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The Motorway Industry In Italy

Privatization, Regulation, and Technical Progress.

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Abstract

This thesis delves into the transformative journey of the motorway industry in Italy, spanning the years from 1992 to 2023. This period is marked by substantial regulatory changes, widespread privatization, and significant technical advancements. The primary aim of this study is to examine how these factors have collectively influenced the industry's performance and evolution.

Employing a mixed-methods approach, this research integrates both qualitative and quantitative data. Data collection was primarily conducted through an exhaustive review of AISCAT documents and the annual balance sheets of motorway companies. The gathered data was meticulously analyzed using advanced econometric software, ensuring robust and precise estimations.

The core of the analysis is built upon an original dataset encompassing 25 Italian motorway concessionaires. The results of the econometric estimations provide compelling evidence of significant technical progress within the sector over the past three decades. Furthermore, the findings highlight the presence of sizeable economies of density and scale, suggesting that larger firms benefit from cost advantages associated with increased traffic volumes and network size.

A critical component of the study is the comparative analysis between privately-owned and publicly-owned motorway firms. This analysis reveals noteworthy differences in operational efficiency and productivity, with private firms often outperforming their public counterparts. These differences are attributed to factors such as managerial practices, investment strategies, and regulatory environments.

The conclusions drawn from this research offer valuable insights for a range of stakeholders, including policymakers, industry regulators, and private investors. The study underscores the importance of continued investment in technological advancements and infrastructure development to maintain and enhance the efficiency of the motorway network. Additionally, the findings suggest that privatization, when effectively regulated, can lead to improved performance and innovation within the sector.

Ultimately, this thesis contributes to the broader understanding of the impacts of privatization and regulation on the motorway industry. It provides a comprehensive overview of the sector's evolution and offers practical recommendations for future policy and investment decisions.

Keywords: motorway industry, Italy, privatization, regulation, technical progress, econometric analysis, economies of scale, public vs private ownership, infrastructure development

Introduction

Italy boasts one of the most extensive and historically significant motorway networks globally, known as the autostrade. This network spans approximately 7,016 kilometers, comprising various types of roads catering to the nation's vehicular traffic needs. Notably, the infrastructure includes 13 motorway spur routes, extending an additional 355 kilometers. The autostrade system showcases diverse configurations, with sections featuring three, four, or even five lanes per carriageway, reflecting the network's adaptability to differing traffic demands. Moreover, Italian motorways exhibit a density of approximately 22.4 kilometers per 1,000 square kilometers of territory, underscoring their strategic significance in the country's transportation landscape.

Historically, Italy pioneered the concept of motorways dedicated solely to fast traffic and motor vehicles, setting a precedent for global transportation infrastructure development. The inception of the Autostrada dei Laghi in 1924, linking Milan to Lake Como and Lake Maggiore, marked a revolutionary milestone in modern transportation engineering. Spearheaded by Piero Puricelli, this visionary project laid the groundwork for subsequent advancements in motorway construction and management practices worldwide.

The management and operation of Italian motorways primarily fall under the purview of various concessionaire companies, each tasked with ensuring the network's efficiency and safety. Notably, Autostrade per l'Italia, under the auspices of Cassa Depositi e Prestiti, oversees tollways in North and Central Italy, exemplifying a collaborative approach between public and private entities in infrastructure governance. Additionally, a plethora of operators, including ASTM, ATP, and Autostrade Lombarde, play integral roles in maintaining and enhancing the motorway infrastructure across different regions.

Central to the functioning of Italian motorways is the toll collection system, which facilitates revenue generation for maintenance and future investments. Toll collection methods, ranging from closed motorway systems based on distance traveled to open systems with fixed tariffs, underscore the network's adaptability to diverse user needs. Furthermore, advancements in electronic tolling technology streamline the payment process, enhancing user convenience and operational efficiency.

Regulatory frameworks, embodied in legislative decrees and traffic codes, delineate the criteria for motorway classification and govern concession agreements between public authorities and private operators. Notably, Legislative Decree no. 50/2016 delineates the allocation of operational and traffic risks between contracting authorities and private entities, ensuring equitable distribution of responsibilities.

However, challenges such as unforeseen events and fluctuating demand, exemplified by the COVID-19 pandemic, underscore the need for dynamic regulatory mechanisms to address evolving transportation dynamics. Moreover, recent legislative amendments, such as those pertaining to tariff adjustments, aim to enhance transparency and accountability in motorway management practices.

In conclusion, the Italian motorway network epitomizes a harmonious interplay between historical legacy, technological innovation, and regulatory governance. As a cornerstone of the nation's transportation infrastructure, it continues to evolve in response to societal needs and emerging challenges, embodying Italy's commitment to excellence in transportation engineering and management.

1. The Importance of the Italian Motorway Industry

Economic Significance and Infrastructure Development

The Italian motorway sector is a cornerstone of the nation's infrastructure, playing a critical role in economic development and regional integration. Its importance is multifaceted, encompassing economic, social, and strategic dimensions.

The motorway sector is a major contributor to the Italian economy. It facilitates the efficient movement of goods and people, which is essential for the functioning of various industries. The transport sector, which includes road transportation, contributes significantly to

Italy's GDP. The motorways provide vital links between industrial hubs, ports, and urban centers, thereby boosting trade and commerce. According to a report by the Italian Association of Motorway and Tunnel Concessionaires (AISCAT), the motorway network supports over 60% of Italy's total freight transport by road, underscoring its critical role in logistics and supply chains.

The construction and maintenance of motorways generate substantial employment opportunities. From the initial phases of construction to ongoing maintenance and operation, the sector provides jobs for thousands of Italians. This not only helps in reducing unemployment but also stimulates local economies, especially in regions where other economic activities may be limited.

Infrastructure Development

The development of the motorway network has been instrumental in modernizing Italy's infrastructure. Beginning in the 1950s and 1960s, during the period of rapid economic growth known as the "Italian economic miracle," the government embarked on an ambitious program to expand the motorway network. The Autostrada del Sole (A1), completed in 1964, is a prime example of this era's infrastructural achievements. Stretching from Milan to Naples, the A1 motorway not only facilitated north-south travel but also symbolized Italy's post-war recovery and industrial growth.

Modern motorways in Italy are equipped with advanced technologies to enhance safety and efficiency. Innovations such as electronic toll collection (ETC), intelligent transport systems (ITS), and real-time traffic monitoring have made the Italian motorway network one of the most advanced in Europe. These technologies help reduce congestion, improve safety, and provide users with real-time information, making travel more predictable and efficient.

Impact on Regional Development

The motorway sector has a profound impact on regional development. By improving connectivity between urban and rural areas, motorways promote balanced regional growth. They facilitate access to markets, healthcare, education, and other essential services, thereby enhancing the quality of life for residents in remote areas. This connectivity is crucial for the

socio-economic development of less developed regions in the south of Italy, known as the Mezzogiorno.

The presence of a robust motorway network also attracts investment. Businesses are more likely to invest in areas with good transport infrastructure because it reduces logistical costs and improves access to markets. This has been particularly important for the development of industrial zones and economic clusters across Italy. Regions with well-developed motorway links tend to have higher levels of industrial activity and economic output compared to those with poor connectivity.

Tourism and Cultural Significance

Tourism is a vital sector of the Italian economy, and motorways play a key role in supporting it. Italy's rich cultural heritage, picturesque landscapes, and historical sites attract millions of tourists each year. The motorway network provides efficient access to major tourist destinations, including cities like Rome, Florence, and Venice, as well as the scenic regions of Tuscany, the Amalfi Coast, and the Italian Alps.

The ease of travel facilitated by motorways enhances the tourist experience by making it easier for visitors to explore multiple destinations. This has a positive impact on local economies, as tourists spend money on accommodation, dining, and other services. The motorway sector thus indirectly supports the hospitality industry, local artisans, and small businesses.

The economic significance of the Italian motorway sector cannot be overstated. It is a critical component of the national infrastructure, driving economic growth, supporting regional development, and facilitating tourism. The sector's contribution to employment, technological advancement, and socio-economic development highlights its pivotal role in Italy's overall prosperity.

Social Impact and Connectivity

Beyond its economic contributions, the Italian motorway sector plays a crucial role in enhancing social connectivity and mobility. It serves as a lifeline for communities, connecting people to essential services and opportunities.

The motorway network significantly enhances mobility for millions of Italians. By providing fast and reliable routes, motorways reduce travel times between cities and regions, making it easier for people to commute for work, education, and leisure. This increased mobility has a positive impact on productivity and quality of life. Workers can access a wider range of job opportunities, students can attend educational institutions in different cities, and families can travel for leisure and social visits more conveniently.

Motorways also facilitate the movement of emergency services, such as ambulances, fire trucks, and police vehicles. The ability to quickly reach different parts of the country is vital for responding to emergencies and providing timely assistance. In this way, the motorway network contributes to public safety and health.

The motorway sector promotes social inclusion by improving accessibility to remote and underserved areas. In regions where public transport options are limited, motorways provide a crucial link to the rest of the country. This is particularly important for rural communities, where residents may otherwise face isolation and limited access to essential services.

Improved accessibility also supports the elderly and individuals with disabilities. By providing convenient and reliable transportation options, motorways help ensure that all citizens can participate in social and economic activities. This inclusivity is a fundamental aspect of social equity and cohesion.

Italy's motorway network also intersects with its rich cultural heritage. Many motorways pass through regions of historical and cultural significance, providing access to ancient ruins, historic towns, and UNESCO World Heritage sites. By improving access to these sites, motorways play a role in preserving and promoting Italy's cultural heritage.

Efforts have been made to ensure that motorway development is sensitive to cultural heritage sites. For instance, during the construction of new routes, archaeological surveys are

conducted to protect and document any significant findings. In some cases, motorways have been designed to avoid or minimize disruption to historical sites, ensuring that Italy's cultural legacy is preserved for future generations.

The motorway sector has demonstrated resilience in the face of economic challenges. During periods of economic downturn, investment in infrastructure projects, including motorways, has served as a stimulus for economic recovery. The construction and maintenance of motorways create jobs and generate economic activity, providing a buffer against economic volatility.

Moreover, the strategic importance of the motorway network for national security cannot be overlooked. In times of crisis, such as natural disasters or geopolitical tensions, the ability to quickly mobilize and distribute resources across the country is vital. The motorway network provides the necessary infrastructure to support these efforts, ensuring that Italy remains resilient and capable of responding to various challenges.

In conclusion, the social impact of the Italian motorway sector is profound. By enhancing mobility, promoting social inclusion, and supporting environmental sustainability, the motorway network plays a vital role in improving the quality of life for all Italians. Its contributions to cultural preservation and economic resilience further underscore its importance as a cornerstone of Italy's infrastructure.

Technological Advancements and Innovation

Technological advancements have been a driving force behind the modernization of the Italian motorway sector. Innovations in transportation technology have enhanced the efficiency, safety, and user experience of the motorway network.

Intelligent Transport Systems (ITS) have revolutionized the way motorways are managed and operated. ITS technologies include electronic toll collection (ETC), traffic management systems, and real-time information services. These technologies have significantly improved the efficiency of the motorway network.

Electronic toll collection systems, such as Telepass, have streamlined the toll payment process. By allowing vehicles to pass through toll booths without stopping, ETC systems reduce congestion and improve traffic flow. This not only saves time for motorists but also reduces emissions from idling vehicles, contributing to environmental sustainability.

Traffic management systems use sensors, cameras, and communication networks to monitor traffic conditions in real time. These systems provide valuable data that can be used to manage traffic flow, respond to incidents, and optimize maintenance schedules. For example, dynamic message signs provide real-time information to drivers about traffic conditions, road closures, and alternative routes, helping them make informed travel decisions.

Safety is a top priority in the Italian motorway sector. Advanced technologies have been implemented to enhance the safety of motorists. These include automated incident detection systems, emergency call boxes, and video surveillance.

Automated incident detection systems use cameras and sensors to identify accidents, breakdowns, and other incidents on the motorway. These systems can quickly alert emergency services and motorway operators, enabling a rapid response to incidents and minimizing the impact on traffic flow.

