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Logistic Disruption In Italy China Trades, Financial Impact and Mitigation Strategies

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Introduction

In recent years, despite the significant disruptions caused by the COVID-19 pandemic, the relations between Italy and China have demonstrated a notable degree of resilience. The continuity of this bilateral relation has been ensured by frequent high-level governmental meetings and institutional dialogues. These interactions have facilitated the launch and maintenance of joint initiatives across multiple strategic sectors, ranging from economic cooperation and investment to education, science, and cultural exchange.
The support to this diplomatic engagement has prevented a fragmentation of cooperation during a period marked by global uncertainty.

However, the existence of a strategic partnership has not automatically translated into proportional growth in Italian exports to China. In 2024, Italian goods exports to China were approximately €16 billion, notably smaller than Chinese exports to Italy, which exceeded €52 billion, resulting in a substantial trade deficit for Italy. Italian exports accounted for only a small share of China's total imports, with Italy's export penetration ranking behind major European competitors such as Germany and France.
The export mechanism faces several dynamics and difficulties. Structural constraints continue to limit Italy's export performance in the Chinese market. These include regulatory barriers, complex certification procedures, differences in standards, and limited familiarity with the Chinese business environment, especially for Italian small and medium-sized enterprises. Italian exporters also face intense competition from Chinese domestic producers and from other European suppliers with stronger scale economies. The demand volatility is another problem that has arisen lately, caused by the shifts in Chinese consumer preferences and the evolution of the society's economy.

Among all the range of structural and operational challenges that limits Italian companies's ability to export to China, one issue has proven to be especially persistent and difficult to manage:

The current geopolitical context, dominated by uncertainty, wars and dispute between countries and social groups, has introduced substantial disruptions to export logistics, particularly in the field of freight transportation. This negative impact created disruptions along key maritime routes, increased security risks, and brought uncertainty in global supply chains.

From a financial point of view, these logistic constraints have had a direct and severe financial repercussion on Italian exporters. Extended transit times and volatility in shipping routes have increased inventory in transit and working capital requirements, placing particular strain on small and medium-sized enterprises with limited liquidity buffers.These tensions caused several losses and increased costs, triggered by longer transit times, higher transportation and insurance fees, and delays in payments.

One of the main geopolitical tension has been triggered by the conflict between Israel and Hamas, particularly in the latest years, when in November 2023 the *Galaxy Leader*, a car carrier ship navigating the Suez Canal, was hijacked by Houthi militants. In the context of Europe–Asia trade, and particularly for Italian exports to China, the instability of the Suez Canal has therefore emerged as a critical external shock, amplifying logistical risk and reinforcing the link between geopolitical tensions and the financial sustainability of export operations.

The aim of this thesis is to analyze in details how the current geopolitical situation in the Red Sea is affecting the financial capacity of Italian companies, by measuring the impact of the disruptions in the logistic supply chain.

Since Italian exports to China are concentrated in a few macro-sectors that are sensitive to logistics in different ways, the first chapter will introduce the current situation of Italian's export to China, and why the logistic matters by sector. For example the agri-food sector is highly sensitive to long distance transportation and rerouting, or the fashion and luxury sector, which has a high

value benefit but is also time sensitive, regarding seasonality, launches and retail calendars.

In the second chapter, we will dive straight into the core of logistics problems in exporting from Italy to China. A first analysis regards the costs of rerouting: since late 2023, many carriers avoided the Suez corridor for the high risks, this means longer transit times and higher fuel consumption. Suez container traffic fell sharply in 2024 and Asia–Europe freight rates from Shanghai to Rotterdam rose strongly between 2023 and 2025. While air rerouting can rescue time sensitive goods, costs are much higher and capacity can be cyclical. The chapter will continue analyzing the cost inflation of freight insurances and compliance. The transportation through high war risk zone bring security related surcharges and higher cargo insurance costs, especially for higher value Italian goods. The chapter will also analyze the ETS (Emission Trading System) maritime costs. The EU regulatory system of ETS has changed, covering 70% of emissions from January 2025, 70% of emissions will be covered by EU companies , leading to increases in surcharges.

The third Chapter examines how these logistics problems hit the companies finances. Since longer transits and more variability means increases in inventory, with direct impact on the balance sheet, and the firms hold more safety stock to protect service levels, a first analysis will be on working capital absorption and the consequential need of short-term financing, with credit lines and overdrafts. The logistic volatility arisen by the geopolitical situation on the Suez Canal, can cause disputes as late delivery and unconformity in the documentation, which increase the probability of delayed payment or the consequential cancellation of payments and the need for stronger payment instruments like guarantees or insurances. The delays also affect the complexity of the FX and financial hedging. If deliveries slide, also the cash flow shift in time. Hedging windows may no longer match the actual cash receipt date and firms face basis risk between forecast and realized cash flows.

The logistical disruptions analyzed in this chapters highlight how shocks in transportation and supply chains do not remain confined to the physical movement of goods, but rapidly translate into financial stress for exporting firms. This chapter examines the financial tools that Italian firms can rely on to mitigate the negative economic consequences of logistic instability, describing a few financial and contractual solutions. These include export credit insurance to reduce non-payment risk and facilitate receivables financing, bank financing supported by public guarantees, and alternative liquidity instruments such as factoring and forfaiting, which enable firms to convert trade receivables into immediate cash. These credit tools to prevent losses are extremely important, an example will be the Italian insurance-financial group, SACE, which provides export credit insurances explicitly designed to protect agains non-payment and contractual termination on export receivables. In parallel, the chapter explores how firms can strategically adjust contractual arrangements, payment terms, and Incoterms to rebalance risk between exporters and foreign buyers. Finally, it considers inventory and distribution strategies, such as the use of bonded warehouses and third-party logistics hubs in China, as financially motivated responses to logistics volatility. In an environment characterized by geopolitical uncertainty and persistent supply chain disruptions, these instruments play a crucial role in sustaining Italian firms' presence in the Chinese market and limiting the transmission of logistical shocks to firms' balance sheets.

The forth chapter will provide a comparison between large firms and SMS companies and why the financial impact differs. Large companies usually have better tools, like logistic teams, multi-carrier contract and a better access to structured trade finance like buyer credit, supplier credit and guarantees, but suffer from larger exposure, like big working-capital swings, reputation and service levels to maintain with Chinese costumers and high governance cost of compliance and supply chain. SMS companies suffer from fragile liquidity, smaller buffers, that increase the reliance on bank short-term lines, less negotiation power with carriers and forwarders and are more exposed to

single-buyer concentration in China. The logistic desegregation can bring even more liquidity stress with higher net working capital, higher probability of credit tightening and delayed investments because the cash is trapped in transit and receivables.

前言

在全球经济高度互联的时代背景下，国际贸易已不再只是商品跨境流动的简单行为，而是深度嵌入全球价值链、金融体系与地缘政治结构之中的复杂系统工程。对于制造业基础雄厚、资源禀赋相对有限的意大利而言，出口不仅是经济增长的重要驱动力，更是维系国家产业竞争力与国际影响力的关键支柱。在众多海外市场中，中国作为全球第二大经济体及世界重要的工业与消费市场，长期以来在意中经贸关系中占据战略性地位。

近年来，尽管新冠疫情对全球供应链造成严重冲击，意大利与中国之间的双边关系仍表现出一定程度的韧性。高层外交互动与制度性对话机制在一定程度上维系了合作框架的稳定。然而，战略伙伴关系的存在，并未自动转化为出口规模的同步增长。意大利对华出口规模在整体贸易结构中仍处于相对有限的位置，且呈现出明显的行业集中性特征。机械设备、工业中间品等资本品长期占据主导地位，而农食品、时尚与奢侈品等“意大利制造”代表性产业虽具有品牌优势，却在市场准入、物流成本与分销体系方面面临更多挑战。

在诸多制约因素之中，物流体系的不确定性逐渐成为影响出口表现的关键变量。物流不仅是货物运输的物理过程，更是连接生产、分销与金融流动的核心环节。尤其是在长距离贸易背景下，运输时间、航线稳定性、保险费用、燃料成本以及监管要求等因素，都会通过库存周转、现金流周期与融资结构传导至企业财务层面。换言之，物流问题并非单纯的运营成本问题，而是可能演变为企业资产负债结构压力的重要来源。

自2023年下半年以来，红海及苏伊士运河周边地区的地缘政治紧张局势显著升级。商船遭袭事件与区域冲突外溢风险，使得传统的亚欧海运通道面临安全性与稳定性的双重挑战。大量航运公司选择绕行好望角，导致航程延长、燃料消耗上升、运输周期拉长，进而推高全球运价指数。与此同时，战争风险附加费、货物保险费率上调以及欧盟碳排放交易体系（ETS）对海运领域的逐步覆盖，使得航运成本结构更加复杂化与制度化。

对于意大利出口企业而言，上述变化意味着多重压力的叠加。首先，运输时间延长直接导致在途库存增加，占用更多营运资金；其次，物流成本上升压缩利润空间；再次，交货延误可能引发合同纠纷、付款延期甚至订单取消；此外，汇率对冲安排往往基于原定交货时间制定，一旦时间错位，企业将面临套期保值失配风险。在此背景下，物流冲击通过现金流、信用风险与融资需求等渠道，迅速转化为财务风险。

值得注意的是，这种冲击在不同规模企业之间呈现出显著的非对称性。大型企业通常具备更完善的物流管理团队、多元化客户结构与更广泛的融资渠道，能够通过多承运人合同、贸易融资工具与风险对冲策略分散风险。然而，其出口规模大、声誉成本高，一旦供应链受阻，也会面临更高的运营复杂性与合规成本。相比之下，中小企业流动性缓冲有限，对短期银行授信依赖度高，且在议价能力与客户集中度方面更为脆弱。当物流冲击导致现金流延迟或信用收紧时，中小企业更容易陷入财务紧张状态。

因此，本论文旨在系统分析当前红海地区地缘政治不稳定对意大利对华出口所产生的金融影响机制。研究从出口结构与行业敏感性出发，探讨不同

产品类别在物流约束下的差异化风险暴露；进一步分析航线改道、运价上涨、保险费用与监管成本如何改变企业成本结构；在此基础上，深入研究物流冲击如何通过营运资本占用、信用风险与汇率风险等渠道传导至企业资产负债表；最后，通过比较大型企业与中小企业的结构差异，揭示规模、治理结构与融资能力在风险吸收过程中的决定性作用。

在方法论上，论文结合宏观贸易数据、航运成本估算、政策法规分析以及企业财务逻辑推演，构建一个将物流风险与金融风险相连接的分析框架。研究强调，现代国际贸易环境中，供应链稳定性已成为企业财务健康的重要前提条件。地缘政治不再只是外生背景变量，而是能够通过航运路线、保险市场与监管制度直接影响企业资本结构与盈利能力的核心因素。

总体而言，本研究试图回答一个核心问题：在全球供应链不确定性加剧的时代，意大利出口企业如何在保持对华市场战略布局的同时，管理和缓释由物流波动所引发的财务风险？通过对风险传导机制的系统梳理与对不同规模企业差异的深入比较，论文希望为理解物流冲击的金融后果提供理论支持，并为政策制定者与企业管理者提供可操作的风险管理思路。

在全球贸易格局持续重构的背景下，意大利对华出口既蕴含增长潜力，也面临结构性挑战。物流稳定性、金融韧性与制度适应能力，正成为决定企业国际竞争力的关键因素。本论文的研究，正是立足于这一现实背景之上，对物流与金融之间日益紧密的互动关系进行系统探讨。

Chapter 1.
Italian Exports to China: Sectoral Structure and Logistics Sensitivity

Over the past two decades, Italian exports have played an increasingly central role in supporting national economic growth, with manufacturing-based sectors driving both value creation and international competitiveness. Export dynamics have been characterized by a gradual diversification of destination markets, towards both European Union and extra-EU countries . Within this broader context, China has emerged as a key non-European destination for Italian goods, reflecting both the expansion of global value chains and the growing importance of Asian markets in Italy's trade geography. An analysis of export growth patterns and destination structures therefore provides the necessary background for understanding the specific vulnerabilities associated with long-distance trade.

Italian exports to China are characterized by high degrees of sectoral concentration, with a limited number of macro-sectors accounting for the majority of total export value. According to official trade statistics, the bilateral export flows are dominated by manufacturing-based sectors, while other categories play a comparatively marginal role. This sectoral configuration has a direct economic relevance, as exposure to geographical distance, transit duration, and logistics reliability varies substantially across industries and product categories. The logistic choices along the extended supply chains linking Italy to East Asia are sensitive to different kinds of exposure rather than homogeneous risks and operational factors. Agri-food exports are particularly sensitive to transport time, cold-chain continuity, and rerouting risks. In contrast, fashion and luxury goods, despite their high unit value, exhibit strong

time sensitivity linked to seasonality, collection cycles, and retail calendars. As a result, disruptions in maritime logistics translate into differentiated operational and financial impacts across sectors, affecting delivery reliability, inventory management, and working capital requirements to varying degrees. This chapter outlines the sectoral structure of Italian exports to China and provides a data-driven explanation of why logistics matters by sector, establishing the analytical basis for the subsequent examination of geopolitical disruptions and their financial transmission mechanisms.

The first section of this chapter provides an overview of Italy's export performance, focusing on recent growth trends and the geographical distribution of export destinations. The second section narrows the analysis to Italian exports to China, examining how the economic performance of the destination country have changed over the last decades. The third section explores sector-specific logistics sensitivity, illustrating how differences in product characteristics, time constraints, and supply-chain configurations translate into differentiated exposure to logistical disruptions.

1.1 Italy's Export Performance: An Overview

Exports represent a fundamental component of Italy's economic structure, shaping production patterns and influencing firms' financial performance. Changes in export volumes and values reflect not only external demand conditions but also cost dynamics and competitive pressures faced by Italian producers. A general overview of export performance is therefore essential for contextualizing subsequent sector- and market-specific analyses.

1.1.1 Historical Export Dynamics and Economic Outcomes in Italy

Over time, the export sector has represented a fundamental pillar of the Italian economy. Historical evidence shows that interregional and international trade

has long been a defining feature of the Italian peninsula, with roots extending back to the commercial systems of the Ancient Roman Empire. Dating back more than two thousand years ago, trade within this economic networks involved agro-food products such as olive oil, cereals and wine, and manufactured goods including glassware, marble and wood objects. When compared with the composition of contemporary Italian exports, this evidence reveals a substantial degree of structural continuity.

It is also instructive to examine the logistical alternatives available during the Ancient Roman Empire. Trade routes relied on three main modes of transportation: roads, rivers and maritime routes. Although the Romas are historically renowned for development of their roads, overland transport represented the most expensive option. Historical estimates indicate a cost ratio of approximately 1:5:28 for sea, river and road transport respectively, highlighting the strong economic advantage of maritime trade. Sea transport was not only the last costly but also the fastest, with archeological evidence suggesting that distance of up to 1,000 nautical miles could be covered in approximately nine days. However, maritime transport was also associated with significant risks, including exposure to piracy and adverse weather conditions, and was largely constrained to specific navigation seasons.[1]

Drawing on this brief overview of Italian's trade history, it becomes evident that export have long represented one of the most dynamic and strategic components of the national economy. The geological features of the territory are marked by a relatively limited endowment of natural resources. The national economy model has historically shaped a development path centered on manufacturing and transformation rather than resource extraction. Over time, Italy's industrial identity has been defined by a production model oriented toward quality, craftsmanship, and technological refinement. Italian firms have therefore relied on their capacity to operate beyond national borders, projecting

[1] Cartwright, M. Trade in the Roman World. www.worldhistory.irg
https://www.worldhistory.org/article/638/trade-in-the-roman-world/

their products into global markets through the promotion of not only high-quality goods, but also products endowed with strong symbolic and reputational value.

In this context, the label “made in Italy” extends far beyond a simple indication of geographical origin. From an economic perspective, the label functions as a symbol of specialization that enhances Italy’s position in the global market with high competitiveness assets. The label represents a combination of cultural heritage, manufacturing expertise and innovation capabilities, conferring a distinctive role to Italy within global trade.
From fashion to agro-food products, the Italian export system embodies a production model based on specialization and innovation, which has enabled its sustained integration into international value chains.This asset-based interpretation implies that the value embedded in Italian exports is not confined to production alone, but extends across the entire supply chain, where logistics reliability, timing, and risk management become integral to value preservation. As Italian firms project high-quality and high-image products across long-distance routes, disruptions in transport and trade corridors do not simply generate operational inefficiencies, but directly affect margins, working capital dynamics, and financial exposure. Framing *Made in Italy* in this way provides a natural link between Italy’s export specialization and the subsequent analysis of how logistical disruptions and geopolitical risks translate into financial consequences for exporting firms.

1.1.2 Latest Datas on Italian export’s movements

Over the past decades, the total value of Italian exports of goods and services has grown steadily, reaching €623.5 billion in 2024 and accounting for approximately 32.7% of Italy’s GPD[2].This sustained expansion is especially relevant when considered against several long-standing structural challenges facing the country, including a weak domestic demand, an aging population

[2] https://www.theglobaleconomy.com/Italy/exports/?utm_source=chatgpt.com

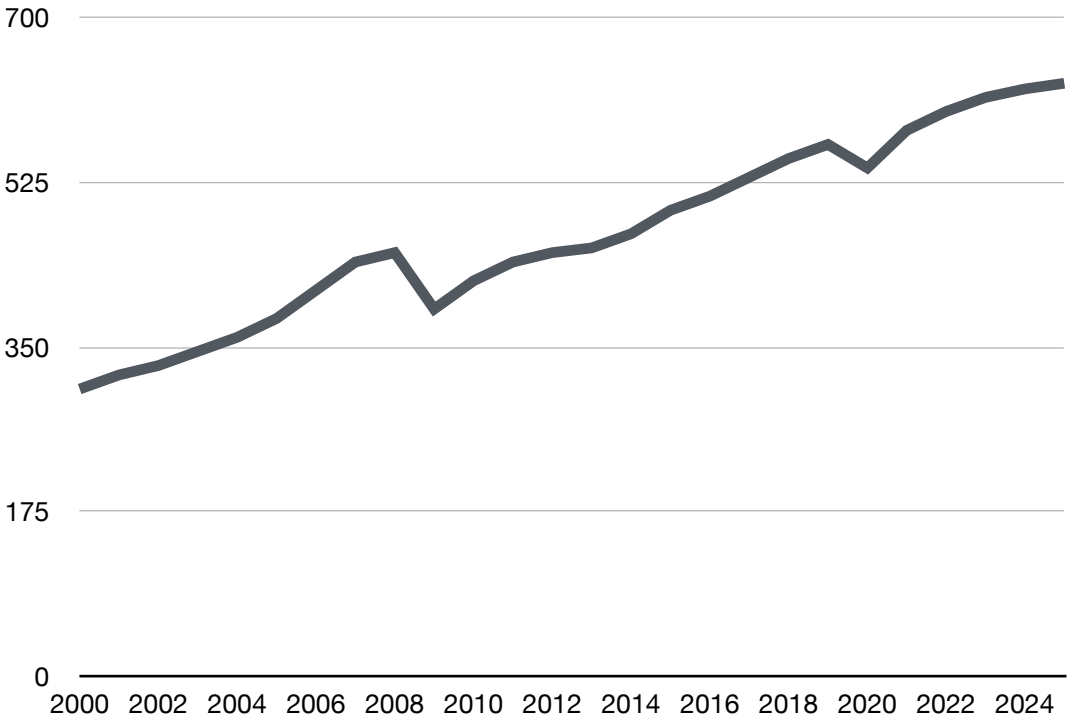
and persistent high levels of public debt. Within this context, exports have increasingly functioned as a stabilizing force for the Italian economy.

