



Analysis of International Labour Force in Türkiye: 2015–2024

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Abstract

This study aims to analyse the number of work permits issued to international workers within the Turkish labour system between 2015 and 2024. The study was conducted using time series-based growth analysis, a quantitative research method. Work permit reports published by the Ministry of Labour and Social Security for the years 2015–2024 were analysed for changes based on gender, education level, sector, nationality, and province. The same data was analysed using the Compound Annual Growth Rate (CAGR) to predict the expected change in work permit numbers between 2025 and 2029. The research revealed that work permits issued to international workers within the Turkish labour system experienced a linear increase, except in 2020, with the number of work permits increasing approximately fivefold between 2015 and 2024. The forecast models indicate that this linear increase will continue between 2025 and 2029, reaching a level of 707,000 work permits according to the CAGR model at the end of the five-year period.

Keywords: International Labour Force, Foreign Workers, Work Permit, CAGR

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INTRODUCTION

The concrete indicator of a country's economic human resources consists of the quantity and quality of its workforce. Current labour market dynamics are determined by the total labour supply resulting from developments in the country's population and labour demand, which is an indicator of economic conditions (Kepenek and Yentürk, 2000). The International Labour Organisation (ILO) defines the concept of labour force as 'the population of working age (15 years and above) who are economically active or wish to be economically active during a specific reference period' (ILO, 2023). Under the ILO's definition, the labour force includes not only those who are employed but also those who are actively seeking work and are ready to work. According to the ILO (2025), the basic components of the labour force are:

- Employed persons: those who are employed or self-employed, unpaid family workers, and those who are absent from work for specific reasons.
- Unemployed persons: individuals who do not have a job during a specific reference period, are actively seeking work, and are currently available for work.

Societies strive to transform their citizens into productive members of society and the labour force through educational processes. In this context, the labour force is largely national in nature and consists of a country's own citizens.

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However, throughout history, workers from outside a nation's own elements have always been present in the labour force. This group within the labour force is referred to as 'Foreign Workers' or, more recently, 'International Labour Force'. According to the Turkish Language Association, the definition of the word 'foreign' is 'a person from another nation, a person who is a citizen of another state, a person or thing related to another nation, a person or thing that is not from one's family or environment, unknown, unfamiliar; a stranger, someone who is not of the same type or kind, someone who has no knowledge or experience in a particular subject, someone who is not specific to a particular place or person' (TDK, 2025). As a legal term, the concept of foreigner is defined as 'persons who do not have the right to claim citizenship of a state' (Ministry of Justice of the Republic of Türkiye, 2025). According to Law No. 5901 on Turkish Citizenship, a foreigner is defined as 'a person who has no citizenship ties with the Republic of Türkiye' (Law No. 5901, Article 3/d; Ergin, 2018).

In the Turkish legal system, the legal regulations on work permits for foreigners aim to ensure that employment is provided in a legal and controlled manner, while also preventing unregistered work, integrating the existing segment into the economy, and preventing unemployment (Kral, 2006). In this context, Law No. 4817 on Work Permits for Foreigners came into force on 27 February 2003 (YÇİHK., 2003).

Law No. 4817, which came into force in 2003 and contained regulations on the employment of foreigners within the Turkish labour system for many years, was repealed in 2016 with the adoption of Law No. 6735 on International Labour Force. There are various reasons underlying the need for a new law. Law No. 4817 only regulated individual work permits for foreigners. Over time, the changing migration structure and labour force profile in our country created a need to broaden the scope. The inadequacy of specific regulations for different categories, such as skilled migration, investors, international students, and researchers, necessitated a new law (Demir, 2017). In particular, the influx of migrants to our country following the Syrian civil war after 2011 has created new needs in the foreign labour market (İçduygu & Millet, 2016). For all these reasons, Türkiye aims to increase its ability to attract high-quality labour at an international level (Çelikel & Öztekin-Gelgel, 2024).

Within the Turkish legal system, workers who were classified as 'foreign labour' prior to 2016 became 'international labour' with the enactment of the International Labour Force Law No. 6735 in 2016. According to the International Labour Force Law, the term "foreign" refers to 'a person who does not have citizenship ties with the Republic of Türkiye.' The law, which regulates the procedures and principles to be followed in the processing of work permits for foreigners, as well as the authorities and responsibilities and the rights and obligations in the field of international labour, does not include the term 'foreigner' in its title, but instead uses the term 'international labour'. For this reason, it would be appropriate to interpret the term 'foreign' from the concept of 'international' in the name of the law (Eksi, 2016; Kavlak, 2019).

After Law No. 6735 came into force, the Regulation on the Implementation of the Law on Work Permits for Foreigners, which was valid under the law, continued to be applied for a while. The new regulation issued under Law No. 6735 on International Labour Force only entered into force on 02.02.2022. The new regulation, the 'Regulation on the Implementation of the International Labour Force Law,' has been in force since that date. There are various reasons behind the delay in the new regulation (Ergin, 2016). The transition process in the preparation of the regulation was influenced by developments such as the need to revise the labour market as a result of increasing mass migration movements, the process of harmonisation with international standards (European Commission, 2015), and the COVID-19 pandemic (Ergin, 2016).