Emergency call boxes are strategically placed along motorways to provide motorists with a direct line to emergency services. This ensures that help is readily available in the event of an emergency, even in areas with limited mobile phone coverage.

Video surveillance systems monitor motorway conditions and provide real-time footage to control centers. This allows operators to monitor traffic, detect incidents, and coordinate responses with emergency services. The presence of surveillance cameras also acts as a deterrent to criminal activities, enhancing the overall safety of the motorway network.

Environmental Sustainability

The Italian motorway sector is increasingly focused on environmental sustainability. Efforts to reduce the environmental impact of motorways include the adoption of green technologies, sustainable construction practices, and initiatives to promote eco-friendly transportation.

Electric vehicle (EV) infrastructure is being expanded across the motorway network. Charging stations are being installed at service areas and rest stops to support the growing number of electric vehicles on Italian roads. This infrastructure is essential for encouraging the adoption of electric vehicles and reducing carbon emissions.

Sustainable construction practices are being implemented to minimize the environmental impact of new motorway projects. This includes the use of recycled materials, energy-efficient construction techniques, and measures to protect natural habitats. For example, wildlife crossings are constructed to allow animals to safely cross motorways, reducing the risk of roadkill and preserving biodiversity.

User Experience

Enhancing the user experience is a key focus of the Italian motorway sector. Technology plays a vital role in providing motorists with convenient and enjoyable travel experiences. Mobile apps and online platforms offer real-time information about traffic conditions, roadworks, and service areas. These tools help drivers plan their journeys, avoid delays, and access essential services along the route.

Service areas along the motorways are continuously upgraded to provide a wide range of amenities, including restaurants, shops, restrooms, and fueling stations. These facilities are designed to make long-distance travel more comfortable and enjoyable for motorists and passengers.

Future Innovations

Looking ahead, the Italian motorway sector is poised to embrace future innovations that will further enhance its efficiency and sustainability. Autonomous vehicles (AVs) are expected to play a significant role in the future of transportation. The development of AV-friendly infrastructure, such as dedicated lanes and communication networks, will be essential to support the safe and efficient operation of autonomous vehicles on motorways.

Smart road technologies, including sensor networks and connected vehicle systems, will enable the creation of fully integrated transportation networks. These technologies will allow vehicles to communicate with each other and with road infrastructure, optimizing traffic flow, reducing accidents, and improving fuel efficiency.

In conclusion, technological advancements and innovation are central to the ongoing development of the Italian motorway sector. By leveraging intelligent transport systems, enhancing safety, promoting sustainability, and improving the user experience, the sector is well-positioned to meet the challenges of the future and continue to play a vital role in Italy's transportation infrastructure.

Strategic Importance and Future Prospects

The strategic importance of the Italian motorway sector goes well beyond its economic contributions and regulatory framework. It plays a pivotal role in national security, regional integration, and international connectivity. Understanding these strategic dimensions is crucial for fully appreciating the significance of the motorway sector in Italy.

The motorway network is an essential component of Italy's national security infrastructure. In times of crisis, such as natural disasters or geopolitical tensions, the ability to swiftly mobilize and distribute resources across the country is vital. The motorway network provides the necessary infrastructure for the efficient movement of military personnel, emergency services, and essential supplies. For instance, during the COVID-19 pandemic, the motorway network was crucial in ensuring the timely delivery of medical supplies, food, and other essential goods. The

ability to maintain uninterrupted transport services during such emergencies underscores the strategic importance of the motorway sector.

Moreover, the motorway network plays a key role in promoting regional integration and economic cohesion within Italy. By providing reliable and efficient transport links, motorways help bridge the economic divide between the more developed northern regions and the less developed southern regions. This is particularly important for the Mezzogiorno, which has historically lagged behind the rest of the country in terms of economic development. Improved connectivity facilitates the flow of goods, services, and labor between regions, fostering economic integration and balanced development. It also enables the efficient movement of agricultural products, industrial goods, and other commodities, supporting regional economies and contributing to national growth.

Italy's strategic location in Southern Europe makes it a crucial hub for international trade and transportation. The motorway network plays a vital role in connecting Italy to the rest of Europe and beyond. Major motorways link Italian ports and airports to inland regions, facilitating the efficient movement of goods to and from international markets. For instance, the Brenner Pass, which connects Italy to Austria, is a critical corridor for trade between Italy and Northern Europe. Similarly, the Mont Blanc Tunnel provides a vital link between Italy and France, supporting cross-border trade and tourism. These international connections are essential for Italy's participation in the global economy and its competitiveness in international markets.

Looking to the future, the Italian motorway sector is poised for transformation through several key trends and innovations. Technological advancements, such as autonomous vehicles, electric mobility, and smart road systems, are expected to revolutionize the way motorways are used and managed. The sector must adapt to these changes to remain relevant and efficient. The development of autonomous vehicles (AVs) presents both challenges and opportunities. AVs have the potential to enhance road safety, reduce congestion, and improve fuel efficiency. However, their widespread adoption requires significant investments in infrastructure, such as dedicated lanes, communication networks, and safety systems. Smart road technologies, including sensor networks and connected vehicle systems, will enable the creation of fully integrated transportation networks. These technologies allow vehicles to communicate with each other and with road infrastructure, optimizing traffic flow, reducing accidents, and improving overall efficiency.

Sustainability is a key focus for the future development of the motorway sector. Efforts to reduce carbon emissions, promote electric vehicles, and implement green technologies are essential for minimizing the environmental impact of motorways. The expansion of EV charging infrastructure, the use of renewable energy sources, and the adoption of sustainable construction practices are critical components of this strategy. The Italian government and private operators are increasingly investing in sustainable transportation initiatives. These efforts not only contribute to environmental protection but also enhance the resilience and competitiveness of the motorway sector in the face of evolving regulatory and market demands.

Strategic planning and investment are crucial for the long-term success of the motorway sector. This includes prioritizing projects that address critical infrastructure needs, improve connectivity, and support economic growth. Public-private partnerships will continue to play a vital role in financing and managing these projects, leveraging the strengths of both the public and private sectors. Investment in maintenance and upgrades is also essential to ensure the reliability and safety of the existing motorway network. Regular inspections, timely repairs, and modernization efforts are necessary to prevent incidents and maintain high standards of service.

In conclusion, the strategic importance of the Italian motorway sector extends far beyond its immediate economic contributions. It plays a crucial role in national security, regional integration, and international connectivity. As the sector faces new challenges and opportunities, effective strategic planning, investment, and innovation will be essential for ensuring its continued success and relevance. By embracing technological advancements and prioritizing sustainability, the Italian motorway sector can continue to support Italy's economic growth and development in the years to come.

2. Timeline and History of the Italian Motorway Sector

Early Beginnings and Initial Development

The story of the Italian motorway sector begins in the early 20th century, reflecting the nation's industrial aspirations and the evolving demands of transportation. During the 1920s, Italy witnessed the birth of its motorway infrastructure, driven by the need to support the burgeoning automobile industry and enhance connectivity.

In 1924, the first motorway, known as the Autostrada dei Laghi, was inaugurated. This road connected Milan to the Italian Lakes, marking the dawn of motorway construction in Italy. The project was a pioneering effort in Europe, showcasing Italy's commitment to modernizing its transport infrastructure. The construction of the Autostrada dei Laghi was notable for its innovative use of materials and engineering techniques, setting a precedent for future motorway projects. After on, the 1930s saw an increase in automobile ownership, which necessitated the expansion of road networks. The government began to recognize the importance of a well-connected motorway system for economic development and regional integration. Preliminary plans for a more extensive motorway network were developed, although progress was hindered by the economic constraints of the Great Depression and the political instability of the period.

The outbreak of World War II brought motorway construction to a halt. The existing infrastructure suffered significant damage during the conflict, and post-war reconstruction posed enormous challenges. The immediate post-war period focused on rebuilding the war-torn nation. The motorway sector was identified as a critical area for investment to support economic recovery and modernization.

In the 1950s-1960s period, the sector saw a reconstruction and economic boom. The post-World War II era marked a period of rapid economic growth and industrial expansion in Italy, often referred to as the "Italian economic miracle." During this time, the motorway sector experienced significant development, laying the foundation for the modern network. The Italian government launched several major infrastructure projects, recognizing the importance of a robust transport network for economic growth. The focus was on creating a comprehensive motorway system to connect key industrial and urban centers. The Azienda Nazionale Autonoma delle Strade (ANAS), a state-owned enterprise, was established to oversee the planning, construction, and maintenance of motorways. This period saw extensive state intervention and investment in motorway projects.

The 1960s and 1970s were characterized by significant state-led expansion of the toll road network. During this period, the Italian government, through entities such as the Institute for Industrial Reconstruction (IRI), played a central role in financing and managing toll road projects. The state's involvement was motivated by the need to accelerate infrastructure

development and ensure equitable access to transportation services across the country. One of the landmark projects of this era was the construction of the Autostrada del Sole (A1), which stretches from Milan in the north to Naples in the south and spanned over 750 kilometers connecting the industrial north with the agricultural south. Completed in 1964, the A1 motorway became a symbol of Italy's economic resurgence and engineering prowess. It facilitated the movement of goods and people, significantly boosting regional trade and tourism. This period also saw the introduction of new construction techniques and materials, improving the efficiency and durability of motorways.

The establishment of the Autostrade per l'Italia company in 1950 was another key development. This state-owned enterprise was tasked with constructing and operating toll roads, and it quickly became the largest toll road operator in Italy. The company's efforts were instrumental in expanding the network, which by the end of the 1970s, included several major routes connecting key cities and regions. However, the state's dominance in the toll road sector also led to challenges. Bureaucratic inefficiencies, funding constraints, and political interference often hampered the effectiveness of state-led initiatives. These issues underscored the need for reforms and alternative approaches to infrastructure management.

Privatization and Modernization

The latter part of the 20th century brought significant changes to the Italian motorway sector, driven by economic reforms and the need for modernization. The 1970s continued the trend of expanding and modernizing the motorway network. New routes were developed to accommodate increasing traffic volumes and support economic growth. Safety became a priority, with investments in road design, signage, and maintenance to reduce accidents and improve overall road safety.

The 1980s were marked by economic reforms aimed at liberalizing the economy and reducing the role of the state in various sectors. This shift included the motorway sector, where privatization initiatives began to take shape. The government introduced the concession model, allowing private entities to operate and maintain motorways in exchange for the right to collect tolls. This model aimed to leverage private investment and expertise while ensuring the efficient management of the motorway network.

The 1990s saw an accelerated push toward privatization, with several major motorway concessions being awarded to private operators. This period marked a significant transition from state control to private management. To oversee the privatized motorway sector, the government established a robust regulatory framework. The Autorità di Regolazione dei Trasporti (ART) was created in 2011 to regulate toll rates, monitor service quality, and ensure compliance with safety

and environmental standards. The introduction of electronic toll collection systems, such as Telepass, revolutionized toll operations, reducing congestion and improving efficiency.

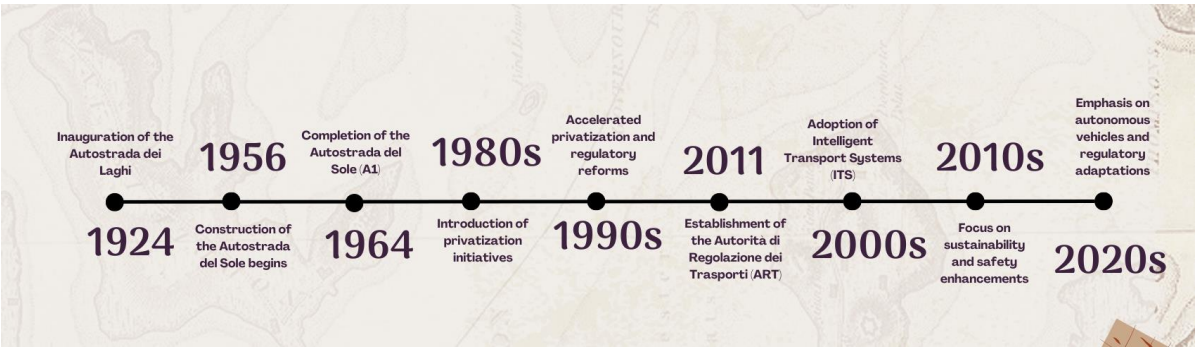
However, the 21st century has been characterized by continued modernization, technological innovation, and a focus on sustainability in the Italian motorway sector. The adoption of intelligent transport systems has transformed motorway management. These systems use sensors, cameras, and communication networks to monitor traffic conditions, manage incidents, and provide real-time information to motorists. Investments in smart road technologies, including connected vehicle systems and automated incident detection, have enhanced safety and efficiency.

