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EFFECT OF FDI, TRADE OPENNESS AND EMPLOYMENT AND MANUFACTURING SECTOR GROWTH: EVIDENCE FROM PAKISTAN BASED ARDL APPROACH

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ABSTRACT: The manufacturing area exhibits a vital sector of Pakistan's economy. Pakistan is facing the worsening macroeconomic outlook in recent years. In political and business climate, the issue is imperative to realize the associations among growth output of manufacturing industries and the macroeconomic factors(determinant) with the purpose of prevent the adversative growths. The core objective is to examine the effects of macroeconomics determinants on manufacturing output growth of Pakistan. The findings present yearly records for the spanning of 1973-2020. The unit root ADF test is performed to identify presence of unit root stationary at level and first difference mixture order of integration. The ARDL test confirm to perceive whether they occur a since a long-term connection among the issues. Meanwhile the macroeconomic determinant, foreign direct investment, employment and trade openness have shown a significant and positive influence on manufacturing sector growth (MSG) in long run and short run, while in long term, the coefficients of inflation and energy crisis have a negative and insignificantly affect with manufacturing sector growth of Pakistan. Our outcomes show that Pakistan ought to consider suitable positive arrangements in regards to macroeconomic determinant (factors), trade openness, employment, manufacturing foreign direct investment, and to accomplish excessive and robust manufacturing sector output and development. There should an increase of trade openness for the betterment of the economy. The government should also ratify strategies to alleviate the revolutionary and industry environment of the nation so as to sustain output growth into the manufacturing industry.

Keywords: foreign direct investment, employment, trade openness, manufacturing sector growth. Pakistan

1.Introduction

The manufacturing industrial sector is performing a critical reliability in the growing of Pakistan's economy. Afterwards agriculture and assistance (service), the manufacturing sector is the second biggest area of Pakistan. The Pakistan manufacturing sector percentage to GDP is 12-13% while services 51% and agriculture 11%. (Economic Survey of Pakistan, 2020-2021). Manufacturing area of Pakistan asserted a real growth output of 4.2 percent for the duration of year 2020 with investments arriving on 1464.0 billion rupees. Manufacturing area of every country clasps the

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huge significance and its commitment in generally growth and financial development cannot be misrepresented. The significance of this area in Pakistan, existence the second biggest area of the economy, is obvious from the way that it represented around 13-14 percent of gross domestic product, 16.1 percent of absolute employment and 74 percent of all out exports of the nation in the financial year 2020-21. It additionally takes the declining pattern of fixed capital investment per capita GDP growth (20.9%, 21.5%, 16.2 percent, and 12.47 % in 2005, 2010, 2015, 2020 years respectively).

Pakistan's economy had unpredictable development design throughout the long term, with facing challenges in accomplishing long-run and all-inclusive development. Unmaintainable growth of manufacturing was brought about by unaddressed long-standing primary issues for instance, low FDI, inadequate export and electricity shortfall in energy area, and low investment funds and saving (Haque, 2014; Mangla & Din, 2015; Rahman & Abu Bakar, 2019).

Pakistan's market has encountered uncommon difficulties through the beyond two-fold years by virtue of adjustment assesses and COVID-19 flare-up that reserved the nation underneath its expected stage. The COVID-19 pandemic that overwhelmed the entire globe is orient-a-century occasion which gives uncovered the deficiency of medical care frameworks all throughout the region. The deficiency occupations, conclusion of organizations, and discarding masses into outrageous poverty coexisted clear results all around the Worldly concern (Pakistan's Economy Survey, 2020-21).

Figure 1: Output growth in manufacturing sector
Source: State Bank of Pakistan, 2020-21

As per displayed in Figure 1, the Pakistan output growth manufacturing sector as percent of GDP within the course of the years has seen a progression of ups and down. Around 1999-2020, manufacturing industry growth output a consistent ascent, however this was transient, so it dropped again in 2005, a consistent decrease is seen from 2012-2020. It is obviously seen from diagram that growth output of manufacturing in Pakistan is not exceptionally uplifting. The diminishing pattern from the most recent fourteen years illustrates that it ought to be made sure

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that why it is not expanding.

The Pakistan's industrial performance has tracked a flourishing– burst growth cycle. In constructing different internationally competitive manufacturing sectors, at a time when the BRICS (the countries like, China, South Africa, Barizal, Russia, and India) emerging economies have achieved. Manufacturing area has attempted to fill in a supported way is as yet tormented by a large group of underlying issues, remembering low efficiency and absence of advancement for item, high inflation and interaction advances (Mangla & Din, 2015; Haque, 2014; Awan, Abro, & ul Mustafa 2021, Agénor, Canuto, & Jelenic, 2012; Kalim, 2001; Rahman, Bakar, & Idrees, 2018). It is focusing on that some previous investigations characteristic the miserable presentation of the manufacturing area to a few issues, remembering an excessive amount of fixation for modern industrial items, absence of quality items, insufficient openness to international business sectors and along these lines to contest, slow human improvement, low investment, and absence of innovative work. Whereas considerable be affected by appearance and issues hampering the manufacturing industries Rahman & Bakar, 2018; Haque ,2014; Mangla and Din ,2015; Rahman & Abu Bakar, 2019; Kalim, 2001) little consideration has been rewarded to the topic of what the macroeconomic variables means for manufacturing area execution. Pakistan economy is facing the worse situation in recent years. In Fiscal year 2018, the economy of the Pakistan did not accumulate several designated large scale factors like gross domestic product (GDP) growth, circular debt, electricity production, revenues, or) investments (FDI and domestic investment) and the manufacturing industrial area needs expansion with sugar industry, materials food, leather industry, textile and chemical industry, actually representing the main part of the area's complete worth added output (Pakistan Bureau of statistics, 2019).

