MOBILITY OF THE LABOR FORCE, WAGES AND ETHNIC DISTRIBUTION IN OTTOMAN BANK

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ABSTRACT

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Keywords: Ottoman Bank, labor history, workforce mobility, ethnic hierarchies, wage inequality, archival data, institutional meritocracy, imperial economies, historical labor markets, AI-assisted transcription, organizational history.

This thesis investigates labor dynamics within the Imperial Ottoman Bank between 1900 and 1930, drawing on archival personnel records to explore ethnic hierarchies, wage disparities, and mobility patterns. By combining AI-assisted transcription of handwritten documents with statistical analysis, the study reveals how the Bank functioned as a microcosm of imperial labor segmentation. Despite data limitations, key findings highlight the use of mobility as a shock absorber, the persistence yet semi-rigidity of ethnic occupational hierarchies, and emerging signs of institutional meritocracy. These insights contribute to Ottoman economic and labor history, comparative empire studies, and the historiography of modern organizational labor structures.

ÖZET

OSMALI BANKASI'NDA İŞGÜCÜ HAREKETLILIĞI, ÜCRETLER VE ETNIK DAĞILIM

BEYZA ÇOKKEÇECI

VERİ BİLİMİ YÜKSEK LİSANS TEZİ, HAZİRAN 2025

Tez Danışmanı: Prof. SELİM SAFFET BALCISOY

Anahtar Kelimeler: Osmanlı Bankası, emek tarihi, işgücü hareketliliği, etnik hiyerarşiler, ücret eşitsizliği, arşiv verisi, kurumsal liyakat sistemi, imparatorluk ekonomileri, tarihsel işgücü piyasaları, yapay zekâ destekli transkripsiyon, kurumsal tarih.

Bu tez, 1900 ile 1930 yılları arasında İmparatorluk Osmanlı Bankası'ndaki işgücü dinamiklerini incelemekte ve etnik hiyerarşiler, ücret eşitsizlikleri ile hareketlilik örüntülerini araştırmak üzere arşiv personel kayıtlarından yararlanmaktadır. El yazması belgelerin yapay zekâ destekli transkripsiyonu ile istatistiksel analizlerin birleştirilmesi sayesinde, Banka'nın imparatorluk dönemi işgücü ayrışmasının bir mikrokozmosu olarak nasıl işlediği ortaya konulmaktadır. Veri sınırlılıklarına rağmen, temel bulgular hareketliliğin bir şok emici olarak kullanıldığını, etnik meslek hiyerarşilerinin kalıcılığını fakat yarı-esnekliğini ve kurumsal liyakatin ilk izlerini gözler önüne sermektedir. Bu bulgular, Osmanlı ekonomik ve emek tarihi, imparatorluklar arası karşılaştırmalı çalışmalar ve modern kurumsal işgücü yapılarının tarih yazımına katkı sağlamaktadır.

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To my mother, who couldn't witness these days

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1. INTRODUCTION

The late Ottoman and early Republican periods were characterised by profound economic and political turbulence: global integration accelerated trade, military and political conflicts redrew borders, new nation states established to replace imperial institutions, and financial capital flowed in increasingly volatile channels. At the center of many of these currents stood the *Imperial Ottoman Bank* (BIO), a hybrid Franco-British chartered bank that combined the privileges of a central bank, a commercial bank, and an arm of European diplomacy. Because the BIO recruited, transferred, and paid staff across 92 branches that stretched from London to Basra for more than a century, its personnel archives offer an exceptionally granular view of how a multinational enterprise managed labor mobility, wage setting, and ethnic diversity in an era of imperial dislocation.

However, despite the Ottoman Bank's centrality to this history and a relatively rich qualitative literature on Ottoman labor, quantitative scholarship on Ottoman labor remains scarce. While many sectors in the late Ottoman Empire left behind sparse or inconsistent documentation, even in institutions like the BIO which maintained relatively systematic personnel records researchers face major archival and methodological challenges. Existing studies, limited by fragmented sources and methods, have struggled to integrate handwritten, multilingual records into systematic analysis. In the case of BIO's personnel files two obstacles stand out: First, the relevant sources are scattered across handwritten personnel books and typewritten board minutes whose paleography, language switching, and physical decay have deterred systematic coding. Second, existing wage and mobility studies typically rely on small samples or aggregate statistics, making it hard to trace individual careers across time and space. Small samples and aggregated statistics have obscured individual career trajectories, leaving critical questions unanswered like 'How did a multinational enterprise like the Ottoman Bank navigate wage-setting, ethnic diversity, and staff mobility despite collapsing empires and rising nationalism?'

This thesis proposes a new methodological approach to better connect archival material with quantitative analysis. Leveraging recent advances in large language mod-

els (LLMs), it processes and transcribes the Ottoman Bank's personnel books and board meetings documents long considered partly inaccessible due to their physical decay, multilingualism, and complex paleography. By automating the most part of the extraction of data from these challenging sources, the project constructs the one of the first longitudinal micro-dataset of Ottoman Bank employees, spanning 3,734 individuals across three decades (1900–1930). This dataset allows for a new level of detail in tracing careers over time and space, revealing how the bank transferred staff across and within borders, adjusted wages amid financial volatility, and balanced ethnic diversity within its workforce. For instance, the analysis illuminates whether compensation correlated with geopolitical shifts or ethnic hierarchies, and how the bank's labor strategies evolved as imperial institutions gave way to nation states. Such insights not only enrich our understanding of the Ottoman Bank's role as both an international intermediary and a modernizing force, but also challenge simplistic narratives of Ottoman economic decline.

Beyond its empirical contributions, the thesis offers broader lessons for interdisciplinary scholarship. Historically, it repositions the Ottoman Bank as a key institution that mediated between European capital and local economies, reshaping labor practices in a volatile region. For contemporary audiences, it provides a case study in managing diversity and instability which is a relevant theme for today's multinational enterprises. Methodologically, it demonstrates how AI-driven tools can revolutionize archival research, unlocking mostly "unreadable" sources and setting a precedent for similar studies in economic history or digital humanities. By merging technology with rigorous historical inquiry, this project not only fills a critical void in Ottoman studies but also charts a path for future research into global labor, institutional resilience, and the hidden human stories within archival silences.

Using that dataset, the thesis addresses three interlocking questions:

Mobility: What kind of patterns characterizes the transfers between branches, and how was mobility shaped by job function, religion, and geopolitical shocks such as war or forced deportations?

Diversity: Did the Ottoman Bank reproduce the three tier ethnic hierarchy sketched by Eldem (1999), or did local commercial pressures erode those boundaries over time?

Wages: To what extent did mobility and ethnicity translate into wage premia, and how resilient were those premia during crises such as World War I or the Turkish War of Independence?

By integrating micro level personnel data with macro historical context, the thesis aims to move the conversation beyond anecdote and towards a data-driven social history of one of the Eastern Mediterranean's most influential financial institutions.

2. LITERATURE REVIEW

The study of labor history serves as a critical lens for understanding the socioeconomic fabric of countries by revealing patterns of power, inequality, and cultural exchange. While research about labor history is rich in European contexts, the Ottoman Empire's labor dynamics remain comparatively underexplored. This literature review synthesizes existing scholarship on labor structures, wage disparities, and mobility within the Ottoman Empire and other empires with similar structure, with a focus on the Ottoman Bank as a unique institutional microcosm. The Ottoman Bank was a multinational institution positioned between European capital and Ottoman governance. Its personnel practices reflected broader imperial tensions. These included contradictions between globalization and localization, meritocracy and discrimination, and stability and upheaval. On the other hand we need to examine the literature about the methodologies in researching and quantifying archival handwritten documents. The study of archival handwriting offers vital insights into historical documentation practices, yet also presents methodological challenges due to the variability of scripts across time, region, and author. Nineteenth and early twentieth century records, ranging from bureaucratic ledgers to personal correspondence, require interpretive labor that blends philological sensitivity with technical skill. This section also synthesizes key approaches developed by scholars and practitioners for working with such manuscripts, from classical paleographic techniques to contemporary machine learning tools. This study pays particular attention to hybrid methods that combine human expertise with automated systems. These methods reflect broader trends in digital humanities, where scholars seek transcription and analysis techniques that are both scalable and reliable.

2.1 Labor in Ottoman Bank and in Ottoman Empire

As Quataert notes, labor history did not emerge as a distinct subfield within Ottoman historiography in the way it did in British or French contexts Quataert (2001). Nevertheless, the Ottoman case offers a rich, if fragmented, body of material that allows scholars to reconstruct labor experiences through diverse and decentralized sources. Unlike centralized labor narratives in Western Europe, the Ottoman Empire's multilingual and multiethnic structure produced records in a range of languages, often penned by workers themselves, which reveal regional nuances and cultural variation. These documents provide rare glimpses into everyday labor practices and power relations from the workers' own perspectives, even if they were not originally intended as part of a formal labor archive Quataert (2001). In this environment the Ottoman Bank stands out as a rare institutional actor that kept remarkably detailed personnel records across its many branches. These archives, ranging from payroll ledgers to transfer and promotion logs, offer a unique window into the employment structures of a multinational institution operating within a collapsing empire. The bank's bureaucratic rigor and supranational positioning make it an exceptional case through which to examine occupational mobility, wage differentiation, and ethno-religious hierarchies within the late Ottoman labor force. In this sense, the Ottoman Bank serves not only as an administrative entity but also as an inadvertent chronicler of labor conditions in an era of imperial transition.

2.2 Labor Diversity in the Ottoman Bank and the Ottoman Empire

The hierarchical structure of labor within the Ottoman Empire was neither static nor uniform; it evolved considerably in response to political, economic, and social transformations. As Quataert notes, the position of Muslim workers within this hierarchy fluctuated over time. In some periods, particularly in the earlier centuries of the Empire, non-Muslim subjects such as Armenians, Greeks, and Jews often occupied skilled or semi-elite roles in commerce and administration, while Muslims were underrepresented in these sectors. However, with the rise of Muslim nationalism and the increasing penetration of state driven modernization policies, the labor landscape shifted, gradually elevating the status and presence of Muslims in ad-

ministrative and commercial roles. This evolution persisted into the late nineteenth and early twentieth centuries, shaping both public and private sector employment patterns across the Empire Quataert (2001).

The Ottoman Bank, as a semi colonial, multinational financial institution operating within this complex social and political environment, provides a particularly illuminating case for examining labor diversity. Functioning under the joint aegis of British and French capital, the bank's organizational culture reflected both Western business norms and the Ottoman Empire's multi ethnic realities. Its employment patterns especially when examined over time offer a microcosmic view of the broader shifts in labor composition and hierarchy that Quataert describes.

Edhem Eldem's extensive research on the Ottoman Bank underscores the duality of its structure: while the top executive positions, namely the General Manager and Assistant General Manager, were consistently held by French or British nationals, primarily to maintain close coordination with the bank's European committees in Paris and London, the rest of the institution displayed a much more heterogeneous composition. According to Eldem, no strict ethnic hiring policy was evident for lower and mid-tier roles, yet the personnel records themselves reveal that religion and ethnicity were consistently documented, implying that these markers were considered relevant if not explicitly operationalized in the hiring and promotion processes Eldem (1999). This paradox between the apparent absence of formal discrimination and the systematic recording of ethno-religious identity raises critical questions about the bank's internal dynamics and the role of unspoken biases or contextual pressures.

Indeed, although the bank may not have instituted official quotas or exclusionary policies, it operated within a highly politicized landscape. The late Ottoman period witnessed significant shifts in official ideology, including the Tanzimat reforms, the rise of Ottomanism, and eventually Turkish nationalism, all of which affected employment trends in both state and quasi-state institutions. As such, the bank was inevitably influenced by these developments. For instance, Eldem observes that during earlier periods, middle-tier positions were predominantly filled by non-Muslim Ottoman subjects, particularly Levantines, Armenians, and Greeks, while Muslims were typically confined to low status roles such as guards, porters, or office boys. However, over time, particularly in the early twentieth century, the demographic composition of the bank's workforce began to shift. The proportion of local Muslim employees increased, a trend that Eldem attributes to both the geographic expansion of the bank's branches and the diversification of its services toward a broader local clientele. As the bank moved beyond its earlier function as a state-oriented financial

intermediary and began engaging more directly with local markets and individuals, the practical need for staff who were culturally and linguistically embedded in local communities grew correspondingly Eldem (1999).

This evolving structure closely mirrors Quataert's broader thesis regarding the transformation of labor hierarchies in the late Ottoman Empire. By contextualizing the Ottoman Bank's personnel records within this larger historical framework, we gain a more nuanced understanding of how global capital, imperial governance, and local identities intersected in the realm of labor. Furthermore, the Ottoman Bank's records which are systematic, multilingual, and exceptionally well preserved offer rare quantitative opportunities to analyze these dynamics. Both Quataert and Eldem acknowledge the challenges of conducting empirical analysis on Ottoman labor due to the scarcity or inaccessibility of primary sources Eldem (1999); Quataert (2001). The dataset at the center of this study, compiled from detailed personnel records preserved by the Ottoman Bank, thus contributes valuable new evidence to a field long constrained by qualitative fragmentation.

By combining these archival records with digital methods, this study aims to shed light not only on the bank's internal diversity but also on the broader socio-political processes that shaped employment and mobility in the late Ottoman world. In doing so, it seeks to bridge a gap in both labor history and Ottoman historiography, offering a case study that captures the entanglements of ethnicity, class, empire, and capital at a time of profound transition.

2.3 Ethnic Wage Disparities in the Ottoman Empire and Other Imperial Contexts

Wage disparities along ethnic and religious lines constituted a defining feature of labor markets in many multiethnic empires, including the Ottoman Empire. These disparities were not merely reflections of individual merit or occupational choices, but rather products of historically entrenched inequalities, segmented labor markets, access to education, and institutionalized discrimination. Within the Ottoman Empire, such stratifications became increasingly visible during the late nineteenth and early twentieth centuries, a period marked by both economic modernization and intensifying ethno-religious tensions.

In the case of the Ottoman Bank, Edhem Eldem's research provides a clear demon-

stration of ethnic wage hierarchies embedded within institutional structures Eldem (1999). As a multinational financial institution governed by French and British capital, the bank's upper management was explicitly reserved for European nationals, who commanded the highest salaries and decision-making authority. Beneath them, a substantial layer of non-Muslim Ottoman citizens—particularly Greeks, Armenians, Jews, and Levantine Christians—held mid-level administrative and technical roles. These employees, often educated in missionary or minority community schools, had greater access to foreign languages and Western commercial training, factors that facilitated their employment in relatively prestigious and well-compensated positions. In contrast, Muslim Ottomans—despite forming the demographic majority of the Empire—were primarily concentrated in low-wage clerical, custodial, or support roles. Their relative exclusion from elite schools and their limited linguistic capital placed them at a structural disadvantage in competing for higher-status jobs.

This ethnic segmentation was not unique to the Ottoman Bank. Şevket Pamuk's broader economic analysis of late Ottoman wage structures corroborates these findings across multiple sectors Şevket Pamuk (2018). Pamuk documents how ethnic Greeks, Armenians, and Jews consistently earned higher wages than Turks, due in large part to their dominance in skilled crafts, banking, and trade—occupations that required forms of human capital disproportionately available to non-Muslim communities. Meanwhile, Muslim Turks were more frequently employed in agriculture, low-skill urban labor, or state bureaucracy, all of which were typically lower-paying fields. These patterns were shaped by a combination of historical legacies (e.g., millet-based education), cultural capital, and evolving state ideologies, especially as Ottomanism and later Turkish nationalism began to redefine the contours of institutional access and privilege.

Comparative examples from other imperial contexts further illuminate the systemic nature of such disparities. In the Austro-Hungarian Empire, a similarly diverse polity, wage gaps across ethnic groups reflected both occupational specialization and regional asymmetries. As Pieter Judson and others have noted, Germans and Hungarians who held cultural and political dominance within the empire were overrepresented in administrative and professional roles, securing higher wages and more secure employment. In contrast, Slavic and Romanian populations were often relegated to agricultural or industrial labor, roles with lower pay and higher precarity Judson (2016). Ethnic stratification in wage structures thus mirrored broader patterns of political hegemony and infrastructural development across the empire.

A similar dynamic played out in the Russian Empire, where economic moderniza-

tion further exacerbated ethnic inequalities. Ethnic Russians, Jews, Armenians, and Baltic Germans frequently occupied privileged positions in commerce, administration, and the professions requiring literacy, numeracy, and bureaucratic training. Meanwhile, Central Asian and Caucasian minorities, often excluded from the empire's formal education systems and residing in peripheral regions, were largely confined to manual labor, agricultural work, or seasonal employment. These wage gaps were reinforced by legal restrictions on mobility, landownership, and schooling, as well as by the geographical concentration of economic opportunity in urban centers such as St. Petersburg, Moscow, or Baku.

In all these cases, including that of the Ottoman Empire, ethnic wage disparities were not incidental but embedded in the very structure of imperial economies. Whether formal or informal discrimination combined with asymmetrical access to education and networks to shape occupational outcomes across ethno-religious lines. Institutions like the Ottoman Bank, while formally multinational and ostensibly meritocratic, operated within and reproduced these broader socio-economic patterns. Religion and ethnicity are recorded in personnel files. However, there are no explicit hiring policies based on these identities. This suggests that such factors still play a hidden role in shaping wages and career paths.

By placing the Ottoman case alongside those of the Austro-Hungarian and Russian Empires, we can better understand how imperial diversity produced not only cultural richness but also economic segmentation. This comparative view shows how empirewide institutions dealt with merit, identity, and hierarchy. Their decisions often reinforced existing inequalities instead of reducing them.

2.4 Mobility in the Ottoman Bank and the Ottoman Empire

The nineteenth century witnessed a dramatic expansion in commercial activity across the Ottoman Empire, with trade reportedly increasing sixteen-fold over the course of the century Quataert (2001). This surge in economic exchange elevated the importance of port cities such as İzmir, Alexandria, Port Said, and Salonika as nodes that became critical centers of both international commerce and labor migration. As Quataert notes, these urban hubs attracted significant flows of workers, particularly those involved in maritime, dockside, and transport sectors. Many of these laborers relocated either permanently or cyclically, forming a seasonal workforce

that moved in response to shipping schedules, harvests, and construction booms Quataert (2001). However, this form of labor mobility was more prevalent among working-class populations. As Eldem notes, the Ottoman middle classes were not very mobile. They included clerks, bureaucrats, and professionals. These groups were often rooted in stable networks of family ties, education, and city life. Eldem (2009)

The Ottoman Bank, as a multinational financial institution embedded in this changing commercial geography, offers a compelling lens through which to study patterns of labor mobility at a different class stratum. As commerce flourished in port cities, demand for financial services naturally followed. This leads to the opening of new branches and the relocation of personnel. Analyzing the Bank's internal labor movements thus allows us to trace how shifts in trade routes and urban economic importance shaped white collar mobility within the Empire.

The Bank's personnel records and institutional archives, as documented extensively by Edhem Eldem, reveal that both voluntary and involuntary mobility were common across the institution's lifespan. Some of these movements were driven by professional advancement or branch expansion, but others were closely linked to political crises and shifting state policies. One of the earliest and most striking examples occurred in 1896, when armed Armenian nationalists stormed the Bank's headquarters in Istanbul. In the aftermath, the institution responded by relocating or dismissing segments of its Armenian workforce, both as a precautionary measure and under external pressure Eldem (1999).

Despite such incidents, the Bank often sought to protect its staff from abrupt political interventions. For instance, during the Greco-Ottoman War in 1897, the Bank petitioned the Ministry of Foreign Affairs to exempt its Greek employees from wartime expulsion orders. During the 1912 Italian–Ottoman war, the Bank tried to stop the deportation of its Italian employees. However, it failed. This shows the Bank's weak political power and the unstable relationship between the state and workers during a time of growing nationalism and war.Eldem (1999).

Perhaps the most consequential episode for employee mobility was the implementation of the 1915 deportation orders targeting Armenians during the First World War. The Bank managed to get exemptions for many Armenian employees, especially in big cities like Istanbul. But in provinces where deportations were happening, it had to move some staff elsewhere. These relocations were not only logistically complex but also deeply fraught, as they required navigating between institutional loyalty and escalating state violence. In later wartime years, further rounds of transfers, layoffs, and negotiations emerged. These were particularly concerning foreign nationals

employed by the Bank. Although management made repeated efforts to shield its multinational staff from mass expulsions and legal threats, the changing geopolitical landscape limited the institution's capacity to resist government directives Eldem (1999).

In this context, labor mobility within the Ottoman Bank was shaped by a dynamic interplay of commerce, state policy, ethnicity, and international conflict. The Bank's strategic role within the Empire's financial system, combined with its multinational identity, made it both unusually exposed to political turbulence and unusually committed to maintaining a stable workforce across borders. By studying how its employees were moved, protected, or sacrificed during key historical events, we gain a deeper understanding of how late imperial institutions negotiated labor, identity, and survival during a period of rapid geopolitical transformation.

