The Quest for Increased Saudization: Labor Market Outcomes and the Shadow Price of Workforce Nationalization Policies

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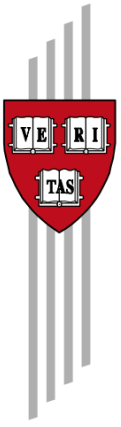

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Abstract

Few countries have embraced active labor market policies to the same extent as Saudi Arabia. In the aftermath of the Arab Spring, the imperative of increasing Saudi employment became paramount. The country faced one of the highest youth unemployment rates in the world while over 80 percent of its private sector consisted of foreign labor. Since 2011, a wave of employment nationalization efforts has been mainly implemented through a comprehensive and strictly enforced industry and firm specific quota system known as Nitaqat. This paper assesses the employment gains as well as the costs and unintended consequences resulting from Nitaqat and related policies between 2011 and 2017. We find that while job nationalization policies generated significant initial gains in Saudi employment and labor force participation, the effects were heterogeneous across workers, firms and sectors. Moreover, our analysis suggests that the resulting unintended consequences far outweighed the benefits over time generating a less cost-effective and productivity inhibiting labor market composition.

Keywords: labor market, employment quotas, expatriate workers, workforce nationalization, Saudi Arabia, occupation, skills, labor productivity

JEL Codes: J21, J23, J24, J31, J42

1. Introduction and motivation

Few countries have embraced active labor market policies to the same extent as Saudi Arabia. The idea of workforce nationalization (henceforth *Saudization*) has been a recurring theme in the Saudi public policy arena for several decades. In the aftermath of the Arab Spring, the imperative of increasing Saudi employment became paramount; the kingdom faced one of the highest youth unemployment rates in the world while over 80 percent of its private sector consisted of foreign labor.

Since 2011, Saudization efforts have been mainly implemented through the *Nitaqat* program. Nitaqat operates based on industry and firm size specific quotas for the share of employed Saudi nationals. Firms above the quota are granted benefits, while those below face restrictions for expat hiring[1]. Nitaqat has gone through different iterations since launching in 2011 and remains in effect to this day. The quota requirements have also been complemented by other instruments (like job training, visa fees, differential minimum wages) aimed at making Saudis relatively more attractive to private sector employers, and vice versa. Despite the size and economic relevance of Nitaqat, there are no recent studies that weigh its long-term costs and benefits. Existing studies find that the first wave of Nitaqat (July 2011-January 2013) was successful in increasing overall Saudi employment in the private sector, however it came at the high cost of firm exits, increasing labor costs, shrinking firm size, declining labor productivity, and falling output among exporting firms[2].

The goal of our paper is to provide a more comprehensive overview of Nitaqat and related Saudization policies' impact on labor market outcomes over the long-term policy horizon. Most importantly, we aim to understand not only the employment gains and other benefits, but also assess the costs and unintended consequences that resulted from stricter implementation. Specifically, we look into the sectoral, demographic and productivity changes that have taken place since 2011. A detailed analysis of the labor market outcomes during the first wave of the Nitaqat policy is provided to highlight the nature of the initial gains, which were also the more sizable ones. The paper then examines relevant patterns and developments that resulted from subsequent iterations of Nitaqat and a related cohort of Saudization policies, which include the further tightening of the quotas and an increase in the Saudi minimum wage.

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[1] Refer to Appendix I for details on the timeline and details on program design as well as enforcement.

[2] There are some qualitative studies about employment frictions in the region. Forstenlechner et al. (2012) find that education and reservation wages are significantly less important in explaining the lack of nationals working in the UAE private sector compared to a perceived lack of work ethic and strong preference for public sector employment among Emiratis. Their study is based on national labor force data and surveys with company executives. Alshanbri et al (2015, 2016) interview human resource managers in Saudi private sector firms to understand how they adjusted to the implementation of Nitaqat. The findings emphasize a lack of vocationally driven education, missing local expertise, low levels of motivation in general and especially for long hours or physically demanding jobs, and mounting costs of employee turnover as challenging aspects for firm compliance with Nitaqat quotas. From an empirical policy evaluation perspective, Peck (2017) uses a regression kink design to estimate the impact of Nitaqat quotas on the Saudi private sector. She finds that while the program created 63,000 out of the 169,000 new jobs over 16 months, Nitaqat led to a decrease in total private sector employment of about 948,000 workers due to significant firm exit (11,000 firms). Cortes, Kasoolu, and Pan (2020) employ a difference-in-difference approach and find that while Nitaqat succeeded in encouraging private sector firms to hire Saudis, it also resulted in firm size reduction, productivity decline, a fall in the output of exporting firms, and an increase in labor costs, low-skill Saudi workers and firm exit. Both studies focused only on the effects of Nitaqat I.

Our findings suggest that Nitaqat and related Saudization policies generated significant improvements in both Saudi employment and labor force participation. The gains were significant for all Saudis entering the labor market and particularly substantial for women. We present evidence on a number of breaks in labor market trends post-2011 compared to the pre-Nitaqat period. On employment, the higher participation and unemployment trend broke as the chances of new labor market entrants finding a job increased. Labor market outcomes continued to steadily improve for Saudi men as well. More tenured workers also benefitted from significant wage gains in addition to the de-facto minimum wage. Their prior private sector work experience became a more valuable asset to firms in need of workers to help meet employment quotas. Increased participation and improved labor market prospects for Saudis in the private sector were a beneficial push in the right direction. However, these labor market gains were concentrated during Nitaqat I when the policy was least restrictive and came at a high cost to firms and the economy.

Costs and unintended policy consequences compounded while the benefits tapered off as Saudization requirements and enforcement tightened over time. Even though Saudi employment increased across the private sector, the Saudi employment share declined in high-wage and high-quality jobs. On the other hand, Saudi workers gravitated into low-wage low-skill industries and were disproportionately concentrated in smaller firms. Minimum wage requirements tied to Nitaqat further increased the cost of Saudi labor for firms relative to expats. Firms with a high initial concentration of Saudi workers decreased their Saudization shares, on average, after the introduction of the quotas. Furthermore, with increased labor costs, firms facing strict quota requirements faced a higher exit probability and were less likely to engage in exporting behavior. These trends further exacerbated the country's state of low productivity with Saudi employment continuing to increase in sectors with larger and growing employment shares but low and decreasing productivity in response to policy induced hiring restrictions.

What remained entrenched and continues to persist, despite the policy efforts, is the Saudi-worker preference for public sector work and the correspondingly high reservation wages. This dynamic has resulted in a large unexplained wage premium that continues to drive firm preference for expat workers. These trends suggest that a job creation strategy by way of prioritizing diversification efforts and transforming the role of the public sector could have been then and is now, the more beneficial and effective approach to sustainable long-run Saudization.

The rest of the paper is organized as follows. Section 2 presents the Saudi macroeconomic and labor market context to better understand the magnitude of the problem and the policy choice. Section 3 describes the program in detail. Section 4 assesses whether the policy achieved its goal. Section 5 dives deeper into the effects on the composition of the labor market. Section 6 examines the unintended consequences and the sustainability of the policy efforts over the long run. Finally, Section 7 concludes and discusses implications of our work as well as future research.

2. Origin and Evolution of Saudization Policies

The challenges faced by policymakers today attempting to increase Saudi participation in the private sector can be traced to the country's history of managing its oil booms and busts. With oil wealth came growth and prosperity, but also imported labor. Over time, expat workers became a core component of a segmented labor market. In an era of rapid population growth and uncertain future oil demand, the sustainability of this arrangement, with the majority of Saudis working in the public sector and most private sector jobs filled by expatriates, has become an urgent policy question.

2.1. The Macroeconomic Making of a Dual Labor Market

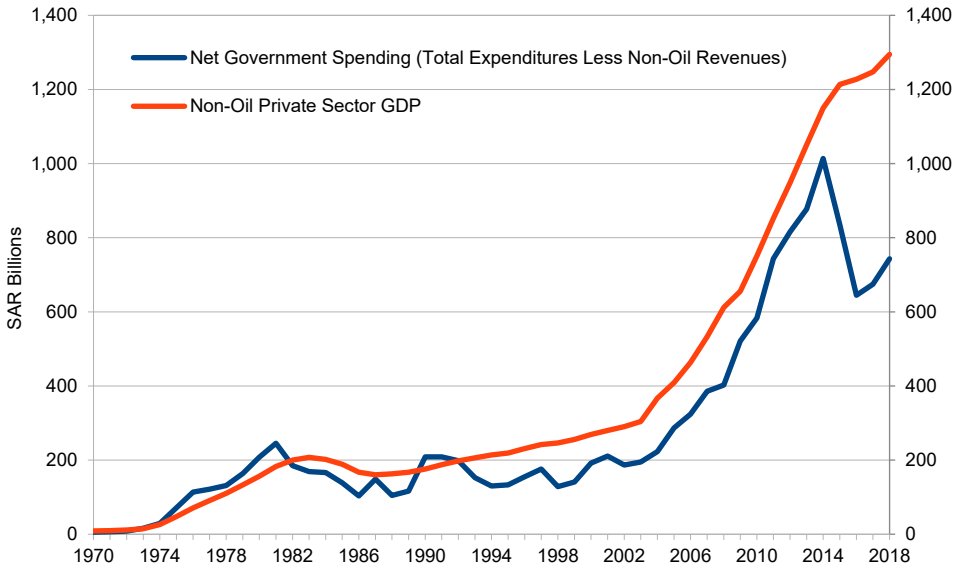
The Saudi labor market has its roots in the windfall from its massive oil wealth, combined with a uniquely open immigration system. Saudi oil production rose from around 1.4 million barrels/day in 1962 to 4 million barrels/day in 1970 and 10 million barrels/day in 1980. Increased production and the high oil prices of the 1970s and early 1980s meant a booming economy: Saudi GDP jumped from $5.3 billion in 1970 to $164.5 billion in 1980, a 31-fold increase. Saudi GDP per capita, as a percentage of that of the United States, rose from 20% in 1970 to 135% in 1980[3].

This sudden, enormous increase in Saudi purchasing power outstripped the capacity of the country's productive base. Imported goods increased from around $1.2bn in 1970 to $44.9bn in 1980, a pattern typical in resource booms worldwide. Where Saudi Arabia differs from many other countries is that, with ample financial resources but little in the way of local human capital to draw on (in the early 1970s, only 15% of Saudi men and 2% of Saudi women were literate), Saudi businesses secured a deal with the government allowing them to bring in large quantities of migrant workers (Allahmorad and Zreik 2020). Saudi brought in both low-skill laborers to work in construction and other low-paying fields and highly skilled expats prized for their technical sophistication (Diwan 2016). As such, expats went from constituting 20% of the labor force in 1970 to around 60% by the 1990s (Fakeeh 2009).

At the same time, the government, flush with oil revenues, spent massively to build out infrastructure, expand public services, and employ large numbers of Saudi workers. Well-paying public sector jobs became a key conduit for the redistribution of oil rents to the Saudi population, allowing households and businesses to benefit from oil-driven purchasing power while keeping costs low through imported goods and a highly competitive, expat-driven private sector labor market. Figure 2.1 illustrates the tight relationship between private sector economic activity and the government's fiscal impulse (spending minus non-oil revenues) tracing from the start of the oil boom in the 1970s until the mid-2010s.

[3] Oil production statistics are Ministry of Energy, Industry and Mineral Resources data taken from SAMA's Annual Statistics. Statistics on GDP, imports, and exports are from the World Bank World Development Indicators.

Figure 2.1. Private sector output and fiscal impulse, 1970-2018



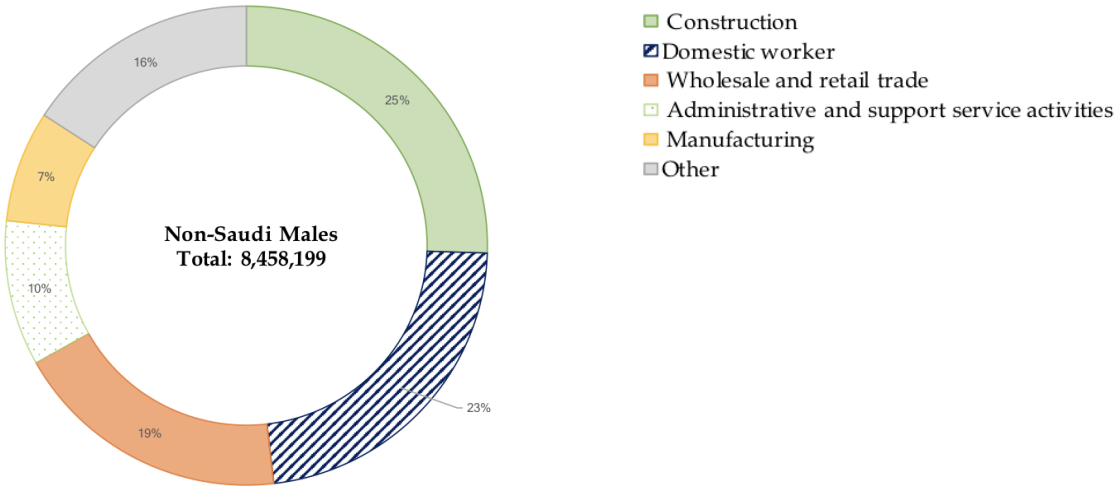
Source: Saudi Arabia Monetary Authority (SAMA), Annual Statistics.

The dependence on foreign labor has persisted to the present day. The General Organization for Social Insurance (GOSI) reports that roughly 80% of the private sector labor force are non-Saudi males[4], representing more than 110 different nationalities. As Figure 2.2 shows, non-Saudi males work primarily in construction, as domestic workers (such as drivers), and in wholesale and retail trade, largely in low-skill, low-wage positions. On the other hand, there is a pronounced public-private sector duality for Saudi workers given a large wage gap driven by a roughly 50 percent public sector wage premium in 2014[5]. Figure 2.3 illustrates the private-public wage gap in the Saudi labor markets in 2015 and highlights the concentration of Saudi workers in public sectors such as government, health, and education as well as low-wage low-skill sectors such as retail, construction, household services and agriculture. The duality and segmentation of the labor market both motivated Saudization policies and determined the degree of their success.

[4] Non-Saudi females just account for 3% of the expats.

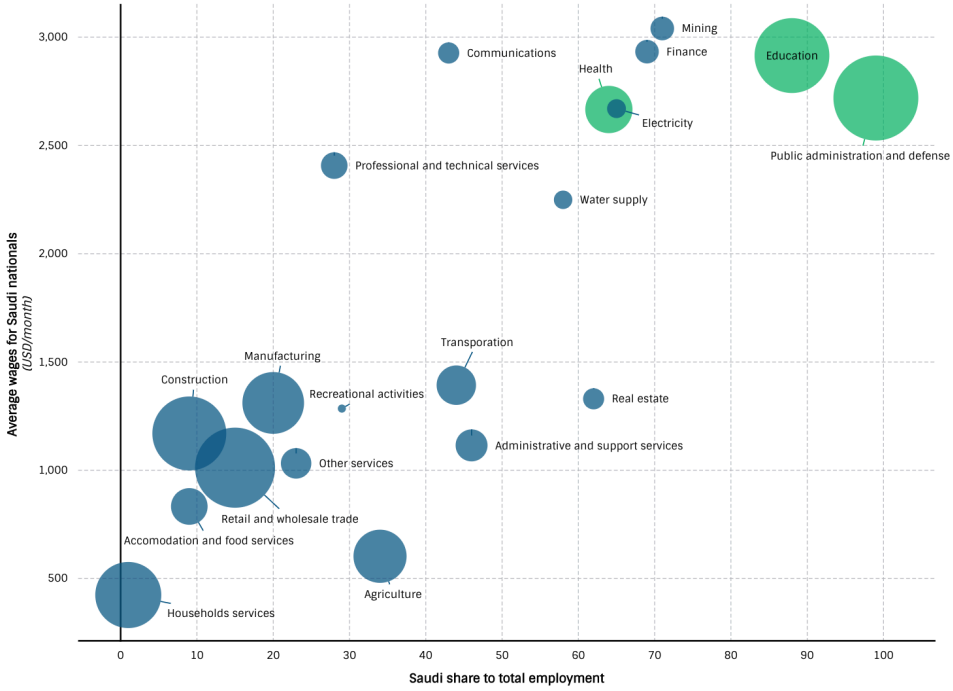
[5] Based on McKinsey Global Institute analysis using data from the Central Department of Statistics and Information, Saudi Ministry of Economy and Planning; Saudi General Organization of Social Insurance; and Saudi Ministry of Civil Service. After the Global Financial Crisis public wages started increasing at a fast pace, while those in the private sector decreased, culminating in a private-public wage gap of about 50 percent.