Article 6 of the regulation outlines how the international labour force policy will be implemented. In order to prevent foreign labour from negatively affecting employment in the country and to minimise any potential negative effects, policies will be developed based on the implementation of the policy, with the aim of prioritising the domestic labour force to meet Türkiye's labour needs, while also aiming to utilise qualified labour by ensuring a balance between domestic and foreign labour without undermining the sustainability of national employment policies (UİKUYön. m.6/f.1).

According to Law No. 6735 on International Labour Force, foreigners who apply to work in Türkiye or who are working, who apply to work for an employer for the purpose of vocational training or who are currently working, who are currently doing an internship or who have applied for an internship, and foreigners who provide temporary services in Türkiye and real and legal persons who have applied to employ foreigners or who employ foreigners are covered by this law (Law No. 6735, Article 2/f.1). Foreigners covered by the law cannot work in Türkiye without a work permit. Therefore, their work is subject to certain conditions and permits (Yilmaz, 2007). The ‘Work Permit and Exemptions’ section, which constitutes the third part of Law No. 6735, regulates the work permits and exemption statuses of foreigners. Here, the work permit in question is defined as ‘a permit issued by the Ministry in the form of an official document and granting the foreigner the right to work and reside in Türkiye within its period of validity’, while work permit exemption is defined as ‘an exemption issued by the Ministry in the form of an official document and granting the foreigner the right to work and reside in Türkiye without obtaining a work permit within its period of validity’ (Law No. 6735, Article 3/f.1). The competent Ministry responsible for issuing the work permit referred to in the law is the Ministry of Labour and Social Security (Law No. 6735, Article 3/f.1-b). If the foreign national applying for a work permit is to submit their application from within the country, they must submit it directly to the relevant Ministry. However, if the application is to be made from abroad, it must be submitted to the embassy or consulate in the relevant country or to an authorised intermediary institution. After the application is made, it is forwarded to the relevant Ministry (Law No. 6735, Article 7/f.1; Demirkol, 2018).

The fundamental principle governing the employment of foreigners in Türkiye is that foreigners, except those covered by exemptions, must obtain permission before starting work. Therefore, the basic principle is not freedom of employment for foreigners, but rather the requirement to obtain permission (Aybay, 2010). There is an exception to this rule for foreigners who are prohibited from working in Türkiye without a work permit or work permit exemption. Accordingly, ‘the right to work is reserved for those covered by Article 28 of Turkish Citizenship Law No. 5901’ (Law No. 6735, Article 6/f.4). This means that those who have acquired Turkish citizenship by birth or who have renounced their Turkish citizenship with an exit permit may work in Türkiye without obtaining a work permit or work permit exemption documents (Doğan et al., 2024).

Under Law No. 6735, work permits for foreigners are divided into five categories: temporary work, permanent work, independent work, exceptional work permits, and the Turquoise Card (Aslantürk & Tunç, 2018). For foreigners with work permits and work permit exemptions, these documents also serve as residence permits. Therefore, they do not need to apply for a separate residence permit. However, a residence permit does not automatically grant work permit rights to foreigners who do not have refugee or subsidiary protection status. In this case, foreigners in this group can only work if they apply for a ‘work permit’. The residence permits of foreigners with temporary protected or conditional refugee status are also considered work permits (Ekşi, 2016).

The ‘Turquoise Card’ scheme plays an important role in the work permits of foreigners within the Turkish labour market. It is used as a work permit tool to attract highly qualified labour and investors to our country, as well as to increase capacity in R&D, science, technology and strategic areas. At this point, it can be described as ‘skilled migration,’ similar to the European Union’s Blue Card (Karagül, 2019; Tunçağıl, 2017). The Turquoise Card, one of the innovations introduced by Law No. 6735, is a scheme that facilitates both the residence and employment of foreigners in the country. The Turquoise Card is a regulation that aims to benefit the country by providing convenience to foreigners who can contribute to both the country’s economy and science (Çelikel & Öztekin-Gelgel, 2024).

The Turquoise Card application is regulated in Article 11 of the International Labour Force Law. Accordingly, ‘In line with international labour force policy, the Turquoise Card shall be granted to foreigners whose applications are deemed appropriate based on their level of education, professional experience, contribution to science and technology, the impact of their activities or investments in Türkiye on the country’s economy and employment, the recommendations of the International Labour Force Policy Advisory Board, and the procedures and principles determined by

the Ministry.' (Law No. 6735, Article 11/f.1). The Turquoise Card is a qualified migration tool that grants foreigners the legal right to work indefinitely and also grants residence rights to their families. However, it is subject to performance and supervision during the first three years and has a transition period. At the end of the three-year transition period, following a positive evaluation, it becomes a permanent card (Karagül, 2019; UİGM, 2025a). In the Turquoise Card scheme, which plays a significant role in attracting qualified labour to the country, the qualified foreigner referred to is: foreigners with internationally recognised academic work, those who have excelled in a field considered strategic for our country in science, industry and technology, or foreigners who contribute or are expected to contribute to the national economy in terms of export, employment or investment capacity. Therefore, foreigners with temporary protection status are excluded from the provisions of the Turquoise Card (Law No. 6735, Article 11/f.5-6; Ayan, 2018).