This paper is a stage toward that path. In particular, it endeavors to investigate the influence of the macroeconomic factors in motivating manufacturing investments on growth output into manufacturing industry. The foremost macroeconomic determinant exerted in this study are employment manufacturing (EML), manufacturing FDI, inflation (CPI), trade openness (TOP), and energy crisis (EC). Meanwhile, the manufacturing industry is essential to the nation, information proceeding its association by the macroeconomic factors existing in the problem monetary climate is vital. Regardless of the changes of EML, EXP, FDI, EC and the consistent development of inflation, no undeniable connection between those factors and the manufacturing area have recognized. Exclusive execution of time series estimations, the practice that the macroeconomic determinant connect with output in manufacturing area development will stay equivocal, and the issue will be hard to foresee what the new advancements in Pakistan's macroeconomic factors will mean for manufacturing growth area.

Rest of the review is coordinated as surveys: Section 2 literature reviews the significant empirical investigations. Section 3 research objective. Section 4 presents Research framework and variable measurement. Data analysis and Scrutinized outcomes are deliberated in Section 5. Lastly, section 6 arranges the conclusion, and policy implication. Formerly the study explores the impact of macroeconomic determinant, it is a smart thought to initially find out with regards to the historical backdrop of the manufacturing area, and the most ideal way of doing that is to find out

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with regards to the strategies executed by the public authority to assist with developing the area over the course of the years through the Pakistan Plans.

2.Literature review

In spite of a considerable lot of different components that possibly will help the development of the nations, the commitment of manufacturing area development is one of the fundamental worries in our review. As we probably are aware, since many years prior, Pakistan management have pertaining different approaches to upgrade the development of the manufacturing industry. Accordingly, the elements that will influence the development and output growth in manufacturing area are our fundamental concentration.

In this examination, five primary factors which will give huge impact to the growth output in manufacturing sector have been incorporated. These factors are inflation, manufacturing employment, manufacturing foreign direct investment, energy crisis and trade openness. This review will utilize however many past research writings as would be prudent as references to discover the effect on manufacturing output growth just as examiner the connection amongst these factors and manufacturing development previously they continue to frame our normal associations

2.1. Manufacturing Growth Output and Foreign Direction Investment

Foreign direct investment (FDI') problems have consistently scrutinized by numerous hypothetical investigations. Hymer (1976) framed a fundamental portion of the writing with his exploration on the inspirations driving FDI. The study discovered that FDI is essential in the financial improvement, everything being equal, particularly creating ones. Financial analysts accept that FDI make employment, rise efficiency, competitiveness, and cause overflows of innovation (Ernst, 2005; Sarwar, Ali, Bhatti, & Rahman, 2021;Denisia, 2010: Rahman, Bakar, & Sadia, 2019; Hunya, 2000; Shittu et al., 2020; Mishra, 2020; Khoula, Rahman, Idress, 2022; Rahman, Chaudhry, Meo, Sheikh, & Idrees, 2021; Rahman, Bakar, & Idrees, 2019; Ali, Rahman, & Anser, 2020. As a rule, despite the fact that FDI was upheld by the " spillover " hypothesis that the situation has produce constructive outcomes towards the monetary development, however this review might in any case want to inspect in much subtleties on what sway FDI created on the sectored development**.**

Providing in the direction of previous conclusions of Castejon and Woerz (2006), Anowor, et al. (2013), Danmola, Olateju, & Aminu (2017), Idoko, & Taiga (2018), Etukafia1, Ekpo & Asogwa (2017), Shahzadi, Sheikh, Sadiq, & Rahman, (2023), Shahid et al. (2022), Hafiza et al., (2022), Khan, Afridi, Shad, Rahman, (2022).Shahid, Muhammed, Abbasi, Gurmani, & Rahman, (2022), Nezakati, Fakhreddin and Vaighan (2011), Muzurura (2018) and Wong (2005), that FDI establish positive and significant on the growth output into manufacturing sector.

Anowor et al. (2013), utilized the OLS technique to concentrate on association between FDI on manufacturing growth. Their outcomes demonstrated a positive connection among FDI and growth of manufacturing area, therefore Nigeria is presently an emerging country. Besides, from the experimental aftereffects of their review that with accentuation on powerful macroeconomic

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approaches, as exchange transparency and swapping scale strategy, FDI influence fair and square of manufacturing area development possibly will incredibly augmentation. The positive impact of FDI and efficiency development and growth (Castejon & Woerz, 2006).

On the differentiation side, investigations of Liu and Daly (2011) showed that a negative relationship exists among FDI and manufacturing growth. Liu and Daly (2011) demonstrated that manufacturing areas are growing, trained labor remain a lot of ideal and henceforth the expense of work will in general increment. Be that as it may, high work cost demonstrating high creation cost which might draw the FDI outside the nations.

Etukafia1, Ekpo & Asogwa (2017) investigated the influence of foreign direct investment (FDI) on the growth for long- and short-term dynamics in Nigeria manufacturing industries between the time span 1981 and 2015. The econometric procedure embraced the bound test and ARDL approach to evaluate cointegrating association of FDI and output growth into manufacturing. Consequences of the since quite a while log run conduct and short run elements demonstrated that liberalization is substantial in impacting distinctions in manufacturing. Danmola, Olateju, & Aminu (2017) confirmed that the impact of foreign direct investment on output growth of manufacturing. The manufacturing FDI claims a positive effect on the manufacturing growth value added. This outcome further affirms the viability of financial strategy of the national legislature of Nigeria through the reception of changed modern and exchange arrangements. These arrangements were attempted so as to further develop proficiency and efficiency, just as to work on the intensity of manufacturing industry.

Idoko, & Taiga (2018) assessed the impact of FDI on manufacturing value added in Nigeria for the time period of 1981 to 2015. Employing VAR procedure and Johansen Co-integration technique illustrated that FDI had a positive however insignificant impact on the manufacturing sector. To enhance FDI on the manufacturing area, the review suggests that administration ought to carryout infrastructural advancement, similar to control supply to work on the absorptive limit of manufacturing industry.

H_1; There is a positive relationship between FDI and growth output in manufacturing area.

