WORKING PAPERS

N° 1700

January 2026

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Capturing the positive effects of brain drain through return migration policies: An analysis of the 1980-2022 Moroccan experience[+]

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Abstract

The emigration of highly educated and skilled individuals from low- and middle- to high-income countries has often been synonymous with human capital losses for the countries of origin, a phenomenon known as "brain drain" (Bhagwati and Hamada, 1974). However, under some conditions, these losses can be offset by human capital formation in the source countries precisely due to emigration. In this case, one talks about "beneficial brain drain" and this phenomenon has been coined "brain gain" (Stark et al., 1997, 1998). Using data on the Kingdom of Morocco covering the 1980-2022 period, we investigate the extent to which the government drew economic benefits from an important population of Moroccans living abroad by implementing return migration policies. More specifically, we explore the effects of measures targeting the Moroccan diasporas and their contributions to the Kingdom's economy on (i) the attractiveness of the Kingdom for foreign investors; (ii) the quality and capacity of the country's commercial air and maritime transport infrastructure; and (iii) the level of modernization of its public administration. The data analysis shows that these measures had a positive impact on each of these key dimensions of development, suggesting that this type of policies can be effective in capturing some of the "brain gain" effects that have been highlighted in the empirical literature on the relationship between emigration and development in developing countries (Beine et al., 2001, 2008; Batista et al., 2025).

Keywords: Kingdom of Morocco; Brain drain; Brain gain; Return migration policy; Foreign investment; Commercial transport; Public administration.

JEL classification codes: F21, H54, J24, O11, O15, O55.

January 2026

[+] Corresponding author: Farid Gasmi, farid.gasmi@tse-fr.eu. We thank Kolotioloma I.H. Yéo for help in collecting parts of the data used in this paper, and Ablam E. Apeti and Munyaradzi Chidakwa for useful comments and suggestions on an earlier draft. Farid Gasmi acknowledges support from the French National Research Agency (ANR) under the Investments for the Future (Investissements d'Avenir) program, grant ANR-17-EURE-0010. The views expressed are only those of the authors and do not necessarily reflect those of the institutions they are affiliated to.

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1. Introduction

The emigration of highly skilled and educated individuals from low-income and lower-middle-income countries to OECD countries has often been associated with negative effects on the countries of origin stemming from the loss of human capital. This is commonly referred to as "brain drain," BD hereafter. This phenomenon is grounded in several mechanisms: skilled emigration can reduce the supply of critical services, for example health care (Adovor et al., 2021), weaken productivity complementarities between skilled and unskilled labor (Gibson and McKenzie, 2011), and generate fiscal losses when publicly financed education yields returns abroad rather than at home (Bhagwati and Hamada, 1974).

At the same time, such flow of population may also lead to positive effects through mechanisms based on, among others, return migration and knowledge transfer (Batista et al. 2025).[1] When these two opposing effects aggregate into a net positive effect for the countries of origin, the outcome is referred to as "brain gain," BG hereafter. The shift from BD to BG is not automatic. It plausibly depends on institutions and policies that reduce barriers to return and translate diaspora engagement into domestic investment and state capacity. This paper explores that policy margin in the Moroccan context.

Over the past few decades, Morocco has pursued an economic development strategy centered on modernization and global integration, alongside a set of measures intended to encourage the return and domestic economic participation of its diaspora. We refer to these measures as "Return migration policies," RMPs hereafter, which aim to mobilize the skills and resources of Moroccans living abroad (MLAs) for domestic economic development and enable Morocco to benefit from positive externalities from their higher education, expertise, networks, and more.

In this paper, we seek to test the hypothesis that the RMPs introduced in Morocco over the past four decades have indeed contributed to economic development across three dimensions: (i) the Kingdom's attractiveness to foreign investors; (ii) the quality and capacity of its commercial air and maritime transport infrastructure; and (iii) the level of modernization of its public administration. We operationalize these three dimensions using annual macro indicators, namely,

[1] Remittances is another home country-benefiting mechanism that has been extensively discussed in the literature (Batista et al., 2025; Di Giovanni et al., 2015, Docquier and Veljanoska, 2020; Fromentin, 2017; Gibson and McKenzie, 2011; Ofori et al., 2022, World Bank, 2023c). However, the relationship between remittances, inflation, and financial inequality is complex (Akçay, 2017; Narayan et al., 2011; Song et al., 2021). Our paper is not concerned with the role of remittances.

foreign direct investment inflows (FDI) as a proxy for investment attractiveness, air and sea commercial activity as a proxy for external connectivity, and workforce adjusted wages and salaries in public administration as a proxy for public-sector modernization. Using Moroccan data for 1980-2022, we examine these relationships in a time series framework.

Relative to the largely micro and cross-country evidence on BG and return migration (Gibson and McKenzie, 2011; Batista et al., 2012; Bucheli and Fontenla, 2022; Diodato et al., 2023), this paper provides Morocco-specific time-series evidence on how discrete return-migration policy episodes relate to investment outcomes, external connectivity, and public-sector capacity. We also connect the diaspora knowledge-transfer and migration-FDI literatures (Docquier and Rapoport, 2012; Foely and Kerr, 2013; Javorcik et al., 2011; Burchardi et al., 2019) to air and maritime activity and public-administration outcomes. Methodologically, we combine VAR and local projections to trace dynamic responses to policy episodes (Sims, 1980; Jordà, 2005; Montiel Olea and Plagborg-Møller, 2021; Jordà and Taylor, 2025).

Morocco is a relevant setting because the period we study encompasses major efforts to strengthen trade-related connectivity and attract investment. For example, the expansion of port capacity and logistics, illustrated by the development and expansion of Port Tanger Med, has been central to Morocco's integration into international trade networks (World Bank, 2023a). Tourism and air connectivity have also been economically important (OECD, 2022), and broader ICT reforms have positioned Morocco as a regional leader in mobile connectivity (ITU, 2021). In parallel, Morocco has pursued long run reforms related to infrastructure and sustainability, including ambitious renewable energy targets (IEA, 2023).

The overarching premise of our analysis is that the transformation and modernization of the Moroccan economy experienced since the early 2000s relied heavily on the integration of the diaspora into the country's economic and social fabric. Successive governments, under the reign of King Mohammed VI (KM6), have resolutely pursued various policies and programs aimed at encouraging the return of MLAs. Indeed, returning emigrants typically bring with them higher education, often acquired abroad, extensive social networks, increased financial resources, and a more diverse cultural perspective, among other valuable assets and contributions.

We expect RMP-induced returns to influence economic development through several channels. First, returning skilled emigrants may contribute to the modernization of public administration by infusing more expertise, facilitating knowledge transfer, and promoting

innovative practices within governmental institutions. Second, a higher return of MLAs resulting from RMPs may also signal better future economic conditions and increased stability to foreign investors. Third, to the extent that return driven activity and investment expand production and trade, RMPs may also translate into higher demand for commercial air and maritime support, and over time, into complementary investments that support external connectivity (e.g., commercial transport).

