

## AN ASSESSMENT TO THE COVID-19 IMPACT ON THE CURRENT PRODUCTION GLUT IN THE CONSTRUCTION SECTOR: EGYPTIAN CASE

DOAA M. SALMAN<sup>1</sup>  
MOHAB KAMAL<sup>2</sup>  
OMNIA EL BASYONI<sup>3</sup>

---

### Abstract

*The real estate and construction sector is a lucrative activity to attract investment on both the internationally and national level. The secret behind continuous investment refer to the other tradable sector which still not competitive and the return of investment is still provide marginal benefit. A status quo accelerates the currency devaluation – especially in countries that are facing trade deficit - the devaluation of the currency has been a common phenomenon during the past sixty years and the real estate present an attractive pool to keep the value of human wealth. In countries that are characterized by increasing the population growth rate consequently the demand for housing pushes the government towards developing new cities and a new capital to absorb the demand.*

*In Egypt the governments built new governorates to absorb the notable increase in the number of population from the centre of the delta to new sites. This strategy helps in, creating new jobs, in order to be able to fulfil the increase in population thus decreasing the crowding effect and minimize wasting resources and opening new opportunities. This paper attempts to analyse the demand and supply side key drivers for steel and cement industry. It investigates how these industries will sustain despite the oversupply status. The current situation presents a future challenge and the paper argue is this sector is going to face market failure. Furthermore, the paper highlight the possible opportunities under the current challenges and assessing the role of the government's regulations and policies after the recent economic reform and provide possible solutions to keep these industries sustainable.*

**Keywords:** Economic growth, employment, production, consumption, oligopoly, sustainable

**JEL Codes:** F34, G33, Z32

---

### 1. Introduction

The industrial sector has gained many advantages and facilities, and there has been an increase in investment directed towards industrial activities. With the beginnings of the twenty-first century, Egypt started a phase of advancement in the Egyptian industry and raising the competitiveness of the Egyptian product thus modernizing the industry. It is done within the framework of an integrated program that contributes to raising exports to effectively join the

---

<sup>1</sup> Prof. of Economics, Head of the Economic Department, October University for Modern Sciences and Arts, Cairo, Egypt; dr.doaaslman@gmail.com; [dsalman@msa.edu.eg](mailto:dsalman@msa.edu.eg)

**ORCID iD** <https://orcid.org/0000-0001-5050-6104>

<sup>2</sup> Academic Researcher, Business School, École Supérieure Libre Des Sciences Commerciales Appliquées (ESLSCA), Egypt, Eslsca university, Egypt; [Mohab.Kamal@gleeds.com](mailto:Mohab.Kamal@gleeds.com)

**ORCID iD** <https://orcid.org/0000-0002-7752-6882>

<sup>3</sup> Academic Researcher, Business School, École Supérieure Libre Des Sciences Commerciales Appliquées (ESLSCA), Egypt, Eslsca university, Egypt; [omniaeelbassoyoni@gmail.com](mailto:omniaeelbassoyoni@gmail.com)

**ORCID iD** <https://orcid.org/0000-0001-9728-1985>



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.

global economy. The Egyptian Industry value-added as a % of the GDP (including construction) increased on average from 34.4 % to 36.4 % during the period between 2010 until 2019 (The World Bank, 2020).

This growth reflected in the inflow of foreign exchange resources. The construction and building activities played a vital economic role as one of the main drivers to the economic performance of any country via completing the infrastructure of utilities and housing. It contributed to achieving the highest rates of growth and employment. The construction and contracting sector played a prominent economic role as one of the mainstays of growth by effectively contributing to completing the infrastructure of utilities and housing, and it has a mutual impact on the economic performance of any country. The growth rates of the construction sector recorded a growth rate of 8.8% to 10% during the fiscal year 2018-2019 (Central Bank of Egypt (CBE), 2020).

Recently the government adopted an expansionary policy and investment in upgrading the infrastructure across the country. It adopted national projects by building a new capital at new Cairo and finalizing this project all ministry activities are going to move from the downtown to the new capital. This project's target is to utilize the unused land and decrease the concentration of the population from downtown especially after the increase of the population as it exceeds 100 million citizens (The World Bank, 2020).