Figure 2.2: Occupational Distribution of Non-Saudi Males in the Private and Household Sectors



Source: GASTAT/GOSI 2019Q1

Figure 2.3: The Saudi Dual Labor Market



Source: Central Department of Statistics and Information; 2015 Labor Force Survey.
Note: The size of the bubble represents total employment in the sector. Green indicates public sectors, and blue represents the private sector.

2.2. Workforce Nationalization as a Policy Goal

The *de facto* segmentation of the labor market has long been a source of political and economic tension. Article 45 of the Saudi *Labor and Workmen Law*, passed in 1969, declares at least 75% of a firm's workforce and 51% of its wage bill must be tied to Saudi employees. In the decades that followed, the Ministry of Economy and Planning generally set ambitious targets for an economy wide Saudization rate as part of its five-year plans to conform with the law. By the mid-1990s, firms were required to increase their Saudization rate by 5 percentage points per year until a 50% target was hit (Perrin 2013). In 2006, the annual increments were discontinued, with an across-the-board 30% requirement imposed on the private sector as a whole. Some expedient attempts were made to fully convert specific sectors - wholesale produce, gold and jewelry, taxis - to Saudi labor, but these attempts tended to be short-lived and stunted by public outcry over subsequent price increases (Fakeeh 2009). In general, however, the challenges of meeting targets for both workers and firms meant that Saudization targets were weakly enforced.

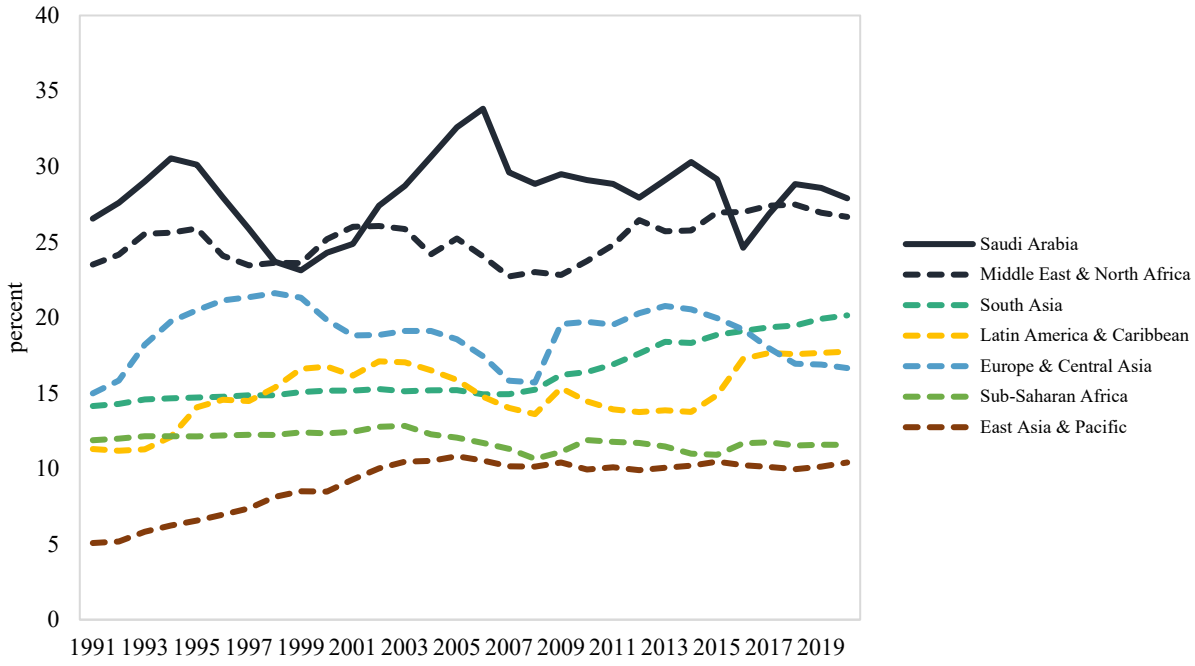
More serious Saudization efforts were undertaken within the government and its state-owned firms. Efforts were mostly centered on the public sector, which, per statistics from the Saudi Arabian Monetary Authority, saw an increase in its Saudization rate from around 70% in the late 1980s to 90% at the start of the 2000s oil boom to 95% today. Saudization targets were put into place for contractors working with national oil company Saudi Aramco (Fakeeh 2009) and petrochemicals giant SABIC (Saudi Hollandi Capital 2011). While successful, these efforts were, by their nature, limited in scope.

In more recent years, however, expanding private sector employment for Saudis became a much more urgent priority for the Saudi government. The unemployment rate among Saudi nationals increased from 9.8% in 2008 to 12.4% in 2011, despite strong macroeconomic conditions following the recovery of oil prices in late 2009. Following the oil boom and subsequent expansion of the expat labor force of the 2000s, the government was under serious pressure to ensure that its flood of oil revenues translated into improved labor market conditions for Saudi workers.

Demographic factors are also important in this shift in policy focus. Rapid Saudi population growth of about 2.5% annually, which resulted in a demographic youth bulge, made finding jobs for new entrants to the labor force increasingly pressing. Figure 2.4 underscores the urgency of the situation - youth unemployment is high in Saudi Arabia even when compared to the rest of the MENA region, which struggles with the phenomenon more than any other region worldwide. While the hundreds of thousands of Saudis graduating from university annually are a valuable potential resource, failing to meet their high expectations would be enormously costly economically and a threat to social stability[6].

[6] Saudi Jobs for Saudis Is Crown Prince's Generational Challenge. Bloomberg. Retrieved March 26, 2021, from https://www.bloomberg.com/news/articles/2021-03-18/saudi-jobs-for-saudis-is-crown-prince-s-generational-challenge.

Figure 2.4: Youth Unemployment[7] Rates by Region



Source: World Bank, World Development Indicators.

3. Nitaqat: A Comprehensive Quota Based Employment Program

The imperative of increasing Saudi employment in general and especially that of the growing youth population entering the labor force gave rise to a new and more aggressive wave of *Saudization* policies. The Nitaqat (in Arabic, "bands") program was launched in 2011 by the Saudi Ministry of Labor (MoL), to replace the existing sector-wide 30% Saudization target with a system of industry-firm specific quotas[8]. The singular focus of Nitaqat was to increase Saudi employment in the private sector, with hopes that it would help reduce high unemployment. The program was also combined with a crackdown on visa irregularities, which resulted in the departure of 1.4 million migrant workers from Saudi Arabia since 2013 (EUI 2015)[9].

Figure 3.1 shows the Nitaqat timeline for the first several years of the program's existence. The first iteration, Nitaqat 1.0, imposed quotas that varied by firm size and industry, for Saudi employment across all firms with more than 10 employees across an expat abundant private sector. The initial announcement of the program details was made in May 2011, while data

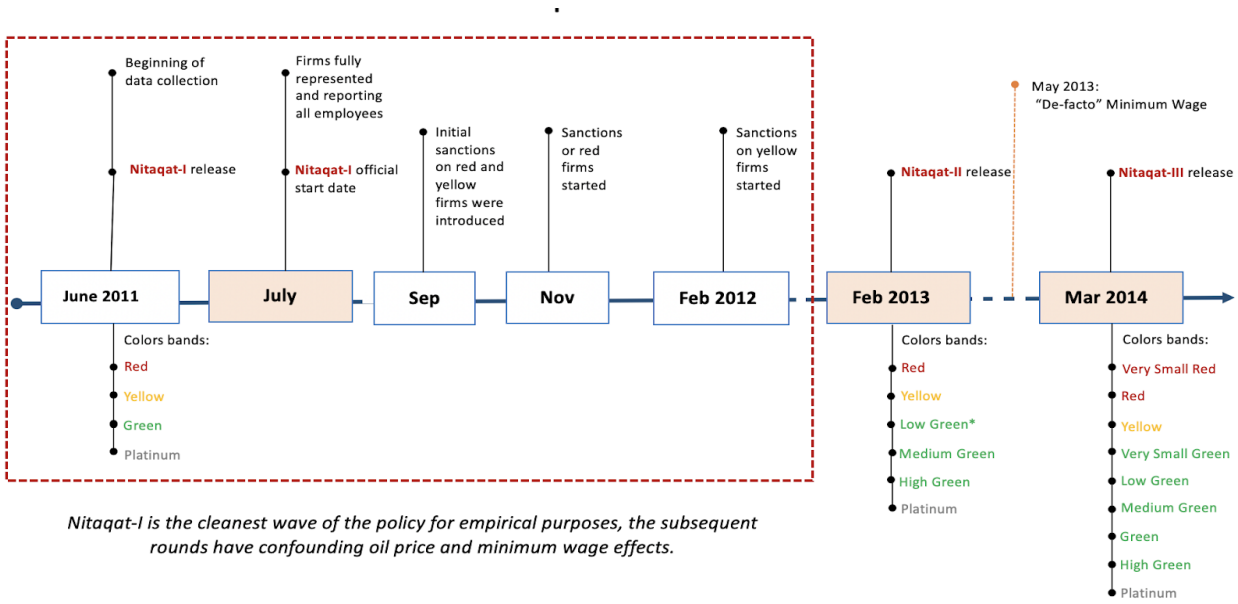
[7] Youth unemployment refers to the share of the labor force ages 15-24 without work but available for and seeking employment.

[8] There exists a body of literature that evaluates in what context and through what mechanisms quota-based active labor market policies can be successful. Holzer and Neumark (2000) use U.S. survey data to assess the impact of affirmative action in recruiting and hiring, and find that the increases in screening, evaluation, and training investment more than outweigh any impact from hiring workers with less experience or weaker credentials. Howard and Prakash (2012) assess the impact of public sector employment quotas in India and show that high-skilled employment increased among the relatively favored group of scheduled castes, while it decreased among the less favored group of scheduled tribes. The quota system also had a positive impact on occupational choices, and the effect increased with years of schooling.

[9] EIU. 2015. Country report: Saudi Arabia.

collection on firms began a month later. Sanctions came into effect in September 2011. Red and yellow firms could no longer issue new work visas, and existing ones could be renewed for a maximum of three months[10]. Additionally, companies could not open new branches or change the expats' job description. In November 2011 and February 2012 visas could no longer be renewed in red and yellow firms, respectively, with their expat employees allowed to freely transfer to Green or Platinum firms, which also benefited from expedited visa processing and tax deferrals.

Figure 3.1. Nitaqat timeline

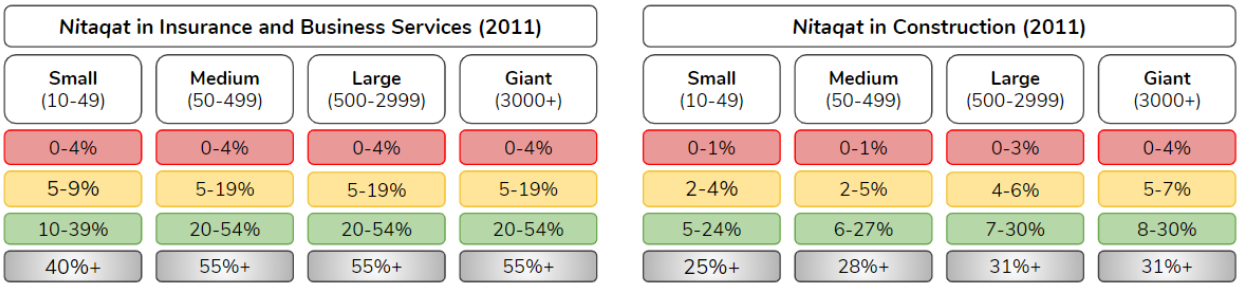


Source: Ministry of Labor

The quotas varied by firm size and industry. Large firms and sectors with traditionally high utilization of Saudi labor faced higher quotas, while smaller firms and expat-dominated sectors had looser requirements. Figure 3.2 displays quota requirements and color bands for a Saudi-intensive sector (insurance and business services) and an expat-intensive one (construction). A medium-sized construction firm, for example, could be marked as Green with a Saudization rate of 6%, while a similarly sized insurance firm would require a rate of 20%. Quota figures were roughly based on pre-existing Saudization rates; quotas were theoretically chosen so that (slightly less than) half the firms would be above. However, the impact of the quota and the portion of firms that faced immediate hiring needs varied substantially across sectors.

[10] Renewals could only be done for workers already in the company.

Figure 3.2: Color bands by industry and firm size



Source: Saudi Hollandi Capital (2012)

Scores for each firm were roughly based on the percent of a firm's workforce made up of Saudi nationals, with some modifications – most importantly, Saudi women counted as two full-time employees at program onset, although the bonus was abolished by 2015 (Husein, Balouziyeh and Burns 2016). Data was updated weekly through visa records from the Ministry of the Interior and employment records from the social security agency, allowing for rigorous enforcement.

Extensions: Expat levy, wage requirements, Nitaqat 2.0 and 3.0 and other initiatives

The implementation of Nitaqat created a framework that has been both expanded and complemented with other policies aimed at boosting Saudi employment. While Nitaqat did push Red and Yellow firms to meet their quotas, skill mismatches and the large wage gap between Saudi and expat employees continued to discourage businesses from further expanding Saudi hiring. In response, in late 2012 the government implemented the "expat levy," which charged firms a flat fee of 2400 SAR per expat per year if they employed more expats than Saudis; in practice, this applied to a large majority of firms. Since 2017, the levy has been increased substantially in the face of fiscal pressures.

While Nitaqat and the expat levy aimed to change the incentives facing businesses, the low wages offered in many private sector jobs relative to posts in the government continued to discourage many Saudis from looking for work outside of the public sector. In response, in May 2013, the government implemented a wage component to Nitaqat. In order for a Saudi employee to count in full towards meeting a firm's quota, they had to be paid 3000 SAR per month or more. The median monthly private sector wage for Saudis in 2012 was 2000 SAR, so the effective impact of this policy change was substantial. The vast majority of Saudi salaries rose to meet this *de facto* minimum.

The Nitaqat quotas themselves were modified several times, as well. In February 2013, the Green band was broken into Low, Medium, and High Green in order to sharpen incentives for better-than-the-minimum compliance ("Nitaqat 2.0"). In February 2014, firms with less than 10 employees were included for the first time, via a mandate that they must hire at least one Saudi. A more complicated system known as "balanced Nitaqat" was unveiled in mid-2016, with Saudization quotas replaced with a score based on five characteristics of a firm's workforce: hiring of Saudis, hiring of Saudi females, average wages paid to Saudi, Saudis in very high-wage

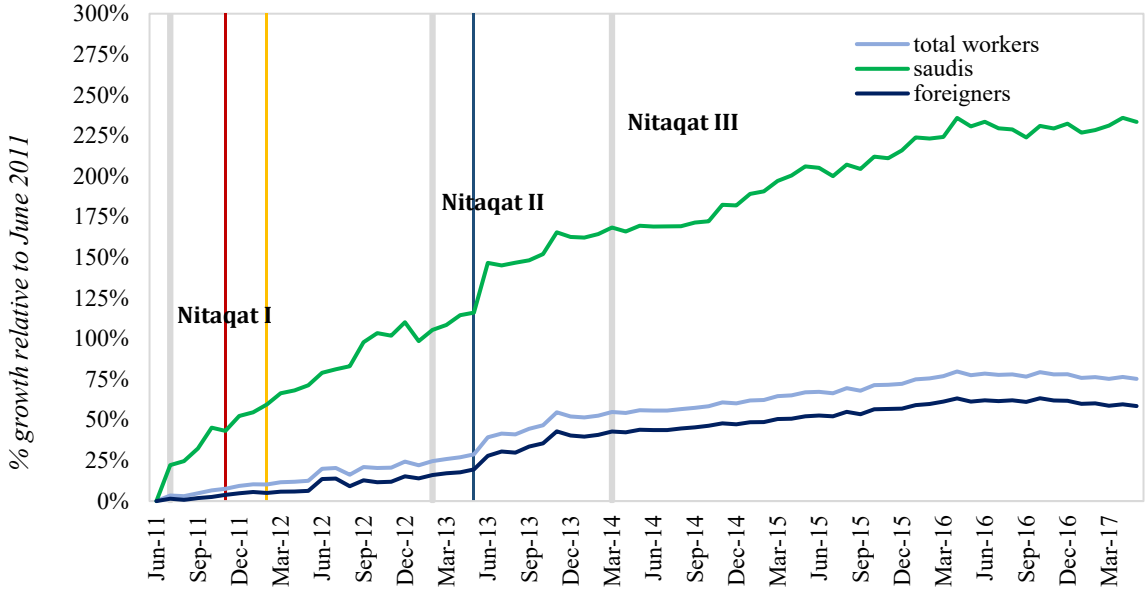
positions, and average Saudi tenure (EY 2016). Eventually, this idea was scrapped, and replaced in September 2017 with a revamped quota system, which shrank the dividing line between micro and small firms from 10 to 6, added two additional size categories, and substantially tightened the bands. Specific sectors have once again been targeted for 100% Saudization, particularly in retail.