2.2 Manufacturing Output Growth and trade openness

As per Shirazi, & Manap. (2005) and Kemal et al. (2002) investigated a positive relationship amongst trade development, modern industrial creation and monetary development for India just by way of alternative South Asian countries. The determinant of growth shows different results in different countries this can be seen by observing the behaviour of trade openness led growth hypothesis. In India, Iran and Fiji impact of trade openness on economies growth shows a positive sign and results of different researches support. However, in some countries performance of trade openness is not appreciable, as this hypothesis shows opposite direction; economic growth leads to increase exports. The situation of Pakistan and Sri Lanka is totally different, there is no any causality between exports and growth manufacturing (Atrkar Roshan, 2007; Rahman, & Bakar, 2019; Love & Chandra, 2005), ul Mustafa, Abro, & Awan, (2021), Zulfiqar, Ansar, Ali, Hassan, Bilal, & Rahman, (2022), Bilal, Shah, Rahman, Jehangir, (2022).

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Since the overall prevailing hypothesis shows that the impact of trade openness on manufacturing value added. They had a lot of study underscoring the various impacts of e trade openness on various sorts of economy. The effect can be partitioned into positive effect and vague effect which can't be identified. Various studies had investigated the positive influence of trade openness on growth, Caglayan & Demir (2014), Riman, Akpan, Duke & Mboto, (2011); Uddin, & Norman (2009), Barisik & Cetintas (2009), Awokuse, (2008). and Swift (2007). Simlilary, the relationship of conversion scale and manufacturing industrial of Taiwa (Fong & Liu, 2009). They expressed that deterioration of money caused an ascent in trades, deals in the local market, absolute deals, esteem added and efficiency. Also, usefulness development of firm was observed to be influenced by devalue of conversion standard over firm scale extension.

Uddin &Norman (2009) analyzed the run-term connection between trades profit and industrial exercises in Bangladesh. Their outcomes affirmed that the presence of a bi-directional causality among exports and Bangladesh's manufacturing industry exercises. Consequently, the creators along these lines believed that a suitable modern area was important to drive Bangladesh outside exchange. Swift (2007) explored the relationship among exports and trades rate and investment on growth of manufacturing areas in Australia. The outcomes presented that absolute value added in manufacturing area development reacted as far as speculation to the cash changes and emphatically impact trade and adversely impact of imported expenses of facts. In different words, when conversion scale remembered it diminished the portion of product and venture yet in portion of imported info gradual increment.

Since the survey of the past writing gave different outcome, this review structure anticipated connection among trade openness and manufacturing growth by scrutinizing the export pattern in Pakistan. The review predicts that the swapping scale have a adverse links on assembling development. At the point when exports in manufacturing drops, esteem added increments consequently the foreign customers rise, and the inferior price draws in monetarist sponsors in marketplace. We, consequently, resort the accompanying hypothesis. to set down
H_2; There is a relationship between trade openness ***(TOP) and growth of manufacturing sector.***

2.3 Growth output in Manufacturing Sector and Inflation

In this time of globalization, the problem of inflation partakes significantly examined by the market analyst and strategy creator on the nation. The association among inflation and value added in manufacturing area has been widely examined in scholastic arena. "New Keynesian Theory" expresses that there is consistently a compromise among inflation and creations. In the investigations of Vaona (2012), the economist offers another hypothetical model and new experimental proof on the association among expansion and development and the outcomes further affirms that inflation adversely influences development and no expansion limit level can be initiate. Adaora (2013) evaluated the positive effect of inflation on manufacturing development. The interpretations that were chosen involved the period somewhere in the range of 1981 and 2011. OLS technique was utilized to analyze the association of government public expenditure, money supply, and inflation rate which are the explanatory factors and the value-added manufacturing as the predicted variable.

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In light of the outcomes of many investigations done by past scientist, this review partitions the impact of expansion on assembling area development into three sorts - adverse consequence, positive effect and no effect. Initially, for the adverse consequence, numerous studies concentrated on the review of Chaudhry, Ayyoub, & Imran (2013), Gopakumar & Salian (2010), Mwakanemela (2014), Gumbe & Kaseke (2009). Medee (2015) explored the effect of inflation on Nigeria's manufacturing area in Nigeria with the utilization of error correction mechanism.

Mwakanemela (2014) led examination to explore the relationship among the macroeconomics factors like inflation, FDI, and trade openness on the Tanzania' manufacturing exports for the time of 1980 to 2012. In this research, the study applied by OLS and Vector Error Correction Model The finding exhibited that inflation has negatively influence of manufacturing industry. Ayyoub, Chaudhry, & Imran (2013) concentrated a significant effect of inflation and growth of services, agriculture, and industry of Pakistan which designed for the time span of 1972 to 2010. From the observational outcome confirmed that the increase inflation is dangerous for various sectors of economy like manufacturing industry.
Gumbe & Kaseke (2009) analyzed the effect of hundred Zimbabwe assembling industries in the swelling time frame from 2005 to 2008. They expressed that assembling area will in general endure the worst part of swelling and the area encountered an adverse consequence where quantities of organizations gone through emergency like radical decrease of creation, laid off specialists and shut plants to keep up with the commercial and the impact of expansion. Gopakumar &Salian (2010), concentrated on the connection among swelling and GDP development in India utilizing mistake adjustment paradigms. The study noticed a negative connection over the long haul among swelling and development, inferring that expansion is unsafe regarding development.
H_3; There is a negative relationship between Inflation CPI and growth of manufacturing sector.

2.4 Output Growth in Manufacturing Sector and Employment
Each administration intends to acquire high work, stable costs, and practical development in the country, whether or not it is a creating or created country. Singh, & Kumar, (2017) investigated that the manufacturing had driven a most significant mechanism of monetary development and advancement, especially in producing nations. It had been experimentally demonstrated that, there was positive relationship between the industrialization and the degree of per capita pay in creating economies. Manufacturing area was viewed as the biggest safeguard of workforce however amusingly the business portion of manufacturing in the India's GDP had been pitiably low for practically the whole post-autonomy time of improvement. Manufacturing is normally seen as an equivalent to industrialization which determined by colossal capital prerequisite

In light of a couple of studies, manufacturer labor occurs a positive effect anyway there are additionally a couple of journalists remain on the contrary perspective. For the positive effect, the investigation of Karim and Yin (2015) and Ahmed (2012). Karim and Yin (2015) investigated the impacts of private investment on employment and manufacturing output. They comprised a time span from 1980 to 2010 for the variable of private investment inflows and from 1981 to 2011 for the factors of work and yield. There were seven cross-section units to address seven

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classes of industries for the investigation. They utilized regression method, the assessed coefficients private investment had measurably critical effects on the output and degrees of employment. Applying Pearson Correlation method, the findings demonstrate that there was a positive connection amongst employment and output.

