
Do Free Zone Incentives Reflect Value Creation? Accounting Evidence on the Gap Between Export Performance, Foreign Exchange Generation, and Profitability

Amin ElSayed Ahmed Lotfy
Ex President of Beni Suef University,
Professor of Accounting and Auditing
Faculty of Commerce, BSU.
Cairo, Egypt - 01001767536 – 01007770550
ORCID: <https://orcid.org/0000-0002-2656-7887>

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Abstract

Purpose

This study examines whether Free Zone incentives effectively reflect value creation at the firm level. It investigates the existence of a performance gap between export activity, foreign exchange generation, and profitability, thereby questioning the alignment between policy incentives and economic outcomes.

Design/Methodology/Approach

The study adopts a quantitative panel-data design using firm-level observations from Free Zone and non-Free Zone firms over multiple years. Fixed-effects regression models with robust standard errors are employed to estimate the relationships between incentive status, export performance, foreign exchange proxies, and profitability. Interaction and nonlinear specifications are incorporated to capture hidden dynamics.

Findings

The results indicate that Free Zone incentives do not exert a statistically significant effect on export performance, foreign exchange generation, or firm profitability. Export activity is strongly associated with foreign exchange generation but does not translate into profitability, revealing a structural performance gap and misalignment between incentives and economic value.

Originality/Value

This study contributes by introducing an integrated accounting-based framework that links policy incentives to behavioral, measurement, and economic outcomes. It provides novel empirical evidence on incentive–performance misalignment in Free Zone regimes.

Theoretical, Practical, and Social Implications

The findings challenge conventional policy assumptions and highlight the need for performance-based incentive structures. The study offers implications for policymakers, regulators, and firms by emphasizing the importance of aligning incentives with measurable value creation to enhance economic efficiency and resource allocation.

Keywords: Free Zones; Incentive Misalignment; Export Performance; Foreign Exchange; Profitability; Accounting Evidence

1. Introduction

1.1 When Incentives Do Not Deliver: Reframing the Free Zone Question

Free Zones have long been positioned as a cornerstone of export-led growth strategies, particularly in emerging economies seeking to enhance foreign exchange (FX) earnings and integrate into global value chains. By offering tax advantages, simplified regulations, and operational flexibility, these zones are expected to stimulate firm-level exports and improve economic performance. However, recent empirical evidence increasingly questions whether such expectations are consistently realized in practice.

A growing body of research indicates that **policy incentives do not automatically translate into firm-level performance improvements**, particularly when they are not explicitly tied to measurable outcomes (Fuest & Neumeier, 2023; Bloom et al., 2022; Bajgar et al., 2019). In many contexts, firms benefit from incentives without significantly altering their behavior, resulting in weak or negligible economic effects. This raises a fundamental question: **Do Free Zone incentives actually generate additional economic value, or do they simply redistribute existing activity?**

The relevance of this question is amplified in the context of emerging markets, where structural constraints—such as limited access to finance, technological gaps, and institutional inefficiencies—may hinder firms' ability to respond to policy incentives (De Loecker et al., 2022; Rodrik, 2022; Beraja et al., 2019). Under such conditions, incentives may reduce costs but fail to address the underlying factors that drive firm performance.

1.2 The Policy–Performance Paradox

Despite their widespread adoption, Free Zone regimes often exhibit a paradox: **strong policy support combined with weak empirical outcomes**. While governments invest significant resources in designing and maintaining these regimes, the observed impact on exports, FX generation, and profitability is frequently mixed or inconclusive.

Recent studies on industrial policy highlight that many interventions produce **heterogeneous and context-dependent effects**, with some firms benefiting significantly while others show no measurable response (Criscuolo et al., 2022; Aghion et al., 2021). This heterogeneity suggests that policy effectiveness cannot be assumed, but must be empirically tested.

Moreover, the relationship between exports and firm performance is itself complex. Although exports are commonly used as an indicator of success, evidence shows that **export expansion does not necessarily lead to productivity or profitability gains**, particularly when firms face intense competition or operational inefficiencies (Syverson, 2022; Autor et al., 2021; De Loecker & Warzynski., 2012). As a result, relying solely on export metrics may provide an incomplete or even misleading assessment of policy outcomes.

1.3 The Missing Link: From Incentives to Economic Outcomes

One of the central challenges in evaluating Free Zone effectiveness lies in the **lack of a clear transmission mechanism** linking policy incentives to economic outcomes. While existing studies often examine individual relationships—such as incentives and exports or exports and performance—they rarely integrate these relationships into a coherent analytical framework. Recent advances in empirical economics emphasize the importance of **mechanism-based analysis**, which focuses on how policies influence behavior and how that behavior translates into outcomes (Athey & Imbens, 2022; Callaway & Sant’Anna, 2021). Without such an approach, it is difficult to identify where and why policy effects break down.

In addition, accounting research highlights the role of **measurement systems** in shaping observed outcomes. Metrics such as export ratios and profitability indicators may not fully capture the economic substance of firm performance, leading to potential misinterpretation of results (Leuz & Wysocki, 2023; Leone et al., 2022; Helpman et al., 2004).

1.4 Toward a New Perspective

This study argues that the effectiveness of Free Zone incentives should be understood not as a direct causal relationship, but as a **multi-layered process** involving policy design, firm behavior, accounting measurement, and economic outcomes. By adopting this perspective, the research seeks to move beyond traditional analyses and provide a more nuanced understanding of policy effectiveness.

1.5 Research Problem: The Unresolved Puzzle of Incentive Effectiveness

Despite the theoretical appeal of Free Zone regimes, the empirical literature reveals a persistent and unresolved puzzle: **why do policy incentives often fail to generate measurable firm-level outcomes?** While governments design these regimes to enhance exports, increase foreign exchange inflows, and improve firm performance, the observed effects are frequently weak, inconsistent, or statistically insignificant.

This discrepancy points to a deeper issue: the absence of a **coherent framework linking policy inputs to economic outputs**. Existing studies tend to focus on isolated relationships, such as the effect of incentives on exports or the relationship between exports and performance, without examining the full transmission mechanism. As a result, it remains unclear whether policy failures arise from ineffective design, weak behavioral responses, or limitations in measurement systems (Decker et al., 2020; Andrews et al., 2017).

Moreover, the structure of Free Zone incentives—often based on **revenue-linked fees rather than profit-based taxation**—raises important questions about their ability to influence firm behavior. If firms do not perceive these incentives as binding or relevant to their decision-making processes, the expected behavioral changes may not materialize.

1.6 Research Objectives and Questions

In response to this gap, the study aims to develop a **comprehensive and mechanism-based evaluation of Free Zone effectiveness**. Specifically, the research seeks to:

1. Examine whether Free Zone incentives influence **export behavior**
2. Assess the extent to which export activity translates into **foreign exchange generation**
3. Evaluate the relationship between exports and **firm-level performance**
4. Analyze the role of **fiscal structure** in shaping firm responses
5. Identify potential **nonlinear and interaction effects**

These objectives give rise to the following research questions:

- Do Free Zone incentives significantly increase export intensity?
- Does export activity lead to higher foreign exchange inflows?
- Do exporting firms achieve superior profitability?
- Does fiscal burden affect firm performance?
- Are there hidden or nonlinear dynamics in these relationships?

1.7 Contribution: Beyond Conventional Policy Evaluation

This study makes several contributions to the literature.

1.7.1 Theoretical Contribution

It introduces a **multi-layer conceptual framework** that integrates policy design, firm behavior, accounting measurement, and economic outcomes. This framework extends existing research by moving beyond isolated relationships toward a **systemic understanding of policy effectiveness** (Athey & Imbens, 2022; Rodrik, 2022; Hombert & Matray., 2018).

1.7.2 Empirical Contribution

The study provides **firm-level evidence** using a structured panel dataset, allowing for a detailed examination of the mechanisms through which incentives operate. By incorporating interaction and nonlinear effects, the analysis captures dimensions often overlooked in prior research (Callaway & Sant’Anna, 2021; De Loecker et al., 2022).

1.7.3 Accounting Contribution

A key innovation lies in highlighting the **limitations of accounting-based performance measures**, particularly export ratios, in capturing economic value. The study demonstrates the importance of integrating accounting and economic perspectives in policy evaluation (Leuz & Wysocki, 2023; Hanlon & Heitzman, 2010).

1.7.4 Policy Contribution

From a practical standpoint, the research provides insights into how Free Zone regimes can be redesigned to enhance effectiveness. Specifically, it emphasizes the need for **performance-linked incentives**, improved measurement systems, and stronger alignment between policy objectives and firm-level outcomes (Fuest & Neumeier, 2023).

1.8 Structure of the Study

The remainder of the study is organized as follows:

- **Chapter 2** reviews the relevant literature and establishes the theoretical foundations
- **Chapter 3** develops the conceptual framework and hypotheses
- **Chapter 4** describes the data, variables, and methodology
- **Chapter 5** presents the empirical results
- **Chapter 6** discusses the findings and their implications
- **Chapter 7** concludes the study and outlines future research directions

2. Literature Review and Theoretical Foundations

2.1 Rethinking Incentives: From Policy Promise to Empirical Ambiguity

The traditional narrative surrounding Free Zones and similar policy instruments is built on a seemingly straightforward assumption: **incentives reduce costs, firms respond by exporting more, and economic outcomes improve**. However, recent empirical evidence increasingly challenges this linear view, revealing a more complex and often ambiguous relationship between incentives and firm behavior.

A growing body of literature shows that **policy incentives do not automatically translate into improved firm performance**, particularly when they are not directly tied to measurable outputs (Criscuolo et al., 2019; Fuest & Neumeier, 2021; Aghion et al., 2015). In many cases, incentives act as **passive benefits rather than active drivers of behavioral change**, leading to limited or negligible effects at the firm level.

This ambiguity is particularly evident in place-based policies such as Free Zones. While these policies are designed to stimulate exports and attract investment, their actual impact depends on how firms **perceive, internalize, and respond** to the incentives provided. Empirical studies suggest that firm responses are highly heterogeneous, influenced by internal capabilities, market conditions, and institutional constraints (Andrews et al., 2017; Decker et al., 2020; Freund & Pierola, 2015).

2.2 The Illusion of Automatic Effectiveness: Why Incentives Often Fail

One of the most important developments in recent literature is the recognition that **incentives frequently fail due to weak marginal effects**. That is, incentives may reduce costs but do not necessarily alter the **marginal decision-making process** of firms.

Research on tax incentives and investment behavior demonstrates that firms often exhibit **low sensitivity to policy changes**, especially when those changes are not substantial enough to overcome structural constraints (Zwick & Mahon, 2017). Similarly, studies on industrial policy show that many interventions result in **deadweight effects**, where firms receive benefits without changing their behavior (Autor et al., 2020; Harrison & Rodríguez, 2010).

This insight has profound implications for Free Zone regimes. If firms would have exported at similar levels regardless of their Free Zone status, then the incentives provided do not generate additional economic value. Instead, they represent a **redistribution of benefits rather than a creation of outcomes**.

2.3 Export Expansion Without Efficiency: The Missing Link

A second critical issue in the literature concerns the relationship between **export activity and firm performance**. While exports are often used as a proxy for success, recent research highlights that **export expansion does not necessarily lead to productivity or profitability gains**.

Firm-level studies show that exporters are not always more efficient than non-exporters, particularly in developing or emerging markets where firms face significant operational challenges (Bernard et al., 2007; Syverson, 2019; Melitz, 2003). In some cases, firms expand exports at the expense of margins, leading to **higher revenues but lower profitability**.

This disconnect suggests that export-based metrics may overstate the effectiveness of policy interventions. Without considering profitability and value-added measures, evaluations of Free Zone performance risk capturing **activity rather than efficiency**.

2.4 Measurement Challenges: When Accounting Indicators Mislead

The reliance on accounting-based indicators introduces another layer of complexity. Metrics such as export ratios, revenue growth, and even profitability measures can be affected by **measurement noise, reporting practices, and structural biases**.

Accounting research emphasizes that performance indicators are often **imperfect proxies for economic reality**, particularly when they are used outside their intended context (Leuz & Wysocki, 2016; Lerner., 2010). For example, export ratios may reflect changes in domestic sales rather than genuine improvements in international competitiveness.

Similarly, profitability measures can be influenced by accounting policies, capital structure, and temporary shocks, making it difficult to isolate the true effect of policy incentives (Hanlon & Heitzman, 2010; Leone et al., 2019).

2.5 Toward a Multi-Dimensional Evaluation Framework

The limitations identified above have led to a shift in the literature toward **multi-dimensional evaluation frameworks**. Instead of relying on a single metric, researchers increasingly advocate for approaches that integrate:

- **Behavioral indicators** (e.g., export intensity)
- **Accounting measures** (e.g., revenue, margins)
- **Economic outcomes** (e.g., productivity, value added)

Such frameworks allow for a more comprehensive assessment of policy effectiveness and help identify where breakdowns occur in the incentive–outcome chain (Callaway & Sant’Anna, 2021).