The increasing trends in the growth rate in the construction sector reflected on the amounts of the investment capital which increased by 216% during the financial year of 2014/2015 until 2015/2016. It also contributed about 6% to the GDP. It scored third in the highest performance among the economic sectors during the fiscal year 2017/2018 (Daoud, et al, 2020)

The Egyptian construction sector witnessed a growth of 8.7% during the period from March till July 2020, defying the negative repercussions of the spread of the pandemic. Which temporarily halted work on construction projects in the country and the supply chains of building materials were disrupted. The government is relying on this sector to achieve a remarkable development boom in the future, as it is one of the high-production and fast-growing sectors. Steel and cement industry economies are declining across the globe, the return on investment is relatively low compared to other industries that do not require the injection of large capital, such as information and communication technology. Also, the high cost of production is not sufficiently reflected in the final prices, similar to the case with the automobile and pharmaceutical industries, in which the cost is high due to the budgets of research and development mainly. However, with the recovery of the economies post COVID-19 and spread of the vaccination this industry will grow once more especially after the increase in demand from china – as it presents the major producer across the globe.

This paper aims to highlight the role of the steel, cement and construction industry on the Egyptian economic performance. In addition to investigating the factors affecting the steel and cement industry and its challenges. Furthermore, it tries to answer, if the steel and cement industries can face a market fail due to oversupply and utilize capacity and due to the increase in the number of producers?

The following sections will provide all the research parts thoroughly. It starts by reviewing the literature followed by discussing the construction, steel and cement industries driving factors to list the current challenges in each industry and finally propose a conclusion and propose policies for implementation.

## **2. Literature review**

There are many market types with different characteristics and different properties. Each market determines how it sets its prices, and how it builds its market strategy. Oligopoly is one of the market structures with a small number of firms, where they can influence each other moderately and the concentration ratio measures the market proportion of the largest

firms. An oligopoly market structure has to consist of a minimum of three firms, otherwise, it will be a monopoly or a duopoly and although there is no upper limit it still has to be low enough for the behaviour and actions of one firm to have a significant influence on the others but the exact number depends on the industry or the country.

There were some industries strongly related to oligopoly such as the steel industry, the wireless carriers and oil companies, the problem with oligopoly market structures is that an oligopoly can be like a closed circle preventing new competitors from entering the market, it can also slow down development and innovation because there is barely a motivation to do so, it may also sometimes increase prices for consumers because few firms are price makers and they set prices in the market. Although this adds a higher profit margin for oligopoly firms than they would have in a perfectly competitive market, it often harms the consumers. Moreover, when oligopoly firms in a particular market determine what quantity to produce and what price to charge, they are often tempted to behave as if they were in a monopoly. To illustrate, oligopolistic firms may sometimes decide to decrease the supply or store the products to increase the prices they charge and divide the profit among themselves; this is called a collusion. Whereas, when a group of firms have a traditional agreement to collude to bring out the monopolistic output and sell at the monopoly price, it is labelled by the term cartel.

The investigation of oligopoly conduct regularly accepts asymmetric oligopoly, regularly a duopoly. Whether the oligopoly is separated or undifferentiated, the basic issue is to decide how the firms act within confront of their realized interdependence. Oligopoly describes a market in which a large number of firms concentrate power. The precise number of companies is not important; what matters is that the bulk of business production is generated by a few businesses. The entry barriers for an oligopolistic industry are high due to the scale of the existing firms and the competitive advantages gained from this level. In contrast, between perfect competition, monopoly and unequal competition, the analysis of an oligopoly in terms of interdependence and competitiveness between its companies is most valuable. Since this type of market is effectively controlled by a few large firms, firms must devise appropriate business strategies and – just as importantly – respond appropriately to competing firms' business strategies.