Ahmed (2012) scrutinized that the impacts of FDI on the manufacturing labor, absorptive limit and actual capital, human capital. The review investigates the impact of human resources, workforce, and absorptive limit, actual capital as a control variable, FDI and economic growth (GDP) on efficiency development in Malaysia. A quarterly information from the time of 1999 to 2008 was utilized. The Ordinary Least Squares (OLS) relapse was applied to assess the information in the initial step and in the second step efficiency pointers were determined. The outcomes displayed that the FDI inflows and data sources utilized were contrarily added to add up to factor usefulness (TFP). In the meantime, FDI assumes a critical part in accomplishing financial development through input driven as demonstrated by the commitment of the TFP. In such manner, a critical positive connection between human resources, workforce and absorptive still up in the air the overflow impact on financial development (GDP) was established and the actual capital has shown negative relationship. For the adverse consequence, the review Khan (2005) and Khan (2018) measured employment openings by development in the small-scale manufacturing area in Pakistan based on their versatilities for the period 1976 to 1986. As indicated by their finding in the small-scale fabricating area size of work was contrarily related with wage flexibility, emphatically related with capital versatility and furthermore decidedly related with worth of item versatility.

In any case, this review assumes that export ought to create positive effect on Pakistan manufacturing area development in the meantime Pakistan is an agricultural nation. Assembling area require more cash to make greater investment and furthermore on the innovative work. Subsequently, expansionary approaches are vital to develop the manufacturing sector in Pakistan. By means of such the study suggest the accompanying speculation with regards to Pakistan for examination.

H_4; There is a positive relationship between Employment (EMPL) and growth of manufacturing sector

2.5 Growth Output Manufacturing Sector and Energy Crisis

Batool, Shamsi & Nazir (2016) analyzed the relationship between energy shortfall, oil costs and manufacturing area development in Pakistan. Applying time series analysis, the study covered the time from1980-2011. The discoveries of the review displayed an opposite connection between the energy emergency and portion of output of manufacturing sector and there is for some long run connection between these factors. Omri and kahouli (2013) analyzed the relationships between, FDI, energy utilization and growth and development. Utilizing panel data approach models in synchronous conditions for a worldwide panel comprising of 65 nations. The review was set aside time span for 1990–2011. In the observational part, the review portrays on development and growth hypothesis and expand the classical growth and development model, which comprises of capital, labor and inflation, with foreign direct investment and shortfall of energy. The study estimated that the long-run relationship between electricity shortfall and GDP.

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The study confirmed that a unidirectional causality occurs between electricity and growth. The issue causes that any conceivable energy crisis might retard the practice of economic growth in Pakistan. Administration wants to finance in energy infrastructure with the purpose of provision growth on Yasmin, Javid, & Ashraf, (2013) and Zeshan & Vaqar (2013). Zhu, Fang, Rahman, & Khan, (2021).

Shah, Essrani, Shah, & Rahat, (2013) scrutinized the energy shortfall on the growth of textile manufacturing industries. The results suggested that the functioning of textile manufacturing industry is seriously suffering in energy shortage phase. Using multiple regression analysis, the outcomes of the study affirmed that there is negative relationship between output of textile industry and energy wastage (Afzal2, 2012).

Lodhi, Siddiqui, and Habiba (2013) explored the components impacting foreign direct investment in Pakistan. Utilizing ADRL method, the discoveries of the review affirmed that in the log-run, domestic investment, shortfall of electricity creation and FDI have positively related on value addition of manufacturing. They likewise reasoned that industrial worth expansion and FDI are positively associated in short term. Zulfiqar et al. (2014) reviewed the impact of energy crisis in power sector and manufacturing foreign direct investment in Pakistan. The study enveloped the time span from 2001 to 2013. Employing OLS test to determine the effect of energy crisis of electricity on FDI. The results of study proved that there exists a negative connection between electricity disaster and FDI.

Shah et al., (2013) studied the impact of the essential for energy alternative on the creation of material manufacturing area of Pakistan for the period of 2005-2010. The fundamental point of their exploration is to investigate the impacts of the crisis in power sector, and loan fee on the material manufacturing industry area of Pakistan. They utilize even proportion examination in their review to look at the presentation of any industry. They reasoned that because of energy shortfall, creation of, the material manufacturing industry has been worsened. Their conclusions support full in the administration manufacturing sector specially textile industry. Shakir et al., (2014) investigated the impacts of energy deficiencies in Pakistan, the primary point of their examination is to investigate the elective assets of energy, they likewise recommended that Pakistan utilize thermal power, wind energy and sun-based energy to produce power. Pakistan government should construct limited scope hydro dams to tackle the issue of energy emergency, they likewise discovered the advantages and usage of accessible assets.

Naseem and Khan (2015) examined the impact of energy tragedy on growth of Pakistan. The review applied time series information for the spanning period 1982-2011. Employing regression method, the review insisted that energy utilization and financial development are positively identified with one another and furthermore found that energy lack gravely influence the growth and development of each area. They recommended that the public authority produces energy from hydro, wind and sun powered rather than oil and furthermore produce energy from atomic and coal stores to beat the energy shortage.

H_5; There is a negative association between energy crisis and growth of manufacturing sector.

