Innovation Amidst Instability: Turkey's Defense Industry, High Inflation, and the Challenge to Development Economics - A Literature Review

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Abstract

This study looks into how Turkey kept the growth of innovation and high-tech exports in the defense sector going even when the economy was unstable and inflation was high. The study by Hausmann and Rodrik (2003) in the field of development economics shows that emerging economies often have trouble keeping up with high-tech exports when their economies are in trouble. Industrial progress is often slowed by economic crises. Even though inflation went up from 20.3% to 44.4% from 2018 to 2024, Turkey's defense exports and innovation grew.When compared with countries like Argentina, Zimbabwe, and Peru—where inflation damaged industrial capacity—Turkey's experience stands out as different. The results show that Turkey's mix of state support, strong defense-industrial policy, and geopolitical demand helped the sector stay strong despite economic problems. This research adds to the discussion about industrial policy and economic diversification in developing countries and questions the common belief that high-tech exports cannot grow during crises.

Keywords: Turkey, defense industry, innovation, high-technology exports, inflation, development economics, industrial policy

1. Introduction

In development economics, one important question is how countries can keep improving their technology when their economies are unstable. Hausmann and Rodrik (2003) explained that developing countries find it hard to expand into high-technology exports because weak institutions, market problems, and ongoing instability stop industrial progress. Many historical examples support this view. The debt crises in Latin America, hyperinflation in Sub-Saharan Africa, and financial crises in Asia all limited the growth of high-tech industries.

However, Turkey's situation in the late 2010s and early 2020s challenges this idea. Between 2018 and 2024, Turkey faced constant inflation, with official rates above 40 percent in 2024 and some independent estimates even higher, sometimes reaching 70 percent (Yalta & Yalta, 2021). The falling value of the Turkish lira reduced savings, lowered consumer trust, and made investment risky. Based on traditional

development theory, innovation and high-tech exports should have declined under such conditions.

Instead, Turkey's defense industry grew quickly. Defense and aerospace exports increased from $2.2 billion in 2018 to over $5.5 billion in 2023 (Sipahi & Torlak, 2023). New products, especially unmanned aerial vehicles (UAVs), found buyers in more than 20 countries. Turkey became known for exporting affordable and battle-tested defense technologies. This unusual situation—high inflation existing together with strong high-tech export growth—needs deeper academic analysis.

This paper argues that Turkey's case shows how focused government support, strong geopolitical demand, and well-organized institutions helped the country continue innovation even during economic instability. To explain this, the paper reviews key ideas in development economics, describes Turkey's macroeconomic conditions, examines the performance of its defense sector, and compares Turkey with other inflation-affected countries such as Argentina, Zimbabwe, and Peru.

2. Theoretical Framework: High-Tech Exports and Development Economics

2.1 Hausmann and Rodrik's Self-Discovery Problem

Hausmann and Rodrik (2003) described economic development as a process of "self-discovery." This means that firms and governments learn what kinds of products a country can make and sell successfully in global markets. In their view, high-technology exports in developing countries are very fragile. New firms that try to enter high-tech industries face big risks but receive little support or reward. When a country experiences economic crises, these problems grow worse, and companies lose motivation to try new ideas. Because of this, many developing countries stay dependent on simple goods or low-technology exports.

This idea also suggests that high inflation and economic instability can destroy weak high-tech sectors. The experience of Latin America in the 1980s supports this argument. Dornbusch and Edwards (1990) said that "macroeconomic populism," which meant high government spending and rising inflation, made many countries in the area lose their industrial base. Because of this, innovation slowed down and the production of high-tech goods fell.

2.2 Unstable macroeconomics and innovation

A lot of research agrees that economic volatility hurts creativity. Aghion et al. (2009) showed that fluctuating exchange rates make it harder for productivity to improve, especially in countries with weak financial institutions. Rodrik (2004) also claimed that industrial strategies only operate when the economy is stable. People won't want to invest for the long run if the economy isn't stable.