By providing firms with access to markets significantly larger than the domestic one, exports helps sustain production levels and support employment during periods of internal economic slowdown.
This role is especially pronounced for medium-sized manufacturing firms and companies operating in traditional sectors, for which export revenues often represent a substantial share of total income. In the first quarter of 2025, for example, Italy exported goods worth approximately €160.1 billion, recording a 3.2% increase in value compared to the same period in 2024.

Italian Exports (Goods + Services),
Year and Current EurosUnit: billion euros (€ bn)
Tab 1.1

2000	305	**2013**	455
2001	320	**2014**	470
2002	330	**2015**	495
2003	345	**2016**	510
2004	360	**2017**	530
2005	380	**2018**	550
2006	410	**2019**	565
2007	440	**2020**	540
2008	450	**2021**	580
2009	390	**2022**	600
2010	420	**2023**	615
2011	440	**2024**	624
2012	450	**2025**	630

Italian Exports (Goods + Services),
Year and Current EurosUnit: billion euros (€ bn)
Chart 1.1



As shown in tab 1.1[3], Italy has significantly increased its export activity over the past two decades. During the early 2000s, export grew steadily, reflecting a deeper integration into global value chains and a strong international demand for Italian manufactured goods.

Two major interruptions in this growth trajectory are clearly identifiable:

[3] The export series is expressed in current euros and covers the period 2000–2025. Data for 2000–2023 are based on consolidated national and international trade statistics (ISTAT, Eurostat, ICE). Values for 2024 reflect the most recent national estimates, while the 2025 figure represents a forward-looking projection based on recent export dynamics
https://seriestoriche.istat.it/index.php?id=1&no_cache=1&tx_usercento_centofe[categoria]=16&tx_usercento_centofe[action]=show&tx_usercento_centofe[controller]=Categoria&cHash=2733e7b65f771031757299b40f00b6e8
Commento ai dati commercio estero Italia ottobre 2025, PDF n° 1761121914, https://www.infomercatiesteri.it/public/osservatorio/commercio-estero/

The first occurred during the global financial crisis of 2008-2009, which caused a sharp contraction in international trade. However, the subsequent recovery phase from 2010 onwards highlights the resilience of the Italian export sector, supported by competitiveness gains, diversification of destination market and the strength of high value manufacturing.
A second temporary decline is visible in 2020, corresponding to the COVID-19 pandemic, which led to a global widespread disruption of international trade flow. This contraction was followed by a rapid rebound, with export surpassing pre-pandemic levels in the following years.

The continuation of moderate growth up to 2025 further confirms the structural relevance of Italy's export-oriented economic model. According to data released by ISTAT, Italy's foreign trade performance in the first seven months of 2025 shows a solid and resilient export trajectory. Between January and July 2025, Italian exports of goods reached a total value of €384.2 billion, marking a 2.9% increase compared to the same period in 2024. This growth is particularly significant given the current environment of geopolitical uncertainty and persistent macroeconomic pressures affecting global trade.

1.1.3 Export Performance in 2025

Export expansion in 2025 was observed across both major market areas. Shipments to European Union partners increased by 3.1%, while exports to non-EU destinations rose by 2.7%. This balanced performance suggests that Italy's export system has been able to maintain competitiveness both within the European Union's Single Market and in more distant, often more volatile, international markets.Despite this positive export dynamic, the trade balance for the first seven months of 2025 amounted to a surplus of €30.7 billion, slightly lower than the nearly €36 billion recorded in the same period of 2024. This reduction indicates that the improvement in exports has been

accompanied by a parallel rise in imports, reflecting strong domestic demand and the continued integration of Italian firms into global value chains.

From a geographical perspective, Italian exports recorded particularly strong growth in several strategic markets. Significant increases were observed towards Switzerland (+12.8%), Spain (+12.1%), and the United States (+10.2%). Exports also expanded markedly to OPEC countries[4] (+9.6%), ASEAN and Middle Eastern economies (both +7.8%), as well as to Central and Eastern European markets such as the Czech Republic (+5.9%), Poland (+3.4%), and Romania (+3.3%). More moderate but still positive growth was registered in major advanced economies, including Germany and Japan (+2.4%), France and India (+2.3%), and the United Kingdom (+2%)[5]. This broad geographical distribution highlights the diversification of Italy's export destinations and reduces dependence on any single market.

Commenting on these results, Foreign Minister Antonio Tajani emphasized the relevance of export growth in a challenging international environment, noting in particular the strong performance in non-EU markets. This trend aligns with the objectives of the Export Action Plan launched in March 2025, which places strategic emphasis on expanding Italy's presence in high-potential markets outside the European Union.

During the National Conference of Export organized by the Farnesina, which toke place in Milan on December 17th of 2025, Tajani further commented:

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[4] OPEC (Organization of the Petroleum Exporting Countries) is an intergovernmental organization composed of major oil-exporting countries that coordinates production policies and plays a central role in influencing global energy markets. In 2025 the countries enlisted in OPAC are Algeria, Congo (Republic of the Congo), Equatorial Guinea, Gabon, Iran, Kuwait, Libya, Nigeria, Saudi Arabia, United Arab Emirates and Venezuela. 20

[5] Press release "New ISTAT data, the Foreign Ministry's work on exports continues", Ministry of Foreign Affair, https://www.esteri.it/en/sala_stampa/archivionotizie/comunicati/2025/09/nuovi-dati-istat-continua-il-lavoro-della-farnesina-per-lexport/

> *“Exports remain one of the main driving forces behind the growth of the Italian economy. The target of €700 billion by the end of 2027 is an achievable goal.”*[6]

In this framework, the Ministry of Foreign Affairs operates in close coordination with key institutions of the Italian economic system, including Italian Trade Agency, SIMEST, SACE, and Cassa Depositi e Prestiti. The joint objective is to support Italian firms in accessing and consolidating their position in foreign markets, with particular attention to sectors facing structural or cyclical difficulties

Overall, these developments confirm the central role of exports as a driver of economic stability and growth for Italy. The government has stated the goal of reaching €700 billion in exports by the end of the legislative term, which will be on October 2027. This reflects a long-term strategy aimed at strengthening Italy’s international competitiveness and reinforcing its integration into global trade networks.

1.2 Italian Exports Dynamics toward China: Growth, Volatility, and Sectoral Patterns

While the aggregate export figures for 2025 point to a broadly resilient performance, they mask significant differences in exposure across destination markets and product categories. In particular, exports to China present a distinct analytical case, given their concentration in a limited number of sectors and their reliance on long and complex logistics chains. The economic relevance of these exports cannot be fully understood without considering the specific transportation requirements, cost structures, and logistical constraints associated with each sector. For this reason, the following section shifts the focus to Italian exports to China, examining how the economic performance has changed over the last decades, analyzing its sectoral composition and

[6]“L'export accelera. Il governo rilancia: “Possiamo arrivare a 700 miliardi””, *Il Giornale*, https://www.ilgiornale.it/news/politica/lexport-accelera-governo-rilancia-possiamo-arrivare-700-2584748.html

highlighting how differences in product characteristics translate into divergent shipping costs, delivery risks, and logistical vulnerabilities.

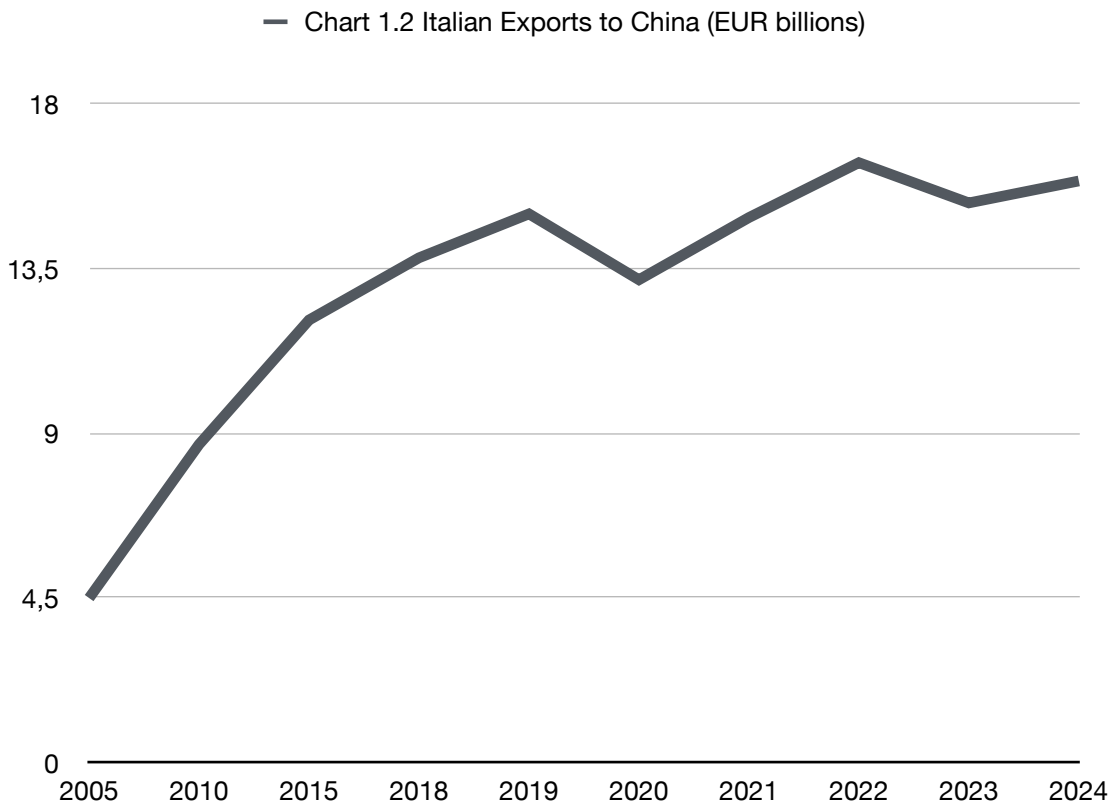
1.2.1 Structure and Evolution of Italian Exports to China

Trade relations between Italy and China are characterized by a substantial and structurally unbalanced exchange. In 2022, total bilateral trade reached €73.9 billion, with Italian exports to China amounting to a record €16.4 billion, compared with imports from China of €57.5 billion.[7] This asymmetry reflects differences in productive specialization and demand structure, which continue to shape the evolution of bilateral trade flows.

The evolution of Italian exports to China, as reported by ICE, reveals a pattern of gradual expansion punctuated by sharp fluctuations. In the years preceding the pandemic, exports grew steadily, often at robust annual rates, reflecting the increasing attractiveness of Italian products in the Chinese market and the deepening of bilateral trade relations.[8]

[7] Economic Diplomacy, Ambasciata d'Italia a Pechino, https://ambpechino.esteri.it/en/italia-e-cina/diplomazia-economica/

[8] ICE (Italian Trade Agency), bilateral trade statistics between Italy and China.



Tab 1.2 Italian Exports to China (Approximate Values 2005–2024)

Year	Italian Exports to China (EUR billions)
2005	4.5
2010	8.7
2015	12.1
2018	13.8
2019	15.0
2020	13.2
2021	14.9
2022	16.4
2023	15.3
2024	15.9

This positive trajectory seen in chart 1.2 was abruptly interrupted during the COVID-19 pandemic, when exports experienced a pronounced contraction[9]. This decline reflects the combined effects of weaker demand, severe logistical constraints, and disruptions across global supply chains. Compared with other destinations, exports to China proved particularly vulnerable during this phase, highlighting how exposure to distant and rapidly changing markets can amplify the impact of global shocks.

In the years that followed, Italian export to China resumed growth, though at an uneven and more moderate pace compared to the pre-pandemic period. While positive rates of change returned, the recovery has been shaped by a more challenging international environment, persistent supply-chain frictions, and a slowdown in China's domestic economic momentum. These factors have contributed to a more cautious and volatile export trajectory, especially for sectors dependent on long-distance logistic and investment-driven demand.

1.2.2 Macroeconomic and Trade Developments in China: Implications for Italian Exporters

Looking ahead, the macroeconomic outlook for China provides additional context for understanding recent and prospective export dynamics. Among emerging economies, China closed the first alf of 2025 with a growth rate of around 5.3%, exceeding the government's growth target of 5%[10]. This performance has been supported by policy measures such as government subsidies, a partial recovery in private consumption, and export growth

[9] Source: ISTAT and ICE compilations; 2024 estimates based on UN COMTRADE. Where detailed ISTAT bilateral data isn't available in public releases, COMTRADE is used as a close proxy.

[10] Jiang Michael and Cai Gary, *China Economic Monitor,* KPMG, August 2025 https://assets.kpmg.com/content/dam/kpmg/cn/pdf/en/2025/08/china-economic-monitor-q3-2025.pdf

reinforced by anticipatory shipments to the United States and sustained demand from other emerging markets. However, growth is projected to decelerate to approximately 4.6% in 2026, reflecting structural headwinds including a prolonged real estate crisis, weaker household demand, and deteriorating labor market indicators.

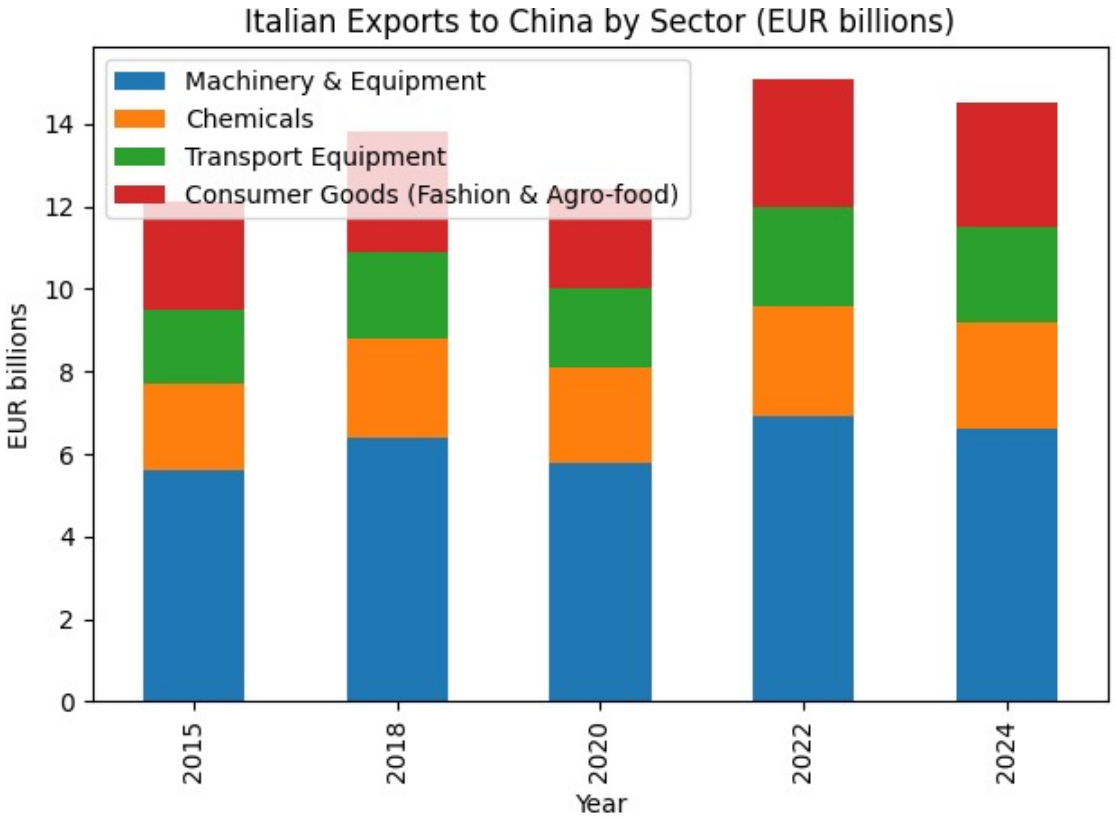
In parallel, international trade conditions are expected to become less supportive. The gradual exhaustion of temporary factors that sustained global trade in the first half of 2025, such as front-loaded purchases and early shipments, combined with the impact of customs duties and lingering trade policy uncertainty, is projected to weigh on global trade volumes. After slowing to an estimated growth rate of 2.8% in 2025 from 3.4% in 2024, international trade expansion is expected to weaken further in 2026, to around 2.1%. For Italian exporters operating in the Chinese market, these trends imply a more challenging environment, where growth opportunities coexist with heightened uncertainty and greater sensitivity to external shocks.

Overall, the data suggests that China remains a strategically important yet structurally complex market for Italian exporters. It offers significant opportunities for growth, but at the same time exposes firms to higher levels of uncertainty. This combination of potential and volatility distinguishes China from more stable, mature export destinations and reinforces the need for diversified and resilient export strategies.

1.2.3 Sectoral Composition of Italian Exports to China

From a sectoral perspective, Chart 1.2[11] shows that Italian exports to China are predominantly driven by industrial and intermediate goods, particularly machinery and equipment, while consumer oriented sectors such as fashion and agri-food account for a smaller, though relatively stable, share of total exports over time.

[11] Data by Istat on Italian export toward China. https://www.ice.it/it/statistiche/tavolepaesi.aspx?IdPaese=720&IdTavola=1



Italian Exports to China by Sector (EUR Billions)
Chart 1.3

Machinery and mechanical equipment consistently represent the largest share of exports, confirming the production-oriented nature of bilateral trade and China's role as a destination for capital goods rather than final consumption. Chemicals and transport equipment also play a significant role, particularly in years of stronger investment activity,

By contrast, traditional "Made in Italy" consumer sectors such as textiles, apparel, footwear, and agri-food products play a more limited role in exports to China. Although these sectors benefit from strong brand recognition and cultural appeal, their growth is constrained by regulatory barriers, distribution challenges, and intense competition.

As a result, Italy's export relationship with China is primarily driven by industrial and intermediate goods, highlighting a trade structure focused on production rather than final consumption.

1.3 Logistics Fundamentals and Sectoral Implications in Trades Toward China

Company logistics refers to the system that connects the different stages and actors of the value chain and governs the physical flows of goods within and beyond the firm[12]. For export-oriented companies, logistics plays a critical role in linking domestic production with international markets, coordinating transportation, inventory, and delivery across long and complex supply chains. As a result, optimizing a firm's supply chain requires an efficient logistics system capable of ensuring reliability, cost control, and timely market access, particularly in international trade contexts[13].

Company logistics can be divided into three main components:

1. Inbound logistics concerns the upstream phase of the production process and includes the sourcing of raw materials, supplier selection, and the transportation of inputs to production facilities. Its primary objective is to ensure the timely and reliable delivery of materials while optimizing transport routes, loads, and costs.
2. Internal and warehouse logistics relate to the coordination of material flows within the firm, covering the movement of inputs through the production process and the management of inventories. At this stage, logistics plays a key role in ensuring operational continuity, minimizing bottlenecks, and efficiently managing stock levels.
3. Outbound logistics refers to the downstream phase of the value chain and involves the distribution of finished products from production sites to warehouses, distribution centers, and final customers. For export-oriented firms, outbound logistics is particularly critical, as it connects domestic production with international markets and requires careful coordination to

[12] Balestri Gianfranco, "Le basi della Logistica", Chapter 1: "Il sistema logistico nell'impresa"

[13] Bionde Prasad, "Mastering Logistics Fundamentals: Navigating Supply Chains with Precision"

ensure timely deliveries, cost efficiency, and reliability across long-distance supply chains.