The failure of the market refers to the inefficient distribution of free-market goods and services. The prices of goods and services in a typical free market are determined by supply and demand strengths and every change in one force results in price shifts and an appropriate change in the other. The changes have resulted in a price balance. In other words, MF failure happens when market distortions create a state of unbalance. It happens when the supplied amount of goods or services does not equate to the required amount of goods or services. Many inequalities affecting the free market may include monopoly power, price controls, wage minimum requirements and regulations of the government (Corporate Finance Institute, 2015).

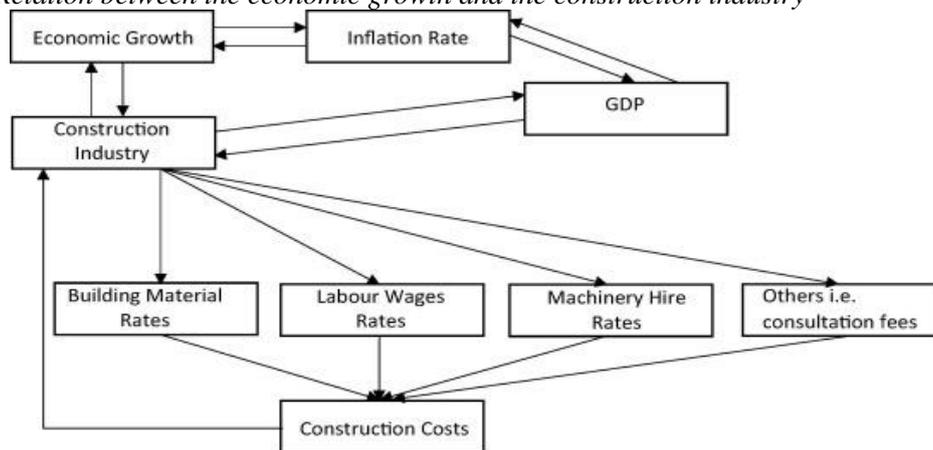
Seven different reasons cause market failure. Firstly, private markets are commonly known as being incapable of producing public goods. Secondly, where externalities occur between various economic activities, which result in a difference between social costs and benefits and private costs and benefits, such as industrial pollution, markets may fail to deliver efficient results because market rates do not represent the true social costs and benefits involved. Thirdly, if markets are monopoly or oligopoly rather than competitive, there would be markets failure. Fourthly, where either purchasers or sellers have insufficient information or when the available information is asymmetrically applied to participants in the market, markets that collapse. Fifthly, incomplete markets could lead to MF because markets cannot supply all goods and services. After all, demand is insufficient to cover the cost of supply. A sixth and related type of MF is induced by incomplete markets implying that complementary markets are absent. Complementary between markets is said to occur where operation in one

market depends on the presence of other relevant markets. Finally, is also claimed to occur in the macro-economies of industrial societies in the context of a business loop Periodic economic downturns result in unemployment and decline in income, whereas economic upturns may create inflationary episodes. This form of macroeconomic uncertainty is generally faced with policy interference under the umbrella of macroeconomic measures intended to flatten the market cycle. Usually, these macro-economic strategies aim to boost economic growth during recessionary times and to minimize this development during boom cycles (Dollery & Wallis, 1997).

### 3. Case Study: Egyptian Steel and Cement sector

Egypt is characterised by a highly populated nation a factor that increases the need for houses. The interest in houses is viewed as inelastic because it is a fundamental requirement for shielding individuals, along these lines there is a solid positive connection between populace size and request for housing and building material. This positive relation is one of the key drivers for economic growth but the recent devaluation reflected negatively and led to the increase of prices and consequently the building material as well pushing prices to increase, see figure 1.

