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THE DISTANCE BETWEEN THE APPOINTMENT OF DIRECTORS IN JAPANESE JOINT-STOCK COMPANIES IN THE KANTO REGION DURING THE EARLY INDUSTRIAL PERIOD IN JAPAN

*Nobumichi Watahiki, Yuki Yasaku, Luiza Gatan, Cristian Vlad**

Abstract

This study investigates the industrial concentration trend in Japan from 1897 to 1907, focusing on the geographical distance between the residences of directors and auditors and the locations of their appointments in joint-stock companies that relied increasingly on professional management. Unlike general and limited partnerships characterized by unlimited liability partners, joint-stock companies introduced limited liability to enable large-scale operations, necessitating highly specialized managerial expertise. The expansion of transportation networks allowed, and indeed encouraged, the recruitment of such specialists from distant regions. This research aims to elucidate the spatial extent from which managerial elites were drawn, thereby illuminating patterns of industrial agglomeration. Furthermore, this study addresses an underexplored aspect in the literature on industrial agglomeration. Prior research, such as Fujita, Krugman, and Venables (1999), has predominantly emphasized the phenomenon of clustering without rigorously defining its spatial boundaries. These approaches often center on cost factors—transportation, wages, transactions—which adequately explain the flow of goods and capital but inadequately capture the movement of human agents who operate and sustain industrial processes. Considering the geographical mobility of these individuals offers a more nuanced understanding of agglomeration dynamics.

Key Words: leadership, Succession, Strategy, Japan, Enterprise, Culture, Psychology, Rural, Business Development

JEL Classification: L60, L63, M14

I Literature Review

1. The Distance Matter

Previous studies on industrial agglomeration have focused on industrial clusters, yet they have not addressed the issue of over what spatial range industrial agglomeration should be considered (for example, Fujita, Krugman, and Venables 1999). This is because they are based on assumptions regarding costs such as transportation costs, wages, and transaction costs.

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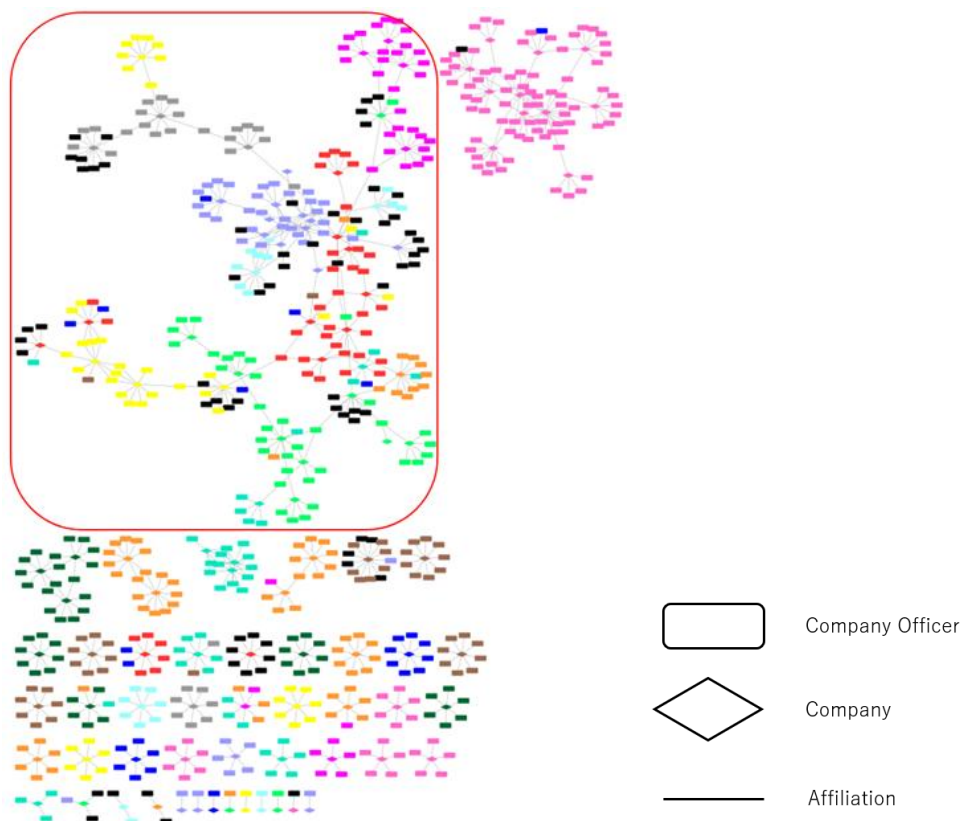
An extension of this idea is seen in studies such as Ivković and Weisbenner (2005), Massa and Simonov (2006), and Quan and Zhang (2021), which clarify the relationship between investors and distance. Kang and Kim (2008) examined geographical factors and corporate investment policies, while Jensen et al. (2015) investigated distance and audit quality. Knyazeva and Knyazeva (2012) focused on the cost of financing, and Kozu (2013) attempted to elucidate urbanization and agglomeration effects through spatial distance.

However, while this allows us to understand the movement of goods and money, I believe that knowing the movements of the people who manage them would bring us closer to reality.

2. The Network of Dually Employed Executives

Regarding the network of concurrent board memberships (dually employed executives) during the period under study, Suzuki ed. (2009) and Minami (2017) revealed its existence and showed that these concurrent relationships contributed not only to national projects but also to the development of local industries.

Figure 1: Network of corporate board members with concurrent positions in companies in Gunma Prefecture (1907) (created by the author)



For example, this diagram depicts the network of company directors holding multiple positions in Gunma Prefecture in 1907. The locations of the companies and the residences of the directors have been color-coded by city or county. From this diagram, it can be observed that directors can be divided into those who serve in only a specific company and those who hold multiple positions. Directors holding multiple positions may serve from long distances or may form networks solely within neighboring areas. Although this paper does not discuss it, it was found that there is also a regional characteristic in how these connections are formed. Gulati (1998) states that networking involves (1) the formation of partnerships, (2) the choice of governance structures, (3) the dynamic evolution of partnerships, (4) the outcomes of partnerships, and (5) the impact on the performance of companies participating in partnerships, but it may be necessary to incorporate regional aspects into this framework.

3. Inter-circles

What can be observed from Figure 1 is that, focusing on the largest connected component outlined in red, a specific group is formed. At that time in Japan, similar to Useem (1986)'s study, an interlocking network centered around financial institutions was formed; however, it was not composed of people from specific schools as Useem described. This is because the individuals serving as active executives at the time were mostly around 50 years old, and schools, except in some domains, were not formalized; education was provided through privately run *terakoya* schools or home tutoring. Therefore, it is more likely that inner circles were formed based on local ties or blood relations at that time.

II. Survey Target

1 Target Age Group

The period surveyed in this study coincides with the enactment of Japan's Commercial Code in 1890, which granted joint-stock companies full legal corporate status. Limited liability enterprises, modeled on British and French precedents, had been introduced as early as 1867; however, these earlier forms functioned as voluntary associations without legal personality.

Prior to this period, property was held individually by families, and no system of joint management existed. Even capital-intensive enterprises were financed and operated by household heads acting as individual investors. A rudimentary form of collective financing, known as *Tanomoshiko*, targeted approximately 500 farming households and functioned as a mutual aid mechanism comparable to life insurance (Najita, 2009). In practice, hereditary village leaders administered the fund, allocating loans by lottery to ensure fairness. However, *Tanomoshiko* was confined to small-scale, personal consumption lending and was ill-suited for large-scale investment. For a Japan

whose export industries were, at the time, largely limited to textiles, this institution was inadequate to support significant industrial expansion.

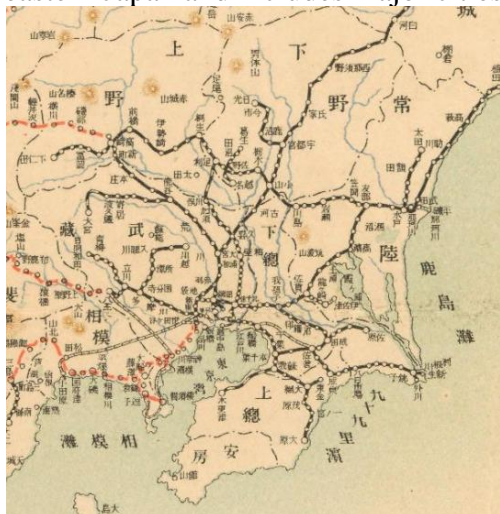
The mass dismissal of the samurai class in 1876 resulted in the issuance of government bonds as severance pay, a policy that contributed to inflation. In an effort to curb this inflation and stimulate industrial development, the government established National Banks across various regions—an initiative widely regarded as the origin of joint-stock enterprise in Japan.

From the 1880s, railway construction expanded rapidly into rural areas, while traditional waterborne transport declined. Everyday travel remained predominantly on foot; horses were largely reserved for agricultural use, and horse-drawn transport was accessible primarily to the relatively affluent.

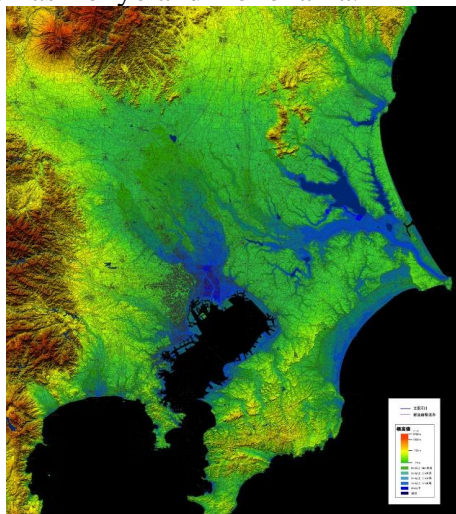
The textile industry continued to dominate domestic production; however, the opening of Yokohama Port in 1859 spurred a decisive shift toward export-oriented manufacturing. This period also marked the transition from household-centered handicrafts to factory-based production, increasingly powered by steam engines and, later, electricity.

2 Area

The area surveyed is the Kanto region. It is located on the Pacific coast of eastern Japan and includes major cities such as Tokyo and Yokohama.



Map 1: Railway lines in 1904
Railway Bureau, 'National
Railway Map,'



Map 2: Elevation differences in the
Kanto region Geographical Survey
Institute

The northern inland area of the region encompasses Gunma and Tochigi Prefectures, while the coastal area comprises Ibaraki Prefecture. Gunma is traversed by the Tone River, which originates in the northern part of the region and is largely responsible for shaping the plains of the Kantō area. Historically,

the Tone River flowed directly into Tokyo Bay; however, its course was redirected at the boundary between Ibaraki and Chiba Prefectures as part of large-scale flood control initiatives. In the northwestern part of Tochigi lies the Ashio Copper Mine, a historically significant site of industrial production. The Watarase and Kinugawa Rivers, both flowing through Tochigi, merge with the Tone River and contribute to the formation of the southern plains. Ibaraki Prefecture features extensive plains in the south and mountainous terrain in the north, the latter historically serving as a source of coal and iron ore. In terms of traditional industries, Gunma was a major producer of silk products, Tochigi specialized in both silk and hemp production, and Ibaraki cultivated tea. These goods were significant export commodities during the period in question.

Saitama, which is classified within the South Kanto region, exhibits a diverse topography with mountainous areas located to the west and expansive plains to the east, a formation attributed to the influence of the Tone River and its tributary, the Arakawa River. Tokyo displays a comparable geographical profile; however, since the seventeenth century, it has served as the capital of Japan and functioned as the central node of the sankin-kōtai system, wherein feudal lords and their vassals from provincial domains were required to reside periodically within the capital. Following the Meiji Restoration in 1867, the abolition of feudal domains and the subsequent establishment of prefectures in 1871, together with the implementation of the Rank and Allowance System in 1876, resulted in the formal dissolution of the samurai class. In order to prevent insurrection, former feudal lords were effectively confined within the capital, and beginning in 1872, vacant properties were settled by members of the aristocracy from Kyoto. Consequently, the environs of Edo Castle in Tokyo became characterized by an unusually high concentration of high-income individuals.

Chiba Prefecture is situated on a peninsula characterized by mountain ranges that extend along its coastline, resulting in limited flat terrain beyond the coastal areas. Consequently, the northern part of the prefecture has developed a prominent soybean cultivation sector, which has progressively evolved into a soy sauce industry. Furthermore, Chiba is internationally recognized for its abundant sardine fisheries; processed sardines were historically transported via river networks to rural districts across various prefectures, where they served as a valuable fertiliser.

Kanagawa Prefecture functioned primarily as a transit corridor between Tokyo and Kyoto until the opening of Yokohama Port in 1859. At that time, Yokohama was a modest fishing village. Although Kanagawa's Pacific-facing location endowed it with several ports, these too largely operated as transit points rather than centers of commercial activity.

III Research and Findings

1 Data Source

As previously noted, the corporate system in Japan was formally established through legislative enactment in 1895. Prior to the promulgation of this legal framework, corporate entities were not subject to statutory regulation, and shares could be freely exchanged as if they represented equity in a formally incorporated company, a practice consistent with those observed in other nations at the time. This regulatory vacuum resulted in a marked increase in fraudulent activities. In response to the need for verifying the legitimacy of corporate entities, private investigative agencies compiled and disseminated the Directory of Directors of Companies in Japan (hereinafter referred to as the “Directory”), which was issued from 1893 to 1939.

This publication is confined to relatively large-scale enterprises, and given that data collection was conducted via postal surveys, it did not yield a complete set of responses. Furthermore, certain small-scale lending institutions catering primarily to individuals were partially excluded from coverage. Although the survey initiative commenced in 1893, the volume of responses during the initial two years remained limited. Moreover, following the transfer of the project to a different company in its third year, only the data collected from 1895 onwards was utilized for analysis.

2 Address identification

The addresses of companies and their respective directors were verified utilizing historical administrative district datasets¹, cross-referenced against the place names documented in the records. The ‘List of Officers’ contained a considerable number of typographical errors and omissions, resulting in certain addresses being unidentifiable as originally recorded. In such instances, addresses exhibiting a Levenshtein distance of one were regarded as corresponding to the same municipality, or alternatively, validation was conducted by referencing the preceding or succeeding year. As the ‘List of Officers’ does not provide street numbers (see Appendix A), address identification was undertaken according to the following hierarchy of priority.

1) Location of the former town hall

In most cases, former village town halls have been repurposed as community centres or public libraries. Accordingly, in instances where no branch office of the town hall exists, the location of the community centre or public library has been employed as a proxy.

2) Post office

Post offices were privatized in 2001; however, at the time under consideration, they operated as public institutions, similar to those in other

¹ Geoshape Repository – Geospatial Data Sharing Site | ROIS-DS Humanities Open Data Joint Utilisation Centre

<https://geoshape.ex.nii.ac.jp/>

countries. For reasons of accessibility, they were generally situated near the centre of the settlement. Furthermore, since post offices were frequently managed as secondary enterprises by local landowners or other prominent individuals, their placement near the settlement centre can be reasonably assumed.

3) Public elementary and junior high schools

The siting of public elementary and junior high schools was based on the premise that pupils would commute on foot. Consequently, such institutions were not established at significant distances from residential areas, but rather in proximity to the settlements they served.

4) Centre of the polygon

The siting of public elementary and junior high schools was based on the premise that pupils would commute on foot. Consequently, such institutions were not established at significant distances from residential areas, but rather in proximity to the settlements they served.

3 Distance measurement

Based on the company and executive addresses outlined above, distances were measured using Google Maps with the walking route setting. In mountainous areas, straight-line measurements are problematic, as road networks do not permit direct travel. Although there are some discrepancies between historical and present-day road systems, the embankments (*azemichi*) constructed to divide rice fields along elevation differences historically served, and continue to serve, a functional role equivalent to roads. Accordingly, distance measurements were conducted under the assumption that contemporary routes do not differ substantially from those of the past.

With regard to river crossings, most locations where ferries had previously operated are now equipped with bridges. Therefore, the use of present-day maps was judged generally reliable for estimating historical accessibility.

4 Normalisation

Normalisation was applied to the above measurements in order to enable valid comparisons across regions. First, the distances were arranged in ascending order, with the longest distance designated as a value of 1 and all other distances converted to proportional ratios relative to this benchmark. Subsequently, the ranked distances were divided by the total number of individuals in the sample, thereby yielding normalised values for comparative analysis.

IV Results

1. Each prefecture, 1897–1907

It was initially hypothesized that the shape of the distribution curve would change substantially with the development of railway networks. However, the overall form remained largely stable and could be approximated by a fourth-order polynomial function. Although minor regional variations were observed, the majority of cases fell within a 2 km radius, and most were located within a 20 km radius—corresponding to a distance generally considered feasible for a single-day commuting journey on foot.

Tokyo displays an irregular pattern around the 0.95 rank in both 1902 and 1907. This anomaly can be attributed to the involvement of investors from the Kansai region, including Osaka. By contrast, appointments to more distant locations were often linked to descendants of former daimyo families or affluent merchants from Kyushu, many of whom concurrently served as board members.

As illustrated in Graphs 1–7, the majority of cases are concentrated within relatively short distances. Table 1 further indicates that the statistical mode consistently corresponds to the same village. With regard to the median, it also falls within the same village for most prefectures. However, Tokyo and Kanagawa demonstrate a distinctive pattern in which the median distance extends beyond that of adjacent municipalities, reflecting their unique regional dynamics.

