Growth Lab

Inputs for Policy Design: Tools of Economic Diversification in the UAE

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Growth Lab Working Paper Series
No. 257

December 2023

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This paper may be referenced as follows: Daboin, J., Lamby, L., Tapia, J., Prasad, P., Brenot, C. (2023). “Inputs for Policy Design: Tools of Economic Diversification in the UAE.” Growth Lab Working Paper, John F. Kennedy School of Government, Harvard University.

About the Growth Lab

The Growth Lab's multidisciplinary team, led by Professor Ricardo Hausmann, pushes the frontiers of research on economic growth and development policy. The Growth Lab advances academic research on the nature of economic growth and conducts applied, place-based engagements that aim to understand context-specific growth processes, address key constraints, and identify promising opportunities. Key frameworks developed at the Growth Lab include Growth Diagnostics and Economic Complexity. Growth Diagnostics is a systematic methodology that aims to identify the most binding constraints to better growth outcomes, allowing policymakers to take the most impactful actions. Economic Complexity is a growing field of research that sees the economy as composed of distributed knowledge and productive capabilities that must be networked in order to be used in production and sees growth as the expansion of both the underlying knowledge and its uses. Through its research and teaching activities, the Growth Lab has become a global thought leader offering breakthrough ideas, methods, and tools that help policymakers, stakeholders, and scholars find ways to accelerate economic growth and expand opportunity across the world.

Acknowledgements

This report was produced in the context of the ongoing collaboration between Harvard's Growth Lab and the Ministry of Economy of the United Arab Emirates (UAE), which aims to produce novel research-based inputs to inform an ambitious, forward-looking economic policy agenda. The goal of this collaboration is to provide rigorous research that can support the Ministry of Economy and related policy-making entities in their mission of promoting high-quality, sustainable growth and fostering structural transformation in the UAE.

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1. Executive Summary

Economic Diversification in the UAE

The UAE has witnessed robust economic performance and made some progress towards diversification over the past two decades. However, challenges remain in the country's transition to more complex, knowledge-intensive activities. While overall economic diversification has improved, the country continues to lag behind aspirational peer countries. Moreover, some of the main elements of that diversifying export basket remain energy-intensive, concentrated in few areas, and display relatively low levels of economic complexity.

The UAE's low economic complexity may represent a drag on future economic growth. This is because the embedded knowhow governs not only what a country can produce today, but also what new things it can produce in the future. When countries specialize in low-complexity activities, few new sectors can make use of the existing stock of knowhow, and the dynamic process of diversification, increasing complexity, and economic growth is stunted.

The are many potential benefits from diversifying the UAE's economy. First, revenue diversification may mitigate the impact of oil price volatility on government revenues and external balance. Second, dominant commodity sectors such as oil may generate significant income but little employment, which can have undesirable social impacts. Diversifying the economy into non-oil sectors can increase job creation. Third, diversification enables adjustment in a world where global changes in technology, environmental constraints, and tastes create new opportunities and bring secular decline to yesterday's dominant sectors. Finally, diversification towards increasingly complex sectors goes beyond these direct benefits and can ignite a self-reinforcing process of knowhow accumulation, upgrading, and growth.

Following the priority sectors identified in the Economic Complexity Report (Tapia et al, 2023) and other government strategies, the country should decide what are the most effective tools to bring about investment and growth in these and other new activities and, thus, fuel export diversification. There are a range of tools that have been used by countries to fuel productive diversification, and the UAE has its own unique characteristics and institutional structure. We focus on three tools that have been a core part of the UAE's diversification efforts to date, and which show promise for accelerating diversification in the future: promoting foreign direct investment (FDI), free zones (FZs), and sovereign wealth funds (SWFs).

Foreign Direct Investment

The UAE has been successful at attracting FDI that contributes to diversification. The country has positioned itself as one of the largest recipients of FDI in the world, and its success is not limited solely to the quantity of flows received. The country has experienced a transformation of its productive structure, gradually diversifying away from oil, with FDI inflows supporting this process. There is some evidence that foreign investments have fueled relatively more sophisticated industries, which is suggestive of a positive contribution to diversification and increased economic complexity. Likewise, many major companies have established their regional headquarters in the UAE, which can be associated with more sophisticated knowhow spreading to the country.

However, to become a global knowledge hub, the country may need to attract a different type of FDI. The UAE is attracting less than its expected share of FDI in knowledge-intensive activities such as research and development and design and development, which challenges the transition towards a knowledge-based economy. Aspirational peers such as Hong Kong have attracted more corporate headquarters and won investments from a wider range of countries. The same goes for Singapore, which has also managed to attract more private investment into R&D and enjoyed superior outcomes on innovation indicators such as scientific publications and patents.

To attract more knowledge-intensive activities, the country should focus on a quality-oriented approach to FDI attraction, engaging with investors, and leveraging existing capabilities. Instead of focusing on the size of the FDI inflows, the UAE needs to focus on FDIs that build domestic knowhow and can be spread to the rest of the economy. This involves defining quality-oriented metrics against which to measure success, including the materialization of FDI spillovers, reviewing targeted sectors and FDI source countries, and evaluating to what extent current policy instruments favor quality FDI. At the same time, authorities should engage in deep and iterative interactions with potential investors to learn what missing inputs are preventing R&D and innovation-related FDI from flowing into the country. Investment promotion agencies can play an important role in that process. Leveraging data on the relatedness between industries, activities, and research can also help, focusing attraction efforts and input provision where they can leverage existing capabilities and, therefore, the likelihood to result in economic growth. Finally, the experiences of successful R&D hubs can serve as valuable cases to study.

Free Zones Development

FZs in the UAE have evolved over time, from focusing on providing access to logistical infrastructure for re-exports to a more diversified second wave including

both hard and soft infrastructure for a wider range of activities, including high-value services. While the success of the Jebel Ali Free Zone is well documented, in the last few years there have been other successes. Dubai Silicon Oasis has managed to attract firms even outside of its initial high-tech scope, while the Hamriyah Free Zone has increased its manufacturing capabilities by catering to SMEs, and twofour54 has developed a media cluster in Abu Dhabi. More recently, there has been a push to expand the role of the zones in Abu Dhabi, with a larger role for government-led anchor investments.

Regulatory changes have impacted the FZs, yet their value goes well beyond such incentives. Historically, FZs in the UAE benefitted from allowing full foreign ownership of firms operating there, which presented a major regulatory advantage for FDI localization compared to the mainland. Even though the restrictions on foreign ownership in the mainland were lifted in 2020, FZs retain important regulatory benefits affecting labor regulations and taxation. However, beyond regulatory advantages, the best-performing FZs have proven adept at learning and bundling the variety of inputs that an evolving set of investors requires. At their best, FZs are much more than tax incentives next to a logistics hub. They are mechanisms for public-private coordination, policy experimentation, and bundling of specialized public goods.

The most successful FZs include the complete set of capabilities needed for target sectors but also are able to adapt their initial models and offerings to attract an evolving set of activities. Having a specific set of objectives and goals for a FZ allows for a more targeted approach, but the best FZs aren't constrained to their initial thesis and should adapt to the needs of both current and prospective firms. By implementing surveys, conducting in-depth interviews, and leveraging data analytics stemming from their economic registries and registries in other FZs, they can gain insights into the evolving needs and aspirations of businesses. Such adaptability would further fuel diversification and allow FZs to remain competitive in the face of increased competition from other zones in the UAE and abroad. Another sustainable advantage of FZs is that they are well-suited to policy experimentation which is impossible in the broader economy. For instance, special rules for fintech innovations and AI.

FZs do not operate separately from the rest of the country and require policy attention. They rely on complementary factors from the mainland, can be the source of knowledge spillovers to it, and should be closely examined when they underperform. While there are strong arguments for the FZs to drive the transition into a knowledge economy, their success also depends on a host of complementary policies outside the zone, including the research and development capabilities of the Emirates, the provision of technical education, the attractiveness of the country to skilled migrants and their overall availability -- which will also depend on the cost of living inside the cities and the amenities provided there.-- Moreover, allowing business between firms inside and outside the Zones, which is often restricted for sensible reasons, would increase their contribution to the overall accumulation of knowhow for diversification, and, therefore, should be considered when feasible. Finally, policy efforts may also focus on less successful FZs -- which could benefit from learning from the most successful ones--, increased coordination across Emirates and zones, and possibly changes in their governance structure.

Sovereign Wealth Funds

SWFs have played a variety of roles in the diversification of the UAE economy. Four of the world's twenty largest SWFs are in the UAE, managing more than USD 1.9 trillion in assets. The country's largest fund, ADIA, is focused on maximizing capital to provide a stable and diversified source of revenue for the government, which are highly dependent on oil. Other funds, such as Mubadala and ADQ, pursue diversification goals in a more direct way by investing in strategic, often knowledge-intensive sectors. These investments are both domestic and international, including some cases where international firms bring their operations to the UAE to transfer knowhow domestically. Finally, SWFs such as the Investment Corporation of Dubai are primarily invested in large state-owned enterprises (SOEs), which indirectly support diversification through the provision of key infrastructure.

While ADIA's mission does justify prudence in targeting broader diversification goals, there are avenues for building further knowhow without deviating from financial diversification. There could be a tension between capital maximization and fueling the UAE's transition to a knowledge-based economy. However, it is still possible for those SWFs to contribute to broader economic diversification without deviating from their core mission. They can spur the creation of knowledge and capabilities outside of the core activities of the fund by attracting top talent and launching initiatives like ADIA Labs, particularly when such efforts are well-connected with the domestic R&D and entrepreneurship ecosystem. The experience of the Singaporean fund Temasek is a promising example in this regard.

The SWFs that target broader diversification goals for the UAE could benefit from applying a complexity lens to their investment considerations as well as leveraging a wider range of channels to transfer knowhow. Quantitative indicators of an industry's complexity and strategic value can inform investment decisions abroad and maximize their contribution to the domestic economy by targeting key gaps in domestic knowhow. At the same time, domestic investments can be optimized by considering their relatedness to the fund's foreign portfolio. Having access to all complementary activities needed benefits foreign investments and may help maximize their contribution to domestic diversification as they will be more able to fuse foreign knowhow into the local economy. Finally, SWFs should take advantage of all channels of knowledge spillovers, beyond firm relocation. UAE-based companies in related industries may be able to learn from the funds' foreign investments through training exchanges, general business relationships, board participation, UAE-based conferences and events, or educational programs. Given the strong knowhow transfer through supplier relationships, those should be fostered whenever possible between foreign investments and the domestic economy. SWFs could invest strategically in foreign companies that require knowledge-intensive goods or services that the domestic economy can export. Sourcing these inputs from the UAE could occur naturally, could be encouraged informally, or could be more directly stimulated through incentives.

The Path Ahead

A common theme across all three of these tools is the need of both public-private and public-public coordination, which are critical for diversification. It is hard to interface with potential foreign investors in new activities compared to large incumbents in existing sectors. However, those new sectors have the greatest need for coordinating with the government given the wide variety of (often missing) public inputs required for new activities to take root. At the same time, responsibility for those public inputs is spread across different levels of government, and different agencies and line ministries. Successful diversification is intensive in public-private and public-public coordination, a role that can be filled by FDI promotion agencies, SEZ managers, and SWF investors. Their proximity to new investors must be paired with an ability to coordinate action and break logjams across the public sector, which means pairing strong public administration skills and financial resources with senior government sponsorship and political capital.

Finally, there is value in considering additional diversification drivers and diving deeper into policy areas supporting diversification. We have identified gaps in complexity, knowledge-intensive investments, research and development activity, and innovation outcomes. This suggests the innovation landscape deserves greater analysis. It is also important to continuously monitor and update sectoral prioritization, given the velocity of change in global technology and demand, as exemplified by the global green growth agenda. Diversification is a process that can be self-reinforcing when ignited, and the UAE is rightly focused on this prerequisite to achieving its long-term economic goals.

2. Introduction

The United Arab Emirates (UAE) has enjoyed robust economic performance and progress towards diversification over the past two decades. Tapia et al (2023) highlighted that non-oil exports expanded by 7.7% per year from 2005-2019, and the diversity of those exports increased notably. Service exports performed well, expanding by a factor of 3.5 over the past 14 years. The country has begun a transition from an energy and trade hub to an all-around high-value business and financial hub.

Yet challenges remain in the country's transition to more complex, knowledge-intensive activities. While overall diversification has improved, it continues to lag behind aspirational peer countries. Moreover, the main elements of that diversifying export basket remain energy-intensive, and, most importantly, display relatively low levels of economic complexity. Even compared to some of its oil-exporting peers, the country's economic complexity remains stubbornly low, both in terms of its goods and services exports as elaborated in the "Economic Complexity" report..

2.1 The 'Why': Diversification and Complexity's Role in Economic Growth

There are many reasons to pursue productive diversification. There is first a direct value of diversification from a financial standpoint, in particular for countries with concentrated export baskets subjected to large price volatility, such as oil. In order to mitigate the impact of those price changes on government revenues and external balance, which can wreak havoc across the economy, it is valuable to increase income from sources outside of oil. By simply investing in non-oil sectors abroad, the government can smooth price volatility, improve economic performance, and save for the future. There are other motivations for diversification, beyond smoothing out price volatility of key exports. For one, dominant commodity sectors such as oil may generate significant income but little employment. There are practical social and political motivations for diversifying into other sectors that can absorb more labor, and thereby provide economic and non-economic benefits to the population. There is also a risk of stagnant specialization in a world where global changes in technology and tastes both create new opportunities and bring secular decline to yesterday's dominant sectors. Diversification helps protect against and adjust to those changes.

The diversification process should target increasing the economic complexity of the UAE. The low complexity of the country represents a drag on future economic growth. This is because complexity captures the entire stock of capabilities and knowhow within a country, as expressed in its exports, and that knowhow governs not only what a country can produce today but also what new things it can produce tomorrow. There is a self-reinforcing virtuous circle of growth when a country's stock of knowhow can be recombined and deployed to a wider range of new (and of higher complexity) products and services, leading to even more new opportunities. Conversely, when countries are specialized in low-complexity activities, few new sectors can make use of the existing stock of knowhow, and this dynamic process of diversification, increasing complexity, and economic growth is stunted.

2.2 The 'What': Targets of Diversification

New and larger high-value sectors are essential for the country to meet its goals and continue its transition to a more diversified and sustainable economy. It is necessary to identify sectors and activities with a high-potential targets for diversification. Though conventional economic wisdom twenty years ago eschewed sectoral priorities as 'picking winners', the UAE wisely followed its own path and achieved success by applying a sectoral lens to industrial policy. Every sector has unique needs and every decision a government makes impacts sectors differently, making it 'doomed to choose' among them when making public investment decisions. Having a sense of sector priorities allows the public sector to engage the relevant private sector actors, discover the opportunities and constraints for growth, and ensure the myriad of sector-specific public inputs are well provided.

To that end, the "Economic Complexity" report identifies sectors that have high potential for fueling the UAE's next stage of diversification and growth while building on the country's recent successes. Typically, for opportunities to add more value, high-potential sectors are identified by looking upstream or downstream from existing sectors, or by doing some general qualitative analysis of broad economic trends and recent diversification successes globally. The Economic Complexity Analysis for the UAE takes a complementary, data-driven approach that systematically evaluates every potential sector or activity in terms of some key dimensions. First, the level of sophistication or complexity by analyzing the degree of knowhow, productivity, and wages compared to the country's current level. Second, its attractiveness, including demand and growth trends. Third, its feasibility which is often expressed in terms of relatedness or proximity. This is, how similar the capabilities needed by that activity are to the current capabilities within the country. In other words, how easy or difficult it will be for that activity to successfully take root in the country. Based on these metrics, Tapia et al (2023) identified 63 products and 18 service sectors, summarized by the following 10 themes: ICT, Financial Services, Business Services, Healthcare, Creative Industries, Food Products, Metal Products, Chemical Products, Plastics, and Machinery.

2.3 The ’How’: Tools of Diversification

With these priority sectors in mind, the next question is to consider the tools that the country has and could use to accelerate diversification. The complexity analysis, in combination with similar sectoral assessments by other researchers or consultants and further refinement by country experts, can identify what sectors should be pursued as the government pursues diversification. But the key question after the ‘what’ is the ‘how’: what are the most effective tools to bring about investment and growth in these and other new activities to fuel further export diversification? The ‘how’ is the topic of this paper.

There are a range of tools that have been used by countries to fuel productive diversification. Many countries produce detailed sector-level reform agendas using taskforces, government agencies, or external consulting companies. Efforts are made to attract foreign investors, encourage the return of the high-skilled diaspora, emulate a Silicon Valley-type entrepreneurial ecosystem, and open new opportunities through trade promotion. Industrial parks, export processing zones, and innovation hubs can also play a role.