Figure 1: Relation between the economic growth and the construction industry



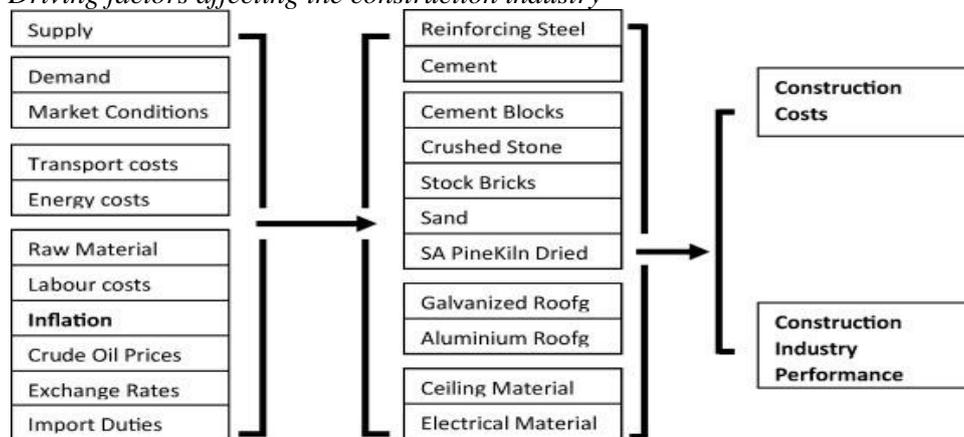
Source: Musarat, Alaloul, & Liew, 2020

As the population increase the demand for houses increase & infrastructure, which increase the construction in the economy so there is a strong positive relationship between population size and demand and supply. The annual population increment by an average of 2.5% calls more services establishment mainly based on infrastructure and urban development (The World Bank, 2020). Recently the government targeted to increase the Egyptian cities. The current target is motivated to derive the population from their concentration along the Nile valley. Over the past, the population density is increasing leading to crowding along with all the cities. The governmental programs for a rapid expansion in residential and industrials cities and districts across the country accompanied by major infrastructure projects i.e. New Administrative capital, New Al-Alameen, new Mansoura and many others. Moreover, the building culture of the Egyptian people and private real estate investment is considered the most favourite money securing method, nevertheless, the unjustified prices continuous increments, see figure2.

The construction industry performance depends heavily on the multiple inputs which reflects the positive trend in prices, see figure 1. This increase is multiplied after the devaluation applied in 2016. The devaluation of the value of the currency against the US dollar affects

greatly the price of cement in the Egyptian market so it affects both the demand and supply of steel and cement (Shiha, Dorra, & Nassar, 2020).

Figure 2: Driving factors affecting the construction industry



Source: Windapo, A., & Cattell, K. (2012).

### 3.1 Steel sector in Egypt

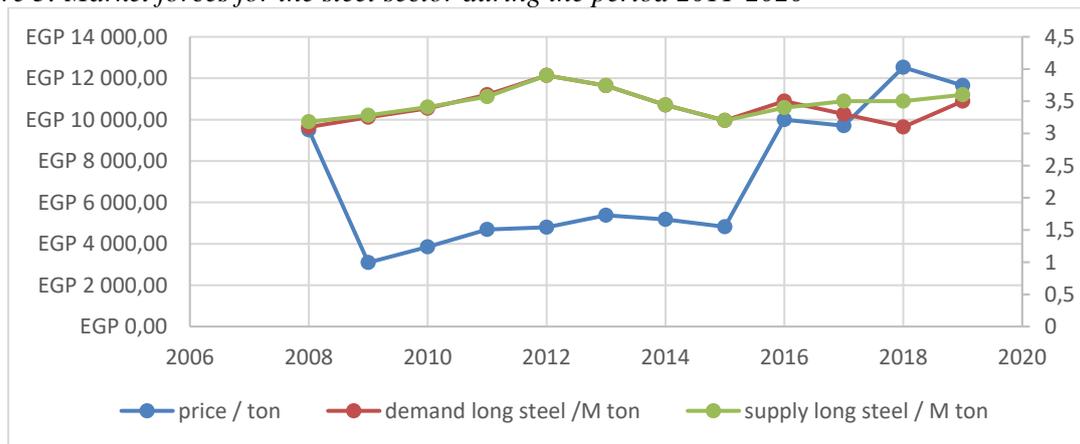
The iron and steel business is an important and strategic industry for any given community as it plays a key role in developing the industry and the economy as a whole. The Egyptian steel sector is the second-largest steel market in the Middle East and North Africa region in terms of production and the third largest in terms of consumption. The Egyptian steel industry represents one of the cornerstones of Egypt’s economic growth and development, due to its linkages to almost all other industries that stimulate economic expansion such as construction, housing, infrastructure, consumer goods and automotive. All these industries rely heavily on the steel industry and so the importance and development of the steel sector are imperative for the progress of the Egyptian economy in general.