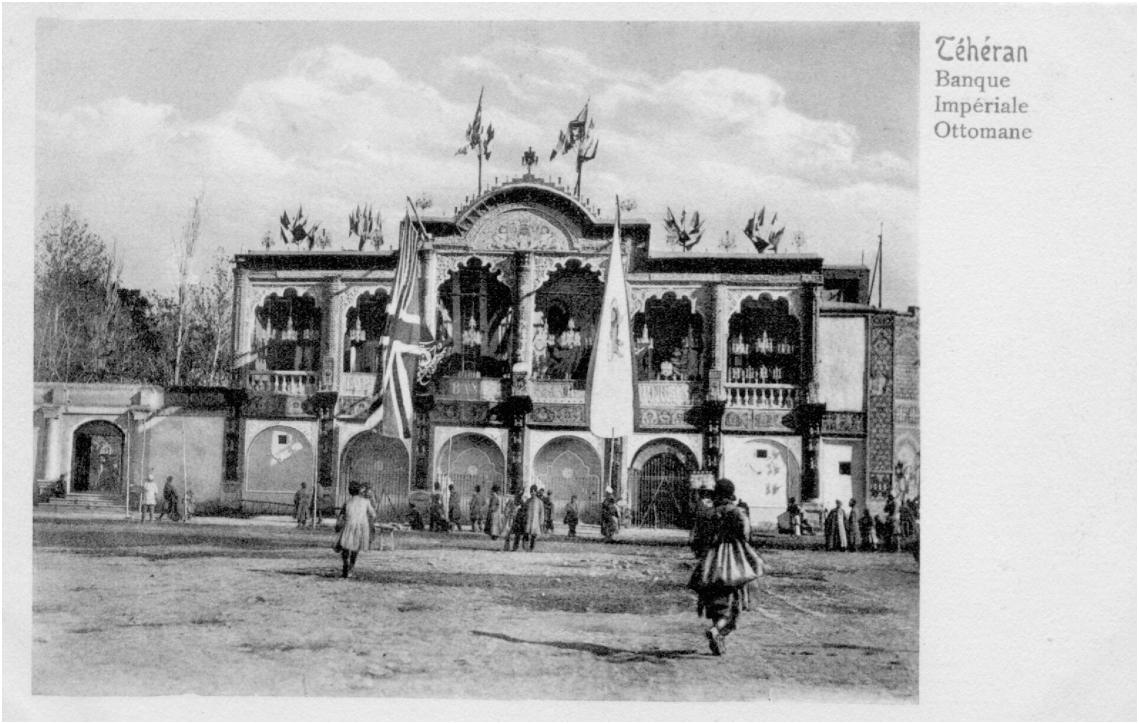


Figure 2.1 Tehran branch of the Ottoman Bank.

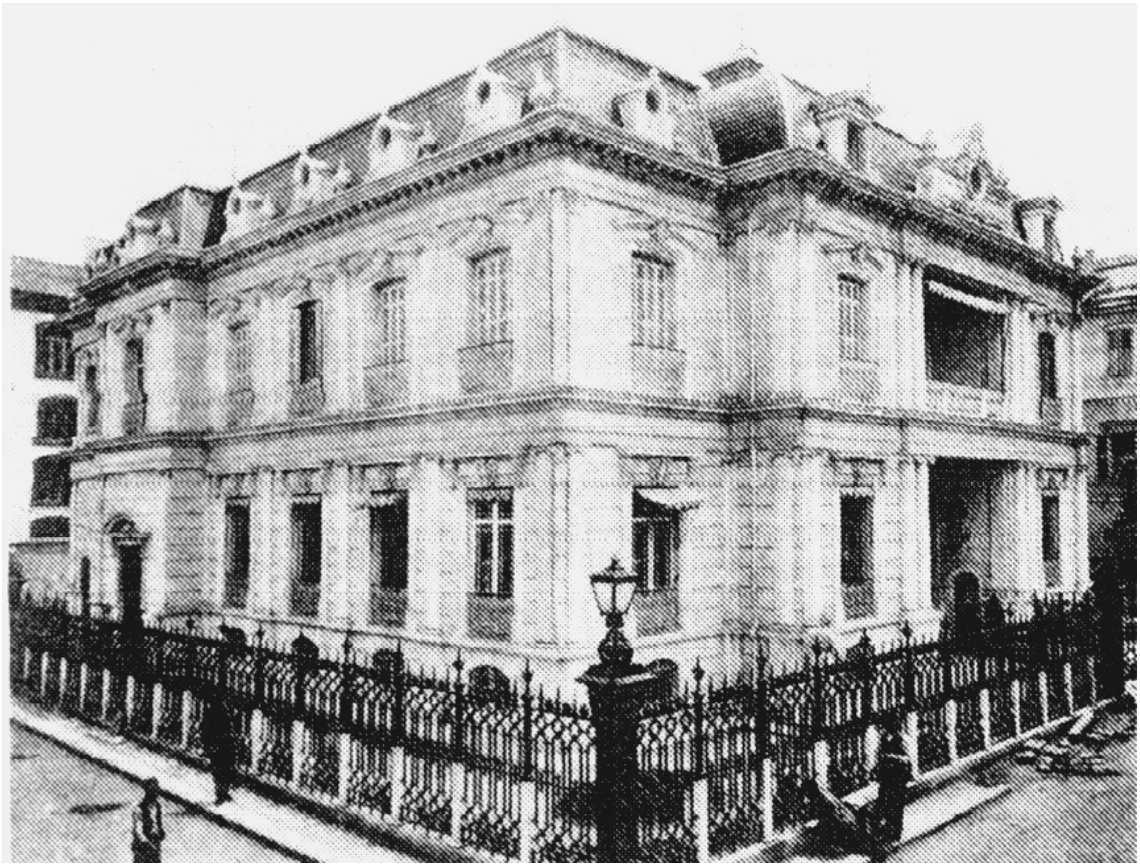


Figure 2.2 Tessaloniki branch of the Ottoman Bank.

2.5 Comparative Reflections and Contemporary Relevance

Comparing with other multiethnic empires, especially the Austro-Hungarian and Russian Empires, helps reveal broader patterns. These patterns relate to labor organization, social hierarchy, and inequality in the late nineteenth and early twentieth centuries. In each of these empires, ethnic and religious identities shaped access to employment, career advancement, and wage levels. Institutions such as state bureaucracies, financial organizations, and private enterprises operated in dual roles: as agents of imperial integration, where subjects of different backgrounds worked under a shared administrative framework; and as mechanisms of stratification, where certain ethno-religious groups were systemically excluded from positions of power or relegated to low-status roles.

The Ottoman Bank exemplifies these dynamics within the Ottoman context, mirroring how multinational institutions elsewhere reproduced social hierarchies under

the guise of bureaucratic neutrality or technical meritocracy. Just as German and Hungarian elites dominated administrative structures in the Austro-Hungarian Empire while Slavic and Romanian populations were concentrated in manual labor, or as Jews and Baltic Germans occupied skilled positions in the Russian Empire while Central Asian and Caucasian groups remained marginalized, the Ottoman Bank reveals how hierarchies of ethnicity and religion operated within trans-imperial corporate environments. Despite an absence of overt hiring policies based on identity, practices of internal documentation, wage disparities, and mobility restrictions indicate that ethnicity functioned as a tacit axis of labor differentiation.

These imperial labor configurations hold enduring relevance in today's global labor market. Contemporary multinational corporations, international NGOs, and financial institutions similarly navigate the complexities of managing ethnically and culturally diverse workforces across national boundaries. Modern organizations often promote values like diversity and inclusion. However, many studies still show ongoing inequalities. These gaps appear in hiring, pay, and promotion. Migrant workers and ethnic minorities are especially affected. Implicit biases, unequal access to education and professional networks, and the legacies of colonial and imperial structures continue to shape labor outcomes in the twenty-first century.

In this sense, the Ottoman Bank's history serves not merely as a case study in imperial labor practices, but as a historical analogue to current debates about equity and representation in global organizations. The institutional tensions between meritocracy and hierarchy, integration and exclusion, continue to animate contemporary discussions of labor justice. Understanding how these tensions played out in earlier imperial contexts can thus enrich our analysis of current workplace structures and contribute to a historically informed critique of modern labor relations.

In conclusion, the labor system of the Ottoman Bank shows clear patterns. These include wage gaps based on ethnicity and religion, limited mobility, and selective inclusion. Such patterns were common in other imperial systems as well. By situating these dynamics within a comparative framework that includes the Austro-Hungarian and Russian Empires, this study contributes not only to the historiography of Ottoman labor but also to broader interdisciplinary discussions on empire, labor, and institutional diversity. Ultimately, it invites reflection on how the past continues to echo in the present, shaping the ways in which labor is managed, valued, and contested in an interconnected world.

2.6 Approaches to Working with Archival Handwriting

Manuscripts from the nineteenth and early twentieth centuries are important for historical research. These include personal diaries, business letters, institutional records, and government documents. They offer rich insights but are often difficult to work with. These documents often provide unfiltered access to the everyday workings of bureaucracies, economies, and lives. Yet, their handwriting styles, diverse scripts, and orthographic inconsistencies pose considerable hurdles for transcription and analysis. The difficulty is particularly acute in multi-script empires such as the Ottoman Empire, where language and script diversity intersected with varied levels of formality, regional usage, and personal idiosyncrasies.

In response to these challenges, scholars have developed a broad spectrum of methodologies to decipher, transcribe, and interpret handwritten sources. At one end of the spectrum lies traditional paleography, which remains indispensable for interpreting pre-modern and early modern scripts. Historians working in this mode rely heavily on close reading and visual pattern recognition, often compiling "reference alphabets" by analyzing multiple documents by the same author. This helps them interpret difficult characters by comparing them to more clearly formed examples. Contextual inference is important. This means reading unclear words by using their narrative or semantic frame. It is also key to understand historical writing conventions. For example, the long-s was used instead of a double "s" in English words like *business* or *assuring*. Jimenez (2016).

To address the need for scale in large archival projects, some institutions have turned to crowdsourcing. Initiatives like *Transcribe Bentham* and the Smithsonian's Digital Volunteer program engage public contributors to transcribe documents, using user-friendly platforms designed to guide non-specialists through the process. These programs highlight the importance of interface design, training materials, and quality control strategies. Too much rigidity in accuracy expectations can deter participation, while too little oversight can compromise the scholarly integrity of the output.

More recently, machine learning has brought new tools for automatic transcription. These tools are powerful and efficient. Platforms like *Transkribus* support work with handwritten texts. They let researchers train Handwritten Text Recognition (HTR) models. This is done using annotated samples, known as "ground truth" pages. These models can then transcribe large collections of texts with high accuracy. Case studies involving nineteenth-century parish registers, Civil War correspondence, and

prison records have reported character-level recognition rates exceeding 90 % once sufficient training data were accumulated Dunley (2018); Muehlberger (2019). Nevertheless, these systems are not without limits: their performance tends to degrade with poor scan quality, unusual handwriting styles, or rare orthographic conventions. As such, human validation remains critical, especially for complex or degraded documents.

A promising frontier involves the integration of HTR with multimodal large language models (LLMs). Recent work by Humphries et al. has demonstrated that transformer-based models can achieve character error rates as low as 1.8 % on historical English manuscripts, approaching the reliability of expert human transcribers Humphries (2024). These systems often operate within feedback loops where volunteer users correct AI-generated transcriptions, incrementally improving the model's performance through reinforcement. Hybrid frameworks like these combine the efficiency of automation with the contextual discernment of human reviewers, offering substantial time savings while maintaining high-quality outputs.

Best practices across these approaches now increasingly emphasize complementarity. Human scholars still play a key role. They correct errors made by machines. They also provide training data, historical context, and interpretation. These are things machine systems cannot do on their own. Meanwhile, automation excels at handling repetitive transcription tasks, enabling researchers to work at scales previously unthinkable. Together, these methods represent a productive synthesis of traditional humanities expertise and digital innovation.

3. DATA

The dataset used in this study is drawn from the archival records of an institution that played a central role in the financial, political, and administrative life of the late Ottoman Empire and early Turkish Republic. Ethem Eldem, who conducted extensive work on these archives, describes them as one of the richest and most comprehensive resources for understanding the sociopolitical and economic dynamics of the period Eldem (1999). Building on this view, our research focuses on a select subset of these materials, particularly those related to personnel management, to investigate labor mobility, wage structures, and ethnic diversity within the BIO.

The archival sources cover the late nineteenth century to the 1930s. Most of them focus on the Bank's Human Resources (HR) activities. In today's terms, these are employee records. The Empire was multiethnic, and the Bank operated across many regions. Because of this, the records provide valuable insight. They show how labor was organized, paid, and moved across different places and systems

This study makes use of two core datasets:

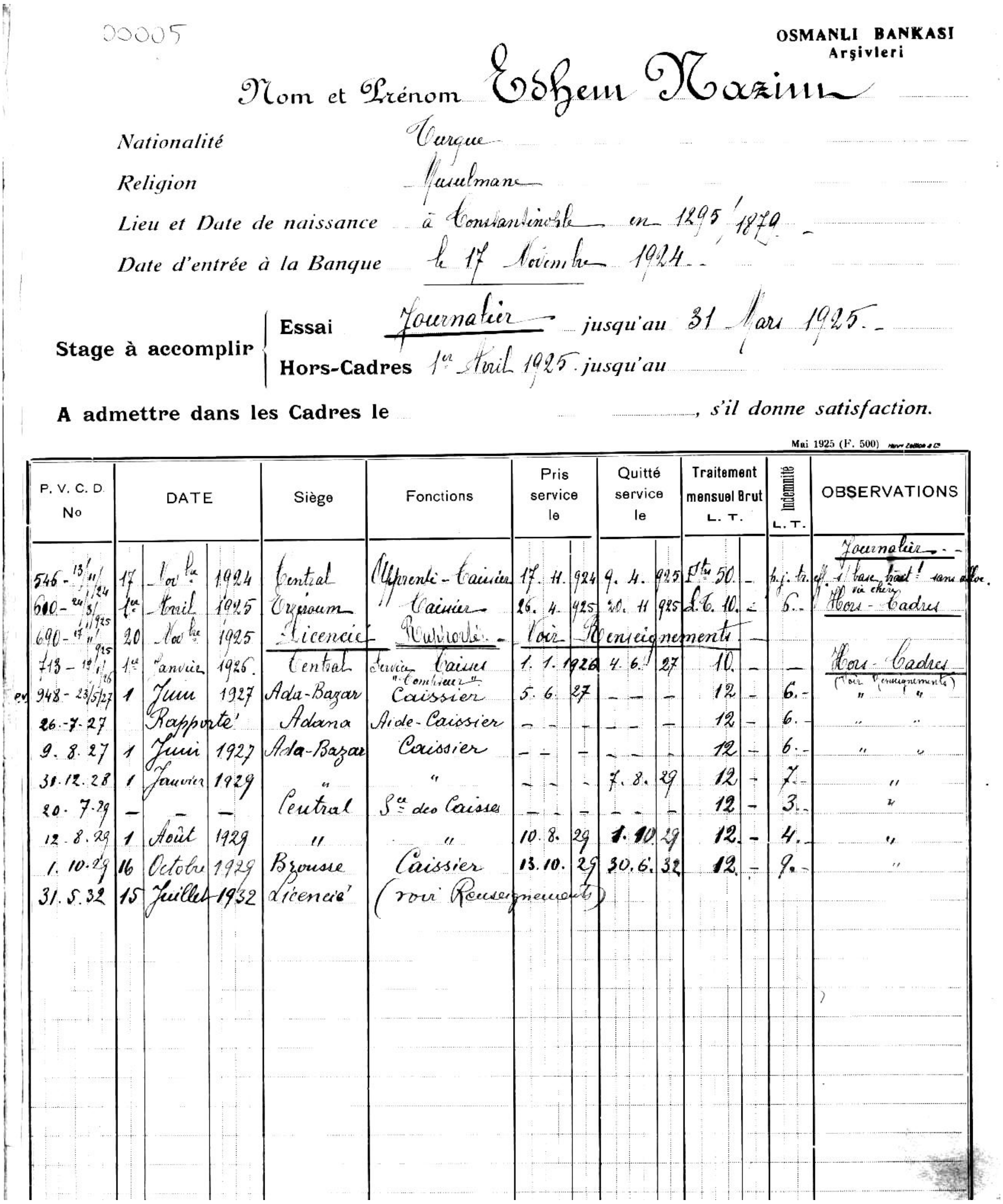
3.1 Handwritten HR Documents

The first dataset consists of handwritten personnel records created and maintained by the Bank's internal HR units. Written predominantly in French, these documents contain rich individual level detail, including employee names, positions, salaries, branch assignments, dates of transfer or promotion, religion, and ethnicity. Many entries span several years, tracking the longitudinal career paths of individual employees across branches from Istanbul to provincial cities such as Adana, Aleppo, and Beirut.

Despite the richness of this dataset, its use posed several technical and methodolog-

ical challenges. The handwriting varies considerably across entries since there were different clerks, the documents are from different time periods, and the physical deterioration of many documents complicates transcription. Furthermore, the cursive French script and historical vocabulary hinder the effectiveness of traditional OCR technologies.

Initially, these constraints limited the usability of the handwritten data to qualitative observation. However, with the advent of multimodal large language models (specifically the GPT-4o mini API) we were able to generate reliable tabular outputs by prompting the model with scanned document images. This allowed us to convert a subset of the handwritten corpus into structured JSON files, dramatically improving accessibility and enabling downstream analysis.



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OSMANLI BANKASI
Arşivleri

Nom et Prénom Edhem Nazim

Nationalité Turque

Religion Musulman

Lieu et Date de naissance à Constantinople en 1295/1879

Date d'entrée à la Banque le 17 Novembre 1924

Stage à accomplir **Essai** Journalier *jusqu'au* 31 Mars 1925

Hors-Cadres 1er Avril 1925 *jusqu'au*

A admettre dans les Cadres le ..., *s'il donne satisfaction.*

Mai 1925 (F. 500)

P. V. C. D. No	DATE			Siège	Fonctions	Pris service le	Quitté service le	Traitement mensuel Brut L. T.	Indemnité L. T.	OBSERVATIONS
										Journalier
546 - 13/11/24	17	Novbre	1924	Central	Apprenti-Caissier	17. 11. 924	9. 4. 925	Pts 50.	h.j. tr.	1 base haut! sans alloc. vie chère
610 - 24/3/925	1er	Avril	1925	Erzeroum	Caissier	26. 4. 925	20. 11 925	L.t. 10.	6.	Hors-Cadres
690 - 17/11/925	20	Novbre	1925	Licencié	Réintégré	Voir Renseignements				
713 - 19/1/926	1er	Janvier	1926	Central	Service Caisse	1. 1. 1926	4. 6. 27	10.	—	Hors-Cadres (Voir Renseignements)
948 - 23/5/27	1	Juin	1927	Ada-Bazar	"Contrôleur" Caissier	5. 6. 27	—	12	6.	" "
26. 7. 27	Rapporté			Adana	Aide-Caissier	—	—	12	6.	" "
9. 8. 27	1	Juin	1927	Ada-Bazar	Caissier	—	—	12	6.	" "
31. 12. 28	1	Janvier	1929	"	"	—	7. 8. 29	12	7.	"
20. 7. 29	—	—	—	Central	Sce des Caisses	—	—	12	3.	"
12. 8. 29	1	Août	1929	"	"	10. 8. 29	1. 10. 29	12.	4.	"
1. 10. 29	16	Octobre	1929	Brousse	Caissier	13. 10. 29	30. 6. 32	12.	9.	"
31. 5. 32	15	Juillet	1932	Licencié	(voir Renseignements)					

Figure 3.1 Example of a handwritten personnel document from the Ottoman Bank.

```
[
  {
    "Date": "1924",
    "Position": "Central",
    "Functions": "Apprenti-caisse",
    "Salary": "5 L.T. 50",
    "General Information": {
      "Nationality": "Turque",
      "Religion": "Musulman",
      "Family Status": "N/A",
      "Date de naissance": "1895, à Constantinople"
    },
    "Summary Notes": "Journalier, Essai jusqu'au 31 Mars 1925"
  },
  {
    "Date": "1925",
    "Position": "Tarsous",
    "Functions": "Caissier",
    "Salary": "6 L.T. 10",
    "General Information": {
      "Nationality": "Turque",
      "Religion": "Musulman",
      "Family Status": "N/A",
      "Date de naissance": "1895, à Constantinople"
    },
    "Summary Notes": "Hors-Cadres"
  },
```


Figure 3.2 GPT-generated JSON output from a handwritten personnel document.

3.2 Typewritten Board Meeting Documents

The second dataset consists of typewritten board meeting minutes, also in French, covering a broad range of HR decisions made at the executive level. These include appointments, promotions, demotions, branch transfers, salary adjustments, leaves of absence, disciplinary actions, and terminations. These records are especially valuable because they provide both individual employee details and institutional rationales behind HR decisions. This makes them different from the personnel files in the sense that it offers this different context often absent from personnel files.