However, there are key characteristics of the UAE, its history of economic transformation, and its future opportunities and challenges that guide the diversification tools to be used and how to best use them. While there is no such thing as the average country, the UAE is particularly unique in terms of its wealth, sophistication, geographic position, demographics, federal governance, and current productive structure. These characteristics, the priority sectors it is pursuing, and the nature of the country’s economic priorities strongly shape what tools are the most relevant for accelerating export diversification. Moreover, the country’s policies over the past 20 years create a unique starting point from which new initiatives should be launched as well as a variety of institutions and initiatives that can be adapted to these new priorities.[1] Finally, it is not only that the country and its priorities have changed over the past 20 years, but the global economic landscape has also changed. Technology has evolved, while decarbonization and advances in energy have created risks as well as new green growth opportunities. This all motivates a country-specific evaluation of the tools for diversification.

In this paper, we focus on leveraging three tools that have been a core part of the UAE’s diversification efforts to date: foreign direct investment (FDI), free zones

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[1] Past successes might paradoxically also present an obstacle, insofar as the sectors, institutions and policy actions that have driven past diversification successes may or may not be as adapted for future, high-value added diversification.

(FZs), and sovereign wealth funds (SWFs). For each of these tools, we will first provide an overview of their design and performance over the past two decades. In particular, the types of diversification goals they have followed and how they managed to deliver them. Finally, we look ahead and provide some ideas on how these tools could be improved to better accelerate future diversification, in particular diversification towards more valuable, knowledge-intensive sectors that can increase incomes, economic complexity, and knowhow in the economy.

3. Foreign Direct Investment

Key Messages

The UAE has proven successful in attracting foreign direct investment. In quantity, it has seen high level of FDI. Beyond quantity, a part of these FDI inflows have supported the development of new and increasingly sophisticated industries, supporting the ongoing diversification process, and has included the establishment of regional offices and headquarters.

Yet to diversify further and become a global knowledge hub, the UAE may need to attract more sophisticated, knowledge-intensive activities and more R&D-related activities in existing industries.

To this end, the country needs to focus FDI attraction efforts and measure success with a quality-oriented approach, including specific metrics and the materialization of FDI spillovers, as well as evaluate to what extent current policy instruments favor quality FDI.

High-value FDI attraction is likely to depend on successful domestic R&D efforts, which may require a close examination of the missing complementary factors that are preventing existing R&D inputs to translate into innovation results and coordinating their provision across government.

Analyses focused on the relatedness between industries, activities and research can help focus attraction efforts and input provision where they most likely result in business success.

3.1 FDI attraction in the UAE

The UAE government has placed attracting FDI at the top of its priority list, citing it as a key element of its long-term economic development plan. In 2021, as part of the series of reforms to commemorate the UAE's 50th anniversary, the government announced various programs aiming to attract USD 150 billion worth of foreign investment and become one of the 10 largest global investment destinations by 2030. The Abu Dhabi's Economic Vision 2030 strategy specifically states that "FDI can be beneficial for the economy as a whole, as it brings with it knowhow and expertise that can trigger further economic growth." Policy efforts have focused on improving the ease of doing business, incentivizing economic diversification, and investing in logistics infrastructure, which has already positioned the UAE as a leading trade and investment gateway.

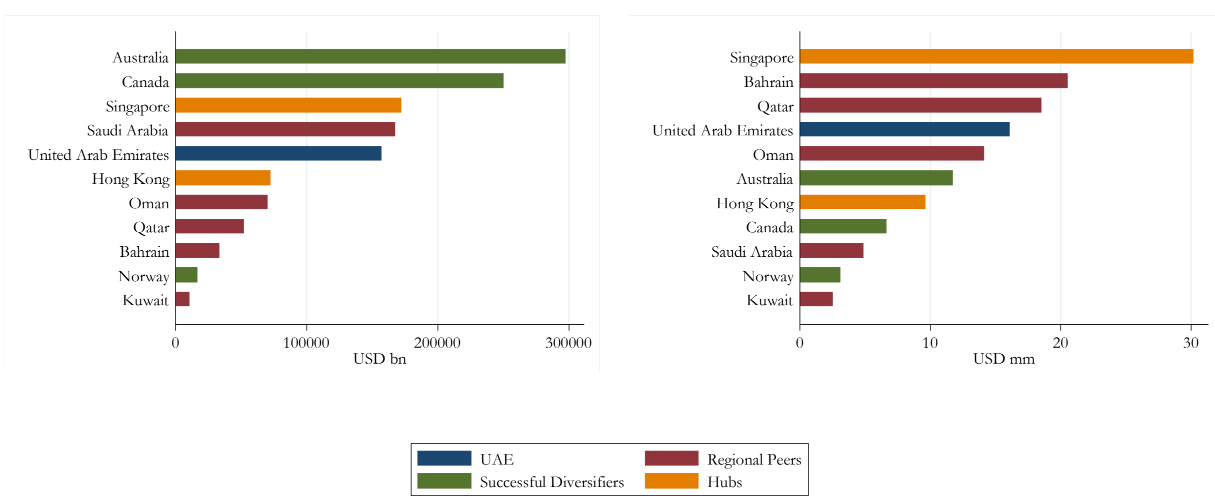
The country has been able to attract major foreign investment inflows, showing similar overall FDI levels to those observed in Saudi Arabia and Singapore (Figure 1, Panel a). In per capita terms, the UAE even surpasses major players in absolute terms such as Australia and Canada, only falling behind Singapore, Qatar, and Bahrain among benchmark countries (Figure 1, Panel b). With a score of 8.4 in the Investment Monitor's 2022 Inward FDI Performance Index, which measures a country's inward investment levels against its GDP, the UAE received more than eight times its GDP-expected share of inward FDI, ranking third globally and first in the region. Likewise, according to the World Investment Report 2022 issued by the United Nations Conference on Trade and Development (UNCTAD), the UAE received 31% and 37% of the total FDI inflow to MENA and West Asia, respectively, ranking first in both regions. Several major global companies — such as Lockheed Martin, Boeing, Northrop Grumman, General Motors, Nova Chemicals, FedEx, Eli Lilly & Company, Mayo Clinic, and Cigna Healthcare – have located offices in the UAE, and many base their headquarters and regional offices in the country.

The overall volume of FDI attracted has varied in time and across Emirates. In terms of the evolution of UAE's FDI over the years, it is possible to distinguish two broad periods. Foreign investments in UAE were larger up until 2008 and, after the fall following the financial crisis, stabilized around lower but still relatively high levels (Figure 2). However, it is worth noting that not all Emirates equally attract FDI. In particular, Dubai and Abu Dhabi have been, by far, the Emirates that have attracted the most FDI over time, together accounting for nearly 75% of FDI inflows on average during the 2005-2019 period.

Figure 1: Total Value of FDI (2005-2019) - UAE and Benchmark Countries

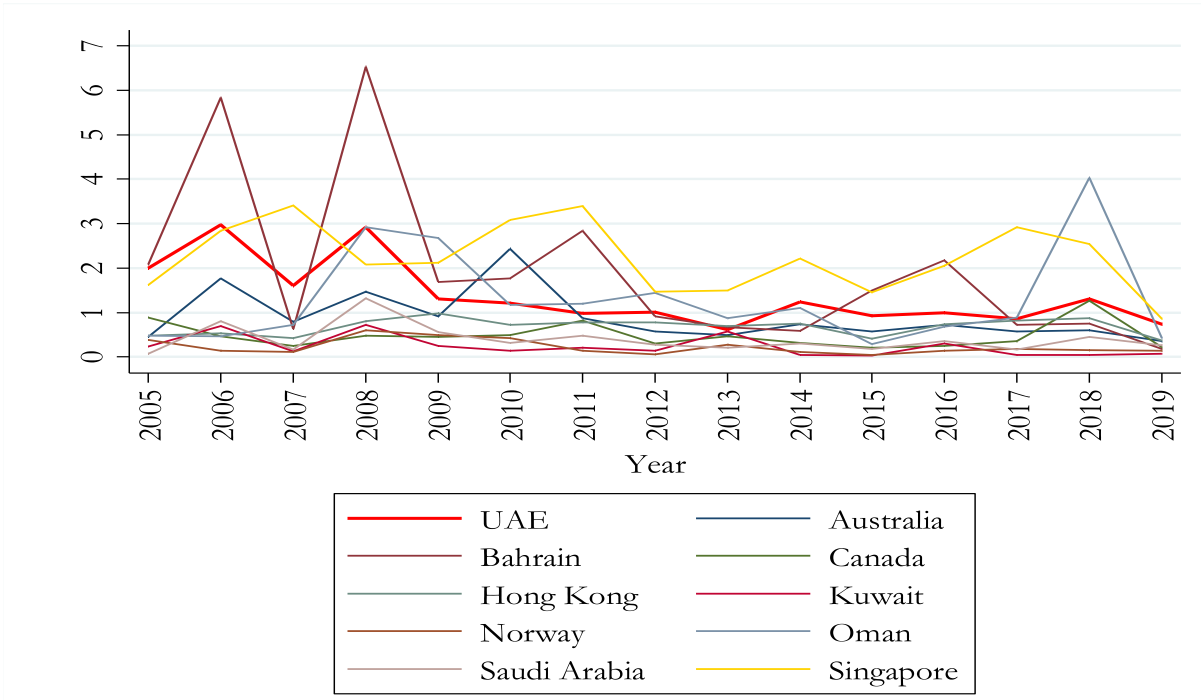
a) Total

b) Per Capita



Source: Own calculations based on FDI information

Figure 2: Value of FDI per Capita (2005-2019) - UAE and Benchmark Countries



* Qatar is excluded to allow for better visualization

Source: Own calculations based on FDI information

3.2 FDI's Contribution to Diversification

There is a large literature on the benefits of FDI for economic development, diversification, and growth. By attracting FDI, countries generally seek faster job creation and economic growth through several channels. The most visible probably corresponds to the greater availability of capital. Multinational companies are usually less financially constrained than local firms, especially - but not exclusively - in emerging markets. Therefore, inward foreign investment can help financially constrained countries make use of their resource endowments or build required infrastructure, among other uses. However, the UAE is a capital and infrastructure-rich country, with large sovereign funds, strong SOEs, and a well-developed financial market. At the same time, high-skilled services – an important part of the UAE's diversification strategy -- are less capital intensive, meaning that benefits of FDI beyond capital, such as knowledge transfer, would be the most relevant for the country.

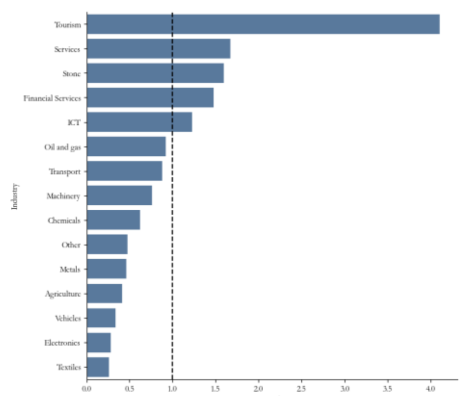
Even in capital-rich countries like the UAE, there are different channels through which FDI can stimulate diversification and growth if more attention is given to its type and quality. Empirical studies show that FDI contributes to factor productivity and income growth in host countries, beyond what domestic investment normally would trigger. FDI influences growth by raising total factor productivity and, more generally, the efficiency of resource use in the recipient economy (OECD, 2002). This means that there are other important channels through which FDI can produce positive externalities. These include entry points into new markets and value chains, stimulus of local investment (through linkages and/or signaling), and improvements in the human capital stock and institutions. Among them, the most important one is perhaps knowledge and technology transfer. Multinationals generally possess a higher level of technology than is available in the host countries and are an important source of corporate R&D activity. Hence, having the potential to generate considerable spillover effects. Implicitly, these channels require a greater focus on the type or quality of FDI, rather than just on its quantity.

FDI inflows appear to have supported the UAE's process of productive diversification from the oil sector. As described in Figure 3, Panel A, the UAE has attracted sizeable investments not only in oil and gas but also in services and tourism. Considering that some sectors are more investment-intensive overall than others, in Figure 3, Panel B we show how that composition compares internationally. Based on the revealed comparative advantage (RCA) relative to the world, the UAE has specialized in attracting FDI in tourism, general services, stone materials, financial services, and ICT. [2] This is consistent with the observed export diversification process, which has been driven by the expansion of different types of services and, among non-oil goods, the growth of stone products.

Figure 3: FDI by Sector in Absolute and Relative Terms (2005-2019) - UAE

a) Sector Share in FDI to the UAE

b) RCA Relative to World by Sector



Source: Own calculations based on FDI information

[2] Revealed Comparative Advantage (RCA) is a measure of the relative prevalence of a product or industry. In this specific case, it is calculated as the ratio between the proportion of the sector in the total FDI inflows of the UAE and the proportion of that same sector in world FDI. If this relationship is greater than one, the UAE receives more FDI in that sector than the global average.

Complementary evidence of the scope and reach of FDI and its impact on the country's diversification trajectory can be found in firm registries. We rely on the employment estimates by industry that were previously introduced in Tapia et al (2023). These estimates are based on data from the National Economic Registry (NER) and ORBIS, a database containing detailed information of millions of companies across the globe.[3] Importantly for this purpose, the NER includes information on the nationality of the company owners. As a result, we can split the sample between the firms with foreign property (which can be jointly with nationals or only foreigners) and those with only national property.

In the assembled dataset, FDI represents a large proportion of economic activity. Companies with foreign ownership total an estimated employment of 3.5 million (joint, 3.1 million, and only foreigners, 1.4 million), while those with only national ownership reach 1.8 million employees in 2021. Moreover, in all sectors –excluding only mining and agriculture- firms with foreign ownership represent more than half of the employment. The sectors where the percentage of foreign company employment is higher than the average (~70%) are information, professional services, wholesale and retail trade, and construction.

FDI inflows have supported the development of the service industries that have driven the UAE's export diversification trajectory. The industrial composition of employment in foreign firms has changed over time, highlighting the sectors in which foreign investment has concentrated in recent decades. We group companies in four cohorts: those that registered (i) before 2000, (ii) in the 2000s, (iii) in the 2010s, and (iv) since 2020. We can also distinguish between firms that only have foreign owners and those that are jointly owned by nationals and foreigners. For the former, as can be seen in Figure 4, Panel A, international trade has always been important, but its dominance has been decreasing over time (the same is true for construction, to a lesser degree), while professional services, information, and financial services have expanded significantly. As for firms with joint national and foreign ownership, construction and trade have receded in importance as professional and business industries have increased, as shown in Figure 4, Panel A.

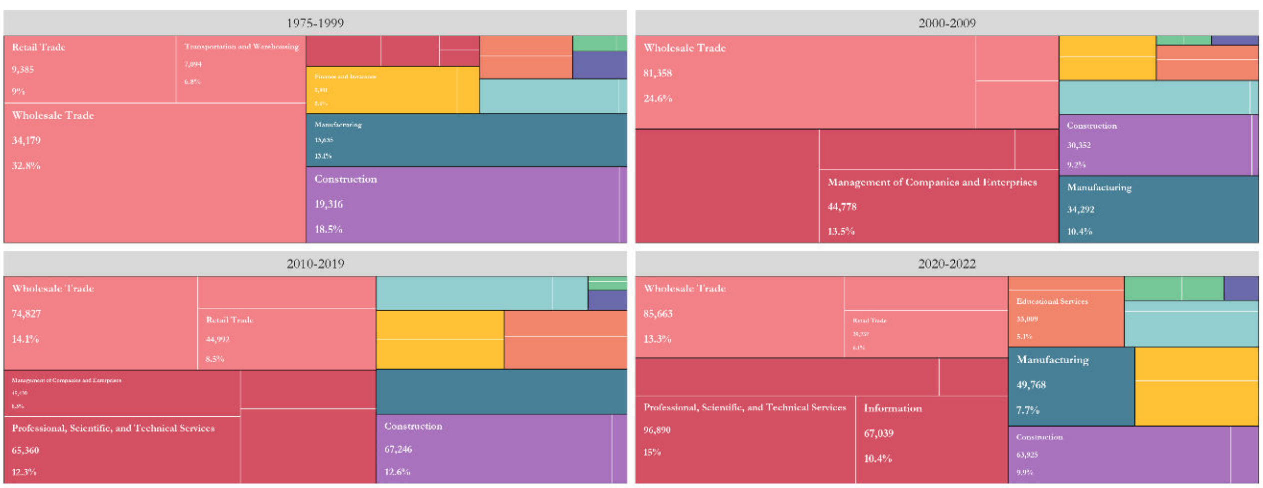
There is some evidence that FDI has been channeled to relatively sophisticated industries. The "quality" of FDI includes the extent to which it has contributed to increasing the economic complexity or sophistication of the country. Ideally, we would like

[3] To build this estimation we developed a time-consuming and highly quantitative process that entailed associating an industry code to each of the companies on the register based on their business description, using natural language processing techniques, and then matching these companies to the ones included in ORBIS to obtain their employment figures. When firm employment was not available in ORBIS, it was imputed based on the average firm employment for the corresponding industry and size-section in the US, and adapted for the UAE aggregate employment figures.