**Demand side – driving factors affecting demand:** The demand for steel in Egypt is mainly dependent on fabrication and construction in addition to some other steel users like air conditioning, needles, furniture, elevators, agricultural equipment’s, electric cable and equipment’s, motor and other industries that use steel as a raw material. The production of steel in Egypt depends heavily on rebar that is an important input to the construction industry in Egypt. Steel production in Egypt averaged 398.53 thousand tons from 1991 until 2019, reaching an all-time high of 750 thousand tons in May 2019 and a record low of 48 thousand tons in November 2016. In 2019 the local iron and steel industry production shared by 1.25% in GDP and its exports represented 3.6% of the Egyptian exported goods. Egypt is ranked at the 23rd position worldwide of crude steel production by 7.3 M ton production in 2018 (World Steel Association, 2020).

**Supply side - Driving factors affecting the steel production:** The value of the raw materials used in production; the source identified the total employment in the rebar industry at about 30,337 workers, of which 26,222 workings in integrated and semi-integrated factories, which start from heavy melting scrap. As for public sector factories, there are 8,706 workers, and the private sector has about 17,000 workers (Liedholm & Mead, 1987). The Egyptian construction sector contributing 15% of Egypt’s GDP. The construction industry is the major user of steel. In addition, that the steel sector relies heavily on importing iron steel from China. Moreover, Egypt is one of the countries that the wages of the labour are lower than the average and the local market is not encountering any shortage of both skilled labour and technical staff.

This factor has a very positive impact on decreasing the cost per ton compared to the competitors. Also, the steel industry in Egypt, in general, requires high capital investment to start up the business which is one of the biggest barriers for new entries especially the steel industry is a very risky business. Also there are high price fluctuations that can lead to many losses to producers. Besides, coming competition from India and China is a major threat to a local market. Furthermore, the cost of the natural gas is one of the main factors affecting the steel selling prices, where any fluctuation in the cost per million British thermal units shall influence the prices significantly. Generally local capacity exceeded consumption also as elaborated above that quality steel production requires a sizeable capital and that reflects a notable impact on the Ezz steel prices in the local market, see figure 3.

Figure 3: Market forces for the steel sector during the period 2011-2020



Source: <https://www.ezzsteel.com/investor-relations/ezz-steel-co-s-a-e/financial-reports>

Analysis of steel rebar supply and demand curves in the last 10 years into three main segments. The first segment during the period 2011 to 2015, is characterized by a slowdown of the construction and the decrease of demand was the main driving factors. In the second segment, from 2016 till 2018 the prices increased due to the floatation and the increase of the gas cost. As well, the government increase the investment in the construction sector and started to carry out mega projects which resulted in increasing the demand. On the other side, the supply has increased slightly in this period. The third segment was during the period 2019 until 2020, which shows a decrease in prices due to stabilizing the exchange rate and decreasing the gas cost. In the first quarter of 2020 price decreased due to the decrease in the prices globally due to COVID-19, quantity supplied decreased due to slowdown in the construction activities in the local market. In the second quarter price remained almost stable, while quantity supplied decreased as an effect of the outbreak of COVID-19 circumstances along with halting granting licenses for construction activities for 6 months on April 20. While in the third quarter Quantity supplied decreased in light of the continuity of the Outbreak of COVID-19. While in the fourth quarter Prices increased due to the increase of the prices globally, quantity supplied increase to meet the demand in light of having an increased demand in the market due to the continuous increases of the steel prices along with the expectations of the of end of the construction halt decision on November 20. And it is expected to maintain increasing for the scarcity of ore and currency weak purchasing power.

