The Effect of Inflation on High Technology Exports

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Abstract:

This study aims to determine the relationship between inflation and exports of high technology products. Within the framework of the research model, the relationships between Inflation, Ease of Doing Business, Education Expenditures and High Technology Exports were analyzed. The research sample includes 5-year data of 130 different countries. Four hypotheses were formulated and tested in the study. As a result of the analyzes, all hypotheses were accepted. According to the hypotheses test results, inflation exerts negative effect on doing business; inflation has a negative impact on education expenditure; education expenditure has positive effect on doing business; doing business has positive effect on high technology exports. The results demonstrate that inflation reduces education spending and increases the difficulty of doing business in a country. Thus, one of the adverse consequences of inflation is a decrease in educational expenditure and an increase in the difficulty of doing business, which in turn has a negative impact on the export of high-tech goods. High-tech goods production and export are vital to a country's economic welfare. In societies where education spending is declining, human potential for creativity and self-improvement may be curtailed. This is a topic that requires further research across a range of disciplines.

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1. Introduction:

The introduction of money into human life dates back a long time. Despite not having as long a history as money, inflation is a widely researched issue because it is a major issue for many countries around the world, affecting general economic activity. This phenomenon has far-reaching detrimental economic and social effects for society. People in high-inflationary areas face a slew of negative consequences, particularly in terms of livelihood. Individuals and families who have trouble obtaining monetary resources witness the shift in standard of living in high inflation circumstances. People's dissatisfaction rises and overall welfare falls in economies that have continuous price increases. Inflation affects purchasing power and can have detrimental effects on production and quality. Governments implement anti-inflation initiatives as one of their primary policies and work to maintain inflation level it within certain bounds to preserve price stability. While these policies can sometimes provide solutions, they can sometimes reach levels that necessitate the assistance of international institutions to resolve. Many economic institutions, including the World Bank and the IMF, continue to develop solution packages for countries facing economic challenges.

The problems and effects of inflation in free market economies have been the subject of many studies. In this study, the relationships between inflation, education expenditures, ease of doing business and high technology exports are analyzed. Education spending is crucial for both the growth of the individual and the building of a civilized society. The state pays for the majority of basic education costs in many nations, yet the quality of education provided is frequently questioned. People also spend on education individually to develop themselves. The extent to which education expenses are affected in an inflationary climate is a subject that needs to be explored. Ease of doing business in a country is also important for domestic and foreign investors in their investment decisions. Whether inflation provides an advantage in terms of ease of doing business is also an issue that needs to be examined. Along with all of these, a nation's ability to improve its wellbeing depends heavily on its export of high-tech goods. The extent to which exports of high-tech goods are affected by inflation is a separate topic of inquiry.

Under the driven conceptual framework, a research model is formed, and all necessary analyses were carried out using data provided from World Bank open data sources in the study.

2. Conseptuonal Background

2.1 Inflation

Prices for goods and services are always subject to change in a free market economy. A widespread increase in the cost of goods and services is known as inflation. Over time, inflation lowers the value of money (European Central Bank, 2024). Inflation is the rate of increase in general level of prices for goods and services over a given period of time (Oner, 2010). Inflation results in a decrease in purchasing power of consumers and can be observed the increase in the cost of living in a country. Due to its broad impact, research on inflation crosses multiple fields, including economics, finance, and sociology. The emphasis of research on inflation keeps evolving as economists and scholars seek to enhance their knowledge of the effects of it on economy and society. Many years of research have been carried out to better understand the fundamental causes of inflation. Researchers keep conducting various studies on demand and supply dynamics, monetary policy, fiscal policy, technological developments and international trade dynamics in order to come up with measures to solve this phenomenon.

A well-researched economic topic throughout history has been the claim that inflation and economic growth are strongly linked (Samuelson & Nordhaus, 2009; Bülbül, 2023). Economists from different schools have argued that inflation can have a positive effect on economic growth (Fischer, 1993; Seyidoğlu, 2007). According to some views, an increase in inflation reduces the wealth of individuals and encourages to save more to restore the pre-inflationary wealth balance. On the contrary, there are opinions that inflation stimulates consumption and thus creates consumption-based growth. But at the end of the day, inflation leads to pessimistic expectations about the future, which adversely affects investments and hampers growth; creates uncertainty; distorts the efficiency of forward-looking investment decisions; causes a depreciation in the national currency, which ultimately has a detrimental impact on exports; and erodes the value of financial assets, tending individuals to hold their

savings in precious metals and real estate (Grimes, 1991; Fischer, 1993; Berber & Artan, 2004; Seyidoğlu, 2007).