RMPs in Morocco span multiple policy instruments. They include targeted return and reintegration measures, initiatives aimed at increasing the attractiveness of public-sector careers for qualified MLAs, as well as return-facilitating arrangements such as bilateral agreements that ensure social security and the portability of social rights. In particular, the "Programme de mobilisation des compétences marocaines résidant à l'étranger," was launched to support the various sector-specific projects initiated and supports collaborations with public and private actors in Morocco. Reintegration services are provided through the "Agence Nationale de Promotion de l'Emploi et des Compétences" (ANAPEC) to support labor market re-entry. Concerning the private sector, the "MDM Invest" fund is used to finance the creation and/or expansion of MLAs-owned businesses.[2]

In our analysis of Moroccan data from 1980 to 2022, we measure RMPs through a dichotomous variable that indicates their implementation and estimate the impact of this variable on some variables used to proxy the above expected economic development effects. We find a positive and significant impact on FDI, sea and air freight transport, and work conditions within the general government. These results suggest that RMPs might be an effective instrument for countries experiencing brain drain to capture some of the brain gain discussed in the literature (Batista et al., 2025) that reflect in their economic development.

The remainder of the paper is organized as follows. Section 2 reviews the literature on migration outflows, the potential contribution of the diaspora to their countries of origin's economy, and some outcomes of return migration. Section 3 highlights the key features of Morocco's development path that appear to have influenced the role of skilled emigration. Section 4 discusses the data, the main variables, and some descriptive statistics. Section 5 presents the econometric analysis. Section 6 summarizes the results, suggests possible transmission channels of the effects found, discusses policy implications, and points to some extensions of our research.

[2] MDM: "Marocains du monde."

2. Related literature

A successful transition from brain drain to brain gain depends on a complementarity between diaspora engagement and state-enabled channels that make return, investment, and knowledge transfer feasible (Batista et al., 2025). While much of the literature emphasizes what diasporas can do for origin countries, it often understates the role of government policies in shaping these opportunities. This section reviews the literature related to migration outflows, the mechanisms through which diasporas contribute, and the economic outcomes that follow.

Migration outflows

Much of the empirical literature measures migration, especially high-skilled, outflows from developing countries to OECD countries destinations using census data. These data enable researchers to construct education-specific emigrant stocks and emigration rates for benchmark years or in panel form (Docquier et al., 2007; Docquier and Rapoport, 2012; Beine and Sekkat, 2013; Di Giovanni et al., 2015). Complementary work studies bilateral determinants of migration using panel data on migration flows (Mayda, 2010). This data structure has shaped the focus of the field toward developing to OECD countries migration and toward the skill composition of outflows (Docquier et al., 2012).

Within this framework, outflows are often modeled as responding to (i) economic incentives and returns to skill across locations, and (ii) migration costs and destination-country policy restrictiveness, factors that can jointly determine the scale of migration and degree of positive selection (Docquier et al., 2007; Docquier and Rapoport, 2012; Di Giovanni et al., 2015).

A stream of the literature shows that the prospect of emigration can raise incentives to invest in education. Because not all individuals who acquire skills in anticipation of migration ultimately leave, and because some migrants may return, part of the additional human capital generated by migration prospects remains (or is re-imported) in the origin country. This provides a theoretical rationale for how BG can arise alongside BD, even absent skill accumulation abroad, through pre-migration human-capital formation, potentially generating a net brain gain (Stark et al., 1997, 1998; Beine et al., 2001; Docquier and Rapoport, 2012).

For example, Beine et al. (2008) use cross-country data on education specific emigration rates for 1990 and 2000 to compute the net brain drain effects, defined as the difference between

an observed and counterfactual skilled share residing in the home country. Their estimates classify Morocco among the countries that experienced a negative net brain drain effect.

Taken together, however, this literature implies that outflows alone do not pin down whether emigration is ultimately beneficial for the origin country economy: the net effect also depends on channels that operate through the diaspora and through return migration (Docquier and Rapoport, 2012; Beine and Sekkat, 2013; World Bank, 2023b).

Contribution of the diaspora to origin country economies

Beyond the size of outflows, migration also helps shape the stock and composition of diaspora networks, which subsequently impact migration patterns and selection of skills across countries (Docquier and Rapoport, 2012). These feedback effects imply that welfare consequences of migration are not fully captured by BD measures alone, motivating a focus on how diaspora and return migration generate benefits in origin country economies through institutional change, knowledge diffusion, and investment.

In terms of institutional development, Beine and Sekkat (2013) argue that diaspora communities can affect origin-country institutions through (i) "exit/voice", i.e., emigrants exert influence from abroad via collective action or political engagement (Hirschman, 1970) and (ii) the transfer of institutional norms from destination to origin (Levitt, 1998). Consistent with these channels, they find that institutional effects are stronger for skilled emigration than for total migration. In line with the norm-transfer channel, Tuccio et al. (2019) show that having a return migrant in a Moroccan household increases demand for political and social change, driven by returnees from Western European countries with exposure to democratic norms. Together, these channels suggest a pathway from diaspora and return exposure to higher demand for institutional accountability, and ultimately, improvements in institutional quality and public-sector performance.

A second set of BG mechanisms operates through knowledge transfers. Knowledge transfer flows can broadly take three, non-mutually exclusive forms, which are ethnic-driven knowledge flows, often through social networks, multinational companies facilitating transfers through employee mobility and collaboration, and direct effects of return migration through entrepreneurial activities and utilization of social networks (Breschi et al., 2017). For example, related work shows how international knowledge flows and collaborations can improve innovation

and research environments in origin countries (Kerr, 2008; Breschi et al., 2017; Fry, 2023; Kahn and MacGarvie, 2016), including through internal mobility within multinational corporations and the role of returnees in managerial positions (Choudhury, 2015). This stream of literature suggests that, beyond demanding and shaping accountability, returnees can improve the performance of the organizations that employ them directly by transferring learned practices and norms acquired abroad into internal routines, management, and collaboration. Relatedly, knowledge transfers need not occur only within existing firms or public agencies. It can also operate entrepreneurial activity of the diaspora from abroad or upon return while maintaining ties to knowledge hubs, although the magnitude of these effects can vary across settings (Gibson and McKenzie, 2011; Kerr et al., 2016; Hausmann and Nedelkoska, 2018; Wang, 2020).

Docquier and Rapoport (2012) further emphasize diaspora-network mechanisms, namely, reduced information/transaction costs and knowledge diffusion, through which migration can stimulate trade and FDI. Consistent with these channels, migrant networks in the United States predict higher U.S. FDI to migrants' origin countries, with effects often stronger for tertiary-educated migrants (Foley and Kerr, 2013; Javorcik et al., 2011; Burchardi et al., 2019). Evidence on low-skilled migration is more mixed, and in some contexts can point to substitution with FDI in certain sectors (e.g., Aroca and Maloney, 2005), while others point to substitutability and dynamic complementarity (Kugler and Rapoport, 2007). To the extent that diaspora driven trade and FDI deepen international integration, they can also raise demand for international connectivity and logistics, providing a natural link to changes in air and maritime transport activity.