Foreigners who will work in Türkiye within the scope of the international workforce cannot work in the country solely by obtaining a work permit. At this point, after obtaining a work permit, they must also meet all the conditions required by law in order to start the job and profession they wish to work in. Furthermore, if the desired job or profession is reserved exclusively for citizens of the country, foreigners must not engage in these jobs or professions. Work areas related to public security, public health, public order, and public benefit are evaluated within this scope (Tekinalp, 2003; Çelikel & Öztekin-Gelgel, 2024).

The International Labour Force Law No. 6735 contains regulations regarding work permits for foreigners but does not provide a list of occupations that foreigners should not engage in. The occupations that foreigners should not engage in are regulated by sector-specific laws and various regulations. In this regard, the resulting confusion is addressed by the 'General Directorate of International Labour Force' under the Ministry of Labour and Social Security, which has implemented an official list titled 'Occupations Reserved for Turkish Citizens' (UİGM, 2025b). This list announces the occupations and positions reserved for Turkish citizens by law and prohibited for foreigners to work in. These professions include: private security guards, financial advisors, dentistry, pharmacy, notaries, lawyers, judges and prosecutors, customs consultant assistants, mediators, honorary traffic inspectors, sports consultants, health profession service unit managers-licence holders, ship agency representatives and ship agency personnel, agricultural labour brokers, trainee aviation information management officers, foreign assistants working outside of specialist training, veterinary medicine, founders, managers, trainers for private security companies, and representatives authorised by the company's legal entity partner, founders of schools established by foreigners that teach in languages other than Turkish, responsible directors in private hospitals, market and neighbourhood watchmen, transport organisers, permanent supervisors and technical staff are among the professions prohibited on the list (UİGM, 2025b). When establishing the current prohibitions under the law, public authority and the establishment of justice, public safety and security, public health, local legal responsibility and national transport, and guidance regimes were taken into account.

The concept of migration is among the leading factors that exert pressure on countries' labor markets. Conceptually, migration refers to the processes through which individuals temporarily or permanently leave their places of residence and move to another country under the influence of multidimensional factors such as economic, social, political, and religious drivers (Budak, 2025). Migration is a multilayered phenomenon shaped by the interaction of economic, social, and cultural dynamics (Kara et al., 2025; Massey et al., 1993).

In countries receiving high levels of migration, low- and medium-skilled segments of the labor market are increasingly sustained by migrant workers due to lower labor costs. Migrant workers play a critical role in preventing production losses by filling labor-intensive sectors such as agriculture, construction, and manufacturing (ILO, 2024). However, their presence may also exert downward pressure on wages, particularly for low-skilled native workers (OECD, 2018). For countries with aging population structures, migrant labor serves a vital function in alleviating labor shortages and sustaining economic activity (OECD, 2020). From the perspective of migrant-sending countries, the continuous outflow of highly skilled labor may entail significant risks, including the loss of human capital and the weakening of institutional capacity (Docquier & Rapoport, 2012). Conversely, for receiving countries,

skilled migration enhances innovation capacity and strengthens research and development activities, thereby increasing competitiveness in fields such as technology, healthcare, and engineering (Clemens, 2011).

Since the 2010s, Türkiye has undergone a transformation from a migration-sending country to a migration-receiving one, a shift that has been substantially accelerated by forced migration flows (İçduygu, 2014). Migration triggered by the Syrian conflict has been particularly influential in this process. While Syrian migration has not led to a large-scale displacement of native employment, it has contributed to downward wage pressures and greater labor market flexibilization (Lordoğlu & Aslan, 2016). Syrian migrants are predominantly employed in agriculture, construction, textiles, and service sectors (ILO, 2020).

International labour in the Turkish labour system has been growing steadily in recent years. One of the most important indicators for international labour, which is bound by certain standards and requirements through laws and regulations, is the number of work permits. In this context, the study examined work permit data published by the Ministry of Labour and Social Security for the years 2015-2024 in order to understand the place, development and future position of international labour in the Turkish labour system. The current situation was analysed using ten years of data, and future projections were analysed using time series forecasting models.

METHOD

The study was conducted using time series-based growth analysis, a quantitative research method. To summarize long-term trends in time series data, mitigate the impact of interannual fluctuations, and create a 5-year forecast model, the Compound Annual Growth Rate (CAGR) was calculated (Damodaran, 2012). Within the scope of the research, the Work Permit Statistics published annually by the Ministry of Labour and Social Security (MLSS) were examined. The study sought to answer the following research questions:

- **RQ1.** How did the number of work permits change between 2015 and 2024 based on gender, education level, sector, nationality and province?
- **RQ2.** How can a 2025-2029 work permit forecast model be created using the work permit data from 2015-2024?

RESULTS

Work permit data for the 10-year period between 2015 and 2024, obtained from the ÇSGB (2025) reports within the scope of the international labour force analysis, were used. First, the data was analysed for changes between 2015 and 2024, and then time series modelling was used to predict changes for the next five years, from 2025 to 2029.

RQ1. How did the number of work permits change between 2015 and 2024 based on gender, education level, sector, nationality and province?

The 10-year change in work permits issued to the international workforce in Türkiye was analysed based on gender and total value.