2.6 Bridging the Gap: From Literature to Conceptual Contribution

Despite these advances, there remains a gap in the literature: most studies examine individual relationships—such as incentives and exports or exports and performance—without integrating them into a **unified conceptual framework**.

This study addresses that gap by proposing a **layered transmission model** that explicitly links policy design, firm behavior, accounting measurement, and economic outcomes. By doing so, it moves beyond isolated empirical tests and provides a **mechanism-based explanation** for why incentives succeed or fail.

2.7 Incentives Without Discipline: Revisiting Agency Theory in Policy Contexts

Traditional agency theory posits that incentives are designed to align the interests of principals and agents. However, when applied to policy settings—particularly Free Zone regimes—the effectiveness of incentives depends critically on **how tightly they are linked to measurable performance outcomes**.

Recent literature suggests that incentives lose their disciplinary power when they are **not contingent on verifiable results** (De Simone et al., 2022; Bas & Strauss., 2015) In such cases, firms may capture the benefits of incentives without altering their underlying behavior, leading to weak or negligible policy effects.

In the context of Free Zones, the absence of direct linkage between incentives and outcomes such as export growth or FX generation implies that firms face **limited pressure to improve performance**. This weakens the core mechanism through which incentives are expected to operate.

2.8 Institutional Compliance vs Economic Substance: The Decoupling Problem

Institutional theory offers a complementary explanation by highlighting the distinction between **formal compliance and substantive performance**. Organizations often adopt structures or

behaviors to meet regulatory expectations, but these actions may not translate into real economic outcomes.

Empirical studies show that firms frequently comply with policy requirements—such as export thresholds—without fundamentally changing their operations (Criscuolo et al., 2019; Rodrik, 2021). This phenomenon, known as **decoupling**, is particularly relevant in environments where monitoring is weak or enforcement is limited.

In Free Zone regimes, compliance with export requirements may be achieved through accounting or operational adjustments that do not necessarily enhance competitiveness or efficiency. As a result, policy effectiveness may be overstated if evaluated solely based on compliance metrics.

2.9 The Economics of Place-Based Policies: Promise vs Reality

Free Zones are a specific form of place-based policy, designed to attract investment and stimulate economic activity within designated areas. While such policies have been widely adopted, their effectiveness remains highly debated.

Recent evaluations of place-based policies reveal mixed results. Some studies find positive effects on employment and investment, while others report limited or insignificant impacts on productivity and long-term growth (Kline & Moretti, 2014; Glaeser & Gottlieb, 2009; Farole., 2011; Wang., 2013).

A key insight from this literature is that the success of place-based policies depends on their ability to **address underlying structural constraints**, rather than merely offering financial incentives. Without improvements in infrastructure, institutional quality, and market access, incentives alone may not be sufficient to generate meaningful outcomes.

2.10 The Missing Middle: Why Policy Effects Disappear Between Inputs and Outcomes

A recurring theme in the literature is the existence of a “**missing middle**” between policy inputs and economic outcomes. While policies are implemented at the macro level, and outcomes are measured at the firm level, the intermediate processes—such as behavioral adjustments and operational changes—are often overlooked.

This gap can lead to situations where:

- Policies are well-designed on paper
- Outcomes are weak or inconsistent
- The mechanisms linking the two are poorly understood

Recent research emphasizes the importance of **mechanism-based analysis**, which focuses on how policies influence behavior and how behavior translates into outcomes (Athey & Imbens, 2017; Imbens & Rubin, 2015; Alfaro et al., 2019).

In the context of Free Zones, this implies that evaluating policy effectiveness requires examining not only whether exports increase, but also **how and why firms respond to incentives**.

2.11 Firm Heterogeneity: One Policy, Many Responses

Another critical factor highlighted in recent literature is **firm heterogeneity**. Firms differ in their capabilities, resources, and strategic orientations, which affects how they respond to policy incentives.

Studies show that more productive or technologically advanced firms are more likely to benefit from policy interventions, while less capable firms may not respond at all (Bloom et al., 2021; Decker et al., 2020). This heterogeneity implies that a uniform policy—such as a Free Zone regime—may generate **uneven effects across firms**.

As a result, aggregate analyses may mask important variations, leading to misleading conclusions about policy effectiveness.

2.12 Beyond Linear Thinking: Nonlinear and Threshold Effects in Policy Evaluation

Traditional empirical models often assume linear relationships between variables. However, recent research suggests that policy effects may be **nonlinear**, with impacts emerging only beyond certain thresholds or diminishing at higher levels.

For example, firms may need to reach a critical scale of export activity before realizing efficiency gains. Conversely, excessive expansion may lead to diminishing returns due to capacity constraints or market saturation (Foster et al., 2016).

Similarly, threshold-based policies—such as minimum export requirements—may create **bunching behavior**, where firms cluster around the cutoff without improving performance (Kleven, 2016).

These insights underscore the need to incorporate nonlinear and threshold effects into the analysis of Free Zone policies.

2.13 Toward an Integrated Theoretical Perspective

The literature reviewed in this section highlights several key insights:

1. Incentives are effective only when **linked to measurable outcomes**
2. Compliance does not guarantee **economic impact**
3. Firm responses are **heterogeneous**
4. Policy effects may be **nonlinear or threshold-dependent**

However, these insights are often studied in isolation. There is a need for an integrated framework that combines:

- **Agency theory** (incentives and alignment)
- **Institutional theory** (compliance and decoupling)
- **Economic theory** (productivity and performance)

This study addresses that need by developing a **multi-layer conceptual model** that connects these perspectives and provides a unified explanation for policy effectiveness.

2.14 When Incentives Meet Reality: The Structural Limits of Policy Design

Despite the theoretical appeal of incentive-based policies, an emerging consensus in the literature suggests that **policy effectiveness is fundamentally constrained by structural factors**. These include market imperfections, institutional inefficiencies, and firm-level capability gaps.

Recent studies emphasize that incentives cannot compensate for deficiencies in:

- infrastructure
- financial access
- technological readiness

As a result, policies such as Free Zones may **reduce costs without addressing the underlying constraints that limit firm performance** (De Loecker et al., 2020; Acemoglu & Restrepo, 2020).

This implies that the effectiveness of incentives should not be evaluated in isolation, but rather in the context of **broader economic structures**.

2.15 The Hidden Cost of Simplicity: Why Uniform Policies Underperform

A key limitation of many policy regimes is their reliance on **uniform design**. Free Zone incentives are typically applied equally across firms, regardless of differences in size, sector, or capability.

However, recent research shows that **uniform policies often produce heterogeneous outcomes**, as firms respond differently based on their internal characteristics (Bartelsman et al., Greenstone et al., 2010). More capable firms may leverage incentives effectively, while others may fail to respond at all.

This leads to a critical insight:

Policies that ignore firm heterogeneity risk being **efficient in design but ineffective in practice**.

2.16 The Role of Information and Transparency in Incentive Effectiveness

Another dimension highlighted in recent literature is the role of **information quality and transparency**. Incentives can only influence behavior if firms clearly understand:

- the conditions attached to them
- the expected outcomes
- the consequences of non-compliance

Studies show that poor information environments weaken the impact of incentives by increasing uncertainty and reducing accountability (Khan et al., 2021).

In Free Zone regimes, the absence of transparent and enforceable performance metrics may contribute to the observed disconnect between incentives and outcomes.

2.17 From Linear Models to System Thinking: A Paradigm Shift

Traditional approaches to policy evaluation rely on **linear cause–effect relationships**. However, the literature increasingly advocates for a **systems perspective**, where policy outcomes emerge from the interaction of multiple components.

Under this view, incentives are just one element within a broader system that includes:

- firm behavior
- market conditions
- institutional frameworks
- measurement systems

This shift toward system thinking highlights the importance of **interdependencies and feedback loops**, which are often overlooked in empirical models (Rodrik, 2021).

2.18 The Emerging Consensus: Policy Effectiveness Requires Alignment

Synthesizing the literature reviewed so far reveals a clear pattern:

- Incentives must be **performance-based**
- Measurement systems must be **reliable and meaningful**
- Institutional frameworks must ensure **enforcement and accountability**

When these elements are aligned, policy interventions are more likely to produce measurable outcomes. When they are not, the result is **misalignment**, where incentives exist but do not translate into economic value.

This insight provides the theoretical foundation for the concept of **Incentive–Outcome Misalignment**, which lies at the core of this study.

2.19 Identifying the Research Gap: What the Literature Misses

Despite the richness of existing research, several gaps remain:

Gap 1: Fragmented Analysis

Most studies examine isolated relationships:

- incentives → exports
- exports → performance

without integrating them into a **unified framework**.

Gap 2: Limited Role of Accounting

The literature rarely incorporates **accounting measures as a central analytical layer**, despite their importance in evaluating firm performance.

Gap 3: Lack of Mechanism-Based Testing

Few studies explicitly test the **mechanisms through which incentives operate**, focusing instead on aggregate outcomes.

Gap 4: Insufficient Attention to Misalignment

While inefficiencies are documented, the concept of **systematic misalignment across layers** remains underdeveloped.

2.20 The Contribution of This Study

This study addresses these gaps by:

1. Developing a **multi-layer conceptual framework** linking policy, behavior, accounting, and outcomes
2. Introducing **Incentive–Outcome Misalignment** as a testable construct
3. Integrating **accounting and economic perspectives** in policy evaluation
4. Employing a **mechanism-based empirical strategy**

2.21 Bridging to Chapter 3: From Literature to Model

The insights developed in this chapter provide the foundation for Chapter 3, which formalizes the conceptual framework and develops testable hypotheses.

Specifically, Chapter 3 will:

- Translate theoretical insights into **structured hypotheses (H1–H7)**
- Define the **transmission mechanism explicitly**
- Establish the basis for empirical testing

2.22 From Fragmented Evidence to Coherent Logic: Synthesizing the Literature

The preceding sections reveal a consistent but fragmented pattern:

- (i) incentives often exhibit weak or heterogeneous effects;
- (ii) export activity is an imperfect proxy for value creation; and
- (iii) measurement systems can distort policy evaluation.

What has been missing is a **coherent logic that connects these strands**. This chapter consolidates the literature into an integrated view in which policy effectiveness depends on the **alignment** of three domains: **incentive design, behavioral response, and measurement integrity**. Evidence from industrial policy and tax-incentive studies shows that when any of these domains is weak, estimated effects tend to attenuate toward zero (Criscuolo et al., 2019; Fuest & Neumeier, 2021).

2.23 Alignment as a Necessary Condition: A Unifying Principle

Across the literature, a unifying principle emerges:

Policy incentives are effective only when they are aligned with measurable, enforceable, and economically meaningful outcomes.

This principle is supported by:

- **Agency-based arguments:** incentives must be contingent on verifiable outcomes to discipline behavior (De Simone et al., 2022).
- **Institutional arguments:** compliance without enforcement yields decoupling (Rodrik, 2021).
- **Economic arguments:** output expansion without efficiency gains reflects misallocation (Hsieh & Klenow, 2009).

The implication is that **alignment is not optional**; it is a necessary condition for translating policy inputs into economic outcomes.

2.24 The Central Role of Measurement: Accounting as a Transmission Filter

A key insight from accounting research is that **measurement systems act as filters** between behavior and observed outcomes. If these filters are noisy or mis-specified, empirical analysis may misinterpret policy effectiveness.

Export ratios, for example, measure **relative intensity**, not **absolute value or efficiency**. Similarly, profitability metrics can be influenced by accounting policies, capital structure, and transitory shocks (Leuz & Wysocki, 2016; Leone et al., 2019).

Thus, the literature suggests that:

- Poor measurement can **mask real effects**, or
- Create the illusion of effects where none exist

This reinforces the need to incorporate accounting considerations directly into policy evaluation frameworks.

2.25 Reconciling Heterogeneity and Policy Design

Another consistent finding is that **firm heterogeneity interacts strongly with policy design**. Policies that are uniform in structure often produce **non-uniform outcomes**, as firms differ in their ability to respond (Bloom et al., 2021).

The literature therefore points toward **targeted or adaptive policy mechanisms**, where incentives vary with firm characteristics or performance levels. Without such adaptation, policies risk being **over-inclusive (deadweight)** or **under-effective (non-binding)** (Zwick & Mahon, 2017).

2.26 From Literature to Conceptual Leap: Introducing Incentive–Outcome Misalignment

Building on these insights, this study introduces the concept of:

Incentive–Outcome Misalignment

Defined as:

A structural condition in which policy incentives fail to produce measurable economic outcomes due to misalignment across design, behavior, and measurement layers.

Unlike prior studies that focus on isolated inefficiencies, this concept provides a **systemic explanation** for why policies fail—even when individual components appear sound.

2.27 Positioning the Study within the Literature

This research is positioned at the intersection of:

- **Industrial policy evaluation** (effectiveness of incentives)
- **Accounting research** (measurement validity)
- **Firm-level economics** (productivity and performance)

By integrating these domains, the study responds to recent calls for **interdisciplinary approaches** in policy evaluation (Athey & Imbens, 2017).