In the context of this thesis, outbound logistics represents the most relevant component of company logistics, as it directly governs the movement of finished goods from domestic production sites to foreign markets. For export-oriented firms, outbound logistics is the stage where transportation costs, delivery times, and exposure to international disruptions become most pronounced, making it central to the analysis of logistics-related risks and financial implications.

The following sections provide a detailed analysis of the role of outbound logistic across export sectors, highlighting how transportation costs, risks exposure, and market requirements influence the final economical outcome of international trade.

1.3.1 Machinery Exports to China: Logistics and Cost Implications

Machinery and mechanical equipment represent the core component of Italian exports to China, reflecting Italy's specialization in capital goods and industrial technologies. This category includes a wide range of products, from machine tools and industrial automation systems to equipment for energy, packaging, and manufacturing processes. While these exports benefit from relatively stable demand linked to investment cycles, they are also characterized by a high degree of logistical complexity.

From a logistics perspective, machinery exports are typically bulky, heavy, and high in unit value, requiring specialized transport solutions such as containerized shipping, flat-rack containers, or break-bulk cargo[14].

[14] "Staying the course in turbulent waters, review of maritime transport 2025", UNCTAD https://unctad.org/publication/review-maritime-transport-2025

Transportation costs therefore account for a non-negligible share of total export costs, particularly along long-distance routes linking Italy to East Asia. Beyond freight rates, additional expenses arise from handling and packaging, since during the sea freight the goods may remain exposed to the elements in an open environment on the deck of cargo ships. To prevent corrosion, a special paint is added on top of the machinery as a separate layer covering the metal. Another necessary and costly step for the packaging is the galvanize, by covering the machines with layers of steel and zinc, which with shock-absorbing quality helps protect against collision and rust[15].

Transit times represent a further critical factor. Machinery exports often involve long production lead times and are frequently delivered as part of project-based contracts or customized orders. Delays caused by port congestion, rerouting of maritime traffic, or disruptions along key shipping corridors can therefore have cascading effects on installation schedules, contractual penalties, and client relationships. Unlike consumer goods, machinery exports are less sensitive to seasonality but highly exposed to reliability and predictability of delivery.

These logistical characteristics have direct financial implications for exporting firms. Long transit times and high shipment values translate into extended cash conversion cycles, as revenues are often realized only upon delivery, installation, or final acceptance of the machinery. As a result, firms exporting machinery to China face increased working capital absorption and greater reliance on trade finance instruments, such as advance payments, letters of credit, export credit insurance, or bank guarantees. In periods of heightened logistical disruption, rising transportation costs and longer delivery times can further compress margins or require firms to renegotiate contract terms.

[15] “Importing and Shipping Machinery and Equipment from China”, Junqing International Logistic, May 2025

Overall, while machinery exports to China remain a strategic pillar of Italy's bilateral trade, they expose firms to a distinct combination of logistical and financial risks. The capital-intensive nature of these goods, combined with long and complex supply chains, makes this sector particularly sensitive to changes in transportation costs, delivery reliability, and geopolitical developments affecting global shipping routes. These features underscore the importance of effective logistics planning and financial risk management for Italian firms operating in the Chinese market.

1.3.2 Fashion and Luxury Exports to China: Time Sensitivity and Logistics Constraints

Fashion and luxury goods represent a distinctive segment of Italian exports to China, characterized by high unit value, strong brand content, and pronounced sensitivity to timing. Before the pandemic, Chinese consumers were the world's largest spenders on luxury goods, contributing to one-third of global sales.[16] This category includes apparel, footwear, leather goods, accessories, and luxury items, whose competitiveness in the Chinese market depends not only on product quality but also on alignment with seasonal collections, product launches, and retail calendars.

From a logistics standpoint, fashion and luxury exports are less affected by weight and volume constraints than machinery, but are highly exposed to delivery timing and reliability. In the current globalized environment, luxury companies face unprecedented challenges arising from volatile consumer preferences, fluctuating spending patterns, and increasingly shortened product life cycles, alongside growing customer expectations for sustainability and transparency. While these factors are relevant to outbound logistics across all industries, they are particularly critical for luxury brands, where customers also demand a superior level of service. As a result, outbound logistics in the luxury

[16] Sgueglia Giorgia, "Exploring China's Luxury Market: Emerging Trends and Future Prospects", China Briefing, November 2024

sector must not only ensure efficiency and reliability, but also uphold high standards of quality, traceability, and responsiveness in order to meet the market[17].

Maritime transport remains the dominant shipping mode due to cost considerations, yet long transit times and potential delays pose significant challenges for products whose market value is closely linked to seasonality. Disruptions along maritime routes, port congestion, or rerouting can result in delayed arrivals that reduce the commercial relevance of collections, force markdowns, or disrupt distribution plans. In response to these constraints, firms operating in the fashion and luxury sector often adopt hybrid logistics strategies, combining sea freight with air transport for time-critical shipments. While air freight offers faster delivery and greater predictability, it involves substantially higher costs, which can erode margins if not carefully managed. The choice between transport modes therefore reflects a trade-off between cost containment and market responsiveness, one that becomes particularly acute in periods of heightened logistical instability.

The financial implications of these logistics choices are significant. High-value inventories in transit tie up capital and increase exposure to demand uncertainty, while delays may lead to inventory obsolescence or price discounting. Moreover, the need to maintain buffer stocks or regional distribution hubs to mitigate delivery risks can further increase working capital requirements. As a result, fashion and luxury exporters to China face a logistics-driven financial exposure that is closely linked to timing risk, inventory management, and margin volatility.

1.3.3 Agri-food Exports to China: Perishability, Cold Chains, and Cost Pressures

[17] Garofalo Chiara, “Analysis of logistics in Fashion & Luxury market”

Although China is one of the world's largest agricultural producers, it still relies heavily on imports to meet internal demand. Agri-food exports occupy a more limited but symbolically important role in Italy's trade relationship with China. In 2024, Italian food exports to China grew by 17.3%,reflecting the global appeal of Italian food products and the strength of the *Made in Italy* brand.[18] This sector includes products with very different logistical profiles, ranging from shelf-stable goods such as pasta, olive oil, and wine to highly perishable items requiring strict temperature control.

Logistics represents a critical constraint for agri-food exports to China, given the long distances involved and the need to preserve product quality throughout the transportation process. Cold-chain logistics, including refrigerated containers, temperature monitoring, and controlled storage conditions, are essential for many products but significantly increase transportation and handling costs. Any disruption in the cold chain, whether due to delays, equipment failure, or port congestion, can result in product spoilage or loss of marketability. Fruits and vegetables, due to their high moisture content and perishable nature, have a limited shelf life. At the global level, it is estimated that between 20% and 50% of fruit and vegetable production is lost or wasted along the supply chain before reaching final consumption.[19] These figures are significant not only in terms of economic losses, but also from an ethical perspective, as food loss and waste have become a global concern. In addition to physical constraints, agri-food exports are subject to stringent regulatory and sanitary requirements, including inspections, certifications, and customs clearance procedures. These factors can further lengthen delivery times and increase uncertainty, particularly in periods of heightened logistical pressure. Compared with industrial goods, agri-food products are therefore more exposed to the combined effects of time sensitivity, regulatory risk, and logistics reliability.

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[18] Monteleone Anna, "China 2025: Tariffs, Growth, and Made in Italy Agrifood", R&P Magazine

[19]Cassani L. and Gomez-Zavaglia A. "Sustainable food systems in fruits and vegetables food supply chains"

The financial consequences for exporting firms are substantial. High logistics costs, combined with the risk of product deterioration, increase the likelihood of losses in the event of delays or disruptions. Moreover, longer transit times and complex clearance procedures extend the cash conversion cycle, tying up working capital and increasing reliance on trade finance and insurance instruments. For smaller firms in particular, these constraints can limit scalability and discourage market expansion despite strong demand potential.

Overall, agri-food exports to China exemplify how logistics can act as a binding constraint on trade, transforming transportation and regulatory challenges into direct financial risks. The sector's vulnerability to delays, cost shocks, and quality degradation highlights the importance of logistics reliability and risk mitigation strategies in sustaining Italy's presence in the Chinese food market.

Chapter 2.
Logistics Disruptions and Cost Pressures in Italy–China Trade

This chapter analyzes the logistics disruptions that have reshaped the cost structure of exports from Italy to China, starting from the central role of the Suez Canal in Asia–Europe trade. After a brief overview of the Canal's strategic importance and the current geopolitical tensions affecting its operability, the chapter examines the operational consequences of rerouting, with particular attention to longer sailing distances, increased transit times, fuel consumption, and air transport alternatives. The analysis then moves beyond physical transport constraints to address risk-related and regulatory cost components, including war risk surcharges, cargo insurance inflation, and compliance frictions, which have become increasingly embedded in international shipping. Finally, the chapter focuses on the extension of the EU Emission Trading System (ETS) to maritime transport, illustrating how carbon pricing introduces a structural and policy-driven layer of cost that interacts with rerouting decisions and fuel consumption. Taken together, these elements show how logistics costs in Italy–China trade have evolved from predominantly operational expenses into a complex combination of market-driven, risk-adjusted, and regulation-induced charges.

2.1 Rerouting and the Breakdown of the Traditional Asia–Europe through the Suez corridor situation

The geopolitical environment surrounding the Suez Canal has increasingly emerged as a critical pressure point for global trade. Its relevance extends well beyond the regional dimension, as the canal constitutes one of the most strategic maritime arteries in the international trading system.

By connecting Europe with Asia and the Middle East, the canal facilitates the transit of a substantial share of global containerized cargo, crude oil, and liquefied natural gas. Consequently, periods of heightened political tension in the surrounding region or in adjacent maritime areas such as the Red Sea prompt shipping companies to reassess operational and security risks. In this context, even the mere perception of instability can influence strategic decisions, leading to changes in shipping routes, increases in insurance premiums, and disruptions to delivery schedules.

Beyond the direct impact on maritime transit, geopolitical instability also affects the broader logistics ecosystem. Delays and rerouting increase already existing container imbalances, ports face mounting congestion, and exporters encounter shortages of empty containers required for outbound shipments. Such effects are particularly pronounced in export-oriented economies, where efficiency, reliability, and timing are essential determinants of international competitiveness.

2.1.1 The disruption of the Suez Canal after 2023

The Suez Canal, in Arabic: Qanat as-Suways, is a symbol of progression for the world's maritime trade. It is an artificial waterway across the Isthmus of Suez in Egypt, that connects the Mediterranean Sea to the Red Sea. It provides a direct route between Europe and the Indian-Ocean region, facilitating about 12% of all global trade.
Its length is approximately 193 kilometers (about 120 miles), extending from Port Said on the Mediterranean coast to Suez on the Red Sea. Its width varies along the route: large sections of the canal are over 200 meters wide, with navigable widths sufficient to accommodate modern container ships and tankers. The canal's depth has been progressively increased and today

reaches approximately 24 meters, enabling the passage of very large vessels, including New Panamax-class ships.
Regarding the traffic system, parts of the canal consist of dual-lane sections, particularly after the 2015 expansion, which significantly reduced waiting times and increased daily transit capacity[20].
Under normal conditions, a full transit takes between 12 and 16 hours.

The canal is currently managed by the Suez Canal Authority (SCA), which works to maintain secure passage for vessels, even in times of instability[21].
While conflicts can potentially pose risks to operations, the canal's strategic importance often prompts heightened security measures to keep it operational. In cases of severe regional instability, shipping companies may take additional precautions or seek alternative routes, but such rerouting is costly and time-consuming. So far, the Suez Canal has generally remained open and functional through various conflicts over the years, as it is vital for global trade.

On 19 November 2023, the *Galaxy Leader*, a Bahamian-flagged vessel chartered by the Japanese shipping company Nippon Yusen, was attacked in the Red Sea by fighters from the Houthi movement. The incident took place less than two months after the outbreak of the conflict between Hamas and Israel, and it quickly came to symbolize a dangerous widening of that war's effects.[22]

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[20] The Suez Canal: The History and Legacy of the World's Most Famous Waterway, Charles River Editors, 2018

[21] All the datas are accessible in the archive of the Suez Canal Authority (SCA), available for consultation on the official site https://www.suezcanal.gov.eg/English/Navigation/Pages/NavigationStatistics.aspx

[22] Ferris Lorenzo, *Israele e Palestina, La verità dei fatti*, *Dalle origini del conflitto alla Global Summed Flotilla del 2025. Storia, geopolitica e società raccontate senza pregiudizi,* 2025. Cap 3

Hamas is a Palestinian Islamist political and military organization, founded in 1987 during the First Intifada[23], operating primarily in the Gaza Strip. Hamas formally entered politics in the 2000s and won the 2006 Palestinian legislative elections. The already existing tension escalated into armed conflict, with cross-bordered operations, bombing and rocket fire. Hamas is currently designated as a terroristic organization by the United States, the European Union and several other states[24].

What might initially have appeared as a single, isolated act soon proved to be something much larger. The seizure of the *Galaxy Leader* signaled the start of a sustained campaign against commercial shipping in the region. In the weeks that followed, more than one hundred attacks on merchant vessels were reported, each claimed by the Houthis as an expression of support for Hamas. The Red Sea, long treated by shipowners as a routine passage linking Asia and Europe, was suddenly recast as a high-risk zone.

2.1.2 Rerouting: Distance and Fuel cost and consumption

One of the most immediate responses to rising geopolitical risk is route diversion. In situations of heightened insecurity, a growing number of vessels opt to bypass the canal altogether and reroute around the Cape of Good Hope. Although this alternative route reduces exposure to geopolitical threats, it significantly increases voyage distances, extending transit times by one to two weeks. These longer journeys translate into higher fuel consumption, rising

[23] The term First Inftifada refers to a mass Palestinian uprising against Israeli rule in the West Bank and the Gaza Strip, lasting from 1987 to 1993. The Arabic word Intifada means “shaking off”, representing the image of a society trying to throw off long-standing political and military control. The uprising began in December 1987, after a traffic accident in Gaza caused by a Israeli military vehicle, where four Palestinian were killed. After this moment, the conflict between Israel and Palestine, triggered by more than twenty years of instability since the Six Days War, shifted from a regional territorial dispute into a global political and moral issue.

[24] Barre Eve, “Houthi attacks in the Red Sea: why maritime trade is (still) not smooth sailing”, *Coface* 29 December 2025 https://www.coface.com/news-economy-and-insights/houthi-attacks-in-the-red-sea-why-maritime-trade-is-still-not-smooth-sailing

operational costs, and delayed deliveries, all of which ultimately contribute to increased freight rates and higher prices for final consumers.

	To Rotterdam, via:		
From	Suez Canal	Cape of Good Hope	Percentage Increase in Navigational Distance
Yokohama, Japan	11,133	14,448	29.8%
Busan, South Corea	10,744	14,084	31.1%
Shangai, China	10,557	13,796	30.7%
Hong Kong, China	9701	13,014	34.1%
Ho Chi Minh City, Vietnam	8887	12,258	37.9%

Tab 2.1 Distance from Asia to Europe, expressed in Nautical Miles

Table 2.1 illustrates the substantial increase in sailing distance between major Asian ports and Rotterdam, comparing the traditional route via the Suez Canal with the alternative rerouting around the Cape of Good Hope. Depending on the port of origin, the diversion typically adds approximately 2,00-3,500 nautical miles, corresponding to an increase of roughly 30–45% in total voyage distance. At standard container ship cruising speeds, this translates into an extension of transit times of 10–15 days.

Longer voyages imply a proportional rise in fuel consumption, which represents the largest variable cost component in maritime transport. Depending on vessel size, engine efficiency, sailing speed, and route characteristics, fueling a cargo ship typically costs between USD 30,000 and over USD 100,000 per day. For large container vessels operating on long-haul routes, total bunker expenditures for a single voyage can therefore reach several million dollars, making fuel price fluctuations and route length critical determinants of freight rates and shipping costs[25].

[25] https://www.upngomoving.com/how-much-does-it-cost-to-fuel-a-cargo-ship/

Tab 2.2 provides an indicative comparison of fuel consumption and daily bunker costs across different cargo ship types, distinguishing by fuel technology and estimating both daily operating costs and the order of magnitude of a full tank refueling under 2025 price conditions.

Tab 2.2 Fuel Cost Structure of Cargo Ships: Daily Operating and Full-Tank Estimates (2025)[26]

Ship Tipe	Fuel Type	Daily Consumption	Daily Fuel Cost (2025)	Full Tank Estimate
Small Feeder Ship (1,000–2,000 TEU)	Marine Diesel	~25–50 tons/day	$25,000–$50,000	$500,000–$1 million
Medium Cargo Ship (5,000–10,000 TEU)	Heavy Fuel Oil (HFO)	~100–150 tons/day	$60,000–$90,000	$2–4 million
Ultra-Large Container Vessel (20,000+ TEU)	Very Low Sulfur Fuel Oil (VLSFO)	~200–300 tons/day	$100,000–$150,000	$4–8 million

Tab 2.2 presents benchmark estimates of daily fuel consumption and bunker costs by cargo ship type and fuel technology, providing a cost framework to assess the financial impact of longer sailing distances associated with rerouting around the Cape of Good Hope. In relative terms, a single full refueling can represent a capital outlay comparable to acquiring a small vessel. To mitigate the additional time generated by rerouting, carriers may increase vessel speed. Speed is a critical determinant when breaking down fuel cost.

[26] TEU is a used capacity unity. In metric terms, one TEU measures approximately:
- Length: 6.06 meters
- Width: 2.44 meters
- Height: 2.59 meters (standard)
  (High-cube containers are about 2.90 meters high)

So, 1 TEU ≈ 6.06 m × 2.44 m × 2.59 m.
Net tonnage (NT) is a measurement of a ship's internal carrying capacity, rather than its weight. It indicates how much revenue-earning space a vessel has available for cargo or passengers and is therefore closely linked to a ship's commercial usefulness. It excludes non-earning areas such as the engine room, crew quarters, navigation spaces, and safety equipment areas.In the context of the Suez Canal, a specific variant known as Suez Canal Net Tonnage (SCNT) is applied. SCNT is calculated according to rules defined by the Suez Canal Authority and is used as the basis for transit fees.

Ships that travel faster burn significantly more fuel. For instance, a large container vessel cruising at approximately 24 knots may consume more than 250 tons of fuel per day, whereas reducing speed to around 18 knots under slow-steaming practices can lower daily fuel consumption by up to 40%. Fuel costs in maritime transport extend well beyond the purchase of bunker fuel itself. Shipping companies also incur additional expenses related to fuel storage and handling at port facilities, fuel testing and quality control to prevent engine damage from contaminated bunkers, and higher maintenance requirements caused by sulfur content and residue accumulation. Moreover, environmental charges, including carbon taxes and emissions-related fees, further increase the effective cost of fuel use.

Taken together, fuel-related expenditures can account for approximately 50–60% of a cargo ship's total operating costs. Consequently, increases in bunker prices are rapidly transmitted to freight rates. These higher operating costs, combined with reduced fleet productivity and tighter vessel availability, have been reflected in sharp freight rate increases on the Asia–Europe route between 2023 and 2025, with direct implications for logistics costs and margin compression for Italian exporters serving the Chinese market.

Recent spot market developments suggest an adjustment of freight rates, although price levels remain structurally elevated compared to the pre-crisis period. In the latest observations, spot rates on the Shanghai–Rotterdam route declined by 3% to USD 2,763 per 40-foot container, while rates on the Shanghai–Genoa corridor fell by 1% to USD 3,839 per 40-foot container.[27] This moderate correction reflects short-term market adjustments rather than a full normalization of logistics conditions. Ocean carriers have suspended plans to resume transits through the Red Sea.