The Rebar steel product is mostly elastic for both supply and demand whereby it is affected by many factors including the supply of raw materials, cost of production and global circumstances and not only the prices. There is always a violation of law of demand and law of supply. There is a current oversupply in the global and local steel market, the local capacities

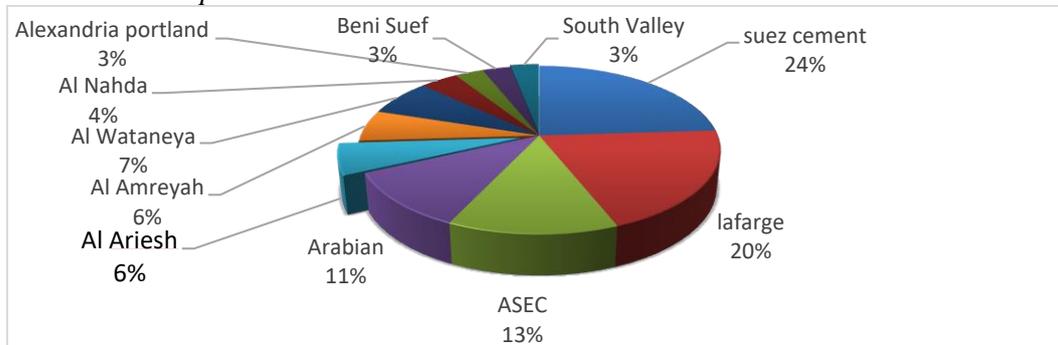
reached to 12MT while the supplied and sold volume reached 6.9MT as of 2020 (Salman & Mohamed, 2019). The market type is an Oligopoly market, whereby it's characterized by limited number of steel suppliers in the market (Ezz Group, Beshay Group, Suez Steel, Garhy Steel). Ezz Group is considered a dominant in the market given the market share exceeding 50% while the other players are considered followers.

### 3.2 Cement sector in Egypt

Cement is one of the main components of concrete, it is a very high quality and economically material that is used in any construction project all over the world. As cement is one of the most vital products that everything in the economy is dependent on it, any fluctuation in its prices affects the whole economy. The cement industry is really interesting to be studied as in the majority of the world it is an oligopoly market, which means there is not a high level of competition yet there are strategies between the players in the market. Cement is a complement product to any construction activity in an economy, therefore cement is an important product that is linked to the development of the country however manufacturing such product leads to high social costs.

Over the years, it has been technically developed with some producers joining the stock market. The cement sector in Egypt goes back to the early twentieth century. Now it includes 19 companies the state-owned capacity is 19.5 million tons (MT) with 10 production lines. While the private-owned capacity is around 61.7 MT with 37 production lines. The cement industry in Egypt has remained stable over the last several years although data indicates that there may be an increase in production over time, Salman, (2017). In 2018, Egypt's cement production was considerably higher than expected at some 81 million metric tons.

Figure 4: Cement companies market share in 2018



Source: <https://cementdivision.com/cement-industry-in-egypt/facts-and-figures/>

Cement consumption in the Egyptian market in 2017 was 53.8 million tons, and in 2018 was 51 million tons. The idle capacity of more than 30 MT due to a decrease in demand. Investments in cement exceed 250 billion EGP. "Production lines plus the cost of investment in building, land and infrastructure". Raw material: cement factories convert the raw material, namely limestone and the quarries to cement blocks (clinker) through thermal reaction. The cost of raw material ranges from 10 to 25% of the total cost of cement production in Egypt. The cost of energy is 50-70% of the total cost of cement production in Egypt. The cement industry in Egypt is vital. The quantity supplied is affected by other factors (mainly production and efficiency costs) and not just price changes, while the main factors that affected demand in Egypt were housing projects, political stability and the value of the Egyptian currency.

All companies in the Egyptian market offer very similar products and none of these competitors can create an identity for their product, so if any of them increases the prices, they will lose their market share as customers who will automatically convert to the competitor at a

lower price. The increase in production capacity led to a gap between supply and demand. Despite the weak demand growth, the production capacities of the industry gradually increased from about 53 MT (million tons) per year in 2010 to about 81.2 MT annually in 2018. This created a gap between supply and demand as the increase in production capacity did not show a similar growth in demand for cement. The productive capacities of factories in Egypt (exceed 80MT) increasing while consumption rates (about 50MT) decreasing) Pandemic, regulations) thus the surplus exceeds 32MT (40%) prices will decrease cement companies incur losses. However, some cement companies may shut down and others van acquire competing companies, to calm competition in prices, to cover the cost of production at the very least (Monopoly outcome). Increase export (lower price 12\$) decrease production cost (energy from cement waste) or reduce production. We believe that government intervention is the only way to reduce market collapse as the current prices do not cover production costs by rationalizing production and regulating the market to maintain a balance between supply and demand.