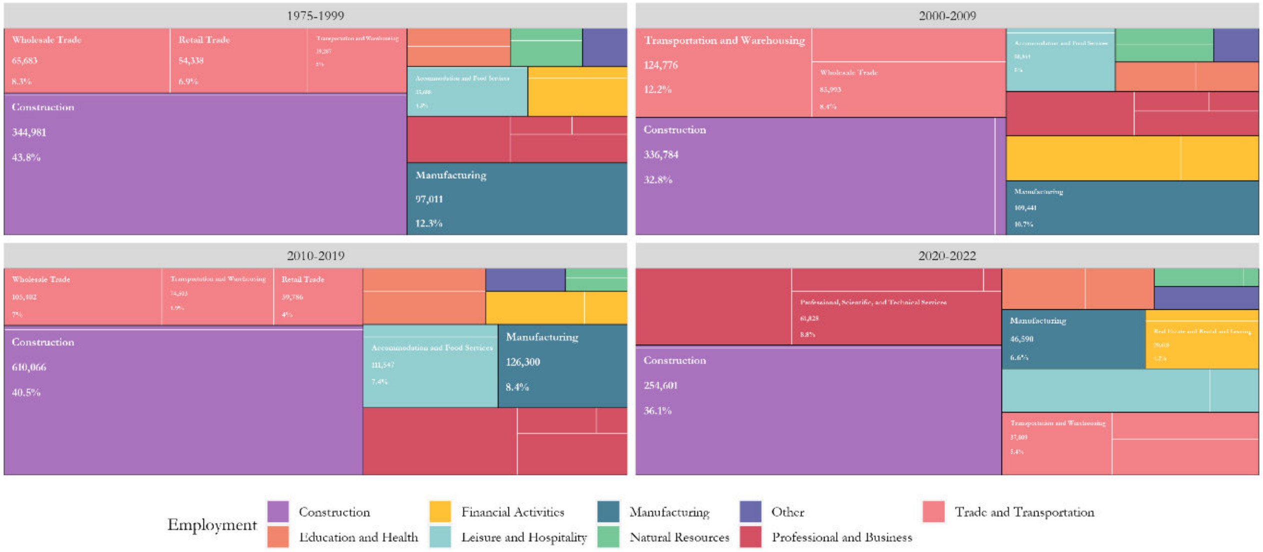
to rely on concepts akin to the product complexity index and/or complexity opportunity gain (how an activity facilitates subsequent transitions to high-complexity industries). However, for technical reasons, calculating these indicators on the employment data used here does not yield reliable results. Therefore, we use the wage levels of industries in the United States as a proxy for their degree of sophistication and compare employment in foreign companies (relative to overall employment) to the level of wages at an industry level. In addition, we distinguish between tradable and non-tradable industries. The results, summarized in Figure 5, suggest that purely foreign-owned firms' FDI has been somewhat concentrated in more sophisticated and tradable industries. The industries that have a higher RCA than the median exhibit an average wage of nearly USD 55,500 and 75% of them are tradable, while the ones below show an average wage close to USD 48,100 and less than 50% are tradable. If, instead, we consider companies with any type of foreign ownership (joint or total), the relationship is less clear.

Figure 4: Employment Share by Industry and Period of Registration (1975-2023) - UAE

a) Only Foreign Ownership



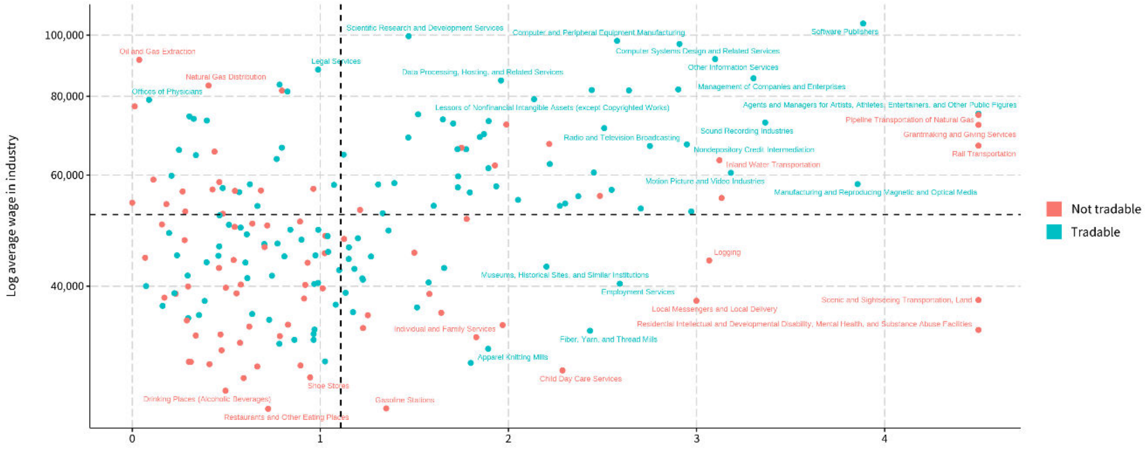
b) Joint Ownership (Foreign-National)



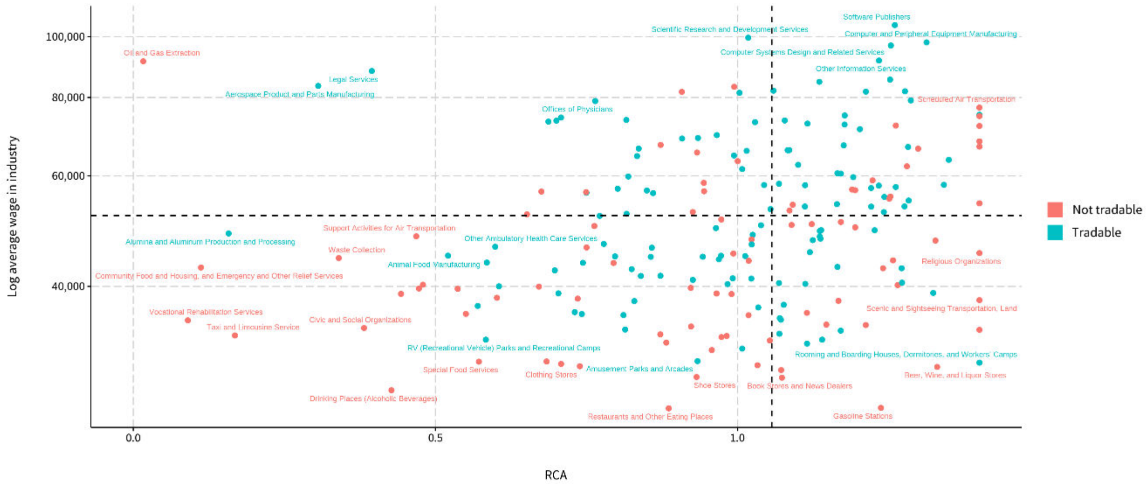
Source: Own calculations based on NER, ORBIS and BLS

Figure 5: Relative Intensity of Foreign Ownership and Level of Wages (2022) - UAE

a) Only Foreign Ownership



b) Any Foreign Ownership

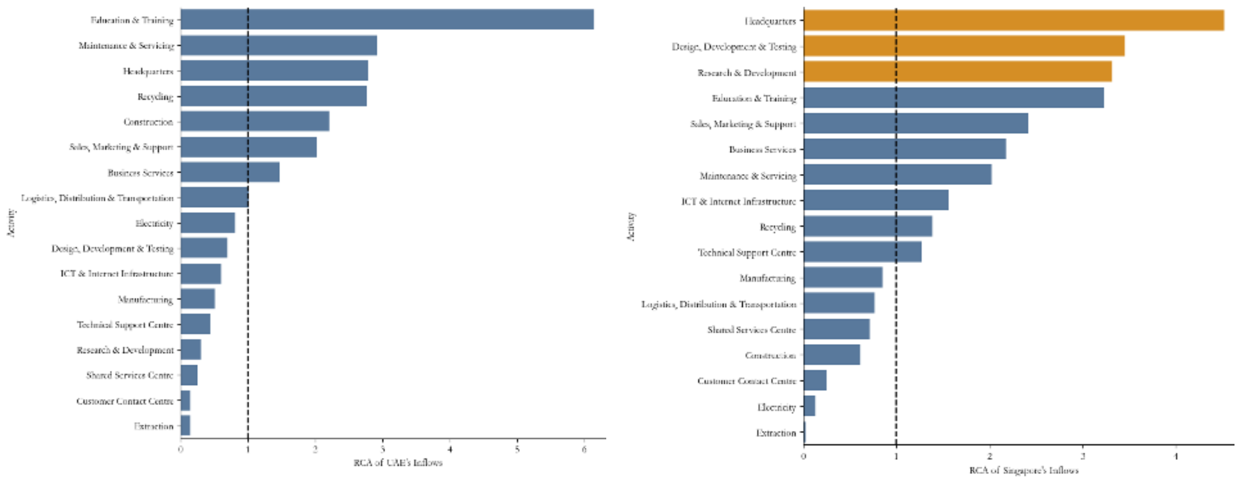


Source: Own calculations based on NER, ORBIS and BLS

However, when analyzing FDI by type of activity rather than industry, the UAE seems to attract less than its expected share in knowledge-intensive activities. Construction and manufacturing represent the largest share of FDI inflows during the period 2005-2019, accounting for more than half of total FDI. If we consider the weight of activities relative to their global FDI, we see that the UAE has specialized in attracting FDI in education, maintenance and servicing, headquarters, recycling, construction, sales marketing and support, and business services activities (Figure 6, Panel A). The UAE is attracting less than its expected share in research and development and design, development and testing, and other activities, which have room to grow. To better assess this performance, a comparison with an aspirational peer like Singapore may be useful. As we can observe in Figure 6, Pabel B, Singapore has largely specialized in the attraction of knowledge-intensive activities such as headquarters, design, development and testing, and research and development. Realizing the UAE's vision of becoming a large international hub may involve attracting FDI of this form. In this regard, it is worth noting that the UAE already shows a certain degree of specialization in the attraction of headquarters, though much less than Singapore or Hong Kong. To continue advancing toward the fulfillment of this vision, the country may have to evolve toward the attraction of more FDI linked to innovation and research.

Figure 6: Specialization of FDI by Activity (2005-2019) – UAE and Singapore

a) UAE **b) Singapore**



* Relative to the world

Source: Own calculations based on FDI information

The UAE's difficulty in attracting R&D-related FDI is likely both a symptom and a cause of the country's relative underperformance in innovation and research output. Building innovation and research capabilities may be an important instrument to meet the UAE's ambitions of pursuing higher added-value economic activities and transitioning towards a knowledge economy. However, the relatively low intensity of FDI inflows directed at R&D and other knowledge-intensive activities has meant that the UAE performs poorly in terms of innovation and research, threatening its chances of achieving those diversification ambitions. According to the Global Innovation Index, the country's innovation outputs remain below what is expected for its level of GDP per capita, and those of peer countries(Figure 7).[4] The main weaknesses in innovation outputs from the UAE come from its relatively low production of patents, scientific publications, and other forms of intangible creation, such as trademarks and industrial designs. In particular, according to data coming from Patstat, patenting activity in the UAE has remained low compared to global peers, though on par with regional peers.[5] In 2019, the number of patents per capita represented less than 2% of the USA level, over-performing Qatar, Oman, and Bahrein, but remaining below what can be seen in Saudi Arabia (4% of USA patenting intensity), and far from the levels shown by countries like Hong Kong and Singapore. A more detailed analysis shows that SOEs (such as Etisalat, Dubai Aluminum PJSC, Borouge, and Etihad), as well as universities and research institutions (like UAE

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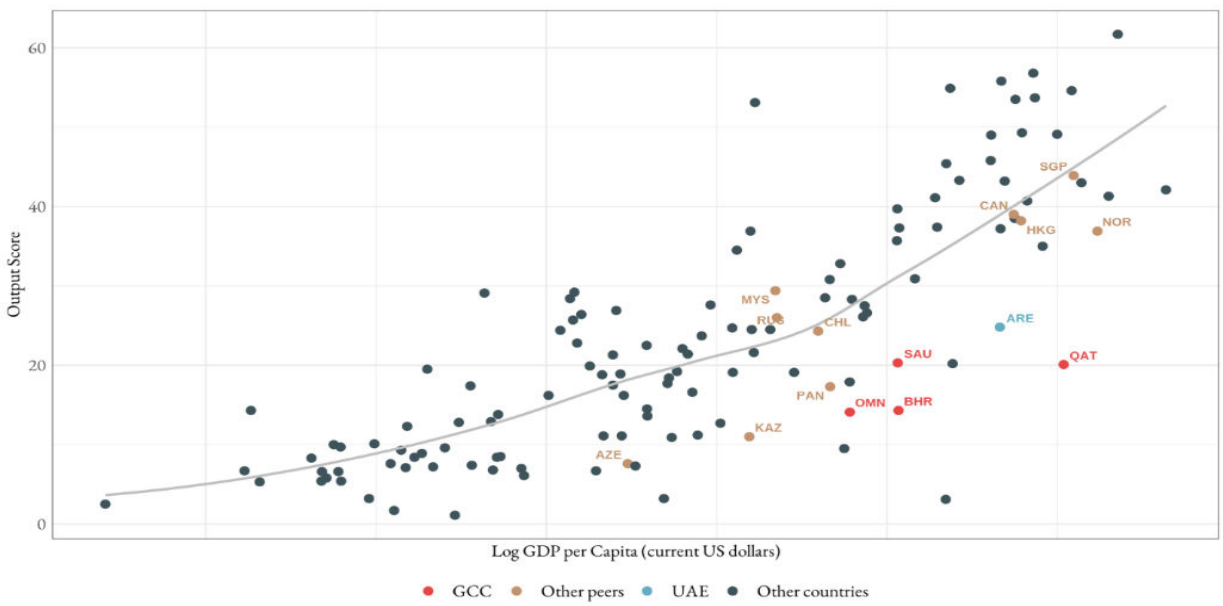
[4] Published annually by the World Intellectual Property Organization (WIPO), the Global Innovation Index provides performance measures and ranks 132 economies on their innovation ecosystems. The index is built on a rich dataset that comprises around 80 indicators from international public and private sources, including measures on the political environment, education, infrastructure and knowledge creation of each economy.

[5] Global database of patent statistics published by European Patent Office (EPO).

University, Masdar Institute of Technology, and Khalifa University), have been the largest sources of patenting activity in the UAE, rather than foreign firms.

In contrast, significant private sector investments have enabled Singapore to position itself as an innovation-driven, knowledge-based economy. That country's success is reflected in the rise in publications, patents, and licensing revenue arising from research during the 2000s (Figure 7). This process has been led by Singapore's private sector, as can be observed in private R&D Spending (Figure 8, Panel A) and resulting patents (Figure 8, Panel B). Importantly, a more detailed analysis reveals that this process has been largely driven by foreign multinationals. In 2020, more than 75% of the R&D spending, patents applied, and patents awarded in the private sector belonged to foreign companies.