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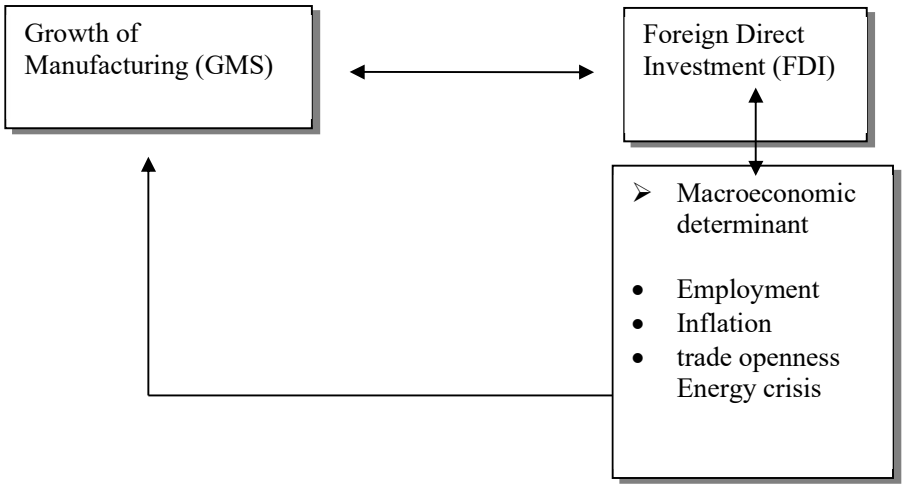
3. Research Objectives

The overall objective of this review is to determine how output growth of manufacturing area development is influenced by the macroeconomic determinant (factors), while the particular destinations are:

1. To examine the effect of foreign direct investment on growth of manufacturing sector in Pakistan.
2. To examine the effect of inflation on growth output of manufacturing sector in Pakistan.
3. To explore the effect of trade openness (TOP) on manufacturing sector growth in Pakistan.
4. To establish the effect of employment (EMPL) on output in manufacturing in Pakistan.
5. To find out the impact of energy crisis (EC) on output growth manufacturing in Pakistan.

4. Research Framework and Measurements of Variable

For deciding the progression of experimental examination, the accompanying exploration structure / framework is contrived to following the effect of different kinds of particular Macroeconomic determinant and Business climate factors to draw in development of manufacturing sector in Pakistan during 1973–2020



The resultant factors have been joined in the observational examination interaction of the review.
.

FDI = Manufacturing Foreign Direct Investment consistently in yearly (information have taken from the Economic Survey of Pakistan).

MSG = Manufacturing Sector growth (data have compiled from the Statistical Handbook of Pakistan).

TOP_ = trade openness designated in Sate Bank of Pakistan.

EMPL = Employment in manufacturing selected from Economic Survey of Pakistan.

INF= CPI inflation

EC= Energy crisis and is measured by short falls of electricity

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5.Data Estimation and Empirical Outcomes

To scrutinize the influences of macroeconomic determinants on the growth output in manufacturing industry in Pakistan as reviewed in the theoretical development (hypotheses) and exemplified in the research framework, this analysis developed the comprehending stages.

5.1 Unit root

In request to prevent misleading the regression result, the study start the examination of the assets of time series information. The study managing to decide whether the factors are fixed or nonstationary in nature. The study tests out for reconciliation of the factors by utilizing Augmented Dickey Fuller test. ADF approach investigates at the request for incorporation among the factors (Dickey and Fuller, 1979). This test develops the accompanying numerical mathematical articulation for calculation

$$\Delta Z_t = \gamma + \theta_{yt-1} + \gamma T + \sum_{j=1}^{k} \vartheta_j \, \Delta Z_{t-j-1} + \epsilon_t$$

From above equation, Z has series by period t; γ is a steady span, k is no. of slacks and εt is repetitive noise error term. Assuming the registered ADF value is not exactly the basic worth, the invalid speculation of series holding unit root can't be dismissed.

Alternately, in the event that the ADF test esteem is further than simple worth, the study reject the invalid speculation holding unit root. It confirmations that there is no unit root in the series. Also, in the event that the information has unit root or isn't fixed, we do contrast once to make it fixed

5.2 Autoregressive Distributed Lag Model

The study applies ARDL model (Pesaran *et al*., 2001). The ARDL technique to cointegration has advantages in that it can be applied when series are integrated of different orders. Moreover, in determining co-integration, it accommodates different optimal lags to be assigned to variables (Raji *et al.,* 2014; 2017). ARDL technique is an advance technique of regression having many features. It can be used efficiently for small sample set. The ARDL model is as stated in the following equation:

$$\Delta MSG_t = \alpha_0 + \sum_{i=0}^{z} \alpha_i MSG_{i-1} + \sum_{i=0}^{z} \beta_i \Delta lnFDI_{t-i} + \sum_{i=0}^{z} \beta_i \, \Delta InEML_{t-i} + \sum_{i=0}^{z} \beta_i \Delta lnEXP_{t-i} + \sum_{i=0}^{z} \beta_i \, \Delta InEC_{t-i} + \sum_{i=0}^{z} \beta_i \, \Delta lnCPI_{t-i} + \pi_1 GMS_{t-1} + +\pi_2 lnFDI_{t-1} + \pi_3 lnEML_{t-1} + \pi_4 lnEC_{t-1} + \pi_5 lnEXP_{t-1} + \pi_6 CPI_{t-1} + \mu_t \, \alpha \quad (1)$$

In Equation (1), Δ is the first changes functioning, $l_n$stands natural logarithm, P remains the optimal lag, MSG is the manufacturing sector growth measured by real growth (% of GDP), FDI in manufacturing is the measure by million USD. Labour is represented by EMP and is measured by employment in manufacturing (No. of Employed Persons by Industry). EC is the energy crisis and is measured by short falls of electricity. and CPI is the inflation rate.

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5.3Empirical Results

In descriptive statistics, the critical structures of dataset for instance mode, arithmetic mean and median stand for the three instruments of dominant value of limitation of a arbitrary variable (Gujarati, 2004). The measurements of descriptive consideration are a key aspect which existing quantitative data appearing in an appropriate procedure similar table 1.