Due to their typewritten nature, these documents were significantly more legible

and easier to process than the handwritten records. Their standardized formatting enabled more efficient parsing and translation into English, allowing us to construct structured datasets with a high degree of confidence.

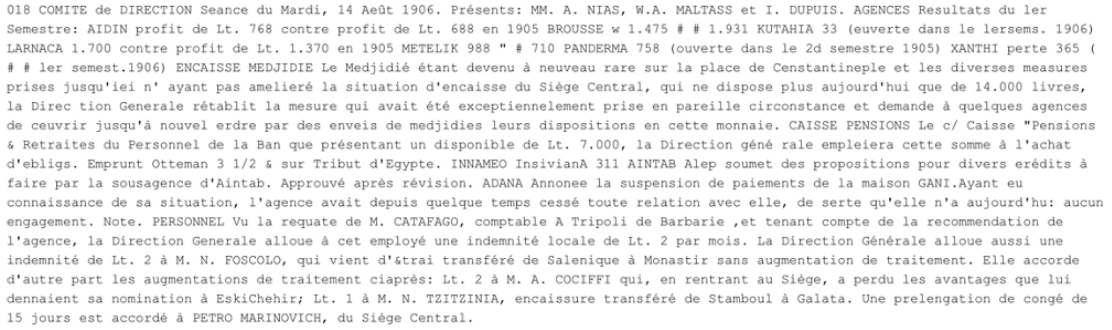

018 COMITE de DIRECTION Seance du Mardi, 14 Aeût 1906. Présents: MM. A. NIAS, W.A. MALTASS et I. DUPUIS. AGENCES Resultats du ler Semestre: AIDIN profit de Lt. 768 contre profit de Lt. 688 en 1905 BROUSSE w 1.475 # # 1.931 KUTAHIA 33 (euverte dans le lersems. 1906) LARNACA 1.700 contre profit de Lt. 1.370 en 1905 METELIK 988 " # 710 PANDERMA 758 (ouverte dans le 2d semestre 1905) XANTHI perte 365 (# # ler semest.1906) ENCAISSE MEDJIDIE Le Medjidié étant devenu à neuveau rare sur la place de Censtantineple et les diverses measures prises jusqu'iei n' ayant pas amelieré la situation d'encaisse du Siège Central, qui ne dispose plus aujourd'hui que de 14.000 livres, la Direc tion Generale rétablit la mesure qui avait été exceptiennelement prise en pareille circonstance et demande à quelques agences de ceuvrir jusqu'à nouvel erdre par des enveis de medjidies leurs dispositions en cette monnaie. CAISSE PENSIONS Le c/ Caisse "Pensions & Retraites du Personnel de la Ban que présentant un disponible de Lt. 7.000, la Direction géné rale empleiera cette somme à l'achat d'ebligs. Emprunt Otteman 3 1/2 & sur Tribut d'Egypte. INNAMEO InsivianA 311 AINTAB Alep soumet des propositions pour divers erédits à faire par la sousagence d'Aintab. Approuvé après révision. ADANA Annonee la suspension de paiements de la maison GANI.Ayant eu connaissance de sa situation, l'agence avait depuis quelque temps cessé toute relation avec elle, de serte qu'elle n'a aujourd'hu: aucun engagement. Note. PERSONNEL Vu la requate de M. CATAFAGO, comptable A Tripoli de Barbarie ,et tenant compte de la recommendation de l'agence, la Direction Generale alloue à cet employé une indemnité locale de Lt. 2 par mois. La Direction Générale alloue aussi une indemnité de Lt. 2 à M. N. FOSCOLO, qui vient d'&trai transféré de Salenique à Monastir sans augmentation de traitement. Elle accorde d'autre part les augmentations de traitement ciaprès: Lt. 2 à M. A. COCIFFI qui, en rentrant au Siège, a perdu les avantages que lui dennaient sa nomination à EskiChehir; Lt. 1 à M. N. TZITZINIA, encaissure transféré de Stamboul à Galata. Une prelengation de congé de 15 jours est accordé à PETRO MARINOVICH, du Siège Central.

Figure 3.3 Example of a typewritten board meeting document.

3.3 Archival coverage and representativeness

Table **??** summarises the temporal and geographic breadth of the digitised personnel dataset used in this thesis.

Table 3.1 Key Summary of the Cleaned Dataset

Attribute	**Value**
Date Range	1900 to 1930
Unique Employees	3734
Unique Branches	92
Unique Job Functions	372
Unique Religions	11

Notes: Superscripts indicate categories manually standardized during data cleaning.

The dataset spans the entire late-Ottoman and interwar era (31 years) and captures personnel movements in 92 distinct branches. Roughly 60% of observations have fully populated core fields. Missingness is largely confined to job function codes in the pre-1905 records and to a handful of war years.

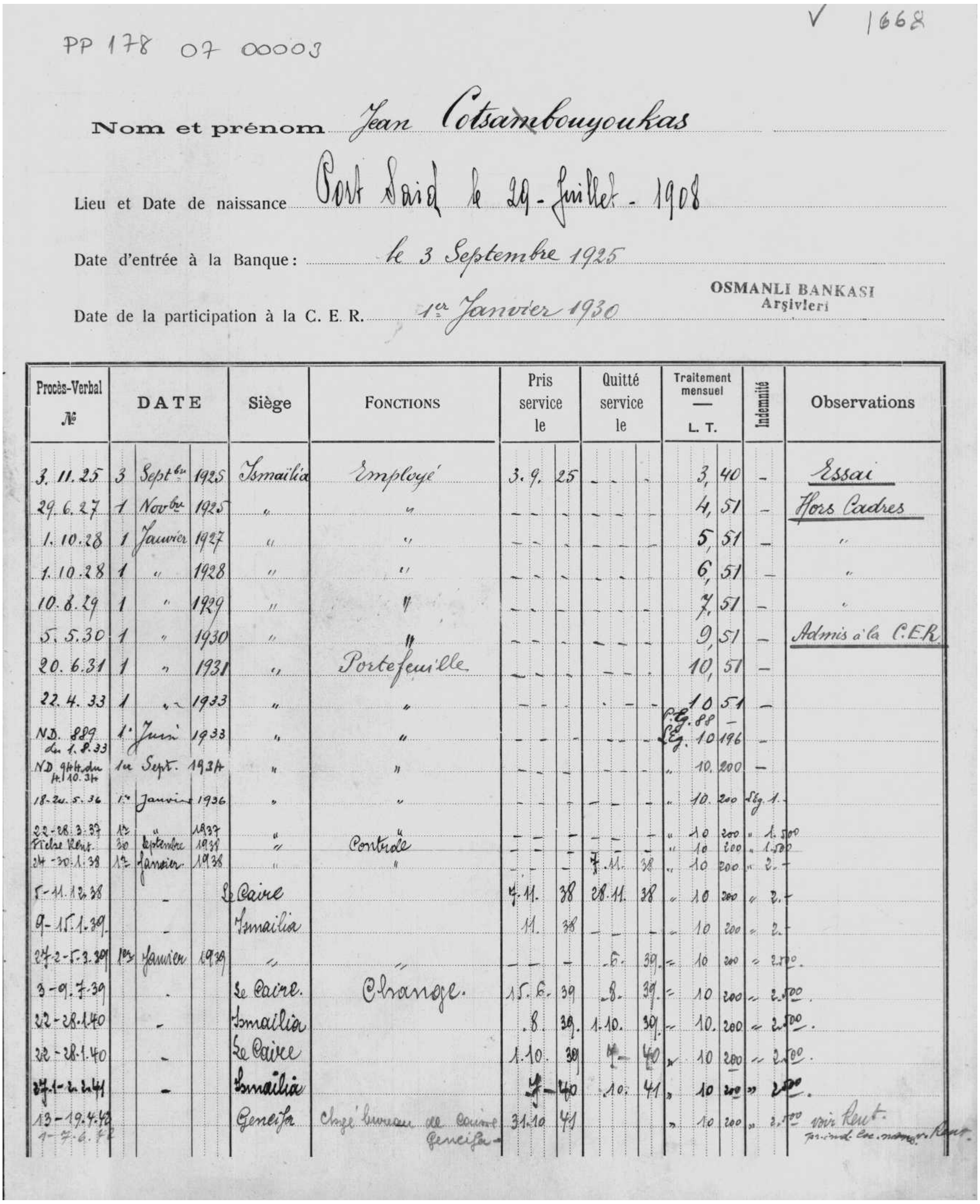
3.4 Data Challenges

Despite the exceptional historical value of the Ottoman Bank's personnel archives, significant challenges were encountered in extracting structured information from the handwritten HR documents. These documents were often written in cursive French. The handwriting styles varied a lot. This made it very hard to digitize them accurately. Inconsistent formatting, deteriorated ink, and overlapping entries further complicated parsing efforts. While the application of multimodal language models such as GPT-4o mini allowed partial transcription and tabularization, these tools were not infallible.

In several instances, the model misidentified employee attributes due to visual ambiguity or contextual complexity. For example, in one record, the model incorrectly read a branch name as part of a job title, resulting in a mismatch between the employee's geographic location and functional role. In another case, two overlapping entries were merged into a single row, erroneously assigning wage and religion data from one employee to another. These errors do not happen often, but they are still important. They show the limits of AI-based transcription tools. This is especially true for historical documents with complex, multilingual, and non-standard handwriting.

As a result, a complete and fully accurate reconstruction of individual career paths across the Bank's branches was not possible. Cross-referencing handwritten records with typewritten board meeting documents proved especially difficult due to differing formats and the absence of consistent employee identifiers. This disconnect limited the ability to systematically trace how administrative decisions at the executive level affected specific employees over time.

Nevertheless, the use of typewritten board meeting documents provided a reliable and structured alternative for studying macro-level trends. These records enabled robust analysis of institutional practices concerning wage adjustments, branch transfers, retirements, and dismissals. While less personalized than the HR files, they offered a stable backbone for this research by ensuring data consistency across decades.



PP 178 07 00003 | V | 1668

Nom et prénom: Jean Cotsambouyoukas

Lieu et Date de naissance: Port Said le 29 - Juillet - 1908

Date d'entrée à la Banque: le 3 Septembre 1925

Date de la participation à la C. E. R.: 1er Janvier 1930

OSMANLI BANKASI
Arşivleri

Procès-Verbal №	DATE	Siège	Fonctions	Pris service le	Quitté service le	Traitement mensuel — L. T.	Indemnité	Observations
3. 11. 25	3 Septbre 1925	Ismaïlia	Employé	3. 9. 25	— — —	3, 40	—	Essai
29. 6. 27	1 Novbre 1925	"	"	— — —	— — —	4, 51	—	Hors Cadres
1. 10. 28	1 Janvier 1927	"	"	— — —	— — —	5, 51	—	"
1. 10. 28	1 " 1928	"	"	— — —	— — —	6, 51	—	"
10. 8. 29	1 " 1929	"	"	— — —	— — —	7, 51	—	"
5. 5. 30	1 " 1930	"	"	— — —	— — —	9, 51	—	Admis à la C.E.R.
20. 6. 31	1 " 1931	"	Portefeuille	— — —	— — —	10, 51	—	
22. 4. 33	1 " 1933	"	"	— — —	— — —	10 51 / P.Eg. 88 —	—	
N.D. 889 du 1. 8. 33	1er Juin 1933	"	"	— — —	— — —	L.Eg. 10 196	—	
N.D. 944 du 4. 10. 34	1er Sept. 1934	"	"	— — —	— — —	" 10. 200	—	
18-24. 5. 36	1er Janvier 1936	"	"	— — —	— — —	" 10. 200	L.Eg. 1.—	
22-28. 3. 37	1er " 1937	"	"	— — —	— — —	" 10 200	" 1.500	
Fiche Rens.	30 Septembre 1938	"	Contrôle	— — —	— — —	" 10 200	" 1.500	
24-30. 1. 38	1er Janvier 1938	"	"	— — —	7. 11. 38	" 10 200	" 2.—	
5-11. 12. 38	—	Le Caire		7. 11. 38	28. 11. 38	" 10 200	" 2.—	
9-15. 1. 39	—	Ismailia		11. 38	— — —	" 10 200	" 2.—	
27-2-5. 3. 39	1er Janvier 1939	"	"	— — —	6. 39	" 10 200	" 2.500	
3-9. 7. 39	—	Le Caire.	Change.	15. 6. 39	8. 39	" 10 200	" 2.500	
22-28. 1. 40	—	Ismailia		8. 39	1. 10. 39	" 10. 200	" 2.500	
22-28. 1. 40	—	Le Caire		1. 10. 39	7. 40	" 10 200	" 2.500	
27. 1-2. 2. 41	—	Ismailia		7. 40	10. 41	" 10 200	" 2.500	
13-19. 4. 42 / 1-7. 6. 42		Geneifa	Chef bureau de Caisse Geneifa	31. 10 41		" 10 200	" 2.500	voir Rent. [illegible]

Figure 3.4 Another example of a handwritten personnel document.

```
[
  {
    "Date": "1925",
    "Position": "Ismailia",
    "Functions": "Employé",
    "Salary": "3 L.T. 40",
    "General Information": {
      "Nationality": "Inconnu",
      "Religion": "Inconnu",
      "Family Status": "N/A",
      "Date de naissance": "29 juillet 1908, à Port Saïd"
    },
    "Summary Notes": "Essai"
  },
  {
    "Date": "1926",
    "Position": "Ismailia",
    "Functions": "–",
    "Salary": "4 L.T. 51",
    "General Information": {
      "Nationality": "Inconnu",
      "Religion": "Inconnu",
      "Family Status": "N/A",
      "Date de naissance": "29 juillet 1908, à Port Saïd"
    },
    "Summary Notes": "Hors Cadres"
  },
```


Figure 3.5 GPT-generated JSON output from a handwritten personnel document.

For instance before ~1920, personnel sheets used a header including *Religion* and *Nationalité* appeared directly beneath the employee's name. After the early-1920s re-design, those fields were sometimes omitted altogether. Thus the model, failed to locate these fields in later scans, returning `"Religion":"Inconnu"` (Figure 3.4). In effect, a visual template shift propagated a systematic missing-data pattern that would be invisible in a purely textual workflow. Other than that when the ledger

packed two identical calendar years on a single vertical line, the model occasionally treated them as distinct JSON objects. The record shown in Figure 3.4 lists the same employee, Jean Cotsambouyoukas, twice for **1925**. GPT parsed the first date correctly but mis-read the second entry as *1926*, producing the JSON snippet in Figure 3.5. The cascading effects were non-trivial: salary, job function, and the observation note were shifted one year forward, thereby fabricating a wage raise that didn't occurred in that specific year.

In summary, although technical and archival constraints limited the completeness of individual level analysis, the data assembled for this study still yielded rich insights into the Ottoman Bank's HR practices. By combining selective extraction from handwritten documents with systematic use of typewritten records, this research contributes both methodological lessons and substantive findings about labor mobility, ethnic hierarchies, and wage structures in a late-imperial institutional context.

4. METHODOLOGY

This study employs a mixed methods approach to analyze personnel records from the Imperial Ottoman Bank between 1900 and 1930. Drawing from both handwritten HR files and typewritten board meeting documents, the methodology combines historical data processing, classification systems, and basic statistical analysis to examine patterns of labor mobility, ethnic diversity, and wage inequality. Given the heterogeneity of the source material which are ranging from unstructured handwritten forms to semi-structured meeting transcripts. Also, special emphasis was placed on data cleaning and functional standardization.

The primary dataset was compiled from transcribed archival documents. For handwritten HR records, multimodal large language models (GPT-4o mini API) were used to extract fields such as employee name, religion, position, salary, branch, and transfer history. For typewritten board meeting documents, a combination of manual annotation and basic regex-based parsing was used to extract HR decisions (e.g., promotions, salary increases, dismissals).

In the end we got nearly 14 thousand rows of data consisting of the employees' code, religion, branch, position, wage and corresponding year. We compared randomly selected 160 rows with the data that we've manually transcribed before and the overall error rate of GPT-4o mini was 10 %. Most of the mistranscriptions were from the job function field since it is the less standardized between branches and historical periods of the bank.

Due to the inconsistent formatting and occasional transcription errors, several data-cleaning steps were implemented:

- **Date filtering:** Records outside the 1900–1930 window were excluded to maintain historical focus and temporal consistency. Also outside of this period there are less number of conclusive data points.
- **Field validation:** Entries with missing or implausible values for religion, salary, or branch were flagged. Only records with valid religion and branch

data were retained for ethnicity-related and mobility analyses, respectively.

- **Duplicate removal:** Identical rows (typically introduced during OCR retries or API retries) were removed.
- **Name normalization:** Minor spelling variations in names were harmonized to ensure continuity of individual career trajectories. Since the personnel writing the documents differ and the regions that the documents are written are different there were many variations in the spelling of the cities or the job functions especially.

To facilitate cross-employee comparison, job titles were categorized into three primary function groups based on hierarchical and operational responsibilities:

- **Management:** Included executive and supervisory roles such as *Directeur*, *Chef*, and *Sous-Chef*.
- **Operations:** Included technical or skilled positions such as *Caissier*, *Comptable*, and *Ecrivain*.
- **Other:** Included support roles (e.g., *Gardien*, *Garçon*) and ambiguous entries that could not be reliably categorized.

This classification was guided by both archival descriptions and secondary literature on the Bank's internal hierarchy Eldem (1999).

Labor mobility was operationalized as the number of unique branches (agencies) at which an employee served. To calculate this:

- Employee records were grouped by individual ID or name where available.
- The count of distinct agency postings per individual was computed.
- Employees with fewer than two valid agency entries were excluded from mobility-related calculations.

Transfer patterns were also cross-referenced with key historical dates (e.g., the 1912 Italian deportations, 1915 Armenian relocations) to investigate the relationship between mobility and political shocks.

Wage data was analyzed in both absolute and relative terms. First, salary values were adjusted to a consistent currency base where possible. Then:

- Average wages were computed by function group and religion.
- Intra-group wage dispersion was measured via coefficient of variation.

- Wage ratios (e.g., between European executives and Muslim clerks) were calculated to quantify structural inequality.

While inflation adjustment was not possible due to limited historical consumer price index (CPI) data for the Ottoman Empire, time-based trends were analyzed descriptively to assess shifts in compensation structures.

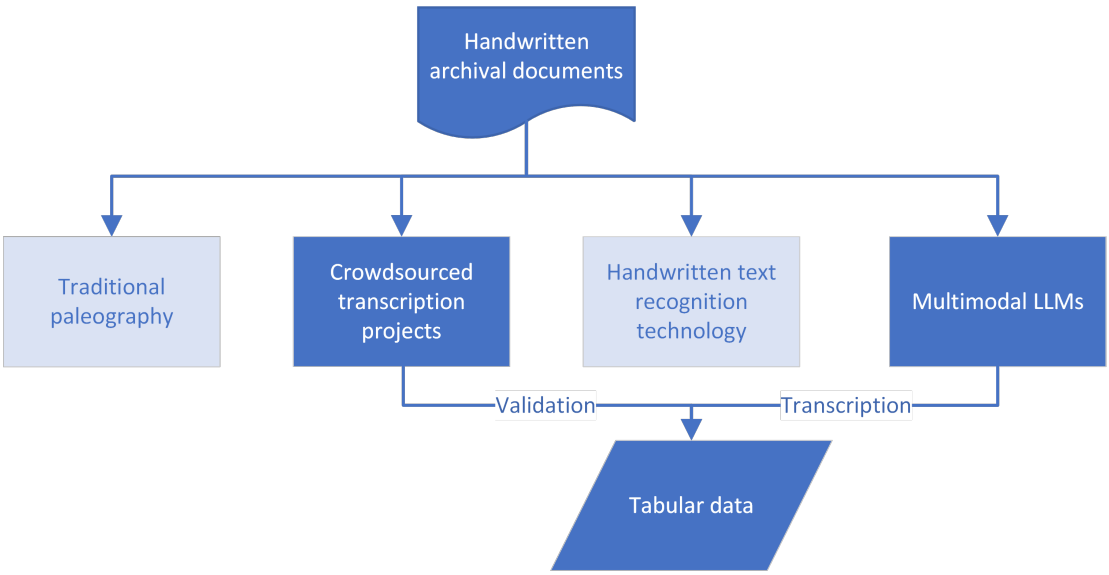


Figure 4.1 Mixture of crowd sourcing and multi modal LLMs are used as a methodology.