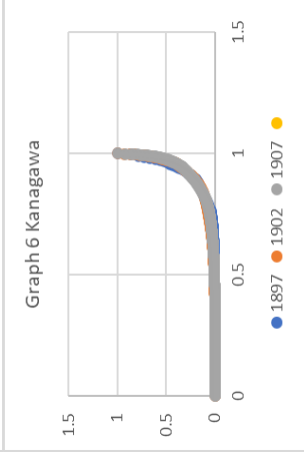
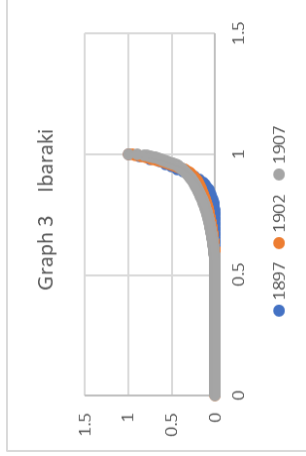
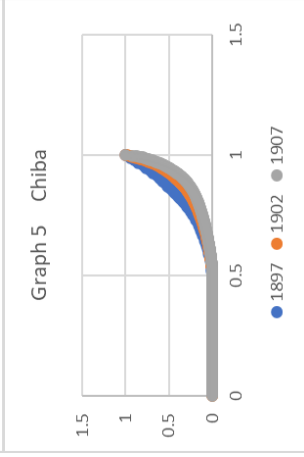
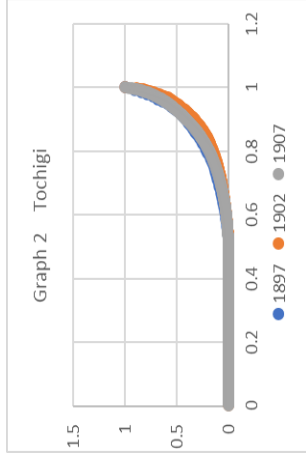
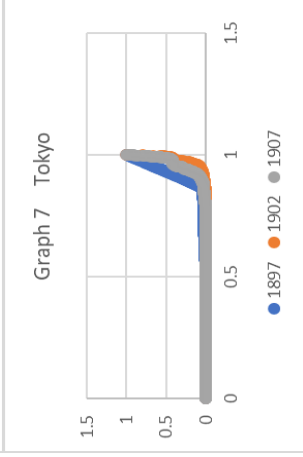
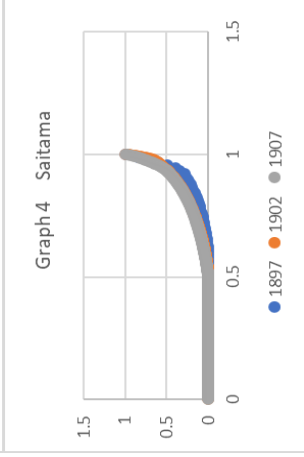
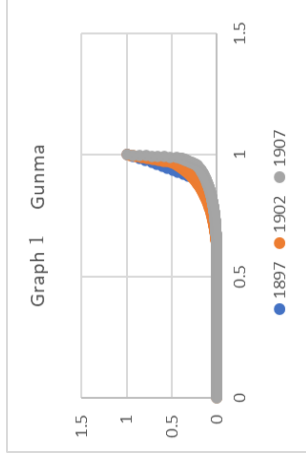


Table 1: Statistics for Northern Kanto

	Gunma			Tochigi			Ibaraki		
	1897	1902	1907	1897	1902	1907	1897	1902	1907
Average	14.42	6.66	30.55	13.28	8.5	8.75	10.92	9.62	8.38
Standard error	2.91	0.84	15.56	2.20	1.17	0.71	2.85	1.19	1.28
Median	0.50	0	0	0	0.26	0.60	0	0	0
Mode	0	0	0	0	0	0	0	0	0
Standard deviation	32.92	18.99	407.48	25.65	25.8	19.16	27.89	25.48	29.54
Variance	1083.87	360.72	6419.31	657.79	665.58	366.94	777.45	649.05	872.74
Kurtosis	5.30	20.68	68.19	11.59	158.93	42.57	8.29	19.2	140.32
Skewness	2.58	4.49	8.17	3.14	10.57	5.20	2.94	4.05	10.41
Number of data points	128	515	685	136	487	721	96	462	530
Maximum value	131	128	744	163	436	245	128	222	468
Minimum value	0	0	0	0	0	0	0	0	0
Confidence level (95.0%)	5.76	1.64	6.01	4.35	2.30	1.40	5.65	2.33	2.52

Table 2: Statistics for Southern Kanto

	Saitama			Chiba			Tokyo			Kanagawa		
	1897	1902	1907	1897	1902	1907	1897	1902	1907	1897	1902	1907
Average	8.71	4.59	5.69	12.97	8.57	8.38	39.57	39.41	44.84	28.54	10.72	14.19
Standard error	2.37	0.5	0.46	1.82	0.65	0.94	3.58	2.7	2.49	5.92	1.51	1.9
Median	0	0	1	3.3	0.65	0	3.5	3.6	4	1	1	0.9
Mode	0	0	0	0	0	0	0	0	0	0	0	0
Standard deviation	22.65	11.57	11.67	17.58	16.98	23.49	129.73	139.13	140.75	86.63	39.77	59.2
Variance	513.08	133.94	136.15	308.95	288.46	551.63	16830.92	19356.93	19810.06	7504.2	1581.77	3504.45
Kurtosis	12.48	43.51	21.29	0.3	14.46	145.87	25.32	39.67	21.05	42.21	81.81	152.78
Skewness	3.58	6.01	4.041	1.23	3.44	9.67	4.63	5.78	4.34	5.72	8.19	10.82
Number of data points	91	543	637	93	687	622	1310	2663	3198	214	694	971
Maximum value	118	118	108	60	133	413	1216	1351	1205	844	508	1089
Minimum value	0	0	0	0	0	0	0	0	0	0	0	0
Confidence level (95.0%)	4.72	0.98	0.91	3.62	1.27	1.85	7.03	5.29	4.88	11.67	2.96	3.73

The individual with the longest distance may vary, as such appointments were sometimes made for purposes of rescue or takeover, followed by relatively short terms in office. As illustrated in Map 1, Chiba and Ibaraki were not connected in 1897, but had established a connection by 1907. This development may account for the observed increase in the number of long-distance appointments. However, the median and mode values do not necessarily reflect a corresponding rise in long-distance placements.

Next, examining Graphs 1–7, it is evident that their overall shapes display strong similarities. When approximation curves are fitted to these data, the results are presented in Table 3 below.

Table 3: Approximate equations for each year

Gunma	1897	$y = 2.9896 \times 10^{\{-5\}} \times e^{\{10.5923x\}}$
		$R^2 = 0.95$
	1902	$y = 9.3591 \times 10^{\{-5\}} \times e^{\{-63.7652x\}}$
$R^2 = 0.94$		
1907	$y = 2.4364 \times 10^{\{-5\}} \times e^{\{-15.7077x\}}$	
	$R^2 = 0.90$	
Tochigi	1897	$y = 1.6272 \times 10^{\{-5\}} \times e^{\{10.8094x\}}$
		$R^2 = 0.97$
	1902	$y = 8.9728 \times 10^{\{-24\}} \times e^{\{52.4158x\}}$
$R^2 = 0.71$		
1907	$y = 1.6415 \times 10^{\{-7\}} \times e^{\{14.7926x\}}$	
	$R^2 = 0.86$	
Ibaraki	1897	$y = 3.8171 \times 10^{\{-6\}} \times e^{\{12.5514x\}}$
		$R^2 = 0.96$
	1902	$y = 5.4546 \times 10^{\{-9\}} \times e^{\{18.7111x\}}$
$R^2 = 0.97$		
1907	$y = 9.0546 \times 10^{\{-58\}} \times e^{\{131.1778x\}}$	
	$R^2 = 0.78$	
Saitama	1897	$y = 1.5773 \times 10^{\{-7\}} \times e^{\{15.7409x\}}$
		$R^2 = 0.98$
	1902	$y = 3.8347 \times 10^{\{-19\}} \times e^{\{42.2811x\}}$
$R^2 = 0.95$		

	1907	$y = 2.1039 \times 10^{-7} \times e^{\{14.9101x\}}$ $R^2 = 0.73$
Chiba	1897	$y = 1.0678 \times 10^{-2} \times e^{\{4.6165x\}}$ $R^2 = 0.97$
	1902	$y = 5.9330 \times 10^{-5} \times e^{\{-25.7455x\}}$ $R^2 = 0.95$
	1907	$y = 1.7929 \times 10^{-12} \times e^{\{26.0746x\}}$ $R^2 = 0.73$
Kanagawa	1897	$y = 5.9642 \times 10^{-13} \times e^{\{27.8345x\}}$ $R^2 = 0.92$
	1902	$y = 8.1153 \times 10^{-30} \times e^{\{66.8361x\}}$ $R^2 = 0.95$
	1907	$y = 3.5299 \times 10^{-48} \times e^{\{108.9673x\}}$ $R^2 = 0.73$
Tokyo	1897	$y = 5.8626 \times 10^{-11} \times e^{\{23.2507x\}}$ $R^2 = 0.94$
	1902	$y = 1.8033 \times 10^{-5} \times e^{\{-55.9867x\}}$ $R^2 = 0.97$
	1907	$y = -3.0459 \times 10^{-5} \times e^{\{-204.3396x\}}$ $R^2 = 0.97$

As the data spans 15 years, it cannot be clearly said that it indicates a definite trend, but it is, nevertheless, worthy to point out that, although the initial coefficient of determination was above 0.9, it has decreased in most areas, except for Tokyo.

1.3 Summary

As described above, the distance between the place of residence and the place of appointment of executives in all prefectures within the Kanto region could be approximated by a fourth-order function in each fiscal year. Although the distribution of distances varies across prefectures, a certain regularity in appointment distances is evident. Over time, there is a tendency for the maximum distance between the place of residence and the appointment location to increase, resulting in a steeper gradient.

2. Differences between rural and urban areas

The distinction between urban and rural areas was formally established in 1888 by the ‘Ordinance on Municipal Systems,’ which designated areas with a population exceeding 25,000 as cities. Maebashi City in Gunma Prefecture, Utsunomiya City in Tochigi Prefecture, and Mito City in Ibaraki Prefecture are situated in regions with historical establishment of former feudal domains and have experienced commercial and industrial development since ancient times. In contrast, Saitama Prefecture had a domain in Inuma; however, the prefectural office was relocated to Omiya to diminish the influence of former feudal powers. Chiba Prefecture was created through the merger of Kisarazu and Inba counties, with its prefectural office moved to Chiba—a former post town that maintained town status as of 1907. Kanagawa Prefecture, originally a fishing village, established its prefectural office in Yokohama, which became an international port in 1859. The development of this port triggered rapid population growth, leading to its designation as a city.

Tokyo presented a more complex scenario, where various feudal domains maintained their Edo residences—akin to local government offices—concentrated within the ward areas until 1872. By that time, the population had already surpassed one million. Following the Meiji Restoration, these structures were confiscated by the new government and temporarily repurposed. With the subsequent decision to relocate the capital to Tokyo, the imperial family and their households moved from Kyoto to Tokyo. Furthermore, former feudal lords who had returned to their home domains were encouraged to resettle in the city districts to mitigate the risk of potential rebellions. Consequently, areas proximal to Edo Castle (present-day Imperial Palace) within the city districts became predominantly inhabited by higher-income residents.

These historical and political factors contribute to explaining the observed distinctions between rural areas and the Tokyo Special Wards.

2.1 Differences in Dispersion Between Rural and Urban Areas

Upon examining the following graph, it becomes evident that, in both regions, rural areas exhibit a somewhat greater degree of concentration in adjacent areas. This phenomenon may be attributed to several factors: 1) During that period, urban centers—often the prefectural capitals—served as locations for the National Agricultural Bank, an institution established as part of a national policy to foster industrial development. The bank’s directors were predominantly members of the local landowning class, with many appointees residing at distances greater than 20 km from the prefectural capital. 2) Furthermore, newspapers and major printing houses were situated in the prefectural capitals, typically functioning as branch offices for influential figures within the prefecture. 3) The existence of the prefectural assembly

constitutes an additional factor, as eligibility for election required a minimum annual income tax payment of 30yen. As this tax was primarily assessed on land holdings, landowners initially outnumbered farmers in the assembly, with instances reported in which individuals acquired land assets expressly to qualify as candidates.

Conversely, rural areas were predominantly organized around enterprises engaged in the processing of hemp, silk, and cotton into textiles, alongside banks that furnished credit to agriculturalists. Prior to the establishment of the corporate system, such enterprises mainly operated as individually managed businesses. However, with the introduction of factories powered by steam engines and electricity—technologies necessitating substantial capital investment—these operations were reorganized into formal companies.

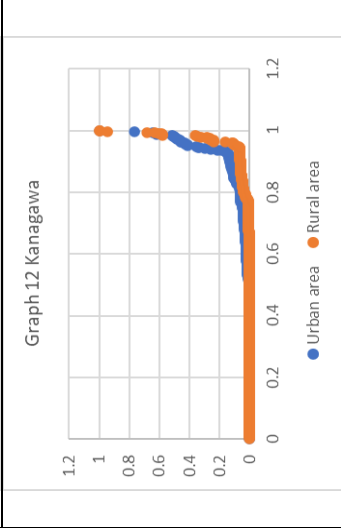
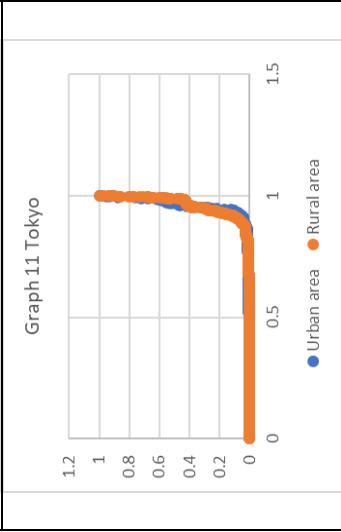
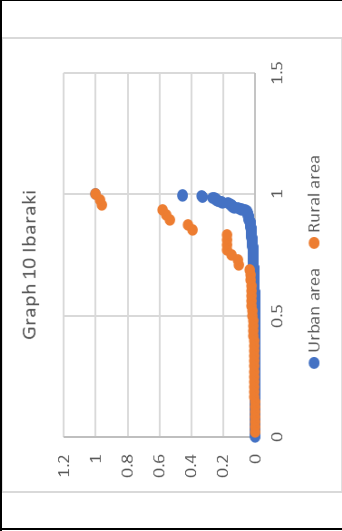
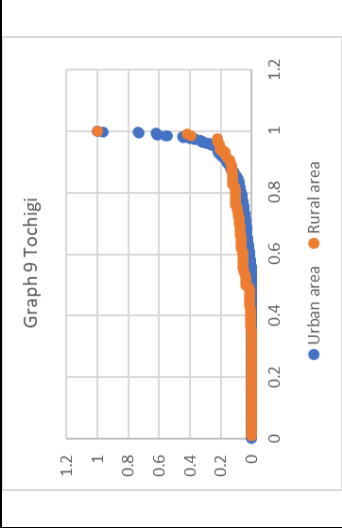
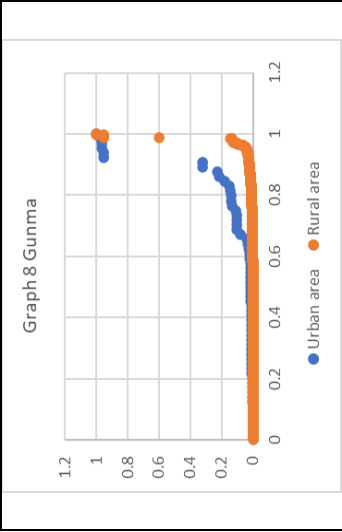


Table 4 Comparison of rural and urban areas in 1907

	Gunma		Tochigi		Ibaraki		Tokyo		Kanagawa	
	Rural areas	Urban areas	Rural areas	Urban areas	Rural areas	Urban areas	Rural areas	Urban areas	Rural areas	Urban areas
Average	15.31	15.33	7.27	16.49	10.38	15.98	37.17	46.37	10.05	17.67
Standard error	3.36	3.88	0.67	2.62	1.64	4.31	5.58	2.77	1.90	3.10
Median	0	1.7	0	9.3	0	1.8	4.2	4	0	1
Mode	0	0	0	0	0	0	0	0	0	0
Standard deviation	83.64	31.01	16.49	28.23	35.01	29.88	129.91	142.74	40.09	71.29
Variance	6995.27	961.87	272.02	796.75	1225.38	892.72	16878.28	20373.44	1606.89	5082.63
Kurtosis	63.28	5.08	23.5	37.83	76.59	4.35	22.17	20.83	263.59	110.58
Skewness	7.93	2.53	4.3	5.19	7.33	2.26	4.63	4.29	14.65	9.15
Number of data points	620	64	605	116	458	48	543	2659	444	527
Maximum value	744	111	136	245	477	112	926	1205	750	1089
Minimum value	0	0	0	0	0	0	0	0	0	0
Confidence level (95.0%)	6.6	7.75	1.32	5.19	3.21	8.68	10.95	5.43	3.74	0

Table 5 Approximate formula for rural and urban areas

Gunma	Rural areas	$y = 1.3544 \times 10^{\{-32\}} \times e^{\{73.5970x\}}$ $R^2 = 0.90$
	Urban areas	$y = 1.2229 \times 10^{\{-4\}} \times e^{\{9.1950x\}}$ $R^2 = 0.92$
Tochigi	Rural areas	$y = 4.9693 \times 10^{\{-8\}} \times e^{\{16.4984x\}}$ $R^2 = 0.92$
	Urban areas	$y = 2.4508 \times 10^{\{-5\}} \times e^{\{9.9347x\}}$ $R^2 = 0.71$
Ibaraki	Rural areas	$y = 1.2222 \times 10^{\{-15\}} \times e^{\{33.7830x\}}$ $R^2 = 0.89$
	Urban areas	$y = 3.1225 \times 10^{\{-4\}} \times e^{\{8.1819x\}}$ $R^2 = 0.98$
Tokyo	Rural areas	$y = 6.2104 \times 10^{\{-13\}} \times e^{\{28.1622x\}}$ $R^2 = 0.98$
	Urban areas	$y = 2.8888 \times 10^{\{-10\}} \times e^{\{21.7511x\}}$ $R^2 = 0.97$
Kanagawa	Rural areas	$y = 9.1344 \times 10^{\{-44\}} \times e^{\{98.5184x\}}$ $R^2 = 0.64$
	Urban areas	$y = 9.1344 \times 10^{\{-44\}} \times e^{\{98.5184x\}}$ $R^2 = 0.91$

Initially, it was expected that in rural areas, where industries involved in agricultural product processing and the banks for their settlements predominated, the governance would be completed by directors from nearby locations. However, Table 4 shows that this is not necessarily the case. Indeed, in Gunma and Ibaraki, it tended to be the rural corporations that appointed directors from the same village or nearby areas, whereas in Tokyo and Tochigi, both rural and urban areas display almost the same trend. Conversely, in Kanagawa, there is a tendency for urban companies to appoint directors from nearby locations. This is because people from production areas in northern

Kanto have moved near the export port of Yokohama and operate companies there for export purposes. (Watahiki2024).

2.3 Summary

Saitama and Chiba were excluded from this analysis due to their lack of city status at the time. Based on these criteria, the area can be divided into two groups: Group A, comprising Tokyo and Kanagawa, and Group B, encompassing all other regions.

Group A, particularly Tokyo, exhibited an exceptionally high population concentration and a considerable proportion of high-income earners even during this period. Conversely, Kanagawa was an artificially established city with a specialized role focused on import and export functions. Consequently, these urban areas contained a higher density of companies. In Tokyo specifically, the suburban areas were home to headquarters of large-capital industries—such as railways and mining—rather than companies primarily supporting local livelihoods.

Furthermore, regional banks, including institutions like the National Bank, were influenced by the presence of former feudal lords or high-ranking samurai residing in the capital. These individuals often established their headquarters within the city while operating businesses in outlying regions, which appears to be a significant underlying factor.

In Kanagawa's case, its function as an export port for northern Kanto's textile and tea industries prompted companies in Yokohama to establish independent export departments for these sectors. Indeed, instances have been documented where executives simultaneously held positions within both the Yokohama export offices and the parent production companies (Watanabe, 2024).

In Group B, the number of companies was markedly higher in rural areas. Firstly, the population was more widely dispersed than it is today, with the prefectural capitals being the only urban areas comparable to cities. Secondly, the industrial structure at the time was primarily centered on the textile industry, with ancillary sectors such as banks facilitating settlement payments to farmers supplying agricultural products, transportation companies, and warehousing likely exerting significant influence.

Within the urban areas of Group B, industries requiring relatively large capital investments—such as newspapers, printing, light railways, and electricity—were more inclined to establish their headquarters in the county seat cities, where management was more feasible.

However, this does not imply that the mere presence in an urban area equated to the existence of individuals capable of substantial investment. Income during this period largely depended on land rents, and high-income earners were often hereditary landowners. Additionally, there may have been

strategic efforts to attract prominent external figures to serve as board members or investors, thereby facilitating capital acquisition through association with influential personalities from the Meiji Restoration-era new zaibatsu, such as Shibusawa Eiichi and Okura Kihachiro.

As evidenced by the foregoing, companies in the rural districts were fundamentally enterprises of the local residents, by the local residents, and for the local residents.

VI. Conclusion

When examining the distance between the headquarters and the residences of corporate executives, nearly 40% were found to reside within a 2 km radius of the headquarters. However, in major urban centers such as Tokyo and Kanagawa, a substantial number of executives were appointed from locations exceeding 40 km away, with some incumbents serving for over a decade while residing more than 600 km distant. In contrast, in other regions, the proportion of executives appointed from distant locations remained below 5%.

When normalizing the maximum distance to a value of 1, the data could be approximated by a fourth-order function irrespective of the level of transportation infrastructure development, including railways. This approximation held consistently for both urban and rural areas. The subsequent question concerns the appropriate threshold distance for board member appointments. Although this study does not delve further into this issue, approximately half of the cases fall within a 0–10 km range, and around 80% fall within a 20 km range, suggesting that this may constitute a reasonable boundary.

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THE ENLARGEMENT OF THE EUROZONE – BULGARIA A MEMBER STARTING 2026

Andrei Rădulescu*

Abstract

Bulgaria joined the European Monetary Union (EMU) on January 1, 2026, following formal approval by the EU Council in July 2025. On the one hand, the adoption of the euro probably represents the most important event in the economic history of Bulgaria, a country confronted with unprecedented transformations in recent decades. On the other hand, the entry into the Eurozone may determine an improvement of macroeconomic performance in the coming years, a scenario supported by the low level of the real interest rates and the low level of the public debt, with a positive impact on the investment climate. In this paper, standard econometric tools are applied, and the databases of the International Monetary Fund (IMF, 2026) and Eurostat (2026) are used to assess the macroeconomic developments during 2000 – 2025 and to identify the main challenges Bulgaria's economy faces in the context of the euro's introduction. The results indicate an upward trend for the annual potential growth in recent quarters (towards the highest level since 2008), an evolution supported by the improvement in gross fixed capital formation. This expresses a better outlook for the economic activity in Bulgaria in the coming years. However, the policymakers should pay attention to the structural component of the budget deficit. Furthermore, the pace of structural reforms should accelerate in the country in order to transform all the opportunities induced by the euro area adoption into more sustainable and inclusive growth in Bulgaria.

