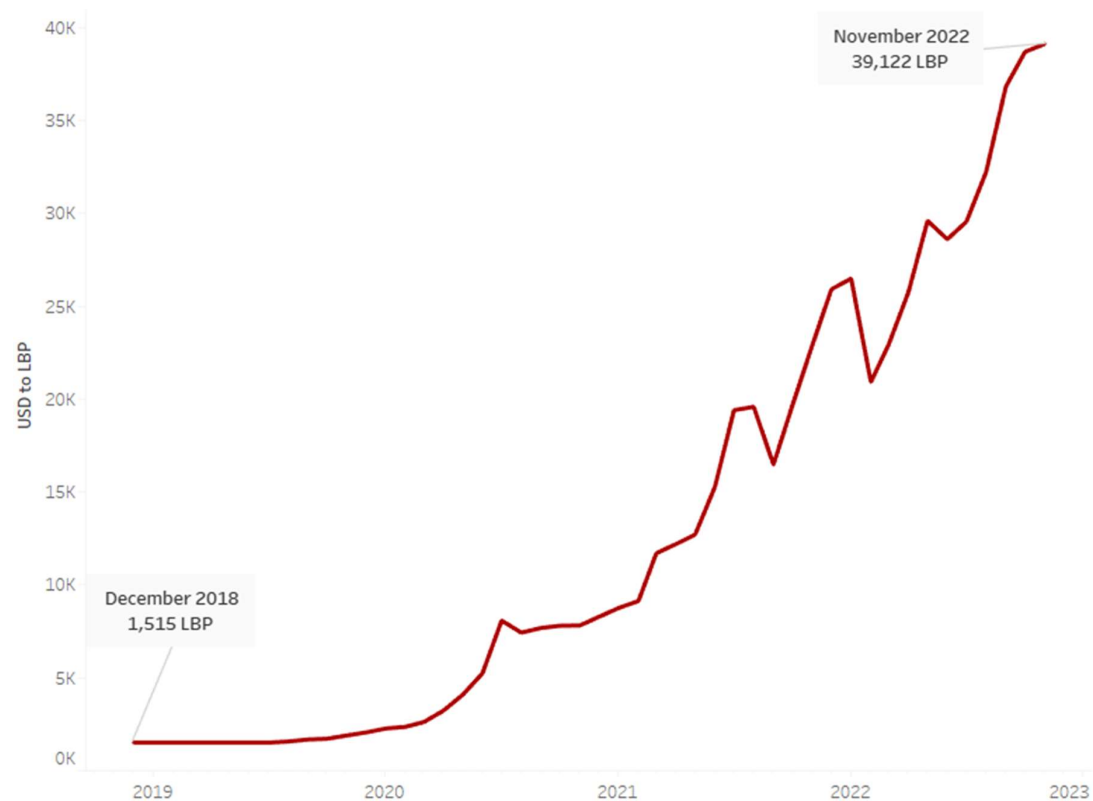


Exhibit 2: The following line graph shows the change of Food Price Inflation, Consumer Price Food Index and Dollar-Rate change over time between 2016 and 2022.

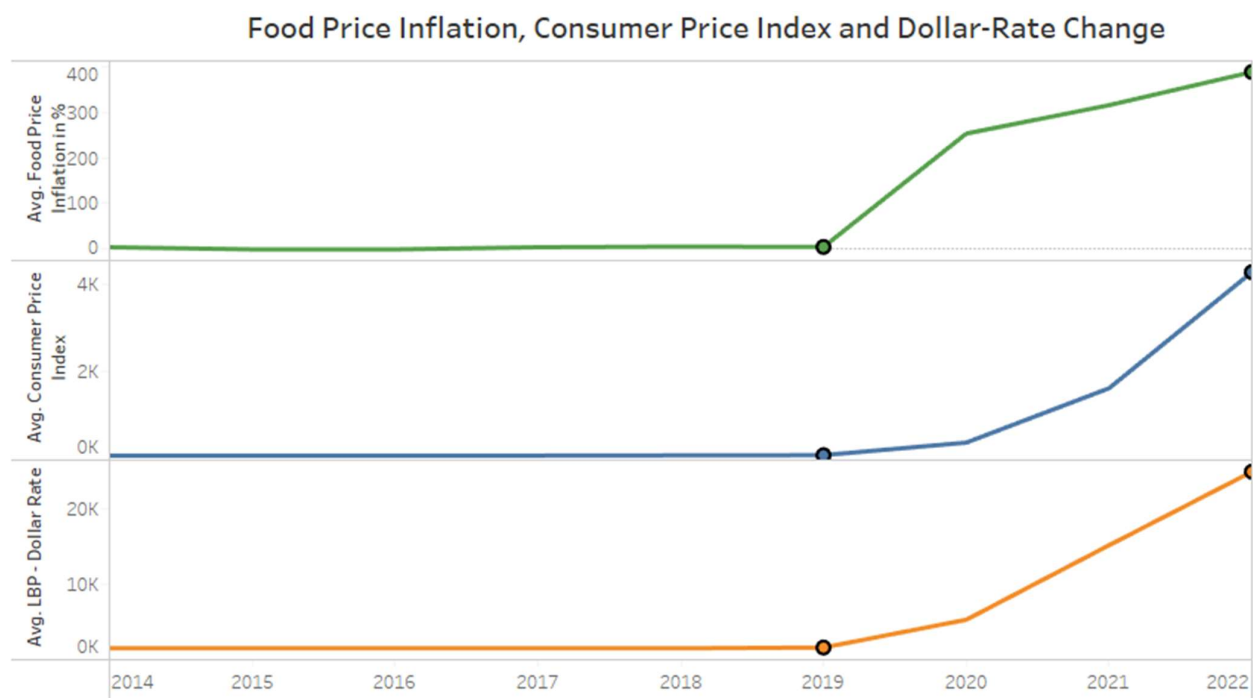


Exhibit 3: The following line graph shows the changes in prices of basic commodities (food + fuel) in the year 2020.

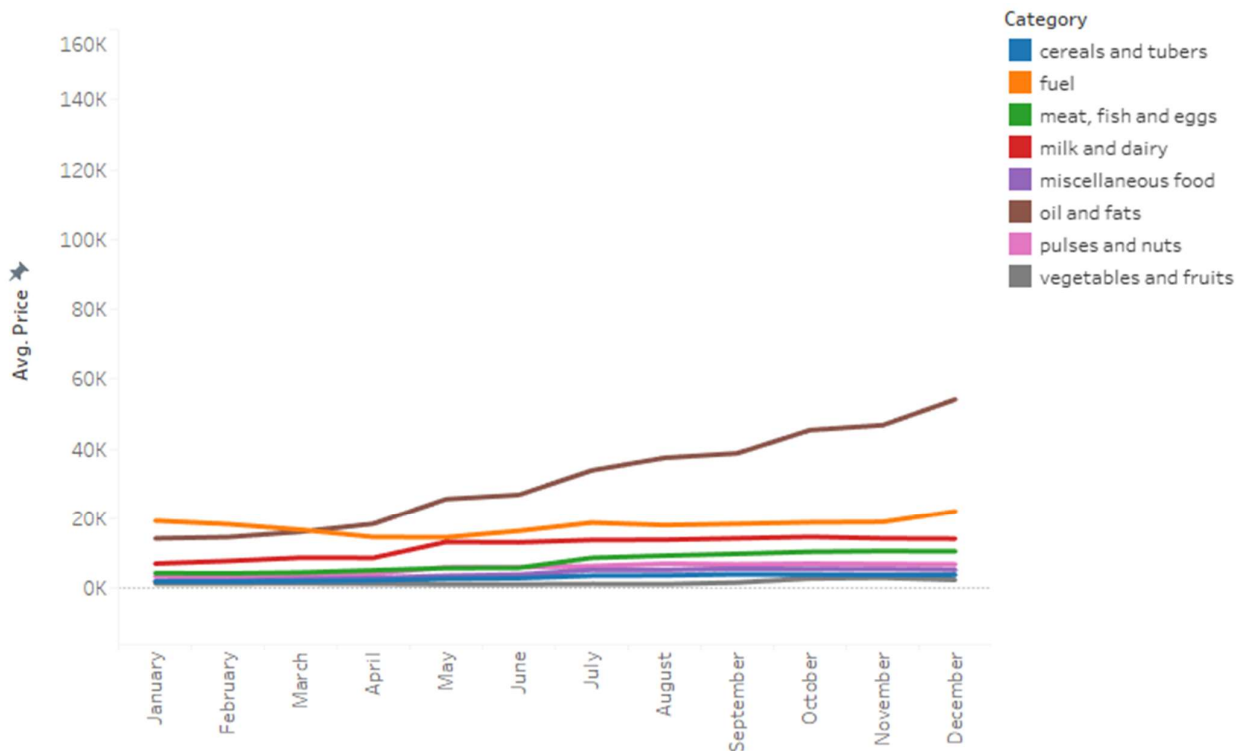


Exhibit 4: The following line graph shows the changes in prices of basic commodities (food + fuel) in the year 2021.