Table 1. Number of work permits by gender and total between 2015 and 2024

Year	Female		Male		Increase		Total
	Number	%	Number	%	Number	%	
2015	37.621	58,3	26.899	41,7	12.217	23,3	64.521
2016	35.601	48,4	37.948	51,6	9.028	14,0	73.549
2017	37.756	43,3	49.426	56,7	13.633	18,5	87.182

2018	48.087	41,5	67.750	58,5	28.655	32,9	115.837
2019	50.690	34,9	94.542	65,1	29.395	25,4	145.232
2020	41.853	33,9	81.721	66,1	-21.658	-14,9	123.574
2021	48.371	28,8	119.732	71,2	44.529	36,0	168.103
2022	57.829	27,2	154.853	72,8	44.579	26,5	212.682
2023	66.299	27,6	173.536	72,4	27.153	12,8	239.835
2024	87.361	29,0	213.491	71,0	61.017	25,4	300.852

When examining the 10-year change in work permit numbers, a 466% increase is observed between 2015 and 2024. In other words, the number of work permits has increased nearly fivefold over the 10-year period. The highest increase rate was 36% in 2021, and there was a one-off decrease of 14.9% in 2020. This decrease appears to be due to the nationwide lockdown measures implemented because of the pandemic. Apart from 2020, there has been a steady increase in the number of work permits over the last 10 years.

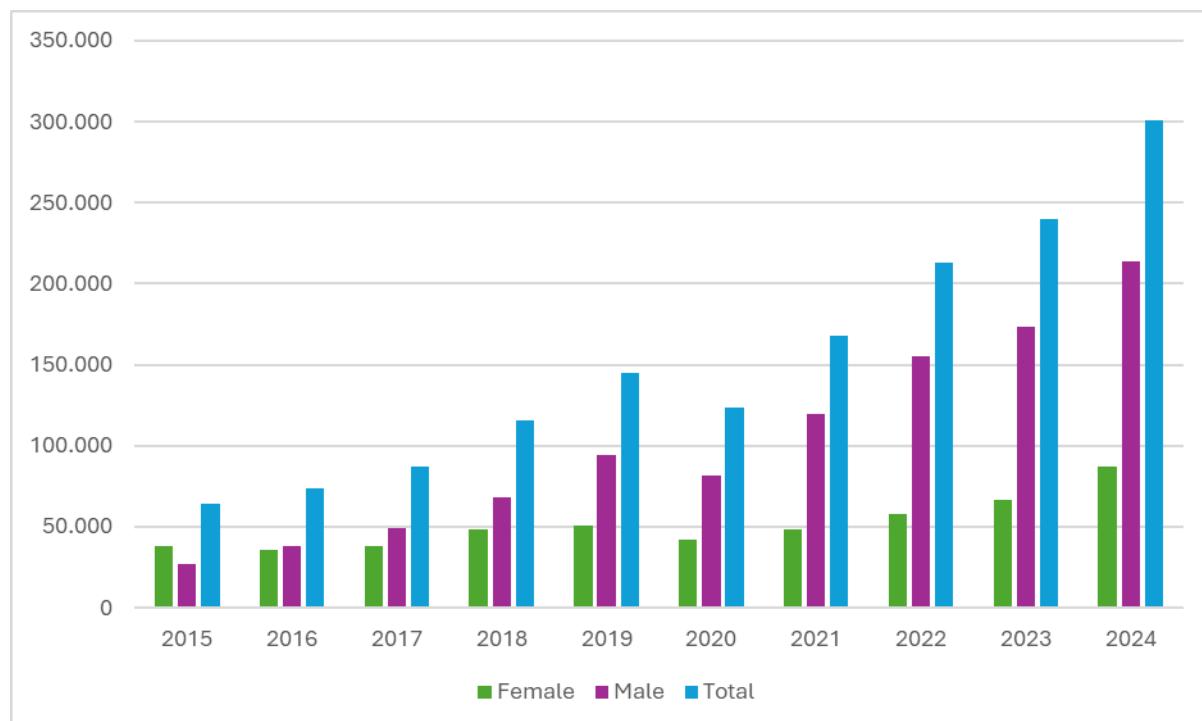


Figure 1. Number of work permits by gender between 2015 and 2024

When the data in Table 1 is examined on the column chart, it can be seen that the number of women was higher than the number of men in 2015. From this year onwards, the number of men steadily increased its proportion within the work permits until 2022. Although there were small proportional improvements in the number of women in 2023 and 2024, it can be seen that almost two out of every three work permits were for men.

Table 2. Number of work permits granted by level of education between 2015 and 2024