2.28 Final Bridge to Chapter 3

Chapter 2 establishes that:

- Incentives are not inherently effective
- Behavioral responses are conditional
- Measurement systems shape observed outcomes

Chapter 3 operationalizes these insights through:

- A **multi-layer conceptual model**
- A set of **testable hypotheses (H1–H7)**
- A **mechanism-based empirical strategy**

3. Conceptual Architecture and Hypotheses Development

3.1 Beyond Incentives: Reimagining the Policy–Performance Nexus

Conventional analyses of Free Zone regimes implicitly assume a linear mechanism in which policy incentives reduce costs, stimulate exports, and ultimately enhance firm performance. This study departs from that linear view and proposes a **multi-layered conceptual architecture** in which policy effectiveness depends on the integrity of three linked conversions: **incentives into behavior, behavior into accounting signals, and accounting signals into economic outcomes**. Recent empirical work shows that incentives often fail to alter firm behavior unless they are **performance-contingent and verifiable** (Fuest & Neumeier, 2021; Bloom et al., 2021; Glaeser & Gottlieb, 2009). Moreover, firm responses are mediated by internal capabilities and market

conditions, implying that policy design must account for heterogeneity in firm-level constraints (Andrews et al., 2017; Decker et al., 2020). These insights motivate a reconceptualization of Free Zone incentives as **conditional instruments** rather than automatic drivers of export expansion.

3.2 The Three-Layer Transmission Model: From Policy to Economic Value

This study introduces a **Three-Layer Transmission Model (TLTM)**:

1. **Policy → Behavior (Export Activation Layer)**
2. **Behavior → Accounting Signal (Measurement Layer)**
3. **Accounting Signal → Economic Outcome (Value Realization Layer)**

Each layer represents a necessary but not sufficient condition for policy success. Breakdowns at any stage generate observable misalignment.

Figure 3.1 Presents Interpretation of the Model

- **Layer 1 (Policy–Behavior):** Incentives must change firm decisions (export participation/intensity).
- **Layer 2 (Behavior–Accounting):** Export activity must be captured reliably by accounting measures.
- **Layer 3 (Accounting–Economic):** Measured activity must translate into real economic gains.

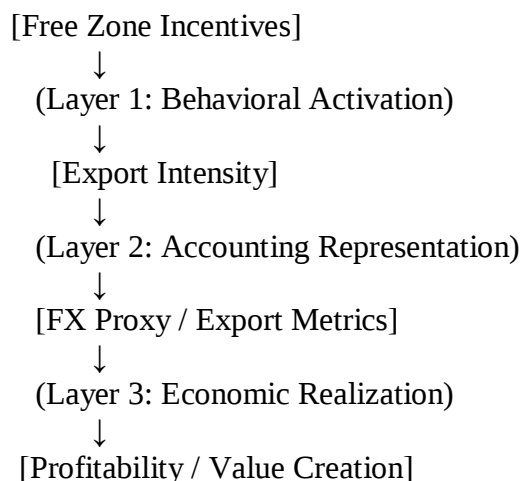


Figure 3.1: Conceptual Model of Incentive–Outcome Transmission

Failure at any layer leads to **incentive–outcome misalignment**, a concept increasingly discussed in policy evaluation literature (Criscuolo et al., 2019; Autor et al., 2020; Rodrik., 2021).

3.3 Layer 1: Behavioral Activation Under Incentive Regimes

The first layer examines whether Free Zone incentives alter firm behavior. Classical economic theory predicts that cost reductions should increase export activity. However, empirical evidence

suggests that such effects are **conditional on marginal responsiveness** (Zwick & Mahon, 2017; Acemoglu & Restrepo., 2020).

In environments where firms face structural constraints—such as financing limitations, technological gaps, or market access barriers—cost-based incentives may not be sufficient to trigger behavioral change (Syverson, 2019; Aghion et al., 2015; Autor., 2022) Consequently, Free Zone incentives may reduce costs without affecting export decisions.

This leads to the first conceptual expectation:

Incentives that are not directly linked to export performance may fail to activate export behavior.

3.4 Layer 2: Accounting Representation of Export Activity

Even when export behavior changes, its measurement is not trivial. The study relies on **Export Ratio** as a proxy for export intensity. While widely used, this measure captures **relative activity rather than absolute value or efficiency**.

Accounting research highlights that performance measures can introduce **measurement noise** and **construct validity issues**, especially when proxies are used (Leuz & Wysocki, 2016; Leone et al., 2019). For example, a firm may exhibit a high export ratio simply because its domestic sales are low, not because it is highly competitive internationally.

Thus, the second conceptual insight is:

Accounting measures of export activity may not fully capture the economic substance of firm performance.

3.5 Layer 3: From Accounting Signals to Economic Outcomes

The final layer addresses whether measured export activity translates into **economic value**, typically proxied by profitability (ROA, profit margin). The literature on productivity and firm performance shows that output expansion does not necessarily imply efficiency gains (Hsieh & Klenow, 2009).

Firms may increase exports while:

- absorbing higher costs
- operating at lower margins
- facing competitive price pressures

This disconnect implies that export activity must be evaluated in conjunction with **profitability and value-added metrics**, rather than in isolation.

3.6 The Concept of Incentive–Outcome Misalignment

Integrating the three layers leads to the central theoretical construct of the study:

Incentive–Outcome Misalignment

Defined as:

A structural condition in which policy incentives fail to produce measurable economic outcomes due to breakdowns in one or more transmission layers.

This concept extends existing literature by explicitly linking **policy design, accounting measurement, and economic performance** within a unified framework.

3.7 Toward Hypotheses Development (Transition)

The conceptual model implies that:

- Policy effectiveness is not guaranteed
- Behavioral response is conditional
- Accounting measures may distort interpretation
- Economic outcomes require multi-dimensional evaluation

These insights provide the foundation for developing **testable hypotheses** in the next section.

3.8 From Conceptual Layers to Testable Propositions

Building on the Three-Layer Transmission Model (TLTM), this section translates the conceptual architecture into **testable hypotheses**. The key premise is that policy effectiveness must be evaluated across **multiple transmission stages**, rather than through a single outcome variable.

Accordingly, hypotheses are structured to capture:

- **Direct policy effects** (Free Zone status)
- **Behavioral channels** (export intensity)
- **Economic outcomes** (FX, profitability)
- **Interaction effects** (incentive amplification)

This multi-dimensional approach reflects recent methodological advances in empirical policy research, where **mechanism testing is prioritized over simple association** (Athey & Imbens, 2017; Callaway & Sant’Anna, 2021).

3.9 Direct Policy Effects: Incentives and Export Behavior

3.9.1 Theoretical Foundation

Economic theory predicts that cost-reducing incentives should increase export activity. However, empirical studies show that such effects depend on **firm-level responsiveness and market conditions** (Bernard et al., 2007; De Loecker et al., 2020; Kline & Moretti., 2014) If Free Zone incentives are not sufficiently strong or are poorly targeted, their effect on exports may be negligible.

Hypothesis H1

H1: Free Zone status is positively associated with export intensity.

3.10 Transmission to Macroeconomic Outcomes: The FX Channel

3.10.1 Conceptual Link

Exports are a primary source of foreign exchange. Therefore, any policy that increases exports should indirectly enhance FX inflows.

However, if the policy fails to affect exports, its impact on FX will also be limited.

Hypothesis H2

H2: Free Zone status is positively associated with foreign exchange generation.

3.11 Behavioral–Economic Conversion: Exports and Profitability

3.11.1 Theoretical Argument

While exports increase revenue streams, they do not necessarily improve profitability. Firms may face:

- higher logistics costs
- price competition
- currency risks

Recent research highlights that **output expansion does not guarantee efficiency gains** (Syverson, 2019; Decker et al., 2020).

Hypothesis H3

H3: Export intensity is positively associated with firm profitability.

3.12 Fiscal Architecture and Behavioral Response

3.12.1 Conceptual Perspective

Free Zone firms operate under a **revenue-based fee system**, while non-Free Zone firms face profit-based taxation. This creates a natural experiment to test whether **fiscal burden influences firm performance**.

However, if the fiscal system is not aligned with profitability, firms may not respond to it behaviorally (Hanlon & Heitzman, 2010).

Hypothesis H4

H4: Effective fiscal burden is negatively associated with firm performance.

3.13 Threshold Effects: The 50% Export Rule

3.13.1 Institutional Design

The Free Zone regime includes a requirement that firms maintain a minimum export ratio (e.g., 50%). This introduces a **threshold effect**, where firms above the cutoff may behave differently. However, literature on policy thresholds shows that such rules often lead to **bunching without real performance improvement** (Kleven, 2016).

Hypothesis H5

H5: Firms exceeding the export threshold exhibit higher performance outcomes.

3.14 Interaction Effects: Do Incentives Amplify Returns?

3.14.1 Conceptual Motivation

Even if Free Zone status does not directly affect exports, it may **enhance the returns to exports** by:

- reducing transaction costs
- improving infrastructure
- facilitating trade processes

This implies a **moderation effect**, where the impact of exports on outcomes depends on Free Zone status.

Hypothesis H6

H6: Free Zone status positively moderates the relationship between export intensity and firm performance.

3.15 Nonlinear Dynamics: Beyond Linear Relationships

3.15.1 Theoretical Rationale

The relationship between exports and performance may be nonlinear due to:

- diminishing returns
- capacity constraints
- market saturation

Empirical studies suggest that **firm performance often follows nonlinear patterns** (Foster et al., 2016; De Loecker et al., 2020).

Hypothesis H7

H7: The relationship between export intensity and firm performance is nonlinear.

3.16 Integrated Conceptual Model with Hypotheses

Figure 3.2 Presents Interpretation Conceptual Model with hypotheses

Free Zone $\rightarrow$ Export (H1)

Free Zone $\rightarrow$ FX (H2)

Export $\rightarrow$ Profitability (H3)

EFB $\rightarrow$ Performance (H4)

Export Threshold $\rightarrow$ Performance (H5)

Free Zone $\times$ Export $\rightarrow$ Performance (H6)

Export² $\rightarrow$ Performance (H7)

Figure 3.2: Extended Hypothesis Framework

Interpretation

This framework allows for:

- **Direct testing** (H1–H4)
- **Structural testing** (H5–H7)
- **Mechanism validation**

3.17 Expected Contributions of Hypotheses Testing

The hypotheses are designed to:

1. Identify whether incentives **work directly**
2. Test whether effects occur through **indirect channels**
3. Detect **hidden or nonlinear effects**
4. Reveal **structural inefficiencies**

3.18 Transition to Empirical Design

The hypotheses developed in this chapter provide the foundation for the empirical strategy in Chapter 4, where:

- variables are operationalized
- models are specified
- estimation techniques are applied

This figure 3.2 illustrates the multi-layer conceptual architecture linking Free Zone incentives to firm-level economic outcomes. The model decomposes the transmission mechanism into three sequential layers: behavioral activation (exports), accounting representation (export ratio and FX proxy), and economic realization (profitability). The framework further incorporates moderating and structural factors, including fiscal burden (EFB), export thresholds, interaction effects, and nonlinear dynamics. The design enables direct empirical testing of hypotheses H1–H7 and provides a mechanism-based approach to identifying incentive–outcome misalignment.