[27] World Container Index, https://www.drewry.co.uk/supply-chain-advisors/world-container-index-weekly-update/world-container-index-assessed-by-drewry, January 2026

As a result, although freight rates have begun to retreat from the peaks recorded in 2025, they remain significantly higher than 2023 levels, indicating that the cost shock associated with rerouting, risk premiums, and reduced route reliability has not yet been fully absorbed or reversed.

2.1.3 Air Transportation

The ongoing geopolitical tension in the Red Sea have pushed companies to increasingly rely on air freight instead of maritime routes. Air freight refers to the transportation of goods by aircraft and represents the fastest mode of cargo movement over long distances. Unlike maritime transport, air freight operates on fixed and frequent schedules, which significantly shortens transit times and reduces the risk of supply-chain disruptions. Air transport plays a strategic role in mitigating delivery delays when other logistics modes become unreliable, despite its substantially higher cost structure.

The primary benefit of this modal shift lies in its ability to restore delivery speed and schedule reliability at a time when maritime routes are exposed to security risks, rerouting delays, and unpredictable transit times. In the context of Italian exports to China, air freight is particularly advantageous for perishable and high-value products. Italian agri-food specialties with limited shelf life, such as fresh food and premium gastronomic products, benefit from reduced transit times that preserve quality and compliance with sanitary standards. At the same time, high-value Italian exports including luxury fashion, leather goods, jewelry, and precision machinery components rely on air freight to ensure delivery reliability, protect product integrity, and meet strict market timing requirements. The pharmaceutical sector represents an especially relevant case: many pharmaceutical products require strict temperature control, rapid delivery, and continuous monitoring throughout the logistics chain, conditions that are more easily satisfied through air transport[28].

[28] https://furlog.com/en/sea-and-air-transport/

From a risk-management perspective, air freight offers a higher level of protection for fragile and sensitive goods compared to maritime transport. Maritime shipments are exposed to longer transit times, multiple handling stages, humidity, vibrations, and weather-related risks, all of which increase the probability of physical damage. In contrast, air transport typically involves fewer handling points and significantly shorter transit durations, reducing exposure to mechanical stress and environmental factors. As a result, for high-value, fragile, or damage-sensitive products—such as luxury goods, precision instruments, and certain pharmaceutical items—air freight can lower the probability of loss or damage, partially offsetting its higher transport cost through reduced insurance claims and quality-related losses.

Another advantage of air freight lies in its flexibility of shipment size. Air transport allows firms to ship limited quantities of goods without committing to standardized container capacities. In contrast, maritime shipping typically requires the use of 20-foot or 40-foot containers, whose cost is largely fixed regardless of the actual volume loaded. When the shipped quantity does not fully utilize the container's capacity, exporters may incur significant inefficiencies, as the freight cost does not adjust proportionally to the cargo volume. Less than Container Load (LCL) shipment represent a partial alternative, where a container is shared with multiple shippers. However, LCL transport involves additional handling, consolidation, and administrative costs, which often reduce its economic attractiveness. These cost components, and their implications for exporters, will be examined in greater detail in the following chapter.

While air freight offers superior speed and reliability, it carries a structural cost premium relative to maritime transport. This premium reflects the fundamentally different cost structures of the two modes. Air freight is significantly more fuel-intensive on a per-kilogram basis, operates under tighter capacity constraints, and relies on airport infrastructure characterized by higher

handling, security, and regulatory costs. As a result, air freight rates are typically several times higher than maritime freight rates for comparable trade lanes. Empirical benchmarks indicate that transporting cargo by air can cost five to ten times more per kilogram than sea freight on long-haul routes such as Europe–Asia. Consequently, the economic viability of air freight is generally limited to high-value, time-sensitive, or perishable goods, where speed, reliability, and risk reduction outweigh the substantially higher transport costs.
Given the limited public availability of firm-level freight quotes, transport cost comparisons in this chapter rely on order-of-magnitude estimates commonly used in academic and institutional analyses. For long-haul routes such as Europe–Asia, maritime container shipping typically implies average transport costs in the range of approximately €0.05–0.20 per kilogram, depending on freight rates, container utilization, and fuel prices.[29] By contrast, intercontinental air freight generally involves costs of around €3–8 per kilogram for standard cargo, with higher values for express, temperature-controlled, or urgent shipments. These ranges vary across time and market conditions, these data state an average pricing situation that consistently illustrate the substantial and structural cost premium associated with air transport relative to maritime shipping.

Although air transport entails significantly higher costs than maritime shipping, the cost premium is often justified by the preservation of brand value, avoidance of inventory losses, and reduction of working-capital immobilization, making air freight a strategic logistics choice in Italy–China trade relations.

[29] this data is provided by the database of International Air Transport Association (IATA)
https://www.iata.org/

2.2 Risk- and Regulation-Driven Cost Inflation in International Shipping

Beyond the strong impact of physical disruptions to transport routes, like increased distance consequent to rerouting and freight rate inflation, International logistic costs are shaped by risk management and compliance obligations.

In the current geopolitical environment, shipping cost are no longer only determined by physical factors such as distance, fuel consumption, and vessel availability, but also by the need to manage security risks, including cargo insurance against geopolitical disruptions, and and the obligation to adapt to a growing set of regulations. Taken together, war risk surcharges, insurance premiums, and compliance-related costs contribute to a cumulative escalation of logistics expenses, generating cost pressures that are less immediately visible than freight rates but equally relevant in economic terms. These dynamics are particularly relevant for long-haul trade routes such as Italy–China, where companies exporting high value items must meet complex regulations and standards.

2.2.1 War Risk surcharges and Security Premiums

War risk surcharge is a supplementary carrier charge, that is only applied when insurance underwriters designate specific maritime zones as war risks, including invasion and insurrection, and areas with high piracy and hijacking. As insurers reclassify certain maritime corridors as war risk zones, insurance premiums for both vessels and cargo rise accordingly, prompting carriers to introduce additional surcharges to recover these costs. Unlike standard freight

rates, war risk and security-related charges are often applied on top of existing transport costs and may vary according to route conditions and risk assessments. As a result, these premiums contribute to a cumulative increase in logistics costs that is less visible than headline freight rates but has a direct and material impact on exporters engaged in long-haul trade. The availability of additional insurance coverage can, in some cases, reduce the need for rerouting, allowing vessels to continue operating on traditional routes despite elevated risk levels.

Under normal conditions, the primary routing option for shipments departing from Italy toward China transits the Suez Canal, crosses the Red Sea, and continues through the Indian Ocean toward major Chinese ports. However, as analyzed in the first paragraph of this chapter,, following a series of attacks on commercial vessels in the region, this corridor has been reclassified as a high war-risk area. The classification of the Red Sea and surrounding maritime routes as high war-risk zones has had significant implications for outbound logistics from Italy to China. The immediate consequences have been most evident in the insurance market, where war risk premiums increased sharply and additional surcharges were imposed on vessels transiting the affected routes. Although these premiums have fluctuated over time, they remain elevated.

At the beginning of 2025, the insurance cost of shipping goods through the Red Sea has more than doubled compared to the prices before the attack and the classification of the corridor as high risk zone. War risk premiums have risen to around 0.7% of the value of a ship, from around 0.3%. Following the renewed escalation of attacks in July 2025, war risk insurance premiums increased once again. After Houthi forces in Yemen attacked and sank two commercial vessels, resulting in the death of at least four seafarers, underwriters raised rates for transits through the area. For a typical seven-day voyage, war risk premiums—set individually by insurers—have been quoted at levels of up to 1% of the insured value, matching the peak observed in 2024

during periods of near-daily attacks.[30] Such premium levels translate into additional costs amounting to several hundred thousand dollars per voyage, significantly increasing the overall cost of shipments transiting the affected routes.

To illustrate the magnitude of these costs, consider a container vessel carrying cargo insured for USD 100 million.At a war risk premium of 1% for a typical seven-day transit through a high-risk zone, the additional insurance cost alone would amount to USD 1 million per voyage. Even for smaller insured values, such as USD 30–50 million, the resulting war risk premium would still range between USD 300,000 and USD 500,000, representing a substantial increase in voyage-level costs. These amounts are incurred independently of standard marine insurance and freight charges, significantly increasing total logistics costs. For exporters of luxury goods and machinery, where margins are sensitive to logistics cost escalation and delivery reliability, such insurance-related expenses represent a material burden rather than a marginal adjustment. This example is indicative and intended to illustrate the order of magnitude of war risk insurance costs under current market conditions.
These cost pressures help explain why Italian exporters increasingly rely on financial and contractual tools to mitigate logistics-related risks, a topic explored in the following chapter.

[30] Saul J., Red Sea insurance soars after deadly Houthi ship attack, Reuters, July 2025 https://www.reuters.com/business/autos-transportation/red-sea-insurance-soars-after-deadly-houthi-ship-attacks-2025-07-10/?utm_source=chatgpt.com

2.2.2 Cargo Insurance Cost Inflation and Exposure of High-Value Italian Exports

In parallel with the introduction of war risk surcharges, cargo insurance costs have risen markedly as insurers reassess exposure along high-risk maritime routes. Heightened geopolitical instability, extended transit times due to rerouting, and the reclassification of strategic corridors as war-risk zones have prompted insurers to increase premiums, tighten coverage conditions, and, in some cases, introduce higher deductibles or coverage exclusions. Unlike freight rates, which are primarily influenced by market capacity and demand dynamics, cargo insurance premiums are directly linked to the insured value of the shipment and the perceived probability of loss, damage, or delay. This mechanism disproportionately affects high-value exports from Italy to China, including luxury goods, industrial machinery, and design-intensive products, where even small percentage increases in insurance rates translate into substantial absolute cost increments. As a result, cargo insurance inflation has become a significant and often underestimated component of total logistics costs, reinforcing the cumulative financial impact of geopolitical risk on long-distance international trade.

For example, an increase in insurance premiums of just 0.5–1% on a shipment insured for USD 50–80 million can generate additional costs of USD 250,000–800,000 per voyage, underscoring how cargo insurance inflation materially amplifies total logistics expenditures.

2.2.3 Compliance and Regulatory Frictions in International Shipping

In addition to risk-driven insurance costs, exporters face a growing set of compliance and regulatory frictions that further increase the complexity and cost of international maritime transport.

Shipping companies and exporters must comply with an expanding framework of international and regional regulations governing safety, security, environmental standards, and documentation requirements, many of which are coordinated through bodies such as the International Maritime Organization and implemented at regional level by authorities including the European Union. Compliance generates both direct costs, including certification fees and third-party verification, and indirect costs linked to administrative labor, coordination with multiple authorities, and potential delays. For long-haul routes such as Italy–China, where shipments cross multiple regulatory jurisdictions, the accumulation of documentation requirements represents a non-negligible source of logistics cost inflation.

Regulatory compliance in international shipping materializes through a wide set of documentary requirements. The following subsections outline the main categories of compliance documentation required in international maritime transport, highlighting their purpose and associated cost implications for exporters engaged in long-haul trade routes such as Italy–China.

Safety Management Certificate (ISM Code)

The Safety Management Certificate, issued under the International Safety Management (ISM) Code, certifies that a vessel complies with internationally recognized safety and risk-management standards. Compliance requires regular audits, documentation updates, and periodic renewals, generating direct certification and consultancy costs. Failure to maintain valid certification

can result in vessel detention or delayed port entry, with immediate operational and financial consequences.

International Ship Security Certificate (ISPS Code)

The International Ship and Port Facility Security (ISPS) Certificate confirms that a vessel meets maritime security requirements, particularly relevant when operating in high-risk areas. Enhanced security levels may require additional reporting, inspections, and coordination with port authorities, increasing administrative costs and, in some cases, extending port stay durations.

Classification Society Certificates

Classification Society Certificates attest to the technical condition and seaworthiness of a vessel. These certificates involve regular surveys, inspections, and maintenance requirements, leading to recurring costs and potential downtime. Delays may arise if inspections uncover deficiencies that must be rectified before departure.

Bill of Lading

The Bill of Lading serves as both a transport contract and a document of title for the cargo. Errors or inconsistencies in this document can lead to customs delays, disputes over cargo ownership, or additional legal and administrative expenses. Even minor documentation inaccuracies may disrupt cargo release at destination ports.

Commercial Invoice and Packing List

These documents support customs valuation and cargo identification. Their preparation entails administrative effort and coordination between exporters, freight forwarders, and customs agents. Inaccurate or incomplete documentation can trigger inspections, reassessments, and clearance delays, increasing storage and demurrage costs.

Certificate of Origin

The Certificate of Origin verifies the country of manufacture of the goods and is often required to determine applicable tariffs or regulatory treatment. Obtaining the certificate involves procedural costs and processing time, while errors may result in customs holds or the application of less favorable tariff regimes.

War Risk Insurance Certificate

The War Risk Insurance Certificate confirms that cargo and vessel are covered for transit through designated high-risk zones. Elevated geopolitical risk increases both the cost and complexity of obtaining coverage, and additional documentation may be required for each voyage. These premiums and administrative requirements represent a direct and growing component of logistics costs.

Security Declarations for High-Risk Zones

For routes classified as high-risk, additional security declarations and risk assessments may be required by insurers, ports, or flag states. These documents increase administrative workload and may delay voyage approvals, particularly when risk classifications change rapidly.

Environmental and Fuel Compliance Documentation

Documentation related to fuel type, bunker delivery notes, and environmental compliance ensures adherence to international emissions and sulfur regulations. Compliance involves monitoring, reporting, and verification activities that generate both direct costs and indirect administrative burdens, especially as environmental regulation becomes more stringent.

Sanitary and Phytosanitary Certificates

For agri-food and pharmaceutical products, sanitary and phytosanitary certificates are essential to demonstrate compliance with health and safety standards. Certification costs, inspections, and potential delays are particularly impactful for time-sensitive and perishable Italian exports to China.

The growing complexity of international shipping regulation is reflected in the expanding set of documents required to move goods across borders. While often treated as routine procedures, these documentation requirements generate real costs and operational frictions. The cumulative effect of these regulatory and compliance-related costs is not confined to the logistics sphere but is ultimately transmitted to exporting firms' financial structures, a mechanism analyzed in the following chapter.

2.3 The EU Emission Trading System (ETS) and Maritime Transport

A further structural source of logistics cost inflation is represented by the extension of the EU Emission Trading System (ETS) to maritime transport. As part of the climate policy framework of the European Union, shipping companies operating on routes involving EU ports are now required to purchase emission allowances to cover a growing share of their greenhouse gas emissions. Unlike temporary market-driven cost shocks, ETS-related expenses are regulatory in nature and structurally embedded, as they directly link transport activity to carbon pricing. In practice, these costs are passed on to shippers through dedicated ETS surcharges or incorporated into freight rates, further increasing the total cost of maritime transport. The introduction of ETS thus reinforces the transformation of logistics costs from purely operational expenses into a combination of risk, regulation, and policy-driven charges.

2.3.1 Regulatory Scope and Phasing-in of ETS for Maritime Transport

The European Union Emissions Trading System (EU ETS) constitutes the primary regulatory instrument through which the European Union pursues greenhouse gas emission reductions across key economic sectors. Established by Directive 2003/87/EC, the ETS is based on a cap-and-trade mechanism that sets a declining ceiling on total permitted emissions, corresponding to an equivalent number of emission allowances, each representing one ton of CO_2 equivalent. Operators covered by the system are required to annually surrender allowances equal to their verified emissions, which are monitored and certified by independent third parties and recorded in the EU Union Registry.[31]

The extension of the ETS to maritime transport applies this framework to shipping activities involving EU ports, thereby incorporating emissions generated during voyages into the EU carbon pricing system. Unlike manufacturing sectors, where free allocation mechanisms are used to mitigate carbon leakage risks, shipping companies are largely required to acquire allowances through auctions, making ETS compliance a direct and monetized cost. The system has been introduced progressively for maritime transport, with 40% of emissions covered in 2024, 70% in 2025, and full coverage from 2026 onward, significantly increasing regulatory cost exposure for long-haul routes such as Europe–Asia[32]. As the overall emissions cap continues to decline over time, the ETS imposes a structurally tightening constraint on maritime emissions, transforming environmental regulation into a permanent component of shipping cost structures.

[31] https://climate.ec.europa.eu/eu-action/carbon-markets/eu-emissions-trading-system-eu-ets_en

[32] https://www.ets.minambiente.it/NovitaEUETS/Marittimo

2.3.2 Emission Intensity and Cost per Voyage

From an operational perspective, the extension of the EU ETS to maritime transport translates emission intensity directly into voyage-level costs. Large container vessels operating on the Asia–Europe route typically consume between 80 and 150 tons of fuel per day, depending on vessel size, speed, and weather conditions. Given that the combustion of one ton of marine fuel generates approximately 3.1 tons of CO_2, daily emissions for a single vessel may range from 250 to over 450 tons of CO_2. Over the course of a long-haul voyage between Asia and Europe, total emissions can therefore easily reach 8,000–10,000 tons of CO_2, with higher values observed in the case of rerouting or higher cruising speeds.

Under the ETS, a growing share of these emissions must be covered by purchased emission allowances.With maritime transport subject to 70% ETS coverage in 2025, shipping companies are required to surrender allowances for approximately 5,600–7,000 tons of CO_2 per voyage on the Asia–Europe corridor. Assuming EU Allowance (EUA) prices in the range of €70–100 per ton of CO_2, this results in an ETS compliance cost of roughly €400,000–700,000 per voyage[33], even before full coverage is reached.

These figures highlight that ETS-related costs are not marginal adjustments but constitute a significant additional cost component at the voyage level.

Importantly, emission-related costs are sensitive to operational choices. Longer routes resulting from rerouting around the Cape of Good Hope increase sailing distance, fuel consumption, and total emissions, thereby expanding the ETS cost base. Similarly, higher cruising speeds adopted to compensate for transit delays raise fuel burn non-linearly, further increasing both emissions and the number of allowances required.For long-haul trade routes such as Italy–China, this mechanism embeds carbon pricing into the core economics of maritime transport.

[33] ETS cost per voyage ≈ (Fuel consumption × CO_2 emission factor × ETS coverage ratio × EUA price).

As a consequence, the ETS amplifies the cost impact of logistics disruptions by linking regulatory compliance directly to operational inefficiencies and geopolitical constraints.

2.3.3 Interaction Between ETS, Rerouting, and Fuel Consumption

The cost impact of the EU Emission Trading System is closely intertwined with routing choices and fuel consumption patterns in maritime transport. Rerouting decisions adopted in response to security risks, particularly the diversion from the Suez Canal to the Cape of Good Hope, substantially increase sailing distance and time at sea. This distance premium, typically in the range of 30–45% on the Asia–Europe corridor, directly translates into higher fuel consumption and, consequently, higher CO_2 emissions per voyage.

Under the ETS framework, increased emissions mechanically expand the volume of allowances that shipping companies must surrender. Unlike fuel costs alone, which can partially be mitigated through slow steaming, ETS costs scale proportionally with total emissions and therefore with total distance sailed. As a result, rerouting not only raises bunker expenditure but also enlarges the ETS compliance base, effectively compounding the cost impact of longer voyages. Even when vessels adopt speed reductions to contain fuel burn, the additional sailing days associated with longer routes still result in higher cumulative emissions and higher ETS-related costs.