		Literate	Primary school	Middle school	High school and equivalent	Associate degree	Bachelor's degree	Master's degree ^{**}	Doctorate	Unknown	Total
2015	Female	2.627	730	4.204	15.992	3.149	10.206	723	*	7	37.638
	Male	1.333	1.087	1.931	8.701	2.704	9.940	1.212	*	1	26.909
	Total	3.960	1.817	6.135	24.693	5.853	20.146	1.935	*	8	64.547
2016	Female	1.033	597	3.993	16.215	2.706	9.786	195	*	1.081	35.618
	Male	1.209	549	2.581	11.227	4.356	11.931	345	*	5.756	37.958
	Total	2.242	1.146	6.574	27.442	7.062	21.717	540	*	6.837	73.560
2017	Female	995	510	3.879	17.168	2.543	10.823	59	*	1.779	35.618
	Male	1.801	617	3.607	14.314	4.106	13.078	225	*	11.678	37.958
	Total	2.796	1.127	7.486	31.482	6.649	23.901	284	*	13.457	87.182
2018	Female	3.977	109	5.054	21.590	549	11.586	103	*	5.117	48.085
	Male	6.772	193	3.299	16.420	683	15.435	318	*	24.632	67.752
	Total	10.749	302	8.353	38.010	1.232	27.021	421	*	29.749	115837
2019	Female	5.864	884	4.939	22.288	2.054	12.240	1.365	*	1.056	50.690
	Male	18.761	8.402	10.539	26.807	2.803	17.290	2.305	*	7.635	94.542
	Total	24.625	9.286	15.478	49.095	4.857	29.530	3.670	*	8.691	145.232
2020	Female	4.046	905	6.291	17.810	1.206	9.371	1.285	*	939	41.853
	Male	17.630	8.464	10.430	18.772	1.815	14.350	2.062	*	8.198	81.721
	Total	21.676	9.369	16.721	36.582	3.021	23.721	3.347	*	9.137	123.574
2021	Female	255	2.669	6.059	21.124	1.818	13.179	1.977	*	1.290	48.371
	Male	960	28.470	19.660	29.767	2.842	19.007	3.009	*	16.017	119.732
	Total	1.215	31.139	25.719	50.891	4.660	32.186	4.986	*	17.307	168.103
2022	Female	*	3.970	5.679	24.422	2.333	16.712	2.522	772	1.419	57.829
	Male	*	38.658	27.542	43.080	3.367	21.996	3.103	1.247	15.860	154.853
	Total	*	42.628	33.221	67.502	5.700	38.708	5.625	2.019	17.279	212.682
2023	Female	*	3.923	7.557	29.711	2.900	18.079	3.273	822	34	66.299
	Male	*	45.144	36.197	56.264	4.221	25.740	4.338	1.614	18	173.536
	Total	*	49.067	43.754	85.975	7.121	43.819	7.611	2.436	52	239.835
2024	Female	*	4.833	11.617	41.545	3.973	20.777	3.826	790	0	87.361
	Male	*	53.721	43.559	76.018	5.328	28.480	4.870	1.515	0	213.491
	Total	*	58.554	55.176	117.563	9.301	49.257	8.696	2.305	0	300.852

* No data is available for these categories for the relevant years.

** Master's and Doctorate degrees from 2021 and earlier have been placed in the same category.

When examining educational levels, it is observed that the highest number in all years falls within the Secondary School and equivalent category. While the Bachelor's degree level was the second highest educational level until 2021, a sudden increase was observed at the Primary School level in 2022, and after 2022, the second highest educational level is seen to be the Primary School level. Percentage changes in educational levels by year are shown in Figure 2.

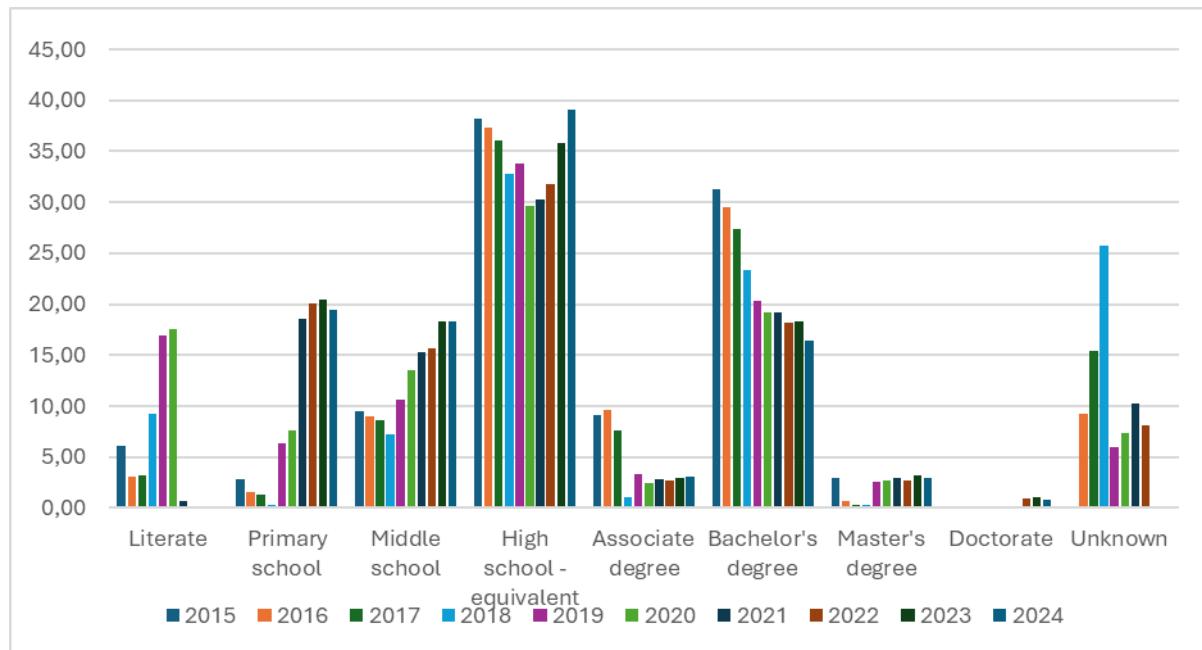


Figure 2. Number of work permits granted by level of education between 2015 and 2024

When examining the graph, it can be seen that the secondary school level follows an uneven curve but remains at the highest proportional level throughout all years. The primary and middle school levels increased their proportional weight after 2018, while the undergraduate level has been decreasing its proportional weight since 2015.