Keywords: Bulgaria, Eurozone, structural reforms

JEL Classification: C53, F15, F33, H60

1. Introduction

The adoption of the euro constitutes probably the most important event in the economic history of Bulgaria, a country confronted with unprecedented structural transformation in the past decades, among which we mention: the transition from a state-run to a market economy, accession to the European Union, and the impact and consequences of global shocks (the Great Financial Crisis, the COVID-19 pandemic, and intensifying geopolitical tensions).

On the one hand, this accession represents a natural process for Bulgaria, following the currency board regime (implemented from 1 July 1997 in the context of the 1996–1997 economic crisis) and EU accession (1 January 2007). This exchange-rate regime, in place for 28 years, generated a high degree of macroeconomic stability, as evidenced by developments in the current account and public finances. According to the database of the International Monetary

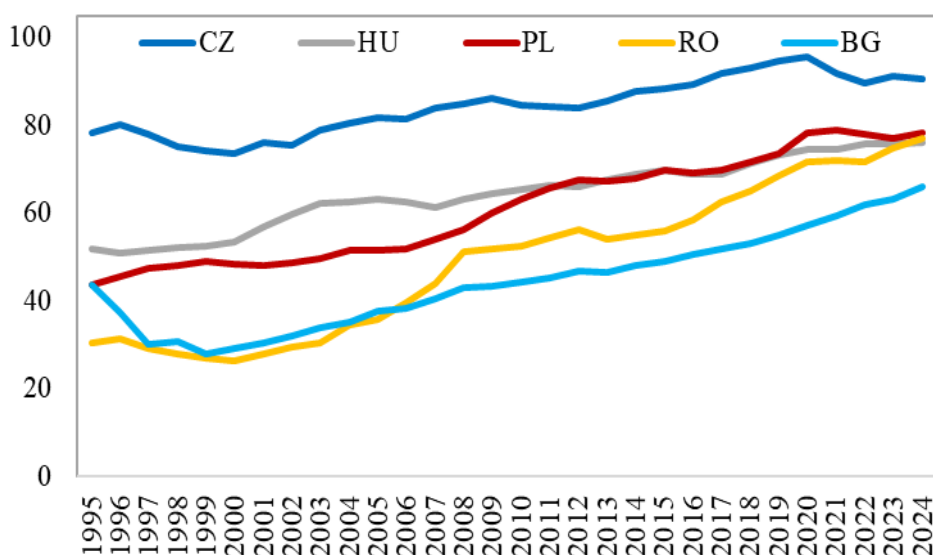
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Fund (IMF, 2026), Bulgaria recorded a budget deficit above the 3% of GDP threshold only in 2010 and 2014.

We emphasize that this exchange-rate regime also made a fundamental contribution to Bulgaria's economic convergence toward the EU average over recent decades. Thus, thanks to the currency board, Bulgaria has been the Central and Eastern European country with the most sustainable European economic convergence in recent decades.

Indeed, over the period 2000–2024, GDP per capita expressed at purchasing power standards, as a percentage of the EU average, increased every year in Bulgaria — except in 2013 (when a decline of only 0.3 percentage points was recorded) — rising from 29% to 65.9%, according to the estimates of Eurostat (2026) represented in the following chart. All the other countries from Central and Eastern Europe, currently members of the European Union, have recorded declines in GDP per capita (at purchasing power standards, as a percentage of the EU average) several times in the past 25 years. For instance, there were six years of decline in the case of Poland (the largest economy in Central and Eastern Europe), three years in Romania (the second largest economy in the CEE region), nine years in Czechia, and four years in Hungary.

Figure 1. GDP per capita (Purchasing Power Standards) (% of the EU average)



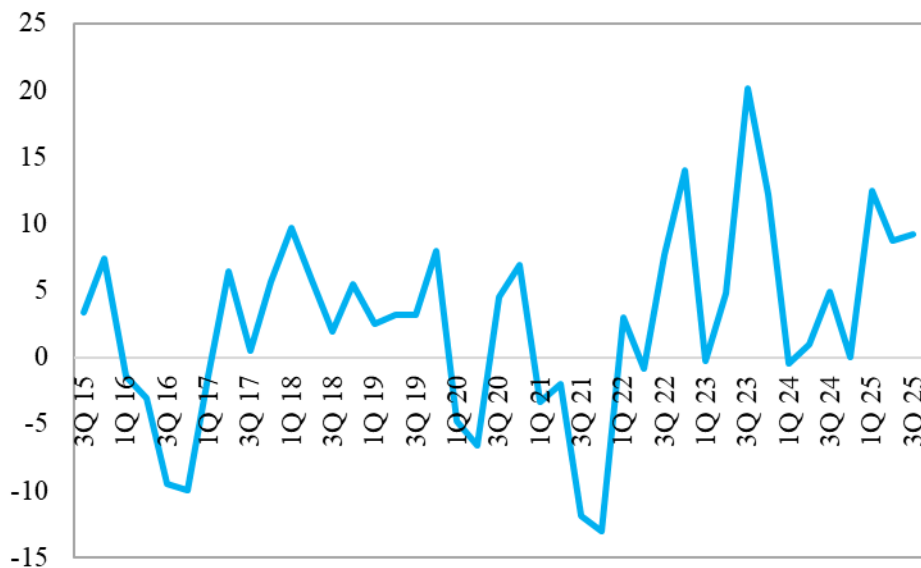
Source: representation of the author based on the statistics of Eurostat (2026).

On the other hand, the entry of Bulgaria into the Eurozone generates opportunities for both Bulgaria and the euro area economy, a point also highlighted by the European Central Bank (ECB, 2026) at the beginning of the year.

The introduction of the euro will positively impact the international companies on the Bulgarian market, a finding confirmed by the increase in foreign direct investment at an annual rate of 11.4%, reaching €3 billion over the period January–November 2025, according to the estimates of the Bulgarian National Bank (BNB, 2026). At the same time, the Bulgarian companies will be able to manage international trade flows more easily, given that the euro is the second most important currency in the international financial system (after the US dollar).

In this respect, we point out the acceleration of the annual pace of the investments before the effective introduction of the euro. According to the estimates of Eurostat (2026), gross fixed capital formation increased for the sixth quarter in a row in 3Q 2025, at an annual rate accelerating to 9.2%, as represented in the following chart. Therefore, during January – September 2025, the gross fixed capital formation advanced at an average annual rate of over 10%. This evolution expresses favourable prospects for the growth pace of the economic activity in the coming years.

Figure 2. Gross fixed capital formation in Bulgaria, annual rate (%)



Source: representation of the author based on the statistics of Eurostat (2026).

In this paper, we apply standard econometric methods in order to assess the macroeconomic developments in Bulgaria during the period 2000 – 2025 with a focus on public finance. The aim of the paper is to identify the main challenges for the economic policy in Bulgaria in the context of the entry into the Eurozone. In this respect, on the one hand, we estimate the annual potential growth rate in Bulgaria by implementing the filter developed by

Hodrick-Prescott (1997) while using quarterly observations for the annual pace of the GDP from Eurostat (2026). On the other hand, we estimate the structural component of the budget deficit in Bulgaria by implementing the method of Balassone and Monacelli (2000).

The rest of the paper has four chapters. The next chapter briefly presents the literature review, while Chapter 3 describes the methodology. The results are analysed and interpreted in Chapter 4, and the main conclusions are underlined in Chapter 5.

2. Literature Review

The entry of Bulgaria into the Eurozone has been intensively analysed by Bulgarian and international institutions and senior experts in recent years.

For instance, the Managing Director of the International Monetary Fund (IMF, 2025) considered the integration of Bulgaria into the Eurozone as a key milestone and emphasized the positive consequences, including the most likely decline in borrowing costs, improvement in sovereign rating, and a significant increase in the number of foreign tourists. On the other hand, Kristalina Georgieva also mentioned the main structural challenges for Bulgaria in the coming years, including the aging of the population, the brain drain, and the intensifying fiscal pressures (given the infrastructure and defense needs).

At the same time, the President of the European Central Bank (ECB, 2025) underlined the advantages of Bulgaria joining the Eurozone, especially in terms of prosperity (through lower financing costs, and better integration in the Single Market), and security (shield from the volatility of international capital flows, and from imported inflation). However, Christine Lagarde also underscored the importance of the continuity of structural reforms in Bulgaria, needed for the transition from convergence to lasting competitiveness and better living standards for all citizens.

Furthermore, the Governor of the Bulgaria National Bank (BNB, 2025) emphasized the historical economic and institutional efforts of Bulgaria and underlined that the entry into the Eurozone increases confidence (real and financial sides of the economy), intensifies integration with the European financial markets, and improves the resilience of the economy.

The main economic advantages of Bulgaria joining the Eurozone were also underlined in the analysis of the World Economic Forum (WEF, 2025): disappearance of the exchange rate risk, price transparency, lower transaction costs, and lower financing costs.

As regards the macroeconomic costs of joining the Eurozone, Todorov (2023) analysed the similarity of the shocks in Bulgaria and the Eurozone during the period 2001 – 2022 by applying standard econometric tools. The results of this analysis indicate a high level of similarity in terms of origin and impulse effect, as Bulgaria has presented a high degree of integration with the

economy of the Eurozone in the past. Therefore, the costs of Bulgaria joining the Eurozone are limited, from this very important perspective developed within the theory of optimal currency areas (OCA).

The main advantages and costs related to the entry of Bulgaria into the Eurozone were previously synthesized by Gechev et al. (2020). In the benefits category, the senior experts from the University of National and World Economy in Sofia also included access to financial support mechanisms and diminishing risks for currency crisis and banking crisis. Among the main costs, the Bulgarian experts also included the one-off costs (including the one-off increase in prices) and the risk of macroeconomic imbalances.

Furthermore, in their analysis based on the comparative analysis between Bulgaria and Lithuania (also from the point of view of the Maastricht criteria), Tikova and Dvorak (2025) underlined the main challenges for Bulgaria adopting the euro, including the higher inflation than in the Eurozone, the low level of the GDP/capita, the high level of income inequality, and the low level of the public support (around 40% of the population).

Last, but not least, from the social point of view, we point out that Bulgaria has been confronted with one of the highest levels of energy poverty among the EU member countries, according to Peneva (2024), who has regularly monitored and analysed the energy poverty in Bulgaria. The Bulgarian senior expert has recently recommended several measures to counter energy poverty in the country, including the implementation of a poverty reduction mechanism before the liberalisation of the electricity market, the targeted mobilisation of EU support funds towards vulnerable households, and the development of an active investment policy for energy efficiency and decarbonisation.

3. Methodology

Standard econometric instruments are applied in this paper to assess the main structural macroeconomic developments in Bulgaria during the period 2000 – 2025.

On the one hand, the filter developed by Hodrick and Prescott (1997) was implemented in order to estimate the trend components for the annual rate of the GDP and its components from the demand side perspective (private consumption, gross fixed capital formation, public consumption, exports, and imports). In this respect, quarterly observations for the annual rate of the GDP and its components from the Eurostat (2026) database were used (unadjusted data).

The Hodrick-Prescott filter represents one of the most applied methods to estimate the structural and the cyclical components of the macroeconomic indicators, expressed in the following relation:

$$\text{Min} \sum_{t=1}^T (\ln Y_t - \ln Y_t^*)^2 + \lambda \sum_{t=2}^{T-1} ((\ln Y_{t+1}^* - \ln Y_t^*) - (\ln Y_t^* - \ln Y_{t-1}^*))^2 \quad (1)$$

In the above relation, Y_t , Y_t^* , and λ are the macroeconomic indicator, its trend component, and a smoothness parameter. As we worked with quarterly data, in this paper, a value of 1,600 for this parameter was considered, as recommended by Hodrick and Prescott (1997).

On the other hand, we estimated the structural component of public finance balance in Bulgaria, by employing the method of Balassone and Monacelli (2000), reflected in the following relation:

$$\text{def}_t = \text{def}_s + \text{def}_c \quad (2)$$

where def_t , def_s , and def_c represent the budget balance, its structural element, and its cyclical component, all expressed as a % of the GDP.

As regards the cyclical component of the budget balance, it was estimated considering the following formula:

$$\text{def}_c = (Y_t - Y_t^*) \times \eta \quad (3)$$

In relation (3) $Y_t - Y_t^*$ is the output gap, while η represents the budgetary elasticity, for which we considered a value of 0.36 in the case of Bulgaria, as estimated by Mourre et al. (2019).

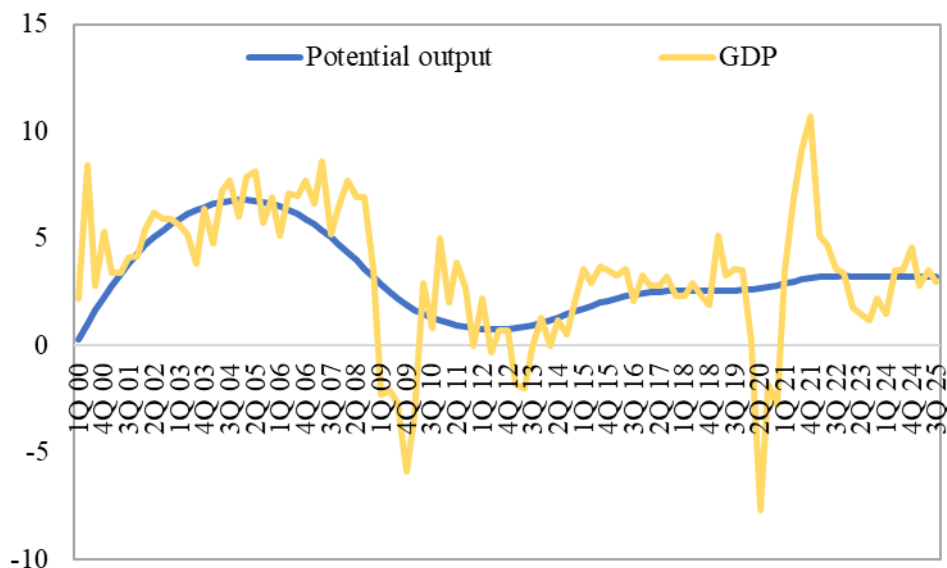
Afterwards, from the total budget balance, we eliminated the cyclical component to estimate the structural component, according to relation (2).

For the total budget balance for Bulgaria (as a % of GDP), we considered the estimates of Eurostat (2026), quarterly data, seasonally and calendar adjusted.

We worked with the econometric software E-Views in this paper.

4. Interpretation of the Results

The econometric estimates indicate the consolidation of the annual rate of the potential output in Bulgaria in recent quarters at the highest level since 2008, the year the economy started to be confronted with the Great Financial Crisis, the worst global economic and financial crisis since the end of World War II. Furthermore, in 2024 and in 2025, the economic activity in Bulgaria recorded an annual growth rate very close to its potential, according to our estimates, as represented in the following figure.

Figure 3. GDP vs. Potential output in Bulgaria (annual rate) (%)

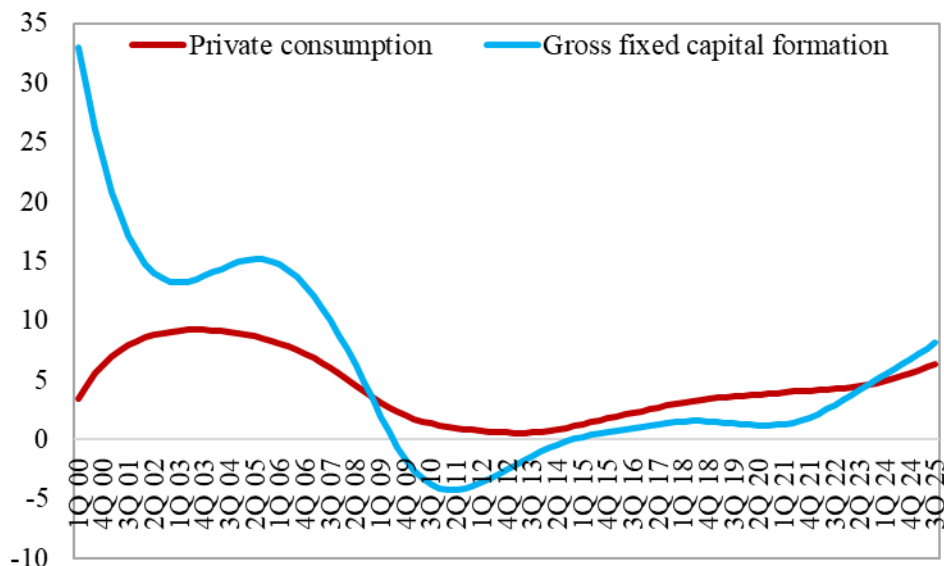
Source: representation of the author based on the econometric estimates using the database of Eurostat (2026).

This evolution has been mainly determined by the upward trend for the annual rate of gross fixed capital formation (the fixed investments). This represents the engine of the economy. According to our econometric estimates, the annual rate of the trend component of gross fixed capital formation in Bulgaria has recorded an acceleration path since 2021, reaching 8.1% in 3Q 2025. This is the highest level since the last quarter of 2007, as represented in the chart below (Figure 4).

It can be noticed the acceleration in recent quarters, determined by the prospects for Bulgaria to join the Eurozone. Therefore, the benefits of the euro adoption for Bulgaria's economy in terms of investments are confirmed. These are supported by the prospects for a better integration within the EU market, but also by the short-term outlook for the real interest rates. These are forecasted at negative levels, as inflation in Bulgaria is expected to exceed the monetary policy rate in the Eurozone in the coming quarters.

Furthermore, our econometric results also indicate an acceleration of the annual rate for the trend component of private consumption in Bulgaria (the main component as a share of the GDP, from the demand side perspective). Thus, the annual pace of the potential private consumption (the structural component of this indicator) has presented an acceleration trend since 2022, towards over 6.3% in 3Q 2025. This is the highest level since 2Q 2007, as can be noticed in the following chart.

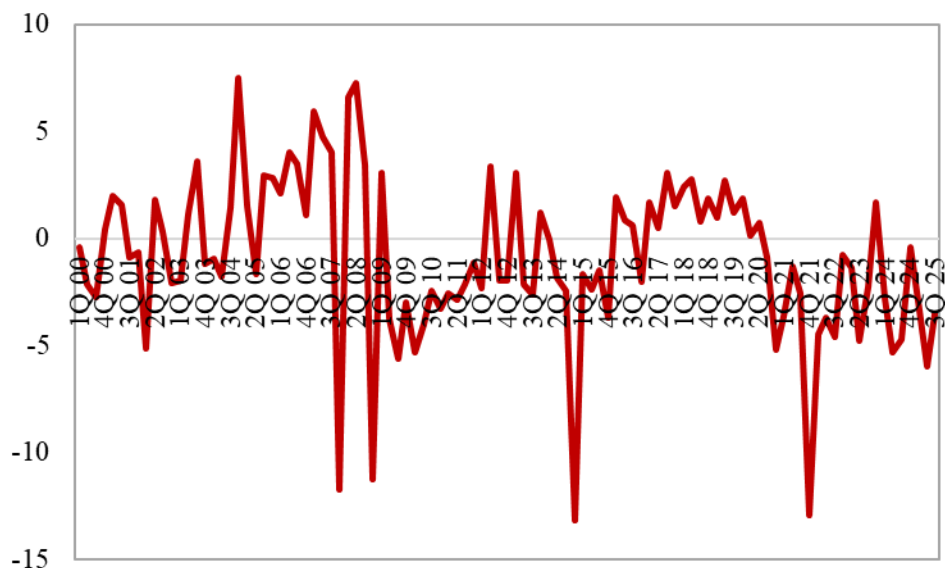
Figure 4. Gross fixed capital formation vs. private consumption in Bulgaria (trend/structural component) (annual rate) (%)



Source: representation of the author based on the econometric estimates using the database of Eurostat (2026).