The motorway sector has increasingly focused on sustainability, with efforts to reduce carbon emissions, promote electric vehicles, and implement green technologies. The expansion of EV charging infrastructure and the use of renewable energy sources are key components of this strategy. Advanced surveillance systems, emergency response mechanisms, and regular maintenance have been prioritized to improve road safety and prevent incidents.

The development of autonomous vehicles presents new challenges and opportunities for the motorway sector. Investments in infrastructure to support AVs, such as dedicated lanes and communication networks, are essential for their safe and efficient operation. The regulatory framework continues to evolve to address emerging challenges and opportunities. Ensuring compliance with safety, environmental, and service standards remains a priority.

The future of the Italian motorway sector will be shaped by ongoing technological advancements, including smart road systems and sustainable transportation initiatives. Continued investment in infrastructure, maintenance, and modernization is essential to support economic growth and ensure the resilience of the motorway network. Leveraging public-private partnerships will remain crucial for financing and managing motorway projects, combining public oversight with private sector efficiency and innovation.

Visual Timeline



Key motorway projects and their impact

Motorway	Year Completed	Length (km)	Economic Impact	Social Impact
Autostrada dei Laghi	1924	48	Supported early automobile industry	Enhanced regional tourism
Autostrada del Sole (A1)	1964	750	Boosted industrial growth, regional integration	Symbol of post-war recovery, improved connectivity
Brenner Motorway (A22)	1974	314	Facilitated international trade	Supported tourism in Alpine regions
Autostrada dei Fiori (A10)	1971	158	Improved cross-border trade with France	Boosted coastal tourism

3. Motorway Concessions in Italy:

The development of Italy's motorway system has been significantly shaped by the interplay between public and private sectors, rooted in legislative actions dating back to the early 20th century. In 1929, the Italian Parliament enacted legislation allowing private companies and consortiums, along with local authorities such as provinces and municipalities, to enter contracts for the execution of public works. This move marked the beginning of private sector involvement in motorway concessions, with notable early participants including "Società Anonima Puricelli Strade e Cave," FIAT, Edison, Italcementi, Banca Commerciale Italiana, and Credito Italiano.

The Italian motorway system, spanning over 6,000 kilometers, operates under a concession model where the roads are publicly owned but managed by private companies under long-term concessions. The government, when granting these concessions, requires a balance between the tolls collected and the investments made in road maintenance. This balance ensures that the revenue from tolls is appropriately used for infrastructure investments. The government monitors this process both before and after, ensuring that toll rates and expenditures on maintenance and investments are aligned.

About half of the motorway network is managed by Autostrade per l'Italia, with the rest operated by other companies. The government is contemplating a €150 million fine and the revocation of the concession for the A10 Genoa-Savona route from Autostrade per l'Italia, potentially transferring it to A.N.A.S. This measure represents the final step in a series of possible sanctions, although revocation would be a lengthy process requiring proof of severe misconduct. Autostrade per l'Italia, owned by the Benetton family, claims to have adhered to control and intervention plans agreed upon with the Ministry of Transport and maintained the Morandi Bridge to high standards. The company's CEO, Giovanni Castellucci, had previously stated that the bridge was not dangerous, with a €20 million contract for structural improvements issued just three months before the collapse.

Concessions, once managed by public companies, began shifting to private management in the 1990s due to Italy's substantial public debt. Autostrade, originally owned by the state through IRI, was privatized in 1999. By 2002, Autostrade per l'Italia was formed to manage several motorway sections. Controlled by the Benetton family through Atlantia, the company now oversees 3,020 kilometers of Italian motorways.

The concession model operates as a monopoly, with no alternative routes for fast travel. The managing companies are responsible for network investments and maintenance, funded by tolls. However, privatization led to significant financial gains for private shareholders, facilitated by favorable concession extensions and tariff regulations. Despite regulations designed to ensure that tariff revenues adequately cover investments, issues like unmaintained standards and increased tariffs have emerged over the years.

The concession to Autostrade per l'Italia, initially set to expire in 2038, was recently extended to 2042. Following the Morandi Bridge collapse in 2018, the government initiated the process to revoke the concession, potentially incurring substantial compensation costs to Autostrade per l'Italia. If proven guilty of severe non-compliance, A.N.A.S. would take over the concession, but it would involve a substantial payout to Autostrade per l'Italia, potentially amounting to around €20 billion considering the expected profits until 2042.

Here's a summary of the ownership structure as of December 31st, 1992, in Table 1.

Table 1 Control and ownership in 1992

Ownership on December 31st, 1992	Concessionaires	Group	Local Authorities	A.N.A.S.	Others
Autostrade Group	Autostrade	88.7	0	0	0
	Rav	58	42	0	0
	Sam	59	5	0	0
	Sat	68.7	1	0	27.3
	Strada dei parchi	0	0	100	0
	Tangenziale di Napoli	100	0	0	0
	Turin-Savona	99.9	0.1	0	0
Total		474.3	48.1	100	27.3
Gavio Group	Ativa	11	72.7	0	0
	Cisa	10.6	70	0	5.1
	Fiori	20.3	16.7	0	4
	Salt	7	26	0	0
	Satap	0	25	0	0
	Sav	32	0	0	8.3
	Sitaf	0	20.8	35.3	0
	Turin-Milan	50.11	0	0	13
Total		131.01	231.2	35.5	30.4
Publicly Operated	Autovie Venete	0	94.1	0	0
	Brennero	0	82	0	4.2
	Brescia-Padova	0	70	0	1
	Consorzi Diciliani	0	100	0	0
	Milan-Seravalle	0	98.5	0	0
	Padane	0	80.1	0	10
	Venezia Padova	0	54	0	8.4
Total		0	578.7	0	23.6
Grand Total		605.31	858	135.3	81.3

Post-War Expansion and A.N.A.S. Involvement

The aftermath of World War II highlighted the need for robust infrastructure to support Italy's reconstruction and economic revival. The expansion of the motorway network became a priority, with concessions emerging as a pivotal mechanism to achieve this goal. The National Roads and Motorways Company (A.N.A.S.) played a central role in this era, overseeing the construction of new motorways and managing concession contracts.

Three primary scenarios were established:

Motorways built and operated by the State through A.N.A.S.
Motorways constructed by private or public entities under concessions and operated by A.N.A.S.
Motorways both built and operated by public or private entities under concessions.
Regardless of the scenario, state ownership of the motorway network was maintained, with concessionaires required to return the infrastructure upon the expiration of their concession terms. Article 3 of the Romita Law further detailed the characteristics and requirements of these concessions, including a maximum concession term of thirty years and a financial plan to ensure economic and financial balance.

Government's Role and Financial Framework
The government's involvement was critical in the early development of Italy's motorway system. Until the early 1980s, major motorway projects were predominantly financed by the government, which awarded contracts to both public and private companies while retaining ownership of the infrastructure. The Decree Law No 463/55 (Romita Law) stipulated that the government would cover up to 40% of construction costs, with the remaining 60% to be recouped by concessionaires through toll collection. Additionally, companies were required to return a portion of their toll revenue to the government after five years of operation.

The Decree Law No 287/71 introduced further financial guarantees for government-backed companies, establishing the Guarantee Central Fund to cover potential loan defaults. Initially funded by the government's budget, this fund later relied on increased toll charges, although regulatory restrictions on toll adjustments exacerbated financial challenges for motorway companies.

Privatization and the Rise of Major Players

By the early 1990s, the majority of motorway companies were publicly owned, with notable exceptions like Satap (Turin-Piacenza) and Turin-Milan routes. The most significant player was the "Autostrade Group," managed by the Institute for the Industrial Reconstruction (IRI), overseeing six major highway companies. Other companies were owned by various public entities, including municipalities, provinces, regions, public banks, and chambers of commerce.

The mid-1990s saw a shift as the Gavio Group, a family business in transportation, expanded its interests by acquiring Grassetto Lavori, a major construction company, and venturing into the highway market. They took control of the Satap – Turin-Piacenza and ASTM – Turin-Milan routes.

Toll Determination and Financial Challenges

The process of determining tolls aimed to ensure that concessionaires could cover their construction, maintenance, and investment expenses. This assessment was based on the Financial Plan, a comprehensive evaluation of revenues and expenses throughout the concession period. Initially, toll charges were agreed upon at the start of each concession period and subject to annual reviews. However, anti-inflationary measures often restricted toll adjustments, leading to financial difficulties for many concessionaires and disputes with A.N.A.S.

The financial crises of the 1970s and 1980s prompted the Guarantee Central Fund to implement various measures, including additional toll surcharges introduced by Decree Law No 531/82. These measures sparked legal battles involving concessionaires, A.N.A.S., and the Ministry of Treasury. Concessionaires sought compensation for lost earnings due to toll adjustment failures while grappling with significant debt exposure resulting from the Fund's interventions.

Trends in the Motorway Industry (2018-2022)

Ownership and Corporate Governance

Between 2018 and 2022, the Italian motorway industry witnessed significant transformations in corporate governance and ownership structures. Leading

motorway companies, such as ASTI-CUNEO S.P.A. and Autostrade per l'Italia, navigated complex regulations and market conditions to push forward infrastructure projects and strategic acquisitions.

ASTI-CUNEO S.P.A.

From 2018 through 2022, ASTI-CUNEO S.P.A. experienced substantial ownership changes. Initially, the company was primarily controlled by three entities: SALT (Società Autostrada Ligure Toscana p.A.) holding a 60% stake, ANAS (Azienda Nazionale Autonoma Strade S.p.A.) with 35%, and ITINERA S.p.A. with a 5% share. By 2021, ITINERA's participation had decreased dramatically, indicating a strategic shift in the company's ownership structure.

The company's engagement with the Ministry of Infrastructure and Transport (MIT) and other regulatory bodies has been crucial. These interactions intensified in 2018, leading to the European Commission's approval of the Highway Link A33 project, despite bureaucratic challenges from the granting authority.

Autostrade per l'Italia

Autostrade per l'Italia's journey post-1999 privatization has been marked by significant strategic maneuvers. The separation of its concession activities from non-highway operations in 2003 and control by Atlantia S.p.A. (holding about 88% of the shares from 2018 to 2022) underscores a stable ownership structure pivotal in directing the company's strategic course.

The acquisition of a controlling stake in Pavimental S.p.A. in 2021 for approximately €14.7 million illustrates Autostrade per l'Italia's commitment to consolidating its operational capabilities. This strategic move enhanced the company's footprint in Italy's highway management sector and aligned with broader market consolidation trends.

Challenges and Strategic Responses

The Italian motorway industry faced various challenges during this period, including regulatory hurdles, financial strains, and natural disasters.

Autostrada dei Fiori (ADF)
In 2019, ADF faced a critical challenge with a landslide severely impacting the A6 motorway. This incident disrupted traffic and imposed economic strains on the surrounding regions. ADF's acquisition of shares in Rivalta Terminal Europa from Finpiemonte Partecipazioni S.p.A. indicated a proactive approach to stabilize its investment portfolio amid unforeseen adversities.

Autovie Venete
Autovie Venete underwent significant transformations, including a shift to standard fiscal year reporting in 2019 and facing legal and regulatory challenges during the concession transition. The formation of Autostrade Alto Adriatico S.p.A. in 2023 represents a significant restructuring effort under regional government control.