Another feature evaluated in the analysis is the nationality of those who have obtained work permits. Within the scope of the analysis, the 10-year data of the 10 countries with the highest number of work permits as of 2024 has been examined.

Table 3. Number of work permits granted by nationality between 2015 and 2024

		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Syria	Order	4	1	1	1	1	1	1	1	1	1
	Total	4.01	13.29	20.96	34.57	63789	62.36	91.50	113.208	108.52	117.33
Turkmenista n	Order	5	5	6	5	4	2	2	3	3	2
	Total	3.32	3.471	3.847	5.547	6.128	9.721	7.850	8.962	13.128	32.276
Russia	Order	6	8	10	10	8	7	3	2	2	3
	Total	2.93	1.966	2.390	2.944	3.922	3.124	6.253	11.561	17.785	17.267
Uzbekistan	Order	7	7	8	6	6	4	8	9	5	4
	Total	2.31	2.436	2.465	3.969	4.480	4.383	3.912	4.677	8.437	15.644
Kyrgyzstan	Order	3	6	3	2	2	6	5	5	6	5
	Total	4.27	3.048	6.359	13.45	11.00	3.505	4.570	6.648	8.187	10.869
Iran	Order	12	13	13	11	7	5	4	4	4	6
	Total	1.52	1.785	1.930	2.689	3.935	4.015	5.072	6.905	8.521	10.466
Indonesia	Order	9	12	12	12	11	16	11	8	10	7
	Total	1.90	1.829	1.956	2.356	2.704	1.417	2.871	4.722	5.607	8.930
Kazakhstan	Order	14	14	16	15	10	18	15	7	7	8
	Total	1.34	998	1.352	1.799	2.860	961	2.051	4.742	6.457	8.597
Afghanistan	Order	37	31	23	22	17	9	10	10	8	9
	Total	305	444	609	894	1.466	1.921	2.923	4.493	6.204	8.335
Azerbaijan	Order	13	9	9	8	9	8	9	6	9	10
	Total	1.46	1.880	2.449	2.997	2.977	2.945	3.612	4.957	6.036	7.560
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Table 3 shows that Syrian nationals ranked first in nine out of the ten-year period. In 2024, the countries in the top ten have fluctuated between the top ten and twenty in previous years, with Afghanistan being the sole exception. Workers from neighbouring countries or countries with shared ethnic heritage predominate, with the notable exceptions of Indonesia and Afghanistan. Despite the geographical distance, Indonesian workers have consistently ranked high over the past 10 years. Afghan nationals have risen to the top ranks since 2020. Russia stands out from other countries due to the Akkuyu Nuclear Power Plant Project. Apart from these, countries such as Ukraine, Georgia, and Bulgaria, which are not included in the table, have been in the top ranks over the past 10 years but have fallen to the lower ranks in the last 4-5 years.

Another analysis examined the 10-year data and changes in work permit rankings for the 10 provinces with the highest number of work permits in 2024.

Table 4. Number of work permits issued by province between 2015 and 2024

		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
İstanbul	Order	1	1	1	1	1	1	1	1	1	1
	Total	22.94	27.63	31.55	42.75	60.58	58.30	72.44	82.147	83.42	103.025
Antalya	Order	2	3	2	2	2	3	2	2	2	2
	Total	14.26	9.818	14.71	23.66	26.34	8.277	15.91	22.10	27.56	35.953
Mersin	Order	10	8	7	7	7	6	6	4	3	3
	Total	759	1.358	2.119	3.253	4.048	4.867	8.025	13.55	22.10	30.079
Bursa	Order	6	6	5	5	3	2	3	3	4	4
	Total	1.915	3.062	4.298	5.269	8.609	8.871	12.88	16.20	17.23	18.296
Ankara	Order	3	2	3	3	4	4	5	6	5	5
	Total	9.260	9.888	9.227	9.274	8.522	7.781	9.139	10.58	12.61	15.121
Gaziantep	Order	8	5	6	6	5	5	4	5	6	6
	Total	1.113	3.111	3.497	4.846	6.127	6.262	9.292	13.11	12.26	14.879
İzmir	Order	4	4	4	4	6	7	7	7	8	7
	Total	3.126	4.314	5.336	5.967	4.862	4.632	50.79	6.354	7.552	8.733
Kocaeli	Order	9	9	9	11	12	9	8	8	7	8
	Total	930	1.046	1.331	1.515	1.838	2.132	3.404	6.080	8.157	8.250
Konya	Order	13	14	13	13	9	8	9	9	9	9
	Total	429	546	876	980	2.247	2.335	3.268	4.728	5.888	6.881
Muğla	Order	5	7	8	8	8	12	10	10	10	10
	Total	2.029	1.624	2.090	3.005	3.541	1.450	2.755	3.574	4.917	6.635

Table 4 shows that the workforce is distributed normally across Türkiye's most populous provinces. İstanbul, Türkiye's largest city, has been the province with the highest number of work permits issued over the past decade. Antalya, Türkiye's most important province in terms of tourism, stands out on the list alongside İzmir, Ankara, and Bursa, which are among the most populous cities, and Kocaeli, an industrial province. Mersin has a distinctive feature in the table. Due to the Akkuyu Nuclear Power Plant Project, it has been receiving an increasing number of work permits over the last ten years. Although not visible in the table, Çanakkale was similarly ranked high between 2015 and 2018 due to the Çanakkale 1915 Bridge Project.