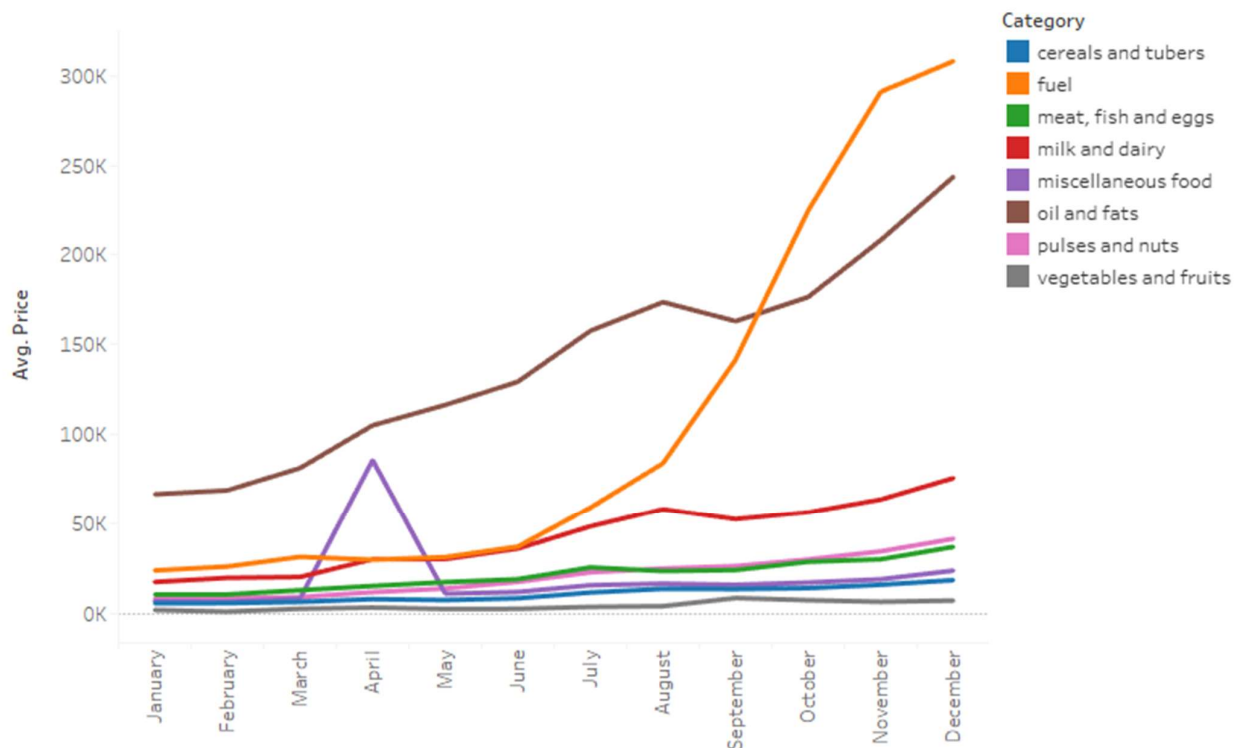


Exhibit 5: The following line graph shows the changes in prices of basic food commodities in the year 2021.

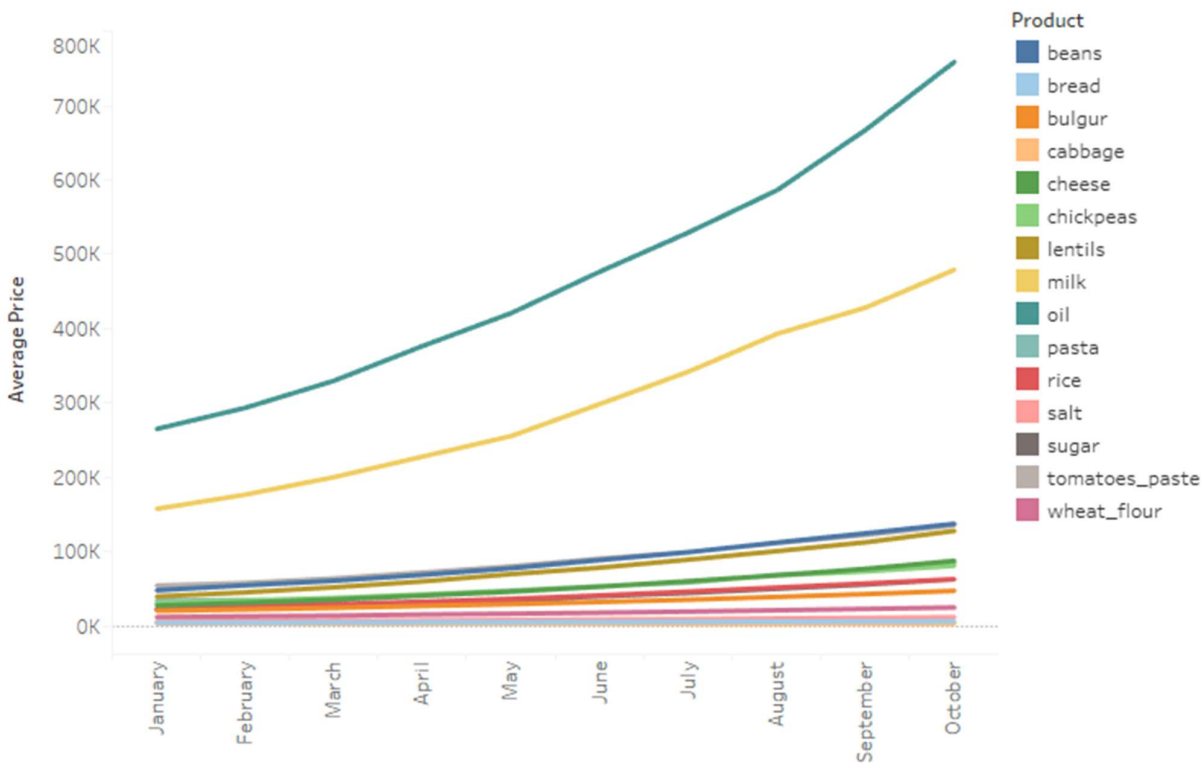


Exhibit 6: The following figure shows the receipts of the two supermarkets we visited in Beirut.



Supermarket A

• Sugar Ghandour 5kg	210,000LBP
• Tuna La Bella	39,000LBP
• Labneh Taanyel	92,000LBP
• Halloumi Taanyel	492,000LBP
• Eggs Hawa Chicken	174,000LBP
• Oil Plein Soleil 1.8L	214,000LBP
• Milk Candia 1L	60,000LBP
• Pasta Divella	30,500LBP
• Rice Maling	107,000LBP
• Chtoura Fava Beans	22,000LBP