Brebemi and Brennero
Brebemi's trajectory was influenced by global investment dynamics, notably Aleatica S.A.U.'s acquisition of shares from Intesa Sanpaolo in 2020. Conversely, Brennero maintained stable public ownership, focusing on leveraging its strategic location and infrastructure without pursuing aggressive expansion.

The Italian motorway industry has evolved through various phases of state intervention, privatization, and strategic realignments. The historical context, marked by government-led initiatives and financial frameworks, set the stage for modern-day dynamics. Recent trends indicate a focus on consolidation, strategic acquisitions, and regulatory engagement to navigate the complexities of infrastructure development. Understanding these trends provides valuable insights into the future trajectory of Italy's motorway industry, highlighting the importance of adaptive strategies to meet evolving economic and regulatory challenges.

System eddiciency if all investments are made from an ESG prspective

Variable	Sustainable	Not sustainable	Not sustainable
Motorway concessions model	Efficiency according to economic criteria	Efficiency according to economic criteria	No efficiency according to economic criteria
	Adopting adequate social accountability models	Not adopting adequate social accountability models	Not adopting adequate social accountability models

Figure 1 economy of the motorway paper

Concessions regulated based on the 2018 law (annex A to decision n. 16/2019)

	Concession	Company name	End of the last regulatory period	End of Concession
1	Convenzione Unica ANAS S.p.A. - Raccordo Autostradale Valle d'Aosta S.p.A.	Raccordo Autostradale della Valle d'Aosta S.p.A. (RAV)	31/12/2013	31/12/2032
2	Convenzione Unica ANAS S.p.A. - Società Autostrada Tirrenica p.A.	Società Autostrada Tirrenica S.p.A. (SAT)	31/12/2013	31/12/2046
3	Convenzione Unica ANAS S.p.A. - Strada dei Parchi S.p.A.	Strada dei Parchi S.p.A.	31/12/2013	31/12/2030
4	Convenzione ANAS S.p.A. - Concessioni Autostradali Venete - CAV S.p.A.	Concessioni Autostradali Venete S.p.A. (CAV)	31/12/2014	31/12/2032
5	Convenzione Unica ANAS S.p.A. - Società SATAP Tronco A4	Società Autostrada Torino-Alessandria-Piacenza S.p.A. (SATAP) Tronco A4	31/12/2017	31/12/2026
6	Convenzione Unica ANAS S.p.A. - Società Milano Serravalle-Milano Tangenziali p.A.	Milano Serravalle S.p.A.	31/12/2017	31/10/2028
7	Convenzione Unica ANAS S.p.A. - Società Autostrada Brescia – Verona – Vicenza – Padova S.p.a.	Brescia - Verona - Vicenza - Padova S.p.A.	31/12/2017	31/12/2026
8	Convenzione Unica ANAS S.p.A. - Autostrade per l'Italia S.p.A.	Autostrade per l'Italia S.p.A.	31/12/2017	31/12/2038
9	Convenzione Unica ANAS S.p.A. - Società di Progetto Autostrada Asti - Cuneo p.A.	Società di progetto Autostrada Asti Cuneo S.p.A.	31/12/2017	11/08/2035
10	Convenzione Unica ANAS S.p.A. - Autocamionale della CISA S.p.A.	Società Autostrada Ligure Toscana S.p.A. (SALT) - Tronco Autocisa	31/12/2018	31/12/2031
11	Convenzione Unica ANAS S.p.A. - Autostrada dei Fiori S.p.a.	Autostrada dei Fiori S.p.A. (Tronco A10)	31/12/2018	30/11/2021
12	Convenzione Unica ANAS S.p.A. - Autostrada Torino Savona S.p.A.	Autostrada dei Fiori S.p.A. (Tronco A6)	31/12/2018	31/12/2038
13	Convenzione Unica ANAS S.p.A. - SALT S.p.A.	Società Autostrada Ligure Toscana S.p.A. (SALT) - Tronco Ligure-Toscano	31/12/2018	31/07/2019
14	Convenzione Unica ANAS S.p.A. - SAV Società Autostrade Valdostane S.p.A.	Società Autostrade Valdostane S.p.A. (SAV)	31/12/2018	31/12/2032
15	Convenzione Unica ANAS S.p.A. - SITAF S.p.A. Autostrada A32 Torino-Bardonecchia	Società Italiana Traforo Autostradale del Frejus S.p.A. (SITAF)	31/12/2018	31/12/2050
16	Convenzione Unica ANAS S.p.A. - Tangenziale di Napoli S.p.A.	Tangenziale di Napoli S.p.A.	31/12/2018	31/12/2037

Figure 2 slides londra (ART)

Uncovering the Trends in the Motorway Industry in 2018-2022

Morandi Bridge Collapse 2018

The Morandi bridge (Officially: Viadotto Polcevera) was an architectural and engineering landmark since its construction. This cable-stayed bridge was characterised by a prestressed concrete structure for the piers, pylons and deck, very few stays, as few as two per span, and a hybrid system for the stays constructed from steel cables with prestressed concrete shells poured on. This bridge was designed by the civil engineer Riccardo Morandi, it was an important part of the A10 motorway, which connects Genoa to the French border, spanned the Polcevera River, and was a crucial connector for both local and international traffic. The total length of Morandi bridge was approximately 1,182 meters (3,878 feet) with a main Span of 210 meters (689 feet) and a total height of about 45 meters (148 feet) above the ground. Morandi was one of the longest concrete bridges in the world when it opened in September 1967. The 1960s were Italy's boom years. For the first time, many Italians could afford a car. But the country's roads – many of them narrow, meandering up mountains and twisting through city centers – needed modernizing. Morandi Bridge was the centerpiece of a brand-new network of highways connecting Milan and Turin in the north to the tourist hotspots of the Ligurian Riviera, bypassing a congested Genoa and ultimately completing the coastline highway that runs from southern France to Tuscany.

The Morandi Bridge was managed and maintained by Autostrade per l'Italia, a subsidiary of Atlantia S.p.A., which operates a significant portion of Italy's toll highways. The company was responsible for the bridge's upkeep, including regular inspections and repairs.

On 14 August 2018, the city of Genoa in northwest Italy woke to a strong summer storm. By 11.30am, the rain was so heavy that visibility had fallen dramatically. Videos captured by security cameras show vehicles slowing down as they crossed Morandi Bridge, which grew progressively more enveloped in a grey mist. At around 11:36 AM local time, a 210-meter (689 feet) section of the bridge, including one of its three main pylons, suddenly collapsed. The collapse sent vehicles plummeting 45 meters (148 feet) to the ground, crushing buildings and warehouses below and into the Polcevera River. The collapse resulted in the deaths of 43 people, including motorists and individuals working in the buildings below. Rescue efforts were immediate and extensive, involving over a thousand emergency personnel, including firefighters, paramedics, and military units. The

search for survivors lasted several days, with rescuers working tirelessly to pull people from the rubble. In the immediate aftermath, approximately 600 people were evacuated from buildings near the bridge due to concerns about further structural failures. Many of these residents were displaced for months, as their homes were either destroyed or deemed unsafe.

From its inception, the Morandi Bridge faced structural concerns. The design, though innovative for its time, had inherent weaknesses, particularly in the use of prestressed concrete, which was prone to corrosion over time. Reports indicated that by the 1990s, the bridge was already showing signs of significant wear and tear. Several maintenance interventions were conducted over the years, but they were often criticized for being insufficient.

In the years leading up to the collapse, there were numerous warnings about the bridge's deteriorating condition. In 2016, a university professor from the University of Genoa warned about the risk of corrosion in the cables and the need for urgent maintenance. Autostrade per l'Italia, the company responsible for the bridge's maintenance, undertook some repairs and monitoring but failed to address the underlying structural issues comprehensively.

In the days following the collapse, multiple investigations were launched to determine the cause of the disaster. The Italian government, led by then-Prime Minister Giuseppe Conte, declared a state of emergency in Genoa and pledged to uncover the truth behind the collapse. Technical analyses focused on the bridge's design and construction, maintenance records, and the environmental conditions at the time of the collapse. Experts identified several critical factors that contributed to the disaster:

- Corrosion: The main cables and stays showed significant corrosion, which weakened their structural integrity.
- Design Flaws: The use of prestressed concrete was problematic due to its susceptibility to environmental degradation.
- Inadequate Maintenance: Despite warnings and evident wear, the maintenance work carried out was deemed insufficient and delayed.

The collapse sparked a political storm in Italy, with calls for accountability and justice. Autostrade per l'Italia and its parent company, Atlantia, faced intense

scrutiny. Government officials accused the company of negligence and failure to ensure the bridge's safety. Several executives and engineers were placed under investigation, and legal proceedings were initiated against them.

The collapse had significant economic repercussions for Genoa and the broader Liguria region. The Morandi Bridge was a critical artery for both local and international trade. Its destruction disrupted supply chains, increased transportation costs, and strained the local economy. The port of Genoa, one of Italy’s largest, faced considerable logistical challenges due to the collapse.The disaster left a deep scar on the Genoa community. Memorials and tributes were held for the victims, and the psychological impact on survivors and the families of those who perished was profound. The tragedy also sparked a broader national conversation about infrastructure safety in Italy.

In the wake of the collapse, plans for a new bridge were swiftly put into action. Renowned architect Renzo Piano designed the new structure, named the Genoa Saint George Bridge. Construction began in late 2018, and the new bridge was inaugurated on August 3, 2020. The design emphasized durability and safety, incorporating advanced monitoring systems to prevent future failures.

The collapse of the Morandi Bridge was a tragic event that highlighted the critical importance of infrastructure maintenance and the dire consequences of neglect. It underscored the need for rigorous oversight, timely intervention, and the adoption of advanced technologies in infrastructure management. The disaster not only reshaped the physical landscape of Genoa but also served as a sobering reminder of the vulnerabilities inherent in aging infrastructure. The legacy of the Morandi Bridge collapse continues to influence policies and practices in infrastructure management, aiming to prevent such tragedies in the future.

Following the tragic collapse of the Morandi Bridge on August 14, 2018, Genoa faced the daunting task of rebuilding a crucial piece of infrastructure. The reconstruction process aimed not only to restore connectivity but also to symbolize resilience and renewal. The new bridge, named the Genoa Saint George Bridge, was completed swiftly and efficiently, showcasing modern engineering and design excellence.

In the aftermath of the collapse, the Italian government declared a state of emergency and prioritized the rapid reconstruction of the bridge. The task of overseeing the demolition of the remaining parts of the Morandi Bridge and the construction of the new bridge was assigned to a special commissioner, Marco Bucci, who was also the mayor of Genoa.