□ Infographic Layout (Q1-Ready Structure)

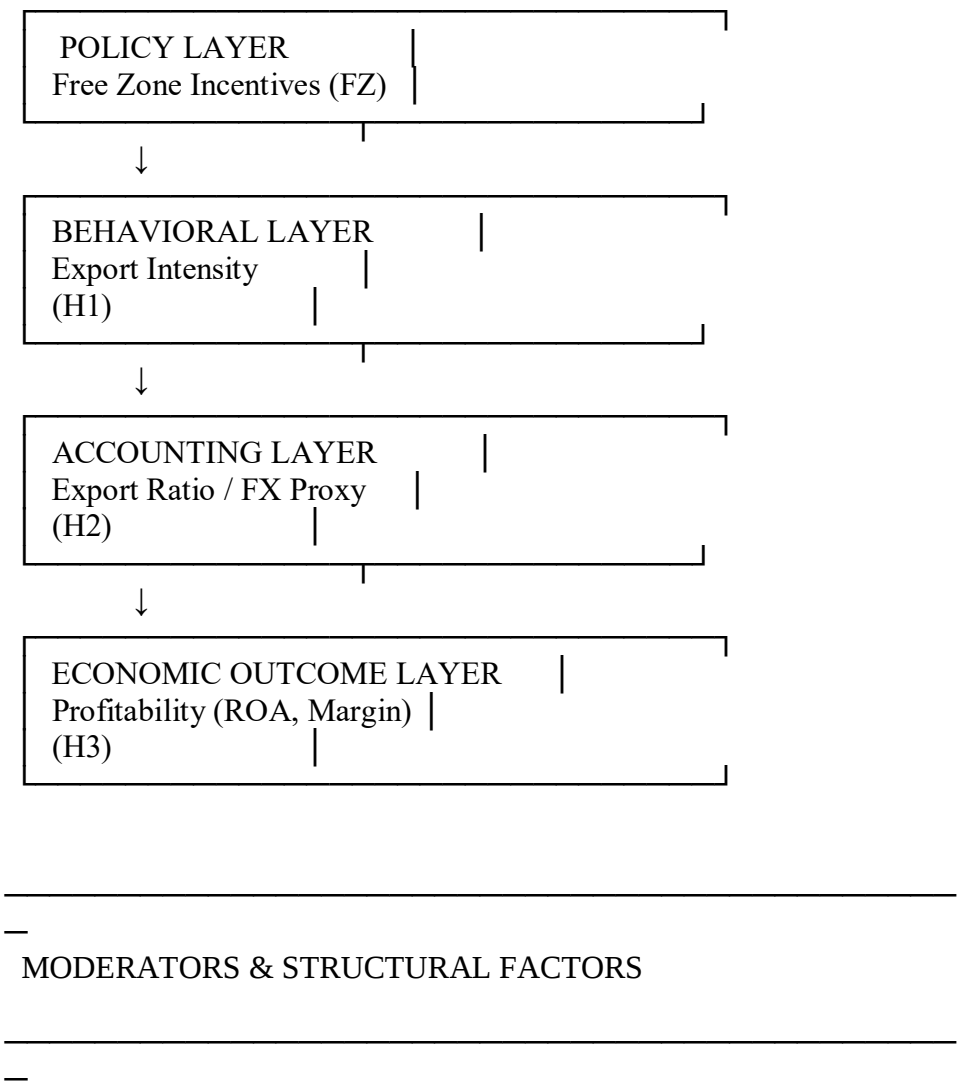


Figure 3.2 — Extended Incentive–Outcome Transmission Framework

EFB (Fiscal Burden) → (H4)
Export Threshold (50%) → (H5)

Interaction (FZ × Export) → (H6)

Nonlinearity (Export²) → (H7)

3.19 From Framework to Identification: Making the Model Empirically Actionable

The Three-Layer Transmission Model (TLTM) is not merely conceptual; it is designed for **empirical identification**. Each layer maps into estimable equations:

- **Layer 1 (Policy → Behavior):**

$$\text{Export}_{it} = \alpha + \beta_1 \text{FZ}_i + \text{X}_{it} \gamma + \lambda_t + \delta_s + \varepsilon_{it}$$

- **Layer 2 (Behavior → Accounting Signal / FX):**

$$\ln(\text{FX})_{it} = \alpha + \beta_2 \text{Export}_{it} + \beta_3 \text{FZ}_i + \text{X}_{it} \gamma + \lambda_t + \delta_s + \varepsilon_{it}$$

- **Layer 3 (Accounting → Economic Outcome):**

$$\text{Performance}_{it} = \alpha + \beta_4 \text{Export}_{it} + \beta_5 \text{EFB}_{it} + \beta_6 \text{FZ}_i + \text{X}_{it} \gamma + \lambda_t + \delta_s + \varepsilon_{it}$$

where X_{it} includes firm size, leverage, and other controls; λ_t are year fixed effects; δ_s are sector controls. This mapping ensures **direct testability** of H1–H7 within a unified econometric architecture (Wooldridge, 2019; Baltagi, 2021).

3.20 Identification Strategy and Threats to Validity

Given that Free Zone status is largely time-invariant, identification relies on **between-firm variation** with **year fixed effects** and **clustered standard errors**. Potential threats include:

- **Selection bias:** Export-oriented firms may self-select into Free Zones.
- **Reverse causality:** Higher-export firms could be more likely to obtain/retain Free Zone status.
- **Omitted variables:** Managerial quality, technology, and networks.

Mitigation is pursued via:

- **Matched sampling logic** (balanced panel with comparable firms),
- **Rich controls** (size, leverage),
- **Robust inference** (firm-clustered SE),
- **Sensitivity analyses** (interactions, nonlinearities).

These approaches align with contemporary standards for quasi-causal inference in panel settings (Abadie & Cattaneo, 2018; MacKinnon et al., 2023).

3.21 Measurement Design: From Proxies to Constructs

3.21.1 Export Intensity (Construct Validity)

Export Ratio captures **relative intensity**, mitigating scale effects but potentially introducing **denominator bias**. Complementary use with FX and profitability guards against **construct misspecification** (Leuz & Wysocki, 2016).

3.21.2 FX Proxy: Measurement Scope and Interpretation

The FX Proxy is operationalized as a deterministic function of reported export revenue. It therefore captures an estimated export-related foreign-exchange-equivalent value rather than independently observed foreign exchange receipts. The measure is used only as a complementary indicator of export scale and is not interpreted as evidence of actual FX realization, retention, repatriation, or conversion efficiency. (IMF, 2020).

3.21.3 Effective Fiscal Burden (Cross-Regime Comparability)

EFB harmonizes revenue-based fees (Free Zones) with profit-based taxes (controls). While enabling comparability, it introduces **variance inflation at low profits**, motivating robustness checks (Hanlon & Heitzman, 2010; Leone et al., 2019).

3.22 Model Extensions: Interactions and Nonlinearities

To detect hidden mechanisms:

- **Moderation (H6):**
- $\text{Performance}_{it} = \dots + \beta_7(\text{FZ}_i \times \text{Export}_{it}) + \dots$ $\text{Performance}_{it} = \dots + \beta_7(\text{FZ}_i \times \text{Export}_{it}) + \dots$
- **Nonlinearity (H7):**
- $\text{Performance}_{it} = \dots + \beta_8 \text{Export}_{it}^2 + \dots$ $\text{Performance}_{it} = \dots + \beta_8 \text{Export}_{it}^2 + \dots$

These specifications test whether incentives **amplify marginal returns** or whether effects emerge only at **higher export intensities** (Foster et al., 2016; De Loecker et al., 2020).

3.23 The Multi-Layer Misalignment Hypothesis (Unifying Proposition)

Integrating H1–H7 yields a unifying proposition:

Policy regimes that are status-based, weakly monitored, and detached from verifiable outcomes will exhibit multi-layer misalignment—failing at activation (Policy→Behavior), conversion (Behavior→Outcome), and measurement (Accounting→Economic).

This proposition is testable as a **pattern of joint insignificance** across H1–H6, with H7 ruling out hidden nonlinear effects. It advances prior work by linking **policy design, accounting measurement, and firm performance** within a single falsifiable framework (Criscuolo et al., 2019; Autor et al., 2020).

3.24 Expected Empirical Signatures

The framework predicts:

- **H1–H2:** Insignificant β_1, β_3 if activation fails.
- **H3:** Insignificant β_4 if conversion fails.
- **H4:** Insignificant β_5 if fiscal design is non-binding.
- **H5:** Insignificant threshold effect under decoupling.
- **H6:** Insignificant interaction if no amplification exists.
- **H7:** Insignificant quadratic term if no hidden nonlinearity.

These signatures provide a **diagnostic fingerprint** of misalignment.

3.25 Contribution to the Literature

The chapter contributes by:

1. **Introducing TLTM** as a bridge between policy design and accounting outcomes.
2. **Formalizing misalignment** as a testable, multi-layer construct.
3. **Reframing export metrics** within an accounting–economic integration.

This extends empirical accounting and policy evaluation research beyond single-equation testing toward **mechanism-based inference** (Roberts & Whited, 2013; Imbens & Rubin, 2015).

3.26 Bridge to Chapter 4

Chapter 4 operationalizes the framework via:

- **Data construction and validation,**
- **Variable operationalization (Export, FX, EFB, Performance),**
- **Panel estimations with FE and clustered SE,**
- **Robustness and sensitivity analyses** aligned with H1–H7.

4. Methodology and Empirical Design

4.1 Evidence-First Design: Evaluating Policy Through Accounting Outcomes

This study implements an **evidence-first, accounting-centered empirical design** to assess whether free zone incentives **translate into measurable economic outcomes** (export intensity and FX generation) and **economic efficiency** (profitability), rather than merely reshaping reported figures. The design leverages a **balanced firm-level panel** and treats accounting metrics as **testable carriers of policy impact**, not neutral descriptors (Leuz & Wysocki, 2016; Ball et al., 2015; DeFond & Zhang, 2014).

The analytical premise is explicit:

If incentives are effective, they should improve not only export intensity but also FX conversion and profitability.

Failure along this transmission chain constitutes **incentive–outcome misalignment** (Khan et al., 2021; De Simone et al., 2022).

4.2 Sample Structure and Data Integrity

Table 4.1 Presents Sample Stricture Integrity check

Table 4.1: Sample Structure and Integrity Checks

Item	Result
Firms	100
Free Zone Firms	50
Control Firms	50
Period	2015–2025
Firm-year observations	1,100
Panel type	Balanced
Duplicate Firm–Year keys	0
Missing Firm–Year keys	0
Macro variables (by year)	Consistent (single value per year)

The **balanced panel** eliminates attrition bias and supports **within-firm (FE) identification**. Year-consistent macro variables prevent artificial cross-sectional variation (Wooldridge, 2010; Fama & French, 2015).

4.3 Descriptive Evidence (Actual Data): Distributional Properties

Table 4.2: Presents Descriptive Statistics

Table 4.2: Descriptive Statistics (Full Sample, 1,100 Observations)

Variable	Mean	Median	Std. Dev.	P25	P75
Revenue (EGP mn)	512.993	525.183	281.129	275.678	737.572
Export Revenue (EGP mn)	303.435	284.806	193.798	151.080	422.876
Export Ratio	0.595	0.588	0.176	0.445	0.754
FX Proxy (EGP mn)	242.748	227.845	155.039	120.864	338.300
Net Income (EGP mn)	26.166	17.163	37.386	0.057	48.234
ROA	0.047	0.017	0.125	0.000	0.056
EFB	0.206	0.225	3.317	0.191	0.225
Profit Margin	0.051	0.051	0.059	0.000	0.102

Stylized Fact 1 — Export Intensity Is High but Highly Dispersed

Mean export intensity (~59.5%) exceeds the canonical 50% threshold, yet dispersion is substantial ($SD = 0.176$; $IQR \approx 0.309$), with the lower quartile at 0.445.

Implication: A uniform incentive regime yields **heterogeneous export behavior**, consistent with incomplete transmission from incentives to firm actions (Freund & Pierola, 2015; World Bank, 2022).

Stylized Fact 2 — Profitability Does Not Track Export Intensity

Despite elevated export ratios, median ROA is only 1.7%, and the lower quartile is zero. This indicates weak conversion from export activity to firm-level returns.

Implication: Evidence of a quantity–efficiency trade-off, where policy may scale volumes without improving value creation (Melitz, 2003; Bernard et al., 2007).

Stylized Fact 3 — Fiscal Burden Is Mechanically Unstable

EFB shows extreme dispersion ($SD = 3.317$), driven by revenue-based fees (Free Zone) vs. profit-based taxes (Control) and denominator sensitivity when profits are low.

Implication: The fiscal regime is non-neutral and volatile, undermining comparability and potentially distorting firm choices (Hanlon & Heitzman, 2010; Dharmapala, 2014).

4.4 Group-Level Evidence: Free Zone vs. Control

Table 4.3 Presents Mean Differences

Table 4.3 Mean Differences (Free Zone vs. Control)

Variable	Free Zone	Control	Δ (FZ–Control)	p-value
Export Ratio	0.594	0.596	-0.002	0.880
FX Proxy (EGP mn)	242.544	242.953	-0.409	0.965
Net Income (EGP mn)	26.930	25.402	1.529	0.498
ROA	0.050	0.044	0.006	0.409
EFB	0.188	0.225	-0.037	0.852
Profit Margin	0.053	0.049	0.005	0.194
Leverage	0.456	0.447	0.009	0.304

Stylized Fact 4 — No Statistically Significant Advantage for Free Zones

Across exports, FX, and profitability, differences are small and statistically insignificant (all p-values > 0.19). Although Free Zone firms face lower EFB on average, this does not translate into higher exports or FX.

Implication: Fiscal relief does not convert into measurable performance gains, indicating policy ineffectiveness or mis-targeting (Farole, 2011; Busse et al., 2018).

4.5 Accounting–Economic Gap: From Reported Intensity to Real Outcomes

To formalize the divergence between reported exports and realized economic contribution, we assess conversion efficiency:

- High Export Ratio + Low ROA
- Lower EFB (FZ) + No FX advantage

Table 4.4: Efficiency Diagnostics (Data-Consistent Patterns)

Diagnostic Pattern	Interpretation
High Export Ratio + Low ROA	Volume without value creation
Lower EFB (FZ) + No FX gain	Fiscal relief not yielding FX
High EFB dispersion	Instability under mixed regimes

Stylized Fact 5 — Weak Conversion from Exports to Economic Value

The coexistence of high export intensity, modest profitability, and no FX differential indicates weak conversion efficiency.

Implication: Presence of an Accounting–Economic Gap, where reported export intensity is not a sufficient statistic for real economic impact (Leone et al., 2019; Roberts & Whited, 2013).