Finally, these channels are likely to depend on fundamental features of the migration process, duration abroad, strength of ties to the origin country, and the domestic institutional environment, which can either enhance or diminish an emigrant's economic and social contribution (Hussain, 2015). This heterogeneity provides a rationale for focusing on return migration policies as instruments that may condition whether diaspora and return translate into measurable macro-outcomes.

Outcomes of return migration

Return migration can affect origin-country outcomes through labor-market and local-development channels. Recent work estimates impact on local economic performance and wage distribution: Bucheli and Fontenla (2022) find that municipality-level return migration rates in Mexico improve

development outcomes such as education, labor, and health outcomes, while Diodato et al. (2023) show that returnees can depress earnings in their own occupational fields while raising earnings elsewhere, exhibiting competition and complementarity effects. The complementary channel often operates through social remittances and institutional outcomes, such that return migration transmits norms and raises demand for accountability, showing effects on political participation and governance-related outcomes (Levitt, 1998; Chauvet and Mercier, 2014; Tuccio et al., 2019).

An existing literature links migrant networks and diasporas to trade and FDI, and another documents local labor market and institutional effects of return migration. However, there is less evidence that isolates the macroeconomic consequences of explicit policy regimes aimed at encouraging return and structured diaspora engagement, particularly for outcomes related to state capacity (e.g., public administration modernization) and international connectivity. Our contribution is to examine whether the implementation of return migration policies in Morocco predicts subsequent changes in (i) FDI inflows, (ii) air and maritime commercial activity, and (iii) public administration compensation, using a long annual time series for Morocco.

3. Moroccan context

Morocco is one of the countries that have taken observable steps that may have transformed BD into BG. This section will describe the historical and political dynamics of the relationship between Moroccan emigrants and the government that may have influenced this feat. We will highlight efforts made by the government to progressively include the Moroccan diaspora in development and economic strategies and summarize the ways that the Moroccans abroad utilize newfound opportunities to contribute back. Table A1 in the appendix provides an overview of key policies and events that have shaped the role of emigrants over time, encompassing diaspora relations as well as family and women's equality considerations. Table A2 in the appendix summarizes reforms affecting our main outcome domains, i.e., investment climate and FDI, sea and air transport connectivity, and public-administration performance.

Historical and political background

Morocco's geographical advantage as the sole African country sharing a land border with Europe heavily influences migration patterns. The implications of this geographical characteristic are far-reaching, with international arrangements playing an important role in shaping the flows of

migration from Morocco.[3] Historic labor recruitment agreements with Germany, France, Belgium, and the Netherlands, along with a demand for low-skilled workers in Italy and Spain, have facilitated emigration to Western European countries, and also have helped to alleviate population pressures and domestic political conflict within Morocco (de Haas, 2015).

In the 1960s-1970s, emigrants, including political activists, highly educated individuals, and working class citizens, were often viewed as political threats, in a period marked by economic shocks and domestic political instability. From the 1980s onward, the state's approach shifted toward institutionalized engagement with the diaspora. Morocco created a dedicated governmental structure for Moroccans abroad around 1990 and established the Hassan II Foundation for Moroccans Residing Abroad to strengthen ties and provide support services. In 2001, the Mohammed V Foundation for Solidarity launched Operation "Marhaba," a recurring state-coordinated reception and assistance for summer returns, which operationalizes diaspora outreach at scale.

For our empirical focus, the relevance of this historical evolution is not descriptive: it provides the institutional and administrative basis through which later diaspora-engagement and return-oriented measures can plausibly operate via state-enabled channels.

Domestic socio-economic advancement and diaspora-inclusive policies

From the 1980s onward, Morocco pursued market-oriented reforms and deeper external integration aimed at expanding export markets and attracting investments. Two milestones toward increasing privatization and regulation were to broaden its trading partners through the Euro-Mediterranean Association Agreement with the European Union (in force in 2000) and the United States-Morocco Free Trade Agreement (in 2006). In parallel, the government relied on sectoral strategies, e.g., the Emergence Plan, Plan Maroc Vert, the Solar Plan, Numeric Morocco, and Vision 2020 for Tourism, to support diversification. Despite these reforms, job creation remained insufficient to absorb labor-force growth. Return and reintegration have increasingly been discussed in Morocco's policy agenda, particularly for returnees with investment projects or high qualifications. Despite these reform waves, job creation did not keep pace with labor force growth,

[3] While the geographic location may be favorable for emigrants, it also presents challenges for the country as it becomes a transit point for many immigrants from other African countries trying to go to Europe. This raises policy issues that cannot be handled alone, and the EU has supported Morocco to financially help deal with this problem, which could inevitably impact emigration in Morocco (World Bank, 2023c).

with particularly high barriers at labor market entry for young and educated workers (World Bank, 2018).

Alongside these domestic reforms, Morocco developed policy instruments designed to engage MLAs and reduce frictions to return, especially for skilled or investment-linked returnees. These include bilateral arrangements on social security and portability of rights, the creation of dedicated diaspora institutions, e.g., a Ministerial Department and the Hassan II Foundation), mechanisms to mobilize diaspora competencies (e.g., FINCOME and CCME), and investment facilitation through the MDM Invest fund launched in 2009 and later restructured (CIFOIT and FIERI, 2019). The 2011 Constitution further codified commitments toward MLAs (rights, consultation, and contribution to development), followed by subsequent strategies in the 2010s.

Appendix Table A2 summarizes economy-wide reforms that plausibly complement return migration policies by strengthening the domestic environment in which returnees can deploy acquired skills and networks. These reforms are critical because they strengthen the investment climate, which can amplify diaspora and returnee-linked FDI, improve external connectivity and trade facilitation, which can lower the cost of cross border business and mobility, and upgrade public-sector capacity and service delivery, which can increase the productivity of skilled returnees inside of public institutions.

4. Data, variables, and descriptive statistics

This paper analyzes Moroccan data covering the 1980-2022 period. In this section, we present the different variables included in the analysis as well as the data sources. Table A3 in the appendix gives the definition of these variables, data sources, and key descriptive statistics.

4.1 Outcome variables

We consider three outcome variables of interest, namely, net inflows of FDI as a percentage of GDP, level of port traffic and air transport commercial activity, and workforce-adjusted wages and salaries in public administration, labeled respectively, FDI, $Transport\_Sea - Air$, and $Wages\_Pub\ Adm$. Data on these variables are retrieved from the World Development Indicators (WDI) database of The World Bank, the Government Finance Statistics (GFS) database of the International Monetary Fund (IMF), and the "Annuaire Statistique du Maroc" (ASM).

FDI net inflows as a percentage of GDP reflects the net inflows of investment aimed at acquiring a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. The average FDI inflow is equal to 1.64%. The maximum recorded inflow is 6.44%, while the minimum level is less than 1% of GDP. The positive minimum indicates that over the last four decades, new investment inflows from foreign countries to the Kingdom of Morocco have surpassed disinvestment.