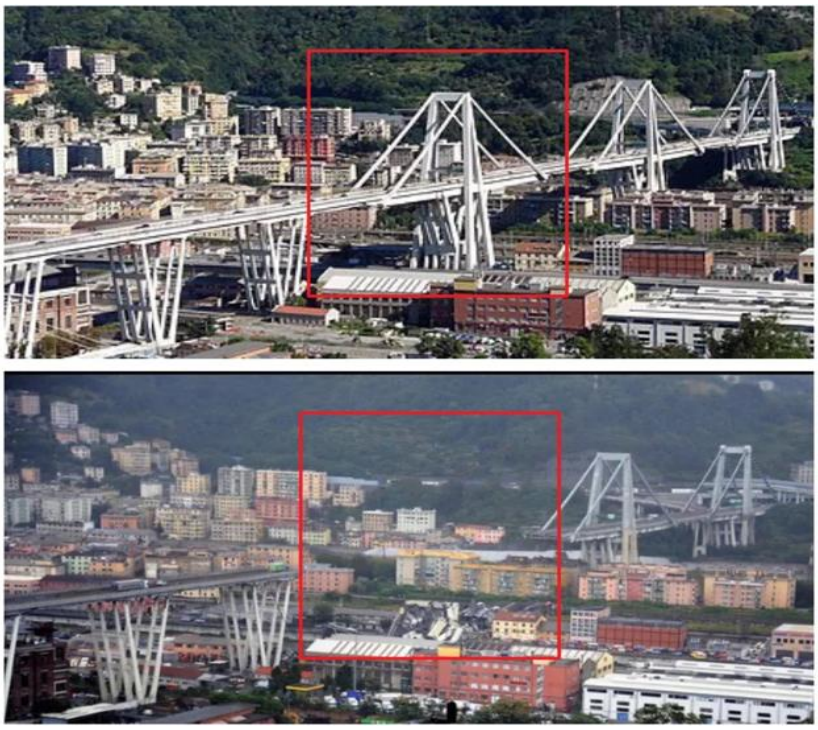
Renowned Italian architect Renzo Piano, a native of Genoa, offered to design the new bridge. Known for his innovative and sustainable designs, Piano's involvement was seen as a gesture of solidarity and commitment to the city's recovery. His vision was to create a bridge that was both functional and symbolic, representing the strength and resilience of Genoa. Renzo Piano's design for the new bridge was both elegant and robust, featuring clean lines and advanced engineering techniques. The key features of the Genoa Saint George Bridge include a length of approximately 1,100 meters, similar to the Morandi Bridge, maintaining the same elevation as the previous structure. The bridge is a continuous steel deck supported by 18 elliptical piers, spaced 50 meters apart. This design enhances stability and distributes weight more evenly. Advanced monitoring systems were integrated into the bridge’s structure, including sensors to measure strain, tilt, and seismic activity. These systems provide real-time data to ensure the bridge's safety and longevity. Solar panels were installed along the entire length of the bridge to provide energy for its maintenance and lighting, making it a sustainable infrastructure project. The remnants of the Morandi Bridge were demolished between February and June 2019. Controlled explosions were used to bring down the remaining sections safely. Construction of the foundations for the new bridge began immediately after the demolition. This phase involved extensive groundwork to ensure the stability of the new structure. The piers were erected in a sequential manner, followed by the installation of the steel deck. This phase progressed rapidly due to prefabrication techniques that allowed for faster assembly. Once the main structure was completed, the bridge underwent extensive testing to ensure its safety and durability. This included load testing, sensor calibration, and final inspections.

The Genoa Saint George Bridge was officially inaugurated on August 3, 2020, less than two years after the collapse of the Morandi Bridge. The ceremony was attended by Italian President Sergio Mattarella, Prime Minister Giuseppe Conte, and Renzo Piano, among other dignitaries. The inauguration was a moment of both

solemn remembrance for the victims of the collapse and celebration of the successful completion of the new bridge.

The new bridge restored a vital transportation link for Genoa, reestablishing efficient routes for local and international traffic. The reopening of the bridge significantly eased logistical challenges for the port of Genoa and the surrounding region.

The Genoa Saint George Bridge stands as a symbol of resilience and renewal for the city of Genoa. Its construction demonstrated the community's ability to overcome tragedy and work collaboratively towards a brighter future. The integration of advanced monitoring systems and sustainable energy solutions set a new standard for infrastructure projects in Italy and beyond. The bridge serves as a model for combining aesthetic appeal with cutting-edge technology.



Impact of COVID-19 on Italy's Motorway Industry: Challenges and Adaptation Strategies

The COVID-19 pandemic brought unprecedented challenges to various sectors globally, and the motorway industry in Italy was no exception. The pandemic affected traffic volumes, revenue streams, operational practices, and regulatory frameworks. This essay delves into these impacts, explores how the industry managed through the crisis, and highlights long-term changes and adaptations resulting from the pandemic.

The most immediate and visible impact of the pandemic on the motorway industry was the drastic reduction in traffic volumes. With the imposition of national lockdowns, movement restrictions, and closure of non-essential businesses, the demand for travel plummeted. The first quarter of 2020 saw an unparalleled drop in passenger vehicle traffic, as people were confined to their homes. Commercial

traffic, although less affected, also experienced a decline due to disruptions in supply chains and reduced economic activity.

The reduction in traffic volumes had a direct impact on the financial health of motorway concessionaires. Toll revenues, which form the backbone of the industry's income, witnessed significant declines. Companies found themselves grappling with liquidity issues and financial instability. The financial strain necessitated a re-evaluation of budgets, with many concessionaires resorting to cost-cutting measures. Non-essential maintenance and investment projects were deferred, operational expenses were slashed, and negotiations with suppliers were undertaken to manage cash flows effectively.

To ensure continuity of operations and the safety of both employees and users, motorway concessionaires implemented rigorous health and safety protocols. Toll booths, service areas, and other high-contact points were subjected to frequent sanitization. Personal protective equipment (PPE) was provided to staff, and social distancing measures were enforced. These adjustments were essential in maintaining operational functionality while adhering to public health guidelines. Remote working became a norm for administrative and support staff, leading to a surge in investment in IT infrastructure and cybersecurity. This transition, while challenging, enabled companies to continue their functions with minimal disruptions. The pandemic underscored the importance of flexible and resilient operational frameworks.

Recognizing the strain on the motorway industry, the Italian government introduced various support measures. These included financial aid packages, tax deferrals, and increased regulatory flexibility. Concessionaires were allowed more leeway in toll adjustments, facilitating a smoother recovery as traffic volumes began to normalize. This regulatory support was pivotal in stabilizing the industry during the peak of the crisis.

With financial resources strained, many investment and maintenance projects were postponed. However, essential maintenance activities, particularly those related to safety, continued unabated. Interestingly, some concessionaires leveraged the reduced traffic volumes to accelerate critical maintenance and upgrade works. This period of low traffic presented a unique opportunity to undertake disruptive projects without significantly impacting users.

As lockdown measures were gradually lifted, motorway concessionaires embarked on aggressive traffic recovery campaigns. Promotional discounts on tolls, partnerships with tourism agencies, and targeted marketing efforts were employed to encourage travel. These initiatives were crucial in boosting traffic volumes and restoring revenue streams. The focus was not only on encouraging travel but also on ensuring that users felt safe and confident in utilizing the motorway services.

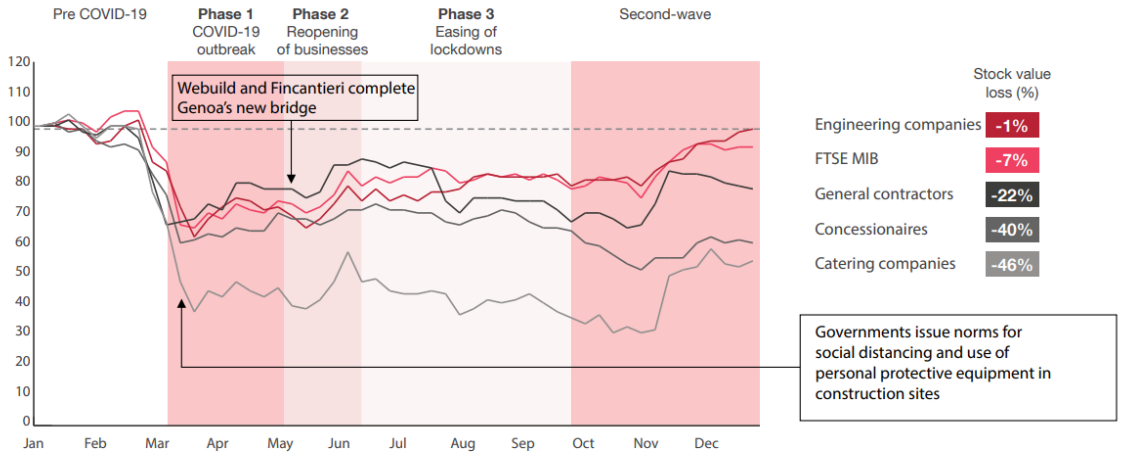
The pandemic acted as a catalyst for digital transformation within the motorway industry. Digital tolling systems and contactless payment methods were rapidly adopted to minimize physical contact. Enhanced online customer service platforms were developed to provide users with real-time information and support. This digital shift improved operational efficiency and customer satisfaction, setting a new standard for the industry.

The challenges posed by the pandemic prompted motorway concessionaires to develop comprehensive resilience plans. These plans encompass financial resilience, supply chain management, and crisis response protocols. The experience highlighted the importance of being prepared for future disruptions, whether they are health-related or otherwise. Long-term changes in the industry include a sustained focus on digitalization and innovation. The lessons learned during the pandemic have reinforced the need for flexibility and adaptability in operational practices. Concessionaires are now better equipped to handle fluctuations in traffic volumes and revenue streams, ensuring a more robust and resilient industry.

The COVID-19 pandemic significantly impacted Italy's motorway industry, bringing to the fore the vulnerabilities and strengths of the sector. Through a combination of government support, operational adjustments, financial management, and digital transformation, the industry navigated the crisis effectively. The pandemic has not only prompted immediate changes but also driven long-term adaptations that will shape the future of the motorway industry in Italy. As the industry continues to evolve, the lessons learned during this challenging period will play a crucial role in enhancing resilience and sustainability.

Stock values of motorways players were strongly hit by the Covid-19, with the exception of engineering companies

Stock price by clusters of motorways players[1] (2020, %)



4. Regulatory Framework and Privatization of the Motorways Industry

Regulatory Framework

The regulatory framework governing Italy's motorways has undergone significant evolution over the years, transitioning from public management to a system heavily influenced by privatization. Initially, Italian motorways were managed by public entities, a reflection of the broader European trend of state ownership of

critical infrastructure. This model, which included management by public entities like Società Autostrade established in 1950, persisted until financial pressures and a shift towards privatization in the 1990s led to significant changes.

Under the current system, motorways in Italy remain public property but are managed under long-term concessions granted to private companies. These private entities are responsible for the operation, maintenance, and improvement of the motorway network. The concept is that these companies invest in the infrastructure in exchange for the right to collect tolls. The regulatory framework is designed to ensure that toll revenues align with the investments and maintenance costs incurred by the concessionaires.

The transition towards privatization began earnestly in 1999 when the Italian government decided to reduce its stakes in various state-owned enterprises, including Autostrade. This move was driven by the need to address the country's mounting public debt and to improve the efficiency of public asset management through private sector involvement. A strategic portion of Autostrade was sold to private investors, marking a significant shift from public to private control. By the early 2000s, this process was largely completed, with a majority of shares transferred to private hands, including a significant stake acquired by the Benetton family through their holding company, Atlantia.

Today, approximately half of Italy's 6,000 km of motorways are managed by Autostrade per l'Italia, with the rest operated by various other concessionaires. The Ministry of Infrastructure and Transport oversees this regulatory framework, ensuring compliance with concession agreements and adjusting policies as needed to address emerging challenges. This oversight has become increasingly stringent, particularly in light of incidents like the Morandi Bridge collapse in Genoa, which underscored the need for more rigorous supervision and potential reform of the concession system to enhance safety and reliability.

Concession agreements, typically lasting 30 to 40 years, are structured to allow concessionaires to recover their investments through toll collection. Renewal of these agreements depends on performance and compliance. The agreements mandate significant investment in maintenance and infrastructure to ensure long-term sustainability and safety. Specific performance standards related to road safety, traffic management, and customer service are enforced, with penalties for non-compliance. Tolls are collected at specified rates, with regulated adjustments to ensure transparency and fairness.

Ensuring compliance with these agreements and the price cap formula requires robust regulatory oversight. Bodies like ANAS must have the authority and resources to conduct regular inspections, audits, and performance evaluations. The regulatory framework must balance the interests of concessionaires with those of the public, ensuring that toll rates are fair and that the concessionaires meet their obligations to maintain and invest in the infrastructure. Incidents such as the Morandi Bridge collapse highlight the importance of transparency and public accountability in the concession system. Regulatory bodies must ensure that concessionaires adhere to safety and performance standards to maintain public trust.

Recent regulatory reforms have focused on enhancing transparency, improving compliance mechanisms, and ensuring that the price cap formula reflects current economic realities. Future reforms may include further refinements to the concession system, increased public accountability measures, and enhanced oversight capabilities for regulatory bodies.