Total: 1,440,500LBP

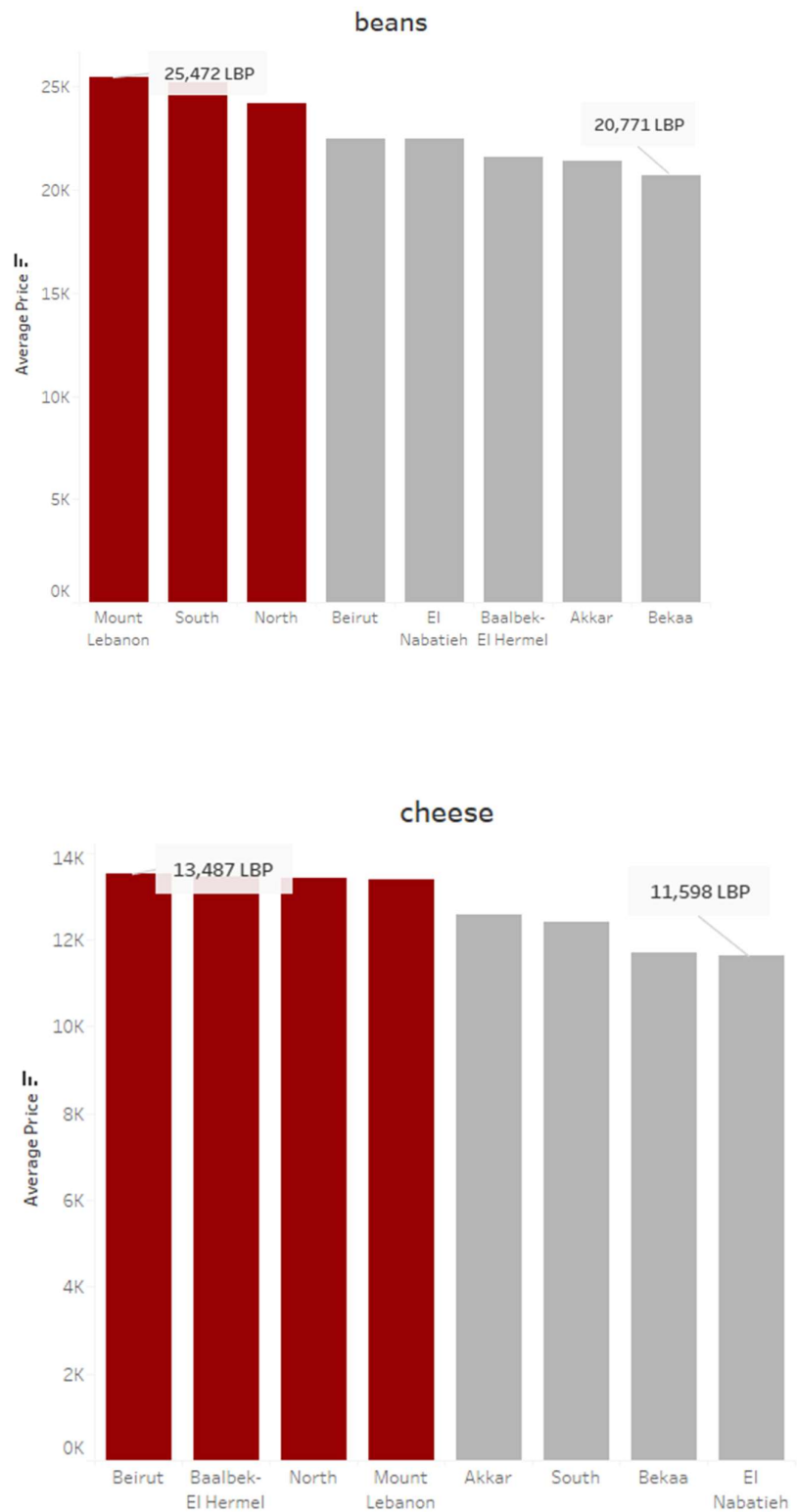


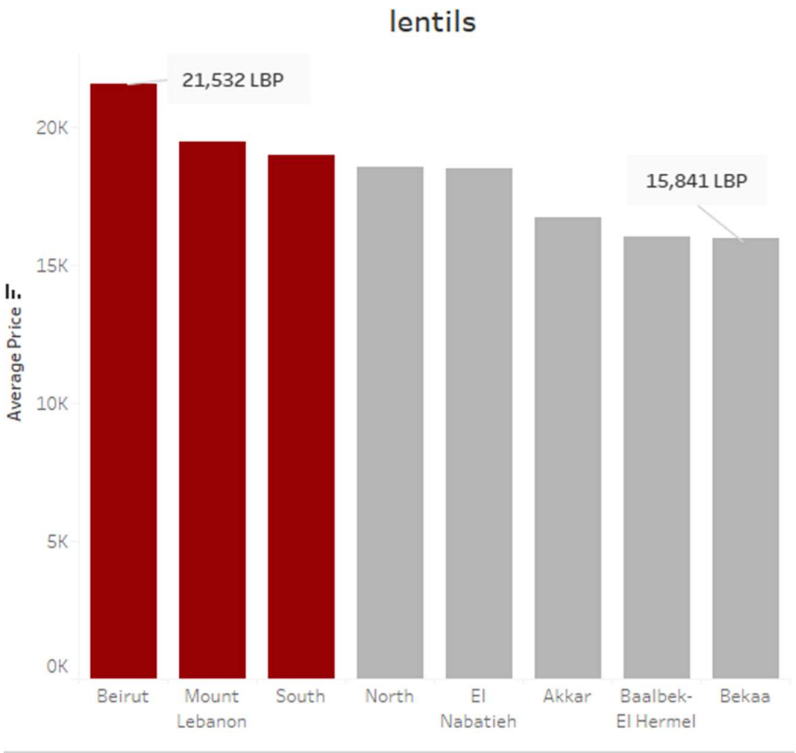
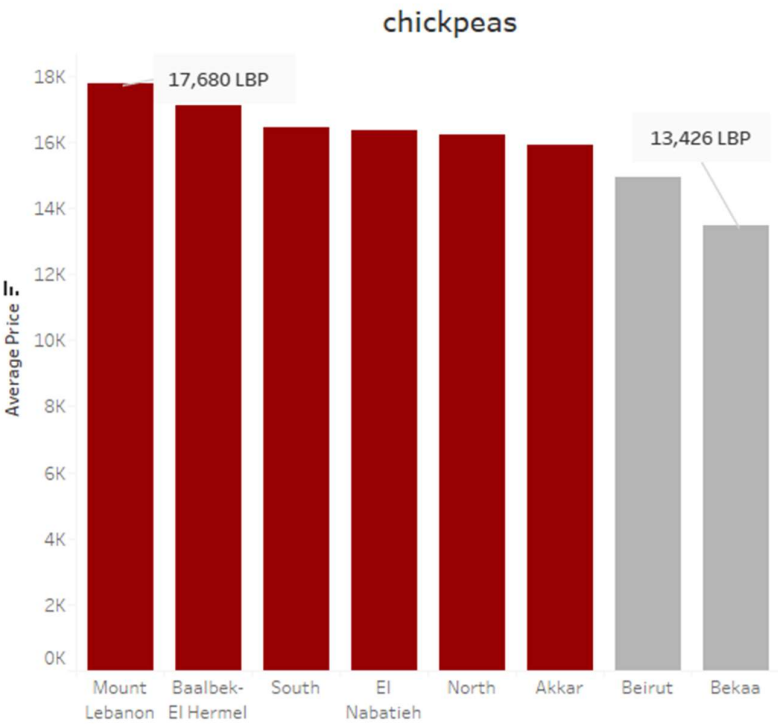
Supermarket B