This interaction creates a reinforcing mechanism between geopolitical disruptions and environmental regulation. Security-driven rerouting decisions amplify fuel consumption and emissions, which in turn increase ETS compliance costs, while ETS pricing further penalizes operational inefficiencies caused by longer routes. For long-haul trade lanes such as Italy–China, this

feedback loop contributes to structurally higher transport costs, as carriers face simultaneous increases in fuel expenditure and carbon pricing obligations. Consequently, the ETS does not operate in isolation but magnifies the economic effects of logistics disruptions. By linking emissions directly to regulatory costs, the system embeds geopolitical and operational shocks into the carbon cost structure of maritime transport, reinforcing the persistence of elevated freight rates and surcharges even in phases of partial market normalization.

Chapter 3.
Financial Exposure to Logistics Disruptions and Risk Mitigation Channels

This chapter investigates how the logistics disruptions analyzed in the previous sections translate into concrete financial stress for exporting firms. Prolonged transit times, increased route variability, and reduced schedule reliability do not remain confined to the operational sphere. Instead, they propagate directly into corporate balance sheets, cash-flow dynamics, and firms' financial risk-management frameworks.

The first and most immediate financial consequence of logistics disruption emerges through working capital dynamics. Longer and less predictable delivery times increase the average duration of inventory holding, forcing firms to tie up additional capital in goods in transit and in safety stock. In order to preserve service levels and protect customer relationships, companies are often compelled to raise buffer inventories, particularly in sectors characterized by high service sensitivity or limited substitutability. This structural increase in net working capital generates an immediate need for short-term financing, thereby increasing financial costs and balance-sheet leverage.

Beyond inventory-related effects, logistics volatility also amplifies commercial and counterparty risk. Disruptions along strategic corridors such as the Suez Canal have increased the frequency of late deliveries and documentary inconsistencies, which may trigger contractual disputes, delay payment schedules, or in extreme cases lead to payment cancellations. As a result, firms face a higher probability of cash-flow disruption and are increasingly incentivized to rely on stronger payment instruments, including bank

guarantees, letters of credit, and export credit insurance, in order to mitigate non-payment risk and stabilize receivables.

A further layer of complexity emerges in the management of foreign exchange exposure and financial hedging. When shipment schedules shift, the timing of cash inflows moves accordingly. Hedging strategies, typically calibrated on forecasted delivery and payment dates, may no longer align with realized cash receipts. This misalignment exposes firms to basis risk, as hedging instruments may fail to perfectly offset underlying exposures, potentially generating unexpected financial outcomes and reducing the overall effectiveness of risk-management policies.

In addition to identifying these transmission channels, the chapter examines the financial and contractual instruments through which firms attempt to contain or reallocate logistics-related risks. These include credit-risk mitigation tools, liquidity-support instruments, contractual adjustments, and inventory-location strategies. The analysis focuses on their ability to reduce financial exposure and on the residual risks that remain when logistics instability persists.

By linking logistics disruptions to working capital absorption, payment risk, and hedging inefficiencies, this chapter highlights how geopolitical shocks in global transport corridors can materially affect firms' financial resilience. The discussion provides the analytical foundation for the subsequent comparative analysis, which investigates how the magnitude of exposure and the effectiveness of mitigation strategies differ between large firms and small and medium-sized enterprises.

3.1 Working Capital Absorption and Short-Term Financing Needs

Logistics disruptions translate into financial stress primarily through their impact on working capital and short-term liquidity, and this mechanism has become particularly evident in the context of the recent instability along the Suez Canal and the Red Sea corridor. Heightened schedule uncertainty has forced firms to hold inventories for extended periods and to increase safety stock in order to preserve service continuity. Capital that would normally circulate efficiently between the different stages of the production and selling process becomes immobilized in goods in transit or in storage, tightening liquidity even in the absence of changes in sales volumes or demand conditions. As a result, disruptions originating in strategic maritime routes are rapidly transmitted to corporate balance sheets, increasing firms' reliance on short-term financing instruments and making working capital management a central component of financial decision-making under geopolitical and logistics uncertainty.

3.1.1 Balance-Sheet Effects of Logistics Cost Increases

From a financial perspective, logistics disruptions do not immediately deteriorate profit-and-loss, but primarily affect firms through balance-sheet adjustments. Uncertainty caused by prolonged transit times and route deviations do not instantly translate into lower revenues or margins, but instead reshape the composition and scale of current assets, leading to a structural expansion of working capital.

The most direct balance-sheet effect arises from the inflation of inventories, both in transit and in storage. When delivery times lengthen and schedule reliability deteriorates, goods remain immobilized for longer periods before

(€/million)	31.12.2024	31.12.2023
- Intangible assets	1,323.3	878.3
- Property, plant and equipment	560.6	478.0
- Financial assets	10.9	9.7
- Deferred tax assets	74.2	60.4
Non-current assets	**1,969.1**	**1,426.4**
- Inventories	621.9	504.7
- Trade receivables	336.1	272.7
- Trade payables	(873.1)	(716.2)
- Other payables (net of receivables)	(181.8)	(143.9)
Net working capital	**(96.9)**	**(82.8)**
Total non-current liabilities and provisions	**(251.0)**	**(195.1)**
Net capital employed	**1,621.2**	**1,148.5**
(Net financial assets)	**(643.2)**	**(662.6)**
Total net equity	**2,264.4**	**1,811.1**
Total net debt and equity	**1,621.2**	**1,148.5**

Tab 3.1 Source: De'Longhi Group, Annual Financial Report 2024.

generating cash inflows. This dynamic mechanically increases inventory days and reduces inventory turnover, even in the absence of demand growth[34].

As inventories expand, firms experience a reallocation of liquidity within current assets. Cash resources are progressively converted into non-liquid assets, reducing balance-sheet flexibility and increasing exposure to short-term cash-flow pressure. While total current assets may increase, their liquidity quality deteriorates, leaving firms more exposed to short-term cash-flow pressures. In balance-sheet terms, companies may appear asset-rich while simultaneously facing tighter liquidity constraints, particularly when disruptions persist over multiple operating cycles.

These mechanisms can be illustrated through the financial statements of De'Longhi, Table 3.1, a large Italian exporter with a strong international footprint and significant exposure to maritime container shipping toward Asian

[34] Brigham and Ehrhardt, *Financial Management: Theory and Practice*, Chapter 16, Working Capital and Short-Term Financing

markets. As shown in Table 3.2, De'Longhi recorded a substantial increase in inventories between 2023 and 2024, with inventory levels rising by over 23 percent. Over the same period, the magnitude of net working capital increased, indicating a higher volume of capital absorbed in operational activities and a lengthening of the cash conversion cycle.

Tab 3.2

Indicators	2023	2024	% change	Index (2023=100)
Inventories	504.7	621.9	23%	123.2
Current Financial Borrowings	289.0	196.1	-32.1%	67.9
Net Working Capital	-82.8	-96.9	+17.0% (Magnitude)	117.0

From a balance-sheet standpoint, this evolution reflects the immobilization of financial resources in inventories and goods in transit in a context characterized by global logistics disruption and longer lead times. Notably, the increase in working capital absorption did not immediately translate into higher short-term financial debt, as current borrowings declined over the same period. This pattern suggests that De'Longhi was able to absorb the balance-sheet impact of logistics disruption through internal liquidity and financial flexibility, rather than through increased reliance on short-term bank financing.[35]

[35] Press Releases regarding 2024 Annual Report, De Longhi Group.
"The net industrial margin stood at €1,769.1 million, equal to 50.6% of revenues, compared to 48.9% in 2023, thanks to the positive contribution of the mix and the reduction in inflationary pressures on some production costs, which more than offset the temporary limited rise in some logistics costs"
https://www.delonghigroup.com/en/investor/results?year=2024&

This evidence highlights a crucial aspect of logistics-induced balance-sheet effects. Even financially strong and well-capitalized firms are exposed to significant working capital absorption when logistics conditions deteriorate. The negative effect lies not in immediate financial distress, but in the reduction of balance-sheet flexibility, as a larger share of financial resources becomes tied up in non-liquid assets. Over time, this can constrain firms' ability to respond to further shocks, invest, or optimize their financing structure. In this sense, logistics cost increases operate as a hidden balance-sheet shock, transmitting operational instability into financial exposure through inventory accumulation and cash-flow timing distortions. Understanding this transmission mechanism is essential for assessing the broader financial implications of logistics disruption and provides the foundation for the subsequent analysis of inventory management strategies and financing pressures.

3.1.2 Inventory Expansion, Safety Stock Accumulation and Sunk Costs

The balance-sheet effects discussed in the previous section are the outcome of a set of managerial responses to logistics uncertainty, among which inventory expansion and safety stock accumulation play a central role. When transport times become longer and less predictable, firms face an increased risk of stockouts, delayed deliveries, and service disruptions. In order to mitigate these risks and preserve contractual reliability, companies frequently adjust their inventory policies by increasing buffer stocks across different stages of the supply chain.

Safety stock represent a precautionary investment in inventories designed to absorb uncertainty in supply conditions While traditionally framed as an operational tool, safety stock can be interpreted as a liquidity-substituting asset: instead of holding cash to manage uncertainty, firms immobilize capital

in inventories to ensure continuity of operations and service levels. Safety stock accumulation represents a rational response to lead-time volatility rather than to changes in demand conditions. As variability in shipping schedules increases, the statistical uncertainty surrounding delivery dates widens, requiring higher inventory buffers to maintain a given service level. This dynamic is particularly pronounced in global supply chains reliant on maritime transport, where the consequences of geopolitical disruptions can significantly alter transit times. As a result, firms may hold larger inventories even when sales volumes remain stable, reinforcing the working capital absorption observed at the balance-sheet level.[36]

However, the expansion of inventories entails significant financial trade-offs. Higher safety stock levels increase holding costs, including storage and insurance, while simultaneously lengthening the cash conversion cycle. This trade-off becomes more acute as logistics disruptions persist over time, transforming what may initially appear as a temporary adjustment into a structural feature of firms' operating models.

In the case of perishable or time-sensitive goods, inventory expansion introduces an additional layer of risk. Extended transit times and congestion may cause products to exceed their physical or commercial shelf life before reaching final markets. When this occurs, inventories cease to represent recoverable assets and must be written down or discarded. At this stage, the costs embedded in production, transport, and storage become sunk costs[37], as they can no longer be recovered through sales or alternative use. This transition marks a qualitative shift from reversible working capital absorption to irreversible value destruction, directly affecting profitability.

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[36] Pike R and Neale B, *Corporate Finance and Investment: Decision and Strategies*, fifth edition. Part iV Short-term Financing and Policies, Chapter 14

[37] "Sunk Cost", CFI Team, https://corporatefinanceinstitute.com/resources/economics/sunk-cost/

More broadly, safety stock accumulation and sunk costs highlights the tight interdependence between logistics reliability and financial outcomes. While increased inventories can mitigate operational risk in the short term, they simultaneously amplify financial exposure by tying up liquidity, increasing the risk of obsolescence, and raising the potential for future write-downs. Inventory policies thus emerge as a critical interface between logistics management and financial resilience, shaping both the scale and the nature of firms' exposure to logistics disruption.

3.1.3 Liquidity Pressure and Reliance on Short-Term Credit

As inventory expansion and safety stock accumulation absorb increasing amounts of capital, firms are confronted with growing liquidity strain. The extension of the cash conversion cycle implies that cash outflows related to production, procurement, and logistics occur well before the corresponding inflows from final sales. When logistics disruptions persist, this timing mismatch becomes structural rather than temporary, forcing firms to actively manage financing gaps.

In this context, short-term financing instruments play a central role in sustaining day-to-day operations. It is a common misconception to view financial management primarily as a discipline concerned with long-term strategic decisions. Companies typically rely on revolving credit facilities and trade-related bank lines to bridge the period between cash outflows and delayed inflows. These instruments are designed to support working capital fluctuations and offer flexibility in responding to short-term liquidity needs.[38]

The reliance on short-term financing carries important cost and risk implications. Such facilities are often priced at floating interest rates and are

[38] Pike R and Neale B, *Corporate Finance and Investment: Decision and Strategies*, fifth edition. Part iV Short-term Financing and Policies, Chapter 14

subject to periodic renewal and credit reassessment. As a result, logistics-induced working capital absorption exposes firms not only to higher financial expenses, but also to interest rate risk and refinancing risk, particularly in environments characterized by monetary tightening or increased risk aversion in the banking sector. What initially appears as a logistics-driven operational issue thus evolves into a broader financial vulnerability.

The impact of liquidity strain is not uniform across firms. Companies with strong balance sheets, ample cash reserves, and diversified financing sources may be able to absorb temporary working capital shocks internally, limiting their dependence on external credit. Conversely, firms with thinner liquidity buffers or more constrained access to capital markets are more likely to experience forced reliance on short-term bank financing, increasing leverage and reducing financial flexibility. An illustrative example of internal shock absorption is provided by De'Longhi. As shown in the company's consolidated financial statements, De'Longhi experienced a significant increase in inventories and net working capital absorption during a period characterized by global logistics disruption. Despite this, the company reduced its reliance on short-term financial borrowings, indicating the ability to finance higher working capital internally through liquidity reserves and balance-sheet strength. This pattern highlights how financially solid firms can accommodate logistics-induced working capital shocks without immediate recourse to additional bank credit, preserving financial flexibility even under adverse operating conditions.

Short-term financing does not merely accommodate working capital fluctuations but becomes an integral part of firms' response to logistics volatility. While essential for maintaining operational continuity, increased dependence on short-term credit also heightens exposure to financial conditions and underscores the systemic nature of logistics-induced financial stress.

3.2 Payment and Credit Risk under Logistics Volatility

Logistics disruptions significantly alter the risk profile of trade receivables, increasing firms' exposure to payment delays and non-payment events. When delivery schedules become uncertain and transit times lengthen, the temporal link between shipment and cash collection weakens. As a result, cash inflows become more volatile precisely at a time when liquidity pressure is already elevated.

Logistics volatility transforms trade credit from a routine operational component into a critical financial risk channel. By increasing the probability and duration of payment delays, logistics disruptions exacerbate liquidity strain and interact with working capital pressures discussed in the previous sections. These dynamics underscore that the financial impact of logistics instability extends beyond inventory financing, directly affecting the reliability and timing of firms' cash inflows[39].

3.2.1 Late Delivery, Documentary Inconsistency and Contractual Disputes

Late delivery constitutes one of the most immediate channels through which logistics disruptions translate into contractual and financial risk. In international trade, delivery timelines are legally relevant conditions that determine payment obligations and are characterized by a strong contractual compliance. When transit times lengthen due to geopolitical disruptions, exporters may find themselves in technical breach of delivery terms despite having fulfilled their obligations in good faith.

[39] Allianz Trade (Euler Hermes), *Global Payment Risk Report*, sections on delayed payments and receivables volatility.

Transport delays can generate inconsistencies between shipping documents, such as bills of lading, commercial invoices, and certificates of origin, and the contractual timelines specified in sales agreements or payment instruments. Even minor discrepancies, when combined with delayed delivery, may provide grounds for contractual disputes, with buyers or banks contesting document conformity and triggering payment delays or refusals. The increase of documentary risk, particularly in transactions governed by strict documentation requirements, is a dynamic directly affected by logistics volatility.

In the case of Letter of Credit (LCs), even minor discrepancies such as inconsistencies in shipment dates may led to a refusal of payment. LCs are governed by the principle of strict documentary compliance, as codified in the Uniform Customs and Practice for Documentary Credits (UCP 600) issued by the International Chamber of Commerce. Under this framework, banks assess only the formal conformity of documents presented and do not evaluate the underlying commercial transaction or the causes of any delivery delay[40]. Payment under an LC is conditional not on the actual shipment or delivery of goods, but on the precise alignment between the documents and the terms of the credit. This rigidity transforms logistics volatility into payment risk, as receivables under letters of credit become contingent on documentary precision rather than operational performance. While LCs reduce buyer default risk, their sensitivity to documentation makes them particularly vulnerable in environments characterized by unstable logistics conditions[41].

From a financial perspective, these disputes undermine the reliability of trade receivables. Amounts that were previously considered low-risk and short-term assets become contingent claims subject to negotiation. As a result, receivables lose part of their liquidity value and may no longer be easily discounted, financed, or used as collateral, amplifying the liquidity strain

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[40] International Chamber of Commerce, UCP 600 – Uniform Customs and Practice for Documentary Credits, Articles 2–14, on strict documentary compliance

[41] Trade Finance Global, Guides on Bank Guarantees and Letters of Credit

already generated by working capital absorption. Importantly, the risk of contractual dispute does not arise solely from exporter misconduct but is often the consequence of exogenous logistics shocks beyond firms' direct control. Nevertheless, the financial impact is borne primarily by exporters, particularly in transactions conducted on open-account terms or under Incoterms that place delivery responsibility firmly on the seller. In this sense, logistics volatility exposes a structural vulnerability in international trade contracts, where operational disruptions rapidly translate into legal and financial uncertainty.

3.2.2 Delayed Payments, Cancellations, and Receivables Volatility

When logistics disruptions persist or escalate, delayed payments may evolve into more severe outcomes, including payment cancellations or contractual renegotiations.

Payment cancellations are most likely to occur when delivery delays materially affect the commercial value of the goods. This is particularly relevant for seasonal, time-sensitive, or rapidly depreciating products, where late arrival may render the shipment partially or entirely unsellable at the originally agreed price. Buyers may invoke contractual clauses related to delivery deadlines, conformity, or acceptance, or may seek to renegotiate terms to reflect diminished market value. Even when contracts do not explicitly allow cancellation, prolonged disputes can lead to de facto payment deferrals that mirror cancellation effects in financial terms.

These dynamics significantly increase receivables volatility. Amounts recorded as trade receivables no longer represent reasonably certain cash inflows but become conditional claims subject to negotiation. Receivables volatility also amplifies liquidity risk. Firms may face sudden and unexpected shortfalls in cash inflows precisely when liquidity is already strained by higher working capital absorption. This interaction between delayed or cancelled payments

and inventory-driven liquidity pressure can force firms to increase reliance on short-term financing, renegotiate bank covenants, or postpone investment and operational decisions.

3.2.3 Non-Payment Risk as a Financial Transmission Channel

Logistics volatility increases non-payment risk through multiple reinforcing mechanisms. Delivery delays may invalidate contractual protections, weaken exporters' legal positions, or erode the commercial value of goods, reducing buyers' incentives to honor payment obligations. In cross-border transactions, jurisdictional complexity and enforcement costs further exacerbate recovery challenges, particularly when disputes arise in foreign legal systems.

Non-payment risk constitutes the most severe financial outcome of logistics disruption and represents the point at which operational instability crystallizes into direct financial loss. From a financial perspective, non-payment risk transforms trade receivables from short-term liquid assets into impaired or irrecoverable exposures. Non-payment risk also has systemic implications beyond individual transactions. Higher default probability increases the perceived riskiness of exporters' receivables portfolios. This dynamic affects credit ratings and insurance premiums, and limits the access to external financing, thereby amplifying the financial impact of logistics disruption at the firm level.

Importantly, exposure to non-payment risk is unevenly distributed across firms. Large exporters with diversified customer bases, structured trade-finance arrangements, and access to risk-mitigation instruments are better positioned to contain losses. Smaller firms, by contrast, often face higher buyer concentration and limited contractual leverage, making them more vulnerable to the realization of non-payment risk.

By acting as a final transmission channel, non-payment risk links logistics disruption to permanent financial loss and balance-sheet deterioration. This highlights why logistics instability cannot be treated solely as an operational issue, but must be understood as a source of credit risk with material implications for firms' financial resilience and long-term sustainability.