Privatization has brought several benefits, including improved operational efficiency and increased investment in modernization. Private sector management has introduced better practices, streamlined operations, and focused on customer service, thereby enhancing the overall quality of motorway services. Fresh capital from privatization has been crucial for the modernization and expansion of the

motorway network, improving safety standards and implementing new technologies. However, privatization has also posed challenges, such as ensuring public accountability and managing toll rate increases. Balancing fair toll rates with the need for revenue to fund investments and provide returns to shareholders has been a contentious issue. Ensuring effective regulatory oversight has proven challenging, given the complexity of concession agreements and the need for detailed monitoring of compliance with contractual obligations.

The economic impact of the price cap mechanism includes predictability in toll adjustments, investment incentives, and inflation protection. The formula provides a predictable framework for toll adjustments, benefiting both concessionaires and road users by enabling accurate revenue forecasts and providing clarity on potential toll increases. By incorporating the investment factor, the mechanism encourages necessary infrastructure improvements, leading to better-maintained motorways and improved service quality. Adjusting tolls for inflation ensures that the real value of toll revenues is maintained, allowing concessionaires to cover rising costs without compromising on maintenance and investment.

However, implementing the price cap mechanism presents challenges, such as ensuring data accuracy, maintaining regulatory capacity, and managing public perception. The mechanism's effectiveness relies on accurate and timely economic data, particularly for inflation rates. Ensuring correct application requires significant regulatory capacity, with expertise and resources to monitor compliance and assess the validity of investment claims. Despite its economic rationale, the complexity of the price cap mechanism can make it difficult for the general public to understand, leading to perceptions of unfairness, especially with frequent or substantial toll increases.

Looking ahead, the regulatory framework is likely to evolve with enhanced transparency, stronger enforcement mechanisms, and increased public engagement. Future regulatory reforms may focus on making more information publicly

available, building trust, and ensuring concessionaires' accountability. Strengthening enforcement mechanisms will be crucial for compliance, including more rigorous audits, penalties for non-compliance, and potential revocation of concessions for severe breaches. Engaging with road users and other stakeholders through consultations, feedback mechanisms, and public hearings will help maintain public support and improve the regulatory process.

Technological advancements will also shape the future of motorway management. The integration of advanced technologies, such as real-time traffic monitoring, automated toll collection, and smart infrastructure, will enhance efficiency, safety, and user experience. Increasing focus on sustainability will drive investments in environmentally friendly practices, such as using renewable energy, green construction methods, and measures to reduce environmental impact. Leveraging big data and analytics can improve decision-making processes, with predictive maintenance, traffic forecasting, and user behavior analysis helping concessionaires and regulators optimize operations and investments.

In summary, the Italian motorway sector's regulatory framework and privatization have transformed its management and operations. Effective strategic planning, investment, and innovation will be essential for ensuring its continued success and relevance. By embracing technological advancements and prioritizing sustainability, the sector can continue to support Italy's economic growth and development in the years to come.

Price-cap-Based Regulatory Regime

In 1996, the Italian Motorway Industry underwent a significant regulatory overhaul, further refined in 2004 and 2007. This new framework eliminated discrimination between concessionaires based on ownership and introduced incentive-based regulation. Initially, toll levels were set at the start of the concession period to ensure revenues matched costs over the concession's lifespan.

Future toll adjustments followed a Laspeyres-type price cap constraint, with formula parameters reviewed every five years, except for the factor X, which could extend to ten years under certain conditions. This regulation also adjusted for inflation, quality standards, and expected productivity gains and was implemented during the renegotiation of concessions between 1997 and 2000.

Formula:

$$\left[\frac{\sum_i p_i^t \times q_i^{t-1}}{\sum_i p_i^{t-1} \times q_i^{t-1}} - 1\right] \times 100 \leq \Delta\text{RPI} - \text{X} + \beta\Delta Q \qquad (1)$$

• p_i^t and p_i^{t-1} are the toll per kilometer paid by a vehicle of type i in the year t and in the preceding one t-1.

• q_i^t and q_i^{t-1} are the total kilometers travelled by vehicles of type i in year t and in the preceding one t-1.

• ΔRPI is the variation in the retail price index.

• X is the offset productivity index.

• βΔQ reflects the change in the quality index Q modulated by the scaling

factor β.

The first practical application of this price-cap regulation was with the renewal of the concession for Società Autostrade S.p.A., which transitioned to operating under market principles after state control was lifted. The productivity index X is recalculated every five years for each concessionaire, ensuring their economic and financial stability by considering factors such as return on invested capital, future investment plans, productivity objectives, and market demand changes. The return on invested capital is compared to the internal rate of return and the average profitability over the previous five years.

Law No. 47/04 updated the calculation method for the fair return on invested capital, tying it to the weighted average cost of capital (WACC) for additional

investments beyond the original provisions. It also allowed extending the review period to ten years for significant extra investments. Productivity objectives are assessed using standard indicators derived from operational costs and kilometers traveled over the preceding five years. These indicators measure productivity improvements in terms of production process organization, resource deployment, technological advancements, and traffic increases.

The regulatory formula also included a unique quality component, linking the quality of service provided to allowed toll charges. This was measured by a composite quality index, Q, which averaged two factors: the accident rate per kilometer and the structural condition of the road surface. The accident rate served as an indicator of overall safety and infrastructure quality, while the surface condition, evaluated through standardized measurements, reflected maintenance levels and journey comfort. The surface quality indicator combined the roughness and regularity indices, ranging from 0 to 100, based on data certified by third parties. Accident rates were calculated using the Global Accident Rate, which considered accidents per 100 million kilometers traveled on motorways with varying conditions.

Where Q and I can be calculated as follow:

$$Q = w_{accidents} I_{accidents} + w_{surface} I_{surface} \quad (2)$$

$$I_{surface} = 0{,}6 I_{s1} + 0{,}4 I_{s2} \quad (3)$$

Furthermore, each class has different value for motorways on level ground (I_{aLG}) and mountainous ones (I_{aM}), as shown in Table:

CLASS	"LEVEL GROUND"	"MOUNTAIN"
A	GAR ≤ 50	GAR ≤ 60
B	50 < GAR ≤ 65	60 < GAR ≤ 80
C	65 < GAR ≤ 78	80 < GAR ≤ 100
D	78 < GAR ≤ 95	100 < GAR ≤ 120
E	95 < GAR ≤ 115	120 < GAR ≤ 140
F	115 < GAR	140 < GAR

Where:

$$I_{aLG}, I_{aM} = A\% + 0{,}75B\% + 0{,}5C\% + 0{,}25D\% \quad (4)$$

Then, an annual indicator $I_{surface,annual}$ is computed weighting I_{aLG} and I_{aM} for the respective lengths of the level ground and the mountainous sections of the motorway. The average of this annual index over the precedent five-year period determines the $Isurface$ to be used in (2). Finally, Q varies between 0 and 100, following this ranking and being 60 the objective operating standard:

• Q ≤ 40, MEDIOCRE.

• 40 < Q ≤ 50, INSUFFICIENT.

• 50 < Q ≤ 60, SUFFICIENT.

• 60 < Q ≤ 70, FAIR.

• $70 < Q \leq 75$, GOOD.

• $Q > 75$, EXCELLENT.

The variation ΔQ is computed yearly with respect to a basic value ($\overline{Q}$), not including the improvements of previous years. For the first five-year period of application of the price-cap formula, the basic value was the arithmetic average of the quality levels of the services offered in the previous five years.

The coefficient β modulates the variation in the quality level - ΔQ – into the allowed change in the average toll-level. Its continuously varying value depends upon and it is positively correlated to the initial level of quality offered by the concessionaire. The higher is the initial quality level – lower, respectively - the higher is β in case of an improvement – worsening – in the concessionaire quality performance. Moreover, it increases – decreases – more rapidly, the higher is the initial quality supplied. Therefore, β, whose value varies between 0 and 0,5, follows two formulas, depending on the sign of the variation of Q. Specifically,

- $\Delta Q > 0, \bar{Q} < 60$, then $\beta = \frac{0,25}{60}\bar{Q}$;
- $\Delta Q > 0, \bar{Q} \geq 60$, then $\beta = 0,25 + [\frac{0,25}{40}(\bar{Q} - 60)]$;
- $\Delta Q \leq 0, \bar{Q} < 60$, then $\beta = 0,50 - \frac{0,25}{60}\bar{Q}$;
- $\Delta Q \leq 0, \bar{Q} \geq 60$, then $\beta = 0,25 - [\frac{0,25}{40}(\bar{Q} - 60)]$.

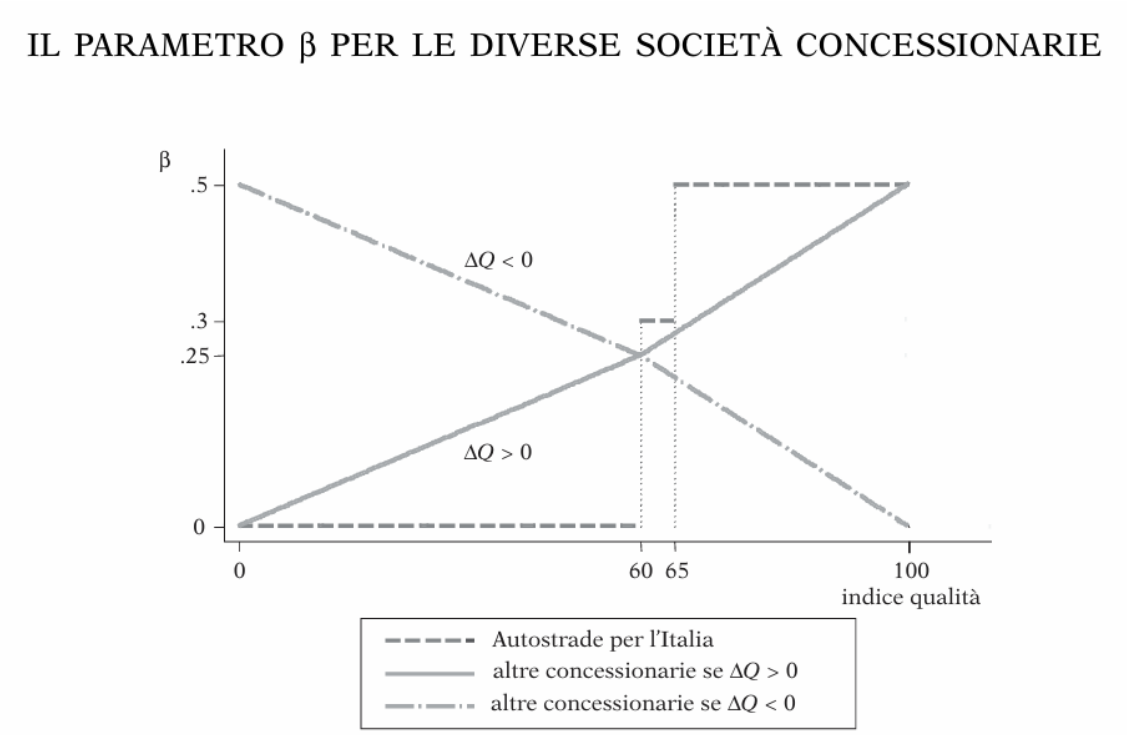


Figure 3. (from Benfratello et al riv pol ec 2006 329…. Paper)

In other words, the quality adjustment term in the formula allows for higher tolls in response to improvements in service quality, offering greater rewards to already well-performing concessionaires. This correlation between toll levels and service quality is based more on the increasing costs that concessionaires incur to meet higher standards than on the benefits customers experience, which tend to increase at a slower rate. Consequently, this quality adjustment acts as a cost-plus element in the price cap formula, reflecting the higher expenses required to achieve and maintain improved service levels.

An analysis of the financial statements of motorway concessionaires from 1994 to 2003 reveals several critical issues needing further examination. Notably, maintenance costs saw a significant rise, particularly after 1998. Autostrade per l'Italia, one of the major concessionaires, accounted for nearly half of the total expenditure on maintenance during this period.