The empirical research on the impact of inflation on economic growth underline how inflation affect investment decisions, production, income distribution and economic development. Many economists and scholars work on future inflation scenarios, consumption forecasts, wage increases, exchange rate analysis, currency depreciation, import and export gaps, income inequality, wealth distribution etc... To measure inflation, price indices such as the Consumer Price Index (CPI) and the Producer Price Index (PPI) are taken into account and changes in the cost of living are monitored through these indicators (Boskin et al., 1998). Friedman (1973) stated that all conceivable scenarios regarding inflation have been observed so far icluding economic growth and economic decline in an inflationary environment and economic growth or economic decline in a non-inflationary environment. Studies on inflation continue to be carried out to provide new contributions to the literature.

2.2 Education Expenditure

Education is the transmission of information, abilities, and personal qualities (Castles, 1989). Education instills cultural norms and values in a community. Children who receive this preparation are given the necessary skills to become contributing members of society in the future (Wyn, 2009). Thus, it promotes economic expansion (Holmes, 2013). Education policy is determined by governments. The promotion of universal primary education has been greatly aided by international organizations like UNESCO (Jones, 1988). The relationship between education and economic growth came under scrutiny after the 1960s. Education level, social relations, knowledge, and skill sets define a nation's human capital. Education is a basic framework that influences everything in a society. Thus, reseach support that the main factor influencing concepts like growth and unemployment is education (Psacharopoulos & Woodhall, 1993; Kibritçioğlu, 1998). From an economic perspective, education is considered a useful instrument for boosting society's creativity and production, ensuring the quality and quantity of labor force needed, and a tool to develop personally and professionally (Kaynak et

al., 2000). Although the ratio varies between nations, on average, 75% of social expenditures are allocated to education (Karaarslan, 2005). Education stimulates growth by encouraging the development of human capital. Leading countries in terms of economic growth and development credit their success to investments in human capital. Countries including Germany, Japan, and the United States have made major long-term investments in human capital (Tsakloglou & Cholezas, 2005).

2.3. Doing Business

Ease of Doing Business Index is released annually and is subject to country-by-country analysis by the World Bank (World Bank, 2021). The goal of this index is to glance at the legal procedures, costs, time necessary for business formation, and legal frameworks in the case of a dispute when a new business is founded in a country. The score also reveals which countries are easiest to proceed when launching and running a business (Bozkurt & Akçacı, 2023). Following the release of these facts, governments have taken measures to entice foreign investors to their nations. Since 2002, statistics from 190 nations have been published, culminating in the execution of over 200 structural reform packages (World Bank, 2021). It has been noted over time that nations scoring higher have begun to receive more investment. This regularly released data has become an important tool for private sector investment guidance (Malik, 2018). Figure 1 shows the steps included in the analysis of Doing Business indicators:

Figure 1. Doing Business Process (World Bank, 2021)

The World Bank examined at 11 distinct indicators that companies can encounter in order to measure these processes more precisely. These indicators, can be seen in Figure 2, include starting a business, getting electricity, dealing with construction permits, getting credit, registering property, protecting minority investors, trading across borders, paying taxes, enforcing contracts, contacting with the government and resolving insolvency (World Bank,

2021). Leading sources in the literature and national policies were also used for generating the indicators (Ruiz et al., 2018).

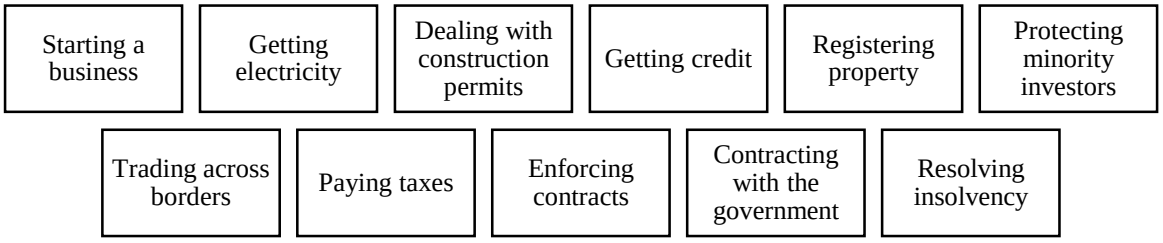

Figure 2. Indicators of Doing Business (World Bank, 2021)

A nation's inclination to invest may rise if there are few formalities and a minimum establishment period. The nations at the top of this list are thought to have greater commercial success. This is so because the governments of these nations encourage rather than obstruct the formation and operation of businesses (Rogge & Archer, 2021).