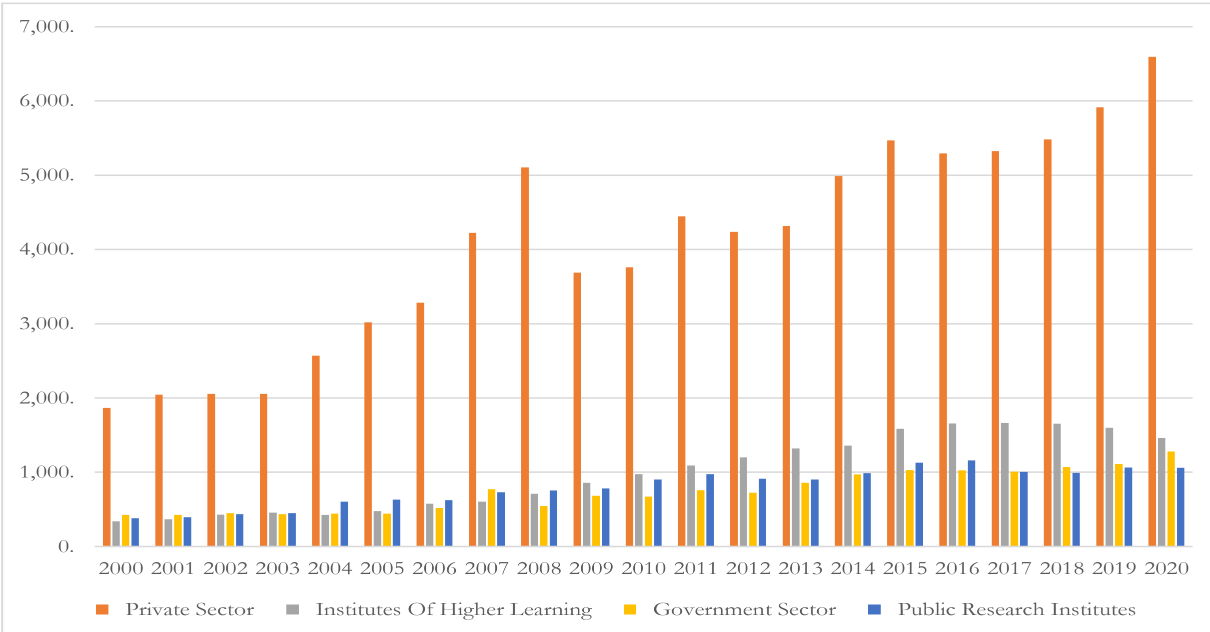
Figure 7: Innovation Output Sub-Index (2022) vs GDP per Capita (2019) – All Countries



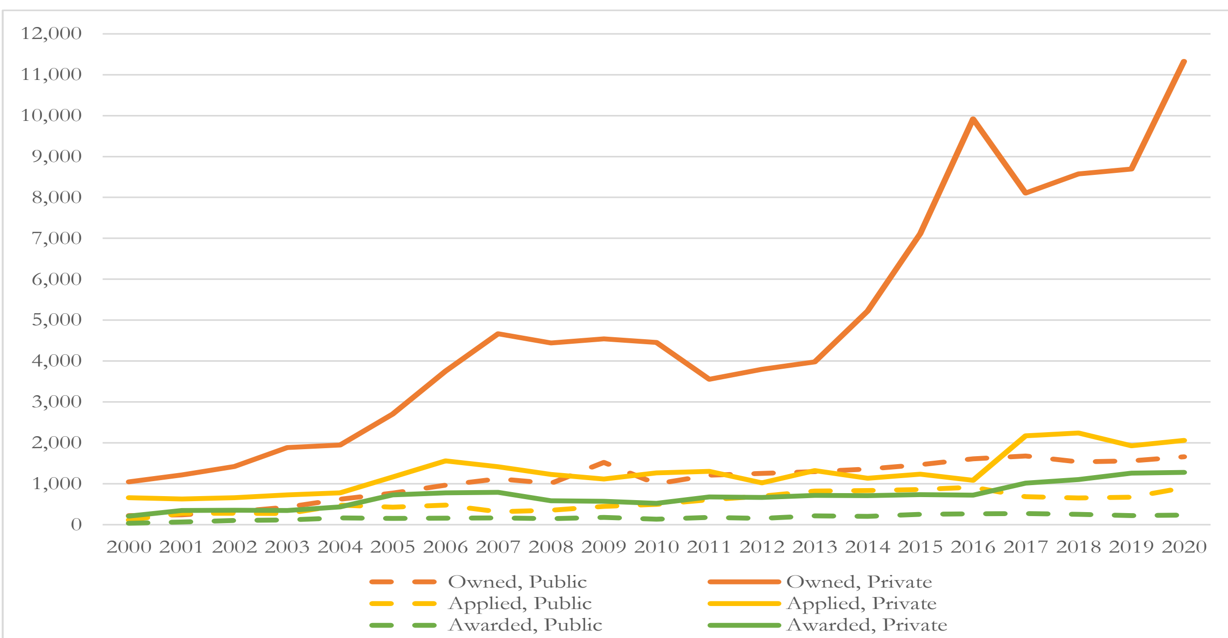
Source: Own calculations based on WDI and GII

Figure 8: Research and Development Metrics by Sector (2000-2020) – Singapore

a) R&D Expenditure by Sector (in SGD million)



b) Patents by Sector (number)

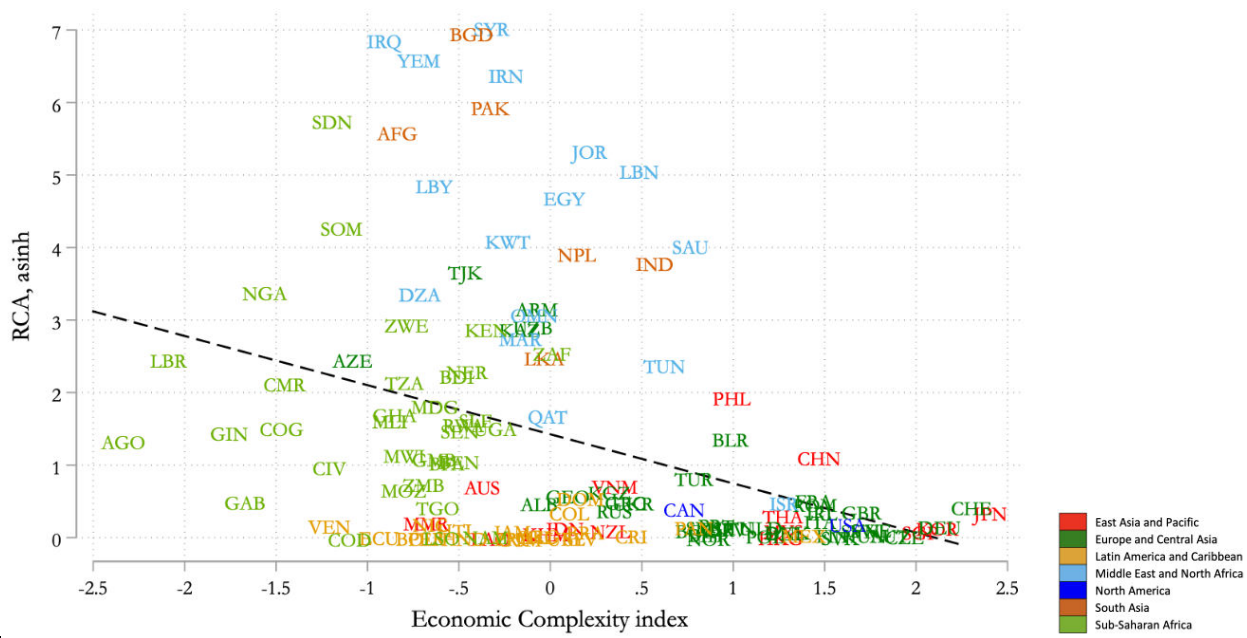


Source: Own calculation based on Singapore Department of Statistics

In terms of FDI sources, neighboring countries are over-represented in FDI inflows to the UAE, while high-income countries with a large FDI presence globally are

underrepresented. We measure the relative prevalence of FDI from every source country using the Dun and Bradstreet (D&B) database, which has detailed information on more than 500 million firms worldwide. In particular, we track firms that state having their headquarters or “global ultimate” in a different country. Since, in the case of the UAE, D&B data quality is particularly poor, we use the National Economic Registry data (which includes information on the nationality of owners). Based on this data, we can calculate an RCA for the different countries of origin of FDI in the UAE.[6] The results of this analysis are summarized in Figure 9, which relates source countries’ RCA with their economic complexity index, colored by region. They show a negative relationship, with almost all high-complexity source countries (usually large global investors) having an RCA below 1. At the same time, most of the countries that display a large RCA are neighboring countries. As a reference, if we do the same exercise for Singapore, it reveals countries with the largest relative presence are mostly high-income and complex (Malaysia, New Zealand, Hong Kong, Taiwan, China, Israel, Korea, and Ireland). It is worth noting, however, that regional and sectoral dynamics partially drive these differences.

Figure 9: Source Countries Relative Presence in FDI and Economic Complexity – UAE



Source: Own calculations based on D&B, NER, and Atlas of Economic Complexity

6 In this case, the RCA corresponds to the share of foreign establishments in the UAE that come from country X, divided by the share of FDI establishments in the world that come from country X. Again, if this relationship is greater than one, we can say that the UAE receives FDI from country X with higher intensity than the rest of the world.

3.3 FDI's Role in Future Diversification

Even though UAE is a capital-rich country, FDI can promote growth as it can bring new productive capabilities into the country. If FDI were just about greater capital availability, the UAE would have little need for it. However, FDI can promote growth through several other channels. In order to build a domestic growth engine and generate positive spillovers to the rest of the economy, the UAE needs to focus on FDI that can bring new productive capabilities from countries where those capabilities are found. To that end, authorities may want to define a set of relevant metrics that are related to the dimensions mentioned and/or evaluated here (productive diversification, economic complexity, strategic value, knowledge intensity, level of wages, source country, and connections into new markets and value chains). In turn, they should consider measuring success against these metrics, even if it means focusing efforts on sectors that represent the largest investments in dollar terms. Moreover, in order to align efforts and facilitate coordination, the country needs to diffuse this approach across all the institutions involved and adapt it to the different Emirates when necessary.

The alignment of incentives with quality objectives may help increase high-quality FDI and its impact on innovation, as it did in Singapore. Singapore's innovation system has been characterized by a strong openness to foreign investments, ideas, and talent. Early on, Singapore recognized and harnessed the benefits of open innovation by collaborating with and anchoring strategic multinational partners, thereby transferring their capabilities and expertise to the local ecosystem while creating good jobs in the local economy. To this end, it introduced a series of incentives, all of which have the unique characteristic of rewarding expansion, upgrading, establishing regional or global headquarters, earning royalties, encouraging innovation, or introducing high-tech skills. Companies that receive these incentives are expected to deliver on performance measured by exports, training, technological upgrading, or research and development. Infrastructure development - a cornerstone in Singapore's strategy - has been designed to facilitate the integration of the capabilities of research institutions, companies, and public sector agencies. As an example, this is the logic behind Singapore's "one-north" development, a 200-hectare purpose-built, high-tech zone, where hubs such as Biopolis and Fusionopolis house public and private institutes and organizations.

While many of the required inputs to attract and develop innovation and research activities seem to be in place, identifying those that are still missing may be crucial to unlock better results in the UAE. In that process, deep interactions with the private sector and prospective investors are key. Although the UAE has underperformed in terms of innovation and research outputs, it shows a positive performance (relative to both peers and level of income) in the "production" of inputs. The country has significantly improved its innovation capabilities around institutions, human capital, market and business sophistication, and infrastructure. Likewise, to increase patenting and innovation activity in recent years, the UAE has joined the Madrid Protocol, enhanced trademark and copyright protection, and issued a new patenting law. Therefore, many of the relevant inputs required to attract more FDI linked to research and development, design and development, and other knowledge-intensive activities seem to be in place.

The main problem of the UAE appears when trying to translate their innovation-related investments to high-quality innovation outcomes. The UAE is not alone in this respect. As highlighted in the last Global Innovation Index report, several high-income economies struggle to obtain a better balance between the level of investment and results. This group includes, notably, oil and natural gas producers and exporters like Canada, Norway, Saudi Arabia, Bahrain, and Brunei Darussalam. Nevertheless, despite efforts to make the necessary inputs available in the UAE, some are not yet accessible. Investment promotion efforts focused on innovation can serve as an information-revelation mechanism to uncover what is needed.

Innovation and complexity data can help guide research and innovation investment towards sectors that have the best combination of proximity to existing activities while moving into the most strategically valuable direction. FDI plays an important role in the diversification of technologies in the UAE, as evidenced by Daboin and Gadgin Matha (2023), where foreign firms were found to be the first patent creators in new technological classes in the country. As shown in Hausmann and Klinger (2006), the probability that a country develops a new industry is related to its existing production capabilities in other similar industries. New capabilities will be more easily accumulated if they can be combined with others that already exist. An implication of this is that a country will diversify by moving from the products they already produce to others that require a similar set of assets and know-how. In Tapia et al (2023), we used a Product Space and an Industry Space to identify the products and industries that can leverage the capabilities already in place, making them more likely to succeed, while also building up the most complex and strategically valuable new capabilities to shift production to more knowledge-intensive sectors. Patent and research data can similarly guide where research and innovation activities would make more sense and thus could attract the related FDI.

Developing new industries and activities requires high levels of coordination across government. Foreign investment in knowledge-intensive sectors involves a vast expanse of government ministries and agencies. International trade and investment treaties, physical infrastructure, the education system, intellectual property law, immigration rules, and a host of other public sector activities significantly and directly impact FDI and its ability to fuel diversification. The public sector has to learn from the industry what inputs are missing and coordinate their provision, which is difficult, especially since the UAE is a federation. Therefore, any strategy to attract and develop these new industries should involve mechanisms to facilitate such public-private and public-public coordination. In this sense, investment promotion agencies can also play a role by acting as advocate for the new industries they are targeting, to maximize their chances of investing and of that investment advancing the country's transformational goals.

4. Free Zones

Key Messages

Free Zones in the UAE have evolved over time, from a first wave providing access to logistical infrastructure to a more diversified second wave providing both hard and soft infrastructure for a wider range of activities including high-value services. More recently, there has been a significant push to expand the role of the zones in Abu Dhabi, with a larger role for government-led anchor investments.

While the success of the Jebel Ali Free Zone is well documented, in the last few years there have been other success cases. Dubai Silicon Oasis has managed to attract firms even outside of its initial high-tech scope, while the Hamriyah Free Zone has increased its manufacturing capabilities by catering to SMEs, and twofour54 has developed a media cluster in Abu Dhabi.

Historically, Free Zones in the UAE benefitted from allowing full foreign ownership of firms operating in the zones, which presented a major regulatory advantage for FDI localization against the mainland.

Even though the restrictions on foreign ownership in the mainland were lifted in 2020, zones retain important regulatory benefits affecting labor regulations and taxation. As a result, they are likely to remain important policy instruments to drive future diversification.

Going forward, successful management of the zones and the attraction of future investment will require continued adaptation to the firms' needs, coordination across government, and innovation in policy and infrastructure improvements. This may prove especially important to attract activities that are newer to the UAE and will drive further diversification.

Policy efforts may also focus on less successful Free Zones. Those might benefit from learning from the most successful zones, increased coordination across Emirates and zones, and possibly changes in their governance structure.

4.1 Origins and Evolution of Free Zones in the UAE –

Special Economic Zones (SEZs) provide a range of incentives and amenities depending on their policy objectives. These programs usually provide some sort of financial and non-financial incentives encouraging firms to set up establishments within the boundaries of the Free Zone. Financial incentives can include tax breaks or outright subsidies. Non-financial incentives include special customs regimes and other relaxed regulatory frameworks, such as more flexible immigration or ownership regulations. Importantly, FZs also act as providers and coordinators of public inputs, facilitating and improving local provision of public goods including hard and soft infrastructure, as well as acting as one-stop-shops for administrative services. [7]

While FZs might offer several incentives, only some of them tend to prove important for firms' investment decisions. Adequate FZs policies are important for investment attraction into them, while having good industrial infrastructure, a strategic location, and good service provision tend to be conducive to investment attraction. Fiscal incentives usually have a more limited influence on firms' decisions to locate in a FZ (Frick and Rodríguez-Pose, 2023).

4.1.1 The origins of Free Zones in the UAE as logistics hubs

In the UAE, FZs were initially conceived as international trade hubs next to port infrastructure. The policy was designed to attract foreign firms by allowing full ownership and providing more flexible labor regulations, while also providing a place where no tariffs were charged on imports, creating favorable conditions for re-exporting activities. At the same time, it also created opportunities for Emiratis to work within the FZs corporate structures (Mogielnicki, 2021).

Table 1. First FZs per Emirate and Years of Creation

Emirate	First Free Zone	Year of establishment
Dubai	Jebel Ali Free Zone	1985
Umm Al Quwain	Umm Al Quwain Free Zone	1986
Fujairah	Fujairah Free Zone	1987
Ajman	Ajman Free Zone	1988
Sharjah	Hamriyah Free Zone	1995
Ras Al Khaimah	Ras Al Khaimah Free Trade Zone	2000
Abu Dhabi	Masdar City Free Zone	2008

Source: Own elaboration based on JAFZA (2023), HFZA (2023), AFZA (2023), Masdar City (2023), RAKEZ (2023), Mogielnicki (2021)

The Emirate of Dubai pioneered the introduction of the FZs policy in the UAE, quickly followed by other Emirates. Its first FZ was located in the port of Jebel Ali and initially

[7] While they sometimes are used differently to attract attention to the main benefits provided by the zones, the terms Special Economic Zones (SEZs) and Free Zones are used interchangeably in this section, as Free Zones is the way that UAE governments tend to refer to SEZs policy.

housed 19 companies. The main purpose of its creation was to provide a space where companies could alter products and immediately re-export freely to other destinations without having to pay import duties inside the UAE (Galadari Law, 2020). At the same time, the FZ was trying to lure commercial activity away from the Dubai Creek to a place where it would have more physical space to expand (Mogielnicki 2021).[8] Other Emirates followed Dubai's policy with JAFZA, albeit with a smaller initial endowment of resources. Ajman, Fujairah, and Umm Al Quwain created their own FZs in subsequent years, establishing them next to their own ports, but with less successful results given the infrastructure gap. This can be attributed to Dubai being a more established business destination and the presence of the Jebel Ali port.

Latecomers to the implementation of the FZs policy were Abu Dhabi, Ras Al-Khaimah, and Sharjah. Ras Al-Khaimah and Sharjah started their FZs policy in the late 1990s with the creation of FZs around the ports of Mina Saqr and Hamriyah, respectively. On the other side, Abu Dhabi was historically prioritizing state-led developments and focusing less on FDI attraction, delaying the implementation of FZs policy until 2006 when Masdar City was created. Abu Dhabi did not establish a port FZ until 2012 when KIZAD was established.