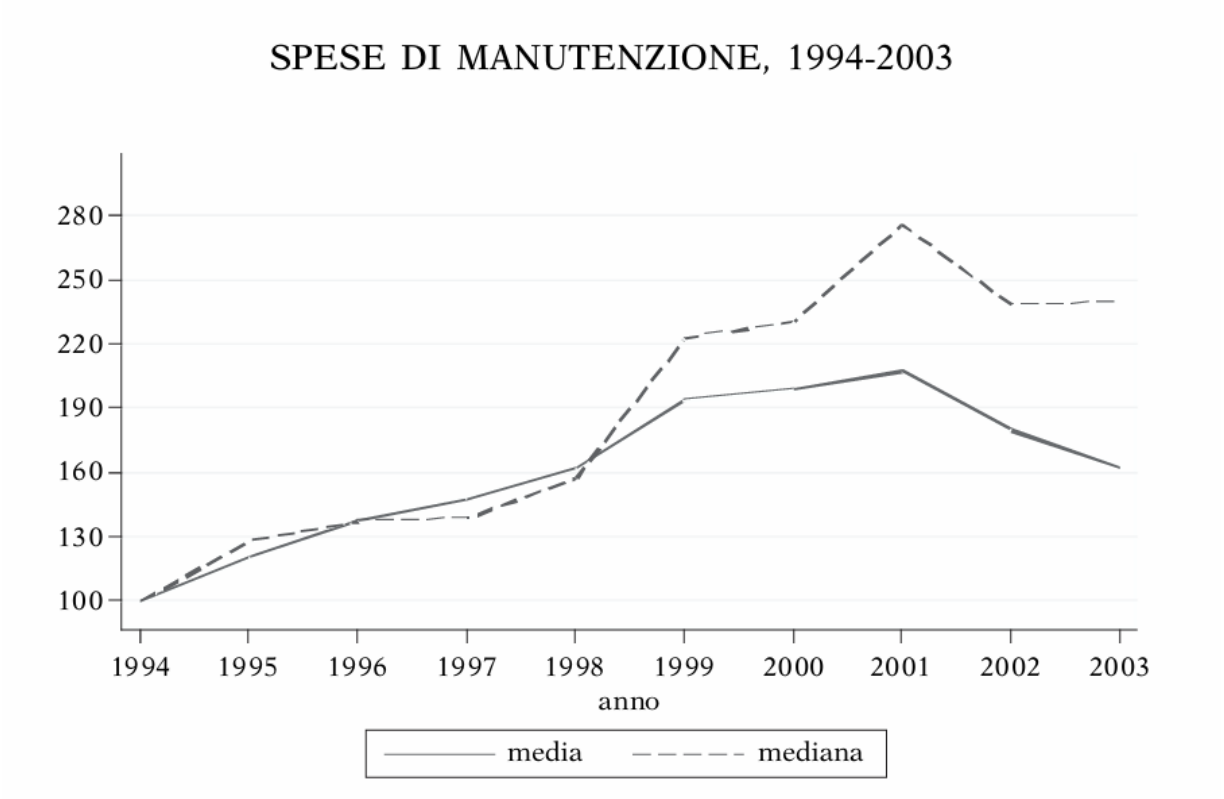


Figure 4 (from Benfratello et al riv pol ec 2006 329…. Paper)

This pattern, beyond the inherently cyclical nature of maintenance expenditures, is likely linked to the introduction of the quality adjustment term in the price-cap formula. Additionally, earnings before interest and taxes (EBIT) for all concessionaires exhibited an upward trend, with average earnings increasing six-fold during the examined period. Autostrade per l'Italia, due to its significantly larger size compared to other concessionaires, was the primary driver of this growth. Analyzing the median, there was a 2300% increase from 1994 to 2003, and a 260% rise since 2001 when the price-cap regulation was implemented for nearly all concessionaires.

UTILI PRIMA DELLE IMPOSTE, 1994-2003

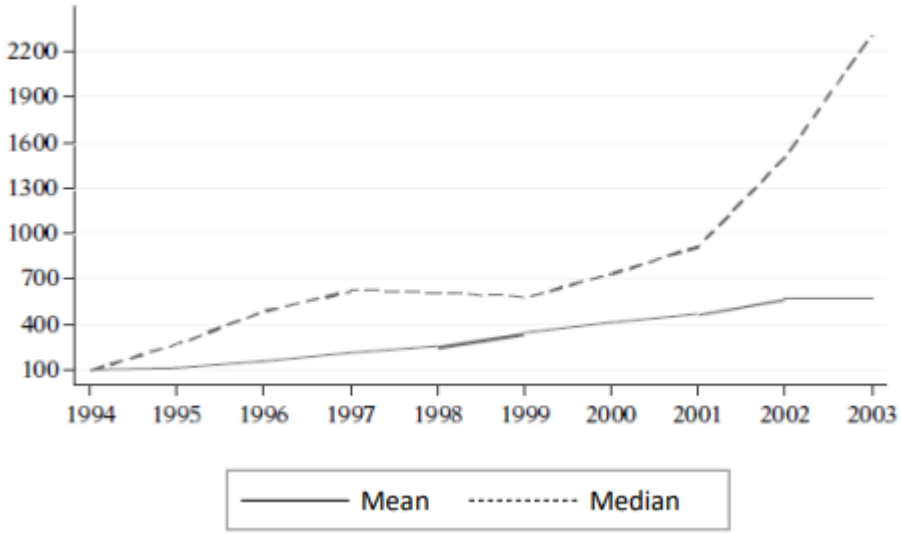


Figure 5 (same paper as before)

Finally, the Global Accident Rate remained relatively stable and even decreased in 2003 and 2004, likely due to the introduction of the penalty-points driving license system in August 2003. Regardless of the cause, this outcome suggests an improvement in road safety during this period.

TASSI DI INCIDENTALITÀ GLOBALE 1991-2004

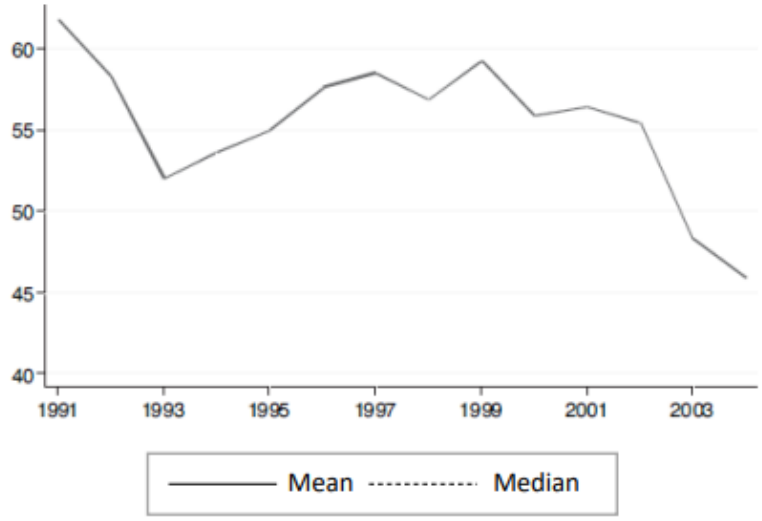


Figure 6 same paper as before

This decrease in the Global Accident Rate led to an increase in toll levels, as the formula awarded a premium for improvements in this safety metric. Consequently, while the sector's radical reform had successful aspects, it also highlighted significant issues, particularly in the financial performance of the concessionaires. These financial outcomes, if unchecked, could pose challenges for sustainable regulatory practices in the long term.

Since the inception of the Italian Motorway Industry, several problems have emerged, all rooted in the lack of a single, independent regulatory authority with the necessary technical and economic expertise and enforcement capabilities. This fragmentation of power contributed to a protracted and complicated convention-renewal process in the late '90s, delays in determining the X-factor for Autostrade per l'Italia—which was only resolved in 2004, a year after the concession's natural expiration—and further delays in subsequent five-year periods. Additionally, conflicts over toll-related authority among ANAS (Azienda Nazionale Autonoma delle Strade), NARS (Nucleo di consulenza per l'Attuazione delle Regole di Regolazione dei Servizi di Pubblica Utilità), and CIPE (Comitato Interministeriale per la Programmazione Economica) necessitated legislative intervention for resolution.

Several historical events have highlighted the inadequacy of ANAS as the sector's regulatory authority for two main reasons: its legal form and its dual role as both sector regulator and motorway operator. As a limited company, ANAS can engage in private juridical acts without the transparency and disclosure obligations essential for a regulatory authority, especially within a discretionary regulatory mechanism like the price cap. This is evidenced by ANAS never disclosing the information that led to the X-factor adjustment for the second five-year period of the concessions.

Furthermore, ANAS's concurrent roles as Regulatory Authority, Concession Granting Body, and Ltd. management-concessions holder for several motorways present a clear conflict of interest. ANAS managed over 1,000 km of the Italian motorway network, second only to Autostrade per l'Italia. In 2005, ANAS itself proposed a "deconsolidation from the public administration" and a strict separation between its concession-granting and monitoring functions and its motorway management operations. This proposal acknowledged the existing conflict of interests.

Reshaping ANAS's competences should be a task for the regulatory authority, focusing on ensuring an optimal number and size of concessionaires suitable for a regulated sector. Sector consolidation processes should aim to guarantee the minimum efficient size of a concessionaire and maintain a sufficient number of independent operators. This would facilitate better market competition during the issuance of concessions and enable benchmarking and yardstick competition by the regulatory authority.

The Actual Toll Dynamics

The methodology used by ANAS for determining the X-factor is poorly documented. An interpretative simulation by NARS (Coco, 2004) suggests that potential productivity gains were approximated using an average of linear and semi-log estimations of operating costs times kilometers traveled. This method reflects a basic understanding of business costs, only shallowly related to kilometers traveled. Deeper studies could identify various variables in the productive process—network length, number of lanes, ongoing works, toll collection methods—and compute their individual contributions to overall cost, revealing potential efficiency gains.

Moreover, it appears that this methodology was used to determine a sector-wide X-factor. Information from the Autostrade Group and the Gavio Group indicates that the same X was applied to all their concessionaires between 2005 and 2009. Previously, a similar approach was used, with a set of X values computed for a range of concessionaires, with different computations only in special conditions, such as significant investments.

Determining a single X-factor for the entire sector contradicts CIPE's resolution, which requires individual X-factor values for each concessionaire. This approach prevents fine-tuning of price-cap formula parameters and treats all companies equally, regardless of profitability, allowing more efficient ones to gain economic advantages. Consequently, the regulator cannot use comparative cost and quality data—yardstick competition—to transfer efficiency gains to consumers.

The Presence of Externalities

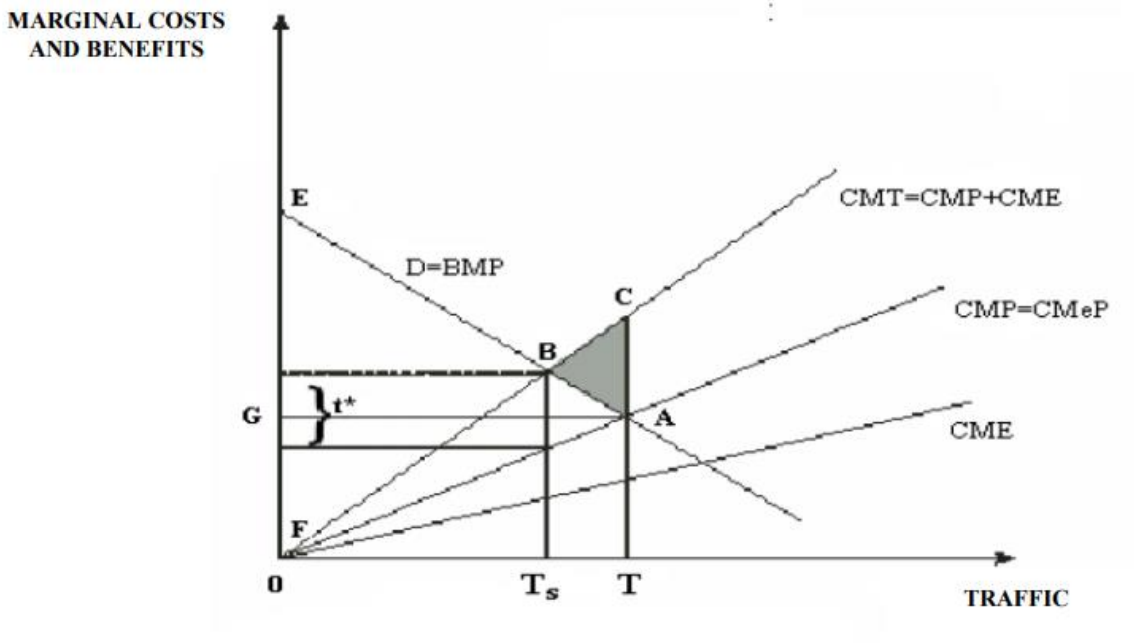
Price-cap regulation is an effective tool for establishing an allocatively efficient toll structure. It aligns the concessionaire's incentives with community interests, encouraging toll levels that maximize social welfare. However, this alignment is imperfect due to externalities in consumption. Congestion, a significant externality,

is driven by behavior less sensitive to price increases, prompting concessionaires to raise tolls. While price-cap regulation doesn't perfectly address optimal toll-setting in the presence of externalities, it does incentivize concessionaires to consider and partially mitigate them.