Growth needs an economic stimulus: for cement demand to return to its usual growth, we need a recovery in the Egyptian economy and an increase in the incomes of individuals, which will allow for continued growth in construction, especially small and medium-sized housing projects. It is expected that the "oligopoly monopoly" type in the market will continue and not turn into "full competition", as there are real steps taken by the government by entering the country to the cement production market, and the market will continue to be monopolized by a few producers, whether the state or the private sector.

**Supply side - Driving factors affecting cement production:** There isn't much that cement companies can do regarding cost structure because the margins are less, to begin with; Cost advantages are usually due to companies having access to a cheaper power source. The increase in the price of cement due to the increase in fuel costs. The Energy resource deficit in Egypt has turned from an oil and natural gas exporting country to a country importing them at different rates, where the energy crisis affected cement factories. The production cost of the cement companies using natural gas increased and as well for coal users, too, but less heavily, given that the cost of importing coal was largely denominated at the global market exchange rate. Energy represents 40- 50% of production costs (for gas users), After all, the basis for certification is that the industry is based on diesel, natural gas or coal, all of which are used at great rates, which this led to a rise in the price of cement itself, and an increase in prices of 100% for coal because it is related to the price of the dollar.

Egypt is consistently seeking for securing different energy sources and some companies are currently considering reliance on wastes as an alternative fuel, in coordination with the Ministry of Environment for the approval of wastes usage as the energy mix, and an auxiliary fuel with coal, not a substitute for it. In addition, in the legal and environmental scenario, the cement industry is directly affected by the environment, which is very common in developing countries where environmental issues are less stringent. Environmental procedures or precautions caused cement's price increase, which causes the non-expansion of the cement industry in Egypt. Environmental studies from different sides proved that cement factories generate many sources of pollution. Environmental, affecting human health, water, and plants. This industry affects the infrastructure components of sanitation, as it requires drainage for the cement plant waste which needs to be treated before being thrown into sewage paths.

**Demand side- Driving factors affecting the cement sales:** Price of the product itself (was apparent when the Egyptian pound devaluation sharply decreased the demand). Small and medium-sized housing projects are the main forces of demand for cement in Egypt. The contribution of these projects ranges from 70 to 90% of the total demand for cement in Egypt

compared to the 10-25% for national projects and first-class housing projects (Trading economics, 2020). Expectations of higher or lower prices in the future affect the current demand for the product. The cement companies facing many challenges from the global crisis of COVID 19 and some ministerial decisions that increasing in supply and low demand, which results from a loss to companies and forced to reduce prices and layoffs so the solutions to revive the cement economy. Also, the government responded to the companies appeal to low prices for natural gas and electricity to lower the cost of production.

### **Conclusion**

The Egyptian industrial experience had a challenging experience to draw upon. The government intervened with a set of regulations to regulate the local steel and cement market. The regulation and opening the door for many competitors was for the benefit for the consumers in terms of decreasing the price. However, other factors participated in the increase in the overall price such as cost of production and the expansion in project as it create higher demand. The study show despite the several shock the Egyptian economy face it the economy struggle to recover. And the government aim to invest heavily in developing the infrastructure driven by the increasing rate of the population as well investing in may industrial projects. These projects create jobs and facilities the business cycle in the light of the available supply chain. But after saturating and fulfilling the objectives the glut of the steel and cement industry are in need to find a new avenue to maintain production, especially that these two industries are labour intensive. The following are a proposed solution to overcome this crisis:

- Investment banks had to enter the market to reduce the gap between the companies and help them to control prices according to cost.
- The government should provide alternative sources of energy and fuel to help the companies managing energy costs.
- Opening new markets for cement export.
- Building a river transport network to facilitate export to Africa, will have positive economic and political results. Accelerate the intra trade with the Arab countries
- Due to the high pollution of cement manufacturing we expect companies to try and reduce the pollution and try a more sustainable way in reaching zero waste industry while profit sustains the business

### **Acknowledgment**

The author is grateful to Dr Nihal Nashet for her comments to develop the paper in its final status.