Researchers suggest that for new ideas to come forth, there needs to be consistent funding, steady demand, and low risk. People spend less on research, skilled workers become less valuable, and supply networks break when inflation is high (Pettis,

2013). Data from different countries demonstrate that only countries with robust financial systems or well-run government institutions can stop these harmful consequences.

2.3 Revisiting the Framework in Key Domains

The Turkish example shows that this approach doesn't work in all areas. Defense and other strategic fields differ from typical consumer sectors. These industries depend on government contracts, security needs, and pressures from other countries. So, even though instability is bad for most industry, strategic industries may keep developing provided they obtain continuous governmental support or foreign demand.3. Macroeconomic Instability in Turkey, 2018–2024

3.1 Changes in the inflation rate and the exchange rate

After 2018, Turkey had a lot of inflation because of strange monetary policies, price shocks throughout the world, and the lira's fall. The Central Bank of the Republic of Turkey (CBRT, 2025) estimates that inflation rose from 20.3% in 2018 to 44.4% in 2024. Some independent research even said that inflation would be more than 70% in 2021–2022 (Yalta & Yalta, 2021). The value of the currency likewise dropped quickly, going from 4.8 lira per U.S. dollar in 2018 to more than 30 lira per U.S. dollar in 2024 (Erdem & Togan, 2022).

3.2 Anticipated Consequences for Industry

According to economic theory, this kind of change usually makes businesses grow more slowly. Aysan, Demir, and Yalta (2021) discovered that changes in the exchange rate had a large effect on Turkish manufacturing investments. Karaduman (2020) demonstrated that elevated inflation disrupted the supply chain and diminished productivity. But the results were different in each case. Defense exports kept increasing up even though the consumer industries were getting weaker.

3.3 Distinguishing

This discrepancy illustrates that instability affects each industry in a different way. One reason the defense sector was safeguarded is that it doesn't rely as much on domestic demand. Instead, it obtains much of its business from government contracts and serves overseas markets that are affected by geopolitical concerns. These features helped it stay away from a lot of the difficulties that inflation produced. This shows that the defense business should be looked at on its own, apart from other kinds of manufacturing.4. Turkey’s Defense Industry and High-Technology Exports

4.1 Progress Over Time

The military in Turkey has increased, and they put a lot of emphasis on becoming self-sufficient. In the 1970s, the U.S. ceased selling weapons to Turkey. After that, the Turkish government started to focus on making things in Turkey. The Presidency of Defense Industries (SSB) made a big plan in the 2000s. It encompassed domestic

research and development, offset agreements, and collaboration between the government and business sectors (Kirişci & Yeşiltaş, 2021).

4.2 From 2018 to 2024, exports will go up.

Turkey's defense exports grew quickly, even though prices were rising higher. Turkey is seeking new ways to keep itself safe, and unmanned aerial vehicles (UAVs), especially Baykar's TB2 model, are a good example. By 2023, many nations in Europe, Africa, and Asia have TB2 drones (Stein, 2022). The export portfolio comprised naval ships including corvettes and submarines, as well as missile systems and electronic warfare technologies (Aydin & Terzi, 2022).

According to official figures, defense and aerospace exports grew from $2.2 billion in 2018 to more over $5.5 billion in 2023 (Sipahi & Torlak, 2023). This substantial rise is not the same as the total reduction in manufacturing.

4.3 Why Resilience Is Important

Experts believe that the industry is strong for three main reasons:

* **Geopolitical demand:** Turkey's low-cost, battle-tested systems were needed by several middle-income and conflict-affected countries, but Western vendors couldn't provide them (Gürcan, 2022).

* **Government support:** The government bought products to make sure there was a steady demand, and R&D programs were safe from inflation (Sipahi & Torlak, 2023).

* **Currency depreciation:** The lira lost value, which made Turkish defense equipment cheaper in other countries and helped exports grow (Aydin & Terzi, 2022).