In economics, inefficiencies from externalities arise not from market failures but from the absence of a market and property rights for those externalities. In the transport industry, air pollution and congestion are the main externalities. Air pollution is a negative externality where transport activities impose costs on third parties without compensation, leading to a resource allocation that is not Pareto optimal.

Imagine a connecting road where D represents the demand curve, reflecting private marginal benefits (BMP) that decrease as the number of vehicles increases. Conversely, CMP represents the private marginal cost curve, primarily consisting of travel time and fuel costs, which increase with more vehicles on the road.

Assuming all individuals are equal, the private marginal cost curve is equivalent to the private average cost curve (CMeP). The traffic level generated is T, the point where marginal costs equal marginal benefits. Up to T, each individual experiences a gain, as the marginal benefit of travel exceeds its marginal cost. Beyond T, individuals incur a loss, as marginal costs surpass marginal benefits.



Assuming all individuals are equal, the private marginal cost curve (CMP) is equivalent to the private average cost curve (CMeP). The level of traffic generated is T, where marginal costs equal marginal benefits. Up to this point, each individual gains as the marginal benefit of travel exceeds the marginal cost. Beyond T, individuals incur a loss as the marginal cost surpasses the marginal benefit.

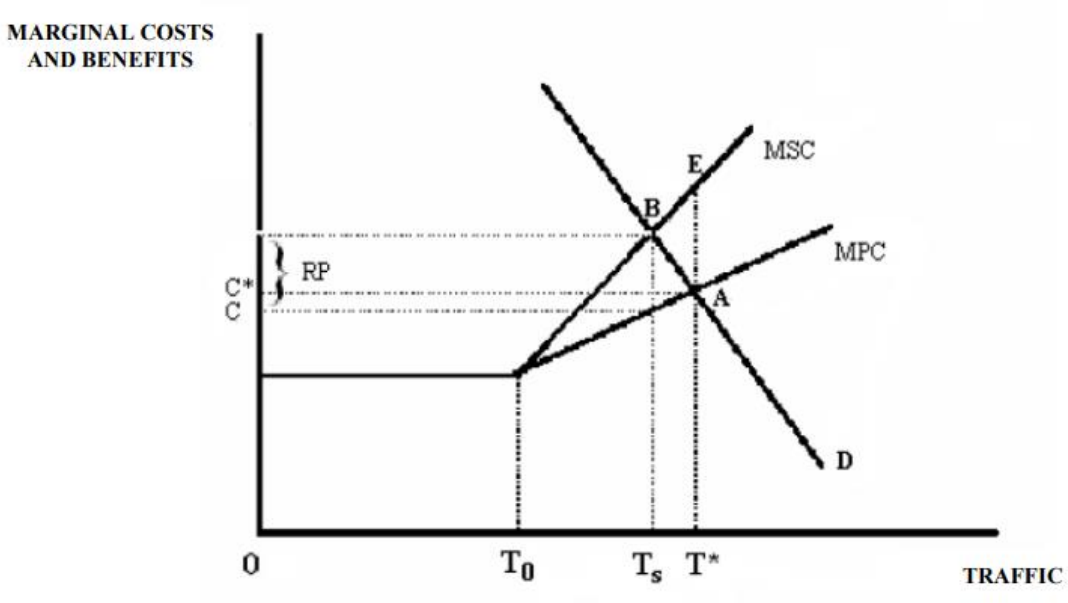
The total surplus comprises the consumer surplus (area EAG) and the producer surplus (area FAG). However, the optimal level of traffic for social welfare is not T due to the negative externalities from air pollution. Emissions and the associated externality costs increase with traffic. The externality average cost curve (CME) reflects these costs, and the total marginal cost curve (CMT) is the sum of CME and CMP. At T, the private optimal point, a welfare loss equivalent to the area CBA occurs because the marginal costs exceed the marginal benefits between Ts, where CMP intersects CMT.

Maximizing social welfare requires reducing the traffic level from T to Ts. This reduction mitigates the welfare loss caused by the externalities.

Congestion, another negative externality, arises because drivers own their cars but not the roads they drive on. They can't exclude others from using the road but must share the resource. Each car occupies a lane portion that others cannot use, temporarily claiming proprietary rights and causing congestion, which slows down traffic.

Congestion differs from air pollution in two key ways: it is an external cost for the driver but internal to the transport sector, and it affects production and consumption functions by increasing travel time. As shown in the graph, as the vehicle flow increases from a base value T0, each additional vehicle incurs an increasing private cost and raises the costs for other vehicles by lengthening travel times.

Here's the modified graph to illustrate this scenario:



Starting from T_0 the marginal cost curve diverges into private marginal costs (CMP) and social marginal costs (CMT), which include externalities like congestion and pollution. Drivers typically consider only their private costs, neglecting the additional costs their actions impose on others, resulting in an efficiency and welfare loss equivalent to the area ABE. Consequently, the actual level of traffic T exceeds the socially optimal level T_s.

The Arguable Incentive System Created

The CIPE resolution of 1996 mandated the establishment of quality-related standards and linked the allowed toll levels directly to the quality of services provided by concessionaires through a correction factor in the price-cap formula. While incorporating a correction factor theoretically promotes social-optimal quality levels more efficiently than merely setting quality standards, its practical implementation has been suboptimal, creating a questionable incentive system for achieving production efficiency.

Firstly, the quality index Q fails to capture the multi-dimensional nature of service quality. Secondly, the accident rate, which is part of the quality index, does not entirely reflect the concessionaires' efforts, as it is influenced by factors beyond their control. Consequently, the reduction in the Global Accident Rate, as shown in Figure 4, led to toll levels exceeding those justified by economic principles aimed at incentivizing fair behavior.

The shortcomings of the Q indicator were recognized from the outset, as the conventions included a commitment to develop a more efficient structure for Q. Law 47/04 later mandated the Ministry of Infrastructure and Transport (MIT) to propose additional quality standards for measurement and verification to the CIPE.

The goal of the quality-related adjustment term in the price-cap formula is to encourage concessionaires to adopt socially optimal quality levels. This optimal level is theoretically achieved when the marginal benefit to consumers equals the marginal cost incurred by the concessionaire for providing enhanced service quality. However, due to knowledge asymmetry about the efficient cost structures of concessionaires, the regulator cannot accurately determine this optimal level.

Moreover, the Q index tends to be higher when starting quality levels are already high. Economically, the adjustment factor should ideally decrease as the base quality level increases, reflecting the diminishing marginal benefits consumers derive from further quality improvements.

The most significant limitation of the quality adjustment term's structure in the formula is that it provides perpetually increasing incentives for quality improvements without any cap. Figure 2 illustrates a substantial rise in maintenance expenditures following the implementation of the price-cap regulation, driven by this flawed incentive system. For instance, in 2002, around 40% of maintenance expenses were allocated to motorway surfaces [Pozzi, 2003], and the average resurfacing cycle decreased from eleven to six years [Gros Pietro, 2005].

In essence, rather than serving as a tool to achieve socially optimal quality levels, the quality component of the price-cap formula has effectively become a mechanism for indefinitely transferring a significant portion of concessionaires' maintenance costs directly into toll levels.

5. Recent Developments in the Italian Motorway Industry

The Ministry of Transport and Infrastructure, along with the Ministry of Economy and Finance, was tasked with ensuring that all existing convention provisions at the time of the Financial Plan's first revision, and those subsequent, were consolidated into a Single Convention.

The Single Convention replaced the original agreements and any additional acts, although it was tailored for each concessionaire based on the specific characteristics of their agreements. Currently, this format has been adopted by all operators except for Autostrade Siciliane, Società Autostrade del Brennero, SITRASB, and SITMB, whose concessions are regulated by International Treaties.

The new protocol aimed to resolve past issues and enhance certainty and transparency in concession agreements. This comprehensive framework included several key provisions designed to improve the management and regulation of motorway concessions.

One significant aspect of the protocol was the method for calculating tolls. This calculation was based on traffic patterns, cost changes, and the efficiency and quality targets achievable by the concessionaire. Additionally, the protocol clearly defined how extra profits generated by the concessionaire should be utilized, ensuring a transparent allocation of these funds.

Another important element was the recovery of investment costs. The protocol allowed for the recovery of toll-income shares intended for planned investments that had not been collected in the prior period. However, toll adjustments were only recognized for planned investments that were completed and verified by the

granting authority. This measure aimed to ensure that investments were genuinely made and accounted for.

The protocol also increased the supervisory role of the granting body, requiring concessionaires to submit annual reports detailing economic, technical, financial, and managerial data. This enhanced oversight was intended to provide a clearer picture of concessionaire operations and ensure compliance with regulatory requirements.

Furthermore, the protocol explicitly outlined the business risks faced by concessionaires, providing a clear understanding of the challenges and responsibilities involved in managing motorway concessions. It also defined the application and value enhancement of sediments for activities related to motorway operations, ensuring that all aspects of the concession were effectively managed.

Effective procedures for concession termination were established, based on performance metrics such as efficacy, efficiency, and economy. This measure aimed to ensure that concessions could be terminated smoothly and efficiently if necessary, safeguarding the interests of all stakeholders involved.

Additional obligations for concessionaires included maintaining capital requirements, adhering to contract adjudication procedures, submitting tender schemes for approval, prohibiting affiliated companies from participating in tenders, and implementing conflict of interest prevention measures in their statutes. These obligations were designed to promote fair and transparent practices within the concession framework.

Finally, the protocol introduced fines ranging from €25,000 to €150,000,000 for failing to comply with Single Convention provisions. These penalties aimed to

enforce compliance and ensure that concessionaires adhered to the agreed-upon terms and conditions.

CIPE Resolution No. 39/2007

CIPE Resolution No. 39/2007 required that Economic-Financial Plans (EFPs) be revised at the end of each five-year regulatory period. This resolution detailed the procedures and documents necessary for these updates, which involved revising the macro-economic and operational assumptions under which the concessionaire would operate for the next five years, including both motorway service management and investment plans.

CIPE Resolution No. 27/2013

CIPE Resolution No. 27/2013 introduced additional criteria for EFP revisions, focusing on the timing and methods for determining the fair remuneration rate of invested capital. This issue was also addressed by Decree Law No. 201/2011, which mandated CIPE to preemptively evaluate updates or revisions to existing motorway conventions if they involved changes to the financial plan or regulatory aspects.

Currently, the revision of financial plans varies due to differences in subscription dates and issues with submitted proposals. Following the first regulatory period, Autostrade per l'Italia and SATAP updated their financial plans with an Additional Act signed on December 27th, 2013. For other companies, procedures are still being refined. The proposals are aligned with efforts to limit toll increases, and lower revenue recovery is achieved through re-planning investments, postponing non-priority projects, and re-evaluating the takeover value.

In summary, the new protocol and subsequent CIPE resolutions were designed to address past limitations and ensure greater certainty and transparency in motorway concession relationships. These measures aimed to improve toll calculation methods, enhance investment recovery and supervision, and establish clear procedures for concession termination, ultimately promoting a more efficient and transparent motorway industry.

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