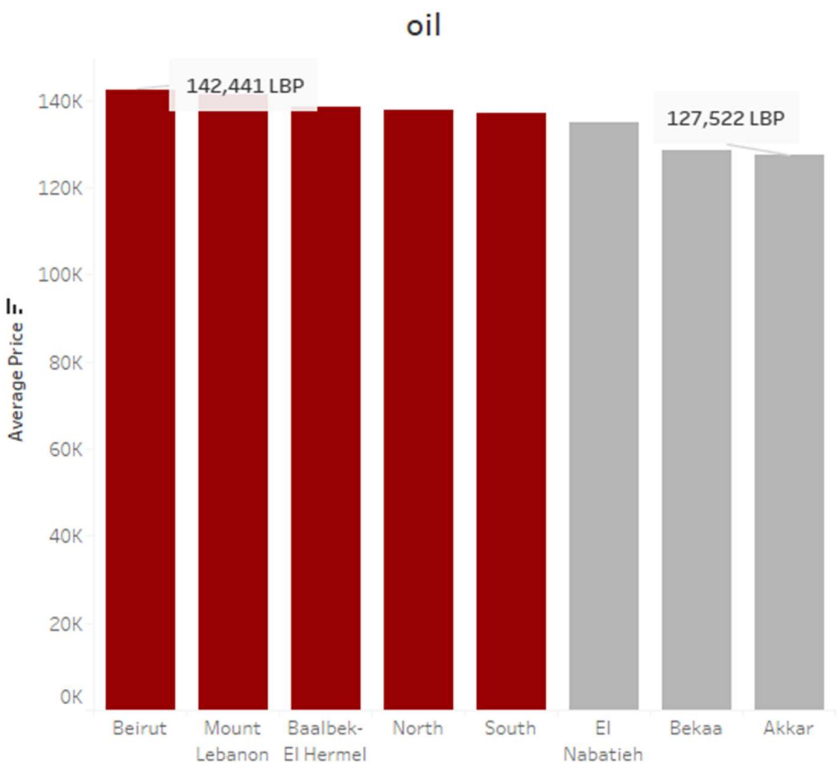
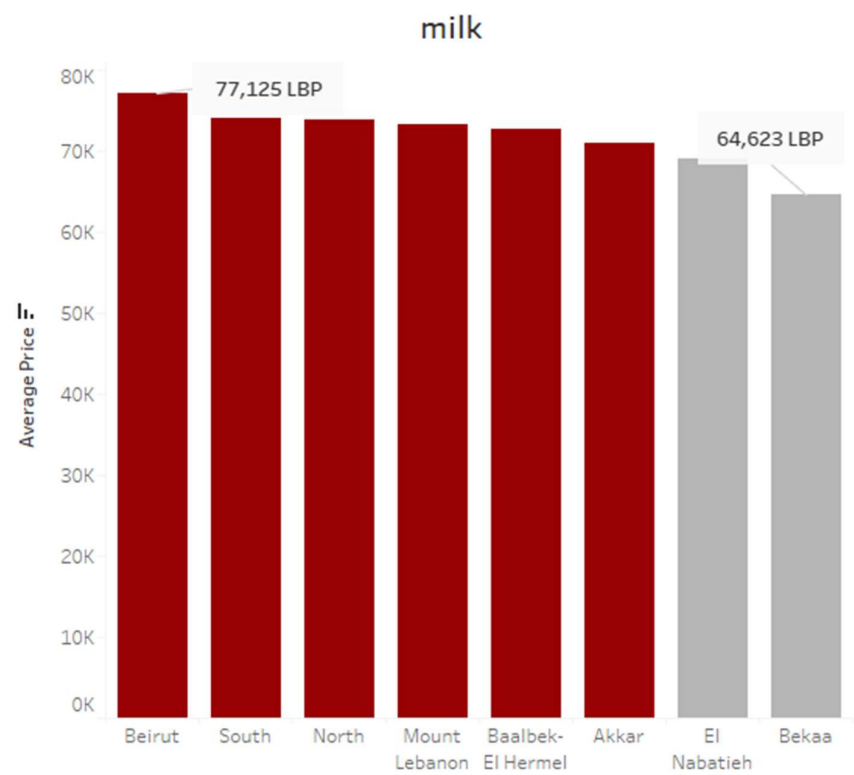
• Sugar Ghandour 5kg	217,400LBP
• Tuna La Bella	50,000LBP
• Labneh Taanyel	96,500LBP
• Halloumi Taanyel	144,500LBP
• Eggs Hawa Chicken	176,000LBP
• Oil Plein Soleil 1.8L	231,500LBP
• Milk Candia 1L	60,000LBP
• Pasta Divella	28,500LBP
• Rice Maling	105,000LBP
• Chtoura Fava Beans	21,650LBP

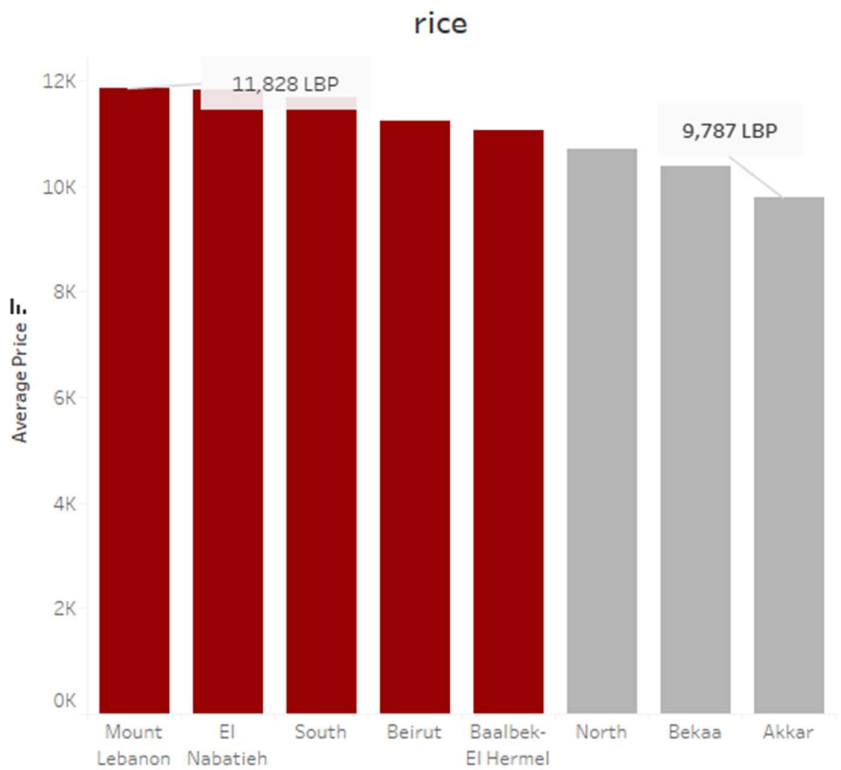
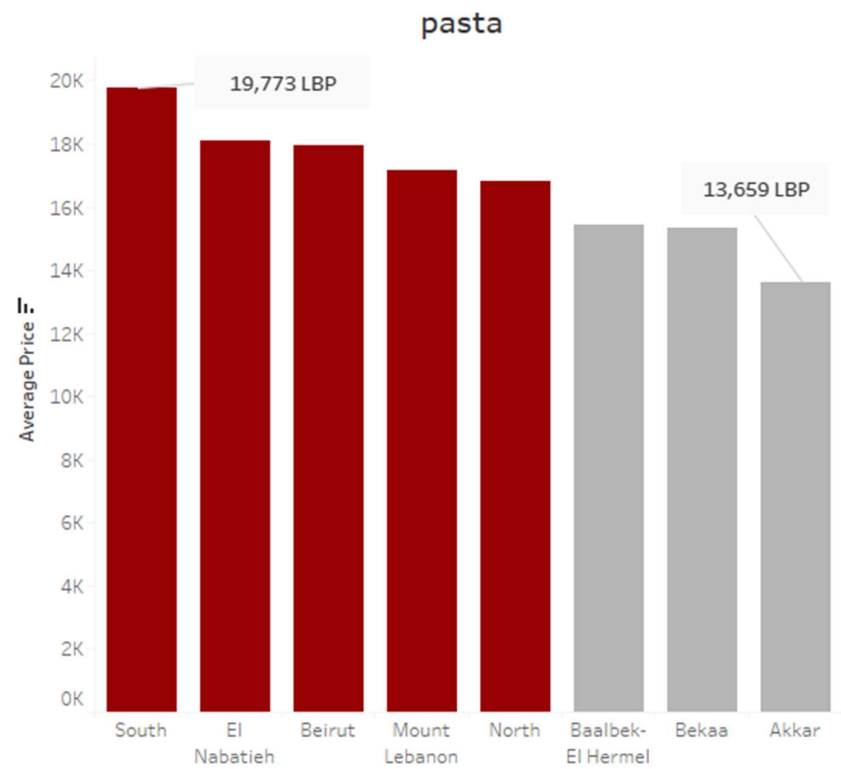
Total: 1,131,000LBP

Exhibit 7: The following bar graphs show a comparison of specific food products between the different Lebanese districts in the year 2021.