4.1 How to Explore Archival Data

Handwritten documents from the 19th and early 20th centuries, from personal letters and diaries to institutional ledgers and government registers, are rich primary sources but present unique challenges to researchers. Across different contexts (government archives, corporate records, private collections, etc.), scholars have developed strategies to read, transcribe, and interpret these materials. Recent academic research and case studies reveal a spectrum of methodologies for tackling historical handwriting, the common obstacles encountered, and the ways scholars structure and analyze the extracted information. This overview highlights key approaches from traditional paleography to modern AI-assisted reading, discusses challenges and solutions, and distills best practices from a variety of archival projects, with references for further reading. Many researchers rely on classical paleographic skills

in reading old handwriting. For example, archivists processing a 19th-century letter collection found themselves deciphering a wide variety of handwriting styles and idiosyncratic 19th-century abbreviations Jimenez (2016) . They note that until the early 20th century there was no single standard of cursive; multiple penmanship styles co-existed, spelling and punctuation were less standardized, and each individual's hand had unique style Jimenez (2016). To cope, historians often read documents in full context to guess unclear words from context, and they compare letters to build a reference "alphabet" of a particular writer's shapes. Familiarity with historical writing conventions is crucial. For instance, recognizing that in many 19th-century scripts a double-s ("ss") was written with a long-s (appearing almost like "fs"), so a word like "Miss" might be written as "Mis" Jimenez (2016). Such knowledge allowed archivists to correctly interpret words like "business" and "assuring" in their documents once they realized an apparent f was actually part of a long-s pair Jimenez (2016). In short, the manual approach involves patient decipherment, often letter by letter, informed by contextual reading and reference to paleography guides.

Crowdsourced Transcription Projects: Given the volume of handwritten archives, crowdsourcing has emerged as a methodology to scale up transcription work. Transcribe Bentham is a well-known case, an initiative to engage the public in transcribing the papers of philosopher Jeremy Bentham (1748–1832). . Volunteers' transcriptions are then reviewed by project editors for accuracy before being accepted. . This approach has proven feasible but not without difficulties: Bentham's handwriting varies in legibility (he wrote with a neat hand in youth but a much deteriorated script in old age) and his articles contain many deletions, marginalia, and even multilingual content, all of which 'are obstacles that confront the novice transcriber'. . The Bentham project's experience underscored the need for training and user-friendly transcription interfaces, as well as a balance between quality control and broad participation – overly strict accuracy requirements can deter volunteers, yet expert oversight is still necessary to ensure reliable transcripts. . Similar crowdsourcing models have been applied in other contexts (for example, the Smithsonian Digital Volunteers that transcribing museum field notebooks) and are now a common strategy to harness the enthusiasm of citizen historians while processing large sets of archival data.

Handwritten Text Recognition (HTR) Technology: In recent years, digital tools have transformed how researchers deal with historical handwriting. Platforms like Transkribus (developed by the READ project in Europe) allow scholars to train machine learning models on sample transcriptions so that a computer can automatically read similar documents Humphries (2024). HTR has been applied to 19th-century

records ranging from parish registers to civil war documents. Case studies show that with sufficient 'ground truth' (ie, manually transcribed examples) for training, HTR engines can achieve impressive precision on specific handwriting styles. A 2019 study demonstrated how HTR through Transkribus could greatly accelerate archives work, and it was argued that such tools could 'transform scholarship in archives' by making thousands of handwritten sources searchable Muehlberger (2019). . The technology is not without limitations – models trained on one writer or one type of document may falter on others, and poor-quality scans or very inconsistent handwriting still pose problems /citeliberquarterly.eu. Nonetheless, archives worldwide (over 150 institutions as of mid-2020s) have begun adopting HTR for projects, given its promise of speed. In one project, the National Archives (UK) reported successfully training Transkribus to read 19th century prison records, dramatically reducing manual transcription needs Dunley (2018). The output of HTR still requires human validation, but it shifts much of the grunt work to algorithms.

AI-Assisted and Hybrid Approaches: Building on HTR, researchers are now experimenting with advanced AI like Large Language Models (LLMs) to handle historical handwriting. A 2024 study by Humphries et al. showed that multimodal LLMs (which can process images and text) outperformed traditional HTR software on various English manuscripts of the 18th-19th century by feeding page images to an LLM-based tool (nicknamed Transcription Pearl in the study), they achieved character error rates as low as 1.8, approaching human-level accuracy Humphries (2024). . This approach also proved faster and potentially cheaper than conventional HTR, pointing toward a future where AI could handle initial transcription and even self-correct its errors Humphries (2024). Another innovative methodology is human-AI collaboration: for example, a project in Sweden had volunteers correct the output of an AI transcription model on 19th-century police records, in a feedback loop that iteratively improved the model's accuracy content.fromthepage.com. Such hybrid workflows leverage automation efficiency and contextual knowledge of human readers. Importantly, these studies emphasize that while AI can accelerate transcription, human expertise in paleography, language, and context remains vital, whether in the training stage or in reviewing results.

4.2 Challenges in Working with Handwritten Documents

A mid-19th century handwritten letter (1850) in cursive. Even relatively recent handwriting can be hard to decipher without familiarity. In this example, the writer's capital "K" has an ornate form that might be mistaken for an "R", and the double-“ss” in words like "business" appears as “fs” (an archaic long-s style), which can confuse modern readers. Working with historical manuscripts is often a test of patience and interpretive skill. Researchers have documented several recurring challenges when dealing with 19th- and early 20th-century handwriting:

Deciphering Diverse Scripts and Styles: Unlike typewritten text, handwriting varies dramatically between (and even within) individuals. Archives from this era commonly contain letters or records penned by many different hands, forcing researchers to constantly adjust to new styles Jimenez (2016). . As one archival intern noted, “there are flourishes coupled with such a variety of styles of handwriting that deciphering the information can become time consuming” Jimenez (2016).

Cursive writing was not standardized in the 1800s. So, someone in 1850 might use Spencerian script, while another used Copperplate or the Palmer method. Each style had its own unique letter shapes.

Writers also used old-fashioned conventions, abbreviations, and spellings. For example, the long-s made the word *Miss* look like *Mifs*.

Modern readers need to learn these older forms. They must also learn to expand unclear abbreviations.

It takes practice to spot individual writing habits. For instance, one writer might draw a capital “K” in a strange way. This could make *Kind* look like *Rind* until the pattern becomes clear.Jimenez (2016). Researchers essentially become codebreakers of handwriting, sometimes transcribing a document multiple times until every word becomes clear.

Physical and Visual Quality Issues: The condition of historical documents can impede reading. Manuscripts may be faded, stained, or damaged after centuries, and ink can bleed or discolor. When working from scanned images or microfilm, problems are magnified – poor resolution or contrast can render letters illegible. For example, an undergraduate researcher transcribing 1820s East India Company papers had to work from microfilmed copies, which added difficulty in distinguishing characters Palmer (2014). Similarly, old photocopies or early scans might introduce

blur or cut off marginal notes. Archivists sometimes employ specialized imaging (infrared or UV lighting) to read faded text, but this isn't always available. Thus, historians often grapple with simply making out the text before they can interpret it. This challenge motivates the high-resolution re-scanning of important collections and the use of image enhancement in digital projects.

Language, Terminology, and Context: Handwritten archives often feature antiquated language or technical jargon. Government documents might use bureaucratic or legal terms no longer common; corporate ledgers might contain cryptic accounting codes or product names lost to time. Researchers working on Ottoman Turkish archives, for instance, face not only Ottoman-language script (Ottoman Turkish in Arabic script) but also administrative terminology specific to that era. Even in English-language collections, a 19th-century author's vocabulary and style can differ from today's. Spelling was not fully standardized (one person might spell a word multiple ways), and abbreviations were used freely (e.g. "inst." for "this month" in letters). Understanding these texts requires contextual knowledge. Readers must know the historical background. They often need to consult reference materials, such as old dictionaries or gazetteers. One case study focused on 19th-century police reports in Gothenburg. It showed that volunteers often used external sources. These included old maps and census records. They helped decode place names and personal names written in cursive **?** . In short, reading handwriting isn't just a visual task but also a linguistic and contextual one, where knowledge of the period's language usage greatly aids interpretation.

Human Resource and Skill Constraints: Reading old cursive is a specialized skill. Many modern researchers and students do not have this skill. Archivists are worried about this. Since cursive is no longer taught in schools, younger generations may struggle. Even 19th-century handwriting might seem "illegible" to them. It risks becoming a lost art. This potential skills gap could make archives less accessible unless training or transliteration is provided. Indeed, paleography courses or transcription workshops are now a crucial part of historical research training. Some archives provide handwriting guides for volunteers (for example, the North Carolina State Archives' guide explains how 18th–19th century handwriting differs from modern styles Humphries (2024) The learning curve can be steep: as one historian quipped, after a few hours of reading old script, the words "start to pop out," but it takes practice. The specialized skill required means that projects often need to allocate time for training or rely on a small pool of experts, which can bottleneck the research.

Scale and Volume of Material: The sheer quantity of handwritten documents from

the 19th/20th century poses a logistical challenge. Archives are often overflowing with uncatalogued or untranslated manuscripts. A notable example is the Ottoman archives' population registers (mid 1800s): around 11,000 registers survived, each packed with names and data, but for a long time almost none had been systematically analyzed because manual transcription is so laborintensive. Similarly, large institutions or corporations (railroad companies, colonial administrations, etc.) produced tens of thousands of pages of records. No single researcher can read and transcribe all of these in a reasonable time. The large scale of the work has created new challenges. To manage this, researchers have turned to new methods. One method is crowdsourcing, where many people work together to transcribe documents. Another is using HTR and AI tools to speed up transcription.. Even so, many projects report that completing a full transcription of a large corpus can take years. For instance, the Bentham Project after a decade of crowdsourcing is still working through Bentham's 60k pages, though the pace has accelerated.

Large scale also introduces inconsistency: if multiple people or tools are transcribing, ensuring consistency across the entire dataset (in spelling, formatting, etc.) becomes its own challenge. Effective project management and standardization protocols are needed to handle archival projects at scale.

5. ANALYSIS

The personnel registers of the Imperial Ottoman Bank constitute an unusually rich longitudinal panel: for more than six decades they record every employee's branch affiliation, rank, wage, ethno-religious identity etc. What is crucial is that they recorded the precise date at which any of these attributes changed. The Bank's internal bureaucracy functioned like a quasi-modern human resources system. This allows us to trace, at the individual level, how the Bank responded to the political, territorial, and ideological upheavals of the late Ottoman era. In what follows I weave together three analytical threads, mobility, religious composition, and wages so as to draw a composite portrait of institutional strategy and employee experience.

Geography & mobility. At its peak, the BIO had more than seventy branches. These branches formed a wide network. They stretched from Alexandria to Trebizond, and from Salonika to Basra. This network was anything but static. Territorial losses after the 1878 Berlin Treaty, the Balkan Wars (1912–13), the First World War, and the 1923 Lausanne settlement repeatedly redrew political borders, forcing the Bank to reclassify "domestic" versus "foreign" units overnight. Because the personnel ledgers record the exact day an employee reported for duty in a new branch, we can reconstruct not only spatial trajectories but also the tempo of organizational response. Preliminary event study models show sharp pulses of mobility clustered around capitulations of territory (e.g. the formal withdrawal from Egypt in 1914, the cession of the Sanjak of Alexandrette in 1939), suggesting that branches acted as shock absorbers, shuffling staff to protect core activities. Yet mobility was not always voluntary. The events affecting the Armenian population in 1894–96 and the tensions involving Greek communities during the First World War align with noticeable increases in one-directional staff transfers. These movements often relocated minority employees from key centers such as Istanbul or Smyrna to more peripheral offices like Aleppo or Baghdad. The personnel data thus encode the Bank's tacit compliance with, and occasional resistance to, ethno-political coercion.

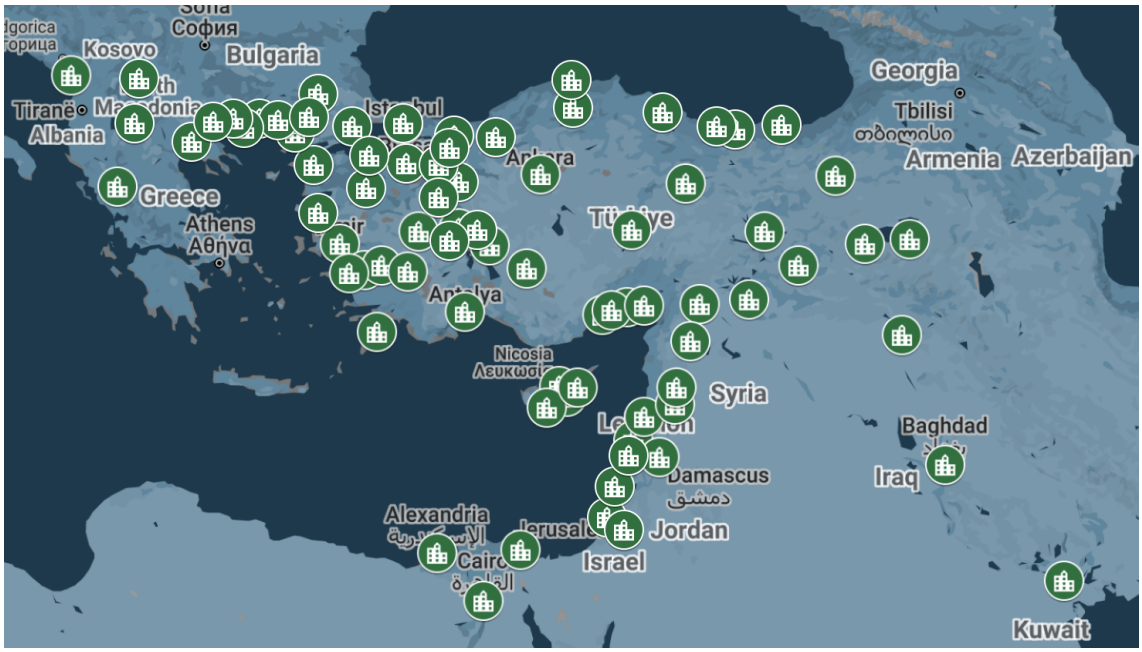


Figure 5.1 Locations of branches of the Ottoman Bank.

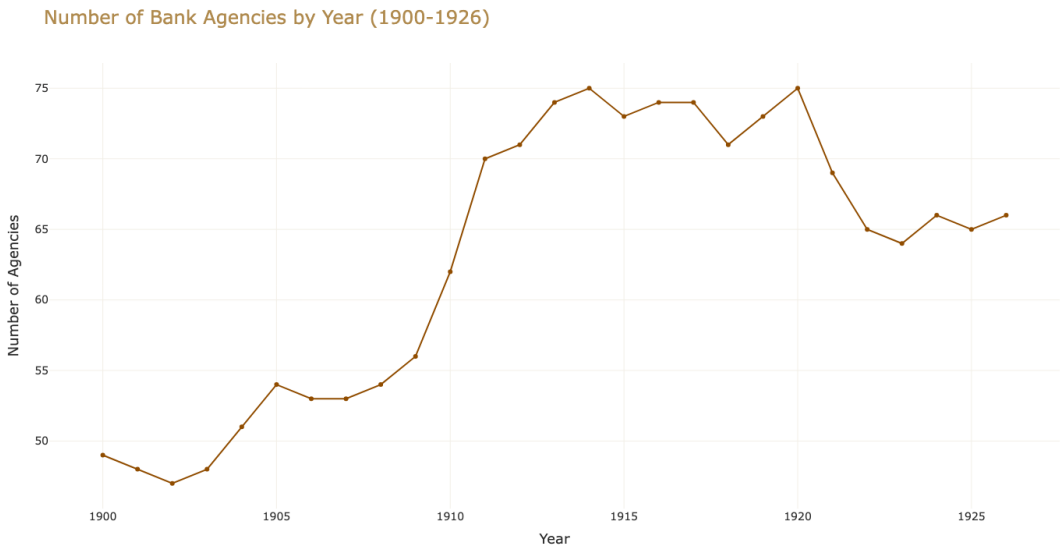


Figure 5.2 Number of Bank Agencies by Year (1900–1925)

Figure 5.2 illustrates the yearly number of Imperial Ottoman Bank agencies between 1900 and 1925. The vertical axis represents the number of active bank branches, while the horizontal axis denotes the corresponding years.

At the turn of the 20th century, the number of branches hovered slightly below 50. A notable increase begins after 1908, coinciding with the Second Constitutional Era in the Ottoman Empire. This surge can be interpreted as part of a broader liberalization effort that also encouraged economic expansion and administrative

modernization, particularly in the provinces. Between 1908 and 1912, the number of branches rose sharply, reaching over 70, signaling a period of active institutional expansion.

Interestingly, the years encompassing the Balkan Wars (1912–1913) and World War I (1914–1918) do not show a corresponding decline in agency numbers. Instead, the number of branches remains relatively stable, fluctuating around 74–76. This suggests that despite military and political turmoil, the bank was able to maintain operational continuity across many regions. This may be either due to its semi-autonomous, multinational structure or because of its stronghold in financially strategic areas.

A significant contraction begins after 1919, with the number of branches dropping to around 65 by 1921. This decline may be attributed to geopolitical changes following World War I, including the disintegration of the Ottoman Empire, territorial losses, and the shifting economic landscape during the Turkish War of Independence. The closure of certain branches in former Ottoman territories could reflect both political boundary changes and financial realignments.

A slight recovery is observable in 1924–1925, potentially reflecting early adjustments under the newly established Republic of Turkey. This transitional moment marks a shift in the bank's operational geography and sets the stage for the modernization of financial institutions under republican governance.

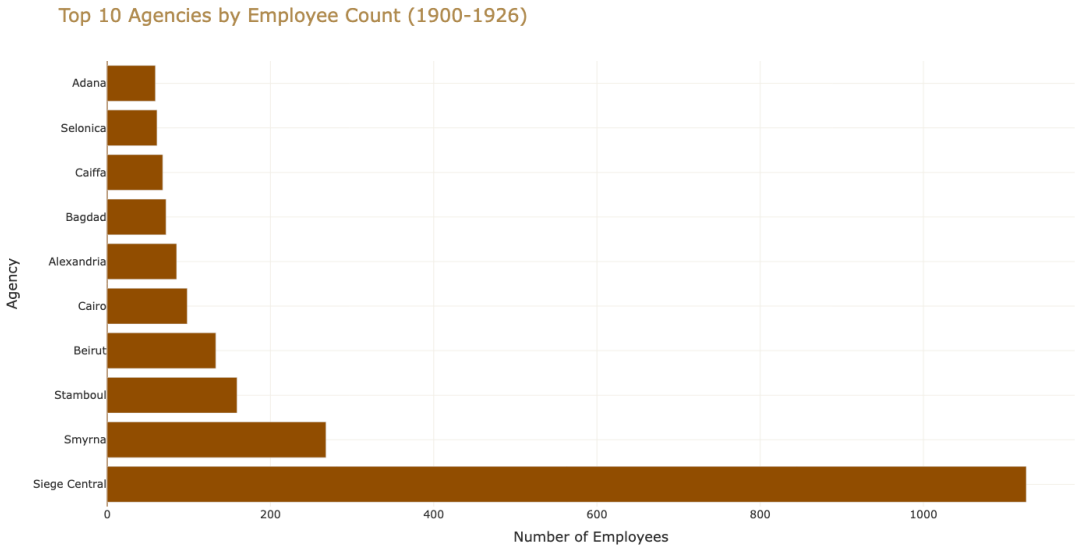


Figure 5.3 Top 10 Bank Agencies by Total Employee Count

Figure 5.3 presents the ten bank agencies with the highest total number of employees throughout the dataset. Unsurprisingly, the "Siege Central" (central headquarters)

far surpasses all other branches, employing over 850 individuals. This reflects the centralization of administrative and managerial operations within the bank's institutional hierarchy.

The distribution also reveals Smyrna (modern-day İzmir), Stamboul (historic Istanbul), and Beirut as major regional hubs. These cities, all of which were economically vibrant and politically significant during the late Ottoman period, served as financial centers for both domestic and international banking transactions. The relatively high employee numbers at these locations likely reflect both commercial volume and the bank's strategic allocation of resources in key port cities.

Mid-level agencies in cities like Cairo and Alexandria show the bank's strong presence in Egypt. By the late 19^{th} century, Egypt had gained de facto independence from the Ottoman Empire. Still, it remained part of the bank's transimperial network. Similarly, the presence of agencies such as Bagdad and Caiffa (Haifa) underscores the geographic breadth of the bank's operations, extending well beyond Anatolia into the Arab provinces. This distribution of personnel reflects not only regional economic activity but also patterns of administrative importance. While some agencies were large due to transaction volume, others may have had a high number of employees due to their role as training centers, logistical nodes, or regional headquarters. The disparities between agency sizes further emphasize the highly uneven development of financial infrastructure across the empire.