3.3 Financial Instruments for Mitigating Payment and Credit Risk

The escalation of payment delays, contractual disputes, and non-payment risk analyzed in the previous section highlights the need for financial mechanisms capable of containing or redistributing credit risk. In response to logistics volatility, firms rely on a set of trade-finance instruments that aim to stabilize cash flows, protect receivables, and reduce exposure to counterparty default.These instruments do not remove logistics risk at its source. Rather, they reallocate financial exposure among exporters, banks, insurers, and other financial intermediaries, often transforming operational uncertainty into explicit financial costs. Their effectiveness depends on firms' financial structure, bargaining power, and access to financial markets, resulting in heterogeneous outcomes across exporters.

3.3.1 Export Credit Insurance and Receivables Protection

Export credit insurance represents a primary tool for mitigating non-payment risk in international trade. By transferring the risk of buyer default to an insurer, exporters protect their receivables against commercial risks such as insolvency or protracted payment delays, as well as political risks that may affect cross-border transactions.

In the context of logistics disruption, export credit insurance plays a dual financial role. First, it limits downside risk by compensating losses when delivery-related disputes ultimately result in non-payment. Second, insured receivables are generally perceived as higher-quality assets by financial institutions, facilitating access to bank financing and improving borrowing conditions.

In the Italian export system, SACE[42] plays a central role in mitigating payment and credit risk for firms operating in international markets. As Italy's official Export Credit Agency, ultimately controlled by the Ministry of Economy and Finance through Cassa Depositi e Prestiti, SACE provides insurance and financial instruments designed to protect exporters against non-payment and to facilitate access to liquidity. Through supplier's credit insurance, SACE issues policies covering up to 85% of the export contract value, with coverage against political and commercial risks reaching 95–100%. This protection allows Italian exporters to discount receivables without recourse by assigning them to banks together with the insurance policy, thereby converting uncertain future cash flows into immediate liquidity. In this sense, export credit insurance functions not only as loss protection, but also as an enabler of receivables financing under conditions of elevated payment risk. SACE also operates through buyer credit structures, in which financing is granted directly to the foreign buyer to pay Italian suppliers. In this framework, SACE guarantees up to 85% of the eligible export contract value, with the possibility of covering additional local costs, while a mandatory down payment preserves buyer commitment. The guarantee, which may cover up to 95–100% of the facility amount and related interest, reallocates credit risk from exporters and banks to the public guarantor. This structure reduces exporters' exposure to delayed or cancelled payments and stabilizes cash inflows, even when logistics disruptions increase settlement uncertainty.

[42] SACE Italian insurance-financial group https://www.sace.it/

However, export credit insurance does not fully neutralize logistics-induced financial stress. Coverage is typically conditional on contractual compliance and subject to waiting periods before claims are settled. As a result, exporters may still face temporary liquidity gaps between shipment and insurance payout. Moreover, premiums tend to increase as perceived risk rises, raising the cost of protection precisely when logistics volatility intensifies. From a financial perspective, export credit insurance transforms uncertain receivables into conditionally protected assets, reducing tail risk while leaving residual exposure related to timing, deductibles, and coverage limits.

3.3.2 Bank Guarantees, Letters of Credit, and Risk Reallocation

Bank guarantees and letters of credit are commonly used to mitigate payment risk by reallocating credit exposure from the buyer–seller relationship to the banking system. By introducing a bank's commitment into the transaction, exporters seek to protect themselves against counterparty default and reduce uncertainty surrounding cash collection. While both instruments enhance payment security, they differ substantially in their mechanics, risk profile, and sensitivity to logistics disruption[43].

Bank guarantees operate as contingent payment commitments. Under a guarantee, a bank undertakes to compensate the beneficiary if the buyer fails to meet specified contractual obligations, typically related to payment or performance. Unlike letters of credit, bank guarantees do not require the presentation of a full set of shipping documents for payment to occur. Instead, they are activated upon the occurrence of a defined default event, such as non-payment beyond an agreed deadline. This structure makes bank guarantees less sensitive to documentary discrepancies and more closely tied to the economic substance of the transaction. In a context of logistics volatility, this feature becomes particularly relevant. Delivery delays or port congestion

[43] International Chamber of Commerce, *UCP 600*, Articles 4, 5, and 14

may disrupt shipment schedules without necessarily invalidating the underlying commercial agreement. In such cases, bank guarantees allow exporters to preserve payment protection even when documentary timelines are strained, reducing the risk that minor compliance issues delay or block payment. However, bank guarantees also have limitations. Their effectiveness depends on the precise wording of the guarantee and on the legal enforceability of the underlying contract. Disputes over whether a default has occurred may delay payment, and recovery may require formal claims procedures or legal action. From a financial perspective, this introduces enforcement and timing risk, as payment under a guarantee may not be immediate even when ultimately successful[44].

Letters of credit, by contrast, provide a more automatic payment mechanism, as banks are obliged to pay upon presentation of compliant documents. This makes LCs highly effective in preventing outright non-payment, but also renders them rigid and vulnerable to logistics-induced documentary discrepancies, as discussed earlier. Under disrupted logistics conditions, this rigidity may reduce their effectiveness as liquidity-stabilizing instruments.

Both bank guarantees and letters of credit entail financial costs, including bank fees, collateral requirements, and balance-sheet absorption for the buyer. These costs increase as perceived risk rises, limiting the feasibility of secured payment instruments in highly competitive markets. Consequently, the choice between guarantees and letters of credit reflects a trade-off between flexibility, certainty, and cost, rather than a simple hierarchy of risk protection. Overall, bank guarantees play a distinct role in the reallocation of payment risk under logistics volatility. By offering protection that is less dependent on documentary precision, they can partially offset the vulnerabilities of letters of credit in disrupted transport environments. At the same time, they do not eliminate credit risk, but transform it into legal and enforcement risk, underscoring the

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[44] Ellinger, Lomnicka, and Hare, *Documentary Credits*, Chapter 3, Legal Structure of Documentary Credits

broader theme that financial instruments redistribute, rather than remove, logistics-induced uncertainty.

3.3.3 Factoring and Forfaiting as Liquidity-Stabilization Tools

Factoring and forfaiting address payment and credit risk from a perspective that is fundamentally different from insurance or bank guarantees. Rather than protecting against loss *ex post,* these instruments aim to stabilize liquidity *ex ante*[45] by accelerating cash inflows and reducing firms' exposure to uncertain payment timing. In environments characterized by logistics volatility, this distinction becomes particularly important, as the primary financial challenge often lies not in the probability of default alone, but in the unpredictability of cash receipts.

Factoring involves the sale of short-term trade receivables to a financial intermediary, typically a bank or specialized factor, in exchange for immediate liquidity. Depending on the contractual structure, factoring may be carried out on a recourse basis, where the exporter retains ultimate credit risk, or on a non-recourse basis, where the factor assumes the risk of buyer default. In both cases, the exporter converts receivables into cash before their contractual maturity, thereby shortening the cash conversion cycle and easing liquidity pressure. Factors Chain International represents the main global network for factoring and open-account receivables financing, bringing together nearly 400

[45] In corporate finance, *ex ante* and *ex post* distinguish the timing of risk management actions relative to an adverse event.
Ex ante risk management refers to measures taken before a disruption materializes, with the aim of stabilizing liquidity and limiting exposure in advance. These instruments primarily address timing risk, ensuring earlier or more predictable cash inflows. Examples include factoring, forfaiting, and the use of secured payment terms.
Ex post risk management refers to mechanisms that operate after a loss has occurred. These tools compensate firms once default or non-payment is formally recognized, protecting against ultimate financial loss but not preventing interim liquidity stress. Export credit insurance is a typical example.
This distinction clarifies how financial instruments differ in their ability to manage liquidity versus loss under logistics volatility.

member institutions across more than 90 countries. The growth of global factoring volumes, which reached approximately €3.66 trillion in 2024 as stated in Factors Chain International's official reports, reflects the increasing reliance of firms on receivables-based financing to manage payment delays and liquidity risk[46].

Under logistics disruption, factoring serves as a practical response to payment delays and receivables volatility. When delivery disputes, inspection delays, or documentary issues postpone settlement, factoring allows firms to decouple operational cash outflows from uncertain inflows. From a financial standpoint, this reduces reliance on overdrafts or revolving credit lines and limits exposure to short-term funding stress. However, this benefit comes at a cost: as receivables become riskier or more contested, discount rates increase, and eligibility criteria tighten, reflecting the factor's reassessment of credit quality.

Forfaiting, by contrast, is typically used for medium to long-term export receivables and involves the sale of receivables on a *non-recourse* basis. Once the receivable is forfaited, the exporter fully transfers both credit risk and collection risk to the forfaiter, achieving immediate and definitive cash realization. This makes forfaiting particularly attractive for capital goods exporters or firms engaged in large, contract-based international transactions. In the context of logistics volatility, forfaiting can offer strong protection against prolonged payment uncertainty, especially when delivery delays stretch payment horizons or increase the likelihood of renegotiation. By crystallizing cash flows upfront, exporters eliminate exposure to future disputes and reduce balance-sheet volatility. At the same time, forfaiting is highly selective: it typically requires structured payment instruments, strong obligors, or sovereign-backed buyers, making it less accessible to smaller firms or transactions with elevated risk profiles.

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[46]Web Article, Factors Chain International, *FCI Release 2024 World Industry Statistics showing the Factoring Market Remains Stable.* https://fci.nl/en/news/fci-release-2024-world-industry-statistics-showing-factoring-market-remains-stable?language_content_entity=en

From a financial perspective, both factoring and forfaiting convert receivables risk into explicit financing costs. Rather than facing uncertain or delayed cash inflows, firms pay a price in the form of discounts, fees, or interest margins. This transformation is central to their role under logistics disruption: they do not remove underlying risk, but price it, accelerate it, and make it manageable.

3.4 FX Exposure and Hedging Mismatches Caused by Delivery Delays

When a company decides to operate internationally, it is exposed not only to the risks inherent in cross-border shipments and international logistics, but also to foreign exchange (FX) risk. Engaging in transactions with countries that use different currencies inevitably introduces a mismatch between revenues and cash flows denominated in multiple currencies. As a result, firms must confront the possibility that exchange rates fluctuate over time between the moment a commercial agreement is signed and the moment the corresponding cash flows are settled.[47]

Under normal operating conditions, this currency mismatch can be managed through standard FX risk management practices, as payment dates and settlement horizons are reasonably predictable. However, international logistics disruptions significantly complicate this process. Delivery delays and rerouting extend the time interval during which firms remain exposed to exchange-rate movements, increasing the uncertainty surrounding the domestic-currency value of foreign-currency receivables and payables.

In this context, FX exposure is no longer solely a function of market volatility, but also of operational uncertainty. Even when the contractual amount of

[47] Pike R and Neale B, *Corporate Finance and Investment: Decision and Strategies*, fifth edition. Part VI, International Finance, Chapter 21 Managing Currency Risk

foreign-currency cash flows is fixed, disruptions in logistics can shift settlement dates unexpectedly, weakening the alignment between commercial transactions and financial planning. Consequently, firms engaged in international trade must be prepared not only to manage exchange-rate fluctuations, but also to integrate logistics-induced timing risk into their FX exposure management strategies.

3.4.1 Different Types of Exposure: Transaction, Economic and Translation

The most immediate form of FX risk is transaction exposure, which arises whenever a firm has foreign-currency-denominated receivables or payables. Between the moment a contract is agreed and the moment cash is actually settled, movements in exchange rates directly affect the domestic-currency value of cash flows. Under stable logistics conditions, transaction exposure is relatively well defined and manageable, as settlement dates are reasonably predictable.

Beyond individual transactions, firms are also subject to economic exposure, which reflects the longer-term impact of exchange-rate movements on a firm's competitive position, pricing power, and future cash flows. Exchange-rate changes may alter relative costs and revenues across markets, affecting demand, margins, and sourcing decisions over time. While economic exposure is more diffuse and harder to quantify, it shapes the strategic environment in which internationally active firms operate.

A further layer of FX risk is translation exposure, which arises when foreign-currency-denominated assets and liabilities are converted into the firm's reporting currency for financial reporting purposes. Although translation exposure does not directly affect cash flows, it influences reported earnings, equity, and financial ratios, with potential implications for investor perceptions and covenant compliance.

International logistics disruptions interact with all three forms of FX exposure, but particularly intensify transaction exposure. Delivery delays and uncertainty extend the period during which foreign-currency receivables remain outstanding, increasing the time window over which exchange-rate fluctuations can affect realized cash flows. As a result, FX risk management under logistics volatility must address not only market movements, but also the operational uncertainty that reshapes the timing and realization of foreign-currency cash flows.

3.4.2 Hedging

In international business, foreign exchange hedging is a core component of transaction risk management. Firms hedge not to speculate on currency movements, but to stabilize cash flows, by protect margins and reducing uncertainty surrounding the domestic-currency value of foreign-currency-denominated receivables and payables[48]. The primary objective of hedging is therefore financial predictability rather than profit maximization. Under normal operating conditions, firms hedge FX exposure once a transaction becomes sufficiently certain in terms of amount and timing. When a sales contract is signed or a shipment is scheduled, the firm can identify the foreign-currency cash flow it expects to receive and the date on which settlement is likely to occur. This information allows treasury departments to select hedging instruments with maturities aligned to the expected payment date.

The most commonly used instruments for transaction hedging are forward contracts, FX swaps and options. Forward contracts lock in an exchange rate for a future date, eliminating uncertainty about the domestic-currency value of the transaction. FX swaps are often used to manage short-term timing

[48] Pike R and Neale B, *Corporate Finance and Investment: Decision and Strategies*, fifth edition. Part VI, International Finance, Chapter 21 Managing Currency Risk

adjustments, while options provide protection against adverse movements while preserving upside potential, albeit at a higher cost.
Companies typically hedge when the potential impact of exchange-rate movements on cash flows or margins is considered material. This decision depends on factors such as transaction size, profit margins, risk tolerance, and internal hedging policies.

3.4.3 Timing Risk and Basis Risks

FX hedging strategies are fundamentally time-dependent. Firms hedge expected foreign-currency inflows based on planned shipment dates, contractual payment terms, and historical settlement patterns. Delivery delays disrupt this structure by shifting cash inflows forward in time, often without clear visibility on the new settlement date.[49] This creates timing risk, defined as the risk that the maturity of hedging instruments no longer coincides with the actual receipt of foreign-currency cash flows. When a hedge matures before the underlying payment is received, firms may be forced to close or roll over positions, potentially at unfavorable market rates. Conversely, if payments arrive earlier or later than anticipated, firms may temporarily remain unhedged. Timing risk is particularly problematic in periods of logistics volatility, where delivery delays are uneven and difficult to forecast. Unlike demand shocks, which may be partially anticipated, logistics disruptions often occur exogenously and evolve dynamically, complicating treasury planning and increasing reliance on short-term adjustments.

Beyond timing mismatches, delivery delays introduce basis risk between forecasted and realized cash flows. Basis risk arises when the hedged exposure differs from the actual exposure in terms of amount, timing, or currency composition. In logistics-disrupted environments, the most common

[49] Levi M, International Finance, fourth edition. Part IV Managing Foreign Risk and Exposure, Chapter 12 Hedging Risk and Exposure

source of basis risk is the divergence between expected payment dates and actual settlement dates.

When cash receipts are delayed, the exchange rate prevailing at the time of hedge settlement may differ materially from the rate applicable when cash is ultimately received. Even if the currency pair remains stable on average, this mismatch can generate residual gains or losses that are not offset by the hedge. In effect, firms become exposed to FX movements during the gap between hedge maturity and cash realization.

3.4.4 Limits of Traditional Hedging under Logistics Uncertainty

The presence of persistent logistics uncertainty exposes the structural limits of traditional FX hedging approaches. Crucially, traditional hedging frameworks assume a stable link between commercial operations and financial execution. Settlement dates are expected to fall within relatively narrow windows, allowing hedges to be structured with confidence that financial instruments will mature close to the realization of underlying cash flows. When this assumption holds, hedging is effective in neutralizing transaction exposure and insulating firms from short-term currency volatility. It is precisely this assumption of predictability that is challenged under conditions of logistics disruption. When delivery schedules shift and payment timing becomes uncertain, the alignment between hedging instruments and underlying cash flows weakens, exposing firms to residual FX risk even when hedging policies are correctly implemented.

As a result, firms may be forced to rely on repeated hedge rollovers, partial hedging, or shorter-dated instruments, increasing transaction costs and operational complexity. Alternatively, firms may deliberately leave exposures temporarily unhedged while awaiting clearer visibility on delivery and payment timing, accepting higher FX risk in exchange for flexibility.

These adjustments reflect a broader shift in risk management priorities. Under logistics volatility, firms face a trade-off between hedging precision and adaptability. Traditional instruments remain useful, but their effectiveness depends increasingly on firms' ability to integrate logistics uncertainty into financial planning. This highlights the need for closer coordination between logistics, commercial, and treasury functions, as well as for more flexible risk-management frameworks capable of operating under imperfect information

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3.5 Contractual and Inventory Tools as Financial Risk Management Strategies

In environments characterized by persistent logistics uncertainty, rather than addressing risk solely through financial instruments, companies adjust the structure of commercial agreements and the physical organization of inventories to reduce exposure to payment delays, liquidity stress, and cash-flow volatility.

By reshaping the timing, allocation, and control of cash flows, contractual and inventory decisions influence the scale of working capital absorption and the probability that logistics disruptions translate into financial loss.

3.5.1 Adjustment of Payment Terms and Incoterms

Contractual terms play a central role in determining how logistics-related risk is distributed between exporters and buyers. In response to increased delivery uncertainty, firms may revise contractual clauses, like payment terms and Incoterms, or governing delivery deadlines and acceptance conditions. These adjustments aim to reduce the exporter's exposure to delayed payments or disputes triggered by factors beyond its control.

Regarding the payment terms, exporters may seek to shorten payment periods, introduce partial prepayments, or require payment upon shipment rather than upon delivery. Such adjustments aim to reduce the time during which receivables remain outstanding and vulnerable to logistics-induced delays

In international business, Incoterms (International Commercial Terms) are published by the International Chamber of Commerce (ICC) and define responsibilities for costs and risks in shipping,. Under logistics volatility, however, the choice of Incoterm directly affects working capital absorption, payment risk, and dispute probability.[50]

Given the role of Incoterms in shaping the allocation of logistics responsibilities and financial exposure between exporters and buyers, this thesis examines a subset of delivery terms that are particularly relevant under conditions of logistics disruption[51]:

- EXW (Ex Works) places almost all logistics responsibility on the buyer, as the seller's obligation ends at its own premises. From the seller's perspective, this minimizes exposure to transport delays, insurance costs, and delivery disputes, resulting in low financial risk. However, EXW may be commercially unattractive in international trade, particularly when buyers lack logistics capabilities or bargaining power, potentially limiting market competitiveness.

- FOB (Free On Board) requires the seller to deliver the goods on board the vessel at the named port of shipment. Risk transfers to the buyer once the goods are loaded. FOB is widely used in maritime trade and offers a

[50] International Chamber of Commerce, *Incoterms® 2020 Official Rules*

[51] Ramberg, *ICC Guide to Incoterms*, Chapter 2 The four categories of the Incoterms rules: main components

balanced allocation of responsibilities, but under disrupted logistics conditions it requires careful coordination.