Table 1. Descriptive Analysis

	MSG	FDI	EML	CPI	EC	TOP
Mean	15.480	93286.85	12.809	44.796	40.932	13.292
Median	15.500	63284.73	13.217	28.666	39.559	13.359
Maximum	18.600	380928.6	15.761	143.202	60.137	17.359
Minimum	12.040	3750.008	8.2700	3.1853	25.242	8.2354
Std. Dev.	1.4336	94620.64	1.6876	43.599	11.0380	2.4417
Skewness	-0.3831	1.609096	-0.8558	1.1234	0.2717	-0.1143
Kurtosis	2.9809	5.005949	3.0157	2.9544	1.5885	2.0758

The average adjusted ratio of Manufacturing sector growth is 15.480 million rupees for our period of analysis with standard deviation of 1.4336, while mean for Foreign direct investment is 93286.35 million USD with 94620.6 standard variations. Employment in manufacturing has an average of 12.809 with 1.6876 standard deviation. Moreover, inflation and trade openness are 44.796 and 13.292 on the mean value while standard variations are 43.59 and 2.44 respectively. Similarly, the average values for Energy crisis (shortfall of electricity) are 40.93 and the value of standard deviation is 11.04. The normality standard value of Kurtosis is equal to 3 although Kurtosis value of FDI in manufacturing and employment (EML) in manufacturing are larger than 3 which is a called leptokurtic distribution. Despite the fact the esteems of MSG, CPI, EC and TOP are lesser than 3 which demonstrates Platykurtic.

Table 2. Correlation Matrix

	MSG	FDI	EML	CPI	EC	TOP
MSG	1.000					
FDI	0.175	1.000				
EML	-0.418	-0.040	1.000			
CPI	-0.689	0.381	0.340	1.000		
EC	-0.376	-0.373	-0.005	-0.747	1.000	
EXP	0.608	0.220	-0.603	-0.145	-0.305	1.000

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In the Table 2, the outcomes exhibited that the association between predicted variable manufacturing sector growth (MSG) and independent variables (FDI, EML, CPI, EC, TOP) ended up being exceptionally valuable in pre-assessment examination particularly as respects potential affiliations proposed by theories. The study confirmed that foreign direct investment, manufacturing trade openness have positive links with manufacturing sector output growth

5.4 Units Root Tests (ADF Test)

To avoid from misleading relapse, we start with an examination of the properties of the time series information that we are managing to decide whether the factors are fixed or nonstationary in nature. The technique utilized here is the Augmented Dickey Fuller (ADF). Information in Table 3 expressed that reliant variable of manufacturing sector (MSG) and further variables of macroeconomic determinant such as, manufacturing FDI, Employment in manufacturing, trade openness Inflation, and Energy crisis.

Table 3: ADF Test for unit root

Variables	Level	First Difference	Order of Integration
MSG	-3.518	-8.219	1(0)
FDI	-3.328	-5.680	1(1)
EMPL	-2.653	-12.761	1(1)
TOP	-0.766	-6.144	1(1)
CPI	-2.780	-0.969	1(0)
EC	-2.545	-9.000	1(1)

From the outcomes in Table 4, the augmented Dickey–Fuller *tests* findings reveal that a few factors are fixed in level whereas another is stationary close to first difference. In this way, in view of the ADF tests outcomes, the study decides to utilize the ARDL technique to lead the since quite a while short run and log-term examination. The ARDL strategy is helpful when factors have combination of orders of mix, that is, I(0) and I(1). It is focusing on that among the factors tried, nobody is coordinated of request two, which might nullify the utilization of ARDL approach. Along these lines, our review is liberated from spurious outcome.

5.5 Bound Test to Co-integration Approach

The study utilizes F-statistics to check the combined implication of the limitations. Our study formerly, at that point, look at the figured worth of F-statistics as well as the basic analytical values of bounds, that is, lower bound, I(0) and upper bound, I(1) . We recognize the presence of co-integration if the assessed F-statistics is more than the analytic value in upper bound and on the other hand, we reject the occurrence of co-integration if F-statistics is underneath the diagnostic value in support of lower bound. The conclusion will stay uncertain when F-statistics

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is between the basic qualities for lower and upper bound. In the F- statistics test, the co-integration does not occur among factors when the null hypothesis. Table 4 confirmed the consequences of bound test to co-integration amongst the factors and we ambit drive in a long run.

Table 4: Bound Test

				Critical Value Bounds	
Test Statistic	Value	k	Significance	I_0 Bound	I_1 Bound
F-Statistic	4.937	5	10%	2.26	3.35
			5%	2.62	3.79
			2.50%	2.96	4.18
			1%	3.41	4.68

In ARDL technique, we need to actually look at the bound test prior to leading the co-integration association between the measured and regressor variables. The bound test to cointegration approach exhibits the value of F-statistic is 4.937 more than critical value in I(1) with the 5percent critical level. This proposes the presence of co-integration among the factors for the Pakistan, explicitly, a long-run association exists among growth of manufacturing sector and explanatory factors (FDI, EMPL, EXP, EC, and CPI). Based on the bound test outcomes, we push accelerate to lead long-run connection of the model

5.6 Estimation of Long Run Relationship

Table 5 presents the outcomes of co-integration among manufacturing sector output growth and trade openness, foreign direct investment in manufacturing, energy crisis, manufacturing employed labor, inflation. The results exhibited that significant and positive associations exist among manufacturing FDI, employment (EML), trade openness (TOP) and the growth output in manufacturing sector of Pakistan. The study indicated that one percent increase in manufacturing FDI causes manufacturing sector growth (MSG) to increase by 0.992 percent. These outcomes aligning with those procured in different nations as brought up in the writing. Our results are alinging with those obtained in other countries as put emphasis on previous literature (Chandran & krishnan 2009; Anowor et al.,2013; Danmola et al., 2017; Ehijiele et al. 2016; Castejon & Woerz, 2006; Wong, 2005; Nezakati, et al., 2011; Okoli & Ogu, 2015), the conclusions for positive effect of FDI and growth manufacturing in the current review are persistent through the prior consequences of research paper from the evidence of Pakistan (Shafique, Rahman, Khizar, Zulfiqar, 2021; Hamid & Pichler, 2009; Rahman & Bakar, 2019; Rahman et al., 2019; Rizvi & Nishat, 2009). This consequence delivers some assistance designed for further liberal strategies in the direction of FDI on growth of manufacturing.