4.1.2 From logistics to a diversified model

Starting in the 2000s and led by Dubai, the FZs policy shifted to the provision of infrastructure for services like finance, insurance, and ICT. Starting with Dubai Internet City as a technology hub in the year 2000, the Emirate started to develop a more expansive FZs policy that was met with strong market demand given the success of JAFZA (Mogielnicki 2021). By the end of the decade, more than 20 FZs were operating in Dubai in a variety of sectors such as finance, ICT, and media. FZs such as Dubai International Financial Centre (DIFC), Dubai Silicon Oasis (DSO), and Dubai Multi Commodities Centre (DMCC) have been at the forefront of Dubai's economic model since the 2000s. Established in 2002, 2003, and 2004 respectively, these FZs have been fundamental in the consolidation of hubs for the financial services, technology and, trade intermediation sectors. These sectors have been an important part of the growth in services exports in the last 10 years (Growth Lab, 2023).

Some years later, the Northern Emirates followed Dubai's Free Zone model. Starting in the 2010s, Emirates like Sharjah and Ajman began emulating some of the zones that were created in the previous decade in Dubai with similar policy objectives and goals. Zones like Ajman Media City Free Zone, Sharjah Publishing City, and Ras Al-Khaimah

[8] Even though it was the main historical point of commercial activity in the Emirate, the Dubai Creek's shallow waters did not allow the original port of Dubai to receive large maritime vessels, which led to the dredging of the Jebel Ali port in 1975.

International Corporate Center were created with similar regulations and governance structures as the zones created in Dubai.

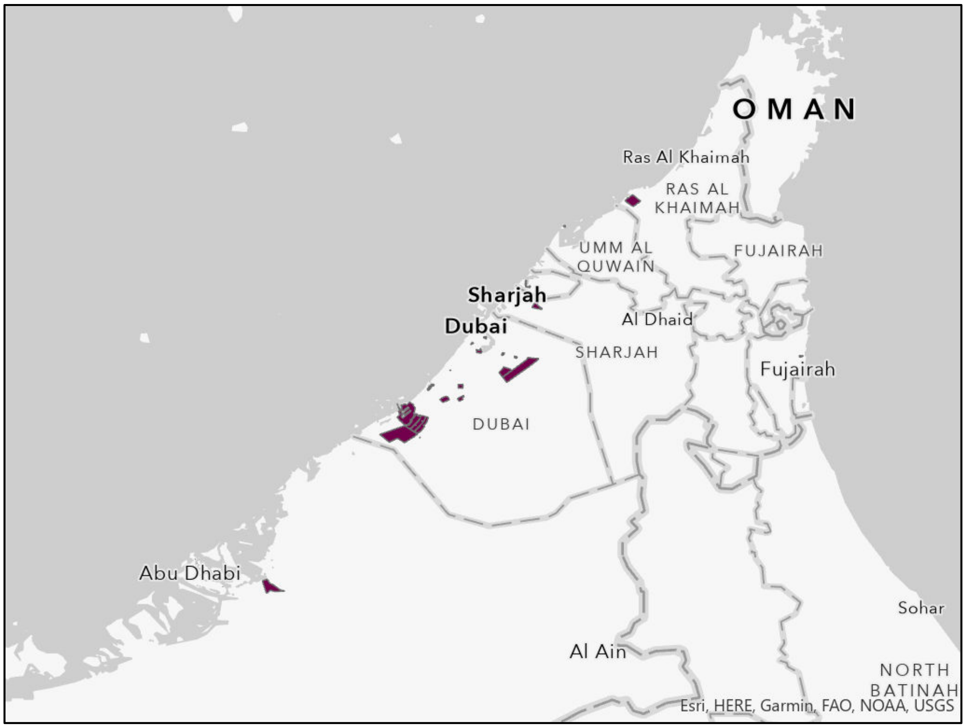
In the late 2000s, Abu Dhabi started to leverage the benefits of accessing state resources as a strategy to attract companies as part of its Free Zone policy. The Abu Dhabi National Oil Company (ADNOC) and other entities of the Abu Dhabi government would condition procurement to the registration of the firm within FZs such as Masdar City, for which ADNOC acted as an anchor investor (Mogielnicki 2021). Later, the Emirate would provide physical infrastructure and regulations similar to those offered in Dubai, while also keeping the other elements of its policy in place.

4.1.3 The current state of Free Zone policies in the UAE

Until 2020, the biggest advantage provided by the FZs was allowing full foreign ownership of companies that operate within its boundaries. The policy outside of the FZs stated that no foreign citizen could own more than 49% of a company, which made the FZs the only investment option for foreign-owned firms. Among the different types of regulatory arbitrage that the zones offered, this was one of the main drivers of foreign investment attraction into the Zones (Haouas and Soto 2012).[9] These advantages have evolved to include access to State resources in the case of Abu Dhabi's zones, or access to better infrastructure as is the case for Dubai's and Sharjah's zones. Figure 10 shows the current FZs in the UAE.

Figure 10. Map of the current Free Zones in the UAE

[9] Free zones offer exemptions from taxes such as tariffs, value added tax and some other exemptions from some labor regulations. They were especially important to offer an alternative to the *kafala* system.



Source: Own elaboration based on OpenStreetMaps.

Yet all Emirates have strived to develop Free Zone benefits going beyond this regulatory advantage. The zones not only offer advantages like full ownership, but also additional services such as human resources, logistics, power supply, and IT. Each Emirate has its own Free Zone policy aligned with its economic strategies. These policies outline the focus, fees, exemptions, and authority for each zone. This approach allows for a diverse range of services tailored to the UAE's overall goals, like sustainable infrastructure in zones like Masdar City, Hamriyah Free Zone, and Enpark, in line with the UAE Vision 2021.

Some of the most successful zones recently have received accolades for their service offering. Hamriyah Free Zone (HFZA), Khalifa Industrial Zones Abu Dhabi (KIZAD), and Ajman Free Zone (AFZA) have experienced rapid growth. These FZs have been highly regarded for their attractive offerings and services, earning them a spot among the top six FZs globally in the fDi Intelligence ranks of 2023. Steel industry leaders like ArcelorMittal have continued to invest in HFZA, while KIZAD and AFZA have successfully attracted manufacturing plants and re-exporting firms into their zones (fDi Intelligence 2023).

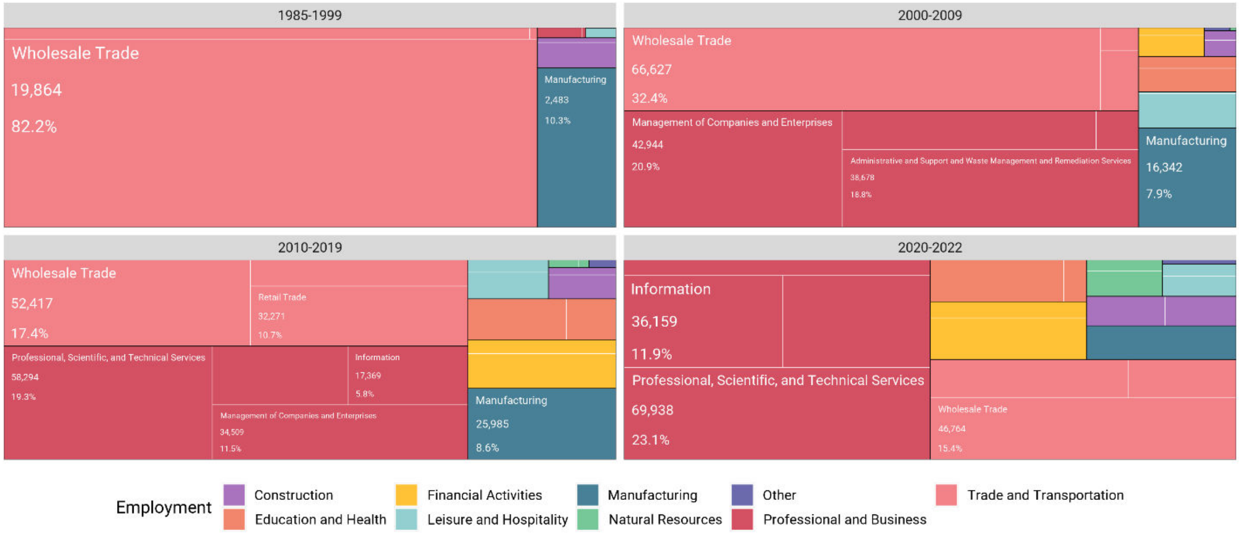
4.2 Free Zones as Enablers of the UAE’s Diversification Strategy

FZs have emerged as a crucial element of the UAE's strategy to diversify from its oil-based economy. As part of this transformation, companies located within the FZs have evolved, being both a reflection of the changing industrial composition of the country and a driver of their efforts to develop new capabilities. Initially, they were predominantly focused on wholesale trade activities related to re-exporting, situated near the primary ports of each Emirate for logistical and travel convenience. Over time, however, these zones have expanded to host more complex services (Figure 11).

The re-export industry has been a key starting point of the Free Zone policy in the UAE, which has led to different patterns of re-export specialization in each Emirate. The combination of logistical capabilities and infrastructure attributes of each port, along with the types of re-exporting firms they have successfully attracted, may have dictated the nature of their exports, and put in place persistent patterns of specialization. For instance, KIZAD in Abu Dhabi is the primary gateway for the re-export of vehicles transiting through the UAE's ports, whereas Jebel Ali in Dubai is responsible for most of the country's electronics and machinery re-exports. (Figure 12).

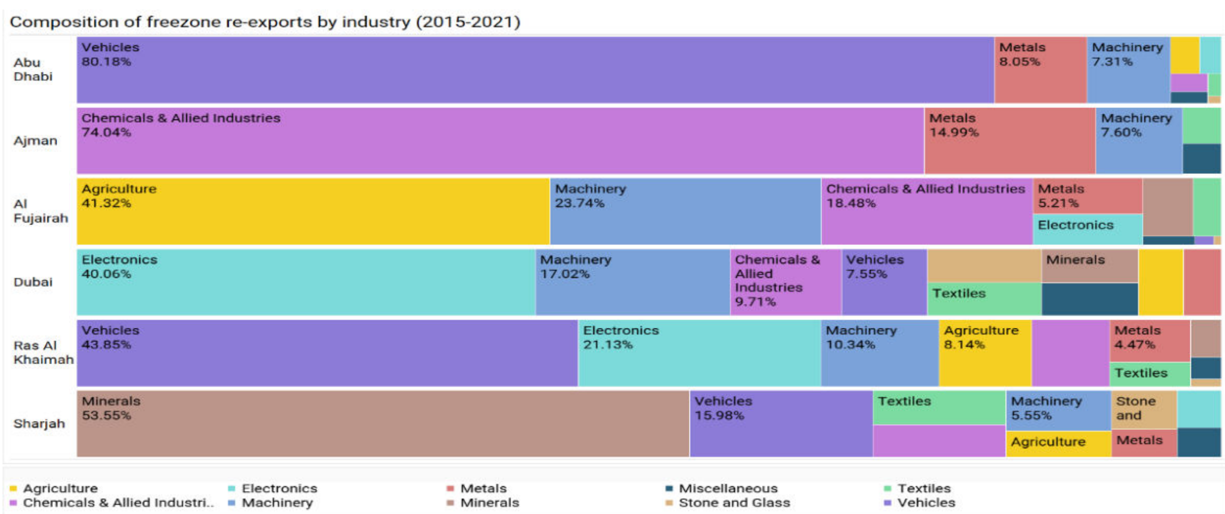
From these conditions, notable patterns of specialization have emerged in each of the FZs. These specializations are governed by the initial focus of each Free Zone, the types of re-exporting activities that took hold, as well as their evolving service offerings (Figure 13). There is a group of zones with an important concentration of transport and wholesale activities given their proximity to the seaports (such as AFZA, JAFZA, or HFZA) and airports (ADAFZ and DAFZ). Other zones have concentrated on a variety of services such as information and media activities (TwoFour54, Ajman Media City Free Zone, Sharjah Publishing Free Zone and Sharjah Media City), health care activities (Dubai Healthcare City), professional services (Dubai Silicon Oasis, Dubai South, Fujairah Free Zone, KIZAD) and of course insurance, management and finance (Dubai International Financial Center, Dubai World Trade Center, and Ajamn Media City Free Zone).

Figure 11. Firm Composition by year of firm creation, all Free Zones, by size of estimated employment



Source: Own calculations based on National Economic Registry (NER).[10].

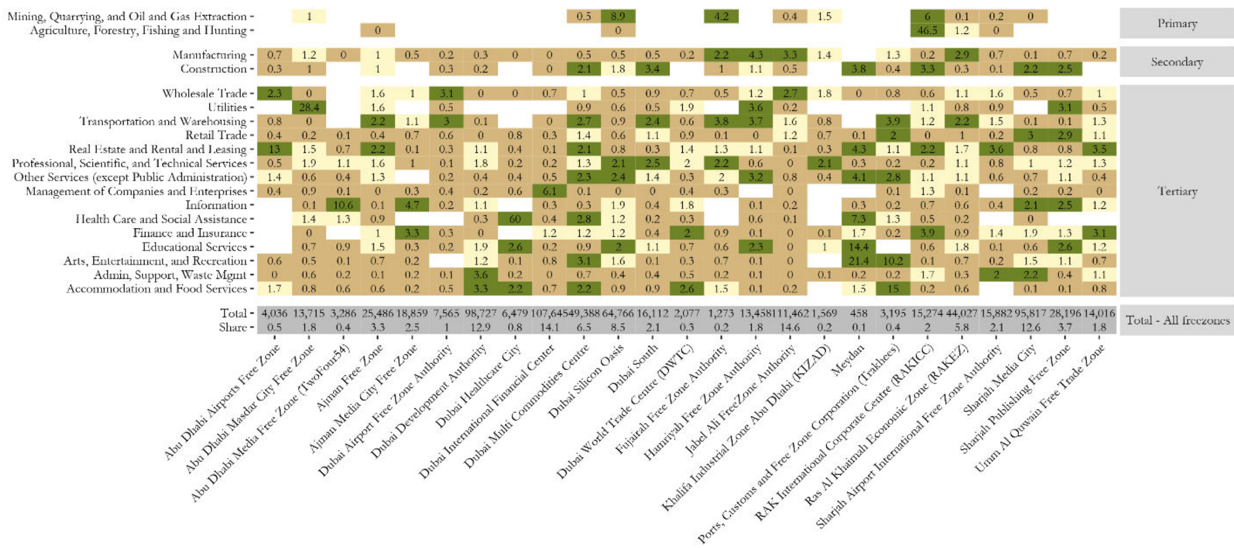
Figure 12. Freezone Re-Export Composition per Emirate (2015-2021)



Source: Oen calculations based on FCSC

Figure 13. Comparative Advantage of Free Zone Authorities within the UAE

[10] Data comes from the National Economic Registry, collected by individual authorities, and compiled by the Ministry of Economy. Growth Lab (2023) processed information from the registry to assign industrial codes in NAICS classification and estimate employment by industry code.



Source: Own calculation based on NER

4.2.1 Selected Free Zone Case Studies: JAFZA, Dubai Silicon Oasis, Hamriyah & Abu Dhabi

JAFZA has transformed from a port-centered zone into a diversified hub that includes a variety of manufacturing and support services (Figure 14). The zone was initially a place where re-exporting firms could get logistical services and send their products to other markets across the world, which was later expanded to include light industrial units, retail spaces, and office buildings. This has allowed the Free Zone to diversify from its initial endowment of firms, while also keeping its comparative advantage in the logistics provided by JAFZA's operator, DP World. DP World's success in JAFZA led to the creation of more FZs under their umbrella. The physical expansions in the 1990s, the creation of a variety of FZs with different sets of policy objectives in the 2000s, and the continued adaptability of JAFZA itself have all contributed to significant growth. Today, several zones operate under the umbrella of DP World's authority, including manufacturing zones (National Industries Park), trade facilitation zones (Dubai Textile City), and the logistical hub of the port of Jabel Ali.

Another interesting case of diversification is Dubai Silicon Oasis (DSO), designed with a technological hub focus, which then generated a variety of additional opportunities (Figure 15). The core idea behind DSO was to establish a hub for high-tech industries, primarily focusing on digital technology. Companies like Gulf Data Hub (GFH) created high-capacity reliable data centers in this Free Zone. Since the opening of their first data center in 2012, GFH has opened three additional data centers with more capacity and is planning to open three more in the next five years in DSO (Gulf Data Hub 2023). The zone has successfully attracted a variety of technology companies, including more than one thousand firms in data processing, hosting, and classification services.

However, the business climate and infrastructure provided by the operator have managed to lure companies that benefit from the physical and technological infrastructure that support high-tech firms, but in sectors beyond technology, surpassing initial expectations set for such a Free Zone. For example, by the end of 2022, the Free Zone had more than 300 firms registered that were related to the oil industry. Significant global service providers such as Exterran were operating, with an important number of data-intensive positions being offered (Exterran Eastern Hemisphere FZE 2023). Additionally, more than 30 providers of geophysical surveying services were also operating under their infrastructure. Moreover, in healthcare, Fakeeh Care Group (Saudi Arabia) has been operating a university hospital within the Free Zone since 2019. The "state-of-the-art" hospital takes advantage of DSO's technological capabilities and has led to the registration of more than 50 firms that provide different types of healthcare within the Free Zone, including a John Hopkins affiliated medical center. The establishment of this diverse set of industries within DSO shows a significant capacity to respond to the needs of the tenants of the Free Zone.