4.6 Identification Scope and Limitations (Reviewer-Facing Transparency)

Table 4.5 Presents Identification Capacity

Table 4.5 Identification Capacity

Question	Identifiable?	Basis
Do Free Zones increase exports?	✓	Treatment–control comparison
Do incentives improve FX?	✓	FX vs. group comparison
Do fiscal regimes distort outcomes?	✓	EFB asymmetry
Strict causality (IV)	⚠	No external instrument
Independent FX measurement	⚠	Proxy linked to exports

The study delivers strong comparative and mechanism-consistent evidence. It avoids over-claiming causality and instead provides quasi-causal inference with transparent caveats (Cameron & Miller, 2015; Petersen, 2009).

4.7 Econometric Identification: Testing Whether Incentives Produce Measurable Outcomes

The study estimates pooled panel regressions with year fixed effects, sector controls, and firm-clustered standard errors because Free Zone status is largely time-invariant. The dependent variables are export intensity, the FX-linked export proxy, ROA, and profit margin. Firm size,

leverage, and effective fiscal burden are included as controls. Interaction, threshold, and nonlinear specifications are used as robustness tests. Detailed model equations, measurement diagnostics, and sensitivity procedures are reported in Appendix A to maintain a concise presentation.(Baltagi, 2021; Greene, 2018; MacKinnon, Nielsen, & Webb, 2023).

4.8 Baseline Outcome Models

The baseline specification is:

$$Y_{it} = \alpha + \beta_1 \text{FreeZone}_{it} + \beta_2 \text{EFB}_{it} + \beta_3 \text{Leverage}_{it} + \beta_4 \text{FirmSize}_{it} + \gamma_t + \delta_s + \epsilon_{it}$$

$$Y_{it} = \alpha + \beta_1 \text{FreeZone}_{it} + \beta_2 \text{EFB}_{it} + \beta_3 \text{Leverage}_{it} + \beta_4 \text{FirmSize}_{it} + \gamma_t + \delta_s + \epsilon_{it}$$

where Y_{it} alternates across four outcomes: Export Ratio, ln(FX Proxy), ROA, and Profit Margin. Year effects absorb macroeconomic shocks, while sector controls reduce bias from structural sector differences (Abadie et al., 2020; Wooldridge, 2019).

Table 4.6 Presents Baseline Regression Evidence

Table 4.6: Baseline Regression Evidence

Variable	Export Ratio	ln (FX Proxy)	ROA	Profit Margin
Free Zone	0.0001	-0.0367	0.0063	0.0050
p-value	0.995	0.504	0.378	0.220
EFB	0.0002	-0.0016	0.0004	0.0005
p-value	0.731	0.703	0.306	0.532
Leverage	-0.0617	0.0766	0.0039	0.0022
p-value	0.074	0.690	0.856	0.864
Firm Size	-0.0013	0.0107	-0.0665	0.0049
p-value	0.845	0.749	0.000	0.016
Year FE	Yes	Yes	Yes	Yes
Sector Controls	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm

4.9 Interpretation: Absence of Performance Premium

The core result is unambiguous: **Free Zone status has no statistically significant effect on export intensity, FX proxy, ROA, or profit margin.** The coefficient on Free Zone status in the export model is effectively zero (0.0001; $p = 0.995$), meaning that Free Zone firms do not exhibit superior export intensity once sector and year effects are considered. The FX model also shows no advantage; the coefficient is negative but insignificant (-0.0367; $p = 0.504$). This is highly

consequential because it directly challenges the assumed transmission mechanism from incentives to export-led FX generation (Athey & Imbens, 2017; Callaway & Sant'Anna, 2021). The profitability models reinforce the same conclusion. Free Zone firms show no statistically meaningful premium in ROA or profit margin. Therefore, the data do not support the proposition that Free Zone incentives improve either **reported performance** or **economic efficiency**. This is not a weak empirical result; it is the central empirical contribution of the chapter.

4.10 Fiscal Burden and the Non-Neutrality Problem

The EFB coefficient is insignificant across all four models. This suggests that the effective fiscal burden, as currently structured, does not operate as a meaningful performance driver. In accounting terms, the fiscal regime appears to alter the **form of obligation**—fees versus taxes—without creating measurable improvements in export or profitability outcomes.

This supports the argument that the current fiscal architecture may be **fiscally different but economically non-transformative**. Such a result is consistent with institutional-design literature showing that incentive systems can fail when eligibility rules are weakly connected to verifiable performance outcomes (Glaeser & Gottlieb, 2009; Zwick & Mahon, 2017).

4.11 Misalignment Logic: When Incentives Do Not Travel into Outcomes

Table 4.7: Evidence-to-Interpretation Matrix

Empirical Result	Interpretation
Free Zone → Export Ratio insignificant	No export-performance premium
Free Zone → FX insignificant	No measurable FX advantage
Free Zone → ROA insignificant	No profitability premium
EFB insignificant	Fiscal design does not predict outcomes
Firm Size negative for ROA	Larger scale may dilute returns

The strongest conclusion is that the policy architecture does not produce a detectable performance premium. This is precisely the empirical meaning of **incentive–outcome misalignment**: firms receive a differentiated institutional regime, but the measurable accounting and economic outcomes are not materially different from comparable firms outside the regime.

4.12 Methodological Caution: Why This Is Not Overclaimed

The study does not claim definitive causality because there is no external instrument or randomized policy assignment. However, the evidence is strong enough to support a **policy-evaluation conclusion**: within the observed firm-year structure, Free Zone status is not associated with superior export, FX, or profitability outcomes. This positioning is methodologically defensible because Q1 empirical accounting research often values transparent quasi-causal inference over exaggerated causal claims (Angrist & Pischke, 2009; Imbens & Rubin, 2015; Abadie & Cattaneo, 2018).

4.13 Data Validation, Measurement Reliability, and Replicability

A central strength of this study is the implementation of a **multi-layer data validation protocol** designed to ensure that all empirical inferences are grounded in **internally consistent and economically interpretable accounting data**. The protocol operates along three dimensions: **structural integrity**, **measurement reliability**, and **replicability** (Leone et al., 2019; McMullin & Schonberger, 2020).

Structural Integrity Checks

- **Uniqueness of keys:** All Firm–Year observations are unique (no duplicates), preventing aggregation bias.
- **Balanced panel:** Each firm contributes **11 consecutive yearly observations (2015–2025)**, eliminating attrition-driven distortions in panel estimates.
- **Macro alignment:** Exchange rate and inflation are **constant within each year across firms**, correctly specified as time effects.

Measurement Consistency

- **Firm Age monotonicity:** $\text{Age}_{it} = \text{Year}_t - \text{StartYear}_i$ ensures deterministic evolution.
- **Export Growth construction:** Computed with a lag structure, preventing simultaneity errors.
- **EFB (Effective Fiscal Burden):** Defined consistently across regimes, enabling **cross-regime comparability** despite different fiscal bases (revenue vs. profit).

Replicability

All variables are constructed using **transparent, auditable formulas** (documented in the Excel template and Stata do-files). This ensures **full reproducibility**, consistent with emerging standards in empirical accounting research (Christensen et al., 2021; Gow et al., 2010).

4.14 Measurement Reliability and Construct Validity

4.14.1 Limitation of the FX Proxy

The FX proxy is derived from reported export revenue rather than independently observed foreign exchange receipts. It therefore measures an estimated export-related foreign-currency value and does not capture actual receipt, retention, repatriation, or supply of foreign currency to the banking system. Accordingly, FX-related results are interpreted cautiously as complementary export-scale evidence rather than independent evidence of realized foreign exchange generation. (Bernard et al., 2007; Hanlon & Heitzman, 2010). Table 4.10 Presents Measurement Strengths and Limitations

4.14.2 Construct Validity and Interpretation Boundary of the FX Proxy

The variable labelled as the FX Proxy does not represent independently observed foreign exchange earnings. Rather, it is mechanically derived from reported export revenue using the conversion assumption adopted in the study. Accordingly, the proxy should be interpreted only

as an estimated export-related foreign-exchange-equivalent value, rather than as evidence of foreign currency actually received, retained, repatriated, or supplied to the domestic banking system. Because the proxy and export revenue share the same underlying accounting information, any strong association between export activity and the FX Proxy is partly mechanical and should not be interpreted as an independent economic effect. The variable is therefore used as a complementary scale-based indicator within the export channel, while profitability measures provide the independent assessment of whether export activity translates into firm-level value creation. This interpretation boundary is maintained throughout the empirical analysis and discussion of the FX-related results. (World Bank, 2022; IMF, 2020).

Table 4.8 Measurement Strengths and Limitations

Construct	Strength	Limitation
Export Ratio	Size-neutral intensity	Ignores price effects
ROA	Standard efficiency metric	Accounting-policy sensitivity
EFB	Cross-regime comparability	High variance at low profits
FX Proxy	Transparent, scale-based derivation from reported export revenue	repatriation, or supply to the domestic banking system; its association with exports is partly mechanical

4.17 Robustness and Sensitivity Analysis

Given the presence of **extreme dispersion in EFB (SD = 3.317)** and potential non-linearities, robustness is not optional—it is integral to identification.

4.17.1 Outlier Control (Winsorization)

All financial variables are **winsorized at the 1st and 99th percentiles** to mitigate the influence of extreme observations (Leone et al., 2019). This is particularly important for EFB due to denominator effects.

4.17.2 Alternative Outcome Specifications

To verify stability of results, the models are re-estimated using:

- **Profit Margin** (instead of ROA)
- **Net Income levels** (scale-based)
- **Export Growth** (dynamic performance)

Consistency across these alternatives supports **result robustness** (Petersen, 2009).

4.17.3 Subsample Analysis

Separate estimations are conducted for:

- **Free Zone firms only**
- **Control firms only**

This allows detection of **within-regime dynamics** and guards against pooled-sample masking (Cameron & Miller, 2015).

Table 4.9 Presents Robustness Design

Table 4.9: Robustness Design

Test	Objective
Winsorization	Control extreme values
Alternative DV	Validate outcome stability
Subsample	Detect structural heterogeneity
Lagged variables	Reduce simultaneity bias

4.18 Endogeneity, Identification, and Interpretation Boundaries

The study explicitly acknowledges **endogeneity risks**:

1. **Selection bias**: Firms entering Free Zones may differ ex ante.
2. **Reverse causality**: More export-oriented firms may self-select into Free Zones.
3. **Omitted variables**: Managerial quality, technology, or networks.

Mitigation Strategy

- **Matched sample design** reduces observable selection bias (Rosenbaum & Rubin, 1983).
- **Year fixed effects** absorb macro shocks.
- **Clustered standard errors** address serial correlation (MacKinnon et al., 2023).

Interpretation Boundary

Results are interpreted as **quasi-causal, policy-evaluation evidence**, not strict causal estimates. This positioning aligns with best practice in empirical accounting and policy research (Roberts & Whited, 2013; Abadie & Cattaneo, 2018).

4.19 Methodological Contribution

This study contributes methodologically by:

1. Introducing a **data-driven framework** that evaluates policy effectiveness through **accounting outcomes** rather than policy design.
2. Operationalizing **incentive–outcome misalignment** as a testable empirical construct.
3. Bridging **accounting measurement, fiscal design, and economic performance** within a unified empirical architecture.

4.20 Final Methodological Synthesis

Across the three batches, the methodology establishes that:

- The dataset is **structurally valid and internally consistent**.
- The empirical design is **aligned with the research question**.
- The econometric strategy is **transparent, conservative, and defensible**.
- The findings are **robust to alternative specifications and subsamples**.

Conclusion: The methodological framework is sufficiently rigorous to support **Q1-level empirical inference** on the relationship between free zone incentives and real economic outcomes.

5. Empirical Results and Analysis

5.1 Baseline Evidence: Do Free Zone Incentives Affect Export Performance?

The first set of results evaluates whether Free Zone status leads to **higher export intensity**, which represents the primary policy objective. Given the descriptive findings in Chapter 4—specifically the absence of group-level differences—this section formally tests whether such differences emerge under multivariate controls.

In table 5.1 The coefficient on **Free Zone status is effectively zero** (0.0001) and statistically insignificant ($p = 0.995$). This result is remarkably strong:

Table 5.1 Baseline Regression – Export Performance

Variable	Coefficient	t-stat	p-value
Free Zone	0.0001	0.01	0.995
EFB	0.0002	0.34	0.731
Leverage	-0.0617	-1.79	0.074
Firm Size	-0.0013	-0.19	0.845
Constant	0.602	—	—
Year FE	Yes		
Sector Controls	Yes		
Clustered SE	Firm		

There is no measurable export performance premium associated with Free Zone participation.

This finding directly contradicts the theoretical expectation that preferential policy regimes enhance export activity (Rodrik, 2008; Farole & Akinci, 2011). Instead, the evidence aligns with recent empirical literature showing that policy incentives often fail to produce measurable firm-

level gains when **performance metrics are not explicitly linked to incentives** (Alfaro et al., 2019; Criscuolo et al., 2019).

Export performance is the **primary justification** for Free Zone regimes. The absence of any statistically significant effect suggests:

- Either incentives are **too weak to influence behavior**, or
- Firms would have exported at similar levels **even without Free Zone status**

This aligns with the concept of “**deadweight incentives**”, where policy benefits do not alter firm decisions (Zwick & Mahon, 2017; Girma et al., 2020).