Air and sea commercial activity is measured by a composite index of container port traffic and air transport freight. More precisely, we standardized the container port traffic and air transport freight variables using the "min-max" scaling method to lie in the unit interval. We then applied weights to these variables, computed using a principal component analysis approach.[4] The air and sea commercial activity index measuring commercial transport is expressed as a convex combination of the standardized versions of the container port traffic and air transport freight variables. It ranges from 0 (indicating the lowest performance) to 1 (indicating the highest performance).

Workforce-adjusted wages and salaries in the public administration are measured by the ratio of wages and salaries within the general government to total workforce. This reflects the compensation side of the modernization of public administration.[5] Indeed, higher compensation reflects potential advancements such as enhanced efficiency, skilled workforce retention, and possibly streamlined processes, which are indicative of modern administrative practices. The rationale for selecting this proxy to gauge public administration modernization is that allocating financial resources to personnel signifies a country's dedication to fostering competitiveness, nurturing professional growth, and bolstering administrative efficiency.

[4] Standardization helps to transform variables onto a common scale, making it easier to compare them across different time periods. For a given variable X_t observed at year t, the "min-max" method gives its standardized version, labeled as $s\_X_t \in [0,1]$, as follows: $s\_X_t = \frac{X_t - \min(X)}{\max(X) - \min(X)}$, where $\min(X)$ and $\max(X)$ refer to the minimum and maximum realizations of X over the period of study, respectively. To maintain brevity, we do not present the details of the weighting formula. Interested readers may refer to Cámara and Tuesta (2018) and Gasmi et al. (2024) who have used this methodology to compute composite indices that proxy key dimensions of the social contract in MENA countries.

[5] While improvements in wages and salaries within the general government can serve as a proxy for measuring the modernization of public administration, factors such as budget constraints, political considerations, and bureaucratic processes may influence wages independently of modernization efforts. Despite this limitation, this measure remains valuable in providing insight into the overall trend of public administration modernization. Increases in wages and salaries within the general government often reflect a commitment to attract and retain skilled personnel, which is a fundamental aspect of modernization. Therefore, although imperfect, this measure offers a tangible indicator of the government's investment in the improvement of its administrative capacity, contributing to our understanding of public administration modernization trends in Morocco.

4.2 Causal variable of interest

As indicated, this research focuses on measuring the contribution of RMPs to Morocco's growth and development during the specified period. Data on RMPs are extracted from the World Population Policies database published by the United Nations Department of Economic and Social Affairs (UN-DESA). UN-DESA captures RMP through a binary variable called "Policy to encourage the return of citizens" indicating for a given year "… whether the government has adopted any policies or programs to encourage the return of its citizens living abroad." This variable takes on the value 1 for "Yes" and 0 for "No." We use this UN-DESA variable as an indicator that an RMP has been implemented.[6]

However, this UN-DESA RMP variable contains missing data. To handle this issue, we complement the UN-DESA database with information on Moroccan RMPs synthesized in a report jointly published by the International Training Centre of the International Labour Organization (CIFOIT) and the 2019 International and European Immigration Research Forum (FIERI) entitled "Favoriser la réintégration sociale et professionnelle des migrants de retour nord-africains : Une comparaison des cas du Maroc et de la Tunisie" (CIFOIT and FIERI, 2019).

[6] The Kingdom of Morocco has implemented key policies over the past four decades to incentivize highly qualified emigrants and the diaspora to collaborate with public and private institutions, invest in, and return to Morocco, contributing to the country's economic development. The current UN-DESA RMP variable does not differentiate between policies targeting various education or skill levels, though it is reasonable to assume that most RMPs target high-skilled emigrants. While many emigrants initially left Morocco for labor-intensive opportunities in countries like Spain or Portugal, recent generations have sought higher education and more advanced career opportunities abroad. Since the establishment of the Ministry of Moroccans Residing Abroad, several policies have been implemented to mobilize the contributions of the highly skilled diaspora. Initiatives include the MDM fund to encourage investment in Morocco, the Competencies Mobilization plan to involve Moroccans abroad in various public and private projects, and the International Forum of Moroccan Skills (FINCOME), which engages researchers and higher education professionals to teach, provide expertise, and contribute to research and development beneficial to Moroccan institutions. Recognizing that efficient and effective public administration is crucial for economic and social development, Morocco has prioritized digitization of public administration services, often in collaboration with international partners (e.g., ENABEL). The country has also joined the Open Government Partnership (OGP) initiative and hired diverse experts in the public sector to support these efforts. Encouraging the return of high-skilled emigrants is motivated by their potential to significantly impact economic growth due to their professional networks and internationally respected skills. Although reintegration involves costs such as social services, housing, and employment programs, high-skilled workers are more likely to justify or offset these expenses. In contrast, policies targeting low-skilled workers are less common because, like many African economies, Morocco faces high unemployment and underemployment among low-skilled labor. Encouraging low-skilled migrants to return could exacerbate these issues, potentially lowering wages and increasing poverty. Investing in policies that attract high-skilled emigrants or prevent brain drain can create opportunities and incentives for talented individuals to return, fostering an environment that stimulates innovation and economic growth.

In summary, our measure of RMPs, labeled RMP, is a binary variable that takes on the value 1 if, in the year under consideration, Morocco has implemented any of the RMPs discussed, and 0 otherwise. Table A3 shows that the Kingdom has implemented at least one of the RMPs in 37% of the years during the period studied, equating to roughly 16 out of the 43 years analyzed, which is a substantial proportion. This materializes the long-standing commitment of Morocco to facilitate the return of its citizens living abroad to contribute to the development of the country's economy.

4.3 Control variables

Let us now turn our attention to the control variables. It is worth noting that countries that implement RMPs have often experienced improvements in their economic conditions before implementing such policies. To some extent, these enhancements are essential prerequisites for the effective implementation of sound return policies. For example, it would not make sense to encourage MLAs to return when the level of inflation in the country is very high and the health system is struggling. Economic conditions may also influence our outcome variables and therefore need to be controlled for, and thus we include inflation, $Inflation$, and the neonatal mortality rate, $Mortality$, as control variables in the analysis. Inflation reflects price volatility and its impact on citizens purchasing power while the neonatal mortality rate serves as a proxy for the overall quality of the health system.

Data on both inflation and neonatal mortality rate are extracted from the WDI database of the World Bank. Inflation is measured as the annual growth rate of the GDP implicit deflator. Neonatal mortality rate is the number of neonates per 1,000 live births who die before reaching 28 days of age, in a given year. Table A3 shows that the average inflation rate over the study period is 3.66%, which is relatively higher than the traditional 2% target typically set by monetary policy. This average is lower than the standard deviation, which points out a high level of dispersion in the values of inflation. On average, the neonatal mortality rate is approximately 28.13 per 1,000 live births. While this indicates there is still room for improvement in the Moroccan health system, the situation does not appear to be particularly alarming.

More generally, to attract citizens living abroad, a country needs to maintain a minimum level of development. Such progress should contribute to the effectiveness of RMPs. Improvements in the overall level of development may also influence the country's attractiveness

to foreign investors, commercial transport activity, and the modernization of public administration. This is because higher development levels often signal that essential conditions for business development are met, support the establishment of modern infrastructure, and provide more resources for better-functioning public administration. To account for the overall level of development, we include as control variables the annual growth of real GDP per capita, GDP, and the percentage of paved roads in the national road network, $Roads\_Paved$.