While one percent rise in employment results in 0.220426 percent increase in manufacturing sector growth. The findings are aligning with past literature (Hamid & Pichler, 2009; Rahman, Bakar, & Idrees, 2019: Karim and Yin, 2015; Nowjee, et al., 2012; Ali and Saddiqi,2011; Ahmed, 2012;

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Table 5: Results for Long Run Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.992123	0.724561	1.379166	0.0309
EML	0.220426	0.129118	1.707168	0.0966
TOP	0.521863	0.098933	5.274925	0.0000
CPI	-0.010862	0.007046	-1.541509	0.1322
EC	-0.048275	0.025152	1.919333	0.1631
C	4.369549	3.199835	1.365554	0.1808

The coefficient of trade openness has positive prompting in manufacturing sector output. Findings indicates that a one per cent rise in trade openness take the lead to 0.521863 per cent in manufacturing sector growth. The outcomes are in line with the studies (Atrkar Roshan, 2007; Love & Chandra, 2005; Narayan, Narayan, Chand Prasad, & Prasad, 2007; Kemal et al.,2002; Rehman,2015; Topalova, 2004; Ellahi, & Mahmood, 2012; Zaman, 2010). Inflation is negative and insignificant persuading in manufacturing sector growth. The finding is supported by preceding literature (Adaora, 2013), and Chaudhry et al (2013).

5.7. Evaluation of Short Run Relationship

Table 6 demonstrations the outcomes sustaining the short run relationship. The coefficient of error correction term effect has negatively significant in Pakistan. The finding affirmed that FDI in manufacturing has positive impact on manufacturing sector growth of Pakistan. It indicates that one percent increase in manufacturing FDI makes output growth into manufacturing sector (MSG) to raises by 0.892782 percent. these results are also supported by past studies (Aurangzeb & Haq, 2012; Haruna, Hayewa, & Kyauta, 2018; Castejon & Woerz, 2006; Ehijiele et al. 2016; Nezakati, Fakhreddin & Vaighan, 2011; Okoli & Ogu, 2015; Ajaz & Ellahi, 2012; Rahman, Bakar, & Idrees, 2019; Rehman, Ali, Idrees, Ali, & Zulfiqar, 2022;). The results show that employment holds significant and positive influence on manufacturing sector growth of Pakistan. The results reveal that percent rise in employment bring about MSG by 0.170014 percent in the short term. these finding is consistent by the studies Ali & Saddiqi (2011) and karim & Yin (2014).

Table 6: Results for Short Run Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
dFDI	0.892782	0.429123	2.238881	0.0295
d(EML)	0.170014	0.095008	1.789463	0.0822
d(TOP)	0.402511	0.080300	5.012567	0.0000
d(CPI)	0.046963	0.034187	1.373706	0.1783
d(CPI(-1))	-0.048213	0.032938	-1.463745	0.1522
d(EC)	-0.037234	0.018724	-1.988633	0.0546
CointEq(-1)	-0.771295	0.141498	-5.450909	0.0000

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In the short run, the magnitude of trade openness (TOP) is positively and significantly contributing the growth manufacturing of Pakistan. These suggests that one percent expand in manufacturing trade openness grow to manufacturing sector output of Pakistan by 0. 402511 percent. we can see that the coefficient is positive and significant, and findings are also supported by the results of (Love & Chandra, 2005; Rahman, Bakar, & Idrees, 2019). Conversely, the coefficients of energy crisis (-0.037234) and inflation (-0.048213) expressed a negative relationship with growth of manufacturing.

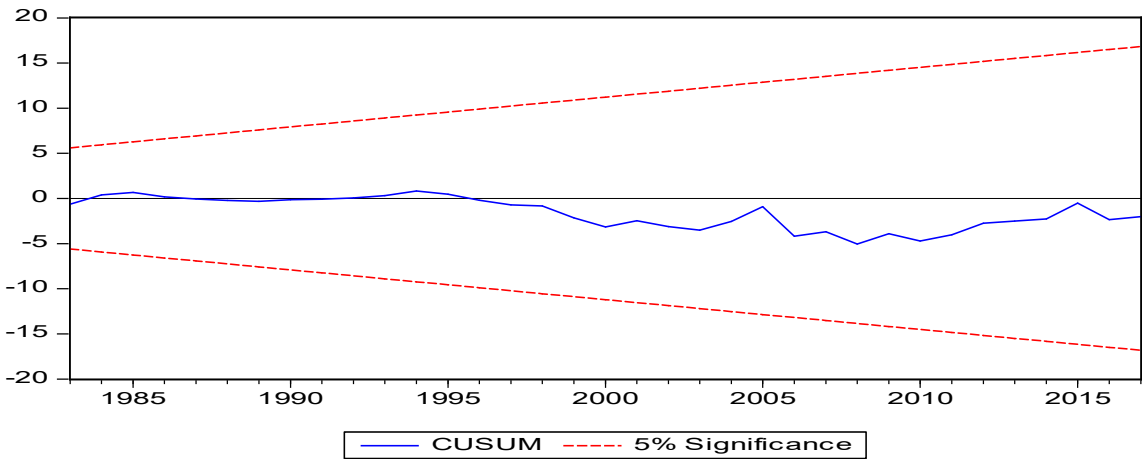
5.8. Diagnostic tests.

The review leads some analytic tests to guarantee model fit and strength. Table 7 demonstrates that the model breezes through every one of the indicative assessments directed. For instance, the aftereffects of autocorrelation and heteroscedasticity tests are not critical at the 5% level. It implies issues of serial correlation and heteroscedasticity don't occur. Also, the consequences of Ramsey RESET tests are not critical with 5% level, proposing that the paradigms are steady and fitted.

Table 7: Diagnostic Test Result

T-Statistics	F-Statistics	P-Value
Serial Correlation	2.506908	0.086
Hetroscedasticity Test	1.349846	0.160
Ramsey Reset Test	1.205505	0.179

We additional apply CUSUM and CUSUM of squares to test for the dependability of hypotheses. Figure, draws CUSUM and CUSUM of squares in Pakistan. The Figure exhibited that the paradigms are steady since CUSUM and CUSUM of squares lines do not go past the 5% analytic lines.