Free zone success in attracting firms beyond their initial goals has not been limited to Dubai. The Hamriyah Free Zone in Sharjah has enjoyed similar success to Jebel Ali, in which they have managed to attract different industries beyond their explicit advantage in transportation and wholesale trade (Figure 17). In the last few years, Hamriyah has won investments in manufacturing, such as the Arcelormittal's new plant, and has managed to attract companies in professional services that provide marketing research services.[11] Hamriyah's success in attracting manufacturing firms has largely been driven by energy-intensive, heavy industries for which the UAE has a comparative advantage. This zone is the second largest in the UAE in terms of available land, enjoys access to the Hamriyah's port facilities, and belongs to the Dubai Metropolitan Area. All these factors make the zone an attractive place for manufacturing facilities, particularly energy-intensive industries such as petrochemicals, steel, and iron. See Box 1 for more details.

Abu Dhabi's FZs have relied more on a model of State support. In KIZAD, the main firm that serves as an anchor for the zone is Emirates Global Aluminum (EGA), a joint venture between the Emirates of Dubai and Abu Dhabi through Mubadala and the Investment Corporation of Dubai (ICD). Masdar City Free Zone is owned and operated by Masdar Energy, which is a subsidiary of ADNOC, and Etihad, Abu Dhabi's airline, works as an anchor firm for ADAFZA. However, the model of State support has not been limited to anchoring State-Owned Enterprises (SOEs) in the zones. Other policies have been put in place to incentivize firms to move to the Abu Dhabi FZs, such as the waiver of the fees

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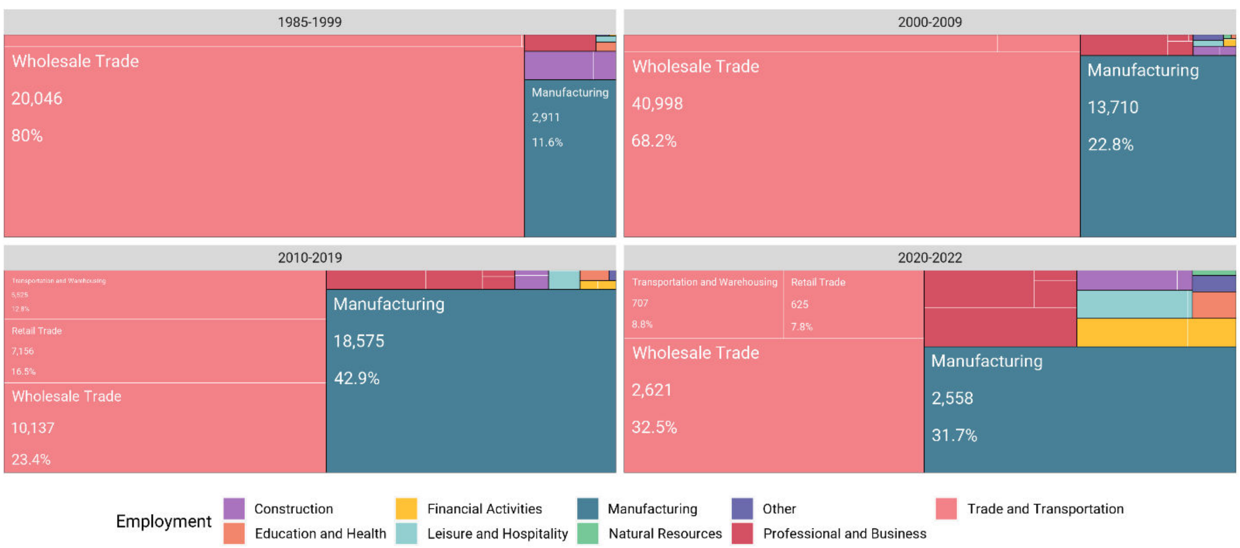
[11] Arcelormittal is the second largest multinational steel manufacturing corporation, and it is owned by Mittal Steel from India.

paid to the zones if they are beneficiaries of the Khalifa Fund (Mogielnicki 2021). Finally, cheap and readily available energy has attracted energy-intensive manufacturing investments.

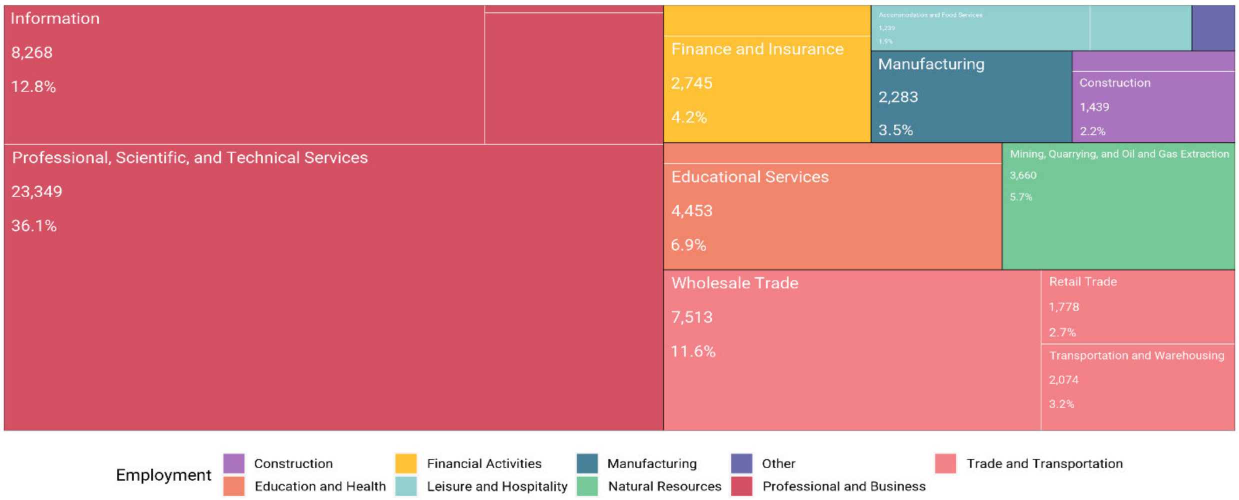
The Free Zone twofour54 has been an outlier in the policies implemented by the government of Abu Dhabi, as they have been able to attract professional services and ICT firms while not having an SOE as an anchor firm (Figure 17). This Free Zone has a partnership with CNN and specializes in the attraction of firms from the media industry. The access to visas for freelance residency and the establishment of several media companies within this Free Zone has allowed them to develop a cluster of companies in industries such as Marketing Services, Picture and Video Production, and Software Development for Gaming, in which multinationals such as Ubisoft are present.

Figure 14. JAFZA Firm Creation, by size of estimated employment (1985-2022)



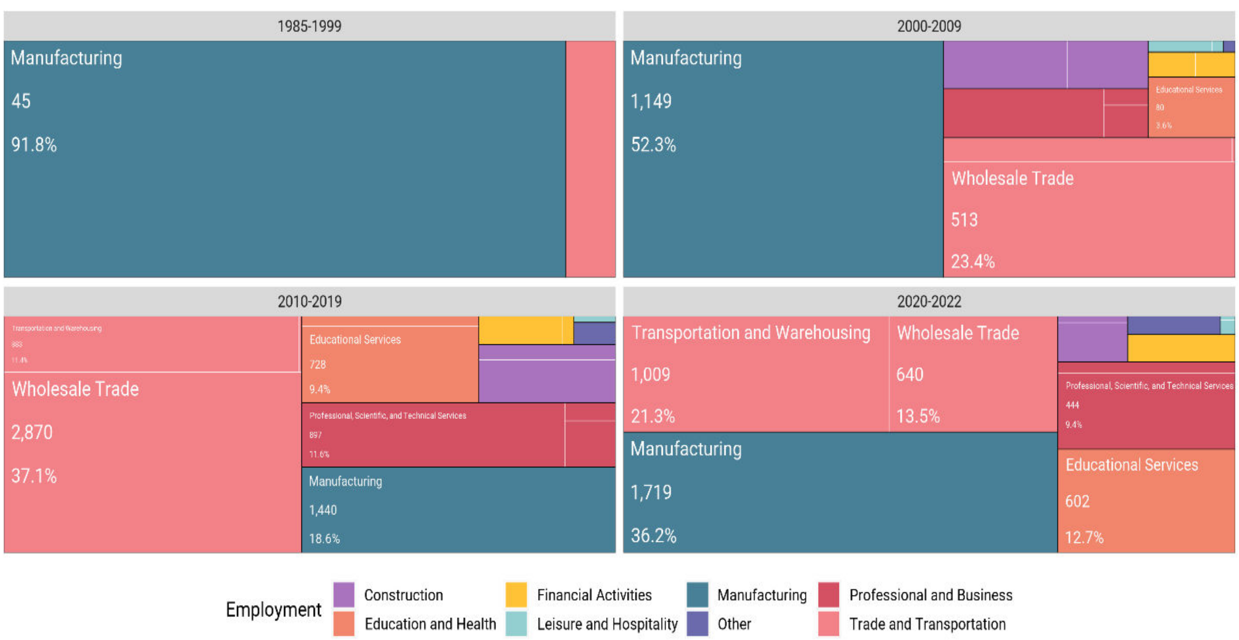
Source: Own calculations based on NER

Figure 15. Industrial Composition of Dubai Silicon Oasis, by size of estimated employment



Source: Own calculations based on NER.

Figure 16. Industrial Composition per Time period of Hamriyah Free Zone, by size of estimated employment



Source: Own calculations based on NER

Figure 17. Industrial Composition of twofour54, by size of estimated employment

Source: Own calculations based on NER.

Box 1: Hamriyah Free Zone:

Out of JAFZA's shadow through targeted policies and careful positioning

The Hamriyah Free Zone in the Emirate of Sharjah is conveniently located close to Dubai and adjacent to the Hamriyah Port. The zone was created in 1995 and established under the management of the Hamriyah Free Zone Authority (HFZA). HFZA started with approximately 55 businesses, concentrated in manufacturing and re-exporting services, and grew to more than 3,400 businesses operating in a wide array of other services, including educational services (Sharjah Business Feature 2017).

The recent success of the zone can be attributed to several factors, but especially to their shift in focus to support and attract SMEs into HFZA. The zone has been praised for the support provided to Small and Medium Enterprises and the responsiveness to their needs (fDi Intelligence 2023), which has been a stated focus since 2011 (Emirates News Agency 2011). Among the policies designed to support SMEs in their operations is easy access to financial support from banks, including instruments to finance Capex, expansions, or energy transition. Zone management has signed deals with banks such as EDB, Mashreq and Etihad Credit Insurance to increase availability of options and funds for the zone's firms.

In addition to financial support, the Free Zone provides a range of industry-specific services, from support to comply with food safety regulations to access to more than 900 storage tanks for oil-related activities. While the zone benefits from its proximity to Dubai's port, it can provide access to a port with similar capabilities as Jabel Ali, access to land and facilities to accommodate workers.

The Jebel Ali Free Zone presents formidable competition for Hamriyah. It is in the Emirate of Dubai, halfway between the cities of Abu Dhabi and Dubai. Following a merger in 2005, the zone has been operated by DP World, a State-Owned Enterprise held by the Investment Corporation of Dubai. The zone contributes to more than a quarter of Dubai's GDP (JAFZA 2023) and concentrates almost half of all non-oil exports of the UAE (Mogielnicki 2021). In contrast with HFZA, DP World has grown to be a global company that handles more than 40 ports and terminals, and 5 economic zones around the world. Given its scale of the operations, the fees obtained from firms operating within the Free Zone make up a small portion of the overall revenue of the company. While JAFZA does not provide the same type of support to SMEs as HFZA, it does offer a more mature cluster for logistical and manufacturing activities, access to the biggest port in the UAE and geographic proximity to the one of the biggest cargo airports in the world: Al Maktoum International Airport.

It's important to highlight that HFZA has been able to provide enough value to the firms in its zone to attract SMEs and large global firms despite the competition from Jebel Ali and the Dubai economy. Competitive fees, increased availability of land, added services and operations responsive to the needs of its tenants have been key in the recent success of HFZA.

4.3 Leveraging the Free Zones for Future Diversification

The UAE's regulatory landscape underwent a major change in 2020 when the foreign ownership requirement policy was changed in the mainland. This has led to some questions about the FZs future. This policy shift was aimed at bolstering foreign investment, promoting economic diversification, and making the business environment more competitive. However, the change had a significant impact on the Free Zone policy of the Emirates, as this was the original regulatory arbitrage benefit that they offered.

Despite this change, major regulatory advantages remain for the FZs. Tax benefits and labor regulations remain as advantages that FZs can use to attract investors. Most of the Free Zones in the UAE offer exemptions to the VAT tax introduced in January 2018, and will offer an exemption to the Corporate Tax that is going to be introduced in June 2023. Combined with no restrictions on the attraction of foreign talent, exemption of the Emiratization policies, and repatriation of capital, there is space for the FZs to continue playing this role. FZs provide a space for firms where they are protected from future changes in mainland regulations, giving greater certainty about their investments and operations.

4.3.1 Providing industry-specific public goods while adapting to new opportunities

FZs can have sector-specific objectives to identify and bundle the full set of needed capabilities. Beyond regulatory advantages, FZs remain spaces where there is a significant role to be played as facilitators to the provision of public inputs to enable diversification (Hausmann 2008). Having a specific set of objectives and goals for a Free Zone allows for a more targeted approach to the design of the policies, regulations, and physical infrastructure needed by those sectors. The UAE has had success with this approach developing zones that manage to attract firms from their target industries.

One benefit well-suited to FZs is the ability to define a controlled environment for policy experimentation that is impossible in the broader economy. This is relevant for innovations that test the boundaries of traditional regulations and require new approaches, with little knowledge of their broader effects. Across different Emirates, there are already several zones engaged in policy experimentation, specifically in the fields of cryptocurrency, artificial intelligence, e-commerce, and the green economy. Such is the case of Abu Dhabi's Masdar City, DSO, and DMCC, which are engaged in providing an environment to attract investments in green technologies, artificial intelligence, and FinTech (Latham & Watkins 2022).

The Free Zone successes also show that flexibility and adaptability are key. FZs should not be constrained to their initial thesis and instead should adapt to the needs of firms located there, both incumbent firms and new investments they can attract. By implementing surveys, conducting in-depth interviews, and leveraging data analytics stemming from their economic registries and registries in other FZs, they can gain insights into the evolving needs and aspirations of businesses. Some FZs within the UAE have shown this capacity to improve their offerings to attract different types of firms and diversify their customer base. One example is HFZA in 2008, which introduced policies to improve the economic support of SMEs, such as reduced leases and credit facilities, to encourage them to set up an establishment there (Gulf News 2008). This adaptability has allowed some zones to remain competitive in the face of increased competition from new zones created in the UAE and abroad.

4.3.2 Policy options for the less successful Free Zones

Outside of the top-performing FZs in the Emirates of Dubai, Abu Dhabi, and Sharjah, other FZs have faced more challenges. While Ras Al-Khaimah has managed to attract some manufacturing and services firms to RAKEZ, the connections with the rest of the country are not as strong as in other Emirates, which might limit the effectiveness of the zone. The FZs contribute to 16.3% of the GDP of the Emirate, and firms within the zone do not trade with other firms within the UAE (Mogielnicki 2021). Similar challenges are found in Fujairah and Umm Al-Quwain, where only a few firms have been established, and the effect of the FZs has not extended beyond their boundaries.

There may be potential for further coordination across the Emirates and across Free Zone authorities. Even though they are competing for investors, lessons from successful zones in Dubai, Abu Dhabi, and to a lesser extent Sharjah and Ajman, should be shared with zones that are not performing as well, particularly in the areas of management and operations. Moreover, diffusing investment towards the northern Emirates may benefit from better coordination through the Federal Government or horizontal coordination with other Emirates. Additional financial support may be desirable for those zones that have potential but lack the resources to accomplish their goals because, as Mogielnicki (2021) notes, Abu Dhabi and Dubai captured most of the financial flows that could have otherwise flowed into the northern Emirates.

Underperforming zones in the northern Emirates could also consider experimenting with a different governance structure that includes public-private partnerships. Since 2018 the Umm Al Quwain Free Trade Zone (UAQ FTZ) port has been operated by Hutchinson Ports, which has relatively improved the performance of the port and the zone in terms of firms' registration.[12] Similar positive experiences with public-private models of tendered zone management have been seen in FZs in other regions, such as Panama, the Dominican Republic, and northern Mexico. Such partnerships could be considered in other northern Emirates' FZs that are currently being operated by their respective Emirates authorities. Other alternatives include signing cooperation agreements with

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[12] Hutchinson Ports is one the largest port operators in the world that is based in Hong Kong.

other FZs from which they can rely on their reputation to attract more business, such as the one signed between DIFC and UAQ FTZ.