Data on these variables are available in the WDI database. Real GDP per capita growth is the annual percentage growth rate of GDP per capita in constant local currency. On average (see Table A3), GDP per capita has grown by 2.24% over the period spanned by our data while the minimum and maximum levels of this variable are equal to -8.17% and 10.67%, respectively. The fact that this variable has taken some negative values suggests that economic performance of Morocco has decreased during certain periods. Paved road is measured as a percentage of the total road network that is constituted of paved roads. The average percentage of roads paved over the period of study is 56.33%, with the minimum and maximum being respectively 49.1% and 70.4%, which is a commendable performance.

Another important control variable to include is emigration dynamics. Indeed, one can reasonably expect that the higher the emigration flows, the higher a country's incentives to implement RMPs. Similarly, emigration flows may affect economic progress and the modernization of public administration by reducing the level of human capital. They may also affect FDI inflows and commercial transport by signaling to foreign investors that the economic conditions, and possibly the level of political and institutional stability, in the country have deteriorated. We control for emigration role through remittances, measured as personal remittances received as a percentage of GDP, labelled $Remittances$. Data on remittances are available in the WDI database. From Table A3, we see that the average level of remittances over the period is equal to 6.04% of GDP, which is significant.

The final control variable that we include in the set of regressors is the annual population growth rate, $Population$. Migration and population growth are actually interconnected factors. Population size can influence high-skilled emigration (Docquier, 2017), thereby having

implications for RMPs. The average population growth rate in the data is 1.56%, with a maximum level of 2.66%. These data are sourced from the WDI database.[7]

5. Econometric analysis

Our econometric analysis of the Moroccan data is organized in two steps. First, we seek to determine whether RMPs cause FDI inflows, changes in air and sea commercial activity levels, and variations in workforce-adjusted wages and salaries in public administration. Second, we aim to uncover the sign of the effect of RMPs on these three outcome variables that reflect the level of development of Morocco.

In the first step, we perform standard Granger causality tests (Granger, 1969). Then, to determine the sign of the effects of RMPs on the outcomes, we estimate Impulse Response Functions (IRFs) using the Local Projection method developed by Jordà (2005), which is an appropriate approach for settings with a binary impulse variable, as in our case. While Granger causality tests help identify causal relationships, the primary goal of the IRFs is to determine the direction, either positive or negative, of a causality relationship rather than to establish or quantify it. Prior to conducting these analyses though, we perform unit root tests to assess the stationarity of the variables. These tests inform us on the selection of the appropriate model to be used to estimate the effect of RMPs on the dependent variables.

5.1 Data stationarity

Table 1 below presents the results from two common unit root tests allowing us to check whether the variables included in our analysis are stationary or not, namely the Augmented Dickey-Fuller (Dickey and Fuller, 1979) and the Phillips-Perron (Phillips and Perron, 1988) tests, respectively the ADF and PP tests hereafter. These tests account for serial correlation through different but complementary approaches. Indeed, while PP uses the Newey-West standard errors (Newey and West, 1987), ADF rather employs lags of the first-differenced variable. The null hypothesis in both tests is that the variable contains a unit root, i.e., that it is not stationary.

The table reports the values of the test statistics along with their significance levels. We see that, for each variable, the null hypothesis of nonstationarity is rejected with both tests,

[7] The number of control variables included in the analysis is admittedly low and is due to constraints of missing data and statistical concerns related to degrees of freedom.

meaning that all the variables are stationary in levels, i.e., they are $I(0)$. Nevertheless, for the variable measuring paved road, $Roads\_Paved$, the ADF test indicates stationarity, whereas PP test suggests nonstationarity. Hence, to decide on the stationarity of this variable, we implement an additional test, namely the Kwiatkowski-Phillips-Schmidt-Shin (Kwiatkowski et al., 1992) test, KPSS test hereafter. In the KPSS test, the null hypothesis is stationarity, whereas, as indicated, in the ADF and PP tests it is nonstationarity. In Table 1, the value of the KPSS statistic for testing the stationarity of the variable $Roads\_paved$ is reported in brackets. We see that this value is lower than all the critical values, meaning that we fail to reject the null hypothesis of stationarity. As two out of three of the traditional tests do not deny stationarity for this variable, we consider, as usually done, that it is indeed stationary.

Since all variables are $I(0)$, we go ahead and estimate a Vector Autoregressive (VAR) model for the purpose of subsequently implementing Granger causality tests aimed at determining whether the variable return migration policies, RMP, causes foreign direct investments inflows, FDI, changes in air and sea commercial activity levels, $Transport\_Sea - Air$, and variations in workforce-adjusted wages and salaries in public administration, $Wages\_Pub\ Adm$. We discuss the results of such an estimation in the next subsection.

Table 1. Unit root tests[+]

Variable	ADF	PP
FDI	-2.061**	-4.456***
$Transport\_Sea - Air$	-3.133**	-3.071**
$Wages\_Pub\ Adm$	-3.993***	-3.677***
GDP	-5.744***	-11.418***
$Roads\_Paved$	-2.113**	-2.070 [KPSS: 0.311]
$Population$	-3.726***	-4.049***
$Inflation$	-5.387***	-10.641***
$Remittances$	-2.829***	-2.718*
$Mortality$	-1.499*	-3.026**

[+] This table reports the values of the test statistics for the ADF (Augmented Dickey-Fuller) test and the PP (Phillips-Perron) test, in which the null hypothesis is that the variable is not stationary, and the p-values are indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$. This table also reports the value of the KPSS (Kwiatkowski-Phillips-Schmidt-Shin) test in which the null hypothesis is that the variable $Roads\_Paved$ is stationary and the critical values for this test are 0.347, 0.463, 0.574, and 0.739 at, respectively, the 10%, 5%, 2.5%, and 1% significance levels.

5.2 Granger causality analysis

In this subsection, we implement Granger causality tests to determine whether the variable RMP causes the variables FDI, $Transport\_Sea - Air$, and $Wages\_Pub\ Adm$. As previously

discussed, the results of the unit root tests performed earlier justify the estimation of a VAR model for the purpose of subsequently conducting these causality tests. The VAR model fits a multivariate time series regression of each variable on its own lags and those of all other variables. This approach allows us to address the potential endogeneity of the variable RMP and any other variables included in the analysis.

Optimal lag length, estimation, and stability condition

The starting point of the VAR analysis is the choice of the optimal number of lags. This is done using information criteria. We rely on three common lag-order selection criteria, namely, the Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC), and the Hannan and Quinn Information Criterion (HQIC). The results of the testing show that the optimal number of lags is 3.[8] Hence, we estimate the VAR model with 3 lags. Note that the coefficients of the fitted VAR are not of interest in our context and are therefore not reported.[9] Instead, we focus on the results of the Granger causality tests, which we discuss next.