2.4. High Technology Exports

A high-tech product is one that uses cutting-edge technology to function in an inventive way (Moriarty & Kosnik, 1989). Frequently, they provide attributes or functionalities lacking in conventional products. These items provide improved user experiences, performance, or features. High-tech production technology is rapidly evolving and these commodities have a wide-ranging impact on people's lives (Forester, 1987). Producing these products requires a high level of ability, and the industry has substantial entrance barriers. The increase in high-tech manufacturing clearly has a favorable impact on the economies of emerging nations. Businesses that create high-tech goods have more chances about future economic growth (Zhang, 2007). Export of high-technology products is the fastest growing area of international trade (Mani, 2000; Srholec, 2007). The increased production and export of high-tech products has brought in significant earnings (Spulber, 2008). Exporting high-tech goods allows countries to gain knowledge, which allows them to become more competitive; also, innovation helps

countries gain a competitive advantage (Forester, 1987; Tebaldi, 2011). If a nation lacks the necessary technological know-how to export high-tech goods, it generally tend to close the gap by investing in or importing technology from other nations (Zhang, 2007; Akyol & Demez, 2020). To enhance its export performance, a nation needs to possess a certain comparative advantage. Exports have a considerable impact on economic growth, employment, and wellbeing. The growth of technologically intensive products improves the efficiency of good exported from a country (Sun & Wang, 2005).

3. Hypothesis Development

Academic studies in different countries have shown that increasing inflation in a country, and especially high inflation, makes it difficult to do business in that country (Mumtaz et al., 2011; Gali, 2015). Within the framework of these findings, the following hypothesis was formulated for the current research. Sharp and uneven increase in prices can negatively affect some businesses and disrupt the structure of the business sector (Belanová, 2023).

H1: Inflation has negative effect on doing business.

Similarly, there is empirical evidence that rising inflation reduces people's expenditures on education (Baldacci et al., 2008). Rising inflation has a deleterious effect on education expenditure (Maher et al., 2022). Inflation directly related with education expenses (Bhattacharjee, 2017). Based on this, the following hypothesis is formulated for the current research.

H2: Inflation has negative effect on education expenditure.

Education expenditure increase the value of the human capital (Dastidar & Chatterji, 2015). In this case, it can be predicted that education expenditures will increase the number of people capable of starting a business within the country. Another aspect that needs to be examined is the effect of education expenditures on doing business. Accordingly, the following hypothesis is formulated.

H3: Education expenditure has positive effect on doing business.

Ease of doing business in a country is predicted to affect high-tech exports (Eifert et al., 2008). Openness to international trade are the major factors impacting the performance of a country's high-tech industry in the global market (Tebaldi, 2011). In this respect, the following hypothesis is formulated.

H4: Doing business has positive effect on high technology exports.

Based on the extant literature, the conceptual research model has been developed.