4.3.3 Diffusing knowhow from the Free Zones to the mainland

There are barriers to the interaction between the mainland and the FZs that could be limiting the spillovers from the zones into the rest of the UAE. For some licensed activities within a Free Zone, there are Federal regulations that prevent them from selling their products or services on the mainland without an agent or distributor licensed by the relevant authorities of the Federal government or in a different Free Zone without the relevant license (UAQ FTZ 2015). There are sensible reasons for these limitations, as the regulatory and tax benefits in the FZs put mainland firms at a competitive disadvantage. But supply relationships are a critical driver of knowledge spillovers between firms, and these limitations to doing business across zone boundaries limit the transfer of knowhow. The reduction of these limitations, when possible, could increase the linkages with the rest of the UAE economy and the diffusion of knowhow from the zones to the broader economy.

5. Sovereign Wealth Funds

Key Messages

Sovereign Wealth Funds (SWFs) pursue several concurrent and potentially conflicting objectives, including long-term capital maximization, macroeconomic stabilization and domestic development.

As part of its domestic development agenda, the UAE is already making use of its SWFs to spur diversification in the domestic economy, with promising signs of success.

To maximize that diversification impact, the alignment between foreign investments and domestic capabilities is a key factor.

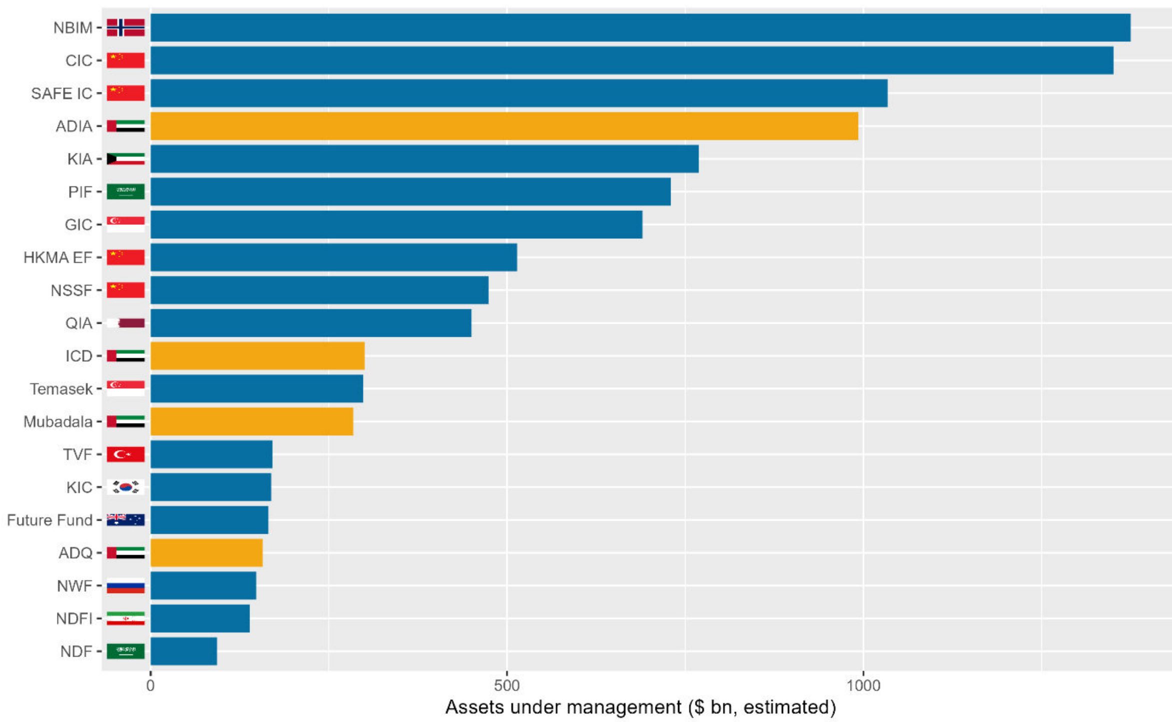
Increasing that alignment can be done several ways: better aligning foreign investments with established or nascent domestic capabilities; conversely, strengthening the domestic capabilities related to portfolio industries abroad; or actively targeting supply chain linkages between domestic and portfolio firms. Using an economic complexity lens to evaluate strategies may be beneficial in that regard.

Onshoring an acquired company is an effective but risky way to generate domestic benefits from foreign investments. There are alternative, “softer” approaches that may deliver some of the benefits with less of the risks. They include increased interactions through networking events and conferences as well as potential training partnerships.

5.1 Sovereign Wealth Funds in the UAE

SWFs play a large role in the economy of the UAE, managing more than USD 1.9 trillion in assets –equivalent to 4.7 times the GDP of the country-- across nine different funds. The use of SWFs and their volume across the world has increased significantly over recent years, and the 100 biggest SWFs are estimated to have over USD 11 trillion in assets under management in 2022 (Global SWF 2023). Yet this is heavily concentrated in several very large funds from a small number of countries (Figure 18). In fact, four of the twenty largest SWFs are in the UAE. This is a dynamic policy area in the UAE as the role that SWFs play in the country has changed over time. Within the past five years, there has been restructuring in the UAE as old funds were merged and new funds with new aims were created.

Figure 18: Top 20 largest Sovereign Wealth Funds Globally by Assets under Management



Data Source: Global SWF 2023

The simplest definition of a SWF is that they are government-owned funds that have no outside beneficiaries and invest according to the objectives of the sovereign sponsor (Clark, Dixon, and Monk 2013). This definition helps to distinguish SWFs from pension funds as their assets are in principle pension liabilities (Dixon, Schena, and Capapé 2022). However, this definition is sufficiently broad to include the large spectrum of different funds. The most important factor that distinguishes funds from one another is the objective of the fund. The objectives can be broadly defined in three different categories (PwC 2015):

1. **Capital maximization:** The aim is to maximize the value of assets to balance intergenerational wealth and fund future liabilities, and invest reserves. The focus is on the long-term impact.
2. **Macroeconomic stabilization:** The intention is to stabilize the exchange rate by preventing a Dutch disease-type effect. Moreover, an important goal can be to facilitate economic smoothing when fiscal shocks arise. This has both a long- and medium-term perspective as the exchange rate stabilization is more focused on the long-term while fiscal smoothing requires certain liquidity and medium-term returns.

3. **Economic development:** This is centered around domestic economic development through investments in hard or social infrastructure or through the pursuit of industrial policy. These aims have a short- to medium-term perspective.

The goal of a SWF will significantly impact the investment strategy of the fund and its governance structure. A fund that is focused on capital maximization, such as the Norwegian Investment Fund or the Abu Dhabi Investment Authority (ADIA), is more likely to have a large portfolio with a large role in passive, public markets investments. On the other hand, a fund that actively pursues economic development goals may more often seek a controlling stake in companies in strategic sectors. A different type of investment strategy will require different capabilities and governance structures within the funds. Depending on the objective of the SWF, funding, and withdrawal rules may also have to allow for discretion. Funds can also attempt to follow multiple goals which may conflict with each other. It is therefore important to understand, to the extent possible, the aims and structures of each individual fund as they differ significantly.

5.2 SWFs Role in Diversification

The UAE has actively been using the policy tool of SWFs to pursue its diversification aims – albeit with a strategy that varies by fund. However, despite their differences, the SWFs of the UAE have some important commonalities regarding their funding and governance structures. Table 2 provides an overview of the most significant SWFs in the UAE and their role as well as investment strategies. The main shared characteristic is that their direct or indirect funding source is the wealth created by oil revenues. Moreover, all funds seem to have discretionary funding and withdrawal rules which heighten the importance of prudent governance given that there is no clearly defined regulatory framework. The commonality in the governance structure is that the boards are dominated by members of the royal families[13]. In the case of Mubadala and the Emirates Investment Authority, they even share the same Chairman. Lastly, ADIA, Mubadala, and ICD[14] are all members of the International Forum of Sovereign Wealth Funds. This is important since it acts as a platform for cooperation between funds and members are required to do self-assessments regarding their adherence to a set of generally accepted principles and practices, known as the *Santiago Principles*. This is an important signal and other funds such as Saudi Arabia's PIF opted not to join this organization. While

[13] In all cases the chairman is a member of the royal family. ADIA only has members of the royal family on its board while all other funds have a mixture of members of the royal family as well as high-ranking bureaucrats on their board.

[14] ICD joined in February of 2023 so no self-assessment is available as of now.

commonalities exist, the goals and activities of the SWFs of the UAE are very different leading to distinct roles in the diversification process of the country.

Table 2: The UAE's largest Sovereign Wealth Funds

Name	Type	Main objectives	Assets under Management (estimated)	Portfolio Markets	Portfolio Industries
Abu Dhabi Investment Authority (ADIA) Est. 1973	Savings Fund	Capital Maximization & Macroeconomic Stabilization	$993 bn	North America: 45 – 60% Europe: 15-30% Emerging Markets: 15-20% Developed Asia: 5-10%	Not disclosed: Seemingly large diversification across the board and mainly passive investments
Mubadala Est. 2003	Development Fund	Economic development & diversification	$276 bn	Not directly disclosed: UAE share estimated at 20% Seemingly most investments in North America and Europe	Business Services, Consumer, Energy & Utilities, Financials, Healthcare & Life Sciences, Industrials, Materials, Real Estate & Infrastructure, Technology
ADQ Est. 2018	Development Fund	Economic development & diversification	$157 bn	Not disclosed: Significant UAE share Foreign investments often in developing markets	Energy & Utilities, Food & Agriculture, Healthcare & Life Sciences, Mobility & Logistics, Financial Services,

					Tourism, Entertainment & Real Estate, Sustainable Manufacturing
Investment Corporation of Dubai (ICD) Est. 2006	Holding Fund	Consolidate & manage portfolio of the Government of Dubai	$ 300 bn	Mostly domestic	Banking & Finance (65% of assets) *Examples: Borse Dubai, Commercial Bank of Dubai* Transportation (25% of assets) Examples: Emirates

Note: Data for estimated Assets under management stems from Global SWF, the information regarding portfolio markets and industries comes from the respective webpage and/or annual report of the funds.
Source: Own elaboration.

While ADIA's revenue diversification is its most important function within this context it is also starting to play a significant role in diversifying the local economy through building knowhow and capabilities. The most promising and recent example of this is the announcement of ADIA to develop an independent research institute called "ADIA Labs" that will conduct research in the fields of Data Science, Artificial Intelligence, and Machine Learning. This research is meant to be independent of investment activities and may explicitly lead to the creation of knowledge-intensive startups. ADIA has shown that it can attract top-level global talent. This is exemplified by its recent announcement of physics Nobel Prize winner Prof. Chu joining the advisory board of ADIA Lab (ADIA Lab 2023). By attracting this talent to the UAE, ADIA increases the knowledge in the economy which can be especially impactful when it is meant not just to inform internal investment decisions but also engages with the domestic economy or even leads to the creation of new companies, as is the case with ADIA Labs. The Singaporean fund Temasek, widely regarded as one of the leading funds in the field, has also started to deploy its internal capacities more widely by engaging in "in-house start-up creation" in the fields of AI and Blockchain (Chan 2022).

Mubadala plays a much more direct role in diversifying the economy of the UAE by connecting foreign knowledge to the domestic economy through strategic acquisitions and partnerships. Mubadala has significant investments in ICT, Healthcare, Finance, Renewable Energy and Life Sciences sectors. All of these are typically knowledge-intensive whose increased presence in the UAE would add to the diversity and complexity of the economy. In some cases, Mubadala invests in foreign companies which in return expand into the UAE and move new operations into the country. A recent example is an equity investment in the US-based biopharma company National Resilience which announced that it will be opening a manufacturing facility in Abu Dhabi (Business Wire 2023). Similarly, a cooperation between Mubadala and Cleveland Clinic that started in 2006 led to the establishment of Cleveland Clinic Abu Dhabi which was a milestone in Abu Dhabi government's Economic Vision 2030 to develop a robust healthcare sector in the Emirate. These investments actively bring new knowhow into the UAE's economy and Mubadala acts as a vehicle for diversification by channeling these into the country.

However, Mubadala also has significant investments in foreign companies where they do not seem to directly start operations in the UAE. The impact on diversification in this instance is less obvious, but may still happen through interactions between those firms and the domestic economy. These directed spillovers, however, are less likely to emerge in cases where Mubadala invests its money through other funds[15] or has significant co-investors, as they may oppose onshoring assets to the UAE. The increased number of direct buyouts from Mubadala over the past years may indicate an attempt to overcome this potential barrier (Shi 2022). Lastly, Mubadala also conducts investments in domestic companies operating within strategically important sectors such as Tourism, Finance, Technology or Energy. The goal here is to provide a cheap source of capital and support growth in these targeted sectors within the UAE.

Similarly, to Mubadala, ADQ actively attempts to drive diversification through a mix of capital provision domestically and foreign acquisitions in strategic industries. Originally ADQ focused on infrastructure companies, but in recent years it has more actively engaged in domestic economic development and foreign private equity. Its investment sectors have significant overlap with those of Mubadala (i.e. Energy, Healthcare & Life Sciences, Financial Services) but it is focused more on companies in emerging markets, as 56% of its private market holdings in 2021 were in companies in Egypt, Turkey and India (Global SWF 2021). The pivot of ADQ towards active private equity investments has also led to more collaboration with Mubadala as both funds have increasingly engaged in co-investments in the past two years. Recently, ADQ has also started to actively acquire assets in startups domestically and abroad by creating the Abu Dhabi Growth Fund (ADG), a subsidiary venture fund that seems to follow the experience of Mubadala with its venture fund "Mubadala Capital". After the transition from ADQ to a more active "development fund" there is significant overlap with Mubadala in terms of goals and activities. However, ADQ seems to still be more focused on domestic

[15] An example of that is Mubadala's USD 15bn investment in Softbank's Vision Fund. Vision Fund raised $93bn in capital from numerous investors and targeted high-tech companies.

investments and investments in emerging markets while Mubadala's investments have a larger focus on developed markets.

Other SWFs, such as the Investment Corporation of Dubai (ICD), manage large SOEs which can act as important inputs in the overall diversification process of the country. ICD manages SOEs such as the Commercial Bank of Dubai and Emirates, which dominate the local finance and transport sectors, respectively. They form an important part of an ecosystem of services that are required for a diversified economy to be able to emerge. The Emirates Investment Authority, which is the only federal SWF, plays a similar role as most of its assets are concentrated in the telecommunications companies Etisalat and "du"[16]. These funds do not undertake strategic investments in industries that were designated as growth and diversification opportunities for the UAE. Rather, they ensure the professional management of large SOEs that provide services that allow for other industries to grow within the country.

5.3 SWFs Role in Future Diversification

ADIA's purpose does justify prudence in targeting broader economic diversification and should remain focused on revenue diversification. Securing a sustainable revenue source that is unrelated to oil is an integral part of the UAE's strategy to diversify its economy. Within that role, ADIA should ensure that its investments are diversified away from oil and that the effect of decarbonization which will likely lead to a falling oil demand in the long term is counterbalanced by the revenue generated by its portfolio investments. This is not an easy task given that in the past overall market conditions have fluctuated in line with oil prices. We analyzed the correlation between the prices of products in external trade and the oil price to identify the exposure to oil price changes. Translating this product-level correlation to the industry level provides an indicator of how sensitive the prices of products traded by a specific industry are to changes in the oil price. The industries shown in Table 3 are the ten industries with the highest positive average weighted correlation, which indicates that a downturn in oil prices has in the past accompanied a downturn in the prices of their traded products. Analyses by fund may likely focus on financial returns and stock prices, but how the value of the investment may withstand a fall in oil prices may also be considered. This would ensure that ADIA can continue to support the diversification of the UAE's economy by smoothing the volatility of oil revenues.

Going forward ADIA can, when possible, leverage its capabilities and global prestige to enhance the accumulation of knowledge within the domestic economy. While its primary function is to take prudent investment decisions and maximize returns, ADIA has started smaller initiatives such as ADIA Labs that aim to build knowledge outside

[16] This is the commercial branding of the Emirates Integrated Telecommunications Company.

of its core investment capabilities within the UAE. Beyond its financial power, it is also ADIA's global prestige that allows it to attract top-level foreign talent and may position it well to engage in this. ADIA is also focused on training its Emirati workforce as foreign staff is often directly paired with national staff and meant to mentor and train them. These activities actively broaden the knowledge base of the UAE's economy and hence support the overall diversification of the country. However, they can be considered an ancillary benefit rather than a fund objective.

The SWFs that target broader diversification goals for the UAE could benefit from applying a complexity lens to their investment considerations. Tapia et al (2023) presented the complexity methodology and key indicators and used them to identify high-potential targets for diversification considering some key dimensions. First, sectors with a lower *Distance* from current production can more easily take root in the economy, as most of the capabilities they require already exist for similar sectors. Second, sectors with a higher *Product Complexity Index* (PCI) are associated with more knowhow and higher wages and would generate greater direct increases in the country's overall complexity. Third, sectors with a higher *Complexity Outlook Gain* (COG) would also indirectly increase future complexity by opening up other new sectors for diversification to a greater degree, by generating capabilities with wider additional uses (see Box 2 for more detail). SWFs can evaluate these metrics across all industries under consideration and determine which sectors would provide the greatest boost to the country's economic complexity, and which would generate capabilities that would then open up the most new opportunities for the country. The value of this approach in combination with more qualitative sector analysis is that it captures economic relationships proven in decades of international trade data, has proven predictive power, and by systematically considering all sectors it can uncover opportunities beyond more widely followed trends.