Before doing so though, we must check whether the stability condition of the VAR model is satisfied. Figure A1 in Appendix II presents the unit circle along with the eigenvalues and their moduli for checking stability condition. The position of the eigenvalues with respect to the unit circle helps know if the stability condition is satisfied. More specifically, for the stability condition to be satisfied all the eigenvalues should lie inside the unit circle. We see from Figure A1 that all the eigenvalues lie inside the unit circle, i.e., the modulus of each eigenvalue is less than 1 as it should. This means that the VAR satisfies the stability condition. We can now interpret the results from the causality tests.

Granger causality tests

Table 2 presents the results of Granger tests (Granger, 1969) of a causality that runs from RMP to each of the outcome variables of interest, namely, FDI , $Transport\_Sea - Air$, and $Wages\_Pub\ Adm$. In other words, we test whether or not the implementation of any of the RMPs has Granger-caused any of the outcomes. Recall that the occurrence of RMP is said to Granger-cause a specific outcome Y to occur if, at a given instant, given the past values of the variable Y,

[8] These results are available from the authors upon request.
[9] These results are available from the authors upon request.

past values of RMP are useful for the prediction of Y. The null hypothesis in this test is that RMP does not Granger-cause Y. The results allow us to conclude that there is evidence in the data to reject, at least at a 5% significance level, the hypothesis that RMP does not Granger-cause the outcome variables FDI, $Transport\_Sea - Air$, and $Wages\_Pub\ Adm$. This conclusion warrants assuming the actual existence of these causal effects of the RMPs implemented by the Kingdom on some important aspects of the domestic economy and uncovering the sign of these effects.

Table 2. Causality tests: $RMP \rightarrow Y^{+}$

Y	FDI	$Transport\_Sea - Air$	$Wages\_Pub\ Adm$
W	9.693^{**}	43.633^{***}	30.655^{***}

[+] This table reports the values of the Wald statistic (W) for testing the null hypothesis H_0: RMP does not cause the outcome variable $Y \in \{FDI, Transpor\_Sea - Air, Wages\_Pub\ Adm\}$. The p-values are indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

5.3 Uncovering the sign of the effects of RMPs on the domestic economy

This subsection aims to uncover the sign of the causal effects, established through Granger causality tests, of the variable RMP on the different outcome variables of interest. To this end, we estimate IRFs using the Local Projection (LP) method developed by Jordà (2005), a novel technique that has gained considerable traction in the literature on IRFs over the last 20 years and is considered an effective approach for estimating the effects over time of a policy intervention (such as RMPs) or shock on a given outcome.[10] As we previously discussed, while Granger causality tests help identify causal relationships, the primary goal of the IRFs derived from the LP method is to determine the direction (positive or negative) of an effect of RMPs rather than to establish or quantify causality.

Recall that our independent variable, RMP, is a binary variable taking the value 1 if, in the year under consideration, Morocco implemented any RMPs, and 0 otherwise. The binary nature of RMP makes it challenging to interpret IRFs, as a one-standard-deviation change or a percentage change in a binary variable lacks a meaningful interpretation.[11] In this context, IRFs derived from a standard VAR model are not appropriate. Indeed, traditional IRFs, obtained from VAR models,

[10] For thorough discussions of inference in the LP framework, see Jordà (2005), Kilian and Kim, (2011), and Montiel Olea and Plagborg-Møller (2021).

[11] Note that for a binary variable, the numbers 1 and 0 do not represent actual quantitative measures. In our context, they are merely used to code a "yes" and "no" answer to a specific question, respectively. Hence, a one-standard deviation change or a percentage change of the binary variable RMP cannot really be interpreted, rendering any interpretation of IRFs questionable.

are typically designed under the assumption of continuous shocks. Applying a one-standard-deviation (or a percentage change) shock to a binary variable is conceptually flawed, as the standard deviation (or the percentage change) is not a meaningful measure for binary indicators. In such cases, IRFs may attempt to simulate a fractional or partial change in the binary variable, which lacks real-world interpretation or practical relevance.

In the case of a binary impulse variable, the LP method is an appropriate approach for computing IRFs (Jorda and Taylor, 2025), and as demonstrated by Montiel Olea and Plagborg-Møller (2021), inferences based on LP are more robust than standard autoregressive inferences.[12] In our case, which is the binary impulse variable setting, the IRF is estimated by comparing the evolution of the outcome variable Y_{t+h} after $RMP_t = 1$ versus after $RMP_t = 0$, where h is the time horizon, controlling for past dynamics of the outcome variable Y, the variable RMP, and other covariates. More precisely, the impulse response, denoted by $\mathcal{R}_{RMP\to Y}(h)$, consists of counterfactual difference in mean outcomes and is defined as follows (Jorda and Taylor, 2025):

$$\mathcal{R}_{RMP\to Y}(h) \equiv E[Y_{t+h}|RMP_t = 1;\ \mathbf{x}_t] - E[Y_{t+h}|RMP_t = 0;\mathbf{x}_t]; \quad h = 0,1,\cdots,H \qquad (1)$$

where the controls $\mathbf{x}_t$ consist of a vector of pre-determined variables, including lags of the outcome variable, the variable RMP, and the other covariates.

The results of the IRF estimation using the LP method over a five-year horizon are presented in Figure 1. We see that RMP is positively associated with FDI, with a peak of correlation achieved 2 years after the policy is implemented. Regarding the relationship between the pair of variables $(RMP, Transport\_Sea - Air)$, we see that the positive correlation between them reaches its highest value 5 years after RMP implementation. With respect to the pair of variables $(RMP, Wages\_Pub\ Adm)$, the results indicate that their positive correlation is the highest 4 years after the policy is implemented. We can therefore say at the outset that these results, which will be discussed in more detail in the next section, are consistent with the overall premise of our work, namely, that the RMPs implemented in Morocco have played a significant

[12] Besides providing theoretical insights on IRF estimation using LP within the framework of a binary impulse variable, Jordà and Taylor (2025) discuss its suitability for binary impulses and provide a broad perspective and a detailed discussion of the advantages of the LP method over traditional approaches based on VAR models. See also, Jordà (2005), Montiel Olea and Plagborg-Møller (2021), and Montiel Olea et al. (2025).

role in the positive transformation and modernization of the Moroccan economy, notably through a strategic integration of the diaspora into the country's development project.