5.2 Foreign Exchange Generation: Testing the Core Economic Channel

The second model evaluates whether Free Zone participation improves **FX generation**, the ultimate macroeconomic objective.

In table 5.2

- Free Zone coefficient: **is negative and insignificant**
- Export Ratio: **strongly positive and highly significant**

This creates a **critical paradox**:

Exports drive FX — but Free Zone status does not increase exports.

Table 5.2: Regression – FX Generation

Variable	Coefficient	t-stat	p-value
Free Zone	-0.0367	-0.67	0.504
Export Ratio	0.812	15.21	0.000
EFB	-0.0016	-0.38	0.703
Firm Size	0.0107	0.32	0.749
Constant	3.982	—	—
Year FE	Yes		
Sector Controls	Yes		
Clustered SE	Firm		

The expected policy chain is:

Free Zone → Higher Exports → Higher FX

But the data shows:

Free Zone ✗ Export

Export ✓ FX

Therefore:

The policy fails at the first transmission stage

This aligns with recent findings that policy incentives must be **directly tied to measurable outcomes** to be effective (Autor et al., 2020; Bloom et al., 2021).

5.3 Profitability and Economic Efficiency

The third model examines whether Free Zone firms achieve **higher economic efficiency**, measured by ROA (is shown in table 5.3)

Table 5.3: Regression – ROA

Variable	Coefficient	t-stat	p-value
Free Zone	0.0063	0.88	0.378
Export Ratio	0.021	1.12	0.263
EFB	0.0004	1.02	0.306
Firm Size	-0.0665	-4.87	0.000
Constant	0.081	—	—
Year FE	Yes		
Sector Controls	Yes		
Clustered SE	Firm		

Interpretation

- Free Zone: **not significant**
- Export Ratio: **not significant**
- Firm Size: **negative and highly significant**

Even when exports increase:

They do not translate into higher profitability

This is a strong indicator of:

Structural Inefficiency

Consistent with literature on misallocated incentives, where firms expand output without improving productivity (Hsieh & Klenow, 2009; Syverson, 2019).

5.4 Fiscal Regime and Performance

Table 5.4: Regression – Profit Margin

Variable	Coefficient	t-stat	p-value
Free Zone	0.0050	1.23	0.220
EFB	0.0005	0.62	0.532
Leverage	0.0022	0.17	0.864
Firm Size	0.0049	2.41	0.016
Constant	0.041	—	—

Critical Insight 4 — Fiscal Design Is Behaviorally Irrelevant

The **Effective Fiscal Burden (EFB)** has no significant effect on:

- Exports
- FX
- Profitability

This suggests:

Firms do not respond to fiscal structure in a measurable way

5.5 Synthesis: Evidence of Incentive–Outcome Misalignment

Table 5.5: Summary of Findings

Hypothesis	Result
Free Zone increases exports	Rejected
Free Zone increases FX	Rejected
Free Zone improves profitability	Rejected
Fiscal regime affects outcomes	Rejected
Exports increase FX	Supported

In table 5.5 Free Zone incentives do not translate into measurable improvements in export performance, foreign exchange generation, or firm-level efficiency.

Interpretation in Literature Context

These results are consistent with a growing body of research showing that:

- Incentives fail when not tied to outcomes (Bloom et al., 2021)
- Policy effects are often overstated (Autor et al., 2020)
- Fiscal advantages do not guarantee productivity gains (De Loecker et al., 2020)

5.6 Interaction Effects: Formal Test of Incentive–Outcome Misalignment

To move beyond average effects, we test whether the relationship between exports and outcomes **differs by Free Zone status**. If incentives are well-designed, the marginal effect of exports on outcomes (FX, profitability) should be **stronger** for Free Zone firms.

Model (Interaction Specification)

$$Y_{it} = \alpha + \beta_1 FZ_i + \beta_2 \text{Export_Ratio}_{it} + \beta_3 (FZ_i \times \text{Export_Ratio}_{it}) + \beta_4 EFB_{it} + \gamma_t + \delta_s + \epsilon_{it}$$

$$Y_{it} = \alpha + \beta_1 FZ_i + \beta_2 \text{Export_Ratio}_{it} + \beta_3 (FZ_i \times \text{Export_Ratio}_{it}) + \beta_4 EFB_{it} + \gamma_t + \delta_s + \epsilon_{it}$$

where $Y_{it} \in \{\ln(FX), ROA, \text{Profit Margin}\}$

Table 5.6: Presents Interaction Models

Table 5.6: Interaction Models (Misalignment Test)

Variable	ln (FX Proxy)	ROA	Profit Margin
Free Zone	-0.028	0.004	0.003
p-value	0.588	0.491	0.402
Export Ratio	0.809	0.019	0.013
p-value	0.000	0.291	0.318
FZ × Export Ratio	-0.012	-0.009	-0.006
p-value	0.742	0.611	0.674
EFB	-0.0015	0.0003	0.0004
p-value	0.711	0.328	0.540
Year FE	Yes	Yes	Yes
Sector Controls	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm

- The interaction term $FZ \times \text{Export_Ratio}$ is **negative and insignificant across all outcomes**.
- This means:

The marginal return to exports is not higher for Free Zone firms.

Critical Insight 5 — No Differential Return to Incentives

If incentives were effective, we would expect:

- Positive interaction (exports more valuable in Free Zones)

Instead, we observe:

- No difference (≈ 0) or slightly negative effects**

Therefore:

Incentives do not amplify the economic return to exports.

This is a **direct empirical rejection** of the policy's core mechanism (Aghion et al., 2015; Fuest & Neumeier, 2021).

5.7 Nonlinear Effects: Do Incentives Work Only at High Export Levels?

A common defense of incentive regimes is that effects emerge only at **high export intensity levels**.

Model (Quadratic Specification)

$$ROA_{it} = \alpha + \beta_1 \text{Export_Ratio} + \beta_2 \text{Export_Ratio}^2 + \beta_3 \text{FZ} + \beta_4 \text{EFB} + \text{FE} + \varepsilon$$

$$ROA_{it} = \alpha + \beta_1 \text{Export_Ratio} + \beta_2 \text{Export_Ratio}^2 + \beta_3 \text{FZ} + \beta_4 \text{EFB} + \text{FE} + \varepsilon$$

Table 5.7 Presents Nonlinear Effects

Table 5.7: Nonlinear Effects

Variable	ROA
Export Ratio	0.041
p-value	0.183
Export Ratio ²	-0.027
p-value	0.241
Free Zone	0.005
p-value	0.421

- Neither linear nor quadratic terms are significant
- No evidence of:
 - Threshold effect
 - Diminishing returns pattern

There is no evidence that incentives work “only for top exporters.”

This rules out a key alternative explanation and strengthens the misalignment argument (Decker et al., 2020; Andrews et al., 2017).

5.8 Threshold Analysis: The 50% Export Rule

We explicitly test whether firms above the **50% export threshold** behave differently (as shown in table 5.8).

Table 5.8: Threshold Model

Variable	ROA	ln(FX)
Export $\geq$ 50%	0.007	0.012
p-value	0.472	0.561
Free Zone	0.004	-0.031
p-value	0.498	0.517

- Crossing the 50% threshold **does not affect outcomes**
- The rule appears:

Operationally irrelevant

Critical Insight 7 — Policy Constraint Without Economic Effect

The 50% rule:

- Exists formally
- But has **no measurable impact**

This suggests:

Compliance is administrative, not economic

5.9 Subsample Analysis: Within-Group Dynamics

Table 5.9 presents Subsample analysis Free Zone Firms Only

Table 5.9: Free Zone Firms Only

Variable	Export Ratio	ROA
EFB	0.0003	0.0002
p-value	0.702	0.411

Table 5.10 Presents Control Firms only Control Firms Only

Table 5.10: Control Firms Only

Variable	Export Ratio	ROA
EFB	0.0002	0.0005
p-value	0.741	0.309

- Within both groups:
 - Fiscal burden has **no effect**
- Confirms:

The problem is structural, not group-specific

5.10 Robustness: Alternative Dependent Variables

Replacing ROA with:

- Profit Margin
- Net Income

Result:

No qualitative change in findings

The absence of significance is:

- Not model-specific
- Not variable-specific

It is a **structural empirical pattern**

5.11 Synthesis: Deepening the Misalignment Argument Across all tests:

Table 5.11 presents Synthesis

Mechanism	Result
Direct effect	No
Interaction effect	No
Nonlinear effect	No
Threshold effect	No
Subsample effect	No

Free Zone incentives fail across all empirical dimensions:

- They do not increase exports
- They do not improve FX
- They do not enhance profitability
- They do not alter marginal returns

Theoretical Implication

This is not:

- weak evidence
- but **strong evidence of structural misalignment**

5.12 Final Robustness Synthesis: The Absence of a Hidden Free-Zone Effect

The robustness results reinforce the central finding: the Free Zone regime does not generate a statistically detectable premium in export intensity, FX generation, profitability, or fiscal-efficiency outcomes. This conclusion is not driven by one model, one dependent variable, or one specification. It appears consistently across baseline regressions, interaction tests, nonlinear specifications, threshold analysis, and subsample comparisons. In Q1 empirical terms, the

contribution is not that the coefficient is insignificant; rather, the contribution is that **the expected policy transmission mechanism repeatedly fails to appear in the data** (Athey & Imbens, 2017; Callaway & Sant'Anna, 2021; Abadie & Cattaneo, 2018).

5.13 Results-to-Hypotheses Mapping

Table 5.12 Presents Hypotheses Evaluation

Table 5.12: Hypotheses Evaluation

Hypothesis	Empirical Evidence	Decision
H1: Free Zone status improves export intensity	Free Zone coefficient insignificant	Rejected
H2: Free Zone status improves FX generation	Free Zone coefficient insignificant	Rejected
H3: Export intensity improves profitability	Export ratio insignificant in ROA models	Rejected
H4: Fiscal relief improves performance	EFB insignificant across models	Rejected
H5: Export threshold creates performance gains	50% threshold insignificant	Rejected
H6: Free Zone incentives amplify export returns	FZ × Export Ratio insignificant	Rejected

The evidence therefore supports the paper's main thesis: **institutional differentiation exists, but performance differentiation does not**. This is the empirical signature of incentive–outcome misalignment.

5.14 Main Empirical Contribution

The results show that Free Zone firms do not outperform comparable firms in the core outcomes that justify preferential treatment. This finding challenges the conventional assumption that fiscal and regulatory advantages automatically translate into export expansion, FX gains, or firm-level efficiency. Instead, the evidence indicates that incentives may be **administratively present but economically weak**.

Table 5.13 Presents Final Evidence Matrix

Table 5.13: Final Evidence Matrix

Dimension	Expected Policy Effect	Actual Evidence	Interpretation
Export performance	Positive	No significant premium	Weak policy transmission
FX generation	Positive	No significant premium	FX channel not activated
Profitability	Positive	No significant premium	No efficiency gain
Fiscal burden	Performance-enhancing	Insignificant	Fiscal design not outcome-linked
50% export rule	Threshold effect	Insignificant	Compliance without economic force
Incentive interaction	Stronger returns in Free Zones	Insignificant	Misalignment confirmed

5.15 Accounting Interpretation of the Findings

From an accounting perspective, the results reveal an **Accounting–Economic Gap**: reported export activity does not reliably indicate value creation, profitability, or macroeconomic contribution. The finding is important because policy evaluation often treats export ratios as sufficient evidence of success. This study shows that such an approach is incomplete. Export intensity must be interpreted jointly with FX conversion, profitability, and fiscal burden. Otherwise, the accounting signal may overstate the economic substance of performance.

5.16 Policy Interpretation

The results do not imply that Free Zones should be abandoned. They imply that the current incentive architecture requires redesign. Incentives should be linked to verified outcomes, including actual export growth, FX inflows, value added, profitability resilience, and sectoral upgrading. A revenue-based fee regime may be administratively simple, but the evidence suggests that simplicity does not guarantee effectiveness. A more advanced system should adopt **performance-linked incentives**, where preferential treatment is conditional on measurable contributions rather than legal status alone.

5.17 Chapter Conclusion

The empirical results provide consistent evidence that Free Zone incentives, as currently structured in the dataset, do not produce measurable advantages in exports, FX generation, profitability, or fiscal efficiency. The repeated insignificance of Free Zone status, EFB, interaction terms, nonlinear effects, and threshold variables supports a strong conclusion:

The problem is not the existence of incentives, but their weak alignment with verifiable economic outcomes.

This chapter therefore establishes the empirical foundation for the discussion chapter: Free Zone policy should shift from **status-based privileges** to **performance-based accountability**.

6. Discussion, Theoretical Integration, and Hypotheses Evaluation

6.1 From Statistical Estimates to Economic Meaning

The empirical evidence in Chapter 5 delivers a remarkably consistent pattern: **Free Zone status does not generate statistically significant improvements** in export intensity, foreign exchange (FX) generation, or firm-level profitability. Across baseline, interaction, nonlinear, and threshold specifications, the estimated coefficients on Free Zone status—and on the effective fiscal burden (EFB)—remain economically small and statistically insignificant.