The final criterion in the work permit analysis is sectors. The ten-year change in the ten sectors with the highest number of work permits was analysed.

Table 5. Number of work permits issued by sector between 2015 and 2024

		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Accommodation	Order	2	2	2	1	1	4	3	1	1	1
	Total	10.50	6.556	10.43	20.16	23.10	6.915	11.71	18.785	22.747	31.785
Domestic workers	Order	1	1	1	7	2	1	1	3	2	2
	Total	16.82	17.02	15.61	3.538	16.76	23.62	18.83	15.14	17.151	25.165
Construction of non-residential buildings	Order	5	7	5	4	14	13	10	7	4	3
	Total	2.704	3.112	4.365	5.323	2.183	2.505	5.097	8.233	16.319	24.433
Wholesale trade	Order	4	4	3	2	3	2	2	2	3	4
	Total	2.849	4.358	5.437	8.276	11.80	9.476	13.51	16.74	16.699	18.685
Manufacture of clothing	Order	14	12	10	11	4	3	4	4	5	5
	Total	747	1.440	2.283	2.958	8.164	8.158	11.55	14.53	11.941	13.401
Manufacture of textiles	Order	19	13	11	10	8	5	5	5	7	6
	Total	517	1.347	2.272	3.101	5.091	5.359	8.160	9.777	9.798	12.275
Manufacture of fabricated metal products	Order	25	21	16	14	9	9	7	8	6	7
	Total	412	776	1.342	1.681	3.079	3.738	5.465	7.945	10.556	11.447
Retail trade	Order	9	10	8	8	6	6	6	6	8	8
	Total	1.851	1.684	2.746	3.481	5.889	4.640	6.802	8.812	9.171	10.595
Food and beverage service activities	Order	16	11	9	9	7	10	12	10	12	9
	Total	862	1.599	2.295	3.387	5.196	3.057	4.677	6.512	7.184	10.244
Building construction	Order	10	3	4	12	23	19	20	17	16	10
	Total	1.720	4.490	4.912	2.860	1.432	1.772	2.161	3.755	5.523	8.944

When examined by sector, the accommodation and domestic worker sectors are seen to be the sectors with the highest number of work permits issued over a 10-year period. Beyond this, the textile, construction and service sectors stand out. The ranking and number of domestic workers declined significantly in 2018. Similarly, the accommodation sector saw a decline in 2020 due to the impact of the pandemic. The sectoral analysis shows that the manufacturing, services and construction sectors stand out.

RQ2. How is the 2025-2029 work permit forecast model created using work permit data from 2015-2024?

Within the scope of the research question, CAGR (Compound Annual Growth Rate) analysis commonly used in time series forecasting models, were employed. The forecasting model was developed using data from 2015-2024, resulting in a 5-year forecast model for the years 2025-2029.

Compound Annual Growth Rate (CAGR)

Time series are commonly used in population, finance, economic, and other analyses to determine growth rates for a specific period, based on a stable growth index between the start and end points, without taking into account interim fluctuations (Damodaran, 2012). The analysis is considered reliable for 3-5 year periods for strategic planning and projection purposes (Brealey, Myers & Allen, 2019).

Within the scope of this study, the 10-year data set covering 2015-2024 was analysed using the Compound Annual Growth Rate (CAGR) model to estimate the number of work permits to be issued in Türkiye for international workers between 2025 and 2029. According to the analysis, which consists of a two-stage calculation, the first formula aims to determine the historical growth rate;

Stage 1:

$$CAGR (\%) = (End\ Data \div Start\ Data) ^ (I \div Year) - 1$$

The formula was applied to the data set, and the CAGR value was determined to be 0.1866. The second stage of the analysis aimed to create a forward-looking predictive model using the historical growth value.

Stage 2:

$$Future\ Value\ (FV) = Present\ Value \times (1 + CAGR) ^ Year$$

The forecast formula was applied using the historical growth rate, and the forecast data for the years 2025-2029 was analysed.

Table 6. Forecast of the number of work permits between 2025 and 2029 using CAGR analysis

Year	CAGR Formula	Estimated Work Permit
2025	$Y_{2025} = 300852 \times 1.1866^1$	356.983
2026	$Y_{2026} = 300852 \times 1.1866^2$	423.587
2027	$Y_{2027} = 300852 \times 1.1866^3$	502.617
2028	$Y_{2028} = 300852 \times 1.1866^4$	596.392
2029	$Y_{2029} = 300852 \times 1.1866^5$	707.662

Based on the CAGR analysis conducted using the increase between 2015 and 2024 as a reference, a linear increase is projected between 2025 and 2029. It is estimated that the number of work permits will exceed 700,000 in 2029.