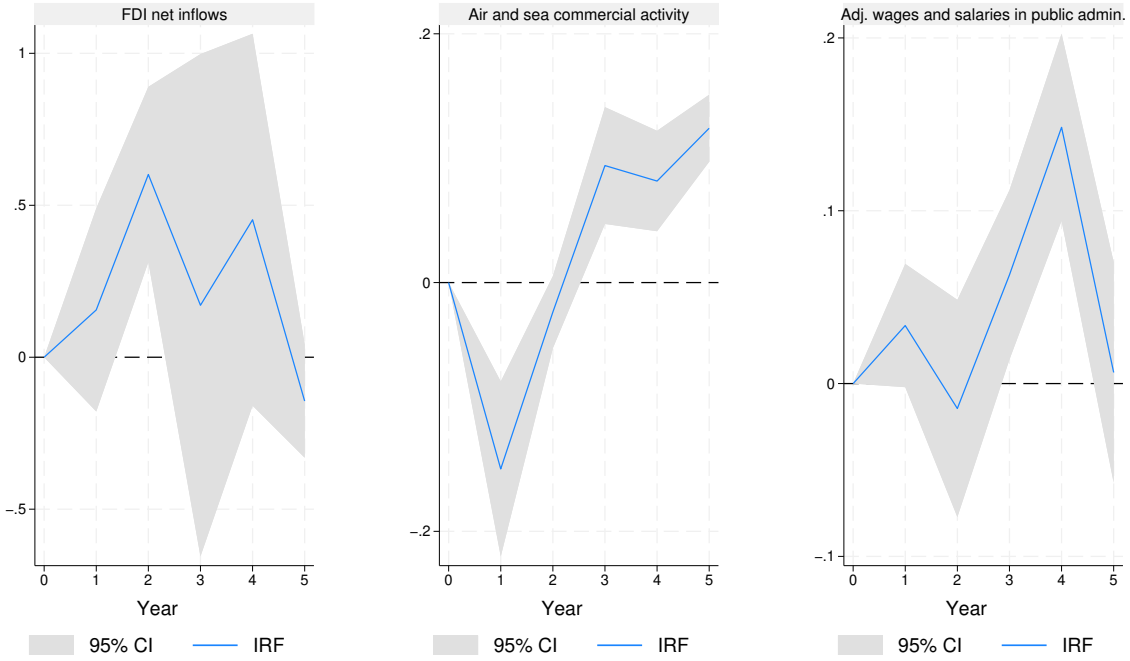

Figure 1. Local projection IRFs.

6. Conclusion

The objective of this article has been to analyze the effects of return migration policies that have been introduced in Morocco since the 1980s, and significantly intensified in the 2000s after the coronation of King Mohammed 6 in 1999, with the aim of testing whether these policies have produced benefits for the country's economy. In the last few decades, Morocco having been an important supplier of, often highly educated and qualified, North-African emigrants to OECD countries, in particular Europe, such an exercise has provided us with a setting to test the existence of possible beneficial effects precisely due to this flow of population, which is akin to a brain drain, i.e., brain gain.

In a dataset covering the 1980-2022 period, we find that these policies have improved the attractiveness of the country to foreign investors, the country's sea and air commercial activity, and the modernization of its public administration. As such, these results feed in the debate on brain drain, its determinants, and its role in growth of developing countries. One specific perspective of the literature to which our study contributes to is that while the phenomenon of

brain drain is unavoidable, developing countries can leverage it by implementing sound and relevant policies to encourage their citizens living abroad to return or otherwise contribute back to the development of their country of origin. We unveil two distinct positive effects that return migration policies may have had on the Moroccan economy: a direct effect by improving commercial transport and the modernization of public administration, and an indirect effect by stimulating greater inflows of foreign direct investment.

The implementation of return migration policies may positively impact Morocco's appeal to foreign investors because, conditional on the effectiveness of these policies, i.e., increased return of Moroccans from abroad, they may see them as a signal of improved economic conditions and stability within the country, thereby motivating them to further investment in this country. Moreover, the government's active support and implementation of these policies underscore its commitment to boost the economy. Complemented by returning migrants who bring valuable skills, experiences, and networks acquired overseas, these efforts reduce operational risks for foreign investors and increase their perceived overall return on investment.

That return migration policies can incentivize greater investment in transport infrastructure leading to higher output is not surprising given the positive externality that infrastructure creates on the global economy. More specifically, the government that promotes these policies must show commitment to facing expected increase of capital, skill, investment, and entrepreneurship following return migrants. More efficient port and airport infrastructure benefits the entrepreneurial activities of returnees, particularly in export-oriented industries. Moreover, this enhanced infrastructure is crucial for connecting the home regions where returned entrepreneurs typically settle to national and international trade hubs, thus facilitating regional economic integration.

A positive effect of return migration policies on the wages and salaries in the public administration may be a sign of modernization of the Moroccan public administration. These policies aim to facilitate the reintegration of skilled emigrants with international experience, professional standards, and higher demands for governance and working conditions. To attract, retain, and effectively employ this human capital, the government ought to engage in reforming and modernizing its public administrations, in particular, by increasing wages to reflect higher skill requirements and performance standards. These increased wages are costly, but they may be seen

as a strategic investment in human capital and institutional quality, which are consistent with the objective of building a modern merit-based state.

This article can be extended in several directions, but we will only mention a few of them here. First, future research should examine how return migration policies reinforce the link between emigration and institutional quality, viewed in a broader sense than that discussed here. The quality of public administration reflects the extent to which the organizational structure of state civilian staff enables effective design and implementation of public policies, as well as efficient delivery of public services. However, return migrants not only constitute the human capital that will be the driving force behind this qualitative leap in the governance of the country, but also bring various other "economic, social, and political remittances," including the improvement of democracy, political accountability, and economic and political freedom (Docquier et al., 2011; Tran et al., 2021; Lodigiani, 2016; Tuccio and Wahba, 2020; Cancellario, 2023; Powell and Regalado Cardoso, 2025;).[13]

Second, one could distinguish between different categories of return migration policies in order to evaluate their relative "social welfare returns." Third and relatedly, the present analysis should be extended to other countries in the MENA region, in particular, Algeria and Tunisia, which not only share significant aspects of the sociology and history of their diasporas, but also have made some efforts to engage in regional integration. Such a comparative study would, to the least, inform us on the extent to which institutional and political contexts impact the effectiveness of return migration policies in capturing brain gain effects. Last, it is worth investigating the effect of vigorously and actively implemented return migration policies on some other milestones of development than those considered in this paper, in particular, access to education and energy, and control of population growth (Robertson, 2022).

[13] We were unable to contribute to this extension in this country-specific study because the limited availability of data would have significantly restrained econometric accuracy.

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Appendix I

Table A1. Moroccan policies that shaped socio-economic conditions for Moroccan residents and emigrants