4. Labor market trends

4.1. Employment

Did Nitaqat and related Saudization policies work as intended? On the aggregate level, the starting point for evaluation is looking at employment growth for Saudis in the private sector, where the impact appears to be very positive (see Figure 4.1). Taking June 2011, when Nitaqat was announced, as a starting point, Saudi private sector employment doubled in the span of about 15 months. This rate was not sustained - firms who had met their Nitaqat targets had less of an incentive to continue hiring, and the implementation in early 2013 of a *de facto* Saudi minimum wage likely discouraged additional Saudi hiring. Still, job growth between June 2011 and April 2017 totaled 233%. This is much higher than expat employment growth of 58%, a figure which is likely to be inflated by reduced informality[11]. Given historical aversion to employment in the private sector, these are remarkable gains.

Figure 4.1: Employment growth in the Saudi private sector

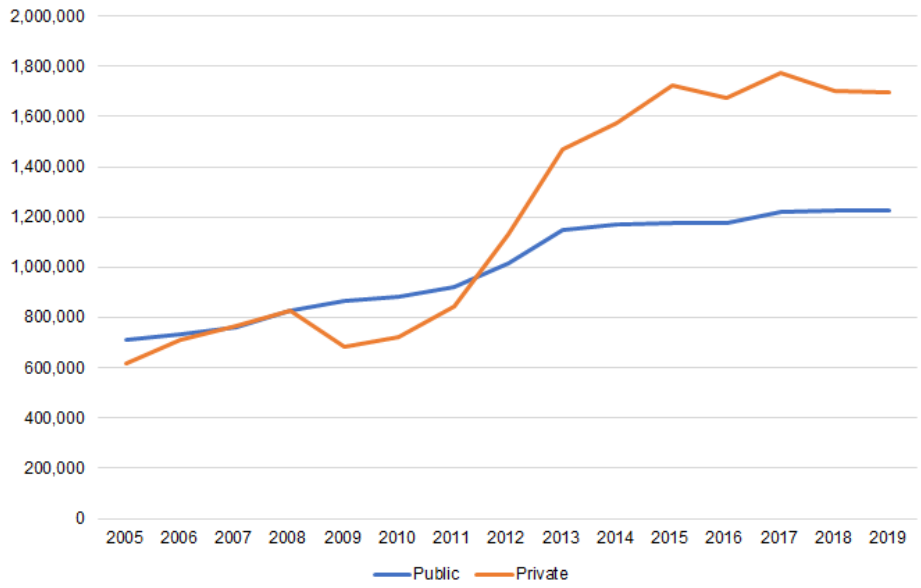


Source: Nitaqat dataset; Ministry of Labor.
Note: The red vertical line indicates November 2011, when sanctions on Red firms were enforced. February 2012 is marked by the yellow vertical line and it indicates the enforcement of Nitaqat sanctions on Yellow firms. The blue vertical line in May 2013 represents the implementation of the de-facto minimum wage.

[11] Official government data collection efforts intensified with the implementation of Nitaqat for monitoring and enforcement purposes.

Another relevant comparison is the differential growth in Saudi employment between the public and private sectors. Comparing the size of the private sector labor force with the number of government employees highlights the rapid acceleration in private job growth in 2011 and 2012, followed by a sustained growth trend over several years. By these metrics, Saudi private employment went from representing about half of total formal employment to around 60% by the mid-2010s. These aggregate data also highlight labor stagnation towards the end of the decade, with the size of the Saudi private sector labor force actually larger in 2015 than in 2019, as macroeconomic conditions worsened, and net government spending was reduced.

Figure 4.2: Saudi employment by sector



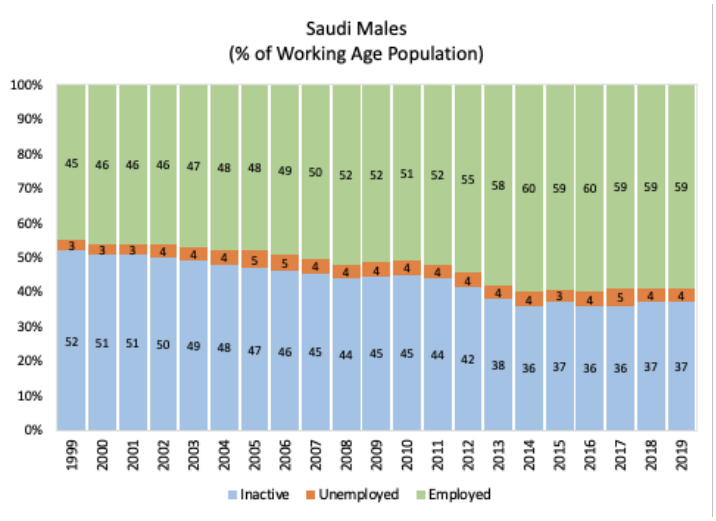
Source: SAMA Annual Statistics 2019. Government sector statistics based on the Ministry of Civil Service, and Ministry of Labor for private sector statistics.

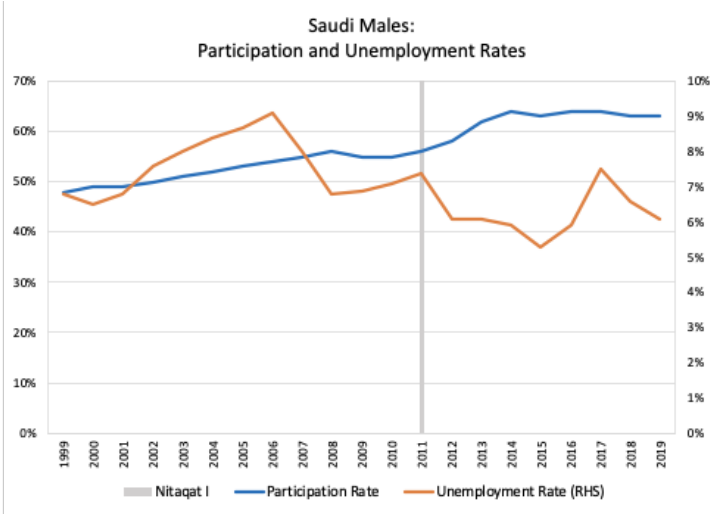
4.2. Labor Force Participation and Unemployment

Rapid job creation in the private sector, however, contrasts sharply with the unemployment statistics. The rate of unemployment for Saudi nationals - a publicly known and politically important statistic - reached 12.4% in 2011 and has remained in a fairly narrow band ever since, bottoming out at 11.5% in 2015 and then rising again to 12.8% in 2017.

Reconciling these two trends requires looking at the Saudi working age (15+) population - composed of employed, unemployed, and non-participating individuals - holistically. Looking first at Saudi males, the last 20 years have seen a fairly steady trend of increased employment, while the mass of unemployed and inactive individuals stays fairly constant. There is a slight increase in the inactive share of the population in 2009 and 2010, followed by a recovery over the next few years, coinciding with the implementation of Nitaqat in late 2011(see Figure 4.3). However, on a longer time frame, these fit with the dominant trends, rather than break from it.

Figure 4.3: Labor market indicators for Saudi males



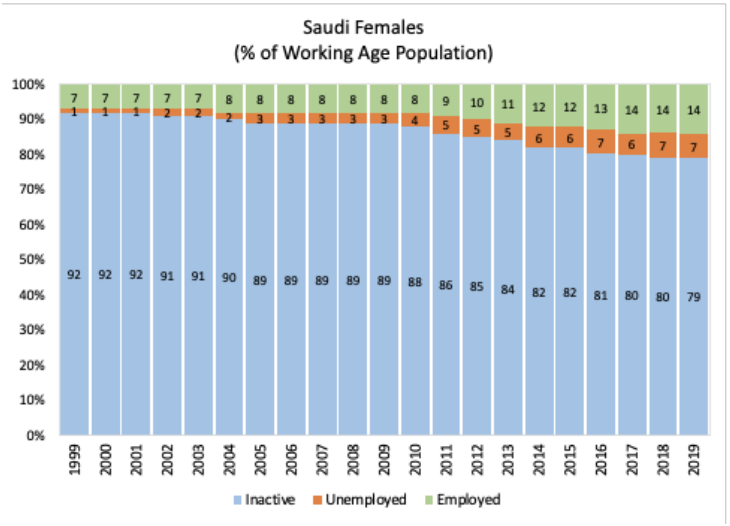


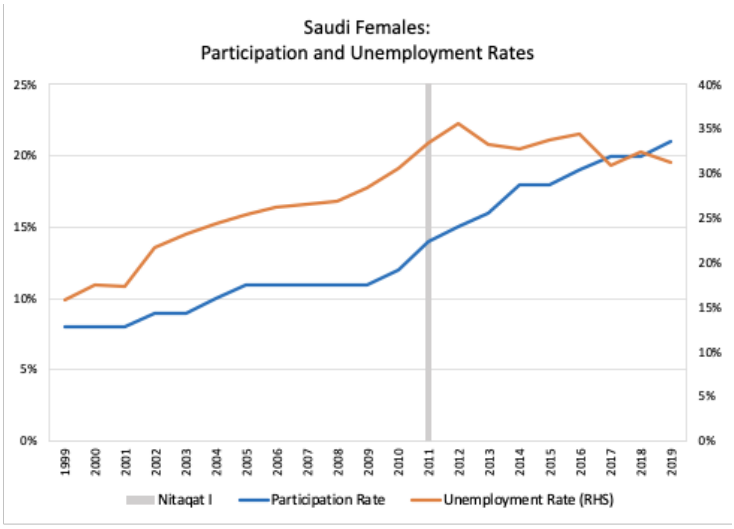
Source: GASTAT Labor Force Survey data.

The share of the working age population that is inactive has fallen from 52% in 1999 to 37% in 2019, while the share of the working age population that is unemployed has hovered between 3% and 5%. Put another way, as the working age population has grown, so has the share of Saudi men seeking employment, and the majority of them have been able to find it. This means rising participation and, especially since roughly 2005, falling unemployment.

Figure 4.4 shows that the experience of Saudi females has been very different. The number of working age women outside of the labor force rose steadily from 1999 to 2010, while the employment track record of those in the labor was quite poor. The share of working age women who were unemployed more than tripled from 1.3% to 4.5% between 1999 and 2011, while the share who were employed increased from only 7.0% to 9.2%.

Figure 4.4: Labor market indicators for Saudi females





Source: GASTAT Labor Force Survey data.

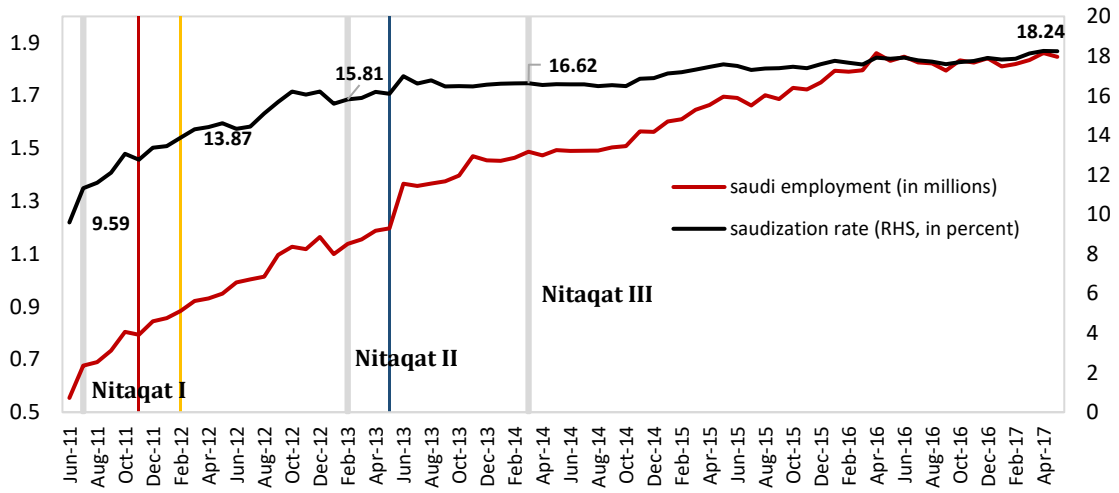
For women, 2011 is a more visible turning point. The number of inactive individuals falls in absolute terms between 2010 and 2014, corresponding to an acceleration in the relative fall. Importantly, more Saudi women become employed- the employed share of the working age population increases from 9% in 2011 to 14% by 2017, while the share of unemployed moves only from 5% to 6%. The pre-Nitaqat period was characterized by slowly increasing participation and rapidly increasing unemployment, while participation has accelerated since 2011 and unemployment has fallen modestly from a 2012 peak, although it remains very high.

In the aggregate level, the impact of Nitaqat and the Saudization push on employment patterns is nuanced. The gradual increase in the share of the working age population that is employed has been a long-running trend, and the increase in employment and reduction in the inactive population in 2011 and 2012, while indicative of a strong labor market, may be more easily attributable to an improvement macroeconomic conditions following the weak crisis-era labor markets of 2009 and 2010. For Saudi women, however, the early 2010s are a more visible turning point, where unemployment began to stabilize and fall after a decade of ongoing increases and participation in the labor market grew rapidly.

4.3. Saudization

While not the standard metric for labor market performance evaluations, the Saudization rate or the share of Saudis in total employment in the firm/industry has become the de-facto key performance indicator (KPI) of Nitaqat. Saudization is the enforcement mechanism of the program, as the bands are defined around the Saudi employee percentages (Saudization rates) at the industry-firm size level. According to Figure 4.6, the bulk of Saudi employment growth happened within the first 12 to 16 months of the policy implementation with very little growth afterwards. Between June 2011 and April 2017, the average Saudization rate doubled (but was never above 20%).

Figure 4.5: Monthly Saudization Rates in the Saudi Private Sector



Source: Nitaqat dataset; Ministry of Labor.

Note: The red vertical line indicates November 2011, when sanctions on Red firms were enforced. February 2012 is marked by the yellow vertical line and it indicates the enforcement of Nitaqat sanctions on Yellow firms. The blue vertical line in May 2013 represents the implementation of the de-facto minimum wage. Monthly Saudization is calculated as the share of Saudis to total employment and is different from the Saudization score used for Nitaqat classification purposes.

These labor market trends show interesting dynamics around the Nitaqat program but do not imply any causality. There is, however, empirical evidence that the policy in fact increased Saudi employment and Saudization rates; see Peck (2017) and Cortes, Kasoolu and Pan (2020). These papers use regression discontinuity and difference-in-difference approaches to study the effects of Nitaqat on firms and employment. They find that the success of the program employment-wise came at a high cost: increased firm exit and lower productivity as well as exports. Thus, Saudization rates increased, but were conditional on firm survival. That is, those firms that managed to increase their Saudi share to comply with the required quota managed to survive with higher Saudization rates during Nitaqat I, but many others were forced to exit.

5. Labor market composition

To understand the overall impact of the Nitaqat policy, we need to dig deeper into the composition of the labor market. While Nitaqat induced increased Saudi employment, this was not homogenous across firms and sectors. The program was designed to target specifically firms with low Saudization rates, which are overrepresented in some sectors and underrepresented in others; thus, creating a differential impact across economic activities. Additionally, because of existing constraints and frictions in the Saudi labor markets (i.e., duality and segmentation), the new entrants were demographically different to the Saudis already employed. In the following subsections we will analyze the changes in the labor market at the industry, firm, and individual worker level.

5.1. Industry level: where were Saudi jobs created?

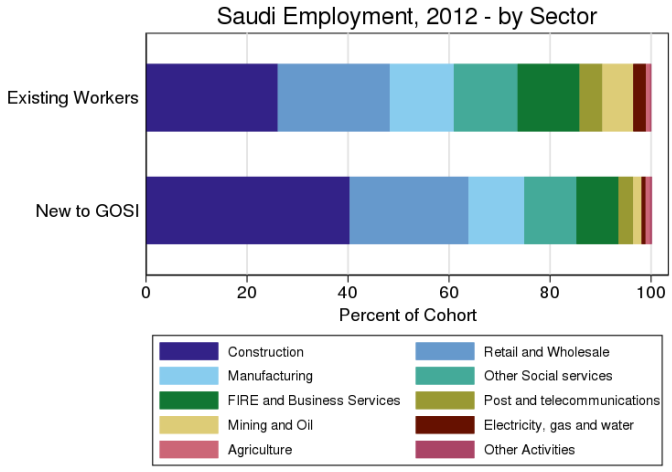
Based on the GOSI industry classification, employment in the private sector in Saudi Arabia is concentrated in a handful of sectors[12]. Construction was by far the largest sector, representing about 42% of total private sector employment in 2011, followed by Retail and wholesale at 24% and Manufacturing at 11% (see Appendix Figure A1). Employment for Saudi nationals, which grew about 34% between 2011 and 2012, did rise in all the ten broadly defined economic sectors between 2011 and 2012, ranging from 7% growth in Electricity, gas, and water to 68% growth in Construction. Despite overall increases in the number of Saudis employed, it is worth asking whether the new entrants are evenly distributed across these different sectors.