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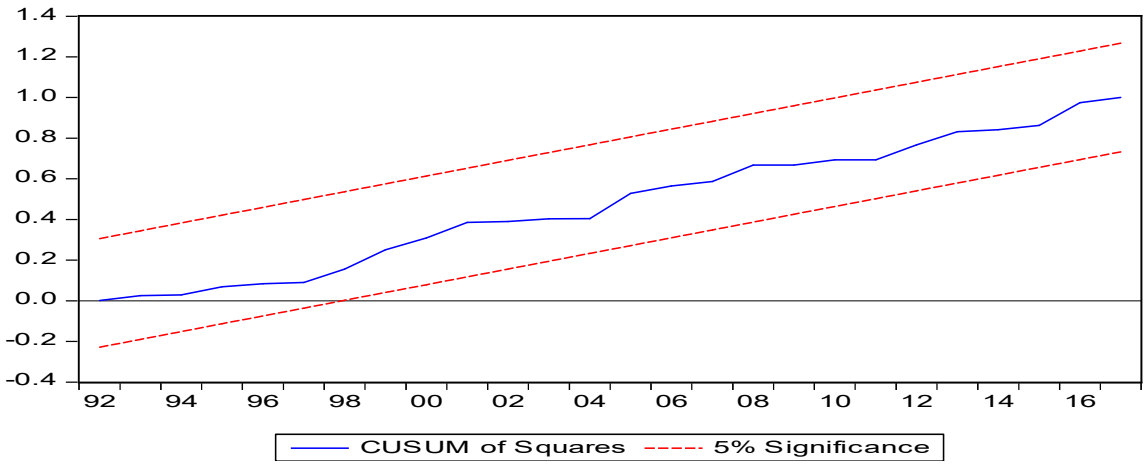

Figure 1. Plots of CUSUM and CUSUM of Squares in Pakistan

6. Conclusion and Policy Implications

The purpose of study attempts to examine the effects of macroeconomics determinants on growth output in manufacturing industrial sector in Pakistan. The study covers the time span 1973 to 2020. To test the speculations of this review, specifically progressive ARDL model utilized. Our outcomes in short run and long-term express that macroeconomic determinants (variables), trade openness. manufacturing FDI, employment have a significantly and positively influence the output growth into Pakistan's manufacturing industrial sector. While, in long run findings demonstrate that inflation and energy crisis negatively and insignificant affect the manufacturing sector growth.

The declining path of manufacturing FDI, the study may possibly recommend that Pakistani policy- inventors want to improve the investments in manufacturing aera. The manufacturing industry to raise and rejuvenate competitive strategy in which a durable and predictable macroeconomic atmosphere is necessary. A constant macroeconomic factor creätes manufacturing foreign direct investment by confirming a business environment portrayed by admittance to reasonable financing through very much created monetary business sectors, strategies public use, conventional duty approaches and smooth long haul administrative business arranging in a low-expansion climate. A developing nation like Pakistan have to construct its FDI strategy substance mindfully well in advancing its objective of growth and development in manufacturing area with macroeconomic determinant and strategy adaptability, on numerous occasions, in logical assurance of manufacturing foreign investment in the future direction.

In developing countries like Pakistan, the declining manufacturing sector growth (MSG) and manufacturing employment share has not been brought about fluctuations of manufacturing endeavors in the advancement quality or amount, yet is for the most part attributes to the disappointments of manufacturing improvement in countless non-industrial nations against the foundation of fast improvement of the industrial area in few nations, hence bringing about a grouping of assembling exercises in non-industrial nations.. As indicated by the State Bank of Pakistan, the manufacturing employed labor are declined by 14.69% between 2014 and 14.21% by 2016, and by 13.54% in 2020 (SBP, 2020). A country draw attention to promote development

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and growth of human capital (labor) for the reason that the outcomes reveal that, human capital (labour) has positively contributed to the growth manufacturing.

Pakistan desires to boost up the charming strategies in high tech organizations to put resources into the region Pakistan Government can facilitate High tech companies' production and her exports to others neighboring countries. Exports oriented FDI will bring new possibility in jobs, innovation, and upgrade of the human resources, managing skills, improvement of the balance of payments and stronger exchange rate and in the country. It is about time that Pakistani policy producers ought to advance the capacity of trade openness, which are falling lately and attempt to diminish the imports. In the existing circumstance, Pakistan trade openness are a lot of lower than imports. Along with the State Bank of Pakistan, manufacturing trade openness declined by 11% between 2014 and 2016, and by 1.19% in 2019-2020 (Pakistan Bureau of Statistics, 2019-20).

The public authority should support up her trade openness equally draws in the foreign investment towards the nation state. The country's acceptable foundation, political security, foreign direct investment and trade openness strategy will influence her development and growth manufacturing. Besides, the government authority of Pakistan needs to foster great framework, political dependability, advancing security circumstance and build up law and order in a nation to draw in the foreign direct investment. On account of Pakistan, in any case, political dependability positioning isn't acceptable contrasted with other emerging nations like India, China and Malaysia.

6.1 Recommendation for Future Research

On the basis of this result, the suggestions gave to future academics is to encompass the impact of macroeconomic factors on the development of manufacturing area by analyzing other macroeconomic determinants like domestic investment real exchange rate, human reserve into manufacturing sector, innovation and manufacturing. What's more, future scholars can utilize bigger example size of information to acquire a greatly improved comprehension of the elements between macroeconomic factors and manufacturing growth area. Recurrence of information can be expanded by utilizing quarterly, week after week or month to month frequencies to increase the sample size and to get a more inside and out check out the variables influencing manufacturing area development

Investment in human capital over skilled advancement modified will make sure long-term comprehensive development and reduction the unemployment. Discerning of this reality, the public/ government is engaged to work with and produce possibilities for business and monetary incorporation of youngsters so they can assume a valuable part in upgrading Pakistan's situation in the worldwide business sectors.

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