Enabling emigrant rights and fostering international relations	
1956	Independence from France.
1958	Establishment of the Moroccan nationality code which acknowledges dual citizenship after receiving required government permission.
1961-1999	Coronation of King Hassan II, who ruled until his death on July 23, 1999.
1960s	Moroccan labor recruitment deals with Germany, France, Belgium, and the Netherlands. Signing the first bilateral agreements with other countries on social security and the portability of social rights.
1990	Establishment of the Ministerial Department for Affairs of the Moroccan Community Residing abroad, which eventually integrated into the Ministry in 1997.
1995	Creation of Hassan II Foundation for Moroccans living (or residing) abroad (MLAs).[+]
1999-	Coronation of King Mohammed VI, who is ruling through the present day.
2001	Operation Marhaba: Yearly assistance to welcome emigrants to return during the summer period.
2003	Establishment of a national migrant's day, a day to celebrate diaspora contributions.
2007	Establishment of the International forum of Moroccan competencies abroad (FINCOME) to mobilize the skills and investments of the diaspora and support social and economic projects.[++] Establishment of the Council of the Moroccan Community Abroad (CCME) that advises the government on how to protects Moroccan interests abroad and encourage Moroccan development, and is composed of Moroccan emigrants.[+++]
2009	Creation of the "MDM Invest" fund.
2011	Revised Constitution recognizes MLAs through various provisions, including, • Article 16: Morocco commits to protecting the rights and interests of Moroccans abroad by maintaining and advancing cultural ties with the Kingdom and increasing their contribution to Morocco's development. • Article 17: MLAs enjoy full rights as citizens, including the right to vote and be elected (however remote voting is not permitted). • Article 18: The Moroccan government commits to facilitating the participation of Moroccans abroad through their consultation on governance issues. • Article 163: CCME should advise on policies enabling MLAs to maintain their links with their Moroccan identity, guarantee their rights, and other policies pertaining to the Moroccan diaspora.
2013	National Strategies for Migration and Asylum Policy (SNIA) and Moroccans Residing Abroad (SNMRE) initiated by KM6.
2014	National Strategy for MLAs.
2021	The Special Commission on the Development Model (SCDM) submitted a report “The New Development Model, Releasing Energies and Regaining Trust to Accelerate the March of Progress and Prosperity for All” which highlights Moroccans of the World as key players to meeting development goals. The strategic ways in which the plan will facilitate the diasporas contribution are through enabling transfer of knowledge and skills (scientific research, R&D, innovation), encouraging the use of international social networks, and broadening investment opportunities in Morocco and abroad.
Improving family life conditions and gender equality in Morocco	
1958	Establishment of the Moudawana, otherwise known as Personal Status Code, which is a traditional code of family law that governs marriage, divorce, inheritance, and child custody laws. It is known for its suppressive nature which allows polygamy, forced marriage, unilateral divorce on the man's behalf, and tight divorce restrictions applied to women.
1993	Ratified the international law Convention on the Elimination of All Forms of Discrimination against Women (CEDAW).
2003	Article 40 of the Labour Code of 2003 indicates that sexual harassment of an employee by an employer as serious offenses.
2004	Moudawana Family code updated allowing Moroccan mothers to pass their Moroccan nationality to their children, increased legal minimum marriage age, removed requirement that a legal guardian must approve a woman's marriage, restrictions on polygamy, and expanded rights for women to seek divorce.
2011	Revised Constitution increases equal access and rights of genders in the political process by implementing various provisions, including, • Article 19: Acknowledges that both men and women enjoy rights and freedoms of civil, political, economic, social, cultural, and environmental equality. • Article 22: Everyone has the right to physical and moral integrity and dignity. • Article 27: Both men and women have the right to information provided by the public administration. • Article 30: Both men and women have equal civil and political rights, including the eligibility to vote and be elected • Article 31: Both men and women have rights to healthcare, social protection, quality education, decent housing, water, and healthy environments.
2016, 2018	The Penal Code of 1962 was amended to eliminate human trafficking and violence against women.
2023	Morocco's Minister of Justice makes commitments to pursue new reforms to end exclusion and mistreatment of women, through potentially another set of revisions to the Moudawana Family Code.

[+] "Fondation Hassan II pour les marocains résidant à l’étranger.".
[++] "Forum international des compétences marocaines résidant à l’étranger."
[+++] "Conseil de la communauté marocaine a l’étranger."

Table A2. Moroccan policies impacting investments, infrastructure, and public administration

Investment climate reforms	
2000	EU-Morocco Association Agreement, signed under the Euro-Mediterranean framework, deepened Morocco's trade and regulatory integration with the European Union.
2006	US-Morocco Free Trade Agreement entered into force, enabling expanded market access.
2014-2020	Industrial Acceleration Plan was implemented.
2022	New Investment Charter was adopted, applying to both foreign and domestic investments, and aiming to position Morocco as an FDI hub.
Sea and air transport reforms	
2006	EU-Morocco Open Skies agreement entered into force, opening market access to European airlines and increasing routes, lowering fares, and raising traffic.
2007	Tanger Med began operations.
2009	Tanger Med II expansion was launched.
2010	National Strategy for the Development of Logistics Competitiveness was adopted, aiming to reduce logistics costs and improve efficiency.
2011	PortNet window system was introduced to streamline cargo customs procedure.
Public administration and governance reforms	
2018	Morocco became the 76th country to join the Open Government Partnership (OGP) following the passage of Law 31-13 on Access to Information.
2019-2021	A national tripartite wage agreement was signed for the public and private sectors, including a 15% wage increase for 800,000 employees.
2021	Law 54-19 on the Public Service Charter was adopted to improve efficiency and effectiveness of the communication and delivery of public services, with an aim of institutionalizing transparency, civic participation, and public accountability in the delivery of services from all administrations, local authorities, and public institutions.

Table A3. Definitions of the variables, data sources, and descriptive statistics[+]

Variable	Description	Mean	Std. Dev.	Min.	Max.	Source[+++]
Dependent variables						
FDI	Foreign direct investment net inflows as a % of GDP (in natural logarithm)	1.64	1.27	0.003	6.44	WDI
$Transport\_Sea-Air$	Composite index of container port traffic and air transport freight that ranges from 0 (lowest performance) to 1 (highest performance)	0.35	0.18	0.04	0.97	Authors, based on Cámara and Tuesta (2018) methodology, and data from WDI.
$Wages\_Pub\ Adm$	Change in workforce-adjusted wages and salaries in public administration measured by wages and salaries within the general government divided by total workforce (in natural logarithm)	207,885	84,648.3	123,996	483,980.3	GFS and ASM
Independent variable						
RMP	Binary variable that takes the value 1 if, in the year under consideration, Morocco has implemented any return migration policy, and 0 otherwise.	0.37	0.49	0	1	UN-DESA and CIFOIT and FIERI (2019)
Controls						
GDP	Real GDP per capita annual growth rate (%)	2.24	4.03	-8.17	10.67	WDI
$Roads\_Paved$	Paved roads as a % of total roads (in natural logarithm)	56.33	4.52	49.1	70.4	WDI

Population	Population annual growth rate (%)[++]	1.56	0.47	1.02	2.66	WDI
Inflation	Annual growth rate of GDP implicit deflator (%)	3.66	5.57	-1.77	33.02	WDI
Remittances	Personal remittances received as a percentage of GDP[++]	6.04	0.94	4.19	8.32	WDI
Mortality	Neonatal mortality rate (per 1,000 live births)[++]	28.13	11.07	11.1	48.3	WDI

[+] Actual values rather than natural logarithms are reported to facilitate interpretation.
[++] Population growth, Remittances, and Mortality rate are not measured in natural logarithm to facilitate the VAR model's satisfaction of the stability condition. Since the values of these variables are low, as reflected in their low means, standard deviations, and maxima, this does not pose any problem.
[+++] WDI: World Development Indicators database of The World Bank; GFS: Government Finance Statistics database of the IMF; ASM: Annuaire Statistique du Maroc; UN-DESA: United Nations Department of Economic and Social Affairs.

Appendix II

Figure A1. Stability condition