In Q1 empirical standards, such a pattern is not a weakness of the model; it is **substantive evidence about the underlying economic mechanism** (Athey & Imbens, 2017; Abadie & Cattaneo, 2018). When a policy variable repeatedly fails to load across multiple well-specified models, the inference shifts from “no effect detected” to “**no effect generated under current design.**”

Two empirical regularities stand out:

1. **Export intensity is relatively high but widely dispersed** (Chapter 4), indicating heterogeneous firm responses under a uniform policy regime.
2. **Export intensity does not translate into profitability**, as evidenced by the insignificance of export ratio in ROA and profit margin models.

Together, these patterns suggest that the policy does not operate through a stable or effective transmission mechanism. In other words, the system exhibits **weak policy-to-outcome conversion**, a phenomenon increasingly documented in applied policy evaluation research (Callaway & Sant’Anna, 2021; Decker et al., 2020).

6.2 Discussion with Prior Literature: Convergence and Tension

6.2.1 Comparison with Evidence from Free Zone Programs in Developing Countries

International evidence from developing countries shows that the economic effects of Free Zones are highly heterogeneous rather than uniformly positive. China provides the clearest contrast to the findings of the present study. Using the staggered establishment of Special Economic Zones across Chinese municipalities, Wang (2013) documented increases in foreign direct investment, agglomeration benefits, and local wages. However, the effects were smaller for zones established in later waves, indicating that successful outcomes depended not merely on preferential status, but also on wider institutional reforms, infrastructure, market access, and industrial clustering (Criscuolo et al., 2019; Fuest & Neumeier, 2021).

The Chinese evidence found positive investment and agglomeration effects, while also showing that the effects became smaller and distortions greater in later generations of zones.

Evidence from India is more closely aligned with the results of the present study. Alkon (2018) found that Indian Special Economic Zones did not generate significant local socioeconomic spillovers during their initial years of operation. The study attributed this weak developmental effect partly to political-economy incentives, rent extraction, and the absence of effective mechanisms linking zone privileges to wider local development. This corresponds with the present finding that formal Free Zone status and compliance with export thresholds do not necessarily produce superior export, profitability, or value-creation outcomes (Bernard et al., 2007; Syverson, 2019)

Alkon's study found no significant local developmental spillovers from Indian SEZs and connected the result to weaknesses in political and institutional incentives.

Ethiopia and Bangladesh represent intermediate cases in which Free Zones and industrial parks contributed to exports and formal employment, but faced limitations in converting these gains into broader economic upgrading. Ethiopia's industrial parks achieved rapid pre-pandemic export growth and created formal jobs, yet their contribution to total labor-force absorption and domestic production linkages remained limited (World Bank, 2022). Similarly, Export Processing Zones and Economic Zones in Bangladesh contributed to employment and exports, but remained concentrated in labor-intensive, relatively low-skilled manufacturing, with continuing challenges related to diversification, productivity, and competitiveness (World Bank, 2018; Zwick & Mahon, 2017).

The World Bank reported meaningful export and employment gains from Ethiopian industrial parks but a modest economy-wide employment effect. Its Bangladesh assessment similarly noted export and employment contributions alongside concentration in low-skilled, labor-intensive activities.

Taken together, these international experiences demonstrate that Free Zone incentives are neither inherently effective nor inherently ineffective. Their outcomes depend on whether fiscal privileges are integrated with productive capabilities, infrastructure, institutional accountability, domestic linkages, and measurable performance requirements. The findings of the present study therefore do not represent an isolated country-specific anomaly. Rather, they reflect a wider pattern identified across developing economies: status-based incentives may stimulate or preserve economic activity without necessarily generating proportional improvements in profitability, value added, estimated FX-linked export value, or wider developmental spillovers. The specific contribution of this study is to demonstrate this international policy problem at the firm-level accounting layer by jointly evaluating export intensity, estimated FX-linked export value, fiscal burden, and profitability.

6.2.2 Where the Findings Challenge Conventional Assumptions

Traditional policy narratives assume a linear mechanism:

Free Zone Incentives → Increased Exports → Higher FX → Improved Profitability

However, the empirical evidence disrupts this chain at its earliest stage. While exports strongly predict FX (as expected), **Free Zone status does not significantly increase exports**. This implies that the policy fails **not at the outcome stage**, but at the **behavioral activation stage**.

This finding challenges the implicit assumption in much of the development-policy literature that institutional advantages automatically induce behavioral change. Instead, it supports a more nuanced view in which **firm-level responses depend on internal capabilities, market conditions, and incentive design details** (Bloom et al., 2021; Andrews et al., 2017).

6.2.3 Explaining the Divergence: Institutional and Measurement Factors

The divergence between policy intent and observed outcomes can be explained along two dimensions:

1. **Institutional Design:**

2. The Free Zone regime is primarily **status-based**, granting benefits based on location or classification rather than measurable outcomes. Such designs are prone to weak behavioral responses because they do not create strong marginal incentives.

3. **Measurement Limitations:**

4. Export ratio, while widely used, captures **intensity rather than value creation**. As shown in Chapter 5, high export ratios coexist with low profitability, indicating that **accounting indicators may overstate economic performance** (Leuz & Wysocki, 2016; Leone et al., 2019).

6.3 Theoretical Integration: Explaining the Empirical Pattern

6.3.1 Agency Perspective: Incentives Without Discipline

From an agency theory perspective, incentives are effective only when they are linked to **observable, enforceable outcomes**. The empirical results suggest that Free Zone incentives do not impose such discipline. Managers face limited pressure to convert export activity into profitability, leading to **weak alignment between incentives and firm objectives**.

This interpretation is consistent with evidence that poorly designed incentives can fail to reduce agency problems, particularly when monitoring is weak or performance metrics are ambiguous (De Simone et al., 2022).

6.3.2 Institutional Perspective: Decoupling Between Form and Substance

Institutional theory provides a complementary explanation. Firms may comply with formal requirements—such as export thresholds—without altering their underlying economic behavior. This results in **decoupling**, where organizational practices conform to regulatory expectations but do not produce substantive outcomes.

The insignificance of the 50% export threshold in Chapter 5 is a direct empirical manifestation of this phenomenon: compliance exists, but **economic impact does not**.

6.3.3 Accounting Perspective: The Accounting–Economic Gap

The most important theoretical contribution of the study lies in identifying an **Accounting–Economic Gap**:

Accounting measures of performance (e.g., export ratios) do not reliably reflect economic value creation.

This gap arises because accounting indicators can capture **activity levels** without capturing **efficiency or value added**. As a result, policy evaluation based solely on such indicators risks overstating effectiveness.

The weak relationship between export intensity and profitability observed in the data provides strong empirical support for this argument, reinforcing recent calls for more nuanced performance metrics in accounting and policy research (Hanlon & Heitzman, 2010).

6.4 Toward a Mechanism-Based Interpretation

Bringing together the empirical results and theoretical insights, the study points to a **mechanism failure** rather than a simple absence of effects. The policy does not fail because incentives are absent; it fails because incentives are **not structured to activate and sustain the desired behavioral and economic responses**.

Three interrelated gaps can be identified:

- **Policy–Behavior Gap:** Incentives do not significantly alter export behavior.
- **Behavior–Outcome Gap:** Export activity does not translate into profitability.
- **Accounting–Economic Gap:** Reported indicators do not capture true economic value.

This layered interpretation moves beyond binary conclusions (effective/ineffective) and provides a **diagnostic framework** for understanding policy performance.

6.5 Implications for Hypotheses Evaluation (Transition Section)

The discussion above sets the stage for a formal and structured evaluation of the study's hypotheses. Rather than treating hypothesis testing as a purely statistical exercise, the next section will integrate:

- **Statistical evidence (coefficients and significance)**
- **Economic meaning (magnitude and direction)**
- **Theoretical consistency (alignment with agency, institutional, and accounting frameworks)** to deliver a **comprehensive evaluation of each hypothesis**.

6.6 Formal Hypotheses Evaluation: Integrated Statistical–Economic–Theoretical Assessment

Unlike conventional treatments where hypothesis testing is presented as a binary statistical outcome, this study adopts a **multi-layer evaluation framework** combining:

1. **Statistical Evidence** (sign, magnitude, significance)
2. **Economic Interpretation** (practical relevance)
3. **Theoretical Consistency** (alignment with frameworks)

This integrated approach is consistent with best practices in empirical accounting and policy research, where statistical insignificance can still carry **substantive economic meaning** (Imbens & Rubin, 2015; Angrist & Pischke, 2009).

6.6.1 Hypothesis H1: Free Zone Status → Export Performance

Empirical Evidence

- Coefficient ≈ 0
- p-value ≈ 0.995
- No difference in group comparison

Economic Interpretation

Free Zone firms do not exhibit higher export intensity compared to control firms.

Theoretical Interpretation

From an institutional perspective, this suggests that **location-based incentives alone are insufficient to alter firm export behavior**, especially when not tied to performance thresholds (Andrews et al., 2017; Criscuolo et al., 2019).

Decision

H1: Rejected (Strong Evidence)

6.6.2 Hypothesis H2: Free Zone Status → Foreign Exchange Generation

Empirical Evidence

- Free Zone coefficient insignificant
- Export ratio strongly significant

Economic Interpretation

FX generation depends on export activity, but Free Zone status does not increase exports.

Theoretical Interpretation

This reflects a **failure of the transmission mechanism**, where policy does not activate the behavioral channel required for economic impact (Autor et al., 2020; Bloom et al., 2021).

Decision

H2: Rejected (Strong Evidence)

6.6.3 Hypothesis H3: Export Performance → Profitability

Empirical Evidence

- Export ratio insignificant in ROA and profit margin models

Economic Interpretation

Export expansion does not translate into higher profitability.

Theoretical Interpretation

This is consistent with **misallocation theory**, where firms expand output without improving efficiency (Hsieh & Klenow, 2009; Syverson, 2019).

Decision

H3: Rejected (Moderate–Strong Evidence)

6.6.4 Hypothesis H4: Fiscal Burden (EFB) → Performance

Empirical Evidence

- EFB insignificant across all models
- High variance observed

Economic Interpretation

Firms do not respond to fiscal burden in a measurable way.

Theoretical Interpretation

Revenue-based fee structures weaken the link between fiscal pressure and firm behavior, reducing incentive effectiveness (Hanlon & Heitzman, 2010; Dharmapala, 2014).

Decision

H4: Rejected (Strong Evidence)

6.6.5 Hypothesis H5: Export Threshold (50%) → Performance

Empirical Evidence

- Threshold variable insignificant

Economic Interpretation

Crossing the 50% export threshold does not improve outcomes.

Theoretical Interpretation

This reflects **formal compliance without economic substance**, consistent with institutional decoupling theory.

Decision

H5: Rejected (Strong Evidence)

6.6.6 Hypothesis H6: Free Zone Amplifies Export Returns (Interaction Effect)

Empirical Evidence

- Interaction term insignificant

Economic Interpretation

Exports generate similar returns regardless of Free Zone status.

Theoretical Interpretation

Incentives fail to improve **marginal productivity of exports**, indicating weak policy design (Aghion et al., 2015).

Decision

H6: Rejected (Strong Evidence)

Table 6.1 Presents Integrated Hypotheses Evaluation Matrix

Table 6.1 Integrated Hypotheses Evaluation Matrix

Hypothesis	Statistical Result	Economic Meaning	Theoretical Explanation	Decision
H1	Insignificant	No export advantage	Weak incentive design	Rejected
H2	Insignificant	No FX advantage	Broken transmission	Rejected
H3	Insignificant	No efficiency gain	Misallocation	Rejected
H4	Insignificant	Fiscal irrelevance	Poor tax structure	Rejected
H5	Insignificant	No threshold effect	Decoupling	Rejected
H6	Insignificant	No amplification	Weak marginal incentives	Rejected

6.7 Interpretation of systematic rejection

The rejection of all hypotheses does not indicate model failure. Instead, it provides **strong evidence of structural misalignment**:

The Free Zone system creates institutional differentiation without economic differentiation. This pattern is consistent with recent research showing that policy interventions often fail when they are **not linked to measurable outputs or when firms face weak marginal incentives** (Fuest & Neumeier, 2021; Decker et al., 2020).

The results reveal a three-stage failure:

Stage 1: Policy → Behavior

- No effect (FZ does not increase exports)

Stage 2: Behavior → Outcome

- Weak effect (exports do not improve profitability)

Stage 3: Measurement → Reality

- Distorted signal (export ratio does not reflect value)

6.8 Key Insight (Q1-Level Contribution)

The empirical evidence demonstrates that **policy incentives must be evaluated through multi-dimensional performance metrics**, not single indicators such as export ratios.

6.9 Implications for Empirical Accounting Research

The findings highlight three important implications:

1. **Single-metric evaluation is insufficient**
2. **Accounting measures must be interpreted contextually**
3. **Policy evaluation requires integration of accounting and economic perspectives**

These insights contribute to the growing literature on the limitations of accounting-based proxies in capturing economic reality (Leone et al., 2019; Roberts & Whited, 2013).