- CIF (Cost, Insurance, and Freight) obliges the seller to arrange and pay for transport and insurance to the destination port, while risk transfers to the buyer once the goods are loaded at origin. This separation between cost responsibility and risk transfer can create ambiguity under logistics disruption. Although the seller provides insurance, coverage is often limited to minimum requirements, leaving buyers exposed to residual risk and increasing the likelihood of disputes when delays or damage occur.

- DAP (Delivered at Place) shifts a larger share of logistics risk to the seller, who remains responsible until the goods reach a specified destination, ready for unloading. Under volatile logistics conditions, this Incoterm significantly increases the seller's exposure to delivery delays, cost overruns, and potential payment disputes. From a financial standpoint, DAP intensifies working capital absorption and heightens the risk that logistics disruptions translate into delayed or contested receivables.

- DDP (Delivered Duty Paid) represents the maximum level of seller responsibility. The seller bears all costs and risks, including import duties and taxes, until delivery at the buyer's premises. While this Incoterm provides maximum protection for the buyer, it exposes the seller to substantial financial risk, particularly under logistics disruption. Delays, regulatory complications, or customs issues can directly affect cash flows, increase financing needs, and elevate the probability of contractual disputes.

Under logistics volatility, the choice of Incoterm directly shapes firms' financial exposure along three interconnected dimensions: working capital absorption, payment risk, and foreign exchange exposure. Incoterms that transfer risk early in the transport chain, such as EXW and, to a lesser extent, FOB, limit the seller's working capital commitment by shortening the period during which

goods remain at the seller's risk and reducing exposure to delivery-related disputes. This earlier risk transfer generally improves cash-flow predictability and confines FX transaction exposure to a more narrowly defined settlement window. By contrast, terms such as CIF introduce a separation between cost responsibility and risk transfer, which may increase payment risk and FX timing uncertainty when delays occur, as sellers continue to bear logistics costs while settlement may be postponed. More delivery-intensive Incoterms, such as DAP and DDP, significantly amplify working capital absorption by extending the period during which inventories and transport costs remain on the seller's balance sheet. At the same time, they heighten exposure to payment delays and contractual disputes, increasing receivables volatility and prolonging the duration of foreign-currency exposure[52].

In this context, Incoterms function not merely as delivery rules, but as implicit financial risk-allocation mechanisms, determining how logistics disruption propagates into liquidity strain, credit risk, and FX hedging complexity.

3.5.2 Risk Reallocation between Exporters and Buyers

Risk reallocation between exporters and buyers does not rely solely on formal contractual clauses. Firms also employ a range of operational and financial techniques that subtly reshape the distribution of logistics, payment, and FX risk within ongoing commercial relationships. These tools are often less visible than guarantees or insurance, but they play a crucial role in managing uncertainty under disrupted logistics conditions.

One key mechanism is the choice of invoice currency. By invoicing in the domestic currency, exporters can transfer FX transaction exposure to the buyer, reducing their own sensitivity to exchange-rate fluctuations and

[52] Ramberg, *ICC Guide to Incoterms*, Chapter 1 Understanding the Incoterms rules and Chapter 5 Role of the Incoterms rules in an international contract of sale

simplifying cash-flow forecasting. Conversely, invoicing in the buyer's currency may improve commercial attractiveness but increases the exporter's exposure to FX risk, particularly when logistics delays prolong the settlement period. Under volatile logistics conditions, invoice currency choice becomes a strategic lever for balancing competitiveness against financial stability.

Firms may also adopt lead–lag strategies, adjusting the timing of payments to manage currency exposure and liquidity risk. By accelerating (leading) or delaying (lagging) settlements, exporters can reduce exposure to unfavorable exchange-rate movements or align cash inflows more closely with financing needs. While such strategies are typically constrained by contractual terms and buyer acceptance, they become more relevant when delivery delays shift the expected timing of payments and disrupt pre-established hedging schedules.

Another important technique is exposure netting, particularly for firms engaged in repeated transactions with the same counterparties or operating across multiple markets. By offsetting receivables and payables denominated in the same foreign currency, firms can reduce the net amount of FX exposure that requires hedging. Under logistics disruption, netting can partially absorb timing mismatches by reducing gross exposure, even when individual transactions settle unpredictably.

Together, these techniques illustrate that risk reallocation is often achieved through day-to-day operational and treasury decisions, rather than through discrete financial contracts alone. By combining contractual adjustments with operational flexibility and internal financial coordination, firms can limit the extent to which logistics volatility translates into liquidity strain, payment disputes, and FX hedging inefficiencies. However, access to these tools remains uneven, as they require bargaining power, recurring trade flows, and internal coordination between commercial, logistics, and treasury functions—capabilities that are more readily available to large firms than to smaller exporters.

3.5.3 Bonded Warehouses and 3PL Hubs as Balance-Sheet Tools

In response to heightened logistics volatility, firms increasingly use bonded warehouses and third-party logistics (3PL) hubs not only as operational solutions, but as instruments of financial and balance-sheet management. By altering where inventories are stored and how they are processed, companies can influence the timing of cash outflows, the stability of receivables, and overall liquidity exposure.

Bonded warehouses are customs-authorized facilities in which imported goods can be stored without immediate payment of duties, VAT, or import taxes[53]. From a financial perspective, this regime allows firms to defer fiscal cash outflows until goods are released for domestic consumption or re-exported. Under logistics disruption, this feature becomes particularly valuable: inventories may arrive earlier than planned or remain unsold for extended periods, and the ability to postpone tax payments helps preserve liquidity while goods are immobilized. In this sense, bonded warehouses act as cash-flow buffers, improving short-term liquidity at the cost of higher inventory holding and storage expenses.

Third-party logistics (3PL) hubs, by contrast, are facilities operated by specialized providers that manage storage, handling, and distribution on behalf of firms. Their financial relevance lies in the conversion of fixed logistics costs into variable costs, allowing firms to scale inventory and distribution capacity

[53] Web Article, CRANE Worldwide Logistic, *What is a Customs Bonded Warehouse?* https://www.craneww.com/knowledge-center/latest-news-and-info/customs-bonded-warehouse/

without committing capital to owned infrastructure[54]. By positioning inventory closer to final markets, 3PL hubs enable firms to decouple downstream delivery performance from upstream transport disruptions, reducing the likelihood that logistics delays translate into late delivery penalties, contractual disputes, or payment delays.

From a balance-sheet perspective, both bonded warehouses and 3PL hubs increase capital tied up in inventory, extending the cash conversion cycle and intensifying working capital absorption. At the same time, they reduce the probability of more severe financial outcomes, such as receivables impairment or non-payment triggered by delivery failures. These strategies therefore function as financial shock absorbers: they stabilize operations and cash flows, but do so by shifting risk onto the balance sheet in the form of higher inventory investment.

Overall, bonded warehouses and 3PL hubs illustrate how inventory location decisions become a form of implicit financial risk management under logistics uncertainty. While they cannot eliminate disruption, they can significantly limit its transmission into acute payment risk and cash-flow instability, reinforcing the close interdependence between logistics configuration and financial resilience.

[54] Web Article, DHL, *What is 3PL "logistics?"* https://www.dhl.com/it-en/microsites/supply-chain/fulfillment-network/knowledge-hub/what-is-3pl-logistics.html

Chapter 4.
Firm Size, Financial Structure, and Asymmetric Impact: Large Firms vs SMEs

Chapters 2 and 3 have established, respectively, the nature of recent logistics disruptions affecting international trade routes and the financial transmission mechanisms through which these disruptions impact firms' balance sheets. Building on this analytical foundation, Chapter 4 shifts the focus from how logistics shocks affect financial variables to why these effects differ systematically across firms. The chapter adopts a comparative perspective to investigate the sources of asymmetry in firms' financial resilience, with particular attention to differences between small and medium-sized enterprises (SMEs) and large firms.

Logistics disruptions do not operate in a vacuum. Their financial consequences are mediated by firm-specific characteristics that shape the capacity to absorb, redistribute, or mitigate external shocks. Among these characteristics, firm size, organizational complexity, governance structures, and exposure to the Italy–China trade corridor emerge as key conditioning variables.

The chapter argues that asymmetry arises not because firms face different shocks, but because they face them with unequal financial architectures. Large firms typically benefit from greater financial depth, diversified funding sources, and sophisticated internal governance, allowing them to internalize volatility through liquidity reallocation or margin adjustments. SMEs, by contrast, often operate with limited liquidity buffers, concentrated exposures, and constrained access to credit, rendering them more vulnerable to prolonged logistics inefficiencies. These differences become particularly salient in long-distance

and institutionally complex trade corridors such as Italy–China, where extended transit times and regulatory burdens amplify pre-existing fragilities.

Within this framework, Chapter 4 pursues two closely related objectives. First, it explains why the financial effects of logistics disruptions are unevenly distributed across firms, emphasizing the role of size and organizational structure in shaping resilience. Second, it critically assesses whether financial instruments can fully neutralize logistics-induced financial stress, or whether residual vulnerabilities persist despite the availability financial tools.

4.1 Structural Determinants of Asymmetric Firm Resilience

Firm resilience is conditioned first by scale and institutional classification. The distinction between small and medium-sized enterprises (SMEs) and large firms, as defined under European institutional standards, reflects more than quantitative thresholds. It captures differences in organizational scope, subsidiary networks, and geographic diversification that influence how firms interact with global markets. Second, financial depth plays a central role. Liquidity buffers, funding diversification, and access to credit determine whether firms can sustain temporary increases in working capital requirements without experiencing financial strain. Finally, governance structures and organizational complexity affect the ability to coordinate responses across operational and regulatory domains, particularly in the context of international trade.

Taken together, these structural features define the baseline conditions under which logistics disruptions unfold. Larger and more diversified firms often possess internal mechanisms that allow shocks to be managed as temporary imbalances, whereas smaller firms operate closer to financial constraints and are therefore more vulnerable to prolonged uncertainty.

4.1.1 Firm Size Classification and Organizational structure under European Institutional Standards

Firm size classification is commonly based on a combination of quantitative thresholds and organizational characteristics, though no single universal standard governs all jurisdictions. Within the European Union, firms are typically categorized according to the European Commission definition, which classifies small and medium-sized enterprises (SMEs) as firms employing fewer than 250 persons, with an annual turnover not exceeding €50 million or a balance-sheet total below €43 million. Within this group, small enterprises employ fewer than 50 workers, while micro-enterprises employ fewer than 10. Medium-sized enterprises occupy an intermediate position, often combining export activity with limited organizational complexity. By contrast, large firms exceed these thresholds and are usually characterized by a high number of employees, extensive subsidiary networks, and geographically diversified operations. Multinational enterprises frequently operate through dozens or even hundreds of subsidiaries across multiple jurisdictions, enabling centralized treasury management, risk diversification, and internal capital reallocation.

While international accounting standards such as IFRS establish rules for consolidation, reporting, and transparency, they do not regulate the extent of firms' operational or geographic diversification. The degree of diversification remains a strategic choice influenced by financial capacity, governance structures, and access to international markets rather than by binding institutional norms. As a result, firms facing similar external conditions may display markedly different internal configurations, reinforcing the structural

asymmetries between SMEs and large firms that condition their resilience to logistics disruptions in global trade[55]

4.1.2 Financial Depth, Liquidity Buffers, and Access to Credit

Differences in firm size and organizational structure emerge most clearly in the way firms finance their activity and manage liquidity over time. Financial depth is not only a matter of scale, but of flexibility: it reflects how easily a firm can absorb temporary imbalances without altering its operations. When logistics disruptions prolong transit times or delay cash inflows, this flexibility becomes a decisive factor in determining whether the shock remains manageable or evolves into financial strain.

Large firms generally operate with a degree of financial slack that allows them to accommodate disruptions without immediate pressure. Groups such as De'Longhi manage liquidity through centralized treasury structures, which make it possible to offset localized cash shortfalls with internal resources. In practice, this means that longer shipping times or temporary inventory accumulation can be absorbed through internal liquidity reallocation or short-term margin adjustments. Financial stress is therefore contained within the organization and does not immediately affect access to external funding.

For SMEs, the situation is structurally different. Liquidity is closely tied to operating cash flow, and external finance is typically concentrated in short-term bank credit. When deliveries are delayed or payments postponed, cash becomes immobilized in inventories and receivables, leaving little room for adjustment.

[55] European Commission, Commission Recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, Official Journal of the European Union, L 124, 20 May 2003.

Access to credit further accentuates these differences. Large firms benefit from long-standing relationships with financial institutions and, in many cases, from access to capital markets, which allows funding conditions to remain stable even during periods of heightened uncertainty. SMEs, by contrast, are more exposed to shifts in bank risk assessments. As logistics disruptions increase cash-flow volatility, financing terms may tighten at precisely the moment when additional liquidity is needed. While this does not necessarily lead to immediate financial distress, it reduces firms' ability to respond flexibly to prolonged disruptions and reinforces the asymmetric effects that become particularly visible in complex trade corridors such as Italy–China.

4.1.3 Governance, Compliance, and Organizational Complexity

Beyond financial resources, firms' ability to withstand external shocks is strongly influenced by their governance structures and organizational capacity. Governance determines how risks are identified, monitored, and addressed, while organizational complexity shapes how quickly information and decisions circulate within the firm. These elements do not eliminate logistics disruptions, but they condition how effectively firms can respond when disruptions occur.

Examining the example of De Longhi, it's clear that governance frameworks are designed to support complex and geographically dispersed operations. Large firms like this can rely on strong compliance units with risk management functions, with internal control systems that continuously monitor operational and regulatory exposure. When logistics frictions arise, responsibilities are clearly defined and responses can be coordinated across financial and legal departments. This organizational depth allows disruptions to be addressed as managed risks rather than as unexpected shocks.

The situation differs markedly for SMEs and for mid-sized exporters that, despite strong market positioning, operate with more concentrated governance structures. In SMEs managerial oversight is often centralized, and compliance or risk management activities are integrated into broader operational roles rather than delegated to specialized units. While this structure supports flexibility and entrepreneurial decision-making, it limits the capacity to absorb the fixed costs associated with complex regulatory environments and extensive documentation requirements. In the presence of logistics disruptions, coordination challenges may emerge as financial, operational, and contractual issues accumulate simultaneously.

These governance and organizational differences also affect internal coordination. Large firms benefit from established procedures and information systems that facilitate real-time communication across functions and subsidiaries, ensuring alignment between operational decisions and financial constraints. Smaller firms often lack comparable integration, making it more difficult to respond coherently when disruptions persist. In this sense, governance and organizational complexity do not merely reflect firm size; they actively shape the way logistics disruptions translate into firm-level vulnerability.

4.2 Exposure to the Italy–China Trade Corridor as a Risk Amplifier

Firm-level asymmetries outlined in Section 4.1 become particularly pronounced when firms operate along structurally demanding trade corridors. Among these, the Italy–China route represents a distinctive case due to its geographic distance, and institutional and regulatory complexity.

4.2.1 Structural and Institutional Complexity of the Italy–China Corridor

Trading between Italy and China entails a level of complexity that extends well beyond physical distance. Transit times are long even under normal conditions, and disruptions such as rerouting or port congestion can further lengthen delivery schedules. As already examined in chapter 3, these delays have direct implications for inventory management, payment timing, and working capital absorption.

In addition to distance, firms face a dense regulatory environment. Product certification and documentation requirements are often more demanding than in intra-European trade, often requiring the support of customs agents and legal advisors. Enforcement mechanisms differ substantially from European standards, increasing uncertainty in the event of disputes or delayed payments. Foreign exchange exposure further complicates transactions, as contracts are frequently denominated in renminbi or U.S. dollars, introducing volatility that must be managed alongside operational risks.

The complexity of the Italy–China trade corridor also interacts with the internal organization of firms along global value chains. Insights from the framework developed by Antràs and Chor help explain why prolonged logistics delays and uncertainty amplify asymmetries between firms of different size and productivity. In sequential production processes, disruptions in upstream stages affect investment incentives throughout the chain, shaping firms' decisions between vertical integration and arm's-length contracting. More productive firms, in particular, are better able to amortize the fixed costs

associated with integrating suppliers and are therefore more likely to internalize stages of production that smaller firms can only profitably outsource[56].

This productivity channel implies that integration choices are not uniform within an industry. When inputs behave as sequential substitutes, more productive firms display a stronger tendency to integrate downstream stages, thereby preserving control over final adjustments. When inputs are sequential complements, however, more productive firms are more inclined to integrate upstream stages, where coordination is critical to sustain investment incentives along the chain. In the context of long-distance trade with recurrent logistics delays, such as the Italy–China corridor, firms with higher productivity and organizational depth can reconfigure their value chains and internalize critical stages, limiting the propagation of disruptions. Smaller or less productive firms remain dependent on contractual relationships that are more exposed to coordination frictions, reinforcing the asymmetric effects identified in this chapter.

Taken together, these elements make the Italy–China corridor a stress-testing environment for exporters. Even in the absence of acute disruptions, the corridor requires firms to sustain longer financial exposure and manage regulatory complexity, operating under heightened informational and contractual uncertainty.

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[56] Antràs and Chor (2013) develop a model of global value chains in which production is organized as a sequence of stages, each requiring relationship-specific investments by suppliers. The model shows that a firm's optimal choice between vertical integration and outsourcing depends on how investments at different stages interact. When stages are sequential complements, outsourcing upstream suppliers can strengthen their incentives to invest; when stages are sequential substitutes, integration of upstream stages becomes optimal to preserve overall efficiency. In contexts characterized by high uncertainty and coordination frictions, such as long-distance trade with frequent logistics disruptions, this framework helps explain why firms with greater integration capacity are better able to manage risk and maintain investment incentives along the value chain.

4.2.2 Large Firms: Diversification and Risk Redistribution Capacity

For large firms, exposure to the Italy–China corridor is mitigated by scale and diversification. Usually big multinational enterprises typically operate across multiple logistics routes and serve a wide range of international markets. Their product portfolios are also broader and more diversified than those of small and medium-sized enterprises. This diversification allows them to redistribute risk geographically and operationally, reducing dependence on any single corridor or product lines.

Among large Italian manufacturing firms, De'Longhi represents a relevant example of a diversified multinational enterprise operating across multiple markets and product categories. Founded in Italy and listed on the Milan Stock Exchange, De'Longhi has evolved into a global player in the small domestic appliances sector, with operations spanning Europe, Asia, and the Americas. The company distributes its products in over one hundred countries and manages a complex international network of subsidiaries, production facilities, and distribution platforms. From an operational perspective, De'Longhi combines geographic diversification with a broad product portfolio that includes coffee machines, kitchen appliances, comfort products, and household electronics. This diversification reduces dependence on any single market or logistics corridor and allows the firm to redistribute operational and commercial risk across regions and product lines. The scale of its operations and the breadth of its international presence provide a level of financial and organizational resilience that distinguishes it from small and medium-sized exporters operating in more concentrated segments.

Corporate disclosures provide direct evidence of how large multinational firms interpret and respond to global uncertainty. The strategic response of large multinational firms to geopolitical and trade disruptions provides concrete evidence of organizational resilience. In its annual report, De'Longhi links global

economic slowdown directly to trade tensions, tariffs, supply chain pressures, and currency volatility, highlighting how these factors shaped corporate decision-making.

> *"The uncertainties relative to trade and tariffs caused by US policies, the ongoing pressure on the supply chain, the geopolitical tensions and currency volatility impacted world trade resulting in a generalized, global economic slowdown. In this context, the Group reacted by increasing the flexibility of its production platforms and strengthening partnerships with key suppliers to address uncertainties arising from the current geopolitical landscape and minimize the impact of tariff policies."*[57]

This response illustrates how diversified multinational firms transform external shocks into organizational adjustments rather than immediate financial constraints. Borsa Italiana commented on the positive results of De'Longhi Group, stating that from a geographical perspective, revenue expansion was broadly balanced across regions, with Europe growing by 9.1 per cent and the Asia-Pacific region by 10.8 per cent, largely supported by strong performance in China[58].