When using complexity data, strategic acquisitions of foreign companies that are intended to onshore to the UAE should also consider distance to a greater degree than investments without any planned relocation. While the nature of these strategic investments is often to invest in capabilities that are not yet present in the domestic economy, having related capabilities as shown through a smaller distance metric makes the successful onshoring of a company more likely. An illustrative example is the case of Mubadala's investment in the semiconductor manufacturing company GlobalFoundries. If Mubadala's goal was to localize a semiconductor manufacturing facility in the UAE this may have been complicated by the fact that the UAE does not yet possess any capabilities in related fields[17], suggesting a much larger distance from existing sectors. There are often a variety of sectors of equal sophistication (PCI) and strategic value (COG), but with

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[17] It is not known whether Mubadala was pursuing the goal to onshore operations of GlobalFoundries – this example is just used for illustrative reasons.

different levels of distance, and giving preference to those that have the same upside but are less distant from existing capabilities makes them more likely to succeed. On the other hand, investments that will not move operations to the UAE are less regulated by distance and can pursue other diversification aims. In those cases, PCI and COG can still be useful metrics, considered in light of the particular knowhow that is being sought, and the channels through which it can be brought to the UAE without onshoring the firm (discussed further below).

Table 3: Industry-Level Correlation with Oil Prices (WTI)[18]

Industry Title	NAICS Code	Correlation with Oil Prices
Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing	3334	0.92
Other Furniture Related Product Manufacturing	3379	0.82
Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	3327	0.82
Other Leather and Allied Product Manufacturing	3169	0.80
Other Electrical Equipment and Component Manufacturing	3359	0.76
Leather and Hide Tanning and Finishing	3161	0.73
Nonferrous Metal (except Aluminum) Production and Processing	3314	0.72
Motor Vehicle Body and Trailer Manufacturing	3362	0.72
Petroleum and Coal Products Manufacturing	3241	0.71
Printing and Related Support Activities	3231	0.67

Source: Own calculations based on UN COMTRADE

The impact of foreign strategic acquisitions on the diversification of the country may be increased by investing in complementary industries domestically in parallel. The idea here is to build up capabilities in industries related to the knowledge of foreign companies that are part of the portfolio of a SWF. This would improve the extent to which the UAE economy may be able to benefit from acquired companies that have not been

[18] We calculate the correlation between the median price of a good as recorded in US exports and imports and the price of oil (using the WTI) over the period 1995 to 2020. We then calculate the average by industry using a HS to NAICS crosswalk and weight the correlation of each good by its share in global world trade.

onshore. The UAE-based companies in related industries may be able to learn through training exchanges or general business relationships with foreign portfolio companies. This would significantly improve the impact that a foreign strategic acquisition has on the UAE's diversification in the absence of onshoring. This could happen through providing capital to those targeted industries domestically through closer coordination between funds such as Mubadala and ADQ in which there is a clear designation as to who takes on the domestic funder role. Currently, both ADQ and Mubadala are increasing cooperation but mostly in joint foreign investments, with some claims that the lines between both funds are blurring (Global SWF 2021). Additionally, research & development or educational programs within those sectors may allow for building local talent that can learn from those companies. Coscia, Neffke, and Hausmann (2020) have shown that business travel leads to knowledge diffusion as "business travel from countries specializing in a specific industry causes growth in that economic activity in the destination country". Therefore, by supporting domestic capacities in related industries the UAE can better leverage the knowhow of foreign portfolio companies and induce spill-over effects. This strategy would be aimed at moving knowhow by building closer connections between the domestic economy and foreign portfolio companies instead of having to move knowhow by fully moving companies and people which may be more difficult.

An alternative way to leverage the investment of SWFs for the diversification of the UAE's economy is to incentivize supply-chain linkages between portfolio companies and the local economy. SWFs could invest strategically in foreign companies that require inputs from certain knowledge-intensive sectors in which the UAE has an advantage. This could naturally lead some to source these inputs from the UAE. The funds could also evaluate financial incentives to portfolio companies to source a portion of those respective inputs from UAE-based providers. In practice, they could take the shape of more favorable financial terms for the company. The first-order effect would be to increase the demand for those goods and services sourced from the UAE, which increases diversification. But the arguably more important effect is that these supply chain linkages in themselves provide learning opportunities and may lead to spill-over effects. It is well documented in the literature that linking up to supply chains has the effect of learning from those linkages which leads to significant diversification opportunities (Cattaneo et al. 2013; Humphrey and Schmitz 2002). These can be fruitful channels of knowhow transfer even for investments where there is no consideration of the firm's location within the UAE. It is important to stress that this should be framed as an incentive rather than a mandate, which could be negatively perceived and lead to companies becoming wary of a UAE SWF investment. This strategy has the benefit that sourcing from the UAE is much easier than relocating to the UAE, which could open channels of knowhow transfer to a much larger set of sectors and countries.

Since transferring knowhow through onshoring bears significant risks, the UAE may want to consider all alternatives to induce spill-over effects which could include

targeted interactions and networking activities. Onshoring a foreign company that was acquired is risky for several factors. It may decrease the value of the company if it is not able to function as well in its new environment, and co-investors may not be supportive of it since it is not happening exclusively due to commercial reasons and it has a reputational cost as other companies may become more hesitant of having a UAE SWF as an investor. Because the onshoring strategy will only be taken in selected cases, the UAE may consider all alternative “soft” approaches to induce learning effects and spillovers. Beyond approaches focused on creating complementarities and linkages discussed above, a holistic strategy could also include approaches focused on increasing interactions and creating networks with portfolio companies. This could take the form of incentivizing members of portfolio companies to engage in UAE-based conferences and networking events. It could be beneficial to have representatives of portfolio companies being board members of domestic companies. Training partnerships either through short training programs conducted in the UAE or through internship and training programs for Emiratis in portfolio companies may also be an option. Even some of these options should be considered carefully since requiring portfolio companies to reserve training positions for Emiratis, for example, may go against the commercial interest of the company and lead to some of the risks discussed above. The approaches must find a balance between increasing learning opportunities and not disrupting the regular commercial activities of portfolio companies. However, in tandem with fostering a receptive domestic ecosystem which includes a strong R&D sector, a supportive business environment and good living standards these “soft” approaches have the promise of eventually leading to an organic onshoring of these capabilities.

Box 2: Product Complexity Index, Distance and Complexity Outlook Gain

Product Complexity Index (PCI): This is a product-specific measure that ranks the diversity and ubiquity of the productive knowledge required for its production. It is determined by the average diversity of countries that make the product, as well as the average ubiquity of the other products that these countries make. The most complex products (that only a few, highly complex countries can produce) include sophisticated machinery, electronics and chemicals. Meanwhile, the least complex products (that nearly all countries, including the least complex can produce) tend to be common agricultural products and some raw materials.

Complexity Outlook Gain (COG): This is a place-product measure that quantifies the extent to which a location could benefit in opening future diversification opportunities by developing a particular product. Complexity outlook gain quantifies how a new product can open links to more, and more complex, products. Complexity outlook gain classifies the strategic value of a product based on the new paths to diversification in more complex sectors that it opens up. Complexity outlook gain accounts for the complexity of the products not being produced in a location and the distance or how close to existing capabilities that new product is.

Distance: This is a place-product measure and corresponds to the sum of the proximities connecting a new good to all the products that country is not currently exporting. This value is normalized by dividing it by the sum of proximities between the new product and all other products. In turn, proximity is a product-product measure that is calculated as the minimum conditional probability that a country intensively exports one product given that it already intensively exports the other. Thus, if a country exports most of the goods connected to a product, then its distance to it will be short (close to zero). However, if the country only exports a small proportion of them, then its distance to it will be large (close to one). Density, in turn, is the inverse of distance (1-distance).

Note: Concepts from Hausmann *et al*. 2014

6. Conclusion

The UAE has enjoyed export growth and diversification over the past two decades, but more remains to be done. Further diversification is needed to smooth volatility in oil prices and to adapt to secular trends in global demand, particularly relating to energy. Most importantly, achieving the country's vision for knowledge-intensive services is consistent with the need to reverse underperformance in economic complexity, to ensure that new capabilities are built up domestically that can fuel diversification and growth for decades to come.

To achieve these goals, the UAE has to identify the right high-potential sectors, but also make the most of its key tools for achieving diversification: FDI promotion, FZs, and SWFs. The Growth Lab Complexity Report, along with other government strategies and reports, has identified many high-potential activities that can help meet these diversification goals. While there are many tools to deploy towards these high-priority sectors, the three analyzed may represent the best combination of success in the past along with the potential to make even more of an impact on diversification in the future.

The UAE has attracted significant FDI, but to become a global knowledge hub, it may need to attract a different type of FDI. The country has positioned itself as one of the largest recipients of FDI in the world, and its success is not limited solely to the quantity of flows received. The country has experienced transformative growth, gradually diversifying away from oil, with FDI inflows supporting this process. There is some evidence that foreign investments have fueled relatively sophisticated industries, which is suggestive of a positive contribution to diversification and increased economic complexity. Likewise, many major companies have established their (regional) headquarters in the UAE, which are associated with more sophisticated work, and speaks to the quality of the FDI received. Still, the UAE is attracting less than its expected share of FDI in knowledge-intensive activities such as research & development and design & development, threatening its chances of transitioning towards a knowledge-based economy.

To attract more knowledge-intensive activities, the country should strengthen a quality-oriented approach to FDI attraction, engage with investors, and focus efforts where they can leverage existing capabilities. Being a capital-rich country, the UAE needs to focus on the kind of FDI that can generate positive spillovers to the rest of the economy beyond what local investment can contribute. This should include defining quality-oriented metrics against which to measure success and evaluate current policy instruments. At the same time, authorities should engage in deep and iterative interactions with potential investors to learn what missing inputs are preventing R&D and innovation-related FDI from flowing into the country. To this end, investment promotion agencies can play an important role. Data on the relatedness between industries, activities, and research can help focus attraction efforts and input provision where they can leverage existing capabilities and, therefore, are most likely to result in economic growth. Finally, for all of the above, the experience of aspirational peers that have been able to successfully develop R&D and innovation activities such as Singapore can serve as valuable cases to study.

FZs still maintain strong advantages within the UAE context to attract investment and drive diversification, even in the face of recent regulatory changes. While some of the regulatory arbitrage opportunities remain, the zones' value goes well beyond this arbitrage, while also providing investors greater certainty about the regulatory environment they will face in the future. In particular, what has been critical to the zones' success is not starting with the right thesis for the zone, or the static offering of infrastructure, energy, government procurement, or regulatory advantages, but instead how the best zones were able to learn and adjust to firms' needs and attract an evolving set of industries over time, some of which may not have been contemplated or even existed when the zone was first launched. At their best, SEZs are much more than tax incentives next to a logistics hub: they are mechanisms for public-private coordination, policy experimentation, and bundling of specialized public goods. The poorer-performing SEZs in the country could benefit from changes in management structure that move them in this direction, including public-private management partnerships. Finally, the benefits of limiting enterprises within the zones to do business with mainland firms must be carefully weighed against the cost of those policies in terms of limiting the spread of knowhow.

Successful policy regarding FZs will require coordination between the different actors that act in the UAE, and it should be linked to other policies being implemented. In this process, every actor has a role to play: the Federal Government, the government from each Emirate, the zones' authorities, and the investment promotion agencies at the federal and the Emirate level. While there are strong arguments for the FZs to become a center of a policy to further transition the UAE into a knowledge economy, their success depends also on a host of complementary policies, including the research and development capabilities of the Emirates, the provision of technical education, the attractiveness of the country to skilled migrants and their overall availability, which will also depend on the cost of living inside the cities and the amenities provided to them.

SWFs have increasingly been used in the UAE to spur the diversification of the domestic economy. While their financial returns and specific projects show promising signs of success, their overall impact on diversification may be increased through a broader appreciation of the channels of knowledge spillovers, and by leveraging complexity data. Onshoring foreign companies and their capabilities may be the most direct way to transfer knowhow, but can be challenging. Considering economic proximity can help reduce risk by selecting sectors for onshoring that are more likely to successfully take root, and PCI and COG can help target efforts on sectors that would add more knowhow to the country considering existing domestic capabilities. In cases where relocation is not feasible or desirable, the UAE should consider a wide array of "soft" approaches to inducing spillovers and connecting the knowhow of foreign investments to the domestic economy. This includes targeting the creation of networks and increasing interaction between relevant domestic actors and portfolio companies through professional conferences or training programs, and by promoting supply relationships. The UAE may strategically incentivize supply chain linkages between portfolio companies abroad and domestic companies.

Moreover, the SWFs themselves can be seen as organizations with significant capabilities that could impact the broader economy. Names like ADIA or Mubadala are globally renowned institutions able to attract top-level talent, enabling them to set up research institutions such as ADIA Labs that may spur the creation of knowledge and capabilities outside of the core activities of the fund. If these activities could be tied in with the domestic R&D and entrepreneurship ecosystem, they may lead to activities that could further enhance the diversification of the domestic economy. The experience of the Singaporean fund Temasek is a promising example in this regard. A good understanding of domestic innovation channels and capabilities in some of the targeted sectors, such as green energy, will also be critical to maximizing the impact. A closer analysis of these factors will be part of the continued engagement of the Growth Lab team with the government of the UAE.

Agents of Public Coordination

One common theme across all three of these tools is their potential to act as coordinating agents across the public sector for their target firms and sectors, which is particularly important for diversification. New productive activities require a host of inputs from the government, such as particular regulations and infrastructure or trade agreements. These can only be provided by the government, and without them, new sectors may have more difficulty emerging. Yet as they are provided by a wide set of government ministries and agencies, each with their own priorities and reporting structures, coordination failures are common. This challenge is amplified when there are multiple levels of government, as is the case in the UAE's federal system. And, unlike existing sectors which have already worked out many of these issues and whose size brings increased government attention, new sectors have more unmet requirements combined with less of a voice to communicate those needs to the government. As a result, diversification into new activities is particularly prone to coordination failures within the public sector.

Addressing this need for coordination can take many forms, but has common ingredients. Different countries have attempted to resolve these issues by outsourcing this priority sector coordination and troubleshooting to external consulting companies, or by launching new cross-ministerial agencies and working groups called productivity councils or productivity taskforces. The right intervention can take many forms, but what is common is the need for a coordinating agent that can directly engage with the new priority sector, identify bottlenecks and missing public inputs, and then work out their provision across government agencies. At times this requires financial resources, but often what is most important is the public administration skills to mobilize action across government, plus the ability to escalate to sponsors with political capital and seniority to break logjams between agencies and ministries when they inevitably occur.

These three tools of diversification: FDI promotion agencies, SEZ managers, and SWF investors, can all fill this inter-public coordinating role in the UAE to fuel diversification. Their proximity to target investors in high priority sectors can give them the requisite information about what is need and what is missing, and if empowered they can act as an internal coordinating agent and advocate for the new sector across government, making sure that the myriad of infrastructure, regulations, public services, and other public inputs are adequately provided so that their target sectors can flourish. The Growth Lab has laid out some design principles for these coordinating bodies in other countries, which could be useful in guiding FDI, SEZ, and SWF leaders to fill this critical need for agents of public coordination to achieve diversification.

A Changing Landscape

It is also important to note that although FDI promotion, FZs, and SWFs have been the major tools of diversification to date, there are other tools to consider, which may be more relevant in the future. Domestic entrepreneurship, skilled immigration (whether for salaried work or entrepreneurs), science and technology policy, and the educational system may all play a larger role in future diversification than they have in the past and may deserve further study and judicious policy efforts. In these cases, it can be particularly useful to study how such tools are used by aspirational peer countries.

This illustrates a more general point that what has been the right approach in the past may not be the right approach for the future. This is behind the recommendation to focus FDI performance metrics not on the size of FDI inflows but their quality in terms of achieving transformational goals for the economy, taking into account the spillover benefits of reducing barriers for doing business between zones and the mainland, and for finding new ways to increase SWF’s impact on diversification without harming investment performance. Adapting existing tools and metrics to new goals, despite their understandable momentum to repeat what was successful in the past, is important alongside evaluating new tools for fueling diversification.

It is also necessary to continuously monitor the landscape and update the country's judgments about what new opportunities are a priority for diversification. Quantitative tools like the Complexity Report are an important complement to qualitative analysis, to both quickly identify new trends and not fall victim to fads (such as the imbalance in policy attention in many countries between biotech and bitcoin over the past few years). Qualitative analysis should be continually updated and tested with the most recent quantitative indicators, to rationalize past priorities and identify new opportunities.

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