Figure 5.1 A) shows the distribution of Saudi employment by economic activity in 2012 for the existing workers (those who were registered in GOSI before Nitaqat) and the new entrants. Workers entering the private sector in 2012 were overwhelmingly more concentrated in Construction, which accounted for 40% of the cohort of entrants, than those who had already been active. On the other hand, sectors where Saudis have traditionally dominated – Mining and oil, FIRE and business services – employed very few new entrants. As a result, Saudization rates did not increase across the board, as depicted by Figure 5.1 B) Saudization rates increased, from 2011 to 2012, in Construction, Agriculture, Retail and Wholesale, and Manufacturing; all sectors with less than 25% average Saudization. Contrastingly, Saudization rates decreased in FIRE and

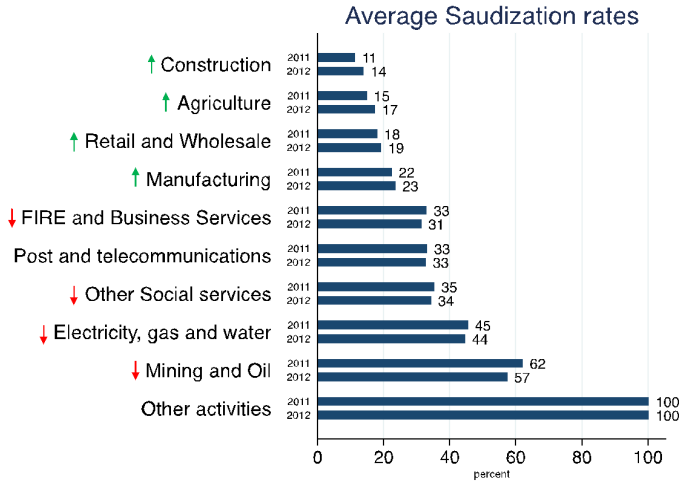
[12] These are: Agriculture, Construction, Electricity, gas and water, Finance, Real Estate (FIRE) and business services, Manufacturing, Mining and Oil, Post and Telecommunications, Retail and Wholesale trade, Other Activities and Other social services.

business services, Other social services, Electricity, gas and water, and Mining and oil. These were sectors with over 30% Saudization, on average, so the quotas were not binding for most firms.

Figure 5.1: Saudi employment and Saudization by sector



A)



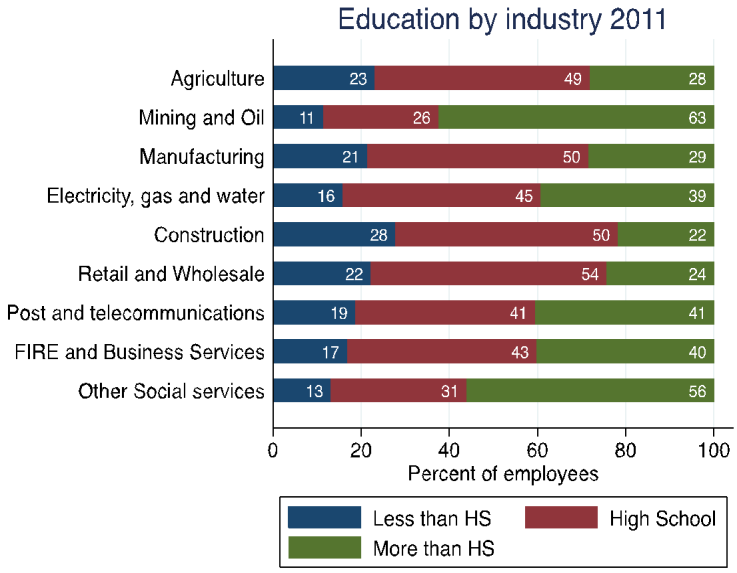
B)

Source: GOSI

Therefore, while there was employment creation across the board, with Saudi entrants in all sectors, Saudization rates only increased in those sectors with the lowest starting Saudization rates and decreased in most of the others. This was a direct consequence of the program design, as we show in the next subsection.

In addition, this pattern implied an interesting shift in Saudi hiring: from high-skill, high-wage, Saudi-intensive sectors (pre-Nitaqat) to low-skill, low-wage, expat-intensive sectors (post-Nitaqat). Figure 5.2 shows that the four sectors that increased their Saudization percentages–Construction, Agriculture, Retail and wholesale and Manufacturing– had in 2011 the highest shares of Saudis with less than high school education and the lowest shares of Saudis with tertiary education. These four sectors also made up four of the five poorest paying sectors for Saudi workers—together with Other Social Services, which, while intensive in highly educated workers, employs a

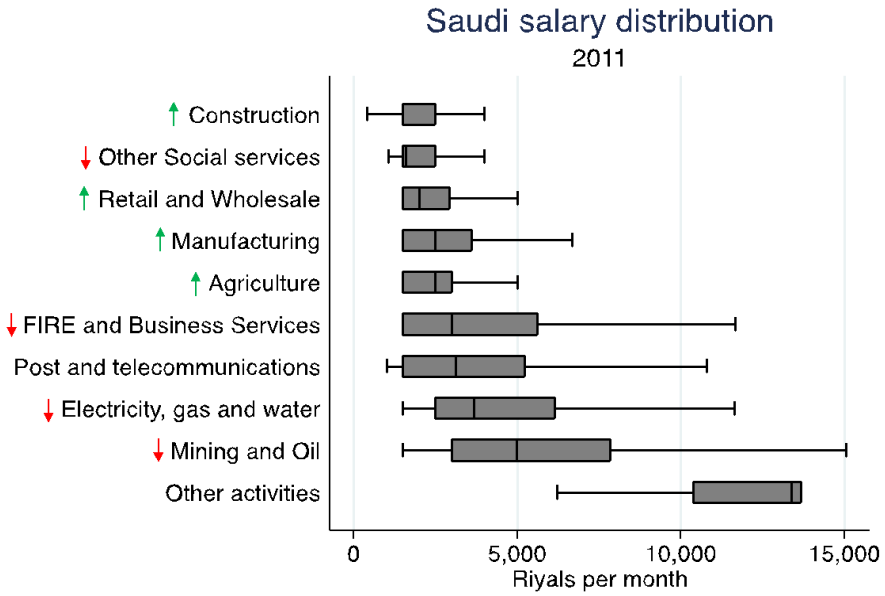
Figure 5.2: Saudi education by sector



Source: GOSI

disproportionate number of women, who are paid less across the education spectrum. Figure 5.3 plots the 2011 salary distribution for all economic activities. Saudization thus increased in those sectors with the lowest mean and median salaries (green arrows) and decreased in the highest paying ones (red arrows).

Figure 5.3: Saudi initial salary distribution



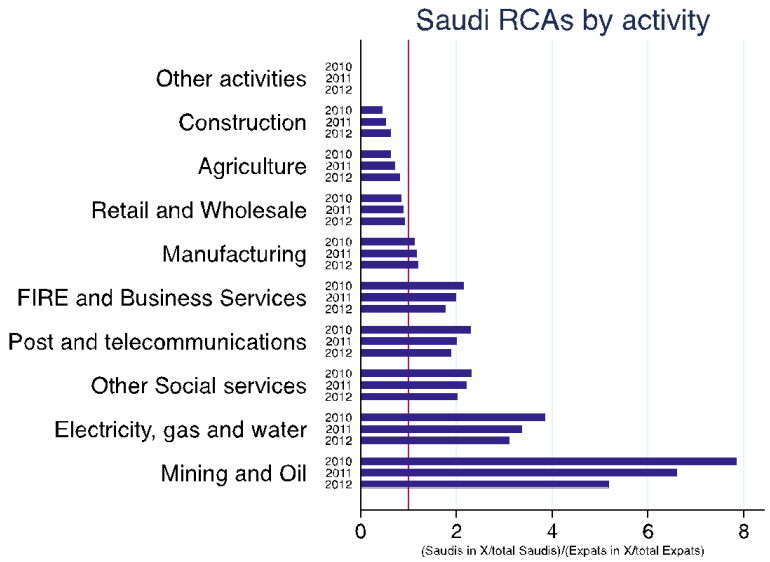
Source: GOSI

Note: Sectors are ordered by median wage. Green arrows indicate sectors in which Saudization increased, and red ones where it decreased.

Finally, Saudi labor in 2012 increasingly shifted towards the only sectors where Saudis had low revealed comparative advantage (RCA) relative to non-Saudi workers, as depicted by Figure 5.4. The RCA here is used as a measure of how intensive each sector is in Saudis and expats, weighted by the size of each group[13] (since naturally expat workers are more abundant than Saudis in all sectors). The increase in Saudization rates across sectors where Saudis had low RCA is particularly noticeable in small firms. This could be due to smaller firms being on average "more red" and thus having greater needs to increase Saudization.

[13] Computed as: RCA in sector A = (share of Saudis in sector A/overall Saudis)/(share of expats in sector A/overall expats).

Figure 5.4: Saudi RCAs by industry



Source: GOSI

This dynamic of increased Saudization in low-skill, low-wage, expat-intensive sectors (and vice versa) may be a cause for concern given Saudi Arabia's strategic and labor market goals. While increasing Saudi employment in sectors where they have not traditionally worked is not inherently problematic, enlarging sectors that already dominate the private sector runs counter to efforts to diversify the economy (a Vision 2030 goal). This is particularly true for Construction and Retail, non-tradable sectors that ultimately depend on domestic demand, fueled by oil revenues and public spending. Additionally, given that the fastest growing pool of unemployed Saudi workers are college-educated women, increasing the demand for Saudi labor in blue collar jobs may not address their labor market ambitions.

Falling Saudization in higher paying, more skill intensive industries is a more pressing concern. These higher-paying, skill-intensive sectors are more likely to be attractive to Saudi jobseekers and hold greater potential for job creation and productive diversification. We discuss below whether the divergence in trends in Saudization could be related to Nitaqat.

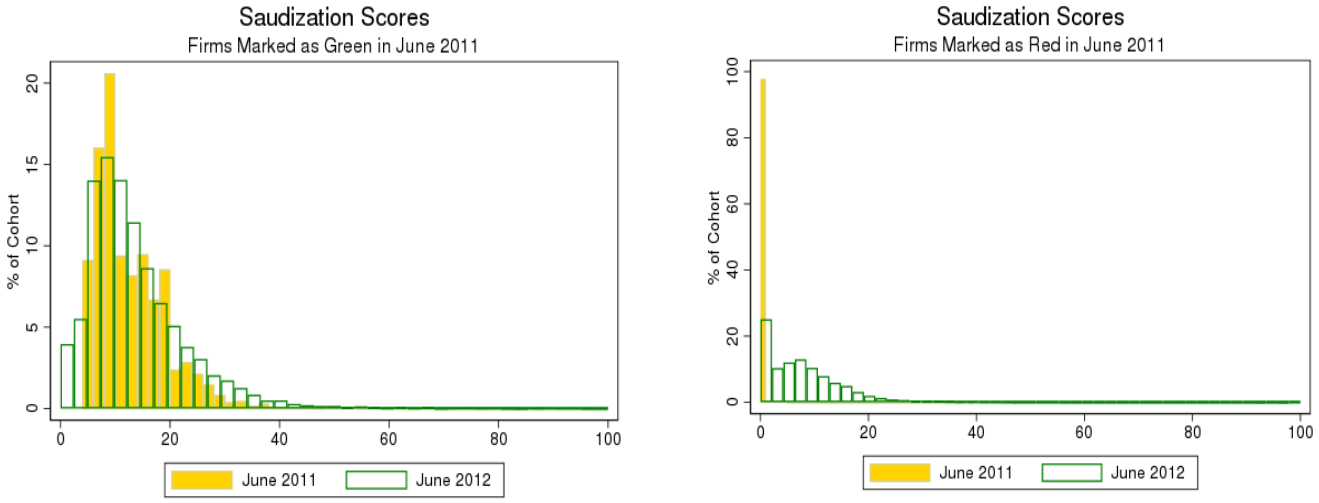
5.2. Explaining Sectoral Trends – Potential Drivers

What mechanism drove the changes in sectoral aggregates from 2011 to 2012? The nature of the Nitaqat program design – quotas with heavy punishments at the lower end of the Saudization spectrum – coincided with an increase in demand for Saudi labor, but only among firms that, in the pre-period, did not hire many Saudis and thus were in danger of being sanctioned. Quota needs were largely met through the hiring of marginal Saudi employees at low cost, resulting in a visibly two-tiered market of Saudi employees.

While the intention of the quotas was to align Saudization requirements with the pre-period norms, having 50% of the firms above and 50% below the Yellow-Green quota in every firm size-industry cell, that was not the case in practice. The low utilization of Saudi labor in the private sector made the quotas more binding by default in certain areas. A larger portion of Construction and Wholesale and Retail firms were marked as Red than in other sectors, particularly among small firms. For example, 77% of small construction firms employed *no* Saudis before the introduction of Nitaqat, making it difficult to calibrate the severity of the quota. As a result, Saudization rates in Construction among small firms increased between 2011 and 2012 by almost 7 percentage points. On the other hand, Saudization rates in medium firms, which had fewer Red firms and tended to employ Saudis more heavily, stagnated or fell.

Virtually all Red firms initially employed no Saudis, but the vast majority of those still operating a year later had added Saudis to their payroll. Figure 5.5 A) compares the June 2011 and June 2012 Saudization score registered in the Nitaqat data among firms marked as Red at program onset. Given that about 80% of non-micro firms are Small, firms could generally comply with the quota by hiring 1 or 2 Saudi employees. On the other hand, among firms that were marked as Green when Nitaqat went into effect, there was no statistically significant increase in Saudization, as shown in Figure 5.5 B).

Figure 5.5: Distribution of Saudization scores for red and green firms



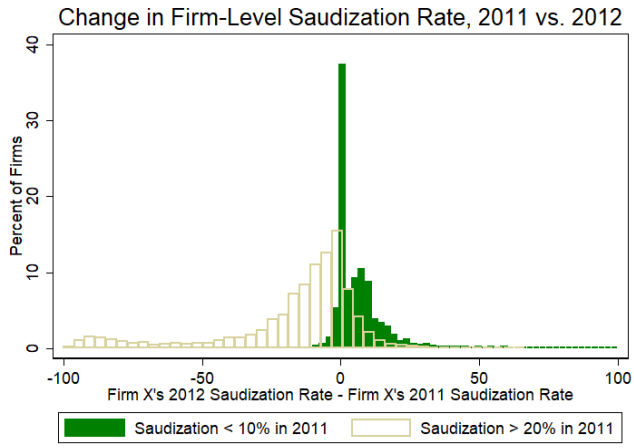
A) B)

Source: Nitaqat data

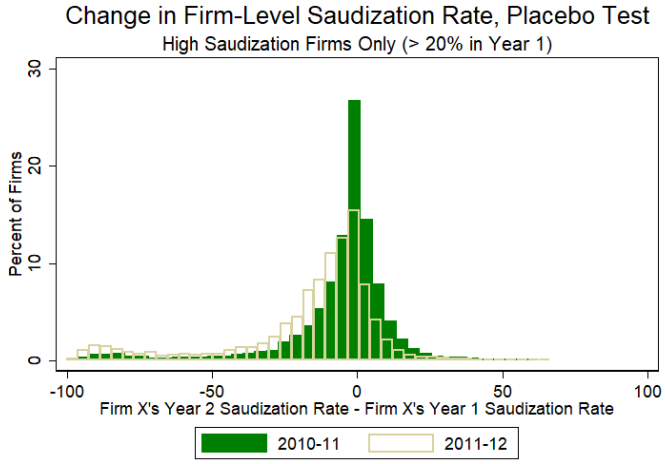
This dynamic becomes more visible when comparing the hiring choices between 2011 and 2012 made by low Saudization firms (which were more likely to be marked as Red and need to increase their Saudi-to-expat ratio) to those made by high Saudization firms (which were more likely to be marked as Green and not require hiring changes), as in Figure 5.6. The distribution for low Saudization firms is skewed to the right: on average, most firms increased their Saudization ratio. The opposite is true, however, for high Saudization firms, with the leftward skew reflecting, on average, a reduction in Saudization among firms less impacted by the quotas. By contrast, between 2010 and 2011, the distribution of the change in Saudization rates for high

Saudization firms was symmetric around zero. The tendency for firms with a large share of Saudi employees to reduce their Saudi-expat ratio was new to the year when Nitaqat went into effect.