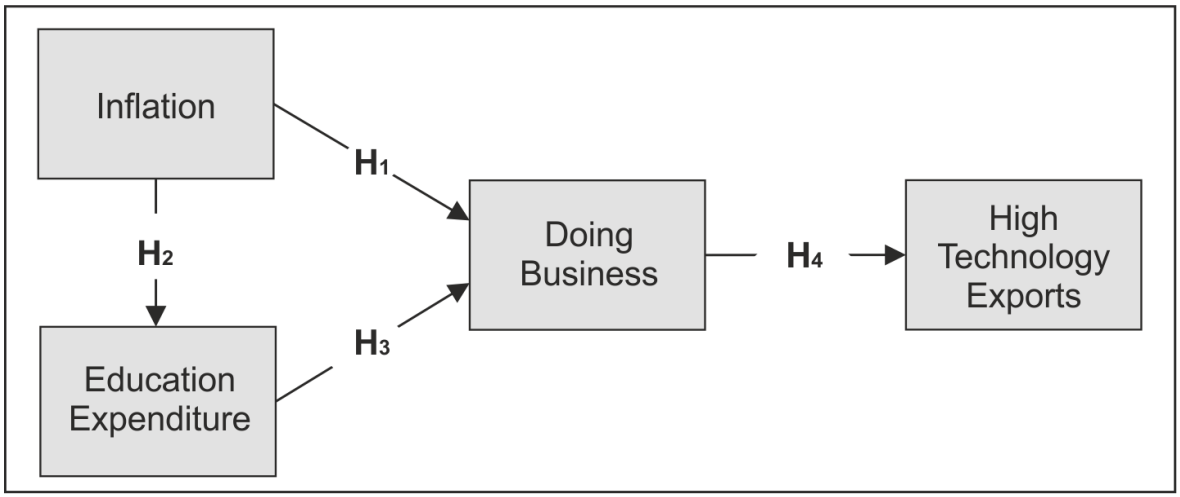

Figure 1. Conceptual Research Model

4. Methodology

Structural Equation Modelling has been used to test the hypotheses to measures direct and indirect relationships within a single model (Meydan & Şen, 2011) reduces measurement errors (Fornell & Larcker, 1981; Anderson & Gerbing, 1988; Byrne, 2010). Structural equation

modelling is a multivariate statistical technique (Civelek, 2018). The analyses were carried out using the statistical software SPSS and AMOS.

5. Measures and Sampling

In the study, direct or indirect relationships among 4 variables are analysed. The data set comes from World Bank open data source, and this data utilized are mostly cited and reliability-tested in scholarly research. In the study, the data on the Inflation, Education Expenditure, Doing Business and the High Technology Exports were used. Inflation data used in this study refer to annual consumer price changes. Education expenditures refer to the share of education in total expenditures. Doing Business data consists of the Ease of Doing Business Index compiled annually by the World Bank and ranked as a percentage of success. High-tech exports show the share of high-tech products in total annual trade. In sum, all data used are expressed in percentages. When analyzing data from the Doing Business Index, keep in mind its limitations. According to World Bank, the data are collected from the country's biggest cities and are typical of the total. Sub-national standards are recognised to ensure data dependability and accuracy. Furthermore, the statistics are typically gathered from limited liability corporations. The research sample includes 5-year data of 130 different countries. It consists of 4 different variables.

6. Results and Discussions

Firstly, correlation values were determined between the principal components. Table 1 shows the correlations between the structures. Subsequently, analyzes were carried out with Structural Equation Modelling to test the hypotheses that constitute the conceptual model of the research together. Consequently, the goodness of fit indices values of the model were found satisfactory (i.e., $\chi 2/DF = 3.672$, CFI = 0.966, IFI = 0.967, RMSEA= 0.062) (Civelek, 2018).

Table 1. Correlations Among Constructs

Variables	1	2	3
1. Inflation			
2. Education Expenditure	-0.078*		
3. Doing Business	-0.152*	0.292*	
3. Hign Technology Exports	-0.070	0.006	0.329*

*p < 0.01

In Table 2, hypotheses test results are shown.

Table 2. Hypotheses Test Results

Relationships	Standardized Coefficients	Hypotheses	Results
Inflation → Doing Business	-0.078*	H_1	Supported
Inflation → Education Expenditure	-0.130	H_2	Supported
Education Expenditure → Doing Business	0.282*	H_3	Supported
Doing Business → High Technology Exports	0.329*	H_4	Supported

*p < 0.05

H_1 hypothesis is supported. This means that inflation exerts negative effect on doing business. H_2 hypothesis is supported. This means that inflation exerts negative effect on education expenditure. H_3 hypothesis is supported. This means that education expenditure has positive effect on doing business. H_4 hypothesis is supported. This indicates that doing business has positive effect on high technology exports

7. Conclusion

In this research, the relationship between inflation and high-tech product exports was determined in the light of data obtained from many countries. Within the framework of the research model, the relationships between Inflation, Ease of Doing Business, Education Expenditures and High Technology Exports were analyzed. As the result, the negative effects of inflation on ease of doing business and education expenditures have been identified, and it has been noticed that education expenditures have a positive effect on ease of doing business, while ease of doing business has a positive effect on high technology exports. The results demonstrate the adverse impacts of inflation on wealth of nations once more. Today, as technology advance, spending on education becomes more essential. A workforce that is trained can make effective and efficient use of emerging technologies. As seen in Table 1, there is no significant relationship between inflation and high technology exports. The importance of the results obtained from hypothesis tests is that they demistify the mechanism behind this indirect relationship. The reason why the relationship is not directly observed is that the harmful effects of inflation appear with a delay in such indicators. The negative impact of inflation on high technology exports occurs through education expenditure and doing business. In societies where education spending is declining, human potential for creativity and self-improvement may be curtailed. This is a topic that requires further research across a range of disciplines.

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