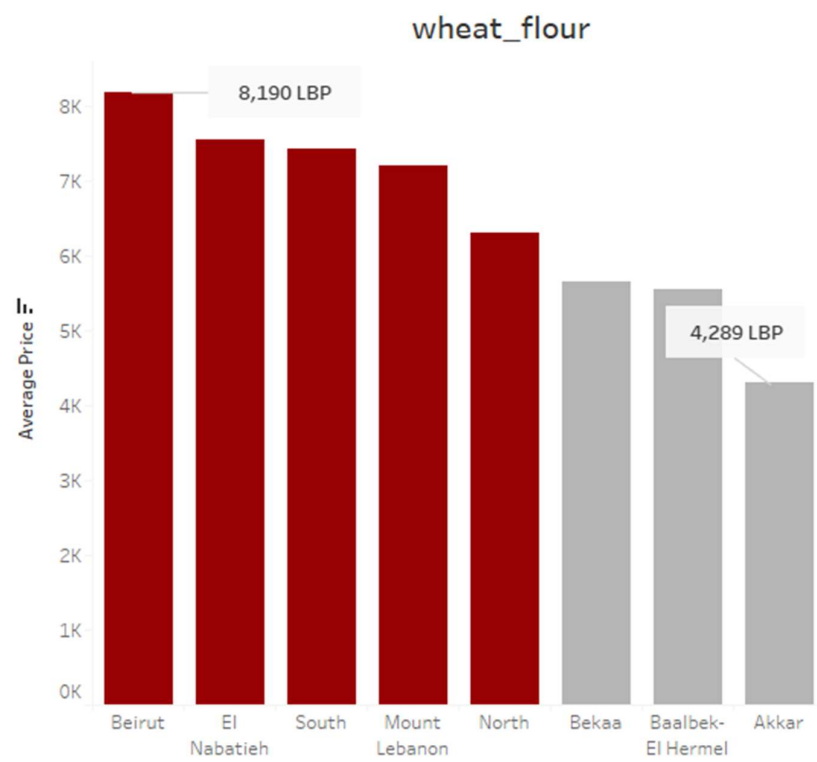
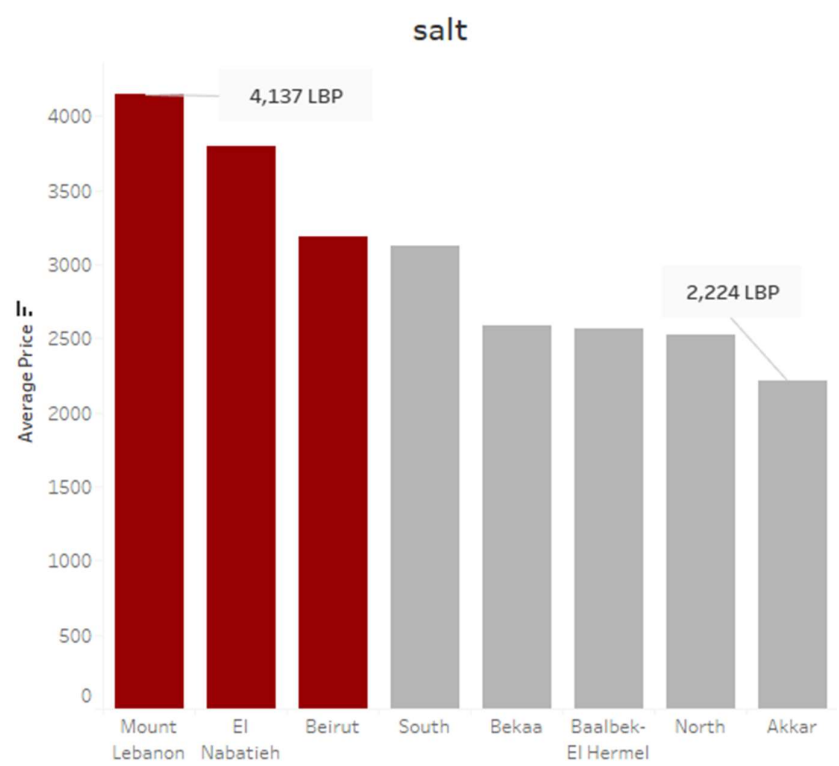
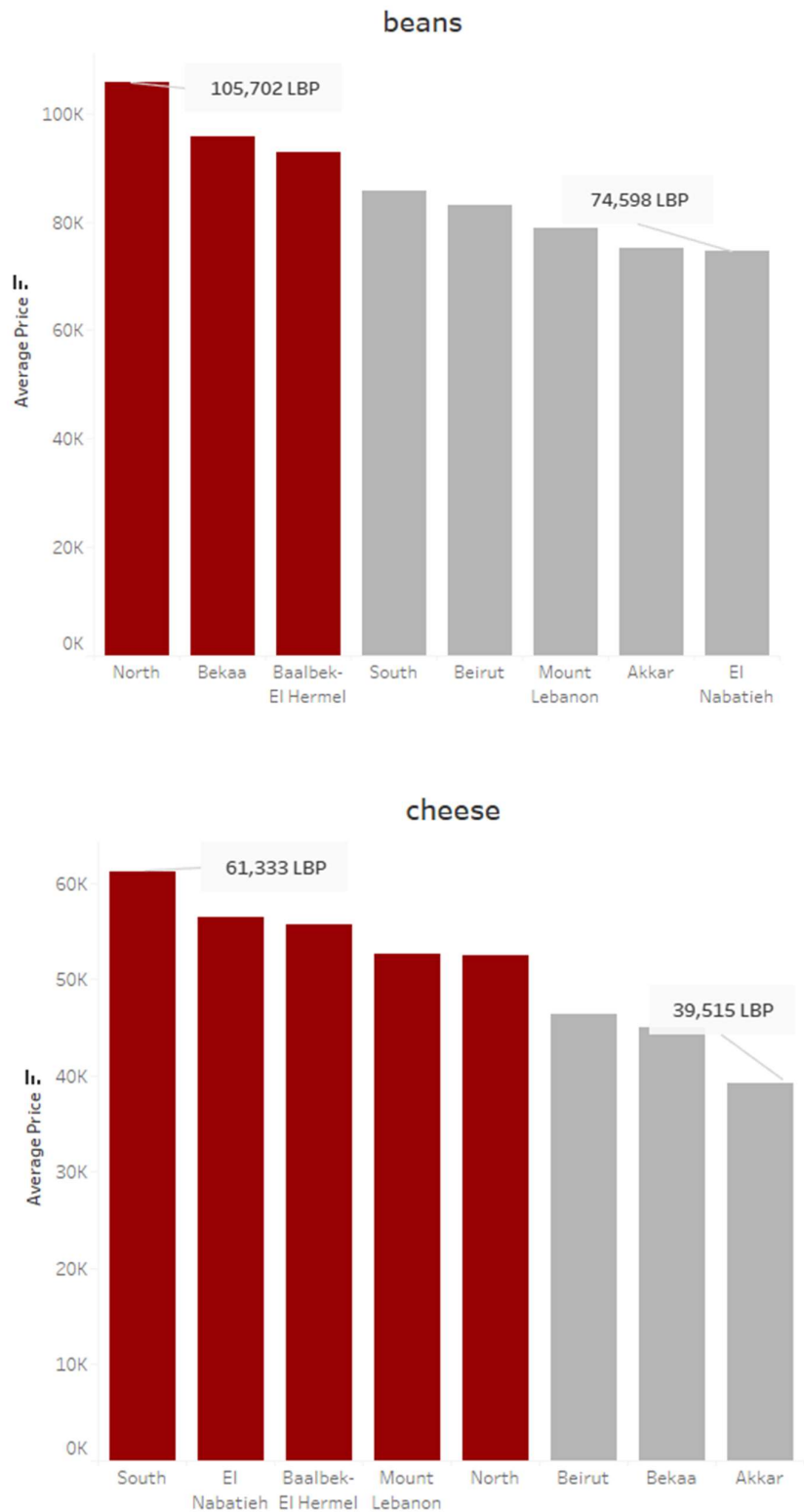
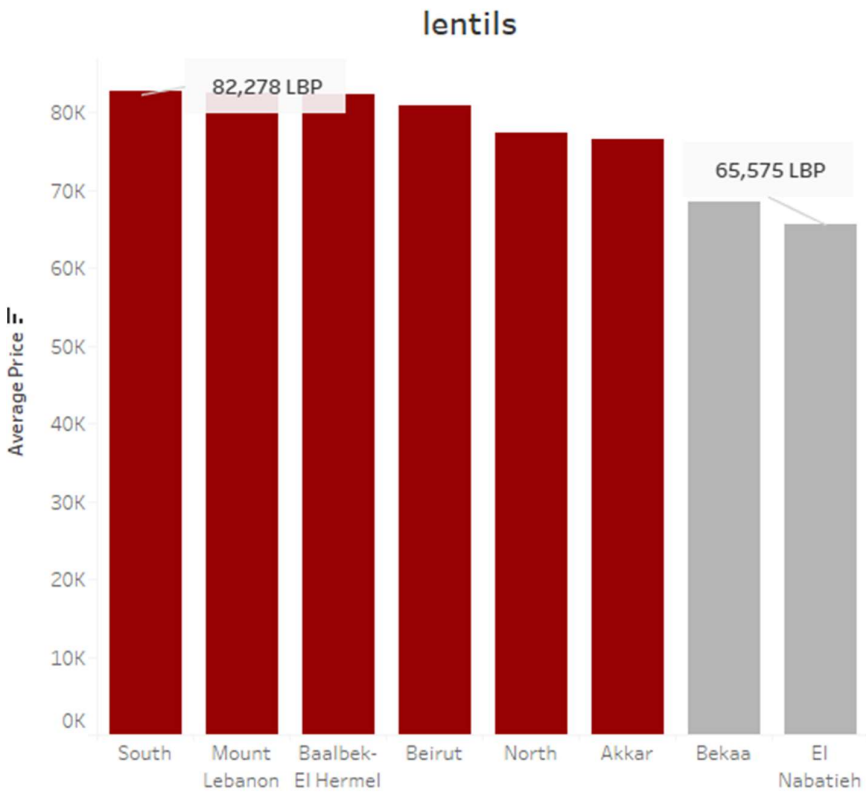
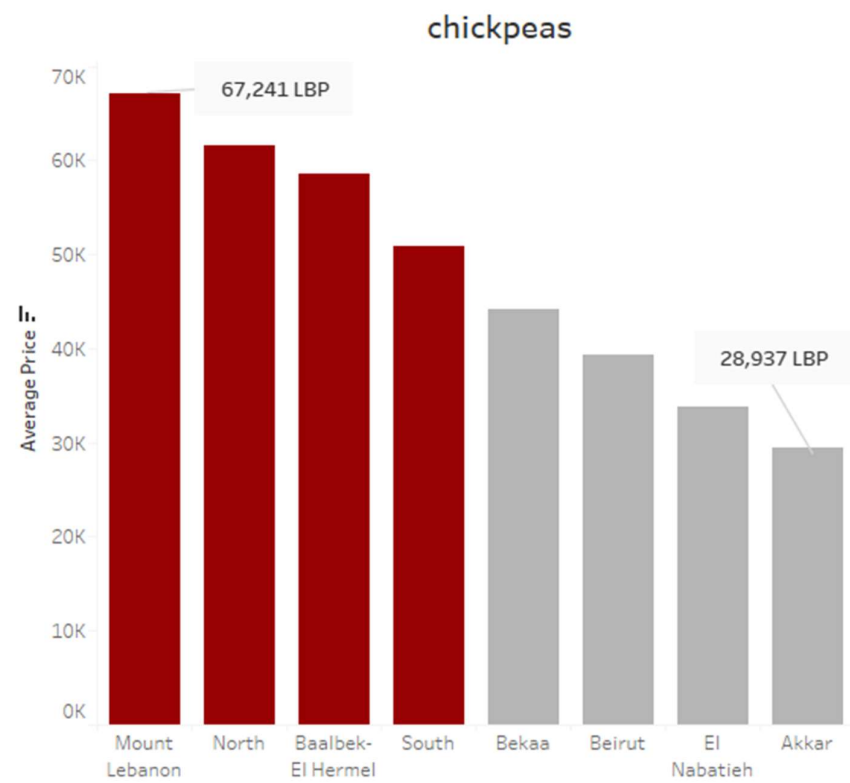