Figure 5.6: Changes in Saudization scores among non-micro firms



A)



B)

Source: Nitaqat data

Firms with differing Saudization quotas exhibit sharp distinctions in hiring behaviors: firms with low initial Saudization levels increased their share of Saudi workers, while firms with high initial Saudization levels reduced their share of Saudi workers, a dynamic not present in earlier years. Specifically, the median firm with a Saudization rate of less than 10% -- most of whom would fall into the Red or Yellow bands -- increased their rate by 3.5pp within a year. On the other hand, the median firm with a Saudization rate above 20% decreased their rate by 8.4pp.

The design of the Nitaqat quotas created several notable incentives for Green and Platinum firms to reduce the Saudi workforce. One was facilitating the free movement of expats: In November 2011 and February 2012, Green and Platinum firms could freely[14] hire expat workers from Red and Yellow firms, respectively, without the permission of the Red and Yellow firm managers. At the same time, firms that needed to increase their Saudization rates were ramping up hiring, putting upward pressure on Saudi wages. Green and Platinum firms could take advantage of this decrease in the relative cost of expat labor by reducing their Saudization rate, since they were far above the quota levels. This effect has become even more noticeable in later years (under Nitaqat 2.0 and 3.0), as quotas tightened at higher levels and wage rates. These findings are consistent with Peck (2017), who shows that firms that were 5 or more workers above their Green cutoff reduced their Saudization percentage by 3.67pp compared to Green firms right at the cutoff, both through hiring fewer Saudis and more expatriates.

Thus, the quotas not only pushed Saudis into low-wage employment-heavy segments of the private sector in which they had previously not been heavily utilized, but also reduced the utilization of Saudi labor in firms and sectors that had traditionally used Saudi labor profitably.

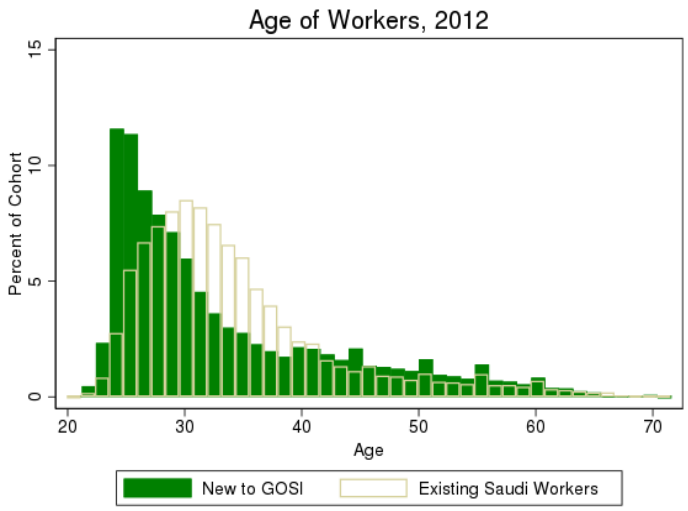
[14] Freely here means without permission from the Red and Yellow firms.

Overall Nitaqat gains were reduced by actions of Green firms, resulting in a weakened overall effect, particularly considering the skills and wages required by the sectors hiring more Saudis.

5.3. Individual level: who were the new entrants?

How were these hiring needs met? Firms that were suddenly in need of new Saudi employees to meet the required quotas brought in workers that, based on wage, demographic, and skill information, form a more marginal[15] cohort on average. This is consistent with the sector-level findings in the previous section, that show that Saudis were predominantly hired in low-skill, low-wage sectors. At the same time, while the Saudi labor force was adding large numbers of new and inexperienced workers, Saudis with a proven track record in the private sector benefited from additional premia for their labor.

Figure 5.7: Saudi worker distribution by age



Source: Nitaqat data

A gap between new and existing private sector workers is visible in a demographic comparison between the two cohorts. Figure 5.7 compares the age distribution of Saudis by their age, which we use as a proxy for work experience, with the existing cohort of workers much more concentrated in their prime working years. New entrants to the private sector, by contrast, are overrepresented primarily at younger ages. Additionally, 32% of Saudis new to GOSI in 2012 are women, compared to 15% of existing Saudi workers in 2011.

These differences are also reflected in the types of jobs taken up by new Saudi workers. broadly, new Saudi jobs in 2012 were more concentrated in clerical and sales/service roles and in construction. For example, in 2010, before Nitaqat had been announced or discussed publicly, 5.5% of new Saudi entrants to GOSI worked in clerical roles in the construction sector. By contrast, in 2012, amidst the Nitaqat hiring boom, 13.5% of first-time Saudi workers were registered as clerical workers in construction. More broadly, jobs were more concentrated in clerical and service/sales positions, and less in personal services and technician roles.

Figure 5.8 A) compares 2012 salaries by level of education of Saudis and cohort[16]. While the overall distribution of Saudi salaries did not change significantly between 2011 and 2012 (see Appendix Figure A2), workers with (more) experience had significantly higher salaries across the board. In addition, median wages for Saudis with work experience with primary, secondary, and tertiary education rose 22%, 25%, and 30% between 2011 and 2012 (not pictured). On the

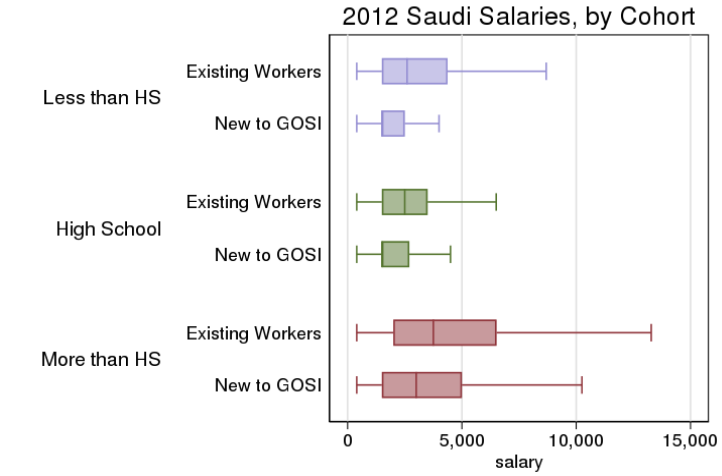
[15] Here marginal refers to the left-hand side of the distribution.

[16] The two cohorts are: workers new to the private sector in 2012 and those who had worked at some point between 2009 and 2011.

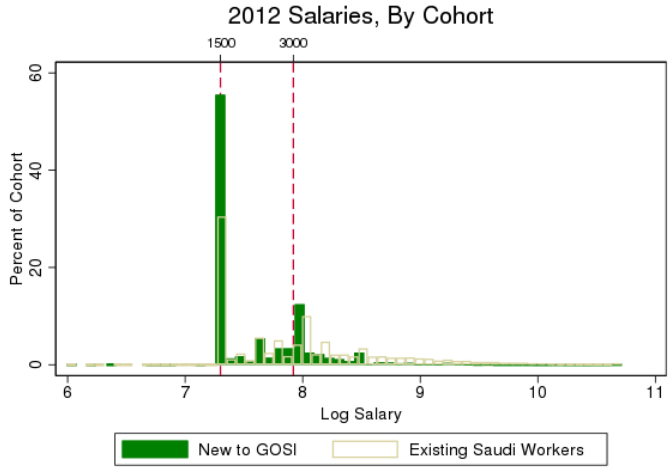
other hand, median wages for Saudis new to the private sector with primary and secondary education were 29% and 25% lower than they were for Saudis in 2011. The difference shrunk to only 4% when comparing wages for tertiary graduates.

These differences are likely due to Saudi hiring predominantly at the lower end of the income distribution. Figure 5.8 B) shows that new labor market entrants were overwhelmingly clustered at the de facto minimum wage of 1500 SAR compared to more experienced workers that had a "flatter" distribution. Finally, regression analysis (see Appendix Table A1) confirms that there are persistent wage premia for Saudis, men, prime-age workers, and educated workers, along with a specific premium for Saudi workers that only occurs once Nitaqat is enacted.

Figure 5.8: Saudi salary distribution by cohort and education



A)



B)

Source: GOSI

5.4. Later policy changes

So far, we have discussed the main labor market changes after the imposition of Nitaqat 1.0. However, the Nitaqat program is still underway, and has gone through several adjustments, also known as Nitaqat 2.0 and Nitaqat 3.0 (see the timeline in Figure 3.1). While Saudi employment increased until 2016, the growth rate diminished significantly after the first 16 months of the program. Similarly, Saudization rates had very little growth (and even stagnated) after June 2013 (see Figure 4.6). This could be an indication that all changes that occurred after the main policy was launched were marginal.

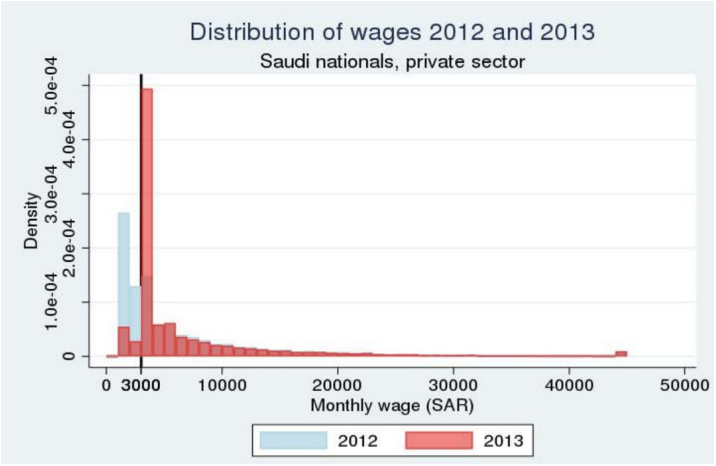
Regarding Nitaqat 2.0, we have no reason to suspect that the breakdown of the green bands had different effects than what we have already described. If anything, we would expect that the "low green" category to have yellow-type incentives to increase Saudization. Similarly, the further addition of new bands and incorporation of the micro firms into the programs (Nitaqat 3.0) tightened the already existing requirements. Thus, we will look into the only policy that could

have had a differential impact, the minimum wage imposition, since it imposed a price constraint rather than a quantity.

Recognizing any consequences of the 2013 change in the Saudi minimum wage, however, is challenging. This is mostly due to compounding effects, as it is very difficult to isolate minimum wage from the Nitaqat band effects. However, we present some descriptives below which suggest that an increase in minimum wage for Saudi nationals raises costs for firms and makes it harder to comply with the quota requirements.

In 2012, before the increase in the minimum wage to 3000 SAR (approximately US$800), almost 40% of the Saudi private sector workers earned below 3000 SAR. In fact, there was a bunching at 1500 SAR, the then "de facto" Saudi minimum wage. Interestingly, even at that wage, Saudi Arabia had one of the highest minimum wages in the world (in PPP), and a significantly higher one than expected for its level of economic complexity (see Appendix Figure A3). Almost 95% of this "under 3000 SAR" pool were males, mostly with a high-school degree or less.

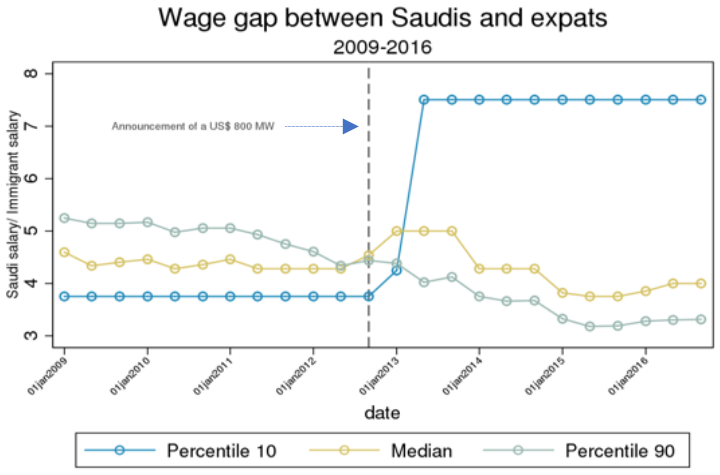
Figure 5.9: Distribution of Saudi wages in 2012 and 2013



Source: GOSI data

Figure 5.9 depicts how the implementation of the de-facto minimum wage resulted in bunching of salaries at the new cut-off, with less than 10% of the workers earning below 3000 SAR. While the rationale for the minimum wage increase was to reduce the existing gaps between the public and private sectors in order to increase labor supply in the private sector, this widened the gap between Saudi labor costs and expat labor costs. Figure 5.10 below shows that this measure led the lowest-wage decile Saudis to become over seven times more expensive than the average wage of the lowest-decile wage expats. Such a disproportionate wage differential makes worker substitution between Saudis and expats highly infeasible.

Figure 5.10: Historical wage gap between Saudis and expats



Source: Juan Obach using GOSI data

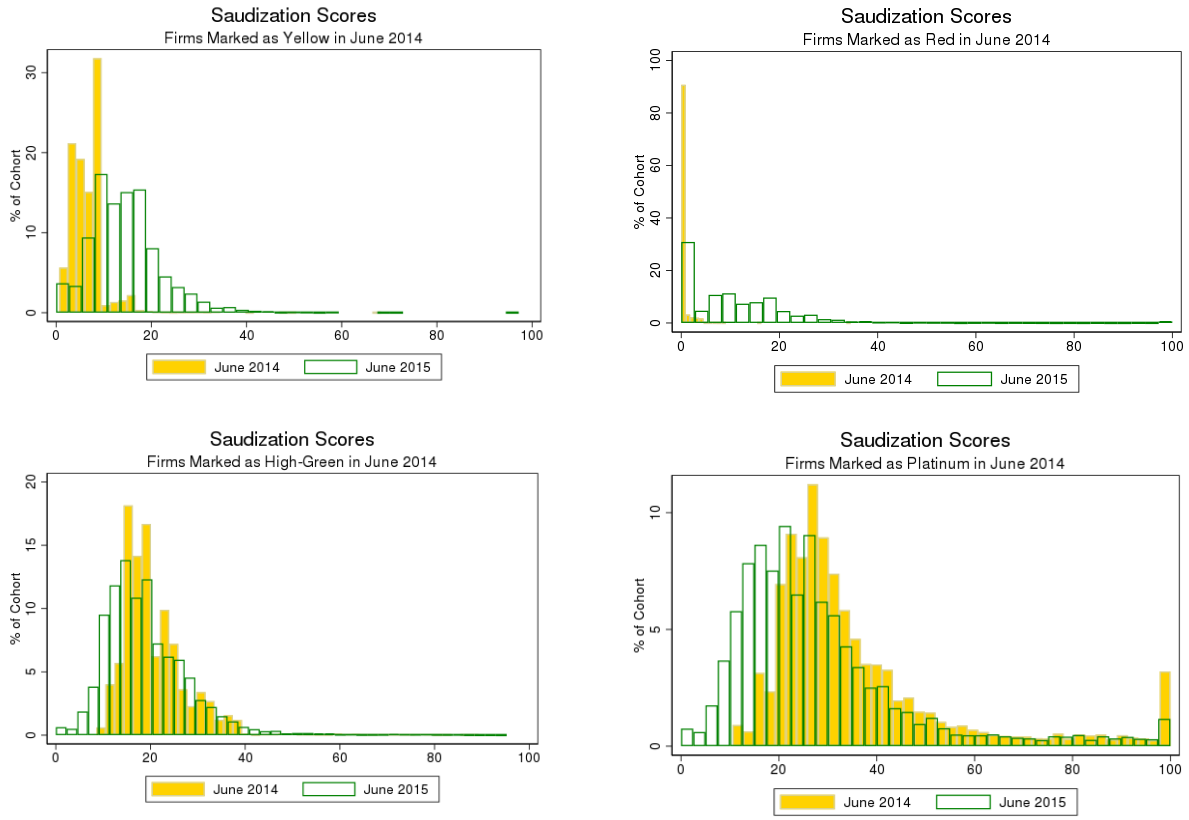
This extraordinary level of clustering at the de facto minimum also raises concerns that some hiring may be overstated. While Nitaqat was implemented rigorously, anecdotes abound that some of the hires at the minimum wage are "ghost workers," or Saudi nationals needed to meet quota requirements that do not

actually work at the establishment. Quantifying this effect is difficult; however, it is worth bearing in mind that some of the impact of the policy (in terms of increased employment) and its positive spillovers (in terms of skill-building and productivity) may be overstated.