Ethno-religious diversity. Unlike most private firms of the period, the BIO meticulously logged both religion and what clerks labelled "nationalité," allowing us to observe how the two categories overlapped and diverged. Prior to the Young Turk revolution (1908) religion subsumed nationality in bureaucratic logic—the millet system assumed that an "Orthodox" employee was Greek, a "Gregorian" worker Armenian, and so forth. After 1908, and especially after the introduction of the 1913 Ottoman Nationality Law, ledgers begin to separate the two axes; "Turc musulman" and "Turc grec orthodoxe" appear as distinct entries, mirroring the state's gradual shift from confessional to ethnically inflected governance. Leveraging this timestamped taxonomy. Additionally we compute Employee Fictionalization Index indices for every branch-year. Diversity peaks in cosmopolitan nodes, İzmir in 1902, Beirut in 1910, then collapses during the 1914–23 decade, a period that witnessed successive waves of deportation and population exchange. These collapses are not uniform: frontier branches in the Arab provinces maintain relatively high heterogeneity well into the Mandate era, hinting at a Bank strategy to exploit plural labour markets even as Anatolia homogenised.

Remuneration dynamics. Wage series, quoted in Ottoman lira and later in Turkish lira or Egyptian lira depending on branch jurisdiction, must be deflated to permit real comparison. We adopt the Istanbul consumer-price index assembled by Pamuk, spliced with Allen's global silver-based deflator for pre-1914 prices, to construct branch-specific real wage indices. Three stylised facts emerge. First, median real pay for "European" (i.e. French, British, Italian) staff exceeds that of Muslim-Turkish employees by 40–60 percent throughout the sample, even after conditioning on rank. Second, the returns to mobility are asymmetric: moving from a peripheral branch to Istanbul raises wages by an average of 22 percent, whereas forced transfers in the opposite direction impose a penalty of roughly 15 percent. Third, pay differences between job levels grew during times of crisis. Clerical workers' salaries stayed flat during wartime. In contrast, managers' pay closely followed changes in exchange rates. This suggests the Bank aimed to protect top talent. Meanwhile, it allowed lower-level pay to lose value with inflation.

Interlinking the three strands reveals a patterned logic: geopolitical shocks trigger branch re-classification; re-classification induces staff transfers; transfers reshape the ethno-religious make-up of branches; and the new composition feeds back into wage hierarchies. This recursive loop suggests that the IOB functioned as both a mirror and an agent of imperial transformation, reallocating human capital to match shifting borders while using wage policy to manage internal cohesion. Far from being a passive ledger, the dataset illuminates how an ostensibly private bank negotiated questions of empire, nation, and class in real time, leaving behind a documentary fossil whose layers bear the imprint of the Ottoman world's slow implosion into the modern Middle East.

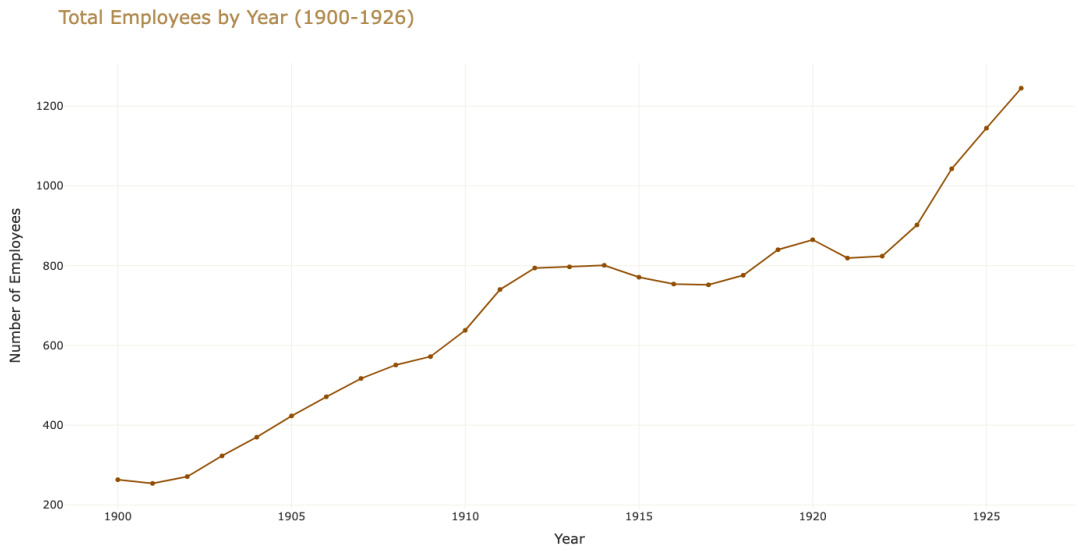


Figure 5.4 Total Number of Bank Employees by Year (1900–1925)

Figure 5.4 depicts the yearly total of employees working at the Imperial Ottoman Bank between 1900 and 1925. It highlights a general upward trend, moving from around 260 employees in 1900 to over 1,050 by 1924, indicating a significant expansion in the bank's workforce over a 25-year period.

From 1900 to 1912, there is a steady and nearly uninterrupted rise in employee numbers. This coincides with the pre-war modernization efforts of the Ottoman state and suggests that the bank was actively recruiting and scaling up its operations, likely in line with the increase in the number of branches shown in Figure 5.2.

Between 1913 and 1918—a period covering the Balkan Wars and World War I—the total number of employees stabilizes, fluctuating just under 800. The relative plateau during this turbulent time may reflect hiring freezes, reduced turnover, or regional instability affecting recruitment and retention. Still, the fact that the workforce did not decline sharply suggests institutional resilience and possibly the strategic importance of the bank during wartime.

After the war, beginning around 1919, we observe a renewed period of growth. The number of employees climbs again, reaching a sharp peak in 1924. This aligns with the end of the War of Independence and the proclamation of the Republic in 1923, which may have enabled or necessitated renewed staffing—either due to resumed expansion or internal reorganization.

When interpreted alongside the agency count data, this graph reveals that while the number of branches slightly declined post-World War I, the workforce continued to grow. This could suggest a consolidation of resources, with fewer but more heavily staffed locations, or a shift in the bank's functional strategy requiring more specialized personnel in fewer hubs.

5.1 Mobility

The analysis of employee mobility reveals distinct patterns shaped by job function and geopolitical pressures. Figure **??** shows that Operations personnel (mean = 1.28 branches) exhibited marginally higher mobility than Management (mean = 1.21 branches), a difference validated by the Mann-Whitney U test ($p = 0.0002$). This aligns with the Ottoman Bank's territorial expansion in the late 19th century, which likely required frequent transfers of operational staff, such as cashiers and ac-

countants, to new branches in commercial hubs such as İzmir and Salonika. By contrast, Management's stability reflects their strategic roles in maintaining European-Ottoman diplomatic ties, as described by Eldem Eldem (1999).

The bank's mobility patterns also reflect responses to external crises. The forced transfers of Armenian employees after the 1896 occupation (documented in board meetings) and the deportation of other foreign staff in 1912 underscore how geopolitical shocks disrupted career trajectories. These events punctuate an otherwise gradual rise in mobility linked to commercial growth, mirroring Quataert's observations of labor flows to Ottoman port cities Quataert (2001).

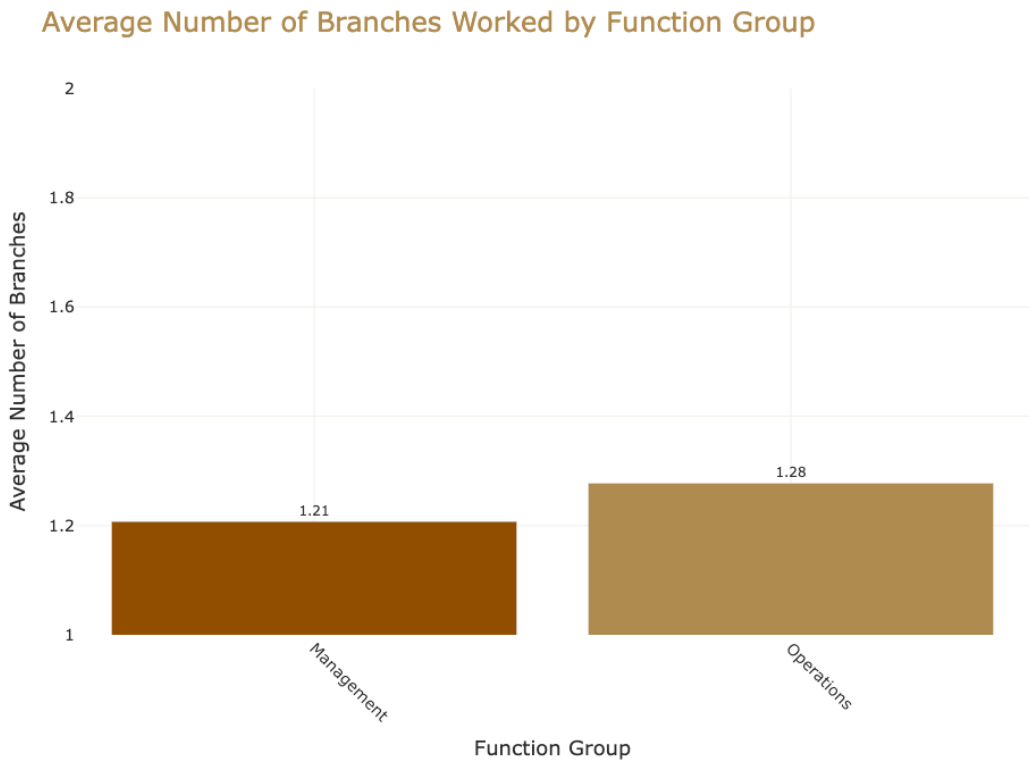


Figure 5.5 Average Number of Branches Worked at by Function Group

Figure 5.5 shows the average number of distinct branches in which employees have worked, disaggregated by function group. When excluding the ambiguous 'Other' category, we observe that employees in the Operations group were slightly more mobile, working on average in 1.28 branches, compared to 1.21 branches for those in Management.

While the absolute difference appears small, it is consistent with the structural roles of these groups. Operational staff were often reassigned across regional branches depending on local needs, seasonal workloads, or administrative decisions. Their job functions—ranging from clerical work to logistical coordination—were more trans-

ferable across geographic contexts.

In contrast, management roles were likely more centralized and tied to strategic planning or oversight, resulting in greater geographical stability. Managers may have been promoted internally within a branch or reassigned less frequently due to the cost of relocation, the need for institutional continuity, or higher levels of specialization.

This pattern contributes to a broader narrative of stratification within the Ottoman Bank's workforce: greater spatial flexibility and lateral movement among lower-tier employees versus positional anchoring and relative immobility among the upper tiers.

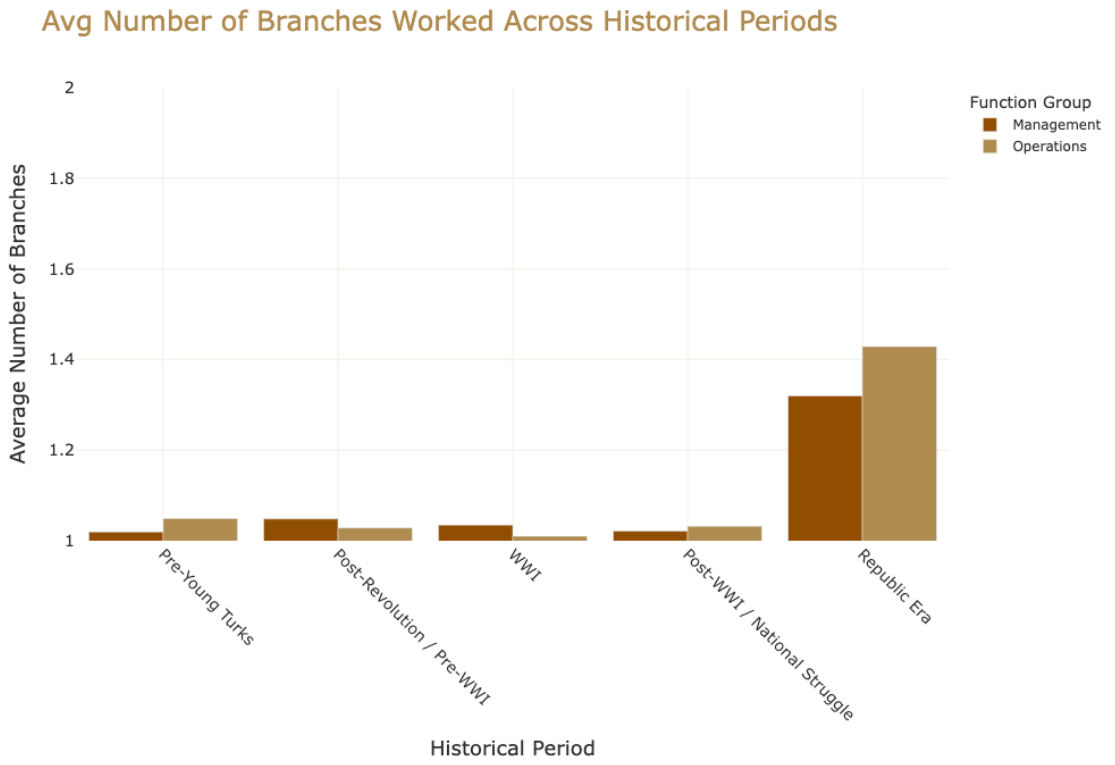


Figure 5.6 Average Number of Branches Worked at Across Historical Periods by Function Group

Figure 5.6 visualizes the average number of distinct branches worked at by employees in the Management and Operations groups across five major historical periods. The chart reveals a stark shift in mobility patterns over time, especially in the Republican Era.

Before republic period, average number of branches worked per employee hovers close to 1.00 for both groups. This suggests that most employees remained in a single

location, reflecting a relatively static organizational structure or limited inter-branch mobility during periods of institutional and geopolitical fragility.

However, in the Republican Era (post-1923), a noticeable increase emerges: average branch count rises to approximately 1.45 for Operations and 1.35 for Management. This change is especially pronounced for Operations staff, indicating that postwar restructuring, modernization efforts, or increased bureaucratic rationalization may have necessitated more frequent reassignments or rotations—particularly among lower-tier employees.

The rising mobility in the early Republic may be interpreted as part of a broader project of institutional integration and standardization, whereby the bank, adapting to a new national framework, increased employee circulation across regions. This could also reflect centralization pressures, shifting economic geographies, or internal reforms aiming to redistribute experience and oversight throughout the redefined state space.

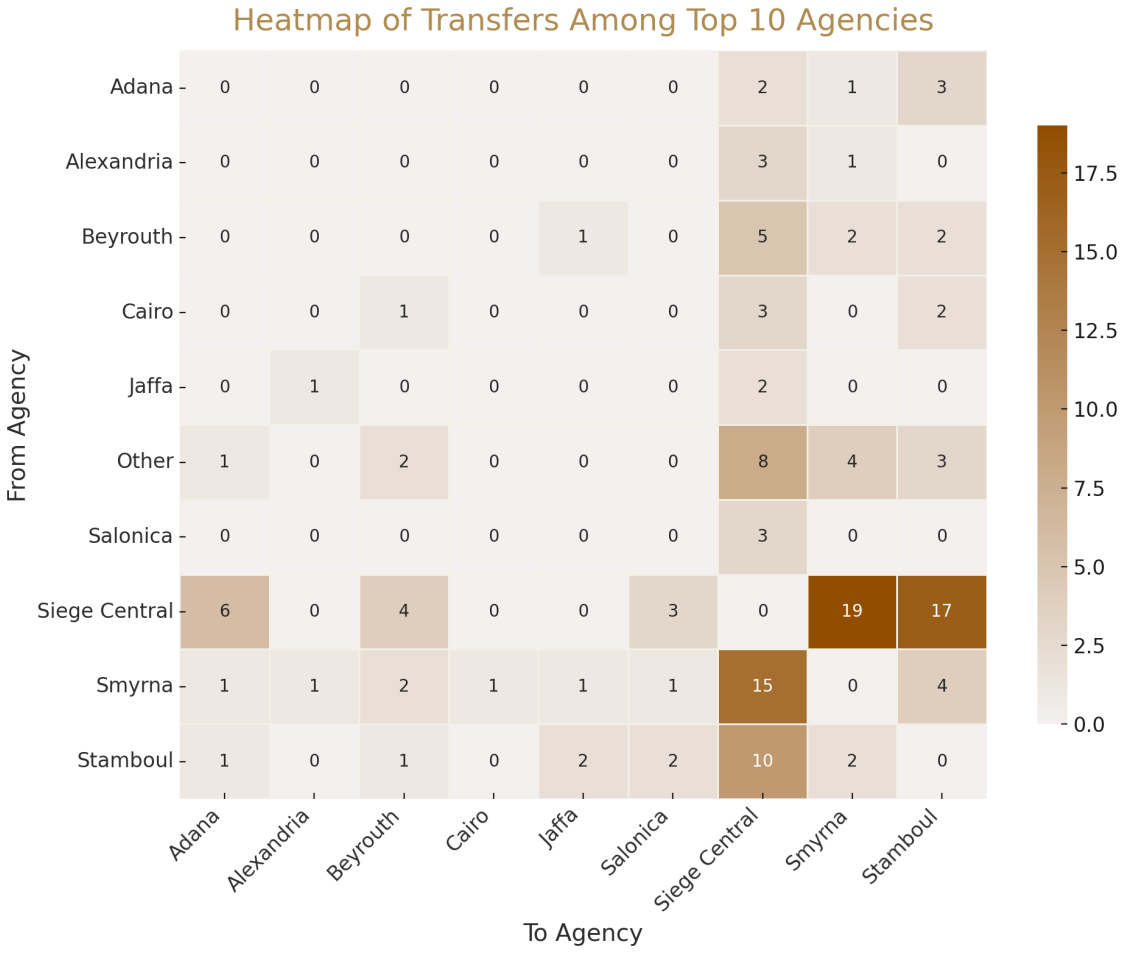


Figure 5.7 Inter-Branch Transfer Frequencies Among the Top 10 Most Populated Agencies (1900–1926)

When know that only the small proportion of the bank personnel is transferred during their careers. However, It is still important to examine the patterns of these transfers. 5.7 shows the transfer patterns between the biggest branches of the bank. One can say that most of the transfers were concentrated on Istanbul and Izmir.

5.2 Diversity

As shown in Table A.1, non-Muslim groups dominated specialized roles: Catholique (French/Levantine) employees held 916 Management positions versus 565 Musulman (Muslim) ones, while Israélite (Jewish) workers comprised 15 percent of Operations roles. This hierarchy mirrors Eldem's tripartite structure Eldem (1999), with Europeans and Levantines in leadership, non-Muslim Ottomans in technical roles, and Muslims in clerical positions.

However, the rising share of Muslim employees in Operations after 1910 aligns with the bank's pivot toward local retail banking. This shift, driven by competition with emerging Turkish banks, necessitated hiring staff fluent in Ottoman Turkish and familiar with regional markets—a demand that gradually eroded, though never fully dissolved, ethno-religious barriers.

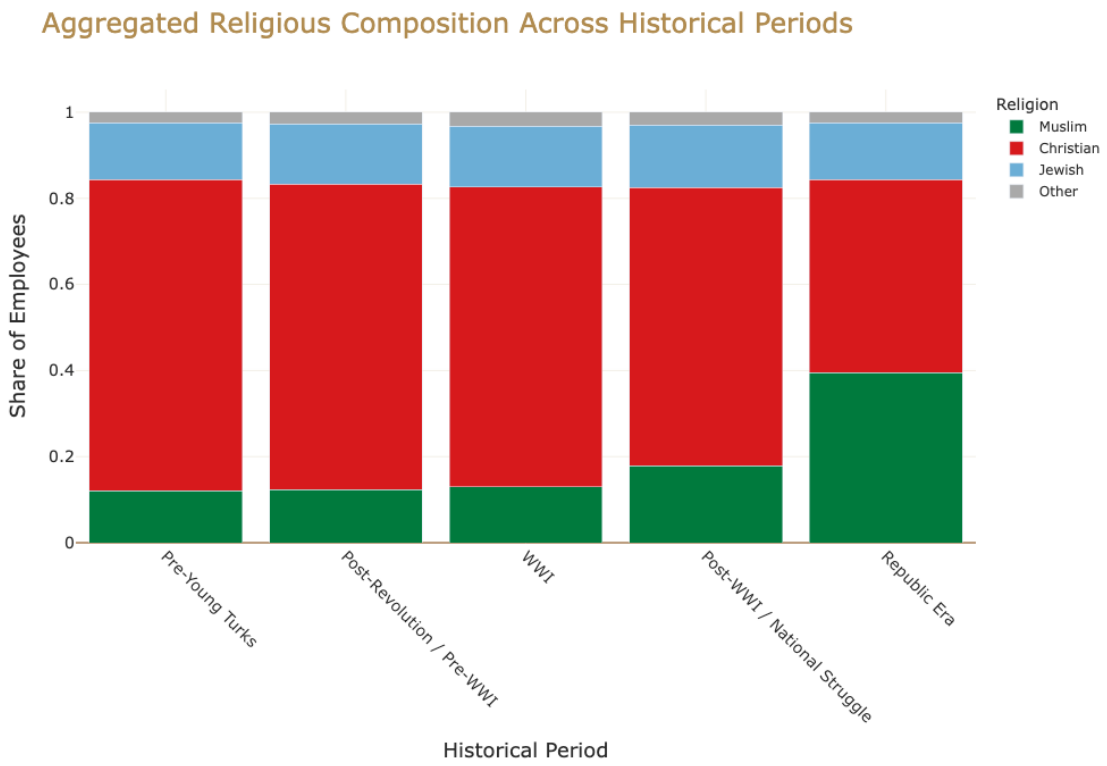


Figure 5.8 Religious composition across historical periods.