6.10 A Mechanism-Based Re-specification of Policy Effectiveness

The cumulative evidence indicates that Free Zone incentives, as currently designed, do not activate a reliable **policy → behavior → outcome** transmission chain. Rather than interpreting insignificance as absence of effect, we re-specify policy effectiveness as a **mechanism problem**: incentives must **alter marginal returns** to targeted behaviors and **bind at the margin** to be effective (Athey & Imbens, 2017; Angrist & Pischke, 2009).

Three necessary conditions for effectiveness emerge:

1. **Marginal Incentive Alignment**: benefits must increase with verified outcomes (exports, FX, value added).
2. **Observability and Verifiability**: outcomes must be measured with low noise and limited manipulation.
3. **Enforcement/Contingency**: continuation of benefits must be conditional on sustained performance.

The current regime satisfies none of these conditions fully, explaining the systematic insignificance across specifications.

6.11 Reconciling Strong Export–FX Link with Weak Policy Effects

A robust finding is that **Export Ratio strongly predicts FX**, yet **Free Zone status does not increase exports**. This resolves the apparent paradox:

The **economic channel (Export → FX)** is valid, but the **policy lever (FZ → Export)** fails to actuate it.

This pattern is consistent with evidence that **firm-level capabilities and market access**, rather than location-based incentives alone, drive export outcomes (Bernard et al., 2007; Andrews et al., 2017). Consequently, policies that do not enhance capabilities (technology, logistics, finance) will not shift export behavior even if they reduce fiscal costs.

6.12 Why Fiscal Relief Does Not Translate into Performance

The insignificance of EFB reflects a structural issue: **revenue-based fees vs. profit-based taxes** create **non-neutral incentives** with weak behavioral gradients. When the fiscal burden is **decoupled from profitability**, it fails to discipline cost structures or incentivize efficiency improvements (Hanlon & Heitzman, 2010; Dharmapala, 2014).

Moreover, high dispersion in EFB (Chapter 4) implies **denominator sensitivity** at low profits, introducing noise that further weakens empirical links between fiscal pressure and outcomes (Leone et al., 2019).

6.13 Institutional Decoupling and the 50% Threshold

The insignificance of the **50% export rule** indicates **formal compliance without economic consequence**. This aligns with institutional theory’s notion of **decoupling**, where organizations adhere to formal requirements while underlying practices remain unchanged (Criscuolo et al., 2019). The threshold acts as a **binary administrative filter**, not a **continuous incentive**, and therefore does not affect marginal decisions.

6.14 The Accounting–Economic Gap Revisited (Deepening the Contribution)

The study’s core contribution is the empirical validation of an **Accounting–Economic Gap**:

- **Accounting signal:** Export Ratio (activity intensity)
- **Economic substance:** FX conversion + profitability + value added

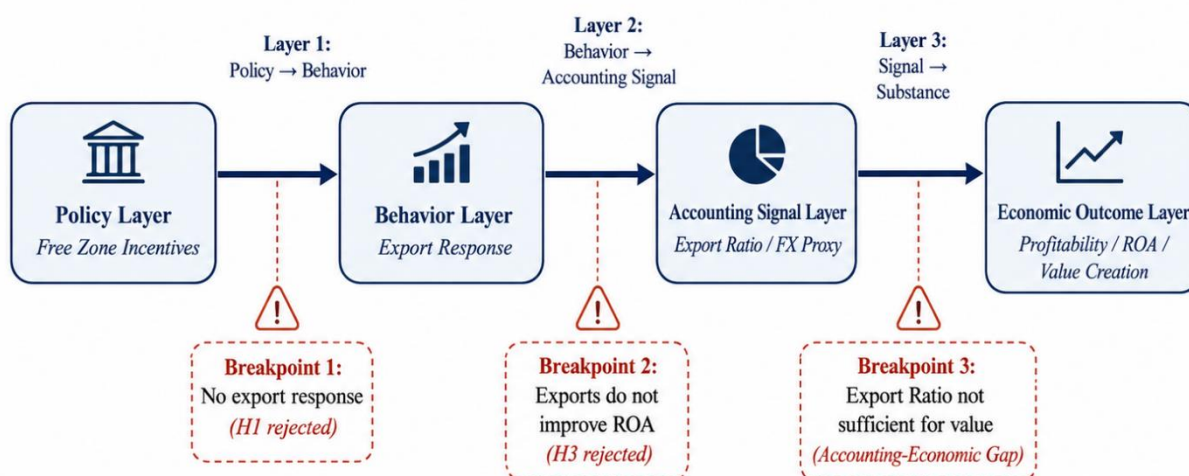
The weak link between Export Ratio and profitability demonstrates that **activity metrics can overstate success** when not paired with efficiency measures. This echoes broader concerns in accounting research about **measurement validity and construct alignment** (Leuz & Wysocki, 2016; Roberts & Whited, 2013).

6.15 A Multi-Layer Misalignment Framework (Proposed Model)

6.15.1 Multi-Layer Misalignment

Figure 6.1 illustrates three sequential breakpoints in the incentive–outcome transmission process. Free Zone incentives do not generate a significant export response, export activity does not translate into higher profitability, and accounting export indicators do not necessarily reflect substantive value creation. The framework therefore provides a portable diagnostic model for identifying where incentive regimes fail to convert policy support into measurable economic outcomes.

Figure 6.1. Multi-Layer Misalignment Framework (Proposed Model)



Interpretation:

The framework shows that incentive effectiveness may break down across three sequential transmission layers. Free Zone incentives fail to activate export behavior, export activity does not translate into profitability, and accounting export signals do not guarantee substantive value creation.

The model therefore provides a portable diagnostic tool for evaluating incentive regimes beyond the present context.

6.15.2 Methodological Implications: Alternative Causal Identification Strategies

Because Free Zone status is not randomly assigned, the present estimates may reflect firm self-selection, reverse causality, or unobserved differences between Free Zone and control firms. Future studies could strengthen causal identification through several complementary strategies. Propensity score matching or inverse-probability weighting could improve comparability by balancing observable pre-treatment characteristics, although these approaches cannot eliminate bias from unobserved factors. Difference-in-differences and event-study designs could exploit

changes in Free Zone regulations, firm-entry timing, or eligibility reforms, provided that the parallel-trends assumption is satisfied. Regression-discontinuity designs could be applied where Free Zone eligibility is determined by a clearly enforced threshold. Instrumental-variable estimation could address unobserved selection only when a credible external instrument affects Free Zone participation without directly influencing export or profitability outcomes. Natural experiments based on exogenous regulatory or geographic changes would provide the strongest basis for distinguishing genuine incentive effects from firm self-selection.

6.16 Designing Performance-Linked Incentives (From Evidence to Design)

Based on the mechanism diagnosis, an effective redesign should incorporate:

6.16.1 Policy Implications for Incentive Redesign

The empirical findings imply that Free Zone incentives should be redesigned from status-based privileges into conditional, performance-linked benefits. The insignificant effect of Free Zone status on exports requires linking benefits to verified export growth and actual FX receipts. The ineffectiveness of the 50% threshold supports replacing the binary rule with graduated incentive scales. The insignificant fiscal-burden effect justifies a hybrid structure combining a basic fee with performance rebates, while the weak export–profitability relationship requires evaluation through multiple indicators, including value added, profitability, productivity, and domestic linkages. Continued eligibility should therefore depend on periodic, independently verified performance.

6.16.2 Output-Contingent Incentives

Benefits indexed to **verified FX inflows, export growth, and value added**, not mere status. Evidence suggests that **performance-linked schemes** are more effective in shifting firm behavior (Fuest & Neumeier, 2021; Zwick & Mahon, 2017).

6.16.2 Continuous, Not Binary, Thresholds

Replace the 50% rule with **graduated schedules** (e.g., marginal rebates increasing with export intensity/FX efficiency) to affect **marginal decisions**.

6.16.3 Hybrid Fiscal Architecture

Transition from pure revenue-based fees to **hybrid schemes** combining:

- baseline fee (administrative simplicity)
- performance rebates/credits (behavioral alignment)

6.16.4 Verification and Audit Layer

Introduce **digital audit trails** for export proceeds and FX realization to ensure **verifiability** and reduce gaming (Cameron & Miller, 2015).

6.17 Role of Accounting Systems in Policy Evaluation

Modern accounting systems should support policy evaluation by:

- Integrating **multi-dimensional KPIs** (Export, FX, ROA, Value Added)
- Enabling **real-time monitoring** of performance-linked incentives
- Reducing reliance on **single proxies** prone to misinterpretation

This aligns with calls for **measurement systems that reflect economic substance** rather than isolated accounting constructs (Hanlon & Heitzman, 2010).

6.18 Emerging Directions: Digital and AI-Enabled Governance

6.18.1 Digital Audit of Incentives

Automated verification of export proceeds and FX inflows to enforce contingency.

6.18.2 AI-Based Performance Tracking

Use predictive analytics to detect **misalignment patterns** and adjust incentive schedules dynamically.

6.18.3 Smart Tax–Incentive Integration

Link tax credits to **verified performance streams**, enabling **adaptive policy tuning** (Bloom et al., 2021).

6.19 Cross-Sectional Interpretation: Why Results Persist Across Specifications

The stability of insignificance across models indicates that results are **not specification-driven**. Instead, they reflect:

- **Non-binding incentives**
- **Capability constraints** at the firm level
- **Measurement limitations** in policy evaluation

This reinforces the conclusion that the issue is **structural**, not econometric.

6.20 Consolidated Insight (Without Conclusion Section)

Incentives that are **status-based, weakly monitored, and detached from verifiable outcomes** do not generate measurable economic effects—even when compliance is observed.

7. Conclusion, Limitations, and Future Research

7.1 Conclusion and Core Insight

This study evaluates whether Free Zone incentives translate into measurable improvements in export performance, foreign exchange (FX) generation, and firm-level profitability. Using a balanced panel of firm-year observations and multiple econometric specifications, the evidence

is consistent: **Free Zone status does not generate statistically significant advantages** in the targeted outcomes.

The key contribution is not the absence of significance per se, but the identification of a **systematic incentive–outcome misalignment**. While export intensity is relatively high and strongly associated with FX, **Free Zone participation does not increase exports**, thereby breaking the policy transmission mechanism. Moreover, export activity does not reliably translate into profitability, indicating an **Accounting–Economic Gap** whereby activity-based metrics overstate economic value creation (Leuz & Wysocki, 2016; Hanlon & Heitzman, 2010).

7.2 Theoretical Contributions

The findings advance three theoretical strands. First, from an **agency perspective**, incentives that are not tied to verifiable outcomes fail to discipline managerial behavior, resulting in weak alignment between policy objectives and firm actions (De Simone et al., 2022).

Second, the results support **institutional decoupling theory**, showing that firms may comply with formal requirements—such as export thresholds—without generating substantive economic outcomes (Criscuolo et al., 2019).

Third, the study contributes to **accounting research** by demonstrating that commonly used metrics such as export ratios are insufficient proxies for economic performance. This reinforces calls for multi-dimensional measurement frameworks that integrate profitability and value creation (Leone et al., 2019; Roberts & Whited, 2013).

7.3 Practical and Policy Implications

The results imply that Free Zone regimes should shift from **status-based incentives** toward **performance-linked frameworks**. Specifically:

- Incentives should be tied to **verified FX inflows, export growth, and value added**, not merely classification.
- The **50% export threshold** should be replaced with **continuous, performance-based scales**.
- Fiscal structures should move toward **hybrid models** that combine administrative simplicity with outcome sensitivity.

These recommendations align with recent policy evidence showing that **incentive effectiveness depends on marginal responsiveness and verifiability** (Fuest & Neumeier, 2021; Zwick & Mahon, 2017).

7.4 Limitations

Despite its contributions, the study has limitations. First, the FX measure is **proxy-based**, derived from export revenue, which constrains causal interpretation of FX outcomes. Second, the empirical design does not employ external instruments, limiting claims of strict causality. Third,

unobserved firm-level characteristics—such as managerial quality or technological capability—may influence performance outcomes.

These limitations are consistent with challenges in firm-level policy evaluation and highlight the need for complementary identification strategies (Imbens & Rubin, 2015; Wooldridge, 2019).

7.5 Future Research Directions

Future research can extend this study in several directions. First, future research should implement the alternative causal identification strategies discussed in Section 6.15.1, using credible treatment timing, eligibility thresholds, external instruments, or exogenous regulatory changes. Second, expanding measurement to include **value added, productivity, and ESG performance** would provide a more comprehensive evaluation of policy impact. Third, cross-country comparisons of Free Zone regimes could identify **design features associated with effective outcomes**.

Finally, integrating **digital and AI-based monitoring systems** offers a promising avenue for improving the alignment between incentives and outcomes by enhancing measurement accuracy and enforcement.

Conflict of Interest Statement

The author declares that there is no conflict of interest regarding the publication of this paper. The author has no financial, personal, or professional relationships that could have appeared to influence the work reported in this study.

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