On the other hand, we point out the downward trend for the annual pace of the volume of total exports (goods and services) in Bulgaria in recent years. According to our econometric estimates, this indicator hit the minimum since the beginning of the century in 3Q 2025. In other words, the international competitiveness of Bulgaria has been deteriorating in recent years, an evolution mainly determined by the consequences of the geopolitical tensions (the crisis in Ukraine), with a negative impact on access to energy resources and the price of energy. This deterioration in the annual rate of the trend component of the total exports represents an important challenge for the macroeconomic performance of Bulgaria after joining the Eurozone. However, we point out that the implementation of the new defensive industrial policies by the European Union and the prospects for Romania to resume the production of gas in the Black Sea in 2027 (Central Europe Times, 2025) are important factors that may determine the change of the trend for Bulgarian's exports in the coming quarters, in our view.

Last, but not least, the results of our analysis indicate the widening of the structural component of the budget deficit in Bulgaria in recent quarters, to levels above the threshold of 3% of GDP, as can be noticed in the following chart (Figure 5).

Figure 5. Structural component of public finance balance in Bulgaria (% GDP)

Source: representation of the author based on the econometric estimates using the database of Eurostat (2026).

4. Conclusions

The integration within the Eurozone represents a maturity test for Bulgaria, the largest country in Central and Eastern Europe that adopts the euro, from the demographic point of view, with a population of 6.4 million, according to Eurostat (2026). It is probably the most important maturity test for the economic policy implemented by the policymakers in Sofia.

According to the results of our econometric analysis, Bulgaria has recently been confronted with a deterioration in international competitiveness and the widening of the structural component of the budget deficit. In this respect, we emphasize that maintaining fiscal stability and continuing structural reforms (in an international context dominated by militarization) represent the main challenges for Sofia's administration in the coming years.

Among the needed structural reforms in Bulgaria, we mention those to integrate technological progress in a balanced and sustainable way, to improve the quality of regulation, and to develop the capital markets. These structural reforms would contribute to the improvement of the contribution of multifactor productivity to the potential growth rate, supporting the consolidation of the economic convergence process towards the EU average.

Furthermore, these elements are essential for Bulgaria to fully benefit from adopting the euro, strengthen its capacity to absorb external shocks in the future, and consolidate the process of European economic convergence. These

reforms are also needed in order to avoid the scenario of the Greek economy following the outbreak of the Great Financial Crisis.

Last, but not least, we point out that the adoption of the euro by Bulgaria should represent the most important example for the remaining countries in Central and Eastern Europe, members of the European Union, but not members of the Eurozone: Poland, Romania, Czechia, and Hungary.

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EXPLORING THE EFFECT OF STOCK MARKET DEVELOPMENT DETERMINANTS ON THE COST OF EQUITY CAPITAL: THE CASE OF TUNISIAN LISTED FIRMS

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Abstract

This paper investigates the effects of stock market development determinants on the cost of equity capital of non-financial Tunisian listed companies. We use a sample includes 24 Tunisian listed firms observed over the period 2007–2016, resulting in a total of 240 firms-year observations. The empirical results reveal that the performance has a significant positive effect on the cost of equity capital. Additionally, various factors such as turnover rate, price spread, stock market capitalization, value of traded shares, volatility of financial asset prices, leverage, dividend policy, size, and inflation all have varying effects on the cost of equity capital. The findings align with existing literature and provide insights into the relationship between various financial factors and Tunisian companies' equity capital costs. This paper offers an important implication for investors, policymakers, and market participants to make informed decisions regarding investment opportunities and the overall development of the stock market.

Keywords: stock market development, cost of equity capital, asset pricing, Tunisian listed firms.

JEL Classification: G21; G28.

Introduction

In recent years, Tunisia's stock market has experienced notable growth and development, increasingly positioning itself as a key platform for capital mobilization and investment facilitation (Jeribi et al., 2015; Saad, 2024); Souffargi and Boubaker (2024). As the market continues to evolve, understanding the factors that influence its dynamics has become essential for policymakers, investors, and researchers. A central element in this context is the cost of equity capital, which represents the return required by investors to compensate for the risk associated with equity investments. Asset pricing models, such as the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), typically rely on two key variables: the risk-free rate and the asset's sensitivity to market risk (beta). According to CAPM, the expected return on an asset is linearly related to these variables. However, numerous empirical studies have questioned the adequacy of such models in ensuring efficient asset pricing. For instance, Smith (1977) found evidence of persistent asset underpricing, raising

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concerns about the validity of traditional pricing frameworks. Brav (2003) further introduced the concept of market indeterminacy, a condition in which it becomes impossible to determine whether an asset is efficiently or inefficiently priced. This perspective challenges the foundational assumptions of asset pricing models and underscores the complexity of accurately assessing equity value in evolving and imperfect markets such as Tunisia. Simlai (2021) found that empirical tests of linear asset pricing models show presence of mispricing in asset pricing. Asset pricing is considered efficient when market prices fully reflect all available information, such that no informed trader can consistently achieve returns that outperform the market or uninformed participants (Yang & Li, 2013).

The main objective of our study is to contribute to the existing literature on stock market development and cost of equity capital by providing empirical evidence from the Tunisian context. The study covers the period from 2007 to 2016 and using sample of 24 listed Tunisian companies. By analyzing various determinants, such as market size, liquidity, regulations, and investor protection, we seek to provide valuable insights into the relationship between these factors and the cost of equity capital. The choice to focus on Tunisian listed firms is justified by the unique nature of the Tunisian stock market, which operates within a developing economy (Saad, 2024). To achieve our objective, we will employ a quantitative research methodology, utilizing a comprehensive dataset covering a significant time period. We will employ various statistical techniques, such as regression analysis, to empirically test the relationship between the determinants of stock market development and the cost of equity capital.

As a result, our research contributes to better understanding of financial market in time of major political crisis, notably in the context of Arab spring (Tunisian revolution). They are of great importance for policymakers, investors, and firms in Tunisia, as they can contribute to the formulation of effective strategies to enhance stock market development and reduce the cost of equity capital. The study found that performance has a significant positive effect on the cost of equity capital for Tunisian companies listed on the stock exchange. Additionally, factors such as turnover rate, price spread, stock market capitalization, value of traded shares, volatility of financial asset prices, leverage, dividend policy, size, and inflation all have varying effects on the cost of equity capital. The results suggest that factors such as turnover rate, price spread, volatility of financial asset prices, leverage, and dividend policy significantly impact the cost of equity capital. The findings align with existing literature and provide insights into the relationship between various financial factors and Tunisian companies' equity capital costs.

This paper sheds light on the factors influencing the cost of equity capital in the Tunisian stock market and provides valuable insights for investors, firms,

and policymakers in formulating strategies to enhance stock market development. By understanding these determinants, stakeholders can work towards creating a more vibrant and efficient stock market, ultimately boosting economic development in Tunisia.

The subsequent sections of the paper are organized as follows. Section 2 presents an overview of the related literature. Section 3 outlines the research methodology used in this study. Section 4 discusses and analyzes the empirical findings. Finally, section 5 concludes the paper.

1. Literature review and hypothesis development

In recent years, the corporate financial performance has become a focal point for several researchers, particularly the emerging markets where structural and institutional dynamics significantly influence firm outcomes (Missaoui & Brahmi, 2025; Simlai, 2021). A growing body of literature seeks to identify and analyze the determinants of the contribution of such financial market. Furthermore, the link between strategy and finance shows a close connection between the company's strategic situation and its performance. These studies underscore the importance of aligning financial decisions with broader strategic goals, especially in environments characterized by volatility and limited access to capital.

In Tunisia, the strategic-financial nexus is particularly pronounced due to the underdevelopment of the capital market (Saad, 2024; Souffargi & Boubaker, 2024). While the stock exchange offers theoretical advantages such as diversified funding sources and reduced dependency on traditional banking most domestic firms continue to rely heavily on bank credit as their primary external financing channel. This reliance is partly attributed to the emerging stage of the Tunisian stock market, which is delayed by issues such as information asymmetry, low liquidity, and higher costs of transaction (Meskini & Chaibi, 2024; Missaoui & Alduraywish, 2023; Saad, 2024). These structural inefficiencies limit the market's capacity to serve as a viable financing alternative, thereby shaping firms' capital structure decisions.

Several financial empirical evidence from Tunisia reveals that firm-specific characteristics such as profitability, asset tangibility, and size play a critical role in determining leverage levels (Mansali & Daadaa, 2018; Meskini & Chaibi, 2024; Missaoui & Alduraywish, 2023; Missaoui & Brahmi, 2025; Psillaki & Daskalakis, 2008; Saad, 2024; Yadav et al., 2021). These findings are consistent with the trade-off and pecking order theories, which suggest that firms balance the costs and benefits of debt based on internal financial metrics and market conditions (Missaoui & Alduraywish, 2023; Missaoui & Brahmi, 2025). Moreover, macroeconomic factors such as interest rates, inflation, and unemployment have been shown to exert significant influence on capital structure decisions, particularly in the context of publicly traded Tunisian firms

(Missaoui & Alduraywish, 2023). The Tunisian case illustrates the broader challenges faced by emerging markets in developing efficient financial systems. Despite policy efforts to modernize the financial sector and attract foreign investment, structural reforms remain incomplete, and the capital market continues to lag behind its regional peers (Baghdadi & Labidi, 2023). As such, understanding the determinants of financial performance and capital structure in Tunisia requires a nuanced approach that considers both firm-level dynamics and systemic constraints.

The investigation of this relationship has played a major role in recent research (Abaidoo & Agyapong, 2024; Chowdhury & Maung, 2012; Masoud & Hardaker, 2012; Missaoui & Brahmi, 2025; Montes & Oliveira, 2025). Economists have long understood that financial development affects economic growth. This can be explained by the tendency of companies to rely on external financing. Financial development helps companies obtain external financing at a low cost (Colombo & Grilli, 2005). It provides the right measure for financing companies. Furthermore, it ensures that investors achieve high returns. The financial market facilitates access to credit at a low cost. It also helps new companies enter the market (Colombo & Grilli, 2005). A developed financial system plays an important role in improving the services of financial intermediaries by reducing transaction and information control costs. It identifies good investment opportunities, mobilizes savings, encourages transaction activities and mitigates risks. Hail and Leuz (2006) emphasize that quality information disclosures increase returns and reduce the cost of equity capital. Masoub (2013) announce that the development of the stock market supports technical innovations, long-term investments, and improves the return on investments. High liquidity, efficient capital allocation, and technological innovation reduce investment risk. Therefore, this eliminates additional demand for a premium from investors to take on additional risk. However, the speed of adaptation to this process depends on specific factors related to the company (difficulty of financing, company valuation in the capital market, company size, profitability, and leverage) and the macroeconomic conditions of countries. As a result, we propose the following hypothesis:

Hypothesis 1: Stock market development has impact on the cost of equity capital.

To test the effect of the determinants of financial market development on the cost of equity capital of listed Tunisian companies, we have derived the following sub-hypotheses:

An investment cannot be separated from its risk (uncertainty) since the investment decision can lead to unexpected profit. Rational investors, before making an investment decision, must consider two things, namely the expected return and the risk that depend on the type of investment. Investment risk is generally classified into two types of investment risks: non-systematic risk and

systematic risk. Non-systematic risk originates from factors specific to a particular company or a group of similar companies, and is often influenced by issues such as the liquidity of the company's securities (Shahed & Shohana, 2022). According to portfolio theory, investors expect a particular return by investing their funds in the form of stocks or other securities. Investing funds entails a risk to be assumed. Therefore, to reduce the risk, investors can diversify the investment of their funds. Furthermore, Jonathan and Lorie (2007) observes that an increase in the return of financial securities results in a rise in the cost of equity capital for a company. Herwany et al. (2014) found a positive correlation between returns and risks. Simlai (2021) argue that investors impose a risk premium compensating for the risk of mispricing the return on assets. Therefore, increased disclosure mitigates the risk of mispricing, increases returns, and reduces the cost of capital.

Barry and Brown (1984) suggest that information produced by a company helps to reduce the risk of error and the cost of equity. Nadarajah et al. (2018) examined the relationship between stock market liquidity and capital structure. They found that companies with more liquid equity have less leverage. Furthermore, they show that stock market liquidity reduces financing costs. Some studies have demonstrated that financial communication of a company plays a very important role in the evolution of the cost of equity (Ajina et al., 2015; Cheriyan & Lazar, 2019; Diamond & Verrecchia, 1991; Hail & Leuz, 2006; Psillaki & Daskalakis, 2008). Beyer et al., (2010) argue that transparency in financial information helps reduce uncertainty (expectation and risk) faced by investors in allocating future cash flows. Another interesting paper by Diantimala et al. (2022) argue that increased public disclosure of information decreases information asymmetry, increases return levels, and therefore leads to a lower cost of capital. emphasize that the relevance and transparency of quality information disclosure help to mitigate information asymmetry and attract investors to invest more, thereby reducing companies' financing costs. As a result, we propose the following hypothesis:

Hypothesis 1.1: The dividend policy has a positive effect on the cost of equity capital.

The turnover rate is considered a relevant indicator of financial market activity because it implicitly reflects the extent of transaction costs. Levine and Zervos (1996) indicate that the turnover ratio measures the volume of stock transactions relative to market capitalization. This ratio measures the volume of stocks traded relative to market size. A high turnover rate is often used as an indicator of low transaction costs. It is important to note that a large stock market is not necessarily a liquid market: a large but inactive market will have a high market capitalization ratio but a low turnover ratio. Levine and Zervos (1996) demonstrate that a high turnover rate means the market is active and transaction costs are low. Datar et al. (1998) use the turnover ratio as a liquidity

indicator. They conclude that liquidity plays an important role in explaining differences in yield. They conclude that each 1% increase in the turnover rate reduces annual yields by approximately 0.54%.

Diamond and Verrecchia (1991) described an inverse relationship between financial disclosure and the cost of equity capital through the concept of stock liquidity. Low information asymmetry tends to strengthen the liquidity of securities. This helps reduce the cost of equity capital by reducing the transaction costs of traded securities. Darwish (2012) examines the effect of returns on transaction volume for the Palestinian financial market using weekly data. He shows that the relationship between return and transaction volume is positively correlated and there is a bidirectional causality between these two variables (returns and transaction volumes). Goldstein and Nelling (1999) demonstrate that high transaction volume leads to high liquidity levels.

Hypothesis 1.2: Turnover rate has a positive effect on the cost of equity capital.

According to the theoretical foundations of market microstructure theory, the bid-ask spread reflects the total cost associated with trading an asset. This includes costs arising from cost of information asymmetry, market making activities, order transmission, and position management (Peng et al., 2024). Easley and O'hara (1992) suggests that a significant volume of transactions is linked to a reduction in spreads, which reflects the presence of economies of scale in market making. Also, Market making theory indicates that the spread widens with the cost of holding the position. This cost stems from opportunity cost and the risk generated by holding a position. This unobservable variable can be estimated through its components, such as the cost associated with volatility risk (Zhu et al., 2025) and liquidity cost (Huang et al., 2025). The price spread can be considered as a signal of the expected volatility by agents placing limit orders. In this context, Huang et al. (2025) demonstrate that when the proportion of informed agents is reduced, anonymity leads to a reduction in the price spread. Therefore, the informed agent acts cautiously by presenting a wider spread. However, the uninformed agent, who cannot identify the leader, interprets this price spread as a weak signal of information risk because it could potentially come from a pre-committed intermediary.

Uninformed agents are more active, the informational content of the bid-ask spread is lower. The opposite consequences are observed when the quota of informed agents is high: anonymity increases the bid-ask spread and its informational content. Amihud and Mendelson (1986) assert that more transparent financial communication helps reduce information asymmetry and increase the liquidity of stocks issued by a company. Indeed, out of fear of trading with better-informed investors, uninformed investors defend themselves through bid-ask spreads. This condition leads to a wide bid-ask spread. In addition, agency costs reduce the volume of securities traded by uninformed

investors. Ultimately, these two combined effects reduce the liquidity of company securities in the markets and increase their cost of capital.

Ajina et al. (2015) investigated the impact of corporate disclosure on information asymmetry and stock market liquidity among French companies listed between 2004 and 2007. Their findings highlight the critical role of information contained in annual reports in shaping investor behavior. Specifically, they measured information asymmetry using the bid-ask spread and assessed liquidity through market indicators. The study revealed that the extent of corporate disclosure in annual reports positively influences market liquidity. Moreover, a negative relationship was observed between the level of disclosed information and the adverse selection component of the bid-ask spread, suggesting that greater transparency reduces information asymmetry and enhances trading efficiency.

Li and Tam (2011) argue that lower transaction costs facilitate quicker adjustments toward target capital structures following deviations, thereby diminishing the persistence of market timing effects. This dynamic contributes to enhanced market liquidity by increasing the volume of securities traded and reducing the overall cost of capital. In contrast, Brock and Kleidon (1992) predict that wider bid-ask spreads (indicative of lower liquidity) are paradoxically associated with higher transaction volumes. This suggests that while liquidity constraints may exist, trading activity can remain elevated due to other market forces, highlighting the complex relationship between transaction costs, liquidity, and market behavior. Therefore, we hypothesize the following:

H 1.3: The spread has a positive effect on the cost of equity capital.

Several studies have shown the importance of market capitalization as a key macro indicator for country analysis. It provides an indication of the impact of financial market development on economic growth (Kumar N., 2010). According to Robins et al. (2015), the effect of market capitalization can be interpreted as an investment strategy. A variety of researchers (Khediri & Daadaa, 2011; Masoub, 2013; Montes & Oliveira, 2025; Sethi et al., 2019) have used market size as an indicator of financial market development. For instance, Hina and Ajmal (2018) studied the relationship between capital structure and company performance before and during the financial crisis. The study focused on 49 construction companies listed on Bursa Malaysia from 2005 to 2008. They showed a relationship between capital structure and company performance.

More precisely, for large companies, there is a positive relationship between return on assets and debt to market capitalization. Phan and To (2025) demonstrate that market capitalization has a positive and statistically significant effect on capital market liquidity. Agarwal and Mohtadi (2004) suggest that stock market development (represented by the percentage of transaction value in market capitalization) generates financial resources to better support

companies. This means that companies can leverage equity further by issuing shares and increasing share liquidity.

H 1.4: Market capitalization has a positive effect on cost of equity capital.

The transaction value can be examined as a liquidity criterion as it allows measuring the speed at which a security can be traded on the financial market. Nowbutsing and Odit (2011) examined the impact of stock market development on growth in Mauritius. An econometric survey on time series is conducted for the period 1989-2006. They analyzed short and long-term relationships by constructing an Error Correction Model (ECM). Two measures of stock market development, namely size and liquidity, were considered. They found that the value of traded securities as a percentage of GDP has a positive impact on short and long-term economic growth. Demirguc-Kunt and Maksimovic. (1994) argue that the increase in volume and value of stock transactions can justify the ability to generate equity.

H 1.5: The value of transactions as a percentage of GDP has a positive effect on the cost of equity capital.

Several studies show that capital structure decisions are more sensitive to stock return volatility as default risk increases. Companies significantly opt for reducing their debt financing due to the high volatility of stock returns and to avoid the possible consequences of default. Darrat et al. (2003) investigate the relationship between trading volume and volatility. They show that the volume of traded securities increases in parallel with return volatility. In other words, an increase in trading volume is associated with an increase in return volatility, leading to an increase in capital costs. Given this, the literature has extensively attempted to understand the relationship between liquidity, volatility, and transaction activity in different markets. The inverse relationship is predicted between return volatility and liquidity in market microstructure theory based on the assumption that market makers bear significant inventory risk for holding a highly volatile security. Empirical studies confirm this relationship by showing a positive relationship between a security's return volatility and its illiquidity (Amihud & Mendelson, 1986; Cheriyan & Lazar, 2019; Diamond & Verrecchia, 1991; Loukil et al., 2010). This contradicts traditional market microstructure theory, where low return volatility is associated with higher trading volumes.

H 1.6: The volatility of returns has a positive effect on the cost of equity capital.