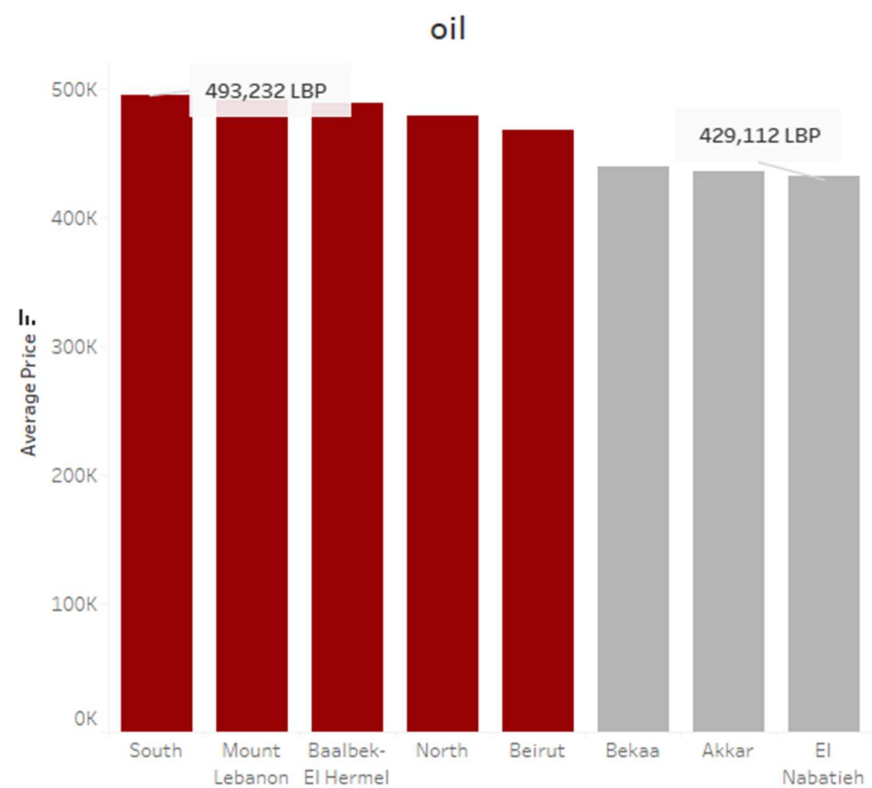
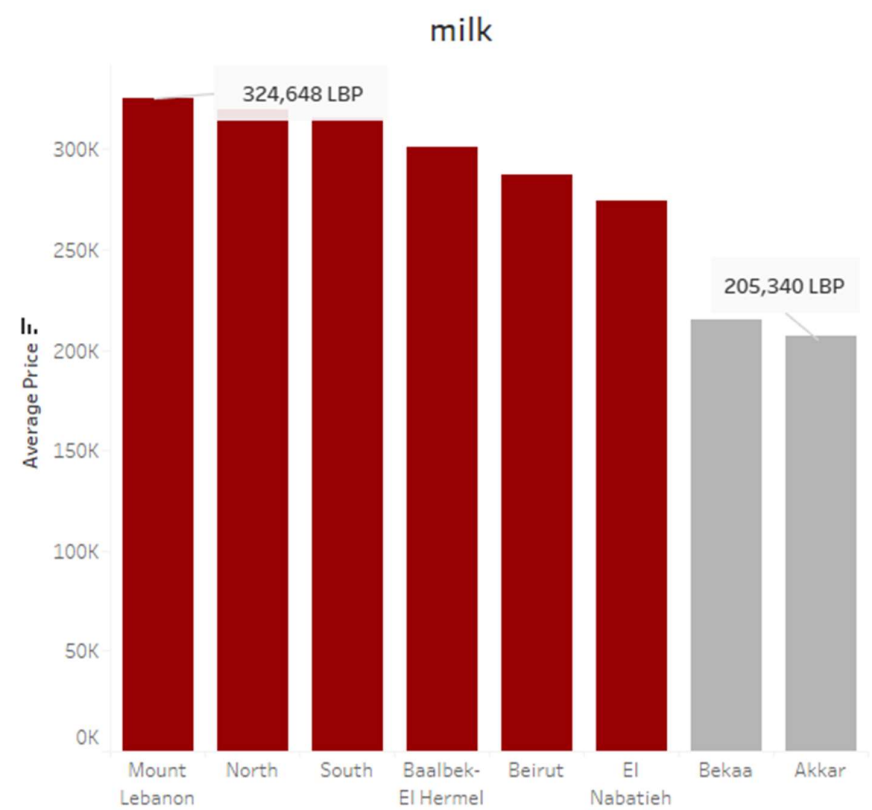
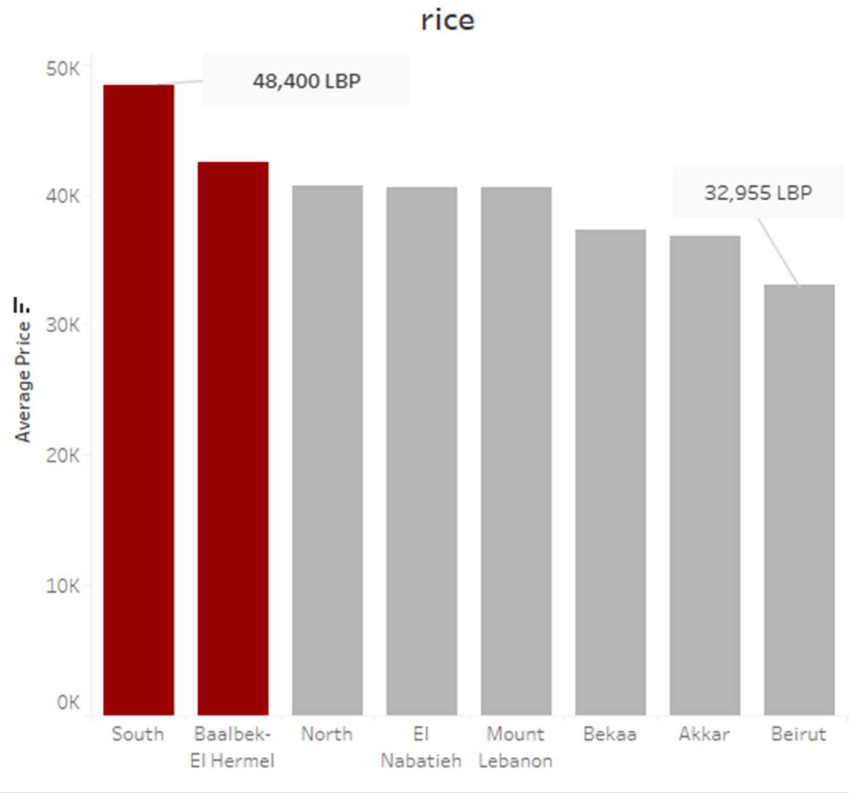
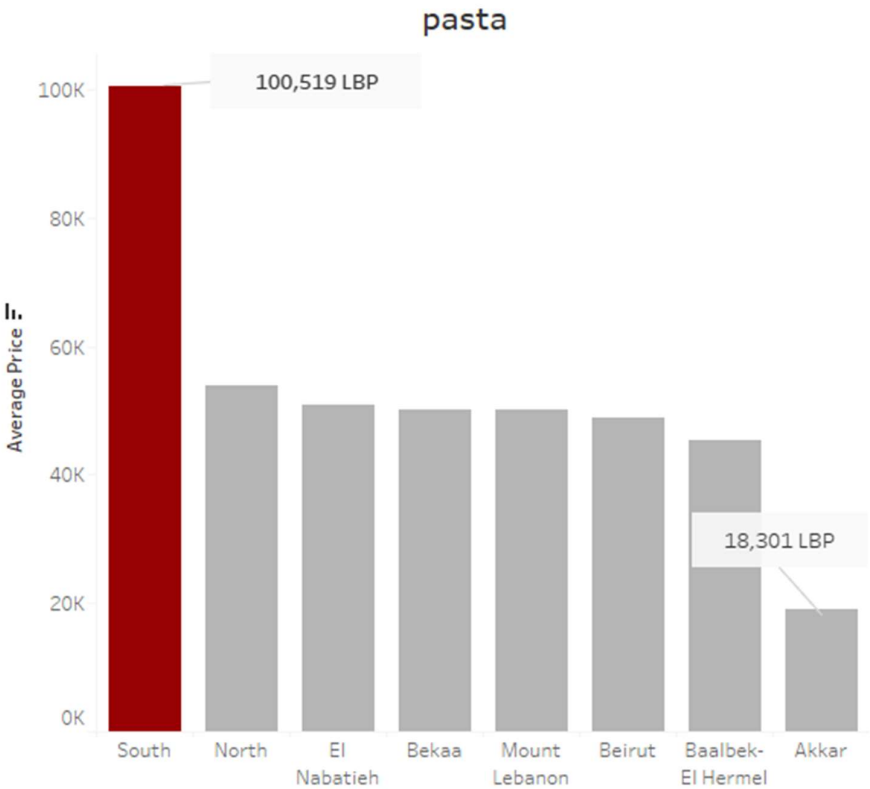