In short, Turkey's military sector shows that innovation is still possible even when the economy isn't doing well, as long as the government supports it and other countries want it.

5. Inflation and Industrial Collapse: A Case Comparison

5.1 Argentina

The 1980s in Argentina are a clear example of how inflation can ruin an industrial base. When inflation went over 1,000 percent, the country's manufacturing industry virtually stopped. Katz and Kosacoff (1989) said that research and development stopped, investments fell, and high-tech companies went out of business. On the other side, Argentina didn't have a solid defense policy to protect important parts of the economy throughout the crisis.

5.2 Zimbabwe

In the 2000s, Zimbabwe had a similar problem: prices rose by more than a million percent each year. More than half of the manufacturing output fell, and all of the

defense-related industries went away (Makochekanwa, 2010). The economy didn't grow better because of weak institutions, a lack of capital, and bad policy choices.

5.3 Peru 5.3 Peru

Peru likewise had a hard time in the late 1980s because hyperinflation ruined a lot of its industrial power. Schydlowsky (1990) said that businesses stopped investing in new ideas because they were more worried about staying open. Peru's economy got worse and worse for many years because of this.

5.4 What Turkey Can Learn

These examples back up what Hausmann and Rodrik say: that inflation usually causes high-tech industries to fail. But Turkey's situation is different. The defense sector stayed strong because the government backed it, the state institutions were strong, and there was a lot of worldwide demand because of geopolitical needs.

6. Discussion: Why Turkey Deviates from Theory

The Turkish Case:

Why Defense Exports Went Up Even Though Things Were Unstable Turkey's experience shows four main reasons why the defense industry did well even when the economy was bad.

First, protection from changes in the market:** Most of the time, military companies got their work through government contracts and long-term projects. This structure kept them safe from inflation and changes in the value of money. Inflation affected real salaries, but defense money stayed safe because keeping the country safe was the most important issue.

Second, a lot of demand from other nations:** Turkey fared well because there was always demand from other countries. Regional conflicts, NATO ties, and the need for cheap defense systems all helped create stable markets for exports. Inflation didn't impact the demand for defense items too much because they don't respond to price changes as quickly as consumer goods do.

Third, a weaker currency is good for you. The lira went down in value, which made it cheaper for citizens from other countries to acquire Turkish defense goods. Inflation made it harder for people to buy things at home, but it helped exporters by making goods cheaper in dollars. People in the Middle East, Africa, and Asia could buy Turkish systems for less than Western systems.

Fourth, the government should keep supporting fresh ideas. Even when the economy was bad, the Turkish government kept spending money on research and development, subsidies, and buying things. This promise is different from what happened in Latin America, when problems with money made plans for industry go bad.

These variables indicate that Hausmann and Rodrik's hypothesis is generally effective, if not universally applicable. Innovation and exports can keep going even when the economy isn't doing well if the government has solid laws in place and there is a lot of overseas demand for goods and services.

7. Conclusion

From 2018 to 2024, Turkey's defense sector will grow in a way that is very different from how development economics usually works. High inflation and unstable exchange rates usually hurt innovation and high-tech exports, but right now, Turkey's defense sector is growing. Exports rose, new ideas came more quickly, and people around the world started to notice.

The results are strange, as shown by evidence from Argentina, Zimbabwe, and Peru. In those cases, inflation killed high-tech companies. Turkey's strength comes from the government's focus on certain things, the demand from other countries, and the protection of its institutions.

This means that looking at specific sectors is very important in development economics. Hausmann and Rodrik's argument is mostly true for most industries, but important areas like the military may act differently. Turkey demonstrates to policymakers how industrial policy can safeguard innovation against macroeconomic volatility.

Future research should investigate the replicability of Turkey's experience in other strategic sectors, such as renewable energy or digital technology, or determine if it is confined to defense. It should also look into how long this resilience will last: can Turkey keep coming up with new ideas if prices keep going up, or will its military sector finally become too weak?

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