Financial leverage is a measure of the level of debt (Jaisinghani & Kanjilal, 2017). It is defined as the ratio of total debt to total assets. Debt provides tax savings opportunities because interest is deductible; however, higher leverage is also associated with higher risk (risk of bankruptcy) (Fama & French, 1993). In addition, Modigliani and Miller (1958) show that the cost of equity increases as financial leverage increases. Jaisinghani and Kanjilal (2017)

indicate that small businesses are negatively influenced by the presence of high levels of debt. Vithessonthi and Tongurai (2015) examined a sample of 159,375 non-financial companies in Thailand during the period 2007-2009. They find that leverage is negatively related to company performance. Khediri and Daadaa (2011) examined the effect of stock trading on capital structure of Tunisian companies listed on the stock exchange during the period 2000-2009. They find that leverage is negatively related to stock trading activity and profitability.

H 1.7: The financial leverage variable has a negative effect on the cost of equity capital.

According to the traditional market microstructure theory, a liquid market will have higher trading volume and therefore be less volatile. From this triangular relationship, a theoretically supported inverse relationship between liquidity and volatility can be revealed, indicating that greater volatility can lead to a decrease in the liquidity of a stock market and vice versa. By focusing on this relationship, the literature identifies a severe liquidity crisis associated with increased volatility that led to the global financial crisis during the period 2007-2009.

Similarly, Barclay and Warner (1993) reveal a direct relationship between liquidity and volatility. Indeed, higher volatility is associated with greater liquidity, where the majority of participants are not informed. Inconsistently, the literature also suggests that professionals' knowledge of the existence of informed traders can cause an inverse relationship between the two (Foster and Viswanathan, 1990). Thus, empirical analysis yields two different results such as a positive relationship between volatility and liquidity as indicated by (Cheriyani & Lazar, 2019). The inverse relationship is predicted between volatility and liquidity in market microstructure theory. Market makers bear a greater inventory risk to hold a highly volatile security. Empirical studies have confirmed the existence of a positive relationship between the volatility of a security's price and its illiquidity (Amihud & Mendelson, 1986). In the Tunisian financial market context, Chabeb and Boubaker (2021) show that short-term volatility only affects buyers in the Tunisian stock market, as limit orders are likely to be placed when volatility increases. They find a weakly significant positive correlation between volatility and selling depth.

H 1.8: Volatility has a positive effect on the cost of equity capital in the Tunisian financial market.

In this study, we added three control variables (dividend policy, size, and inflation rate) to analyze the effects of other variables on the cost of capital. Multiple studies have indicated that dividend policy is important informational content. It provides a good or bad signal to market participants. In this context, Ntui et al. (2015) found a positive relationship between dividend yield and stock price. Distributing dividends can increase stock prices and reduce the cost

of capital. It can also be adopted by shareholders to adjust the risk-sharing between themselves and creditors. In cases where the level of debt is lower than it was at the time of issuing the bonds, shareholders may pay themselves a dividend to restore the situation. If they do not, creditors will receive too high a return given the additional risk.

Many empirical studies show that small companies are associated with higher risk, therefore have a higher cost of capital. In other words, a negative relationship occurs between size and stock returns as size decreases, returns tend to increase, and vice versa. Banz. (1981) analyzed the size effect in stock returns. He noticed that small companies had a higher average return than large companies. This indicates that the higher the risk, the higher the return. Consequently, investors demand higher returns to compensate for a high level of risk. Several studies have highlighted the importance of the inflation rate, especially in the context of countries facing economic difficulties (Elkhaldi & Daadaa, 2015). Empirically, Boyd et al. (2001) studied the relationship between inflation and the stock market evolution (represented by the market capitalization ratio, transaction value ratio, turnover ratio, and return volatility). They indicate that an increase in inflation rates reduces the real rate of return of currency and all other assets. Therefore, this reduces the incentive for agents to lend and increases their incentive to borrow. As a result, a higher inflation rate reduces the availability of credit. De Jong and Van Dijk (2007) emphasize that macroeconomic factors have a significant impact on companies' capital structure decisions. When the stock market expands, the equity ratio would be higher in the capital structure. Elkhaldi and Daadaa (2015) analyzed the macroeconomic determinants of the capital structure of Tunisian companies listed on the stock exchange over the period 2002-2012. The authors show that macroeconomic variables related to monetary and fiscal policy have an impact on leverage. They find a negative correlation between macroeconomic determinants (interest rate, unemployment rate, and inflation rate) and financial leverage.

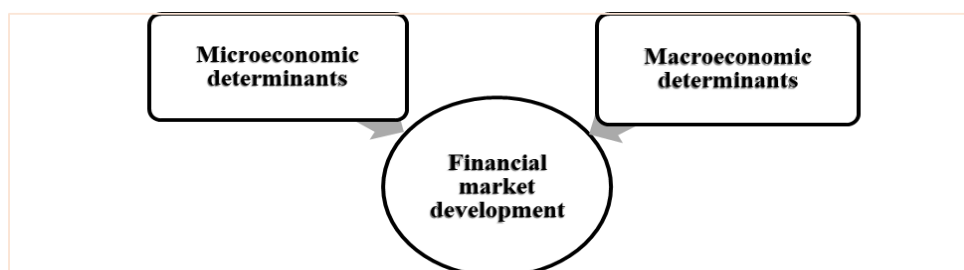
2. Research methods

2.1. Data

In order to test our hypotheses in the Tunisian context, we built a sample of 24 listed Tunisian companies. The sample is limited due to the exclusion of financial companies because of the specificity of their financial data. Additionally, we eliminated companies with missing data. Our work is based on observations from 2007 to 2016. The data is calculated manually from publications available at the Financial Market Council, from certain brokers, or on the websites of some firms, as well as from the publications of the Tunis Stock Exchange. The use of panel data offers the advantage of benefiting from both the individual and temporal dimensions of the available information.

To study the effect of the development of the financial market on the cost of equity capital of Tunisian companies listed on the Tunis Stock Exchange (BVMT), we conducted a multiple linear regression analysis on panel data. Therefore, our methodology is based on a regression analysis on panel data for a sample of 24 Tunisian companies listed on the BVMT over 10 years (2007-2016). Panel data allows to consider two dimensions at the same time: an individual dimension designated by the index "i" representing the firm, and a temporal dimension indicated by the index "t", representing time. It is therefore a form of multiple regression that allows to address both individual and temporal effects simultaneously. On the contrary, this is impossible with time series or cross-sectional data. The estimation of the cost of equity capital variable is determined by the ex-post method through the Capital Asset Pricing Model (CAPM). Data collection is daily from 01/01/2005 to 12/31/2016.

Figure 1: Determinants of the development of the Tunisian financial market



Source: Author

Table 1: Summary table of measures of financial market development and cost of equity capital

Variable	Notation	Mesure	Signe attendu
dependant variable			
Cost of equity capital	COE	$Re=rf+\beta(rm-rf)$	
Les variables indépendantes			
Return	REND	Measured by the ratio of prices at T and T-1 increased by the dividend	(+)
Turnover Rate	TURNOVER	Trading volume as a percentage of market capitalization.	(+)
Spread	Spread	The ratio between the fork and the middle of the fork	(+)
Market Cap to GDP Ratio	CPIB	Market capitalization expressed in GDP.	(-)
Transaction Value to GDP	VPIB	Value of transactions as a percentage of gross domestic product.	(+)
		Is a control for a firm's risk is calculated as the standard deviation of monthly stock returns over	

Return Volatility	Rvar	the past 12 months.	(+)
Leverage	Lev	Total liabilities as a percentage of equity	(-)
Historical Volatility	Vol	Historical volatility based on the historical variations that a security's price has experienced.	(+)
Control variables			
Dividend Policy	DIVI	Dummy variable equal to 1 if firm i distributed dividends in year t, otherwise 0.	(+)
Size	Taille	Logarithm of total assets	(-)
Inflation	INF	Log of inflation rate	(-)

2.2. Statistical development of the conceptual model

The cost of equity capital can depend on several factors, such as: Return, turnover rate, price range, stock market capitalization as a percentage of GDP, transaction value as a percentage of GDP, return volatility, financial leverage, volatility, dividend policy, size, inflation. This is a multiple linear regression that takes the form:

$$COE_{i,t} = \beta_0 + \beta_1 Rend_{i,t} + \beta_2 ROTATION_{i,t} + \beta_3 Spread_{i,t} + \beta_4 CPIB_{i,t} + \beta_5 VPIB_{i,t} + \beta_6 Rvar_{i,t} + \beta_7 LEV_{i,t} + \beta_8 Vol_{i,t} + \beta_9 DIVI_{i,t} + \beta_{10} Taille_{i,t} + \beta_{11} INF_{i,t} + \varepsilon_{i,t} (1)$$

Analysis and Discussion

2.1. Bivariate analysis

Table 2: Descriptive statistics

	Kcp	REND	TURNOV ER	Spread	CPIB	VPIB	Rvar	DIVI	Lev	Taille	INF	Vol
Mean	0.0003	0.080	0.061	0.060	0.0105	0.913	0.102	0.704	1.711	7.896	0.041	0.036
Median	0.0003	-0.0002	0.019	0.015	0.1245	0.875	0.082	1.000	0.980	7.848	0.040	0.010
Maximum	0.002	3.947	0.794	1.213	1.7068	2.450	0.689	1.000	36.075	9.374	0.063	0.884
Minimum	-0.011	-0.652	1.20E-05	-0.741	-2.694	-0.801	0.026	0.000	-26.804	6.386	0.020	0.001
Standard Deviation	0.0009	0.435	0.104	0.163	0.798	0.551	0.084	0.457	4.021	0.4191	0.011	0.089

Table 2 represents the descriptive statistics of the independent variable and the dependent variables that will be introduced in our model. We find that listed Tunisian companies have an average cost of equity capital equal to 0.03%. The maximum cost of equity capital is around 0.2% and the minimum cost of equity capital is equal to -1.1%, indicating a significant divergence among the listed Tunisian companies in our sample.

Table 3: Correlation matrix of measures of financial market development

	REND	TURNOVER	Spread	CPIB	VPIB	Rvar	DIVI	LEV	Size	INF	Vol
REND	1										
TURNOVER	0.052	1									
Spread	0.135	-0.128	1								
CPIB	0.208	0.290	0.072	1							
VPIB	0.160	-0.259	0.175	0.531	1						
Rvar	0.144	-0.002	0.174	-0.003	-0.002	1					
DIVI	0.039	-0.036	0.129	0.240	0.162	-0.153	1				
LEV	0.098	-0.039	-0.040	0.002	0.002	0.021	-0.233	1			
Size	-0.060	-0.083	0.015	0.191	0.493	-0.036	-0.217	0.452	1		
INF	-0.013	0.043	-0.021	-0.054	-0.064	-0.025	0.0166	0.036	0.022	1	
Vol	0.141	0.016	0.028	-0.063	-0.096	0.484	-0.150	0.006	-0.125	0.067	1

Table 3 presents the Pearson correlation matrix between the different variables selected in our model. Volatility has a strong positive correlation (0.48) with return volatility. However, it has a negative correlation with market capitalization as a percentage of GDP, value of transactions as a percentage of GDP, size, and dividend policy. Turnover variable has a positive correlation with return, value of transactions as a percentage of GDP, inflation, and volatility. It has a negative correlation of -0.128 with price range, transaction volume as a percentage of GDP, return volatility, dividend policy, leverage, and size are equal to -0.083. The dividend policy variable has a positive correlation with return, price range, market capitalization as a percentage of GDP, and size. However, it has a negative correlation of -0.036 with TURNOVER, -0.153 with return volatility.

Table 4: multicollinearity test on the variable characteristics in the VIFs calculation

Variable	VIF	1/VIF
CPIB	2.95	0.338
Taille	2.55	0.391
VPIB	2.07	0.483
LEV	1.69	0.590
ROTATION	1.55	0.644
Rvar	1.39	0.721
Vol	1.38	0.725
DIVI	1.29	0.777
REND	1.14	0.873
FOURCHETTE	1.11	0.899
INF	1.03	0.968
Mean VIF	1.65	

Source: author

Subsequent the realization of various tests to determine the most appropriate estimation method for the equation, it was observed that there is no significant multicollinearity between the variables. Additionally, the assumption of normality of the residuals was validated, but individual heteroscedasticity is present. In other words, no VIF greater than or equal to 10 was detected (the highest being 2.95). However, the average of the VIFs is slightly below 2 (1.65). Therefore, the threshold of 10 was retained, indicating the absence of significant multicollinearity for our variables. Furthermore, the probability of the Jarque-Bera statistic exceeds the 5% threshold, confirming the presence of

individual heteroscedasticity according to the White test. Finally, the Hausman test showed that the coefficients of the two estimations (fixed and random) are not statistically different, leading to the preference for adopting a random effects model. Therefore, the model was estimated using the generalized least squares method.

Analysis and Discussion

Table 5: Impact of the development of the financial market on the cost of equity capital of Tunisian listed firms

Variable	Coefficient	t-Statistic	Prob.
Constant	0.0004	0.776	0.438
REND	0.0002	2.729	(0.006) ***
TURNOVER	0.0005	1.894	(0.061) *
Spread	0.0003	1.714	(0.098) *
CPIB	4.18E-05	0.500	(0.124)
VPIB	-9.16E-05	-1.827	(0.068)
Rvar	-0.0006	-1.648	(0.1006)
Vol	0.0009	3.284	(0.001) ***
LEV	-1.51E-05	-2.595	(0.010) **
DIVI	-0.00015	-2.553	(0.011) **
Taille	4.21E-05	0.547	(0.584)
INF	-0.006	-3.051	(0.002) ***
R-squared		0.189	
F-statistic		4.842	
Prob(F-statistic)		0.000	
Durbin-Watson stat		1.671	

Notes : This table presents the effect of the development of the financial market on the cost of equity capital of the 24 non-financial companies listed on the BVMT observed over the period from 2007 to 2016. The dependent variable is the cost of equity capital (COE). The independent variables are: return (REND); turnover rate (TURNOVER); Spread; market capitalization as a percentage of GDP (CPIB); trading volume as a percentage of GDP (VPIB); return volatility (Rvar); dividend policy (DIVI). In all regressions, we control for a number of variables specific to financial performance and risk, including company size, inflation, and volatility. The estimation method used is the generalized least squares estimated (MCG estimated). ***, **, and * respectively represent statistical significance levels at 1%, 5%, and 10%. Values in parentheses are p-values.

Table 5 presents the relationship between the cost of equity capital and various determinants of stock market development. The Durbin-Watson statistic, calculated at 1.671, supports the acceptance of the null hypothesis, indicating the absence of autocorrelation in model's residuals of errors. Furthermore, the p-value associated with the Fisher statistic is effectively zero (0.000), confirming that the overall model is statistically significant.

The empirical analysis demonstrates that the return level exerts a statistically significant and positive effect on the cost of equity capital for Tunisian firms listed on the stock exchange, with significance at the 1% level. Specifically, a one-percentage-point increase in firm performance is associated with an average rise of 0.06 percentage points in the cost of equity capital. This result aligns with the theoretical expectation that enhanced performance boosts investor confidence, thereby reducing perceived risk and lowering the required rate of return. In financial markets, investors typically demand compensation for risk through higher returns; thus, superior performance serves as a signal of reduced risk, contributing to a more favorable cost of capital structure. Furthermore, market liquidity emerges as a pivotal factor in this dynamic. Increased liquidity tends to elevate stock valuations, which in turn compresses the cost of capital. The foundational work of Diamond and Verrecchia (1991) supports this relationship, arguing that improved corporate disclosure reduces information asymmetry, thereby enhancing market liquidity and stimulating investor demand. Their model suggests that firms engaging in transparent reporting practices can attract a broader investor base, leading to higher asset prices and a lower cost of equity.

We also find that the turnover rate is positively and statistically significantly associated with the cost of equity capital, with significance at the 10% level. This suggests that turnover rate serves as a critical indicator of market liquidity, which in turn influences investor behavior and financing costs. Empirically, a one-percentage-point increase in turnover rate corresponds to a 0.6% rise in the cost of equity capital, indicating that higher trading activity may be linked to increased transaction costs and perceived risk. This positive relationship aligns with theoretical expectations, where elevated turnover reflects greater liquidity but also potentially higher volatility and trading costs. As a result, investors may demand a higher risk premium, thereby increasing the cost of equity. This result aligns with the work of Datar, Naik, and Radcliffe (1998). They found that the turnover rate plays a significant role in explaining cross-sectional variations in stock returns. Their study concluded that each 1% increase in turnover is associated with a reduction in annual returns by approximately 0.54%, which indirectly contributes to a higher cost of equity. These findings underscore the importance of liquidity metrics in financial market analysis and suggest that firms operating in less liquid environments may face higher equity financing costs due to increased investor risk aversion.

The bid-ask spread, widely recognized as an inverse proxy for market liquidity, exhibits a positive and statistically significant impact on the cost of equity capital at the 10% significance level. Empirical evidence suggests that a 10% increase in the spread corresponds to a 0.98% rise in the cost of equity capital. This relationship is consistent with microstructure theory, which posits that the bid-ask spread reflects the cumulative costs of trading, including those arising from information asymmetry, inventory holding, and order processing. A wider spread signals greater uncertainty and higher transaction costs, prompting investors to demand a higher risk premium, thereby increasing the cost of equity financing. This finding is supported by studies in financial economics. For instance, Demsetz (1968) introduced the concept of transaction costs as the “cost of exchanging ownership titles,” emphasizing the role of the bid-ask spread in capturing market inefficiencies. Biais (1993) extended this framework by analyzing how market structure influences price formation and liquidity, showing that fragmented markets tend to exhibit more volatile spreads, which can elevate financing costs. Moreover, holding securities entails opportunity costs, particularly when spreads are wide. Investors facing higher spreads may require greater compensation for illiquidity and uncertainty, which translates into a higher cost of equity capital for firms. These findings underscore the importance of market microstructure in understanding the dynamics of equity financing and investor behavior.

The variable representing stock market capitalization as a percentage of GDP (CPIB) shows a positive coefficient, although it is statistically insignificant. Despite the lack of significance, the direction of the relationship suggests that higher market capitalization may contribute to improved liquidity and reduced transaction costs, thereby lowering the cost of equity capital. This finding is consistent with the theoretical and empirical literature on financial development. For instance, Levine (1996) provides robust evidence that stock market development is positively associated with long-run economic growth, emphasizing the role of liquid and efficient markets in facilitating capital accumulation and productivity gains. Moreover, Mureșan and Silaghi (2013) demonstrate that market capitalization significantly influences liquidity in European Union capital markets, suggesting that larger and more developed markets tend to exhibit greater trading activity and efficiency.

As market capitalization reflects the aggregate value of listed firms—essentially the present value of expected future dividends—its expansion is generally associated with enhanced investor confidence, improved price discovery, and reduced financing costs. Although the statistical insignificance in the current model may reflect country-specific factors or data limitations, the theoretical foundation and cross-country evidence underscore the potential relevance of market capitalization in shaping equity financing conditions.

The variable $Rvar$, which captures the volatility of returns, displays a negative but statistically insignificant coefficient. This suggests that lower return volatility may be associated with higher trading volumes, potentially leading to a reduced risk premium demanded by investors and, consequently, a lower cost of equity capital. However, this interpretation is not statistically robust and contradicts findings in the existing literature. For instance, Darrat et al. (2003) and Huang and Masulis (2003) report a positive relationship between return volatility and trading volume, indicating that increased volatility tends to stimulate trading activity rather than suppress it. In contrast, the variable Vol , representing the volatility of financial asset prices, exhibits a positive and statistically significant effect on the cost of equity capital at the 1% level. This result implies that heightened market volatility increases the cost of equity for Tunisian firms, as investors demand higher returns to compensate for elevated levels of risk and uncertainty. This finding is consistent with the theoretical and empirical work of Sbeai et al. (2014), Nikoomaram et al. (2011), Amihud and Mendelson (1989), Foster and Viswanathan (1990), and Stoll (2000). These studies collectively argue that price volatility amplifies perceived risk, prompting investors to require a higher risk premium. Moreover, empirical evidence has shown a positive association between asset price volatility and liquidity costs, reinforcing the notion that volatile markets impose additional financing burdens on firms. In the context of the Tunisian financial market, Hmaied et al. (2004) identified a weak but positive correlation between volatility and market depth, suggesting that investors operating in uncertain environments demand substantial compensation to mobilize their capital. Overall, the observed relationship between price volatility and the cost of equity capital aligns with theoretical expectations and underscores the importance of market stability in reducing financing costs.