Exhibit 8: The following bar graphs show a comparison of specific food products between the different Lebanese districts in the year **2022**.









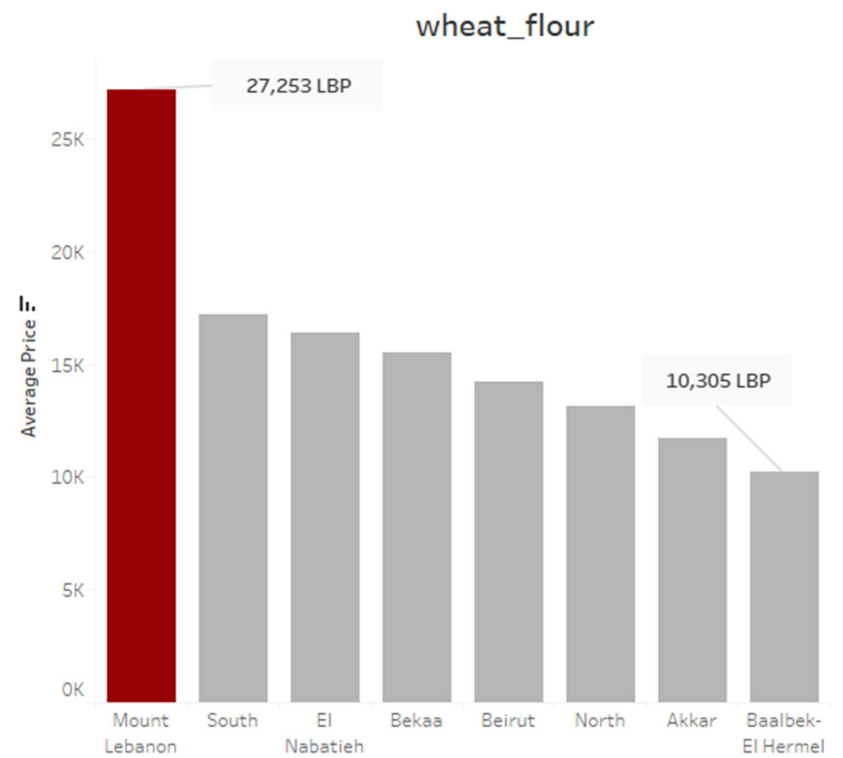
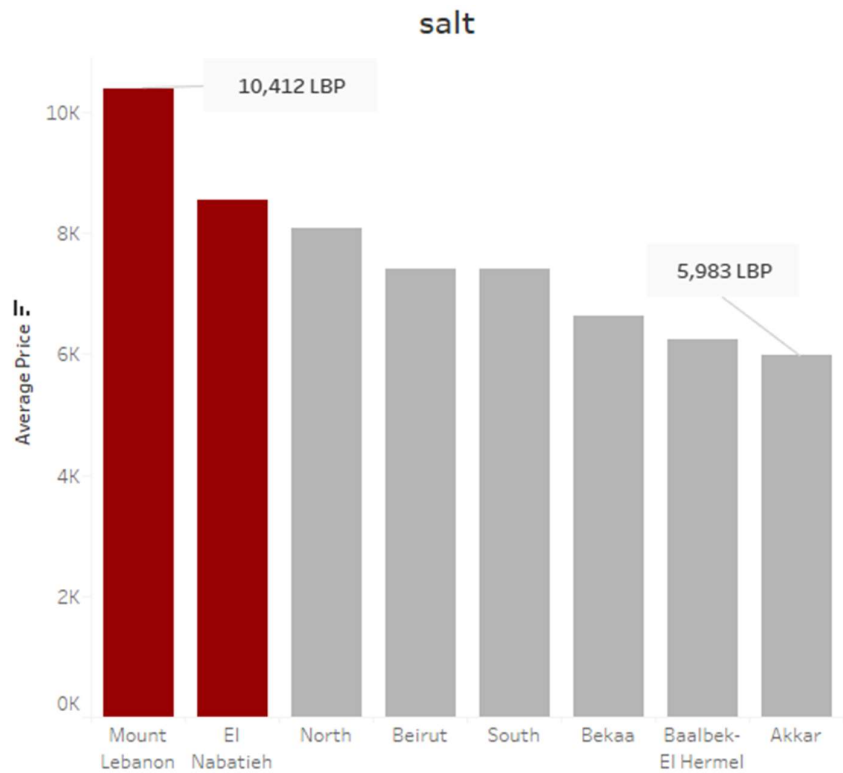
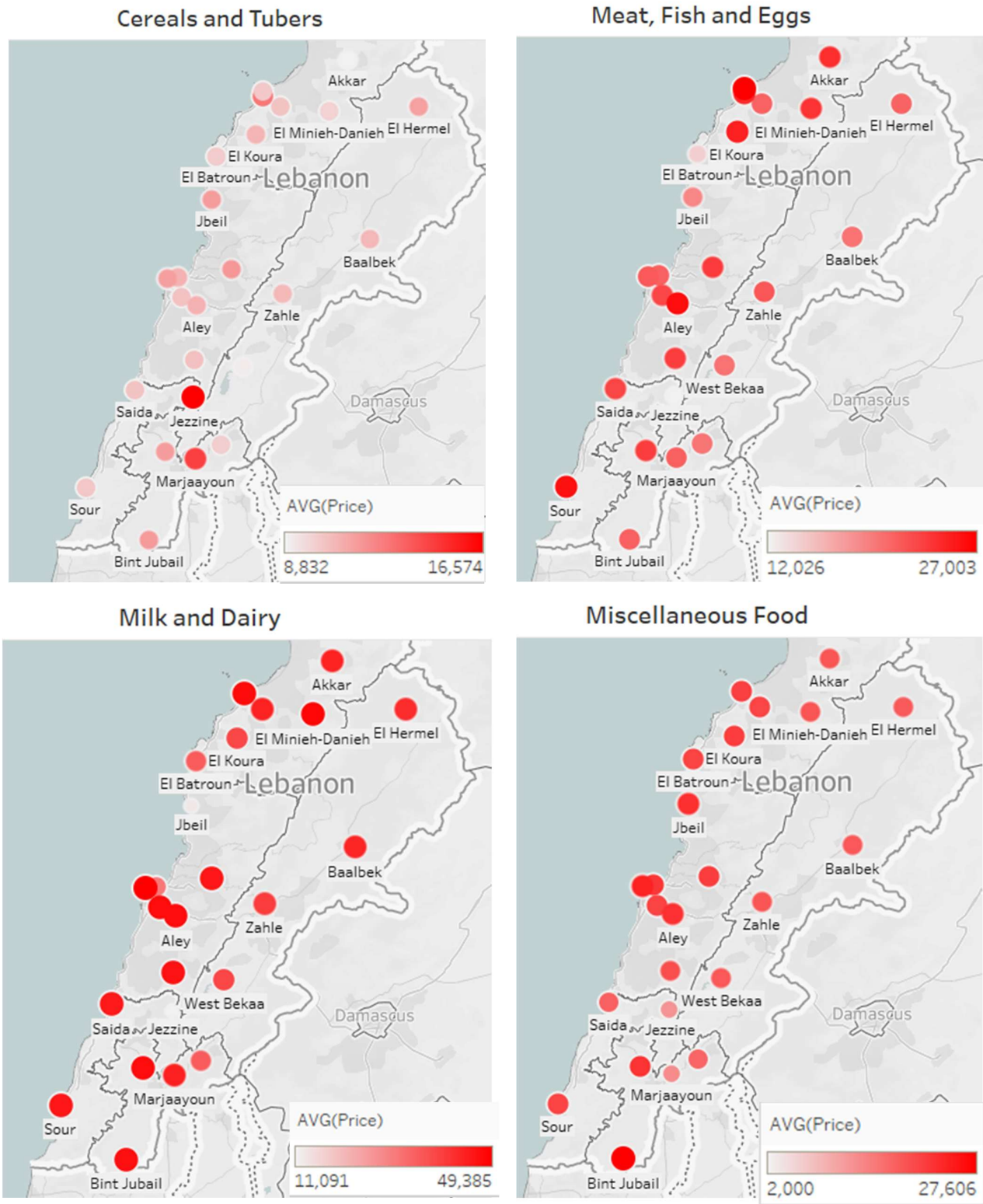
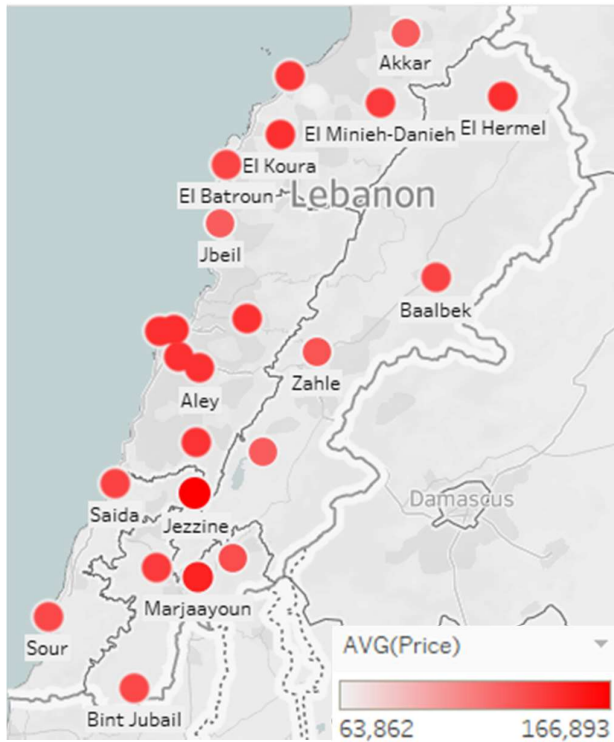