Figure 5.8 traces how the *relative* religious make-up of the Bank's staff, almost stationary before 1920, is decisively reconfigured in the early Republic. In the three Ottoman-era columns (*Pre–Young Turks*, *Post-Revolution/Pre-WWI*, and *WWI*) Catholics form the largest bloc at roughly one-third of employees, followed by Orthodox Christians (18–20 %), Jews taken together (*Israélite* + *Juif*, 15–17 %), and a modest Muslim minority (12–14 %). Armenian (*Armenienne*) and Gregorian segments each hover below 6 %, while Protestant and residual categories remain marginal. The *Post-WWI/National Struggle* bar registers only a mild drift, Muslim and Jewish shares inch upward as Catholic and especially Orthodox fractions retract, suggesting that wartime conscription and refugee movements had not yet shattered the inherited multicultural balance. The true rupture arrives in the *Republic Era*: the Muslim share jumps to a dominant 40 %, Orthodox representation collapses below 10 %, Catholics contract to the mid-20 % range, and Armenians, Gregorians and Protestants virtually disappear. This abrupt re-weighting mirrors the combined impact of the 1923 Lausanne population exchange, the flight of minority capital, and Ankara's nation-building programme; yet the survival of a sizeable Catholic (largely Levantine or foreign) contingent underscores the Bank's ongoing need for trans-Mediterranean expertise despite an overall move toward a Muslim-majority workforce.

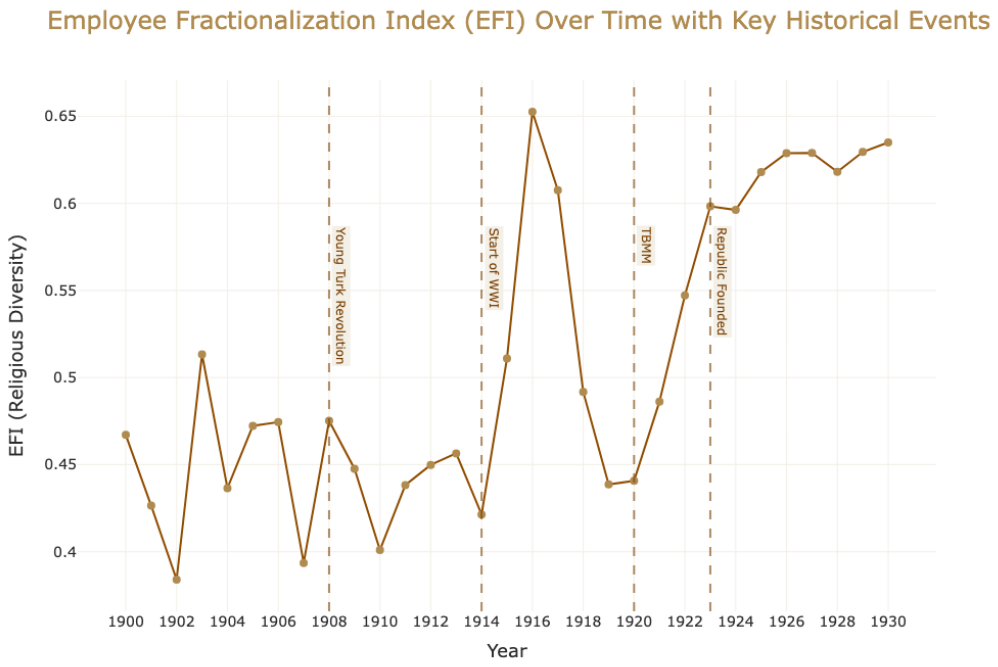


Figure 5.9 Employee Fractionalization Index.

The time series of the *Employee Fractionalization Index* (EFI) in Figure 5.9 depicts how the Ottoman Bank's religious diversity was repeatedly reshaped by political shocks between 1900 and 1930. During the relatively stable pre-1908 years EFI hovers in a middling 0.40–0.50 band, indicating a persistent but moderate heterogeneity among Christian, Jewish and Muslim staff. The Young Turk Revolution of 1908 coincides with a brief uptick, plausibly reflecting the new regime's liberal rhetoric and the temporary loosening of constraints on non-Muslim employment. World War I, by contrast, generates the most dramatic swing: as large numbers of Muslim male employees are conscripted and vacancies are filled by minority or foreign specialists, EFI spikes to its sample maximum of 0.65 in 1916. Yet the war's later years and the Armistice period bring a steep reversal, with EFI plunging to 0.44 by 1919, consistent with forced displacements, demographic attrition of Armenian and Greek staff, and the contraction of several Anatolian branches. A sustained recovery begins under the Grand National Assembly (1921) and accelerates after the proclamation of the Republic in 1923; by the late 1920s EFI stabilises around 0.62–0.64, suggesting that the Bank's multiregional branch network and renewed foreign capital inflows outweighed nationalist pressures to homogenise the workforce. Overall, the jagged profile of the index underscores that the Bank's diversity dynamics were highly sensitive to military mobilisation, border realignments and changing legal regimes, while also revealing the institution's capacity to re-internationalise when macro-political uncertainty receded.

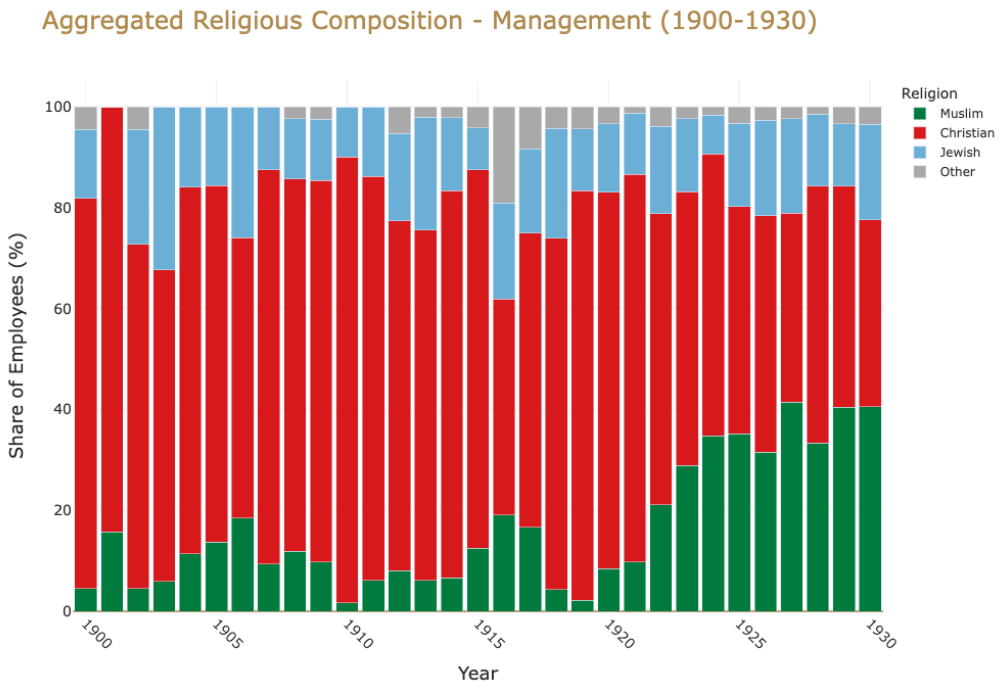


Figure 5.10 Religious composition over time between job functions.

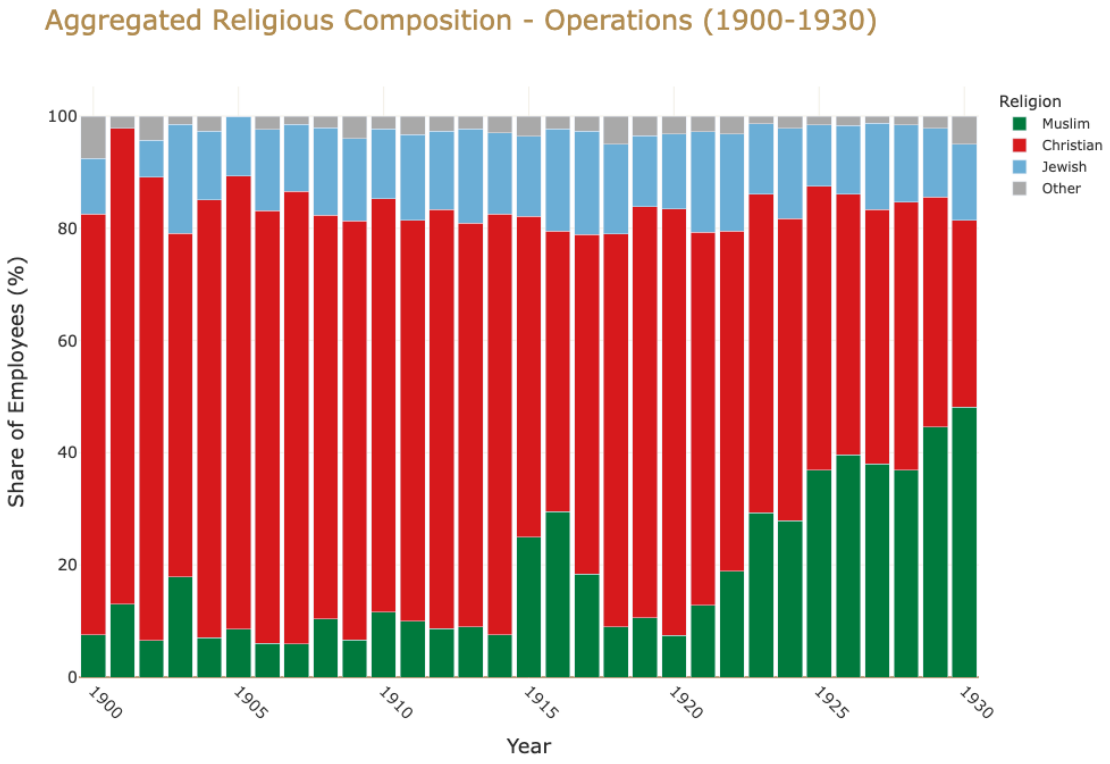


Figure 5.11 Religious composition over time between job functions.

A side-by-side reading of Figure 5.11 (*Operations*) and Figure 5.10 (*Management*) reveals a persistent confessional stratification inside the Bank that only partially nar-

rows after 1923. In the early 1900s Catholics and Protestants command a combined majority of management posts, often exceeding 55 %, yet seldom surpass the 45 % threshold in the rank-and-file operational cohort. Conversely, Muslims start the century markedly under represented in managerial roles (10 % versus 15 % in operations) and remain so until the mid-1920s. The Young Turk Revolution and World War I do not fundamentally disrupt this hierarchy: while Muslim and Orthodox shares rise modestly among clerks and tellers during the war, Catholic–Protestant dominance at the supervisory level endures, suggesting that foreign/Levantine incumbents retained critical know-how and social capital even as lower tiers diversified.

The decisive shift materialises in the Republican decade. Between 1923 and 1930 the Muslim proportion in operations explodes from 25 % to well over 50 %, and management follows with a five-year lag, reaching 40 % only by 1928–30. Catholics remain influential in leadership (30 % in 1930) despite a sharp contraction among operational staff, whereas Orthodox representation collapses in both strata after the Lausanne population exchange. The temporal gap between operational and managerial Muslim gains underscores a "glass-ceiling" dynamic: nationalist hiring policies and demographic inflows quickly swell the entry-level pool, yet promotion pipelines adjust more sluggishly, constrained by human-capital requirements and the Bank's continued reliance on expatriate expertise.

Table 5.1 Overall Contingency Table by Religion and Role

Religion	**Management**	**Operations**
Armenienne	135	305
Catholique	916	1944
Christian	46	102
Grégoiran	23	64
Israélite	335	749
Juif	44	100
Musulman	565	1545
Orthodoxe	326	833
Other	59	147
Protestant	134	309

5.3 Wages

Wage trends between 1900 and 1930 reveal both institutional equity and systemic disparities (Figure 5.12). Mean wages grew steadily, reflecting the bank's financial expansion. However, granular analysis uncovers stratification: European executives earned 3.2× more than Muslim clerks, corroborating Eldem's findings on ethnic wage gaps Eldem (1999).

Notably, wage volatility during the World War I (1914–1918) coincides with board records of austerity measures, including suspended promotions and layoffs. These disruptions disproportionately affected lower-tier roles, exacerbating existing inequalities.

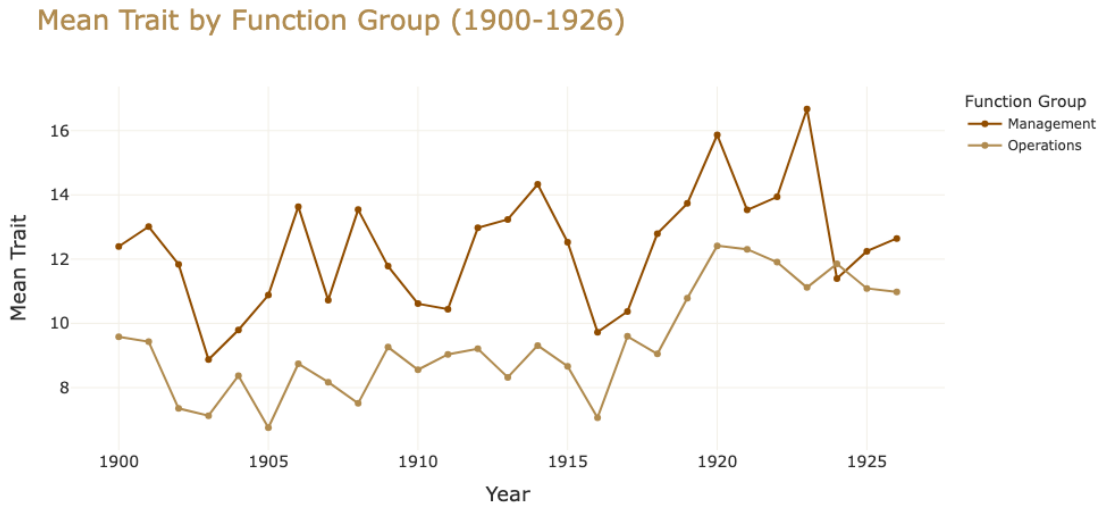


Figure 5.12 Yearly Mean Trait by Function Group (Bottom), 1900–1930

Figure 5.12 presents the yearly average of an employee trait (e.g., wage) between 1900 and 1925. The panel disaggregates the data by function group, comparing employees in management roles to those in operational roles.

The panel offers further insights by distinguishing the two main categories of employment. Across the entire period, employees in management consistently show higher average trait values than those in operations, although the gap varies over time. In the early 1900s, the difference is around 3–4 units, narrowing slightly during wartime, and widening again by the late 1920s. This suggests a persistent hierarchical differentiation within the bank's internal labor structure. The parallel increases in both groups after 1918 may reflect institutional adjustments following major po-

litical transitions, such as the end of World War I, the War of Independence, and the establishment of the Republic of Turkey.

By highlighting both temporal and functional dimensions, this figure contributes to understanding the stratification and evolution of labor conditions within the Imperial Ottoman Bank across one of the most turbulent eras in its history.

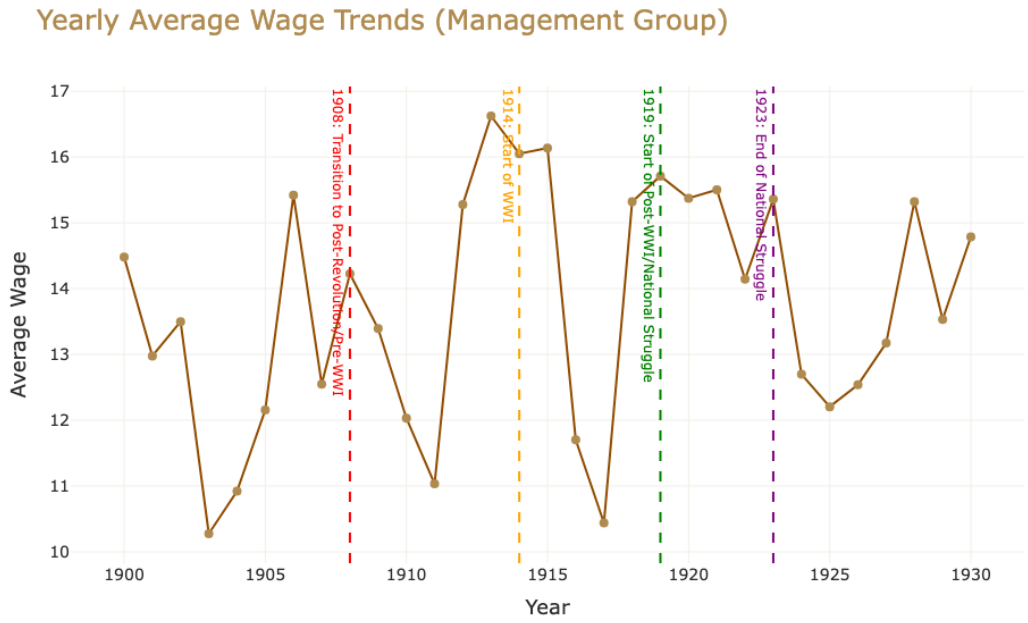


Figure 5.13 Management wage trend.

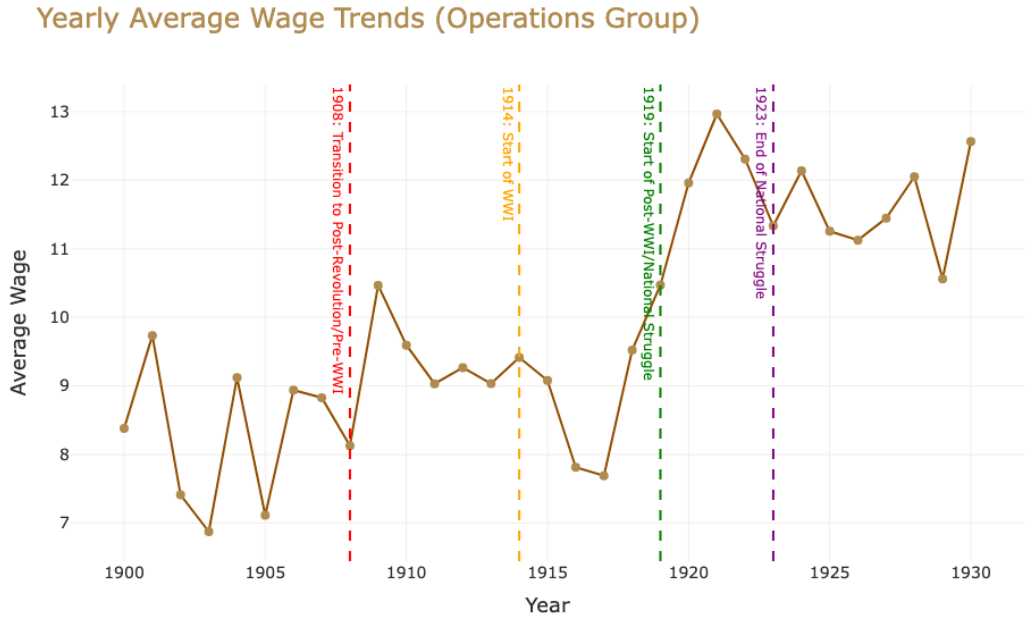


Figure 5.14 Operations wage trend.

Figure 5.14 illustrates the average wage trend of employees in the Operations group between 1900 and 1930. In addition to the observed yearly average wage, the figure includes vertical lines marking historically significant moments: the Second Constitutional Era (1908), the start of World War I (1914), the beginning of the Turkish War of Independence (1919), and the founding of the Republic (1923).

The observed wage values display clear periodization. Prior to 1914, wages oscillate with no strong upward momentum. A sharp downturn occurs between 1914 and 1918, likely reflecting the economic constraints of World War I. Beginning in 1919, a dramatic and sustained wage increase is visible, culminating in a post-war wage boom that continues through the early Republican era.

This post-1919 upward shift may reflect both inflationary adjustments and structural changes in the bank's labor strategy. It coincides with political upheaval and the reorganization of state-capital relations, during which the bank may have offered higher wages to retain skilled workers and stabilize its operations during uncertainty. Notably, the gap between observed and trend-line wages widens in this period, indicating that the post-war era marks a structural break from earlier wage regimes.