Leverage demonstrates a negative and statistically significant relationship at the 5% level, indicating that higher debt levels relative to equity are associated with increased financing costs. This suggests that firms with greater market liquidity tend to favor equity financing over debt, a finding consistent with prior research by Lipson and Mortal (2009), Vithessonthi and Tongurai (2015), and Khediri and Daadaa (2011). The analysis of control variables reveals several notable effects on the cost of equity capital.

Among the control variables, dividend policy exhibits a negative and statistically significant effect at the 5% level. A reduction in dividend payouts may send adverse signals to investors, potentially leading to lower stock valuations and a higher cost of equity capital. This outcome is consistent with signaling theory, which highlights the role of dividends in conveying information about a firm's future profitability and financial stability. However, this result contrasts with earlier studies such as Brennan (1971) and Shobhana & Karpagavalli (2011), who reported a positive relationship between dividend

yield and stock prices, suggesting that dividends can enhance investor confidence and firm valuation. The variable representing firm size, measured by the logarithm of total assets, shows a positive but statistically insignificant coefficient. Although larger firms are generally expected to benefit from lower capital costs due to economies of scale, better access to financial markets, and reduced agency problems, this relationship is not confirmed in the Tunisian context. This finding diverges from the results of Kim et al. (2015) and Jaisinghani & Kanjilal (2017), who observed a negative correlation between firm size and the cost of equity capital in other markets. Finally, inflation demonstrates a negative and highly significant effect at the 1% level. Elevated inflation rates are associated with increased equity financing costs, reflecting the adverse impact of macroeconomic instability on investor sentiment and market conditions. This result is supported by studies such as De Jong et al. (2007), Mills (1994), and Elkhaldi and Daadaa (2015), which emphasize the influence of inflation on corporate financial decisions and investor behavior.

Robustness test

We are moving on to the robustness test (Appendix 1 and 2) in order to better study the effect of financial market development determinants on the cost of capital. We observe that the turnover rate, price range, and volatility have a positive and statistically significant effect at the 5% and 1% threshold. However, the value of securities traded as a percentage of GDP, financial leverage, dividend policy, and inflation have a negative and statistically significant effect at the 10% threshold. Our result confirms the importance of macroeconomic and activity factors in stimulating the growth of the stock market Chen (2018), Maverick (2019).

Conclusion

This paper explores the impact of financial market development on the cost of equity capital for Tunisian firms listed on the Tunis Stock Exchange (BVMT). We applied a panel data from a sample of 24 listed companies observed over the period from 2007 to 2016. Our research falls within the field of financial market microstructure, which seeks to document the evolution of various measures of financial market development. It also enables the study of the impact of factors that may explain these measures, particularly identifying the elements driving the development of the financial market for securities listed on the Tunisian stock exchange.

First, on a theoretical level, we attempted to find an appropriate measure of financial market development and to present a literature review of the financial structure of cost of capital. We found a lack of agreed-upon mechanisms for measuring financial market development. However, there are determining factors of financial market development. The literature on microstructure shows that trading volume, transaction value, and returns can

support these shortcomings. Indeed, this literature explains the trajectory of financial market development. The final stage of our theoretical study focused on studying the microstructure of the financial market and liquidity as well as market anomalies (notably the studies conducted by Amihud, Mendelson, and Wood (1990)). These studies show that financial crises have impacted the price spread mechanism and liquidity provision in the market. Indeed, financial crises have had a systematic and dramatic effect on the liquidity of global financial markets.

Literature supports the positive impact of stock market development on economic growth, as well as a reverse causality from the latter to the former. Therefore, researching appropriate measures for determining factors in stock market development is an important step for creating and implementing adequate financing and investment policies. We have followed the Capital Asset Pricing Model (CAPM) to measure the cost of equity capital for listed Tunisian companies. As such, we used daily data including portfolio and market returns, in addition to the risk-free interest rate of securities listed on the Tunisian stock market from 2005 to 2016, to calculate the cost of equity capital. This likely validates these measures in the Tunisian stock market. Finally, we used data including closing prices, trading volume, number of transactions, prices and quantities offered and demanded. We presented a liquidity market model for most securities listed on the Tunisian stock market.

We noticed that the Tunisian financial market has experienced multiple reforms marked by the following criteria: innovation, security, transparency, the need for quality information disclosure, and liquidity which constitutes a criterion for adjudicating the stock market. These changes have brought the Tunisian financial market in line with international standards. Furthermore, the adaptation and integration of new technologies into the functioning and organization of the Tunisian stock market allows for an increase in transaction volume and the introduction of new investors to the stock market. This helps to reduce transaction costs and ensure the quick execution of such transactions, as well as encourage foreign investors. We observe that the development of the stock market reduces the cost of equity capital. This supports the argument that the financial market plays a significant role in providing liquidity, reducing information asymmetry, diversifying risks, improving corporate governance, and reducing systematic macroeconomic uncertainty.

Furthermore, we found that the turnover rate, return on investment, price range, transaction value as a percentage of GDP, volatility, financial leverage, dividend policy, and inflation are significantly correlated with the cost of equity capital. In addition, the study of the simultaneous effect of these variables indicates that the development of the financial market in the industrial and commercial sector appears as a specific element for each security belonging to the same sector. Past information can also be considered as a specific element

for the different determinants of the development of the financial market of securities listed on the Tunisian stock market. One way to refine our results is to conduct a more comprehensive study on the understanding of the inter-temporal variation in the development of the stock market, taking into account all securities listed on the Tunisian stock market over a longer period of study. Indeed, this would allow us to draw more relevant conclusions and better generalize our results. Similarly, the results highlighted in the Tunisian stock market open up multiple paths for future research, such as considering economic and financial crises, political crises, etc.

Appendix :

Appendix 1 : Selected sample of Tunisian listed companies for the period 2007 to 2016 (0: industrial company, 1: commercial or service company).

Code	Sector	Abbreviation	Name
1	1	Magasin générale	Magasin générale
2	1	Monoprix	Monoprix
3	0	Siphat	Société des Industries Pharmaceutiques de Tunisie
4	0	ASSAD	ASSAD
5	1	Electrostar	Electrostar
6	0	GIF	GIF FILTER
7	1	STEQ	Société Tunisienne d'Equipeement
8	0	STIP	Société Tunisienne des Industries de Pneumatique
9	0	SOTRAPIL	Société de transport des hydrocarbures par pipelines
10	1	SOMOCER	SOMOCER
11	1	SIAME	Société Industrielle d'Appareillage et de Matériels Electriques
12	0	ICF	Industries Chimiques du Fluor
13	1	AIRLIQUIDE	AIR LIQUIDE
14	0	ALIKIMIA	ALIKIMIA
15	1	SOTETL	Société Tunisienne d'Entreprise et Télécommunication
16	1	SOTUMAG	Société Tunisienne des Marchés de Gros
17	0	SOTUVER	Société Tunisienne de Verreries
18	1	TUNISAIR	Société tunisienne d'Air
19	0	SFBT	Société de Fabrication des Boissons de la Tunisie
20	1	SIMPAR	Société Immobilière et de Participations
21	1	SITS	Société Immobilière Tunisio-Saoudienne
22	1	ESSOUKNA	ESSOUKNA
23	1	ADWYA	ADWYA
24	0	TPR	Tunisie Profilés Aluminium

Appendix 2: Chow Test before revolution period

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.239076	(23,63)	0.2477
Cross-section Chi-square	35.826286	23	0.0430

Cross-section fixed effects test equation:

Dependent Variable: COE

Method: Panel Least Squares

Date: 11/10/21 Time: 16:28

Sample: 2007 2010

Periods included: 4

Cross-sections included: 24

Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVAR	-0.000232	0.000376	-0.618172	0.5381
DIVI	1.03E-05	9.69E-05	0.105910	0.9159
LEV	-3.37E-05	1.55E-05	-2.169960	0.0328
size	9.54E-05	4.65E-05	2.053529	0.0431
INF	-0.012403	0.002442	-5.079428	0.0000
Turnover	8.06E-05	0.000145	0.554584	0.5806
LOGPIB	0.004049	0.001053	3.843600	0.0002
GROWTH	4.81E-05	1.77E-05	2.722861	0.0078
POLRISK	-0.000111	9.56E-05	-1.160920	0.2489
C	-0.028106	0.007034	-3.995627	0.0001
R-squared	0.397488	Mean dependent var		0.000510
Adjusted R-squared	0.334435	S.D. dependent var		0.000438
S.E. of regression	0.000357	Akaike info criterion		-12.93925
Sum squared resid	1.10E-05	Schwarz criterion		-12.67213
Log likelihood	631.0838	Hannan-Quinn criter.		-12.83127
F-statistic	6.303980	Durbin-Watson stat		2.495588
Prob(F-statistic)	0.000001			

Appendix 3 : Chow Test after revolution period

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.609594	(23,63)	0.0704
Cross-section Chi-square	44.375233	23	0.0047

Cross-section fixed effects test equation:

Dependent Variable: KCP

Method: Panel Least Squares

Date: 11/10/21 Time: 16:19

Sample: 2011 2014

Periods included: 4

Cross-sections included: 24

Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.017124	0.007901	-2.167158	0.0330
RVAR	-0.000460	0.000674	-0.682428	0.4968
DIVI	-0.000119	0.000111	-1.075848	0.2850
LEV	2.64E-06	1.71E-05	0.154441	0.8776
size	-5.26E-05	5.44E-05	-0.965909	0.3368
INF	0.008058	0.010552	0.763669	0.4472
Turnover	-3.68E-05	2.72E-05	-1.354162	0.1792
LOGPIB	0.002637	0.001160	2.272108	0.0256
GROWTH	-1.44E-05	1.89E-05	-0.760376	0.4491
POLRISK	3.99E-05	0.000116	0.342949	0.7325
R-squared	0.108682	Mean dependent var		0.000189
Adjusted R-squared	0.015404	S.D. dependent var		0.000406
S.E. of regression	0.000402	Akaike info criterion		-12.69951
Sum squared resid	1.39E-05	Schwarz criterion		-12.43239
Log likelihood	619.5764	Hannan-Quinn criter.		-12.59153
F-statistic	1.165146	Durbin-Watson stat		1.936101
Prob(F-statistic)	0.327574			

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REJOINDER TO WYSOCKI ON AUSTRO-LIBERTARIAN WELFARE ECONOMICS

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Abstract

Wysocki (2023) is to be congratulated for having the courage to attack head-on one of the most basic insights in all of economics, and philosophy too: that it is illegitimate to deduce an ought from an is. He sets on their heels all those who adhere to this well-established insight. However, despite his brilliance, and creativity (several of those scenarios he concocts are alone worth the full price of admission), it is my contention that he fails in his quixotic attempt. But his article is a gem in many ways, erudite, well worth reading, informative, challenging.

Key words: Austrian economics; libertarianism; normative; positive

JEL Classification: B53, B41, D60

Wysocki (2023)¹ speaks of, makes much of, this phrase: “the Austro-libertarian paradigm.”

It just so happens, that there is a high correlation between people who support football on the one hand and target shooting and hunting on the other. Let us stipulate that this is so, at least arguendo. Could that phenomenon then be characterized as a macho-gun football paradigm? Yes, as a shorthand device. But, still, it would be fallacious to paper over the differences between these two very different interests. There are many football fans who eschew the rifle range, and many adherents of the latter not at all interested in the former.

It makes little sense to conflate either Austrian economics and libertarianism on the one hand, nor shooting and football, since there is no intrinsic relationship in either case. It is more than a coincidence that the two pairs of interests attract similar types of people, respectively, but, still, it behooves them to make a sharp distinction within each of these papers. It is my contention that Wysocki fails to do so in the latter case..

Matters are similar with regard to Austrian economics and the libertarian political philosophy. They occupy two entirely different universes of discourse. The first of these is a school of economics. The dismal science is dedicated to examining why certain commercial phenomena occur: inflation, unemployment, poverty, wealth, etc. Its métier, its only focus, is cause and effect.

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¹ Unless otherwise specified, all mention of this author will be to this one publication of his. Further, in my quotes from this essay of his, I delete his footnotes

The second is a branch of ethics. It attempts to explain justice, an aspect of morality. It addresses the issue of what are proper laws, what should take place, not what actually does ensue. Yes, virtually all Austrian economists happen, also, to be libertarians; but very few libertarians are Austrian economists, because very few who adhere to this political philosophy are economists in the first place, and that is a necessary condition for following the praxeology of this school of thought in the social sciences.

It cannot be denied that there is indeed a correlation, and a strong one, between Austrian economics and libertarianism. But these two disciplines, just as in the previous case, are very much divorced from one another.

Then, too, there are blatant exceptions. For example, “Hans Mayer, one of Austrian School economists that is not well-known due to his infamous behavior during WWII collaborat(ed) with the Nazi regime...” (Lopez, 2019). Nazism is just about the polar opposite of libertarianism, but Mayer was an Austrian economist in good standing.

Are there any libertarians who reject Austrian economics, sometimes quite bitterly and vociferously? Here, the list is numerous. It would certainly include Gary Becker, Brian Caplan (undated, 1999), David Friedman, Milton Friedman, Sherwin Rosen (1997), Thomas Sowell, George Stigler, Gordon Tullock (1987).²

Yes, there are certain elements in praxeological economics that incline practitioners in the direction of liberty: views on monopoly, monopsony, cardinal versus ordinal utility, money. But to link them as closely as does Wysocki is an inaccurate exaggeration.

States our author: “If their economics is to be genuinely *wertfrei* (in particular, free of any underlying principles of justice), then we should naturally expect some Austrian economists to be socialists, some to be outright communists and still others classical liberals or libertarians for that matter.

But of course Austrian economists have values. But not *qua* the practice of praxeology. Some Austrians like beer and pizza. Does this destroy their *wertfreiheit*, as Wysocki is coming dangerously close to maintaining? To the extent that an Austrian economist has values in other fields of endeavor beside the commercial, such as regards pizza, all is well. But when he takes on values as an Austrian economist, not only can he no longer claim to be a praxeologist, he cannot even be a non-Austrian economist, for this discipline totally eschews normative economics in favor of the positive variety.

Do physicists have values? Of course they do, they are human beings. All members of this species have values. May they have values *qua* practitioners of this discipline? Of course not. It, too, is value free. It is solely concerned with

² Evidence for some of these scholars is given by their publications. For others, this claim is based upon my personal conversations with them.

understanding and explaining physical reality. How to manufacture an atom bomb is a purely empirical enterprise. This lies within the realm of physics. Whether or not this ordinance ought to be dropped on city X, lies, entirely, outside the bounds of this discipline. Physicists, along with everyone else under the sun may have a viewpoint on this second issue, but this does not at all undermine the claim that physics, too, is value free.

Wysocki avers: “As Futerman and Block (2021, p. xvii) make clear, Austro-libertarianism is a combination of both ‘the libertarian philosophy’—the prong the authors label ‘the normative thread’ and Austrian economics, dubbed by the said authors as ‘the positive thread’”.

I have nothing against the phrase “Austro-libertarian.” It is a good shorthand to describe scholars who adopt both these positions. But that is where it ends. Wysocki, I claim, in inferring more from this convenient terminology than is justified.³ In like manner, the following short hand versions also work: “Anti-war physicist”; “pro-war physicist”; “gun toting football fan.” One should not be fooled by this convenience of language into thinking that there is a greater connection between any of these cases than there is.⁴

Next, let us consider this statement of Wysocki’s: “Any welfare economics worthy of its name hinges on some normative premise. After all, welfare economics is supposed to measure welfare and welfare must consist in some natural property or fact. And what constitutes welfare is precisely the normative question we mean. Given this, it would be unreasonable to demand that welfare economics should be free of any normativity.”

Au contraire. Rothbard (1956) is an intense examination of welfare economics. And yet there is not a smidgen, anywhere in it, or even a hint of “normativity.” This author superlatively demonstrates that it cannot be proven that government is a net benefactor to human welfare. He does so in a completely value free manner. No ethical considerations intrude into his analysis. None.

Wysocki mentions that “Austrian business cycle theory (e.g. Huerta de Soto, [1998] 2006) interestingly relies on normative considerations (viz. banks acting unrightfully lending depositors’ money).

I do not see this as a valid claim demonstrating that Austrian economics is infected with values. Yes, the libertarian can quite correctly claim that fractional reserve banking is fraudulent, and therefore criminal.⁵ The Austrian,

³ This is a positive statement of mine, not a normative one.

⁴ This is a normative (ethical) claim of mine not a positive (factual) one.

⁵ Bagus, Howden and Block, 2013; Barnett and Block, 2008; Baxendale, 2010; Block and Caplan, 2008; Block and Garschina, 1996; Davidson and Block, 2011; Hanke, 2008; Hazlitt, 1979; Hollenbeck, 2014; Hoppe, Hulsmann and Block, 1998; Howden, 2013; Huerta de Soto, 2018; Hulsmann, 2008; Murphy, 2010; North, 2009; Polleit, 2010; Reisman, 1996; Rothbard, 1991; Salerno, 2010

in very sharp contrast, can maintain that this sort of phenomenon leads to the Austrian business cycle.⁶ But, never the twain shall meet. One and the same person, of course, can make both statements. But if so, the first is made only as a libertarian, the second, only as a praxeologist. One and the same person can also state that dropping atom bombs on innocent people is morally problematic, and, also, that the way to manufacture this weapon is thus and such. His first claim is made as an ethicist, the second as a physicist. From this it would be improper to conclude that physics is a value-laden enterprise. But that is pretty much what this author is saying about economics. Neither claim would be valid.

But Wysocki is by no means finished furnishing examples in this vein. He now asserts: “Furthermore, Austrian definition of inflation (e.g. Hülsmann, 2008) also characteristically presupposes governmental violence, and is hence also normatively tinted (viz. being rights-based).” Governments engage in all sorts of violence, some of it justified from the libertarian perspective, some not. When a policeman stops a rape or murder, he must often employ violence. But this is defensive, and thus from a libertarian point of view, justified.⁷ However, to say that the cop used force in such cases is merely descriptive, a mere empirical claim, devoid of any evaluation. It is the same with inflation. Yes, the state is often responsible for this state of affairs. That is a positive claim. That it should not do so is a normative one, and, again, we are now involved in two separate universes of discourse. Just because one and the same person makes both assertions, gives us no warrant to conflate these very different insights.

What are we to make of this statement of our author’s: “Eventually, Rothbard ([1962] 2009, p. lvi) himself conceived of exchanges as inseparable from the notion of property rights, while claiming that ‘[e]xchange cannot be adequately analyzed until property rights are fully defined’”. My assessment is that is a true statement in the positive realm. Exchange is a mutually agreed upon alteration of property rights, and if we are unclear on exactly what property rights are, then, to that extent, our analysis is likely to be wanting. Does this mean that Rothbard conflates the normative and the positive? Hardly.

Our author avers the following: “Austrian economics might simply take the libertarian theory of justice as a given and then proceed with purely positive considerations, while spelling out logical consequences of the former. But then again, the most sensitive spot of Austro-libertarianism is Austrian welfare economics.” In effect, if I read him correctly, he is acknowledging that there is a vast gap between fact and value amongst the studies of Austro libertarian economists, but that this chasm disappears when it comes to welfare economics.

⁶ Barnett and Block, 2012; Garrison, 2001; Hayek, 1931; Mises, 1912, 1949; Rothbard, 1963; Woods, 2009

⁷ The fact that his salary is financed via compulsory taxation is an entirely different matter.

He continues in this vein: "... there are unproblematic (and even necessary) value statements in economics (e.g. what welfare consists in, without which welfare economics cannot even get off the ground)."

Whereupon Wysocki throws down the gauntlet strongly: "Without doubt, welfare economics is at the bottom a normative enterprise. What-ever positive apparatus it might possibly resort to, it must ultimately rest on some normative premise. That is, for any welfare economics to even get off the ground, there should be an attempt made to identify some fact or property that makes the economic actor or society better off or worse off.... Since the present essay is mainly preoccupied with both justice and welfare as they are understood within the Austro-libertarian framework, it is crucial to ask how the two actually relate to one another. Specifically, the question is: do libertarian principles of justice assign rights independently of welfare considerations or are the former a function of the latter?"