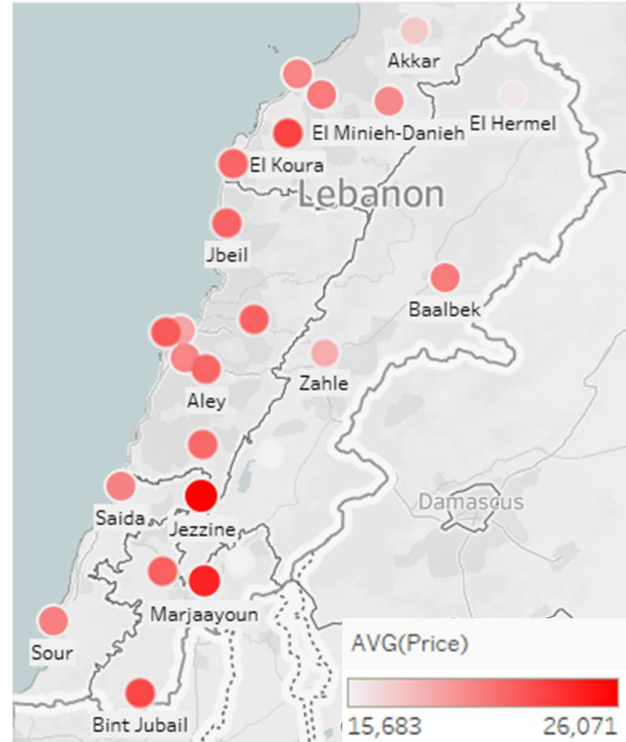
Exhibit 9: The following maps show the distribution of prices of specific food categories over different Lebanese regions in the year 2021.



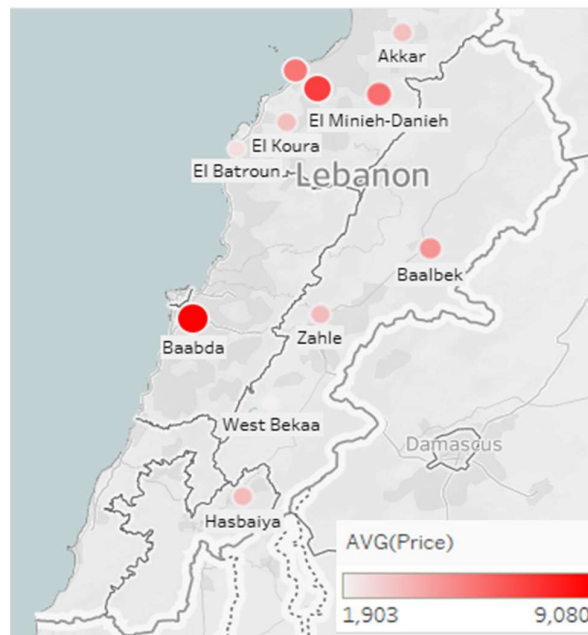
Oils and Fats



Pulses and Nuts



Vegetables and Fruits



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