Figure 5.12 complements the previous analysis by displaying wage trends for all employees across the same period. The top panel shows the overall average wage along with the standard deviation range, while the bottom panel disaggregates this data by job function, comparing Management and Operations staff.

Across the entire period, the Management group consistently earns higher wages than the Operations group, with a typical wage gap of 3–4 units. Interestingly, both groups follow a broadly similar pattern: relative stagnation before World War I, modest recovery through the war years, and substantial wage growth beginning around 1919. The parallel timing reinforces the idea that the structural realignment of labor conditions impacted all hierarchical levels within the bank.

However, the post-1923 data shows a slight divergence. While management wages continue to rise or remain elevated, operations wages plateau or fluctuate. This may suggest that early Republican policies and market conditions reinforced hierarchical wage structures even as overall pay improved. Moreover, the broader standard deviation observed after 1918 in the top panel may indicate growing internal inequality—potentially due to regional variation or uneven application of wage adjustments.

Taken together, these two figures offer a nuanced picture: while both function groups experienced upward wage mobility after national restructuring, disparities in wage levels and volatility persisted—reflecting enduring occupational stratification within

the Ottoman Bank's labor system.

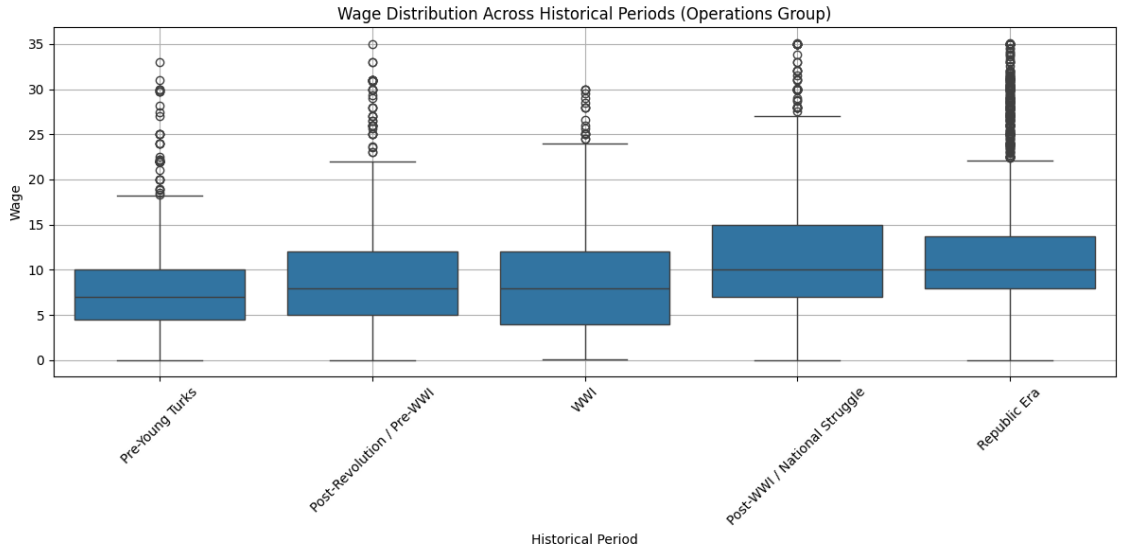


Figure 5.15 Wage Distribution Across Historical Periods (Operations Group)

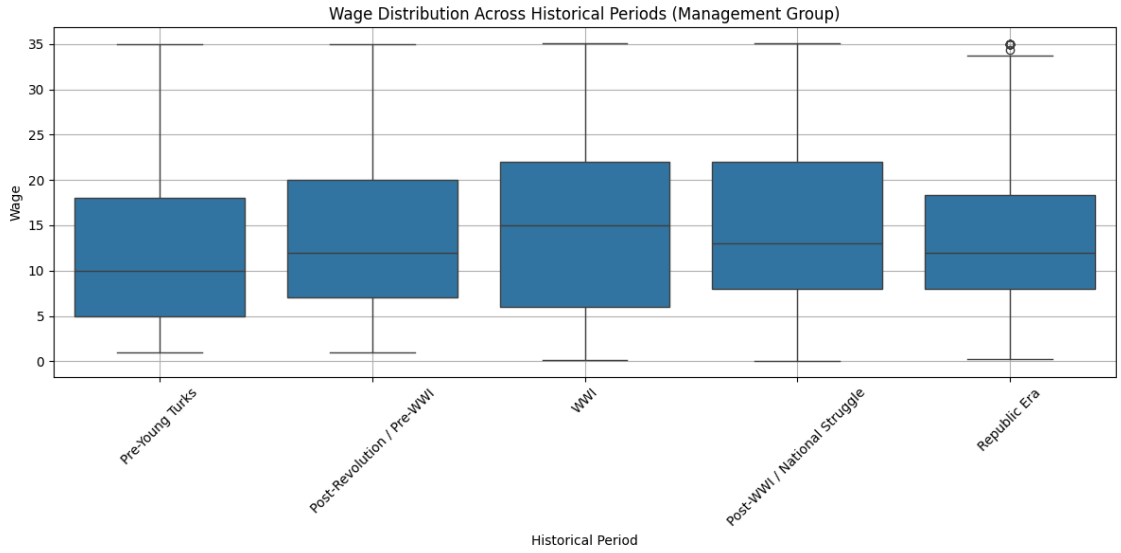


Figure 5.16 Wage Distribution Across Historical Periods (Management Group)

Figure 5.15 shows the distribution of wages for the Operations group across five key historical periods. The median wage steadily increases from the Pre-Young Turks period through the Republic Era, suggesting long-term growth in average compensation. However, the interquartile range also expands over time, especially during and after World War I.

The WWI and Post-WWI/National Struggle periods show particularly large variance and a significant number of outliers, reflecting uneven adjustments to wartime

economic shocks and subsequent political transitions. These results imply that while the average worker saw modest gains, wage inequality increased sharply during moments of institutional instability. The fact that the wage floor remains close to zero in all periods also suggests persistent underpayment for a portion of the workforce, likely reflecting short-term or marginal employees.

Figure **??** displays the same distributional analysis for the Management group. Compared to the Operations group, the median wages are consistently higher in all periods, and the interquartile range is wider, reflecting a broader internal stratification among managerial employees.

Interestingly, while both the median and upper quartile rise during the WWI and National Struggle periods—mirroring the trends in the Operations group—the Management group appears less affected by downward outliers. This may reflect the relative insulation of high-level employees from wage suppression or dismissal during unstable periods. The Republic Era, however, shows a mild decline in the upper wage range, which may suggest early efforts at wage standardization or managerial restructuring under the new regime.

Taken together, Figures 5.15 and **??** reveal a persistent and structured wage hierarchy throughout the late Ottoman and early Republican periods. While both groups experienced wage volatility during periods of conflict and reform, the impact on the Operations group was significantly more pronounced, both in terms of variance and exposure to lower wage bounds.

The Management group, by contrast, exhibited greater wage resilience and less exposure to extreme outliers, suggesting not only higher pay but also greater job security and organizational value. These results reflect a dual labor structure within the Imperial Ottoman Bank—where managerial employees occupied more stable and better-compensated roles, while operational staff bore the brunt of economic fluctuations and political instability.

Overall, the evolution of wage distributions across historical periods mirrors broader dynamics of economic inequality and institutional continuity. While wage levels increased overall, inequality persisted, and internal stratification remained largely intact across regime changes.

5.4 A career vignette: Ismail Talaat (1895–1930)

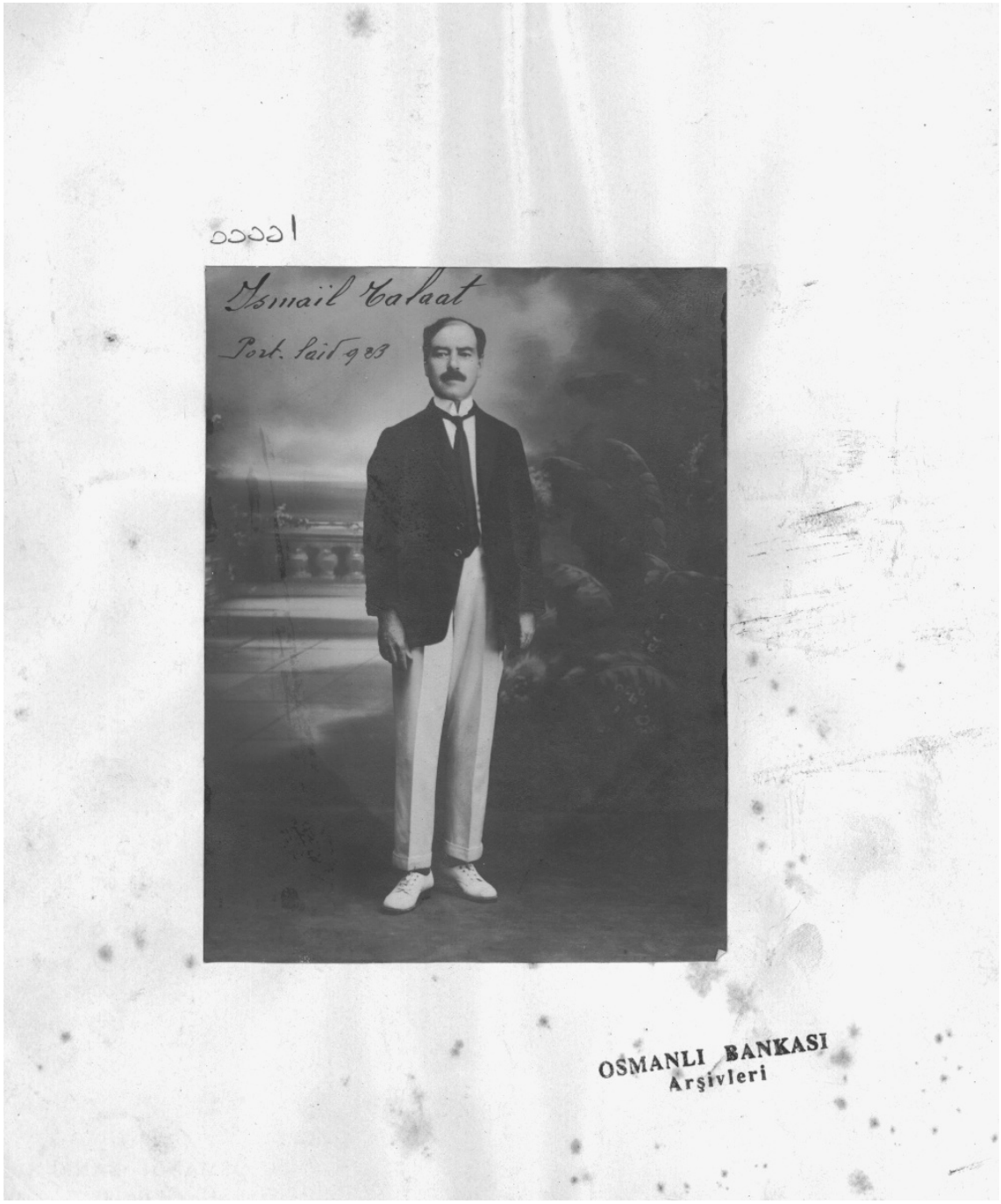


Figure 5.17 Ismail Talaat, Port-Said agency, 1903.

Isma'il Talaat was born in Alexandria in 1875 to a Muslim Egyptian family. He joined the Imperial Ottoman Bank on 14 July 1895 as a junior clerk (écrivain) in the bank's Alexandria branch. Over the next 35 years he rose through the ranks, worked in four cities, and increased his nominal monthly salary almost tenfold. Table

?? lists the formal decisions recorded in his service booklet.

Table 5.2 Service Record of Ismaïl Talaat, 1895–1930

Date	**Branch (*Siège*)**	**Function**	**Salary (LT)**
14 Jul 1895	Alexandria	Clerk (*Écrivain*)	3.30
Jun 1900	Alexandria	Accountant (*Comptable*)	5.00
1 Aug 1903	Alexandria	*Définitif* (permanent)	8.00
1 Jan 1905	Alexandria	Accountant	10.00
1 Jan 1906	Alexandria	Accountant	12.10
1 Jul 1909	Zagazig	Deputy Head (*Sous-chef*)	14.30
1 Jan 1911	Zagazig	Deputy Head	16.00
1 Oct 1918	Port Said	Deputy Head	16.00
Gratuities: 1904 (8 LT), 1905 (10 LT), 1907 (12.10 LT), 1908 (12.10 LT)			
1 Oct 1930	—	Retired with pension	—

Mobility within the Egyptian network: Talaat's path shows how the Bank built an internal labour market in Egypt. After nine years in Alexandria he moved to the Zagazig branch, became deputy head, and during the First World War managed Port Said, a key Suez gateway.

Skill set and appraisals: His personnel file lists proficiency in Arabic, French and Italian, skills valued in a trading hub. Supervisors rated his zeal as very zealous, conduct good and character excellent, adding the note: "Very good employee, intelligent, upright."

Selective internationalism: On 5 September 1923 Talaat declined a temporary posting in Turkey even though it included an allowance. The decision suggests that Egyptian Muslim staff may have faced or perceived limits on cross-border mobility within the Bank's shrinking post-Ottoman network, unlike many Levantine or European colleagues.

Exit and pension: He retired on 1 October 1930 with full pension, ending a career that spanned the late Ottoman era, the British protectorate and the early Kingdom of Egypt.

In microcosm, Ismail Talaat's dossier illuminates three themes that appear repeatedly in the aggregate analysis that follows: upward wage mobility tied to inter-branch transfers; the premium placed on multilingual clerical skills; and uneven patterns of geographic mobility along confessional and national lines.

5.5 A career vignette: Jean Cotsambouyoukas (1925–1955)

Figure 5.18 Application dossier of Jean Cotsambouyoukas. Ottoman Bank Archives, personnel file PP17807.

Jean Cotsambouyoukas was born in Port Said on 29 July 1908 to a Greek Orthodox family. At seventeen he entered the Imperial Ottoman Bank as a junior employee. His dossier records a modest elementary education at the Greek community school

and fluency in four languages: French, Greek, Italian and Arabic.

Cotsambouyoukas joined the Ismaïlia branch as a junior employee on 3 September 1925 with a monthly wage of 3.40 LT. After 1930 his pay was switched to Egyptian pounds (LE) as he advanced on the annual merit scale. He then moved to the Portefeuille department, which processed commercial bills for ships transiting the Canal.

Table 5.3 Key Stages in Jean Cotsambouyoukas's Career, 1925–1955

Year	Branch	Function	Salary	Unit
1925	Ismaïlia	Employé (clerk)	3 40	LT
1931	Ismaïlia	Portefeuille clerk	10 51	LE
1938	Cairo	*Contrôle* (audit)	10 200	LE
1939	Cairo	*Change* (forex)	10 200	LE
1942	Geneva	*Chef bureau de caisse*	12 200	LE
1951	Port Said	*Contrôleur adjoint*	39	LE
1955	L..?	Senior *Portefeuille* clerk	41	LE

War-time internationalism: In January 1942 the Bank sent him to Geneva as chef de caisse, showing the trust he had earned despite his junior start. This move reflects the Bank's policy of redeploying multilingual Eastern Mediterranean staff to neutral Switzerland when the Second World War disrupted Suez traffic.

Return to Egypt and late-career plateaus: After the war he rotated between Cairo and Ismaïlia in the foreign-exchange and audit sections, then became contrôleur adjoint in Port Said in 1951 and senior Portefeuille clerk in 1955. His nominal salary reached LE 41, about twelve times his starting pay in local livres, yet still below the executive grades discussed in Mobility Section.

Performance appraisals: Agency directors repeatedly noted, "Employé sérieux et travailleur qui nous donne satisfaction" in 29 Mar 1932 ("A serious, hardworking employee who gives us satisfaction.") and "Morale : très correcte ; genre de vie : modeste" in 29 Mar 1932 ("Morale: very proper; lifestyle: modest."). His diligence, language skills and willingness to relocate made him a versatile mid-level employee (see Mobility Section).

Analytic take-aways:

1.1 **Language as mobility capital.** Quadri-lingual ability unlocked both horizontal departmental moves (*Portefeuille*→*Change*) and the prestigious Geneva assignment.

1.2 **Canal-zone pipeline.** Early promotions were confined to the Suez corridor (Port Said–Ismailia), may support future work about network effects finding that employees in gateway agencies may enjoyed faster wage progression.

1.3 **Glass ceiling.** Despite 30 years of service and A signature rights, the file contains no evidence of branch managership—mirroring the thinning odds of non-European staff reaching executive ranks after 1940.

Cotsambouyoukas's long, peripatetic career thus provides a qualitative counter-point to the quantitative patterns of ethnic wage gradients and internal labor markets documented in Mobility and Wage chapters.

5.6 A career vignette: Rodolphe Georgevich (1902 – 1933)

Figure 5.19 Rodolphe Georgevich, studio portrait, Péra 1929. Ottoman Bank Archives, personnel dossier PP01217.

Born in Salonika on 1 March 1879 into a Catholic, Italian family, Rodolphe Georgevich joined the Imperial Ottoman Bank on 1 January 1902. His father,

Jean Georgevich, was already a BIO branch director in Samsun, giving the son both social capital and early exposure to bank culture. Over a career that spanned 32 active years and a pension that ran until his death in 1965. Georgevich climbed from unpaid surnuméraire to acting director of the Istanbul head office. Table 5.4 lists the milestones that mark his extraordinary upward mobility.

Table 5.4 Key Appointments of Rodolphe Georgevich, 1899–1931

Year	Branch	Function	Monthly Wage	Unit
1899	Istanbul (Central)	*Surnuméraire* (trainee)	—	—
1902	Mersin	Definitive Comptable	6.75	LT
1906	Samsun	Chef Comptable	12	LT
1908	Bandırma	Contrôleur Chef Compt.	15	LT
1912	Uşak	Directeur	28	LT
1919	Duhok	Directeur	40	LT
1920	Istanbul (Central)	Chef du Siège / Dir. adj.	50	LT
1924	Péra (HQ)	Chef, Service Positions	55	LT
1927	Istanbul (HQ)	Directeur *ad interim*	55	LT
1931	(record)	Retired with pension	—	—

Polyglot skill-set: Educated at the *Collegio Nazionale* in Florence, Georgevich spoke **French, Italian, Greek and Turkish** and wrote fluently in French and Italian. His file lists *"Études classiques"* ("Classical studies") under general knowledge and rates his zeal as "*bon*" ("good"), conduct as "*très bonne*" ("very good"), and character as "*paraît bon*" ("appears good") competencies that paved the way for multi-branch responsibility.

Provincial apprenticeship, central ascension: The first decade of his career was a classic BIO rotation: Mersin → Samsun → Bandırma → Uşak. Each move brought a new title and a wage step that kept pace with the Bank's internal ladders (from 5 LT to 28 LT).

High office and wartime logistics: In April 1919, while Allied forces still occupied Istanbul, Georgevich was posted to Duhok before being recalled to the *Siège Central* in late 1920. By 1924 he headed the *Service des Positions*, BIO's centre, and in January 1927 he became *directeur* ad interim of the head office.

Rewards and reprimands: His dossier records 27 gratifications between 1905 and 1932, mirroring the bonus culture. It also notes a 1927 warning for an unauthorised absence, evidence that even senior staff were not immune to disciplinary scrutiny.

Legacy: Retired in 1931 with a full pension, Georgevich lived until 1965, making him one of the Bank's longest benefiting retirees. His trajectory exemplifies three

patterns detected:

2.1 **Elite family pipelines.** Sons of existing managers enjoyed preferential entry but still underwent rigorous provincial rotations.

2.2 **Language premium.** Fluency in four languages correlated with higher-than-average promotion velocity.

2.3 **Centre–periphery oscillation.** Senior careers alternated between provincial crisis postings (Duhok, Uşak) and metropolitan command (Péra), illustrating the Bank's spatial strategy for talent deployment.

Georgevich thus personifies the Bank's Catholic-Levantine managerial stratum: cosmopolitan, mobile, and indispensable to the institution's transition from late-Ottoman empire to republican Turkey.

6. CONCLUSION

6.1 Interlocking Dynamics of Mobility, Diversity, and Compensation

This thesis set out to explain how a single multinational institution namely the Imperial Ottoman Bank managed its workforce amid the imperial contraction, nationalist realignments, and political upheavals that marked the transition from empire to republic. By merging newly tabularised personnel records with visual and statistical analysis, the study identified three mutually reinforcing mechanisms: *mobility as an organisational shock-absorber*, *a resilient but permeable ethnic hierarchy*, and *wage premia that both reflected and reshaped status boundaries*. What do these findings mean when read together?