The usual example put forth vis a vis this issue is the following. We all know that free enterprise is the last best hope for the prosperity of mankind.⁸ But suppose, just suppose, arguendo, that matters were entirely the opposite. That is, socialism, not capitalism, created wealth par excellence, and free enterprise, not central planning, led to poverty. What then? Should we then eschew our support for the free market system out of concern for human welfare? The best answer to this challenge is to reject its premise not as unlikely, but as literally impossible. It is akin to a square circle or asking if God can create a rock so big that he could not pick it up.⁹

Why so? This is due to the fact that free enterprise consists of nothing more, nothing less, than voluntary trade. As praxeology teaches us, all such "capitalist acts between consenting adults" (Nozick, 1974, p. 163) are necessarily beneficial in the ex ante sense. True, the plans of mice and men often go astray, and as Wysocki brilliantly illustrates, this will not lead to prosperity if someone drinks poisoned water, intending to quench his thirst. However, under socialism, only some few interactions meet this criterion.¹⁰ As for the rest of the commercial interaction taking place in this system, they cannot even meet this low bar.¹¹

Let us now attempt to respond more directly to this important challenge placed before us by this keen philosopher, Wysocki: "do libertarian principles

⁸ Austrian economists, at least, full well know this. Here, they are distinct from their non-Austrian economic brethren. The latter subscribe to the notion of "market failure." The former do not. See on this ()

⁹ It is also akin to asking someone if he has stopped beating his wife yet?

¹⁰ Members of the socialist paradise are legally allowed to own their underwear, toothbrushes and other such personal items, this does not apply to any of the means of production.

¹¹ Mises (1922) demonstrates not merely the unlikelihood, but the utter impossibility of rational economic central planning.

of justice assign rights independently of welfare considerations". The obvious answer is yes. What are these principles? In my view, there are three. First, the non-aggression principle. According to the NAP, it is a crime to engage in, or threaten the use of physical force against innocent people.¹² Violence may be used in defense, or by agreement, such as in the case of boxing or sado-masochistic arrangements. Second, private property rights are based on initial homesteading (Hoppe, 1993), and secondarily upon all voluntary interactions such as buying, selling, renting, investing, lending, borrowing, gift-giving. Third, free association. No one should be compelled to associate with anyone else against his will (Block, 2010).

What is the relationship of all of this with "welfare considerations?" Obviously, what we have here is a blueprint for human happiness. If and to the extent these three rules are followed, prosperity and well-being are sure to follow. However. Suppose that the all-powerful and very nasty Martians beam down a message to us relatively weak humans that if we follow these strictures they will blow up our entire planet, just as they did for the previous fifth planet, which now consists of the Asteroid Belt. We now have a rather sharp deviation between libertarian principles and prosperity, even survival.¹³

The radical, logically consistent libertarian will respond: "Death before dishonor." "Full speed ahead and damn the torpedos."¹⁴ "Let those Martians take their threats and shove them." On the other hand, the utilitarian libertarians would eschew any such reasoning, violate their own principles, and submit to Martian demands. How any of this bridges the unbridgeable gap between fact and value, between positive and normative economics, is unclear.

No truer words were ever said on this matter than those of our author: "...as Hausman and McPherson (2006, p. 172) put it: 'The philosophical libertarian's commitment to liberty is in principle independent of any welfare consequences. But libertarians would like it to be the case that protecting freedom also makes people better-off'. Indeed, in libertarian theories of justice, the just distribution of (property) rights does not appeal to welfare considerations at all. Rather, a just distribution of rights is explained by the so-called entitlement theory (Nozick, [1974] 1999), which provides two sorts of principles of justice of interest to us: (1) justice in original appropriation and (2) justice in transfer. Neither of them ties the distribution of rights to welfare." But this vitiates against his own thesis.

¹² Block, 2017, 2023; Rothbard, 1973, 1982

¹³ They will not allow any human beings to emigrate to their planet.

¹⁴ The Talmud demands such a reaction on the part of observant Jews. The Nazis told the leaders of Jewish towns: "Give us one Jew. Anyone you want. Even the worst one, who does not follow the 613 commandments. We will kill him. Otherwise, we will slaughter everyone in this village." The Jews who followed the strict letter of the law refused.

Here is a crucially important statement of our author's: "...no exchanges could even count as welfare-enhancing or welfare-diminishing unless they were just in the first place."

Why do I place such weight on this short statement? It is because if it were but true, his controversial and courageous thesis would be valid. That is, if so, Wysocki would have proven the unprovenable, squared the logical circle. Then, there would be no gap between Austrian or indeed any type of economics on the one hand, and ethics on the other. Alas for his initiative, it is not true. For example, A steals \$100 from B. That is unjust, a paradigm case of injustice. Whereupon A goes to the store and purchases \$100 worth of groceries. This too is unjust, in that A should, instead, repay B from whom he had stolen the funds. Nevertheless, it is extremely difficult to deny the conclusion that A's deal with C is mutually beneficial at the very least *ex ante*, and in all probability, *ex post* as well. Both A and C have gained in welfare from this unjust exchange. A, because he values the foodstuffs more than his ill-gotten, \$100, and the grocer too, since he places greater importance on the stolen money he receives from A than upon his wares that he must surrender in this sale.

The typical scenario mentioned in this context is where Jean Val Jean steals a loaf of bread to feed his starving son. This is unjust. Yet, our hearts cry out in favor of this theft. No man of good will wishes to contemplate a starving child. Yet, if we extrapolate from this incident, and many people walk out of bakeries without paying for what they steal, soon enough there will be no more bakeries, and everyone will starve.¹⁵

Wysocki dazzlingly offers yet another example. This one also undercuts his own thesis. A thief steals some garden furniture from a rich man who regards it as junk, but is too busy to get rid of it. This is an unjust act on the part of the robber; yet, it improves the welfare status of both the criminal and the owner.¹⁶

Speaking of undermining his own thesis, what are we to make of this statement of his: "...justice and welfare are two distinct and incommensurable goods..." It is difficult to think of a better, more pithy, more eloquent short statement of the normative positive distinction than this one. If I am interpreting it correctly, Austro-libertarianism is just a convenient abbreviation. One and the same person can of course adhere to both intellectual strands, but the gap between them cannot be bridged over.

¹⁵ Presumably, the reason the father was in such dire straits in the first place was due to some unwise and improper government intervention in the free economy such as socialism, regulationism, inflation, depression, the minimum wage law, etc.

¹⁶ Of course, in order for this example to succeed, we must stipulate that this successful theft does not have further implications, such as encouraging robbery.

My learned friend¹⁷ mentions “... a putatively happy coincidence that this kind of economy is the most productive: It so happens that the free-market economy, and the specialization and division of labor it implies, is by far the most productive form of economy known to man, and has been responsible for industrialization and for the modern economy on which civilization has been built. This is a fortunate utilitarian result of the free market...”

But is it really just a “happy coincidence?” If I admit that it is more than that, am I agreeing with Wysocki’s thesis that the is-ought distinction is invalid? No. I maintain that it is more than just an accidental co-incident, and, also, *au contraire*, there is all the world of difference between facts and values.

Let us consider a few examples. Austrians maintain that cardinal utility, not ordinal utility is logically coherent. However, egalitarians are beloved of the former, and that is a basic element in their case for compulsory redistribution of wealth. Even worse, their argument depends upon interpersonal comparisons of utility.¹⁸ So praxeology leads in the direction of libertarianism, but does not at all invoke the invalidity of the normative positive distinction.

A similar phenomenon is Mises’ (1922) contention that central planning is necessarily irrational, since there are no free market prices that indicate relative scarcity. Again, this inclines one in the direction of free enterprise, without in the slightest requiring the rejection of the fact-value distinction. A third case: monopoly. It is impossible for it to arise in the free economy, therefore anti-trust legislation¹⁹ is intellectually incoherent. That, too, inclines one in the direction of free markets, without in the least compromising the distinction we are considering.

Once again, into breeches: “... we believe that once we disentangle the logical relations standing behind the concepts of free market, voluntariness and being beneficial, it turns out that the entire reasoning by Rothbard (1956) is an exercise in begging the question. More specifically, we maintain that the conclusion that all market exchanges are beneficial merely restates his non-definitional premise; that is, that all voluntary exchanges are beneficial.

In effect, Wysocki is accusing Rothbard of offering a tautology. But this type of statement, e.g., bachelors are unmarried men, tells us nothing about the real world. It is necessarily true, to be sure, given that is an accurate rendition of how we use language. But it tells us nothing more than just that: it gives a definition of a word, “bachelor” in this case. What Rothbard is engaged in, here, is something entirely different. He is offering a synthetic *a priori* analysis. It is equally necessarily true. But where it diverges, and sharply so, from a tautology, is that it also tells us something about the real world, something

¹⁷ And several times co-author: Block and Wysocki, 2018, 2024; Wysocki and Block, 2017, 2018A, 2018B, 2018C, 2020, 2022; Wysocki, Block and Dominiak, 2019.

¹⁸ The rich supposedly benefit from their marginal dollar far less than do the poor from theirs.

¹⁹ Unless it applies to government enterprises such as the post office

which does not at all “beg the question.” To wit, Rothbard maintains that all market activity²⁰ is mutually beneficial *ex ante*, and that the same cannot be said of our interaction with government which, to say the least, is not at all voluntary. We learn an important lesson from Rothbard that has nothing whatsoever to do with mere definitions. Wysocki’s error, here, is failure to distinguish the praxeological method, which rests on the synthetic *apriori*, from mere definitional tautologies.

But Wysocki is not having any of this. He attempts to undermine the Rothbardian syllogism with his fascinating discussion of Ohio and its nickname, the Buckeye State. According to the old chestnut aphorism, “If you strike at the king, you must kill him.”²¹ I cannot think of anyone who better fits the appellation “king of Austrian economics” other than Rothbard. Wysocki makes a valiant effort to unseat him. I give Wysocki an “A” grade for his exhibition of intellectual courage. But I cannot think that he levels a fatal blow against Rothbard in this regard. His argument stems from the claim that the person who was ignorant of the Buckeye State being a nickname for Ohio learns something from the interchange, and that this is exactly, precisely, the same as the person in the economic argument learns that the market is the concatenation of all voluntary exchanges.

But Wysocki’s criticism founders on the fact that there is a disanalogy here. Learning about the nickname is solely, only, a matter of definition. What Rothbard is pointing to is not merely definition at all. Real learning emanates from his analysis, and on two grounds. First voluntary trade is mutually beneficial *ex ante*. Second, that is what free enterprise is all about.

Take the average person, unsophisticated about the niceties of the dismal science. Does he know that “voluntary trade is mutually beneficial *ex ante*.” No, of course not. If he has attended any American university, he full well knows that voluntary trade, instead, is exploitative. The rich exploit the poor in this manner. Second, does he know that free enterprise consists of all voluntary trades? Of course not. Rather, he is of the opinion that there are numerous “market failures.” The idea that free market capitalism is beneficial is anathema.

When the person ignorant of the fact that Buckeye is the nickname for Ohio, he will reply, “Oh. I didn’t realize. Thanks for clarifying that.” What the person ignorant of the fact that all trades are mutually beneficial *ex ante* and that is what the market consists is told about that, he will say, in sharp contrast: “Don’t give me that crap. Free enterprise is exploitative. You are a fascist for denying this, a veritable Hitler; according to Marx, capitalism is just a stage leading to eventual Nirvana.” When and if he changes his mind, real substantive

²⁰ Absent fraud, which of course take a commercial interaction out of the realm of *laissez faire* capitalism

²¹ Otherwise, he will come and get you

learning about reality will have taken place that is not at all merely definitional, as in Wysocki's Ohio example.

Next on Wysocki's hit list is this: "Rothbard's second premise ("all market exchanges are voluntary exchanges") could be only contingently true instead of being a mere definition. In other words, it would remain an open question whether market exchanges are voluntary given a market-independent account of voluntariness. And hence, most crucially, Rothbard's conclusion that all market exchanges are beneficial would be also open to rebuttal."

He is now trying to improve on Rothbard (1956). I am having difficulty wrapping my mind around the notion that, in effect, some market exchanges are coercive. This is akin to asserting that some rectangles are round. One yearns to ask, if a commercial interaction is under the threat of a gun, how can it be voluntary?

Nor can I see my way to acquiesce in the concept that some market exchanges are not beneficial, in the sense of anticipations. Why, ever, would they occur did not each participant expect to gain from them? One possibility would be gift giving. A gives a gift of \$100 to B. Non-economists might be tempted to assert that B gained but A lost out from the arrangement. But a more sophisticated understanding would realize that in A's mind, he, himself, A, is better off with this money in B's hands than in his own.

My debating partner seems to take it all back when he states: "... an exchange is voluntary when there is no aggression or a threat thereof on the part of either party to an exchange. And conversely, if aggression or a threat thereof occurs, then the resultant exchange is involuntary." As far as I am concerned, this merely deepens the puzzle.

Next in the batter's box is this insight from our world class philosopher:

"If one is ready to grant that these two outcomes are economically identical and that their only distinctive feature is that the payment to a blackmailer (case 1) was voluntary (due to a non-right-violating character of the blackmailer's proposal), and therefore valid, while the payment to a gunman (case 2) was involuntary (due to a right-violating character of the gunman's proposal) and therefore invalid, then one must conclude that the question of whether a given economic actor benefits or not does not (or at least not only) depend on the question whether a proposal threatens a right-violation or not."

I was very impressed by this contribution. I have myself written, often, on the distinction between blackmail and extortion.²² But I have never before seen these two distinct acts in the manner that Wysocki impresses upon me. Yes, in both cases there is a transaction. Only the blackmail fits into the market system;

²² Block, 1972, 1973, 1986, 1987, 1997, 1998, 1999A, 1999B, 1999C, 1999D, 2000A, 2000B, 2000C, 2000D; 2001A, 2001B, 2002-2003, 2005, 2009, 2023, 2025; Block and Anderson. 2001; Block and Gordon. 1985; Block and Kent, 1999; Block, Kinsella and Hoppe. 2000; Block, Kinsella and Whitehead, 2006; Block and McGee, 1999A, 1999B; Gordon and Block, 2014.

the extortion case does not since it constitutes a rights violation, a purely libertarian point. Yet, nevertheless, in both cases, compared to the status quo ante, the target of both threats gains. The blackmailee values the silence he obtains more than the money he pays for it. In like manner, the extortionee also “benefits” since he places his very life on a higher plane the money he must expend to safeguard it. But I still do not see how this undermines the positive normative distinction, the thesis of this author.

Wysocki continues with this analysis, but here he loses me entirely. He states: “... we contend that some voluntary, viz. rights-respecting, exchanges are not beneficial. And thus, our considered judgement is that regardless of the fact that in blackmail case (1) we earn the said right, it still might be as bad (in terms of welfare) as case (2), in which no right was earned at all. What is more, (1) may be ex post even worse (only as far as welfare goes),²⁸ for there still might be a plausible ex post expectation that a blackmailer might blackmail me again despite the fact I have already earned a right that he does not blackmail me ever again.”

One problem with this is that we had stipulated an honest blackmailer. One who was once bought would stay bought.²³ He was paid to keep the secret forever, and now reneges. One might well render the extortionist dishonest: after you pay him to keep you alive he murders you anyway. In any case, with regard to the crooked blackmailer, you now have a weapon against him. You can broadcast to the world that insofar as honest blackmailing goes, your particular blackmailer is an utter failure. Why is this a weapon against him, apart from the fact that he will lose face in the honest blackmailing community? It is due to the fact that his next target will tell him to “publish and be damned.” Once word gets out about the perfidy of this blackmailer, he will find it far more difficult to ply his trade.

Next this brilliant theoretician constructs a case wherein not only is the blackmail compatible with libertarianism, but so is extortion (the latter is righting the scales of justice, since his “victim” previously shot a member of the extortionist’s family). He then states “Given all this, so constructed, 2* (i.e. legitimate gunman’s proposal) may differ from the blackmail proposal only with respect to its impact on the proposee’s welfare, as their moral character of the two proposals is now identical by assumption. And, interestingly, it might as well be the case that paying the gunman proves to be more beneficial both ex ante and ex post than paying the blackmailer. And if so, since 2* is assumed to be morally legitimate, then there is no obstacle to treat paying the legitimate gunman as better overall than paying the blackmailer. After all, with both of these proposals being presumed to be morally legitimate, it is only their

²³ That is, you could actually buy his silence, not merely rent it for a time

differential influence on the recipients' welfare that allows us to decide which of the two proposals yields a better result overall."

But in so doing he creates problems for his thesis. First of all, this in no way undermines the fact-value distinction. Secondly, he does not hold to strict *ceteris paribus* conditions. Wysocki paints the extortionist as an honest actor: he will do precisely what he contracts to do; after he accepts payment, he will no longer plague his target. In contrast, the blackmailer will renege on his agreement.

Wysocki concludes "that voluntariness alone cannot render an exchange beneficial in a welfare-enhancing sense, everything else equal. One problem is that everything else is not equal. Another is that in the revised justified extortion case is no longer an example of a voluntary exchange. We have moved from that to one of compensation for a crime previously committed by the target of the extortion.

In the view of Wysocki, "... our overall normative framework provides that the primary good to be maximized is justice, with justice being non-tradeable for welfare."

If the choice is between someone stealing one stick of bubble gum and the world goes on as before, versus no one steals any such thing and the entire world is blown to bits by the evil omnipotent Martians, I think that most libertarians would be pro theft. I certainly would.

Our author continues: "Coming back to our sofa thought experiment, our Austro-libertarian account predicts that even though the owner of the sofa got his economic bad removed for free by the thief, this outcome is still infinitely worse on balance than any one in which rights would have been respected." "Infinitely worse" sounds like, reeks of, cardinal utility. Plain old ordinary "worse" is compatible with ordinal utility. Austrians eschew the former, embrace the latter.

Wysocki claims "that involuntary (i.e. coerced) exchanges are non-beneficial..." But that theft of lawn furniture is not an exchange; it is just theft. What of extortion. Is it an exchange? No. Not unless the word "exchange" is imbued with an entirely different meaning.

Is blackmail really an exchange? According to Nozick's (1974) notion of a "productive exchange," it really is not. Sometimes called "drop dead theory," the point here is that our arrangement with the grocer is a "real" exchange, since you pay him \$100 for foodstuffs you value at \$150.²⁴ The last thing you want is for him to drop dead, or disappear from the scene entirely, leaving you not holding the bag of groceries, but holding your \$100.

Matters are different with the blackmailer. You do indeed wish that he would go away, and bother you no more with his so-called "offer." You would

²⁴ Ditto for the merchant. He prefers, *ex ante*, your funds to his wares

be better off if that worthy had not existed. One way out of this difficulty is to realize that the offer could have come from either direction. In the usual case of blackmail, it is the blackmailer who approaches the blackmailee with his offer to trade silence for money. But, we can easily envision the opposite occurring. The blackmailee initiates the deal with the blackmailer: “Hey, shut up about this occurrence and I’ll pay you big.”

In contrast, it is extremely difficult to think of this in the case of extortion. No extortionee ever approached an extortionist and paid him to leave him alone. Rather, the target, here, wishes to completely avoid the assassin. Thus, we can distinguish blackmail from extortion based upon the issue of initiation. If not, we would fall into Wysocki’s trap, and have to admit that the only reason we regard blackmail as an exchange, but not extortion, is predicated on the libertarian notion that the latter violates rights but not the former. If so, the normative positive breach would have been bridged over, and Wysocki’s thesis would have been validated.

But this initiation business will not do. It all depends upon whether or not the extortionee feels safe. Under ordinary circumstances, he will avoid the hit man like the plague. However, consider the situation wherein the two of them are in the same room, and the murderer is about to pull the trigger. Then we can full well appreciate the scenario in which the innocent person initiates the deal: “Hey, don’t kill me; whatever you are now being paid to do so, I’ll pay you more.” So, we cannot distinguish the two events, blackmail and extortion, based upon who initiates the financial arrangement.

But we do not need to do so to ward off Wysocki’s challenge. All we need realize that in both cases, blackmail as well as extortion, the target gains. In the former, he values silence more than the money he must pay for it. In the latter, he ranks his very life more than the funds necessary to save it.