Average monthly wages per worker paid by firms increased from SAR1,083 in 2012 to SAR1,139 in 2013 and kept rising afterwards, presumably as the quotas became more binding. The increase in average wages was clearly driven by the sharp rise in average Saudi wages, which after 4 years of a decreasing trend, jumped from 2216 SAR in 2012 to 3065 SAR in 2013 – an almost 40% rise (see Appendix Figures A4 and A5).

In the later years of the program, strategic firm behavior to get as close as possible to the quota became more obvious, possibly as a response to more expensive Saudi labor. Firms show a tendency to move towards the Low Green category, whether from below (as Red or Yellow Firms) or above (in the case of High Green or Platinum firms reducing their Saudization rates). Figure 5.11 illustrates this dynamic between 2014 and 2015, showing a convergence towards the mandated level.

Figure 5.11: Saudization scores by color band, June 2014 vs. 2015



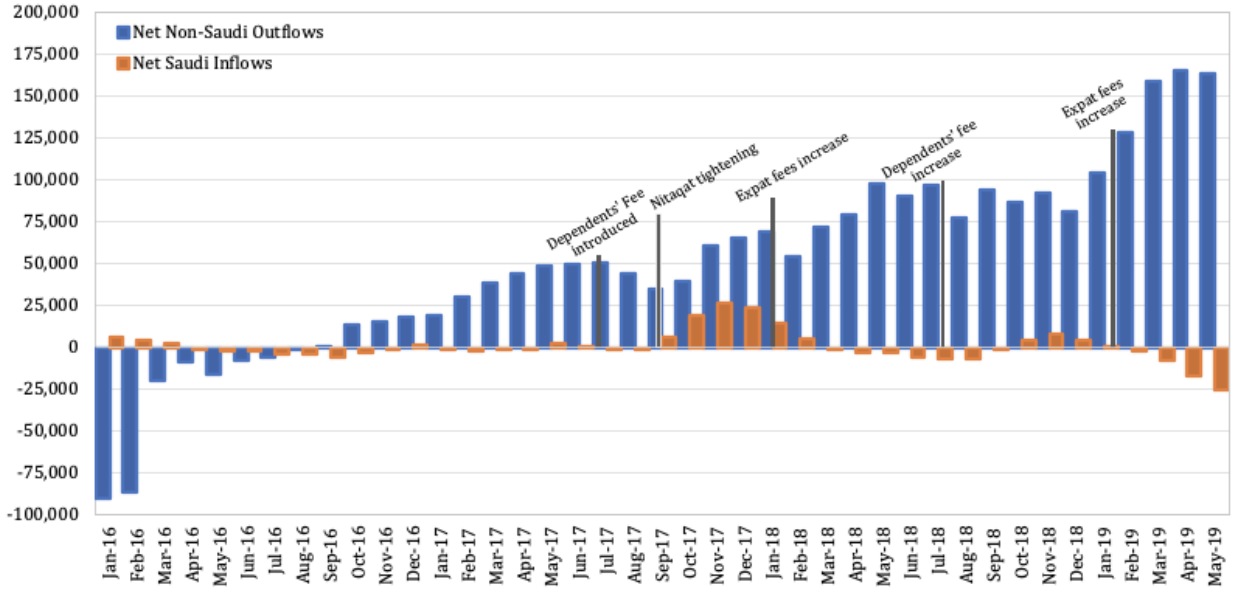
Source: Nitaqat data

This sharper pattern raises the concerns that the quotas are creating a cost incentive large enough to meaningfully change firm behavior. Red and Yellow firms are forced to seek out Saudi employment, while Green and Platinum businesses with a track record of employing large shares of Saudis face no such pressure. As a result of this mismatch, Saudization rates show a tendency to collapse towards the Yellow-Low Green threshold, with firms well above their quotas reducing the Saudi share of their workforce, usually through hiring expats. In the absence of a quota, it is plausible that many of these firms would have continued to fill positions with Saudi workers.

In more recent years, lower oil prices and subsequent fiscal pressures have pushed the government towards heavier reliance on non-oil revenues, including the expat levy. When introduced in 2012, the levy was aimed more at altering firm hiring choices than making a macroeconomic impact - fiscal surpluses in 2011, 2012, and 2013 were 11.6%, 11.9% and 5.5% of GDP, respectfully. Since then, however, levies on expats have increased drastically, to 400 SAR in January 2018, 600 SAR in January 2019, and 800 SAR in January 2020 with fewer exemptions and only a 100 SAR discount for Saudi-majority firms. Additionally, a 100 SAR monthly levy on expat dependents was introduced in July 2017 and increased by 100 SAR with each subsequent year. As a result, expat levy revenues increased to 28 bn SAR in 2018 and 56.4 bn SAR in 2019, or about 1.8% of GDP. Finally, as of November 2020, it was announced that the Saudi wage requirement for Nitaqat would be further increased to 4000 SAR.

Together with an economic slowdown, these substantially higher fees and a tightening of Nitaqat led to a large outflow of expat workers from the country. The number of expat workers in GOSI fell by about 2.2 million between January 2017 and June 2019 (Figure 5.12). However, the Saudi employment response was weak, with only a few months of increases in Saudi employment in GOSI in late 2017. Admittedly this was against the backdrop of tighter fiscal policy and a weak economy, but the lack of substitution in the face of widespread reducing expat employment is still highly visible in the data.

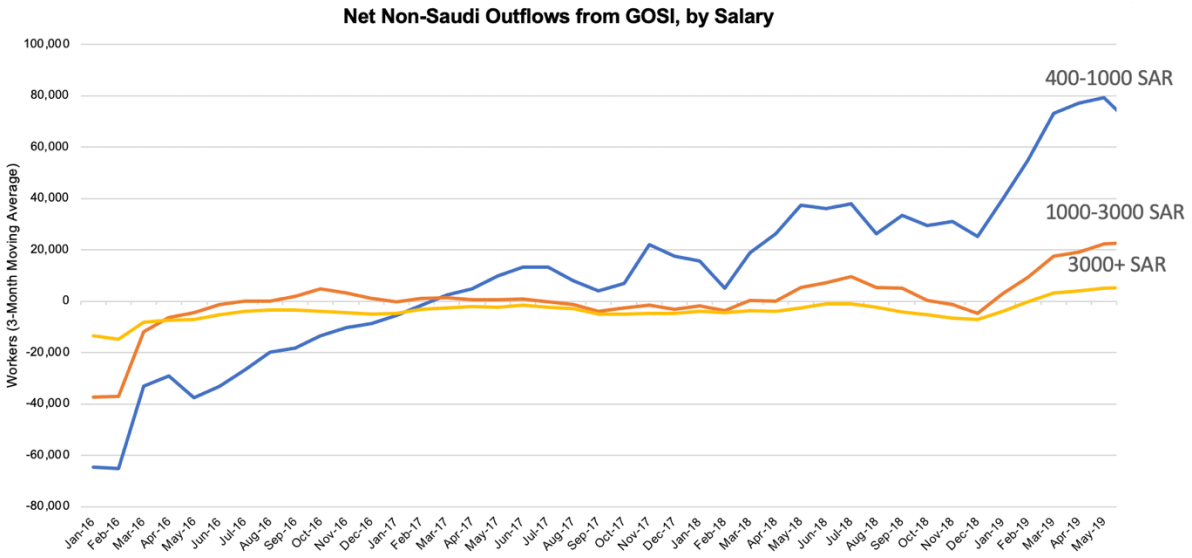
Figure 5.12: Inflows and outflows of workers from GOSI



Source: GOSI data

The underlying salary distributions of the expats exiting from GOSI sheds light on the lack of compensating growth in Saudi employment. The increased exit trend since 2017 is much stronger amongst the lowest-paid expats, who are unlikely to hold jobs for which Saudi workers are suitable substitutes (Figure 5.13). Considering the heavy weight placed on the private sector, these policy instruments may have reached the point of sharply diminishing returns in terms of fomenting Saudi employment with higher fees or tighter quotas. The increase in the minimum wage in November 2020 to 4000 SAR, together with tighter quotas, increases the likelihood of firm exit, as the costs on businesses continue to rise. Less competitive labor markets may also hamper diversification and FDI-attraction efforts underway.

Figure 5.13: Expat outflows by salary level, 2016-19



Source: GOSI data

6. Costs, consequences and policy sustainability

The Nitaqat policy will be considered successful as long as the long run benefits outweigh the costs, which include the unintended consequences. Quotas that changed preconceived notions about private sector employment and led to investment in Saudi human capital, worker training, and long-term productivity gains would be positive, while quotas that merely impose costs would be less notable and more likely to see reversed gains if policy is eased. While increased Saudi employment has been widely celebrated, both the implementation of the program and its compliance have been very strict—thus translating into onerous burdens to firms. Significant challenges to the Saudi economy, and the private sector in particular, have been amassing since the start of Nitaqat in 2011. The falling oil prices after 2015 have further exacerbated these challenges by increasing the fiscal burden on firms and draining fiscal stimulus from the domestic market.

We have described the success of the policy in terms of immediate employment gains, its main objective, and have shown many other "side-effects", unplanned and presumably unnoticed by the enforcers of Nitaqat. These unintended consequences—which include changes in the composition of the labor market in terms of industries, firms and workers—are likely to persist in the long run. This section aims to discuss the implications of those. Such exercise will allow us to estimate the many unintended costs originating from the design and implementation of Nitaqat. We focus on the medium- to long- term effects of the policy in light of the larger Vision 2030 agenda centered on economic diversification and building a more sustainable economic model for Saudi Arabia.

6.1. Decomposing Aggregate Labor Productivity

Section 2 explains the Saudi economic model as one of excess demand for labor. In this model, during periods of high oil prices and high government spending, employment rises rapidly, traditionally favoring relatively cheaper expat labor. When inputs are complementary, which seems to be the case for Saudis and expats, these employment decisions affect productivity. Overall productivity can be analyzed in terms of within- and between-sector contributions (see Appendix C for definitions and methodology). Figure 6.1 decomposes aggregate labor productivity into the productivity effect (within sector) and the labor share effect (between-sector).

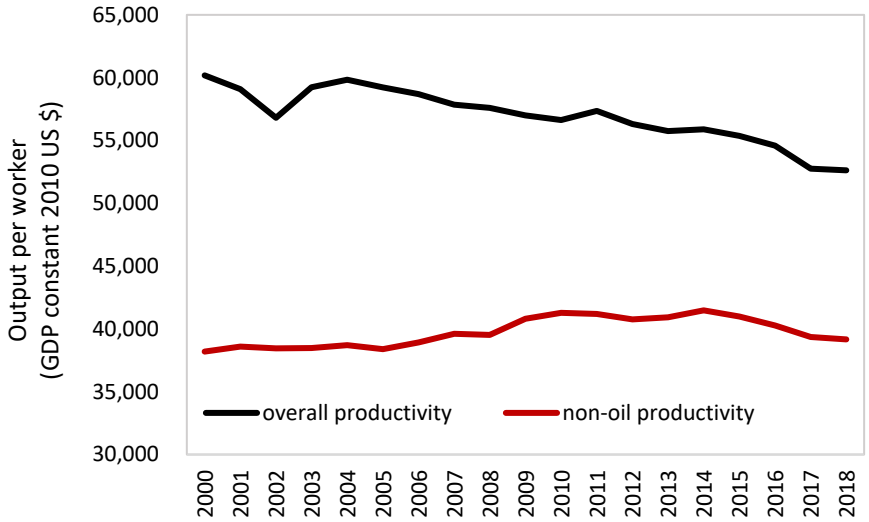
We can observe that, in 2014, when oil prices peaked at $107.95 per barrel, the positive labor contribution to productivity levels was canceled out by a drop in within-sector productivity. This change might have been the result of labor moving into low productivity non-tradeable service sectors, like restaurants and shopping malls, to meet increased domestic demand especially in recreational activities. On the other hand, the increase in oil production might have disproportionately and cyclically increased overall productivity.

Overall labor productivity in Saudi Arabia has been on a downward trajectory since 2003, while non-oil labor productivity has been stagnant (Figure 6.1 A). Like other countries in the region, the Kingdom seems to be stuck in a low productivity trap. From 2011 onwards, which coincides with intensified *Saudization* policies, the within-sector effect has contributed negatively to overall as well as non-oil aggregate productivity growth (see Figure 6.1 B and C). This is not surprising. We have shown in the previous section that Nitaqat imposes restrictions on firm hiring. This should make them worse-off, and presumably less productive, by affecting optimal resource allocation.

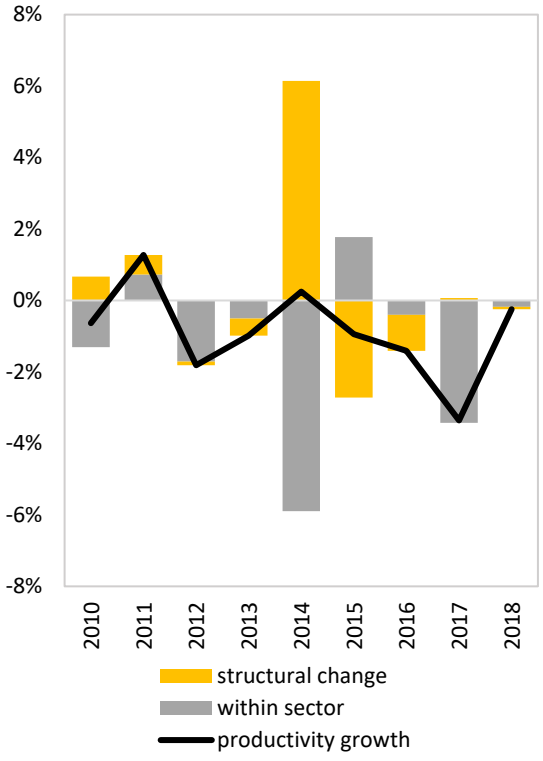
As we have noted before, the underlying assumption that Saudis and expats were largely substitutable is very unlikely given their wage differences. In addition, we have shown that Saudi hiring (and the overall share of labor) increased relatively more in low productivity (i.e., low wage) sectors, like Construction and Retail and Wholesale, which previously did not heavily employ Saudi workers. These findings are in line with Cortes, Kasoolu and Pan (2020), who find that Nitaqat had a negative effect on productivity per worker as well as decreased competitiveness, even for the more inherently productive firms (exporters).

Figure 6.1: Aggregate labor productivity trend

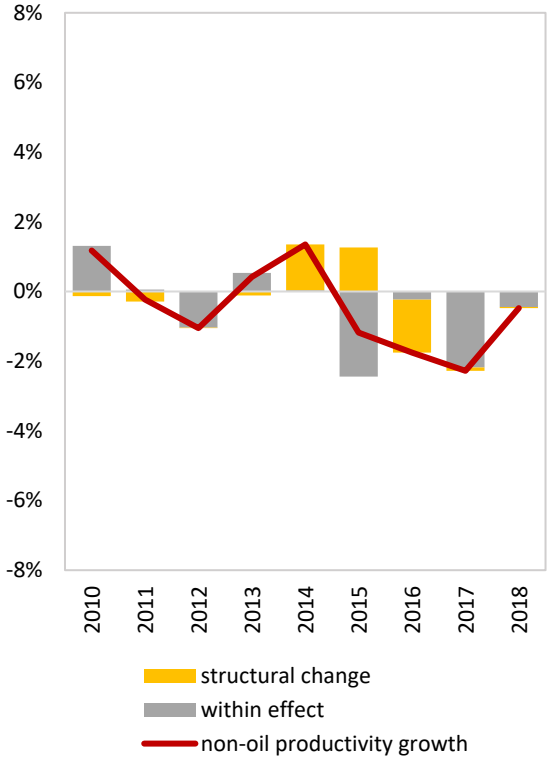
A) historical trend in productivity levels[17]



B) Overall productivity growth decomposition



C)Non-oil productivity growth decomposition

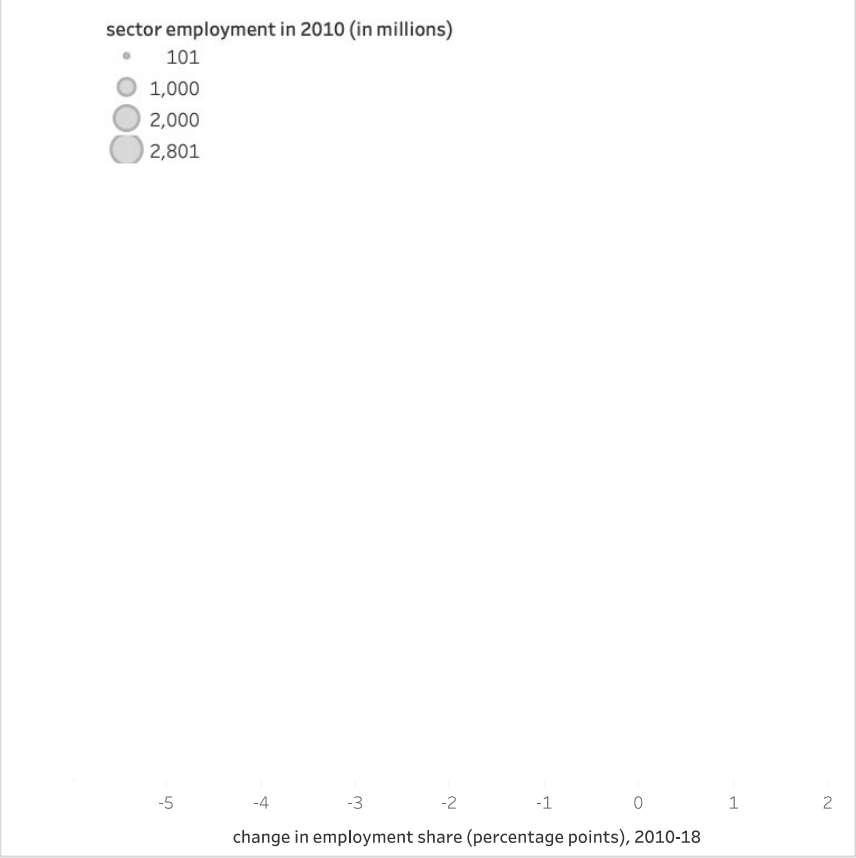


Source: ILOSTAT data

[17] Non-oil excludes the mining sector.