### **Abbreviation**

GDP	Gross domestic product
FY	Financial year
MF	Market Failure
MT	Million tons

## References

- Cement division. (2021). Cement industry Figure and facts. Retrieved from <https://cementdivision.com/cement-industry-in-egypt/facts-and-figures/>.
- Central Bank of Egypt. (2020). *The central bank of Egypt – initiatives*. Retrieved from <https://www.cbe.org.eg/ar/Pages/CBEInitiatives.aspx>.
- Corporate Finance Institute. (2015). *Market Failure - Definition, Causes, and How to Address*. Retrieved from: <https://corporatefinanceinstitute.com/resources/knowledge/economics/market-failure/>.
- Daoud, A. O., Othman, A. A. E., Ebohon, O. J., & Bayyati, A. (2020). Overcoming the limitations of the green pyramid rating system in the Egyptian construction industry: a critical analysis. *Architectural Engineering and Design Management*, 1-14. <https://doi.org/10.1080/17452007.2020.1802218>.
- Dollery, B. E., & Wallis, J. L. (1997). Market failure, government failure, leadership and public policy. *Journal of Interdisciplinary Economics*, 8(2), 113-126. <https://doi.org/10.1177/02601079X9700800202>.
- The World Bank. (2020). *World Development Indicators*. Retrieved from <https://datatopics.worldbank.org/world-development-indicators/>.
- Trading Economics. (2020). *Egypt Steel Production | 1991-2020 Data | 2021-2022 Forecast | Historical | Chart*. Retrieved 19 August 2020, from <https://tradingeconomics.com/egypt/steel-production>.
- Ezzsteel. (2018). Ezz financial statements. Retrieved from: <https://www.ezzsteel.com/investor-relations/ezz-steel-co-s-a-e/financial-reports>.
- Liedholm, C., & Mead, D. C. (1987). *Small Scale Industries in Developing Countries: Empirical Evidence and Policy Implications*. Michigan State University, Department of Agricultural, Food, and Resource Economics. DOI 10.22004/ag.econ.54062
- Musarat, M. A., Alaloul, W. S., & Liew, M. S. (2021). Impact of inflation rate on construction projects budget: A review. *Ain Shams Engineering Journal*, 12(1), 407-414. <https://doi.org/10.1016/j.asej.2020.04.009>.
- Salman, D. M. (2017). An assessment of the oligopoly cement industry in Egypt: is it a curse or a blessing? *International Journal of Green Economics*, 11(1), 41-61. <https://doi.org/10.1504/IJGE.2017.082713>.
- Salman, D., & Mohamed, S. (2019). Price discrimination in the Steel Industry: evidence from Egypt. *Proceedings of Business and Economic Studies*, 2(3). <https://doi.org/10.26689/pbes.v2i3.699>.
- Shiha, A., Dorra, E. M., & Nassar, K. (2020). Neural networks model for prediction of construction material prices in Egypt using macroeconomic indicators. *Journal of*

*Construction Engineering and Management*, 146(3), 04020010.  
[https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001785](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001785).

Windapo, A., & Cattell, K. (2012). Examining the trends in building material prices: built environment stakeholders' perspectives. *Manage Construct Res Pract*, 1, 187-201. Retrieved from <https://core.ac.uk/download/pdf/196579323.pdf#page=201>.

World Steel Association. (2020). *World Steel in Figures*. Retrieved 3 June 2020, from <https://www.worldsteel.org/en/dam/jcr:f7982217-cfde-4fdc-8ba0-795ed807f513/World%2520Steel%2520in%2520Figures%25202020i.pdf>.