Tab 4.1 Statement of Financial Position, De'Longhi Group.

(€/million)	30.06.2025	30.06.2024	31.12.2024
Net working capital	58.0	1.6	(96.9)
Net operating working capital	208.3	138.6	84.9
Net operating working capital/Revenues	5.7%	4.3%	2.4%
Net capital employed	1,660.7	1,702.8	1,621.2
Net financial assets	345.8	305.3	643.2
of which:			
- net bank financial position	*475.2*	*408.7*	*746.1*
- other financial receivables/(payables)	*(129.4)*	*(103.4)*	*(102.9)*
Net equity	2,006.5	2,008.1	2,264.4

[57] Interim Financial Report at 30 June 2025, De'Longhi Group

[58] Borsa Italiana https://www.borsaitaliana.it/borsa/notizie/teleborsa/finanza/de--longhi-ricavi-a-38-miliardi-nel-2025-87-confermata-guidance-sugli-utili-225_2026-01-28_TLB.html?

This geographic diversification underscores the firm's exposure to multiple markets while also highlighting the strategic relevance of the Chinese market within its global portfolio.

According to De'Longhi's interim financial report to June 2025, net operating working capital increased to €208.3 million, reflecting higher inventory levels due to early stockbuilding in key markets, while trade receivables were managed through reduced collection periods, highlighting active working capital management in a logistics-intensive environment.

The company's annual reports emphasize disciplined working capital management as a central component of financial strategy. Given the seasonal nature of demand in several product segments, fluctuations in inventory levels and receivables are structurally embedded in the business model. De'Longhi manages these variations through continuous monitoring of inventory turnover, collection periods, and payment terms to suppliers. This active management of net working capital enables the firm to absorb temporary increases in inventory or delayed cash inflows without generating immediate liquidity stress.

When disruptions occur, large firms can draw on alternative sourcing strategies, reroute shipments, or adjust inventory policies across regions. Financially, they are better positioned to absorb prolonged cash conversion cycles, as exposure to China represents only a portion of a broader portfolio of activities. Organizationally, established governance structures facilitate coordination between financial and legal functions, enabling a managed response to regulatory or contractual challenges. In this context, the Italy–China corridor does not disappear as a source of risk, but it becomes one risk among many, embedded within a diversified operational framework. Scale does not eliminate exposure, but it transforms it into a manageable component of overall business risk.

4.2.3. SMEs: Liquidity Fragility and Buyer Concentration in China

For SMEs, the same corridor presents a fundamentally different risk profile. Export activity is often concentrated on a limited number of foreign markets, and China may represent a significant share of total international sales. This concentration magnifies exposure to corridor-specific disruptions, as delays or payment issues cannot be easily offset through diversification.

Liquidity fragility further intensifies this vulnerability. As shipments to China involve long transit times and extended payment terms, SMEs must finance inventories and receivables for prolonged periods. When disruptions occur, cash remains tied up for longer than anticipated, placing pressure on working capital and increasing reliance on external credit. Buyer concentration compounds the problem, as dependence on a small number of Chinese counterparties reduces bargaining power and limits flexibility in renegotiating terms. These dynamics create a situation in which logistics disruptions along the Italy–China corridor translate rapidly into financial stress for smaller exporters. Unlike large firms, SMEs lack the organizational and financial capacity to redistribute risk, making exposure both deeper and more persistent.

While large multinational firms can redistribute operational risk across multiple markets and logistics corridors, smaller and mid-sized exporters often operate with a more concentrated exposure structure. The case of Brunello Cucinelli illustrates how geographic specialization and product focus may amplify vulnerability along complex trade routes such as Italy–China. The company, operating within the high-end luxury segment and based in Solomeo, aims to increase China's contribution to total revenues from the current 13% to 16% within the next three to four years, thereby achieving a balanced geographic exposure of approximately 33% each across Europe, the Americas, and Asia. This growth strategy is expected to be supported by a deeper understanding of Chinese culture and an expansion of production capacity. Banca Akros

noted that Brunello Cucinelli's exposure to the Asian market currently stands at around 27%, compared to an industry average of approximately 41%, commenting on a recent management update[59]. Brunello Cucinelli, although internationally recognized and listed on the Italian stock exchange, remains structurally smaller than diversified industrial conglomerates. Its revenue base is more concentrated across selected premium markets, and China represents a strategically significant component of its international expansion. The company's growth strategy relies heavily on direct retail presence and strong relationships with local partners, making sales performance closely tied to regional demand conditions and regulatory environments.

Small and medium-sized agri-food exporters illustrate particularly clearly how exposure to distant markets such as China can generate structural liquidity fragility. A relevant example within the Italian agri-food sector is Arborea, a dairy cooperative based in Sardinia and active in milk and dairy production. Unlike large multinational food conglomerates, Arborea operates primarily through a cooperative model that integrates local agricultural producers into a vertically coordinated supply chain. While the company has developed export channels, including extra-European markets, its production base and governance structure remain regionally concentrated.

In 2019, the company pursued further expansion toward Chinese cities, leveraging the positive performance previously achieved in other Asian markets, like Vietnam and Malaysia, as well as the solid results recorded in Shanghai, where the company operates through a dedicated marketing and distribution subsidiary, *Arborea Trading Shanghai*. In the first months of the year, international exports grew by 64%, underscoring both the strategic relevance of Asian markets and the firm's increasing exposure to long-distance

[59] Web Article, Camurati F, "*Cucinelli spinge sulla Cina, nonostante le tensioni sui dazi*" https://www.classxhsilkroad.it/news/azienda-manifatturiero/cucinelli-spinge-sulla-cina-nonostante-le-tensioni-sui-dazi-202506031806129175

trade corridors[60]. Although internationally active, Arborea does not possess the structural diversification of larger industrial conglomerates and operates within a concentrated product segment, relying on maritime shipping to reach China. Exports to this market involve extended transit times, customs clearance procedures, sanitary compliance requirements, and distributor-based payment structures. Each of these elements contributes to lengthening the cash conversion cycle. In the agri-food sector, these characteristics are particularly relevant. Moreover, food products are inventory-intensive and subject to shelf-life constraints, which increase the financial cost of delays. This structure creates a form of liquidity fragility that differs qualitatively from the position of large multinational firms. Whereas diversified enterprises can redistribute cash across subsidiaries or absorb temporary working capital spikes through internal treasury mechanisms, smaller exporters operate with narrower financial margins. For a firm of this scale, prolonged logistics disruptions along the Italy–China corridor translate directly into higher working capital absorption and tighter liquidity management. Remigio Sequi, CEO of Arborea, stated that in 2024, the company faced a surplus of 20% for logistic costs, related to maritime transportation and the latest European policy on ETS[61].

Unlike large diversified firms, Arborea cannot easily offset corridor-specific disruptions through cross-market reallocation or product diversification. Its exposure to China therefore represents not merely a growth opportunity, but also a source of financial sensitivity, illustrating how corridor complexity interacts with firm scale to amplify liquidity fragility.

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[60] De Ciglia, Web Article, "*Arborea porta la sfida del latte sul mercato cinese"*, La Repubblica

[61] Web Article, Arborea https://www.arborea1956.com/ufficio-stampa/caro-energia-e-caro-traghetti/

4.3 Logistics Disruptions and Financial Exclusion Risks

The asymmetries described in the previous sections become most visible when logistics disruptions persist over time. While the financial transmission mechanisms are common to all firms, their outcomes are not. Differences in size, organizational capacity, and exposure to the Italy–China trade corridor determine whether logistics shocks are absorbed as temporary frictions or translated into cumulative financial constraints. As repeatedly highlighted in firm-level surveys by the Bank of Italy, periods of heightened uncertainty tend to exacerbate pre-existing asymmetries in access to finance, even in the absence of generalized financial distress.

Taken together, these mechanisms illustrate how logistics disruptions function as a source of financial exclusion risk. The exclusion is rarely immediate or explicit; rather, it emerges through tighter credit conditions, immobilized liquidity, and constrained investment capacity. In this sense, logistics disruptions act as non-tariff barriers that disproportionately affect smaller and less diversified firms, reinforcing the asymmetries identified in the previous sections.

4.3.1 Credit Tightening and Rising Cost of Capital

One of the first channels through which logistics disruptions affect firms asymmetrically is access to credit. As delays increase cash-flow volatility and working capital requirements, lenders reassess firm risk profiles. For large firms, diversified operations and stable financial structures generally allow credit conditions to remain broadly unchanged. Temporary liquidity needs are interpreted as manageable fluctuations rather than as signs of structural weakness. For SMEs, the same dynamics can trigger credit tightening. Extended transit times and delayed payments weaken short-term financial indicators, precisely those used by banks to assess creditworthiness.

To prove the value of this thesis's we can look at the Financially Stability Report from the Bank of Italy of 2022. In the section regarding the risks to banks' assets deriving from the war in Ukraine, it's stated that the total exposure hold by Italian banks in the form of loans, securities, derivatives and guarantees to counterparties resident in Russia, Belarus and Ukraine have been subjected to economic sanctions. At the end of 2021 these exposures reached €29.1 billion. A second channel through which the effects of the conflict may be transmitted to the quality of Italian banks' assets concerns the difficulties faced by firms exporting in the areas related to the conflict in repaying their loans. Firms deriving at least 10 per cent of their revenues from these countries experienced a decline in sales that impaired their repayment capacity. At the end of 2021 around 1,500 firms had outstanding loans from Italian banks amounting to €4.6 billion, corresponding to approximately 0.5 per cent of total corporate lending. For the banking system as a whole, this exposure remained limited. Notably, around half of these firms, accounting for roughly half of the related lending, were classified in the highest credit quality categories, a share higher than that observed for the broader population of firms[62].

Evidence from the Bank of Italy indicates that smaller firms are more exposed to pro-cyclical adjustments in lending conditions, facing higher interest rates or reduced credit availability, specially during period of operational instability and logistic disruptions. While larger firms find it easier to finance relaxed credit and inventory policies, smaller firms are less able to issue commercial paper or negotiate lines of credit. With fewer ways to finance receivables, smaller firms rely on factoring more than large firms As a result, the cost of capital rises not because firms become fundamentally riskier, but because logistics disruptions increase perceived volatility.

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[62] Financial Stability Report 2022, Bank of Italy
https://www.bancaditalia.it/pubblicazioni/rapporto-stabilita/2022-1/en_FSR_1_2022.pdf?language_id=1

4.3.2 Cash Trapped in Transit and Receivables

Positive operating cash flow allows firms to internally finance their working capital needs, reducing reliance on external funding. When firms generate sufficient cash from operations, they can sustain higher levels of inventories and receivables without increasing financial vulnerability. This enables a more conservative working capital strategy, which in turn supports operational continuity and facilitates future sales growth. By contrast, firms with negative operating cash flows must rely on external sources of financing to cover working capital requirements. This dependence increases exposure to credit conditions and financing costs, potentially constraining growth when external funding becomes more expensive or less available.[63] Logistics disruptions alternate the equilibrium of working capital, affecting firms through the immobilization of cash. Longer voyages, port congestion, and rerouting extend the time goods spend in transit, delaying invoicing and payment. At the same time, inventories remain on balance sheets for longer periods, absorbing liquidity without generating immediate returns.

Large firms are generally able to accommodate this temporary immobilization through internal liquidity buffers or treasury reallocation. For SMEs, however, cash trapped in transit and receivables rapidly becomes a binding constraint. According to the OECD, prolonged cash conversion cycles are a major source of vulnerability for smaller exporters engaged in long-distance trade, as working capital is absorbed for longer than anticipated. What begins as an operational delay thus evolves into a structural liquidity problem, particularly along corridors such as Italy–China where exposure per shipment is high.

[63] Hill, Kelly and Highfield, *Net Operating Working Capital Behavior,*2010. Section B Ability to Finance Operating Working Capital, Paragraph 1 Operating Cash Glow

4.3.3 When is a Firm classified with Financial Distress?

The asymmetric effects of logistics disruptions become particularly relevant when firms approach a threshold of financial vulnerability that can be formally classified as financial distress. Financially distressed firms are characterized by limited financial slack and reduced cash-generating capacity. Under such conditions, firms often adjust their operating policies in order to preserve liquidity. This may involve accelerating the collection of receivables, tightening credit terms offered to customers, liquidating inventories, or stretching payment terms with suppliers. While these measures can temporarily relieve liquidity pressure, they may also weaken commercial relationships and reduce future growth potential.

Empirical evidence suggests that financial distress is closely associated with reductions in trade credit and working capital investment. Molina and Preve (2012) show that financially distressed firms maintain significantly lower levels of trade credit compared to non-distressed firms, reflecting constrained access to external financing and reduced bargaining power. Consistent with this perspective, working capital requirements are expected to be inversely related to financial distress: as firms face increasing financial strain, they reduce working capital commitments in order to preserve cash[64].

Following Molina and Preve, a firm is classified as financially distressed when two conditions are simultaneously satisfied. First, the firm must exhibit difficulty in covering interest payments. This is measured through an interest coverage ratio, defined as operating income before depreciation divided by interest expense. A firm meets this condition if the ratio is below one for two consecutive years, or below 0.80 in any single year. Second, the firm must be

[64] Molina and Preve, *An Empirical Analysis of the Effect of Financial Distress on Trade Credit,* 2012. Chapter 4 Cross Sectional Variations of the Response of Trade Credit to Financial Distress

over-leveraged relative to its industry peers. A firm is considered over-leveraged if its leverage ratio falls within the top two deciles of its industry's leverage distribution in a given year. When both criteria are met, an indicator variable ($Distress_{t-1}$) is assigned a value of one; otherwise, it equals zero[65].

This definition provides a structured way to identify firms that have moved beyond temporary liquidity stress into a state of structural financial vulnerability. In the context of this chapter, it allows for distinguishing between firms that absorb logistics disruptions through adjustment mechanisms and those for whom prolonged operational frictions contribute to a measurable deterioration in financial stability.

[65] Hill, Kelly and Highfield, *Net Operating Working Capital Behavior,*2010. Section B Ability to Finance Operating Working Capital, Paragraph 5 Financial Distress

Conclusion

The analysis developed in the previous sections raises a central question for both firms and policymakers: can financial instruments fully offset the financial consequences of logistics disruptions, or do residual constraints persist despite their use? The answer emerging from this thesis is necessarily nuanced. Financial instruments play a critical role in mitigating logistics-induced stress, but their effectiveness is partial, conditional, and unevenly distributed across firms.

A wide range of instruments is available to exporters facing heightened uncertainty, including export credit insurance, factoring, forfaiting, public guarantees, and hedging tools. These mechanisms are effective in addressing specific dimensions of risk, particularly counterparty default, liquidity shortages, and exchange-rate volatility. Institutions such as SACE and multilateral frameworks supported by the OECD have significantly expanded the availability of such instruments, especially in response to recent global shocks. However, these tools primarily operate by redistributing financial risk, rather than by eliminating the underlying operational constraints generated by logistics disruptions.

For large firms, this distinction is often manageable. As shown in Sections 4.1 and 4.2, diversified operations, strong governance, and deep liquidity buffers allow financial instruments to complement internal shock-absorption mechanisms. Insurance coverage, supply-chain finance, and public guarantees can smooth cash flows and stabilize funding conditions while firms adjust routes, inventories, or sourcing strategies. In this context, financial instruments are frequently sufficient to prevent logistics disruptions from translating into binding financial constraints, even when disruptions persist over time.

For SMEs, the picture is more complex. Access to financial instruments is often conditional on buyer quality, transaction size, or balance-sheet strength, precisely the dimensions that are weakened by prolonged logistics disruptions. Factoring and insurance may be unavailable or costly when receivables are concentrated or when delivery delays increase uncertainty. Public guarantees can alleviate credit constraints, but they do not shorten transit times, accelerate payments, or reduce working-capital absorption. As a result, SMEs may remain exposed to liquidity stress even when formal mitigation tools are in place. Financial instruments reduce the severity of the shock, but they do not fully neutralize its structural effects.

From a conceptual perspective, this implies that financial instruments function as risk transformers rather than risk erasers. They shift exposure across actors and over time, but they cannot fully compensate for prolonged disruptions in physical trade flows. When logistics inefficiencies persist, especially along complex corridors such as Italy–China, residual vulnerabilities remain embedded in firms' cash conversion cycles and investment decisions. These residual effects are not evenly distributed and tend to reinforce the asymmetries identified throughout this chapter.

The central conclusion of Chapter 4 is therefore clear. Financial instruments are necessary but not sufficient to neutralize the financial consequences of logistics disruptions. Their effectiveness depends on firm size, organizational capacity, and exposure structure. While large firms can often integrate financial mitigation into a broader resilience strategy, SMEs face persistent constraints that limit the extent to which finance can substitute for reliable logistics. In this sense, logistics disruptions continue to act as selective, non-tariff barriers to trade, shaping participation in global markets even in the absence of overt financial distress.

The analysis conducted in Chapter 4 suggests that logistics disruptions generate structurally asymmetric financial effects that cannot be fully

neutralized by firm-level strategies alone. These asymmetries have implications for public institutions involved in trade policy, export credit support, and financial intermediation. While existing frameworks provide important mitigation tools, their effectiveness varies systematically with firm size, organizational capacity, and exposure structure.

At the European Union level, the findings highlight the importance of treating logistics resilience as a component of competitiveness policy rather than as a purely operational concern. Prolonged logistics disruptions function as de facto non-tariff barriers, disproportionately affecting smaller exporters. Policy initiatives aimed at strengthening supply chain resilience, improving transparency along strategic corridors, and simplifying regulatory procedures for extra-EU trade could reduce the amplification of firm-level vulnerabilities. In this context, the role of the European Commission is central in coordinating trade facilitation measures and aligning them with SME-support instruments.

Export credit agencies (ECAs) play a critical role in mitigating financial risk, but the analysis suggests that their instruments are more effective at addressing payment and credit risk than at compensating for prolonged logistics delays. Agencies such as SACE provide essential support through insurance and guarantees, yet access to these tools often depends on transaction size, buyer quality, and firms' financial standing. As a result, smaller exporters may benefit less from existing schemes, even when formally eligible. This points to a potential gap between the availability of risk-mitigation instruments and their practical accessibility for SMEs operating along complex trade corridors.

From the perspective of the banking system, logistics disruptions raise challenges related to credit assessment and pro-cyclicality. As shown in the chapter, increased cash-flow volatility and longer cash conversion cycles can lead to tighter lending conditions for smaller firms, even in the absence of deteriorating fundamentals. Prudential frameworks and supervisory practices, shaped at both national and European levels, influence how banks adjust credit

conditions in response to operational uncertainty. In this respect, the role of institutions such as the European Central Bank and the Bank of Italy is relevant in balancing financial stability objectives with the need to avoid reinforcing structural asymmetries in access to finance.

Overall, the policy implication emerging from Chapter 4 is not that existing instruments are ineffective, but that their impact is uneven. Financial and institutional support mechanisms mitigate logistics-induced stress, yet they do not fully offset the disadvantages faced by smaller and less diversified firms. Addressing these asymmetries may therefore require a more integrated approach, combining logistics resilience, trade facilitation, and financial support, particularly for firms exposed to long-distance and institutionally complex trade corridors such as Italy–China.

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