Saudi Arabia's oil economy model makes these economy-wide measures of productivity prone to aggregation errors, which mask the underlying dynamics and drivers at the sectoral level. To disentangle the driving forces of productivity growth, or lack of it thereof, we now focus on a sector and sub-sector analysis[18]. Figure 6.2 describes the relationship between the initial sectoral productivity relative to aggregate productivity measured in logs and the change in employment share of that sector. Between 2010 and 2018, the largest growth in employment took place in some of the lowest productivity sectors: construction, health, agriculture, public administration and education. This is consistent with our previous findings, that show that Saudization pushed for increased hiring in construction as well as with the fact that public sector employment like health and education tend to rise with oil revenues.

Figure 6.2: Initial productivity and changes in employment share



Source: Annual Establishment Survey

A traditionally low productivity sector, retail experienced a significant loss in employment share, but this could just be a consequence of having the highest employment in absolute numbers to start with. In fact, retail has the second largest level of employment in 2010, only second to

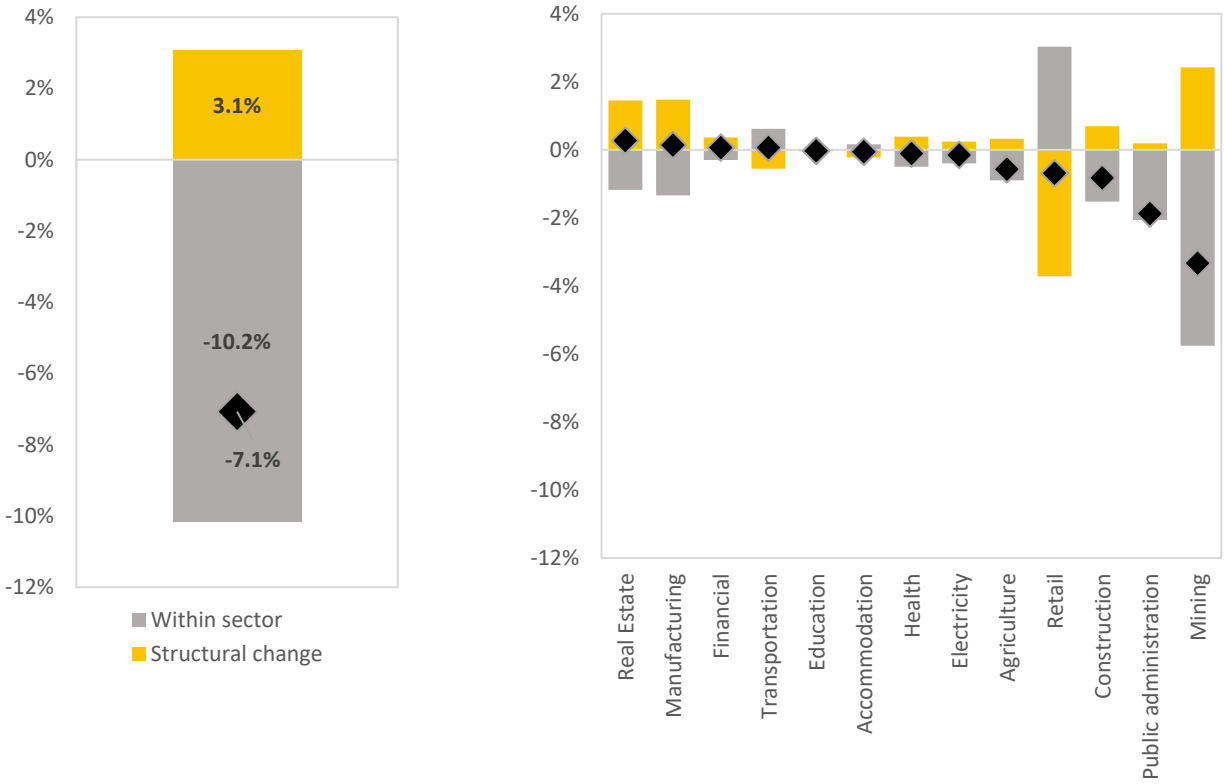
[18] This productivity focused sectoral and sub-sectoral analysis is different from the sectoral employment trends presented in Section 5.2 based on GOSI data. The GOSI dataset does not have output or value-added measures; therefore, we use the ILOSTAT and the GASTAT Annual Establishment Survey to calculate and decompose labor productivity measures.

public administration. High productivity sectors such as mining, manufacturing, real estate, finance, and electricity witnessed smaller employment growth.

From 2010-18, private sector employment was further pooled into low productivity sectors, which translated into a disappointing 7.1 percent decline in overall productivity (Figure 6.3 A). Decomposing this change in labor productivity by component, we find that the structural change component subtracted from aggregate productivity, dragging it down by -10.2%; while within sector productivity changes modestly compensated the decline in productivity growth (3.1%). The mining sector is the main driver behind the change, having modestly increased its employment share, but drastically decreased within sector productivity (Figure 6.3 B). Again, this is consistent with our findings that Saudization *decreased* or did not *sufficiently increase* in high-skill, high-wage, Saudi-intensive activities like mining, presumably because the Nitaqat rules incentivized substitution for lower-skill and lower-wage workers. Finally, there were small structural change gains in real estate, manufacturing, and financial activities.

Figure 6.3. Aggregate and sectoral productivity growth decomposition, 2010-18

A) Overall productivity *B) Sectoral productivity*



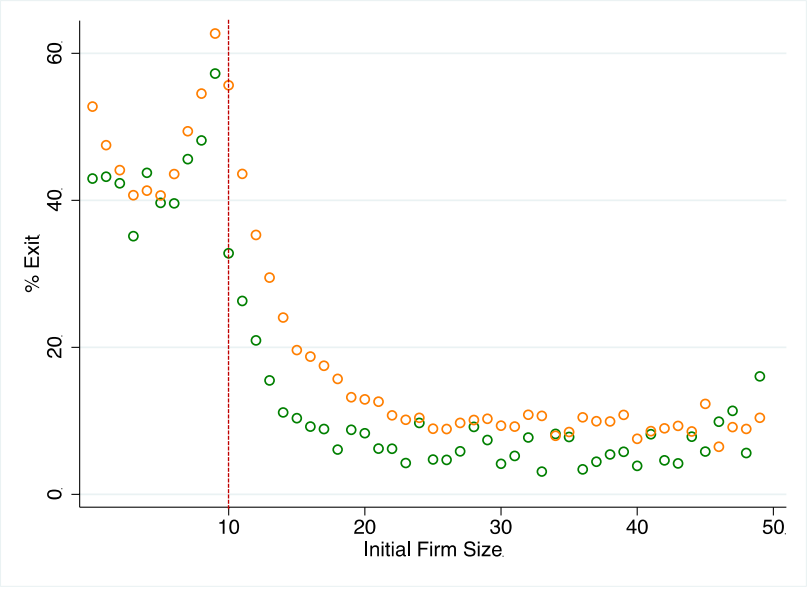
Source: ILOSTAT data

6.2. Firm Effects

Given its design, scale and strict enforcement, Nitaqat has had significant effects on firm behavior and outcomes. Oftentimes in policy discussions, the emphasis is put squarely on aggregate employment outcomes while overlooking the impact that the policy has had on private sector firms. One of the notable negative outcomes of Nitaqat has been increased firm exit –Peck (2017) and Cortes, Kasoolu and Pan (2020) are actually able to identify exit as a causal effect from the program. While some business closure is optimal in a healthy market economy (i.e., the lowest productivity firms lose their consumers to more productive ones), high exit rates, like those observed in Saudi Arabia, may be worrisome. Not only do they create unemployment, but a lot of specific know-how and employment relationships that are hard (and sometimes impossible) to replicate get destroyed.

Figure 6.4 shows that the exit rates varied by firm size, with smaller-sized firms having much higher rates during Nitaqat 1.0. This negative relationship between firm size and exit is particularly strong for red and yellow firms with less than 20 employees. Although micro firms (10 or less workers) were not sanctioned during Nitaqat 1.0, they exhibit a U-shaped relationship between firm size and exit.

Figure 6.4. Percentage of firms that existed in the sample between July 2011 and October 2012 by initial number of employees

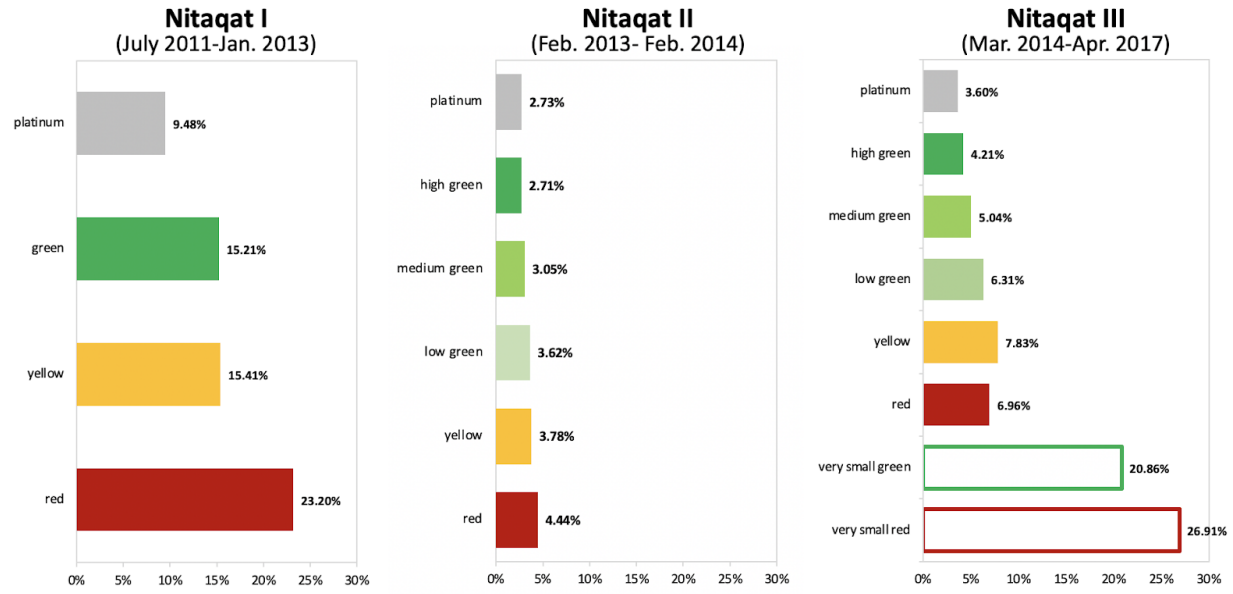


Source: Nitaqat dataset and own calculations
Note: Yellow circles show the exit rate for Yellow/Red firms and green circles show exit rates for Green/Platinum firms.

We explore the exit dynamics further, in order to identify patterns. When comparing exit shares across color bands and different waves of the policy over time, two clear trends emerge: 1) Nitaqat 1.0 had the highest exit rates across all color bands, and 2) micro firms had a disproportionately high exit rate once quota requirement extended to them starting in March 2014 with Nitaqat 3.0.

Figure 6.5 shows that from July 2011 to January 2013 firms classified as red had an exit rate of 23% and those in the yellow band followed with 15%. Green and platinum firms had higher than expected exit rates, 15% and 9.5% respectively, despite not being subject to policy sanctions. Firms around the quota threshold, yellow and green firms, exited the market at virtually the same rate. Exit shares were much lower during Nitaqat 2.0 and there were no significant differences in exit shares across color bands. With the inclusion of micro firms, the exit rate was 21% for those in the micro green category and 27% for those in red. Overall, Nitaqat– together with the November 2012 implementation of the first expat levy – appears to have had important effects on exit not just among those firms facing sanctions, but also in green and platinum firms especially during Nitaqat I. However, the initial exit effect of the policy could have been more of a cleansing effect, disproportionately pushing out of the market the smaller and relatively less productive firms.

Figure 6.5. Unconditional Exit Probabilities by Color Band



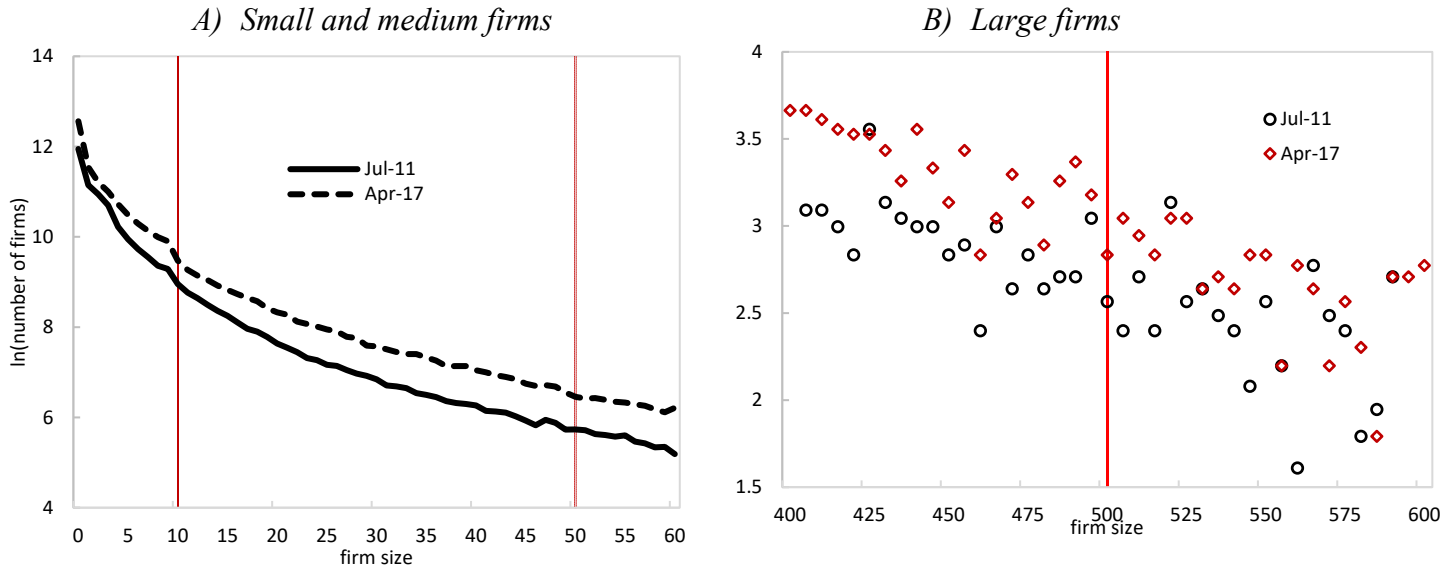
Source: Nitaqat dataset and own calculations

Furthermore, Nitaqat's size-based design, with higher quotas for larger firms, introduced perverse incentives for firm growth in the private sector. Firms could minimize the effect of Nitaqat by either reducing their size to below the ten-employee cut-off in order to become exempt from the Nitaqat policy, or to downsize to the lower size category where they are held to

a lower quota[19]. Figure 6.6.A captures the relationship between firm size and number of firms in a given size bin, which provides evidence in favor of the firm downsizing hypothesis for small and medium firms (60 or less employees). Between July 2011 and April 2017, the gap between the two lines increased indicating growth in the number of firms that are downsizing to the smaller size category in order to achieve a smaller quota requirement.