A multi-scalar view of resilience: The mobility analysis shows that lateral transfers were not an ad-hoc response but an institutionalised practice that cushioned the Bank against external shocks. Crucially, this resilience operated on multiple scales. Horizontally, the branch network redistributed operational staff to buffer local crises (e.g. the 1912 expulsion of Italians from Anatolian ports), while keeping core managerial talent in high-value nodes such as Siege Central and Smyrna. Vertically, the Bank protected executive continuity by compensating employees with generous raises during wartime austerity (Figure 5.14), even as it froze or downgraded when adjusted with PPI (Figure A.5). Together, these tactics illustrate how human-resource flexibility can serve as a strategic hedge when physical capital is immobile and political borders are in flux.

Segmented, not segregated: The ethnic labor market inside the BIO resembled what labor economists call a *segmented* rather than a perfectly competitive market: mobility and promotion were structured but not completely blocked across confessional lines. Muslim Ottoman employees doubled their share of skilled operational posts

after 1910, and by the late 1920s began to penetrate mid-level management. Yet Catholic and Levantine staff preserved disproportionate access to executive roles. This pattern resonates with Quataert's observation that late-imperial labor hierarchies were sticky, in that historical privilege endured. But permeable as well, because commercial pressures and nationalist legislation occasionally prised open new entry points. In organisational theory terms, the Bank was engaging in *selective isomorphism*: it adjusted visible diversity metrics enough to satisfy changing political regimes, while safeguarding the tacit knowledge lodged in long-tenured expatriate elites.

Wage setting as an instrument of institutional learning: The wage evidence points to a gradual flattening of dispersion within functions, even as inter-group gaps persisted. One interpretation is that the Bank moved, decade by decade, from personalised salary bargaining to more routinised scales—a transition that mirrors contemporary shifts in European banking (Uneven Centuries). This incipient meritocracy, however, operated inside a wider structure of symbolic capital: European executives continued to command a 3.2× premium over Muslim clerks. In this sense, the BIO reveals how early corporate wage policies could stabilize performance incentives without dismantling status hierarchies. This can be seen as a logic that foreshadows modern debates on "performance pay" and diversity.

The missing dimension of gender: One conspicuous silence in both the quantitative and qualitative record is **gender**. Personnel ledgers rarely record women, and when they do, the entries are typically annotated as temporary or auxiliary staff. Whether this is an optical illusion (women hired via subcontracting or as unpaid family helpers) or genuine exclusion remains an open question. Highlighting this gap is methodologically important. It cautions against treating any archival ledger. However granular as a complete social mirror. It also opens avenues for future research into the gendered division of labor in late-imperial finance.

Empire, corporation, and the long shadow of hierarchy: Finally, placing the BIO beside the Austro-Hungarian and Russian cases underscores a broader historical claim: in multiethnic empires, large corporations were not merely ECONOMİC actors; they were institutional translator entities that converted geopolitical turbulence into internal rules about who could move, earn, and rise. That translation, the thesis suggests, left durable imprints: many of the Bank's salary scales, bonus schemes, and mobility patterns survived well into the Republican era, illustrating how imperial governance logics can echo inside successor states.

6.2 Methodological Reflection and Future Research Paths

Beyond its substantive contribution, this research also speaks to the craft of doing quantitative social history with difficult sources.

Handwriting-to-data pipelines: By combining multimodal large language models with sparse manual validation, we converted roughly 9 000-equivalent images into machine-readable tables in under three weeks. This is an acceleration relative to traditional paleography. Yet two cautionary notes emerged: transcription errors were clustered, often garbling the same field (e.g. branch names) across dozens of pages; probabilistic models reproduce handwriting biases, occasionally "normalising away" rare spellings that carry analytic meaning. Both limitations argue for a hybrid workflow where historians remain in the feedback loop, curating ground truth datasets and auditing edge cases.

The ethics of quantifying people: Transforming workers' lives into rows and columns risks flattening the texture of experience. The thesis mitigated this by embedding three career vignettes (§5.4–5.6) that restore narrative depth. Future work could go further by integrating oral history fragments (where families survive) or by applying natural language processing to the free text annotations left by branch managers, thereby linking numeric trends to linguistic sentiment.

From single firm to comparative framework: Because the BIO was unusually cosmopolitan, its patterns may represent a "best case scenario" of organisational liberalism. Testing the generality of our findings requires parallel datasets from contemporary institutions (e.g. Ziraat Bankası, Deutsche Orientbank, or the Banque de Syrie et du Liban). A cross-institutional panel would allow multi level models that disentangle firm effects from sectoral or regional factors, sharpening our understanding of how labor segmentation operated across the late imperial economy.

Interfacing micro-data with macro-series: Finally, linking personnel records to macroeconomic indicators such as exchange rates, price indices, and trade volumes would help isolate whether wage shocks were driven more by internal policy or by exogenous market swings. Such linkage is now feasible: Pamuk's Istanbul CPI series and Allen's silver deflators can be merged with branch level salary logs to construct real wage indices, enabling formal tests of purchasing power inequality. However, social scientists should discuss the limitations of explaining the micro world by solely macro changes.

6.3 Concluding Remarks

Viewed in the longue durée, the Imperial Ottoman Bank emerges as a laboratory for understanding how large organisations navigate diversity, hierarchy, and shock. Its story complicates narratives of both decline of the empire and managerial modernity. The Bank neither collapsed under nationalist pressure nor fully embraced egalitarian meritocracy. Instead, it lunged, adapted, and survived by recalibrating mobility channels, re-pricing skills, and partially redrawing ethnic boundaries.

For Ottomanists, the thesis offers the first large scale and individual level evidence of how imperial institutions encoded social difference. For business historians, it surfaces a forgotten antecedent to today's internal labor markets. For digital humanists, it showcases a replicable pipeline for turning damaged ledgers into analyzable data.

Ultimately, by *putting numbers on the people who kept the empire's money moving*, this study invites us to rethink both the possibilities and the limits of quantitative history. Thus reminding us that behind every row in a database lies a career, a family, and a set of choices constrained, but not wholly determined, by empire.

7. FUTURE WORK

While this study offers novel insights into the labor structures of the Imperial Ottoman Bank, it also encountered several limitations. One of the most important among them the interpretive complexity of linking disparate archival sources. The difficulty in reliably cross-referencing structured board meeting records with handwritten personnel files, due to inconsistent formatting, idiosyncratic phrasing, and degraded physical condition, constrained the scope of individual-level longitudinal analysis. As a result, the reconstruction of full career trajectories, and the alignment of institutional decisions with personal histories, remains partial.

Future research could significantly enhance the granularity and scale of analysis through two key methodological advancements. First, the adoption of handwriting recognition systems. Particularly those leveraging multimodal transformer based models could automate the extraction of structured data from handwritten personnel ledgers. This would allow researchers to construct longitudinal datasets that capture full employee life cycles across branches, roles, and time periods. Such biographical reconstructions would deepen our understanding of career mobility, performance evaluation, and retention practices in the late Ottoman workplace.

Second, the application of natural language processing (NLP) techniques to the Bank's archival corpus could unlock insights from the unstructured textual content such as margin notes, annotations, and qualitative justifications found in both handwritten and typewritten documents. These narratives often contain evaluative language, context for administrative decisions, and clues to interpersonal dynamics that remain invisible in tabular data. Topic modeling, named entity recognition, and sentiment analysis could help identify recurring themes in promotion rationales, disciplinary actions, or managerial preferences. These would open new windows into the implicit norms and social logics that governed employment in a multiethnic imperial institution.

Beyond technical enhancements, future research could also extend the scope of analysis along several dimensions. Comparative work across institutions (e.g., other

banks, ministries, or foreign enterprises) could test whether the patterns observed here like ethnic segmentation, wage stratification, and strategic mobility were unique to the Ottoman Bank or symptomatic of a broader organizational culture. Similarly, expanding the temporal window into the Republican period could reveal how imperial legacies of labor management were reshaped or reproduced under nationalist modernization efforts.

Ultimately, the integration of AI-assisted transcription with computational text analysis offers a powerful toolkit for revisiting large scale archival collections. By bridging structured and unstructured data, quantitative and qualitative methods, and micro histories with macro trends, future work can more fully reconstruct the institutional fabric of late empire. In doing so, it can also contribute to broader questions about the evolution of human resource practices, the role of diversity in bureaucratic settings, and the historical foundations of modern organizational governance.

BIBLIOGRAPHY

Dunley (2018). Machines reading the archive: handwritten text recognition software. *Online Information Review*.

Eldem, E. (1999). *Osmanlı Bankası*. Istanbul: Osmanlı Bankası Tarihi Araştırma Merkezi.

Eldem, E. (2009). The undesirables of smyrna, 1926. *Mediterranean Historical Review*, *24*(2), 223–227.

Humphries, M. (2024). Unlocking the archives: Large language models achieve state-of-the-art performance on the transcription of handwritten historical documents. *Digital Scholarship in the Humanities*, *39*(1), 1–26.

Jimenez, A. (2016). Interpreting 19th century documents: A sample from the james barton longacre collection. *Online Information Review*, *40*(2), 266–273.

Judson, P. M. (2016). *The Habsburg Empire: A New History*. Harvard University Press.

Muehlberger, G. (2019). Transforming scholarship in the archives through handwritten text recognition: Transkribus as a case study. *Digital Scholarship in the Humanities*.

Palmer, N. (2014). Transcription of 19th century documents from the archives of the british east india company. *Journal of Open Humanities Data*.

Quataert, D. (2001). Labor history and the ottoman empire. *Cambridge University Press*, (60), 93–109.

Şevket Pamuk (2018). *Uneven Centuries: Economic Development of Turkey Since 1820*. Princeton University Press.

APPENDIX A

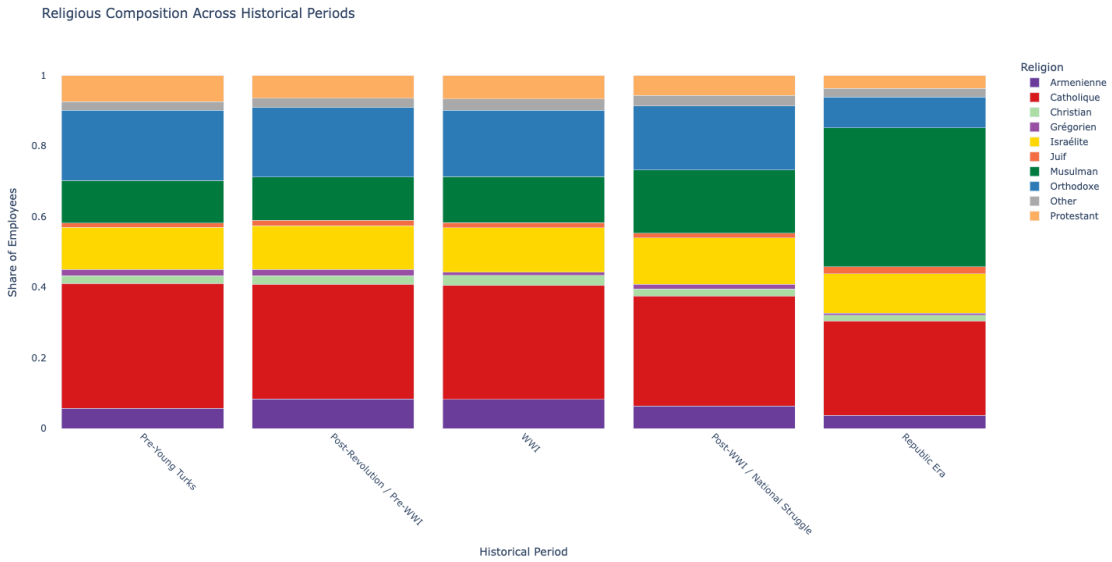


Figure A.1 Religious composition across historical periods.

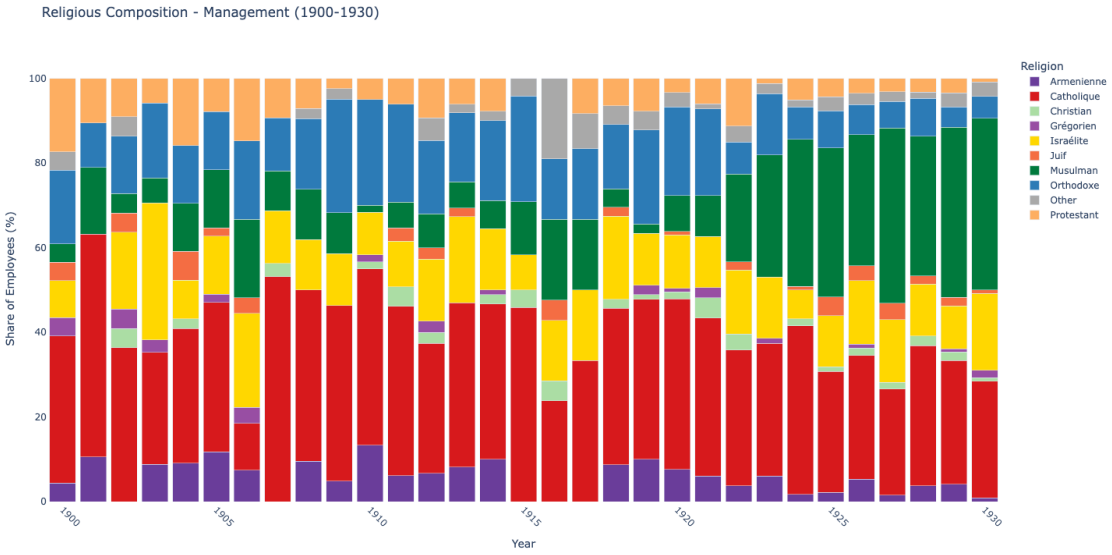


Figure A.2 Religious composition over time between job functions.

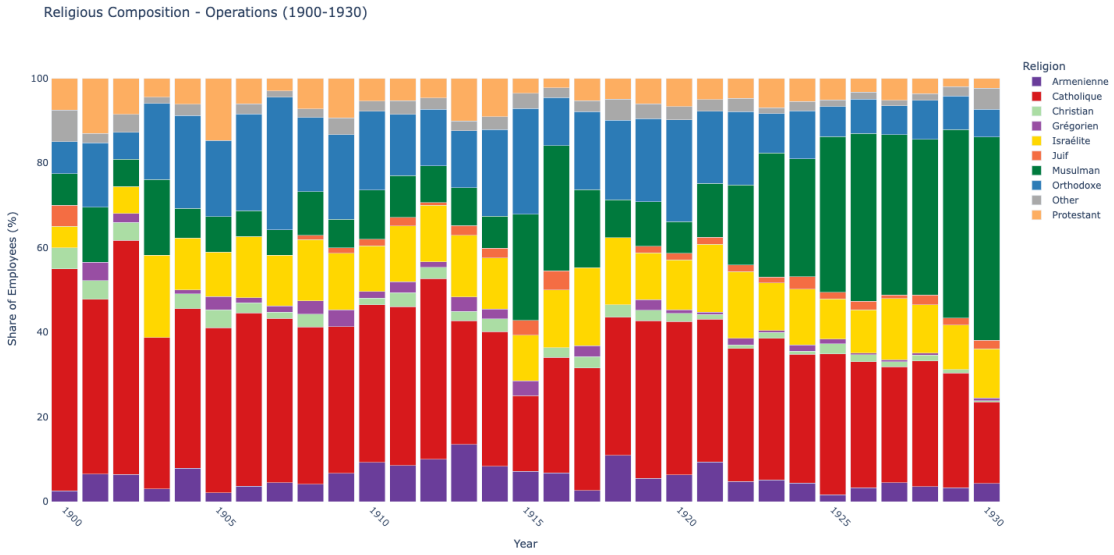


Figure A.3 Religious composition over time between job functions.

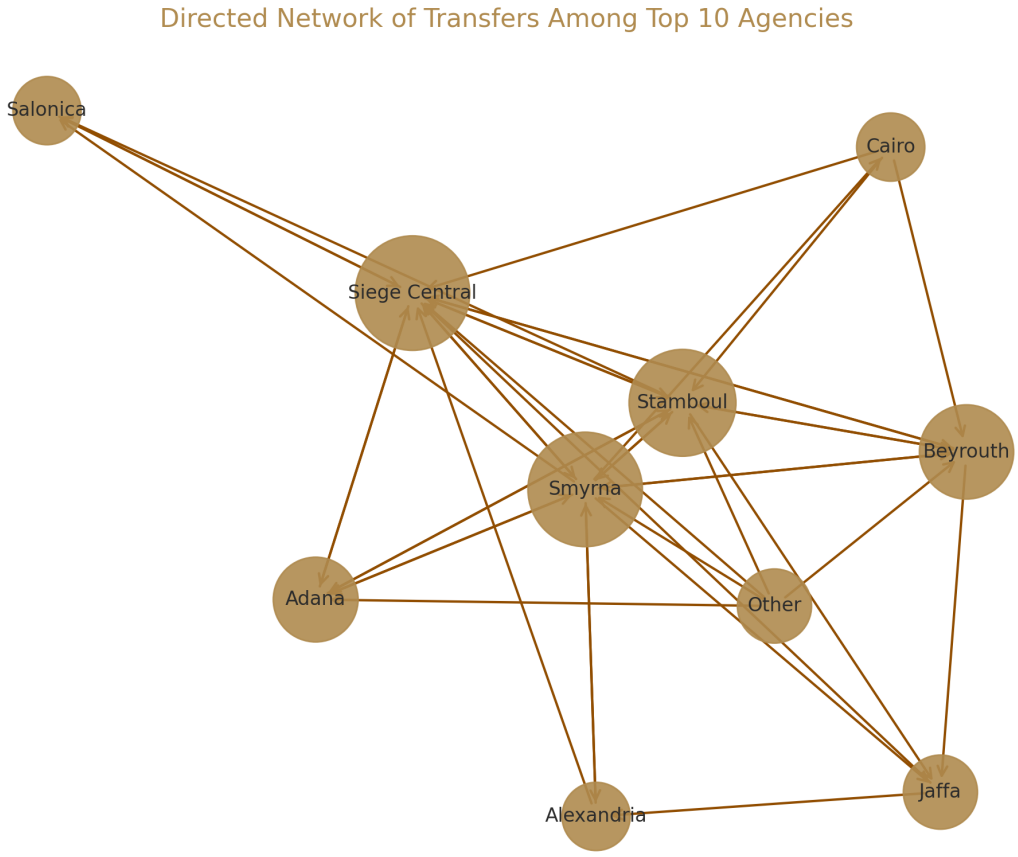


Figure A.4 Directed Network of Transfers Among the Top 10 Most Populated Agencies (1900–1926)

Table A.1 Contingency Table: Religious Groups by Historical Period

Religion	**Post-Revolution / Pre-WWI**	**Post-WWI / National Struggle**	**Pre-Young Turks**	**Republic Era**	**WWI**
Armenienne	159	188	96	195	73
Catholique	678	948	622	1719	310
Christian	40	50	44	81	27
Grégoiran	34	28	25	33	7
Israélite	227	355	189	681	135
Juif	26	38	12	120	10
Musulman	191	482	192	2284	131
Orthodoxe	349	562	283	490	188
Other	40	71	34	142	36
Protestant	128	150	136	192	64

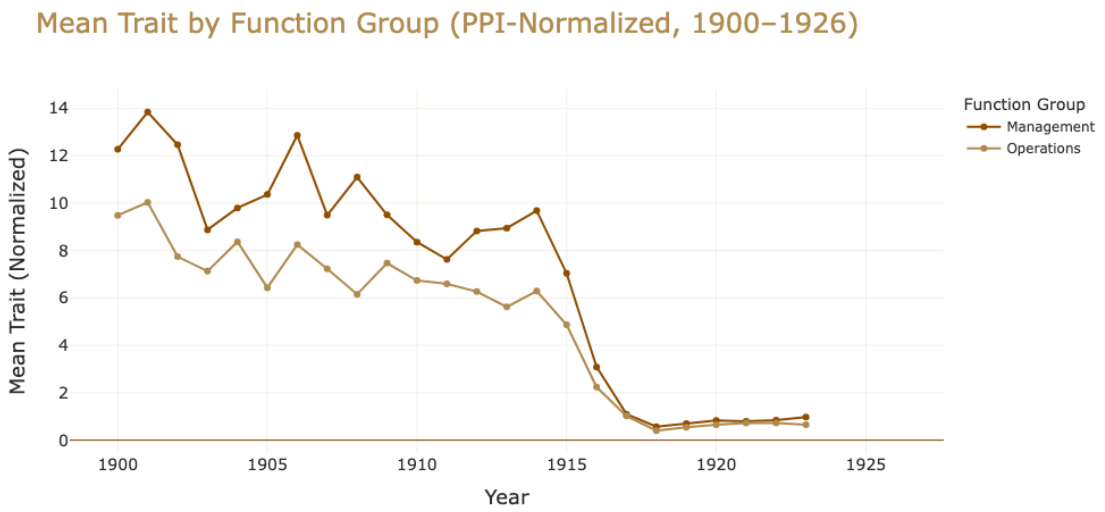


Figure A.5 Mean wages by function group normalized by Purchasing Price Index.

Figure A.6 How wages differ between people who transferred different number of times.