In order to test the consistency of the model, a forecast model was created using data from 2005-2014 and 10 years of data from 2015-2024. As part of the analysis, the CAGR value for 2015-2024 was determined to be 0.2095, and a CAGR forecast model was created for the actual years.

Table 7. Number of work permits issued between 2015 and 2024 and the estimated model based on CAGR analysis

Year	Estimated Work Permit	Work Permit Issued	Difference	Deviation Ratio (%)
2015	63.265	64.521	-1.256	-1,95
2016	76.523	73.549	2.974	4,04
2017	92.559	87.182	5.377	6,17
2018	111.956	115.837	-3.881	-3,35
2019	135.418	145.232	-9.814	-6,76
2020	163.797	123.574	40.223	32,55
2021	198.122	168.103	30.019	17,86
2022	239.641	212.682	26.959	12,68
2023	289.861	239.835	50.026	20,86
2024	350.605	300.852	49.753	16,54

Upon reviewing the analysis results, it was observed that the CAGR modelling produced consistent forecasts up to 2020; however, deviations in consistency occurred following the decline caused by the pandemic and lockdowns in 2020. Despite this, a 16% deviation between the forecast and actual figures was observed for 2024. Considering that the situation in 2020 was a global event affecting the entire world, it can be said that the modelling produced consistent results. The 2005-2014 forecast model showed a deviation rate of 3.69% in the five years prior to 2020 and a deviation rate of 9.87% for the model as a whole.

CONCLUSION and DISCUSSION

When examining the changes in work permits within the scope of the international workforce in Türkiye, it is seen that, although the proportion of female workers was higher in 2015, the proportion of male workers increased significantly in subsequent years. The gender balance has shifted slightly in favour of women over the last two years. Over the ten-year period, work permits increased nearly fivefold, with an average annual proportional increase of 20%.

When examining the distribution of work permits by education level, the highest proportion is at the secondary school level. In particular, the proportional increase in lower education levels in recent years is striking. It would not be wrong to say that this situation is a result of the search for labour-intensive labour instead of knowledge-intensive labour. It is seen that this need, which is difficult to meet from the national labour market, is being attempted to be filled with international labour. The slight proportional increase at the postgraduate level after 2022 is also noteworthy. Although numerically and proportionally low, an increase at the postgraduate level has been observed.

In the analysis of work permits by nationality, the dominance of neighbouring countries and countries with Turkish ethnic ties is particularly striking. Due to the impact of Syrian refugees in Türkiye, the highest number of nationalities is Syrian. The number of Iranian workers in the neighbouring category is also noteworthy. Georgia and Bulgaria have also occasionally ranked high within the ten-year data period. The most striking result in the nationality-based assessment is Indonesian workers. Despite being geographically very distant, Indonesia consistently ranks high in the work permit data set. Another important result is the noticeable proportional and numerical increase in Afghan workers. The country that stands out from other countries in the nationality-based assessment is Russia. Russia, which has consistently ranked high over the ten-year period, has experienced a significant leap in terms of ranking and numbers, especially in recent years. The fact

that the Akkuyu Nuclear Power Plant Project is being carried out by Russia has had a major impact on this situation.

In the province-based evaluation, results directly related to population are seen, and again, the impact of the Akkuyu Nuclear Power Plant Project is noticeable in the province of Mersin. Apart from this, Antalya and Muğla, which are tourism centres, and Bursa and Kocaeli, which have an important place in the manufacturing industry, are ranked at the top. Istanbul is the province with the most work permits issued, directly related to its population. Ankara and Izmir are also ranked at the top as Türkiye's major metropolitan cities.

In the sector-based assessment, accommodation, domestic workers and wholesale trade stand out from other sectors. These three sectors have consistently ranked among the top three. Furthermore, as a major textile country, Türkiye also stands out in terms of work permit numbers in the textile sector. The clothing manufacturing and textile products manufacturing sectors have gained a strong position over the past 10 years. Similarly, in the construction sector, a significant number of work permits are obtained for building construction and non-building construction. Overall, the international workforce in Türkiye has experienced a significant numerical increase over the last 10 years. Although there have been no major transformations in terms of nationality, province, and sector, a striking transformation has been observed in terms of education level.

The model, projected for the years 2025-2029, also shows linear growth. A steady increase in the number of work permits is predicted over the next five years. According to the Compound Annual Growth Rate (CAGR) model, the number is projected to reach 707,000 in 2029. The estimated model also shows that the international workforce in Türkiye will continue to grow and develop within the workforce over the next five years. Reports published on Continental Europe show that the international labour force ratio is increasing every year (CaixaBank Research, 2025; European Central Bank, 2023; European Central Bank, 2025; OECD, 2024). It is observed that developments in the international labour force in Türkiye are similar to those in European countries. International population mobility has been occurring in recent years due to wars, waves of migration, epidemics, ageing populations, etc., and as a natural consequence, increases in the international workforce are being seen at the European level.

Ethical Approval: This study uses publicly available data as its data source. Therefore, it is outside the scope of ethical approval.

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