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A REVIEW OF THE CONCEPT OF SUSTAINABLE CLOTHING CONSUMER BEHAVIOR

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Abstract

The paper analyzes sustainable consumer behavior in relation to clothing items, focusing on the influence that social media has on perceptions, motivations, and purchasing decisions. In the context of growing interest in responsible fashion and pressure generated by the textile industry's impact on the environment, the study aims to clarify how consumers navigate between online information, brand messages, and their own values. The methodology is based on a systematic review of the literature, carried out by selecting and analyzing relevant articles from the main academic databases, using rigorous inclusion and exclusion criteria. The results highlight both the motives that favor the adoption of sustainable behavior and the barriers that limit this transition, such as lack of transparency, high prices, or greenwashing. At the same time, the analysis emphasizes the ambivalent role of social media, which can facilitate change but can also amplify superficial trends. The contribution of the paper lies in integrating these perspectives into a coherent framework that provides a nuanced understanding of consumer behavior and outlines relevant directions for future research and the development of effective communication strategies in the field of sustainable fashion.

Keywords: sustainability, fashion, consumer, second-hand, behavior

JEL Classification: M31, M37, D91

1. Introduction

The clothing manufacturing industry is increasingly affecting our daily lives through the levels of pollution it produces. According to Antonio Guterres, UN Secretary-General, the fast fashion industry is extremely harmful to the population, creating a global waste crisis (UNEP, 2025). According to data presented by the UN, every second, the equivalent of a truck full of clothing is incinerated or thrown into a landfill. The fashion industry is responsible for 8% of greenhouse gas emissions and consumes huge amounts of water and chemicals (UNEP, 2025). The problem with fashion is not just about trends, but it is part of a global waste crisis that hits vulnerable communities the hardest. Why is this happening? Because current business models focus on rapid production, and clothes are designed to be worn only a few times before being thrown away. If we extended the lifespan of clothes, we could reduce the industry's emissions by up to 44%. In fact, the resale market is growing rapidly, and designers are beginning to experiment with recycled materials, which, together with growing consumer demand for sustainability, shows us that

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change is indeed possible (UNEP, 2025). This research aims to present in a structured way perspectives of sustainable clothing use.

2. Literature review

2.1 Consumer behavior in the context of sustainability

The study of consumer behavior is a multidimensional field that includes various aspects of human decision-making, motivation, and factors that influence purchasing decisions (Lee, 2011). Consumer behavior is a form of expression, which is particularly influenced by today's society (Balaure, 2003). Sustainability is an important issue that has attracted a lot of attention in the fashion industry in recent years. The goal of sustainable fashion is to reduce the damage that the manufacture and use of clothing causes to the environment and its residents. Sustainable clothing behavior refers to consumers' choices and actions when it comes to purchasing and using clothing in an environmentally friendly and socially responsible manner (Daukantienė, 2023). This behavior is influenced by various factors, including individual beliefs, social norms, economic considerations, and access to sustainable options (Yavari, 2019). Understanding these factors is crucial for promoting and encouraging sustainable clothing behavior (Yavari, 2019). The complexity of sustainability in clothing is not just about labels or the origin of raw materials, but includes the entire life cycle, from manufacturing and delivery to maintenance (washing) and disposal (Harris, Roby and Dibb, 2016). Since a product goes through numerous stages, from obtaining raw materials to assembling accessories, we cannot easily assess its impact on the environment. This means that in order to fully understand how environmentally friendly a product is, a detailed analysis of each stage in the supply chain is necessary (Harris, Roby and Dibb, 2016)

Based on Fraudi's (2025) analysis of the literature, it can be observed that consumers' views on sustainability in the fashion industry are divergent, being influenced by culture, but circularity is considered important given the attention paid to recycling and clothing waste management. Furthermore, Faludi (2025) points out that consumers may be suspicious of the veracity of sustainability claims made by the fashion industry, may not be very open to using/wearing second-hand clothing, and may consider sustainable clothing to be expensive. However, Faludi (2025) highlights branding strategies that companies can use to address consumer concerns when it comes to combining sustainability with fashion.

Consumer diversity and priorities:

- Consumers are mostly motivated by things like price, quality, style, and comfort. Ethical or sustainability stuff tends to be less important, since buying clothes isn't really seen as an altruistic thing to do (Harris, Roby and Dibb, 2016).

- Differences in personal values and ethical concerns lead to a fragmented approach: some consumers are concerned about working conditions or environmental protection, while others do not even think about these details (Harris, Roby and Dibb, 2016). The fast fashion industry promotes an ideology of consumption that focuses on repeated purchases of cheap, low-quality items, favoring short-lived trends and discouraging investment in durable pieces, while also creating a culture of detachment from the long-term value of clothing (Harris, Roby and Dibb, 2016).

After analyzing the specialized literature, it was found that there are certain barriers that we come across when making a purchase decision, these can be internal at the consumer level and external at the society and industry level (Bondarev, 2021). Internal barriers consist of a lack of information and understanding, with buyers often lacking the knowledge necessary to perceive the ecological impact of our clothing decisions, given washing practices and methods of clothing disposal (Harris, Roby and Dibb, 2016). This category of internal barriers also includes habits that are resistant to change, such as washing at high temperatures or impulsively purchasing new clothing items. External barriers in the field of sustainable fashion manifest themselves in the form of major external challenges: from the difficulty of tracking each stage of production, which undermines trust in labels, to stereotypes that make eco-friendly design seem too unconventional or unattractive, to the pressure to save money that causes retailers and consumers to opt for cheap clothes instead of investing in sustainable pieces (Harris, Roby and Dibb, 2016). Social media has been documented as an effective tool for describing actions and promoting ideas centered on fashion and sustainability. Vladimirova et al. (2023) postulated that Twitter would be an appropriate channel for communicating and obtaining feedback on fact-based topics, while Instagram would work best as a means of disseminating feelings about sustainability and fashion-related topics, with both platforms considered to have great potential to influence fashion consumption. Social marketing campaigns can be used to inform and educate the general public through campaigns aimed at reshaping cultural perceptions and highlighting the benefits of a long-term relationship with clothing, the idea of repairing, creatively transforming (upcycling), or even renting clothes as alternatives to buying new ones (Harris, Roby and Dibb, 2016). Vladimirova et al. (2024) state that the fashion industry must align its processes with sustainable goals. Vladimirova et al. (2024) recommend that future studies focus on exploring the potential role of social networks as a vehicle for educating and building emotions about sustainable fashion consumption behavior.

Faludi (2025) recommends that future research focus on exploring the suitability of integrating circular approaches into the fashion industry, investigating consumer eco-behavior in fashion and collaborative consumption,

particularly given the increase in the use of social media to promote such behavior (Vladimirova *et al.*, 2024). Social media platforms have transformed the way consumers distinguish and purchase clothing items. Social media platforms such as Facebook, Instagram, and TikTok facilitate the promotion and creation of a social experience with brands. This is where the concept of FOMO (fear of missing out) comes in, defined as a feeling of anxiety about not participating in events that are considered essential (Bläse *et al.*, 2024). For example, the event organized by DM drogerie markt chain of stores in May 2025, when tickets for the event sold out within minutes of going on sale, is a telling example of the above. Such events directly influence purchasing behavior. Consumers are constantly influenced by the flow of information and influencers who promote the continuous purchase of new clothing products, even if they are not necessarily needed. Such behavior is not ethical from a sustainability perspective (Bläse *et al.*, 2024). Long-term thinking and awareness of the positive or negative effects of our actions are important for sustainability. It is necessary to develop environmentally friendly behavior in order to protect natural resources and ensure a more sustainable future (Rastogi *et al.*, 2025).

3. Methodology

To conduct this study on sustainable consumer behavior in the clothing industry, we searched the main academic databases, including Google Scholar, Scopus, and Science Direct. We obtained 40 articles, from which we selected only those that met the main requirements, including language (we only analyzed papers written in English) and relevant keywords for the study. We conducted the research using combinations of keywords such as Sustainable fashion+consumer behavior, consumer awareness+sustainable fashion, circular fashion+consumer attitudes, resulting in a final number of 23 articles viable for the study.

4. Results and discussions

In analyzing the literature on sustainable consumer behavior in the clothing industry, we observe a growing interest in responsible fashion, due to concerns about the textile industry's impact on the environment. It can be seen that adopting sustainable behavior is not a linear process, where ethical and ecological motivations coexist with barriers such as high prices or a lack of transparency in processes.

The analysis revealed a set of sustainable practices that have been adopted by consumers, including purchasing second-hand items, reducing purchases, and choosing sustainable brands. These types of behaviors are influenced by factors such as education level, income, personal values, and exposure to social media.

The literature has identified several benefits of consuming second-hand clothing, including:

- o Economic benefits, which are some of the main motivations for choosing second-hand clothing items. Consumers perceive purchases of this kind as a smart financial decision, due to the savings and good value for money (Hur, 2020).

- o Self-expression benefits, which are linked to consumers' desire to express their unique style and personality through clothing. Consumers perceive second-hand clothing as a way to build an image that is different from the fast fashion trends currently on the market (Machado *et al.*, 2019).

- o Emotional satisfaction benefits, which refer to the pleasure of finding something unpredictable in a good way, a piece of clothing that is suitable in every way, such an achievement reinforcing the feeling of personal satisfaction (Hur, 2020).

- o Environmental benefits, which are related to awareness of the impact that the fashion industry has on the environment, with the use of second-hand clothing contributing to extending their life cycle. Reusing clothing reduces the amount of textile waste and the need to generate new items through polluting production processes.

The transition from a linear consumption model to a circular one is very important, as resources are continuously reused and revalued (Hur, 2020). In 2013, Joung *et al.* conducted a study showing the factors that motivate clothing disposal behavior among students. Four main behaviors of clothing disposal were identified, including: resale and donation, which are significantly influenced by environmental concerns; reuse; donation, which has a strong charitable component; and discarding, which is largely driven by convenience. Post-purchase behavior refers to how buyers manage clothing items after they have purchased them, either opting for reuse, wearing again, donating, selling, repairing, or recycling, transforming old fabric into new resources (Kemi and Zilahy, 2025). Reusing and repairing items reduces the exploitation of new raw materials and reduces excessive waste accumulation (Kemi and Zilahy, 2025).

4.1 Practices and strategies for sustainable clothing use

Sadachar *et al.* (2016) state that strategies for sustainable clothing use include promoting ecological awareness of clothing items. The article emphasizes that more detailed information about the impact of manufacturing processes (fiber processing or material recycling) contributes to the development of more responsible behavior. This knowledge can lead to more responsible choices and more sustainable consumption (Sadachar, Khare and Manchiraju, 2016). Strategies for sustainable clothing use include maintenance, repair through DIY projects to replace zippers, repairing defective seams, or reconditioning items where possible. These practices extend the life cycle of

clothing and help reduce textile waste (BBC, 2022). To encourage sustainable consumer behavior, certain strategies can be implemented, including education and information campaigns on consumption, recycling, or the transformation of clothing items. Responsible consumption is not just about choosing products, but also about understanding their long-term impact (Kim, Jung and Lee, 2021). Another important aspect is the transparency of production processes. Detailed communication on how clothing products are created, from the collection of raw materials to the finished product, providing consumers with a different perspective. This way, consumers become more informed about purchasing more environmentally friendly products (Kim, Jung and Lee, 2021). According to Laura (2009), by providing clear and credible information, consumers can identify and eliminate vague or misleading messages in green marketing, thus reducing the level of skepticism and confusion associated with ambiguous terms such as "eco-friendly" or "sustainable". In the competitive context of the eco-fashion market, simply manufacturing clothing products in an ethical manner is not enough to attract and retain consumers. Brands must differentiate themselves through innovative approaches that complement the responsible production process (Chan and Wong, 2012). Thus, it is necessary to adopt differentiation strategies in several main directions: Brands must create marketing campaigns that are not limited to highlighting the aesthetics of eco-products, but also inform the public about the social and environmental benefits of sustainable consumption. These campaigns detail the positive impact of choosing eco-fashion products and help consumers understand that increased commitment translates directly into a real contribution to protecting the environment. In this way, the purchasing process becomes a conscious and responsible buying decision, strengthening the emotional connection between the brand and the consumer (Chan and Wong, 2012).

In today's technological era, the use of digital channels is becoming essential for building a strong community around a brand. Through social media, newsletters, and other online platforms, companies can constantly distribute information about authentic sustainability initiatives and interact directly with their audience. Thus, communication helps create a sense of belonging to a community of engaged consumers, which increases loyalty and continued support for the brand (Chan and Wong, 2012). The adoption of circular economy principles is achieved by promoting a model that encourages the repeated use of resources through collection, reconditioning, and reuse processes, contributing to the creation of a sustainable brand image. This approach not only reduces environmental impact but also supports a long-term relationship with sustainability-conscious consumers (Yoo, Jung and Oh, 2021). Certain retailers stand out for their affordable prices and excellent value for money. They offer second-hand products at competitive prices, while ensuring superior value for money. In this way, they attract a segment of customers who

want to save money without compromising on quality standards, clearly differentiating themselves from traditional fast fashion offerings. Through this strategy, brands not only respond to a real economic need, but also strengthen their competitive position in the market (Machado *et al.*, 2019). Constant monitoring of customer feedback is an essential strategy for remaining relevant in a market that is constantly evolving. Periodically evaluating the shopping experience and collecting customer opinions allows brands to identify any shortcomings or opportunities for improvement. By actively listening to customers, brands are able to adapt their communication and marketing strategies to meet their expectations and needs. This is a results-oriented approach that not only optimizes the in-store experience but also contributes to the continuous adaptation of the offer, ensuring competitiveness in a dynamic consumer environment (Chan and Wong, 2012). Success in the eco-fashion market depends not only on ethical production, but also on brands' ability to educate, engage, and listen to consumers. By combining marketing education and effective communication, companies can create an authentic and powerful brand image that responds to both the emotional and functional needs of consumers in an ever-changing market environment. With the adoption of new production strategies, such as the switch to recycled materials or technologies that reduce water consumption, consumer interest in reuse, repair, and recycling has also increased. This change is supported by the principles of the circular economy promoted by the European Union and the UN (Kemi and Zilahy, 2025).

4.2 Sustainable fashion and circular economy

In 2019, Hatef and Shahrudin conducted research on clothing recycling behavior and intentions to purchase clothing made from recycled materials. The results of the study showed that consumers who have a positive attitude toward eco-fashion clothing, who believe that it is high quality, attractive, and beneficial to the environment, are much more likely to want to buy it. The same authors show that when people feel they have the ability and resources to purchase such products, their intention to buy increases significantly. In addition, the study shows that social influences such as pressure and expectations from family or friends also play a role, but their impact is smaller compared to personal attitude and sense of control. Hatef and Shahrudin (2019) also concluded that there is a strong relationship between how consumers manage the disposal of their clothes (through recycling, donation, or reuse) and their actual decision to buy eco-fashion clothing. The results suggest that reinforcing a positive attitude towards eco-fashion, combined with strategies that promote sustainable clothing disposal behavior, can stimulate the purchase of clothing made from recycled materials (Hatef and Shahrudin, 2019). According to Niinimäki (2009), the concept of eco-fashion is defined as

a clothing concept characterized by sustainability, ethical production methods that have a lower impact on the environment, and the use of eco-friendly or recycled materials in the manufacture of clothing items. This approach is proposed as an alternative to fast fashion, emphasizing sustainability and quality (Niinimäki, 2009). Transparency in the food production chain is much more evident than in the fashion industry, this lack of clarity making it difficult to assess sustainability and ethics in an integrated manner, with the assessment of eco-fashion products often being reduced to eco-friendly materials or less environmentally harmful production methods, without considering the entire life cycle of the product (Niinimäki, 2009). Niinimäki (2009) highlights a phenomenon known as the attitude-behavior gap in eco-fashion consumption, emphasizing a gap between what consumers say about the ethics and sustainability of clothing products and the actual choices they make. Even if these values attract their attention, buyers actually make purchasing decisions that are more influenced by factors such as price, material, design, and how well the items fit into their wardrobe (Niinimäki, 2009). Several barriers to purchasing sustainable products have been identified, such as price; lack of availability: a limited range of sustainable products and difficulty in identifying brands that offer such a range; perception, where sustainable clothing is often perceived as unfashionable or unattractive; consumption habits: loyalty to certain brands and inertia in changing consumption habits contribute to maintaining a gap (Wiederhold and Martinez, 2018). Nowadays, there is a phenomenon known as "cheap chic," which refers to the purchase of inexpensive clothing items that are worn a few times and then thrown away (Philippa Crommentuijn-Marsh, 2017). Subramanian (2016) presents in his book a case study of a small textile company in Argentina, Curbreme, founded by designer Alejandra Gottely to promote the use of natural materials and organic fibers. The company uses local raw materials, such as sheep and camel hair/fur, as well as plant fibers such as cultivated cotton, in accordance with the agro-ecological principles of the provinces of Argentina (Subramanian, 2016).

Curbreme uses traditional methods in its production process, such as manual looms and tailoring workshops, but also modern technology. This combination of production methods results in high-quality tailoring and a reduced production line, which contributes to reducing pollution and using resources more efficiently. This company produces seasonal clothing, thus contributing to the reduction of overproduction and unnecessary waste (Subramanian, 2016). For reference, major fast fashion brands change their collections at least once every six weeks (BBC, 2022). Textile waste can be reduced through certain approaches, such as wool, which can be turned into a resource through composting. Waste turned into compost can be used to optimize agricultural soils, closing the textile life cycle (Subramanian, 2016). In the circular economy, consumers actively contribute by purchasing

second-hand clothing. Consumers buy second-hand clothes for several reasons, including the desire to be unique, treasure hunting, or nostalgia, which leads to a reduction in demand for new clothes (Machado *et al.*, 2019). The fashion industry needs to adopt a circular model, as this model can help reduce waste through reuse, repair, or recycling of materials, thus leading to a more sustainable textile industry (Kim, Jung and Lee, 2021).

Table no.1 Comparison between the linear economic model and circular economic model

Linear economic model	Circular economic model
Traditional approach that leads to the disposal of clothing items as textile waste (Ta, Aarikka-Stenroos and Litovuo, 2022).	In a different approach, products are reintroduced into the cycle through reuse processes. Extending the life cycle and reducing environmental impact (Ta, Aarikka-Stenroos and Litovuo, 2022)
Mass production of new products is highlighted, with an focus on increased sales (Faludi, 2025).	The circular model is integrated into certain business models. The main focus is on making the most of materials that have already been used, by reusing them or turning them into new stuff (Kim, Jung and Lee, 2021).
The consumer experience focuses on classic product attributes, such as a new look or innovation, without focusing on sustainability aspects (Ta, Aarikka-Stenroos and Litovuo, 2022).	Here, the consumer experience focuses not only on classic attributes but also on awareness of the sustainable value of products (Ta, Aarikka-Stenroos and Litovuo, 2022).

5. Conclusion

This paper analyzed the specialized literature, which highlights the fact that sustainability in the fashion industry is no longer just a passing trend but a broad process of transforming the way consumers purchase and use clothing items. The literature reviewed shows that ethical and environmental motivations are gaining ground, but actual behaviors are heavily influenced by price and the lack of transparency offered by brands. At the same time, social media plays a central role in shaping consumer behavior, as it showcases certain sustainable practices. However, it can also create confusion among consumers by promoting superficial trends or through greenwashing.

The conclusions of the research indicate that although interest in sustainable fashion is growing, the transformation of this interest consists of a combination of factors such as access to real information, brand transparency, and consumers' availability to adapt their habits.

In this sense, the paper provides a starting point for the development of more effective communication strategies that support consumers in making truly sustainable clothing choices. Through this approach, the research

contributes to a more nuanced understanding of the phenomenon and opens relevant directions for future research.

Future directions in the literature point to the need for new empirical studies to further explore the impact of social media on purchasing decisions, generational differences, and how post-purchase behavior is managed. The results show that sustainable fashion is constantly evolving and there are numerous opportunities for research. In this context, it becomes clear that mechanisms such as social and psychological ones underlie consumer behavior and are necessary for the formulation of effective strategies to promote sustainability.

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