Figure 6.6.B shows that this relationship did not hold for large firms. Nitaqat appears to have resulted in a phenomenon of stunted firm growth for small and medium firms not having the same flexible employment margins of large firms and ability to expand in order to accommodate the required Saudization quota[20]. Figure 6.7 breaks down contributions to overall Saudization by firm size. From July 2011 to April 2017, the Saudization rate increased by almost 7 percentage points. The contribution of firms with less than 500 employees more than doubled from 5 to 11 percentage points. Over time, Nitaqat shifted the employment of Saudi nationals from large and giant to smaller firms. The latter appear to also have had higher exit rates on average.

Figure 6.6: Relationship between number of firms and firm size

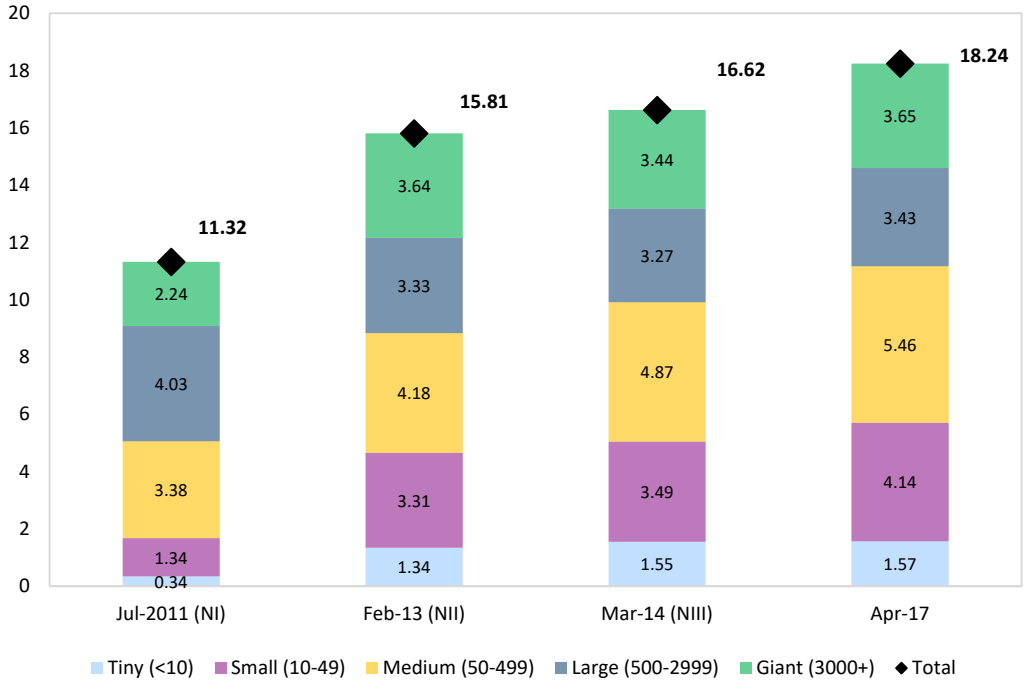


[19] There is also some evidence of firms engaging in "ghost employment" to comply with quota requirements. The term refers situations in which the worker is not doing the job as reported to GOSI, which can range from outright fraud (for instance, the worker's National ID Number is used without the worker's knowledge or permission) to workers receiving the GOSI reported minimum wage or lower salary without doing any meaningful work at the firm. Given the disproportional increase in women employment and participation, sometimes even in sectors like construction, there were concerns about increased rates of "ghost employment" especially among women. Miller, Peck, and Seflek (2019) use worker career trajectories to estimate whether the share of "ghost workers" in the Saudi private sector during Nitaqat is substantial. They find that women are more likely to be active workers when controlling for observable worker characteristics, and the likelihood of promotion appears to be steadily increasing over time for women. We therefore conclude that even if ghost employment is captured by the GOSI data it does not appear to worsen after Nitaqat and does not worsen for women in particular.

[20] Note that firms classified as medium in Saudi Arabia (49-499 employees) would be considered large in other countries.

Source: Nitaqat dataset and own calculations
Note: This figure shows the log of the number of firms by firm size in one-employee bins. Vertical lines indicate size bin cutoffs at 10 and 50.

Figure 6.7: Saudization contribution by firm size



Source: Nitaqat dataset and own calculations
Note: Saudization (in percent) is defined as the proportion of total employment that are Saudi nationals. This is different from the Saudization *score* that's used by MOL for the band classifications. Contributions by firm size are measured in percentage points.

6.2.1. Impact on Exporters

Beyond the general private sector firm effects, it is important to consider Nitaqat's effect on non-oil exporting firms. We pay special interest to the export sector as it is the key to the diversification efforts. Moreover, there is substantial evidence that exporters are larger, more productive and pay higher wages than those that serve just the domestic market (see Bernard and Jensen 1999, Melitz 2003, Bernard 2006, among others). This subsection will briefly complement the earlier productivity discussion by examining firm dynamics and export behavior in response to Nitaqat over time.

Cortes, Kasoolu and Pan (2020) find that exporters are much less likely to be below the Nitaqat threshold –only 42% faced sanctions versus 70% of non-exporters. In addition, average exit rates (1%) were much smaller than for the rest of the firms (5%). There is, however, compelling evidence regarding the adverse effects of Nitaqat on exporting firms' competitiveness. First, the probability of exporting decreased for firms subject to sanctions relative to that of firms above the quotas. Second, in order to comply with the quotas, firms increased Saudi hiring but reduced

expat employment by a greater proportion. This not only affected the input composition but also the costs: even though the total number of employees decreased, payroll expenses rose considerably for firms below the threshold. All of these effects combined eroded the competitiveness of the exporting sector. Hani and Lopesciolo (2020) look at non-oil exporters between 2011 and 2016 and find that each additional Saudi employee is associated with a $135.25 fall in annual exporters per worker (a proxy for productivity), after including controls for firm characteristics and applying year-level fixed effects.

7. Discussion and Conclusions

7.1. Research Findings

Nitaqat was designed and implemented with the principal goal of reducing Saudi unemployment, especially among the rapidly growing youth population. Given the abundance of expat labor in the private sector, policymakers embraced a job substitution mechanism instead of a job creation strategy to meet the predetermined goals. The expected success of this approach relied exclusively on the implicit assumption that Saudi workers are close substitutes for expats – that Saudi workers would be eager to, effectively, swap in for expatriate workers, and that this would be feasible without excessively burdening the private sector or hampering productivity.

We present evidence that, while Saudi employment and labor force participation did indeed rise sharply initially in light of Nitaqat, this underlying assumption of broad or significant worker substitutability is not supported in the evidence. In fact, we present some evidence that would support the alternative, which indicates that Saudis and expats are largely complementary, and that the post-Nitaqat mix was less cost-effective and potentially productivity-inhibiting.

More specifically, our analysis shows a number of trend breaks in the Saudi labor market, which is uncharacteristic of previous periods:

- Employment increased substantially for Saudis starting in 2011, especially women's employment. The trend of higher participation and higher unemployment for women broke in 2011, as new entrants to the labor force were increasingly able to find jobs rather than ending up unemployed. Labor markets were strong for Saudi men as well, but the trend break is less noticeable.
- While Saudi employment increased across the private sector, Saudization rates did not follow the same trend. Notably, the Saudi share of employment decreased in sectors offering higher wages or higher quality jobs.
- On the other hand, Saudization increased substantially in low-wage, low-skill industries traditionally dominated by expats, like construction. This effect was particularly strong in smaller firms.
- Firms with high Saudization rates (especially Green firms) at the onset of the program, on average, substantially reduced the share of Saudis in their workforce weakening the impact of the program, while firms marked as Red hired disproportionately more Saudis.
- Existing Saudi workers, on the other hand, benefitted from significant wage gains in addition to the de-facto minimum wage, as their proven track record and prior private sector work experience became a more valuable asset to firms in need of workers to help meet their quotas.

- The implementation of the de-facto Nitaqat minimum wage resulted in a bunching of salaries at the new cut-off, with less than 10% of the workers earning below 3000 SAR. While the rationale for the de-facto minimum wage increase was to reduce the existing gaps between the public and private sectors in order to increase labor supply in the private sector, this widened the gap between Saudi and expat labor costs.
- Firms below the quota faced substantially higher exit rates and a decrease in the probability of exporting, compared to those above the threshold.
- Saudi employment continued to increase after Nitaqat I (through at least 2017) in sectors with large and growing employment shares but low and decreasing labor productivity (for example, construction, agriculture and retail) in response to hiring restrictions introduced by Saudization policies. These trends further exacerbated Saudi Arabia's low productivity trap.

In short, we have shown that the policy gains were mostly concentrated in creating Saudi employment during Nitaqat I, when the policy was the least restrictive. Both during the first wave of the policy and over the long run, as Nitaqat requirements and enforcement tightened, the costs and unintended consequences compounded while the benefits tapered off with time[21].

We claim that the aforementioned trends are a result of the specific policy design. Nitaqat quotas were disproportionately binding in some (expat-intensive) firms and sectors, which then consequently experienced a surge in demand for Saudi labor. Given that firms in expat-intensive sectors could not renew their employee visas, expats became relatively cheaper and readily employable by Saudi-intensive firms and sectors. The concentration of Saudi labor in existing large industries undermines diversification efforts and does little to improve productivity in the private sector or to close the wage gap with the public sector. While the employment of Saudi labor at the margin that Nitaqat achieved (i.e., low-skill and with little experience) on a large, rapid scale may be considered a policy success and an important change in social norms, the shift in Saudi labor from firms and sectors that require higher skills and afford higher wages to those which do not underscores the potential distortions that quotas may induce.

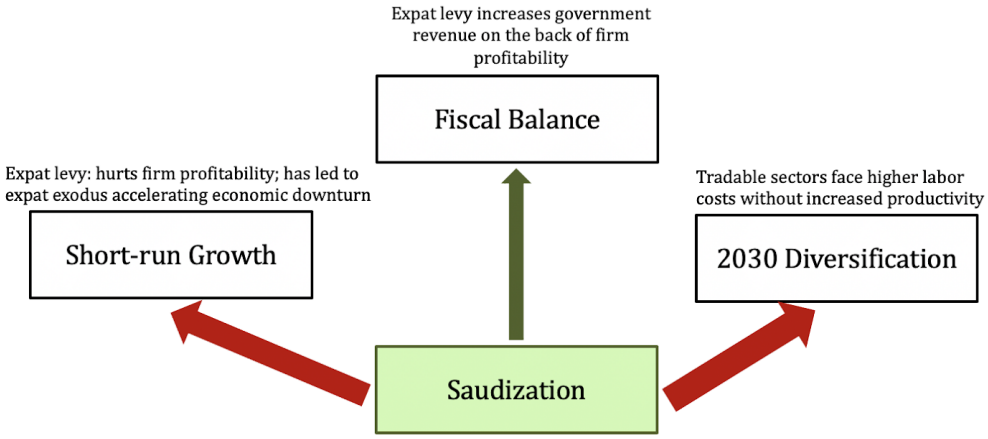
What remains entrenched is the Saudi-worker preference for public sector work and the correspondingly high reservation wages have resulted in a large unexplained wage premium that continues to drive firm preference for expat workers. These trends suggest that a job creation strategy via prioritization of diversification efforts and transforming the role of the public sector could have been then and is now, the more beneficial and effective approach to sustainable long-run Saudization.

7.2. Policy Implications

[21] Even the real effects of participation rates, mostly driven by women entering the labor market for the first time, remain unknown. Comparing numbers of women employment between GOSI and the Labor Force Survey data has revealed that a significant percentage of the women employed were not real workers but rather names to fill the Saudi quotas.

Why does all this matter? Nitaqat adopted a standard KPIs approach both in terms of the policy design as well as its evaluation. While this approach has its merits in keeping policymakers' efforts and resources focused, it also has one fundamental shortcoming: it fails to account for the more general equilibrium interactions and unintended consequences to workers, firms, the private sector and the economy as a whole. The imbalance between narrowly defined benefits and broad-based policy costs became especially taxing over time once the initial low-hanging gains were realized.

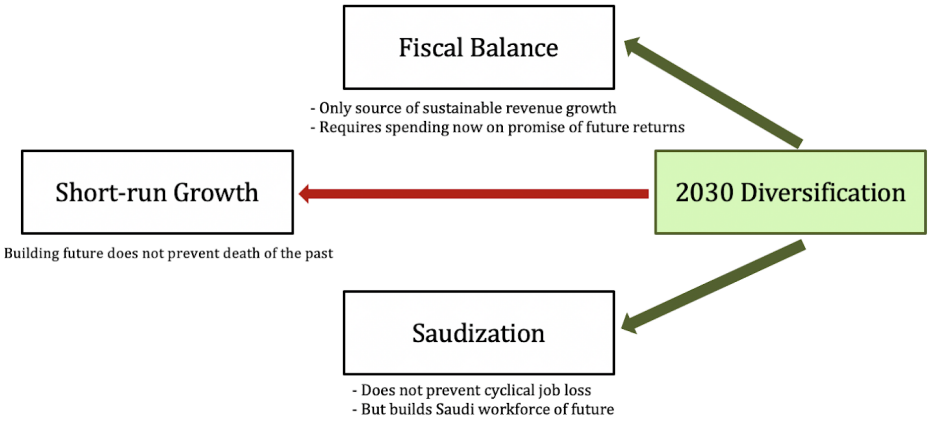
The findings we have presented and current economic challenges that the country faces make it infeasible to continue pursuing Saudization goals through outdated policy levers. Programs like Nitaqat and associated Saudization efforts appear to have outgrown themselves and their underlying assumptions on mechanisms of securing jobs for Saudis are no longer viable or scalable. If Saudization policies and efforts continue on the same course, our evidence suggests that the gains will not justify the costs. For instance, the expat levy helps artificially increase Saudi employment by making expats relatively more expensive to firms. The collected revenues have a cushioning effect on fiscal balance at the expense of firm profitability. On the other hand, the levy has led to massive departure of expat workers with exacerbating effects to the economic downturn. Tradable sectors also face higher labor costs without increased productivity, which undermines long-run diversification goals. Therefore, a Saudization driven policy agenda comes with modest gains and long-term structural consequences.



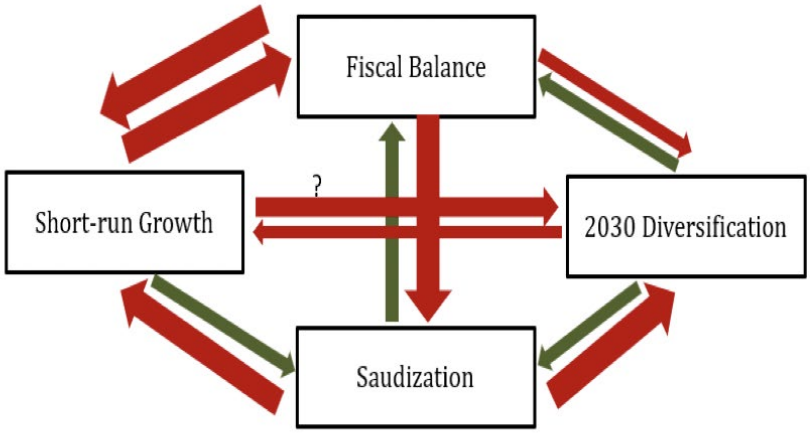
Source: Growth Lab elaboration; Framework of the Saudi Policy Quadrilemma by Ricardo Hausmann & Tim Cheston.

An alternative, perhaps the only viable alternative, centers around the prioritization of diversifying the economy away from oil. Concentrating efforts on diversification requires moving resources away from ad-hoc measures to boost short-term growth. Building the future of the Saudi economy and guaranteeing sustained prosperity for its people involves a certain degree of creative destruction. This process of structural transformation hinges on continuous product and process innovation mechanisms through which new production processes replace outdated

ones. In Saudi, this requires strengthening the competitiveness of existing tradable sectors and significant expansion on the extensive margin to enter into new non-oil related activities. A diversification approach would employ a job creation strategy in generating more and better jobs for Saudis that would be sustainable in the long run. Diversification requires incurring an upfront cost on spending and cyclical unemployment; yet it is the necessary path to sustainable revenue growth and building the Saudi workforce of the future. Ultimately, it will help achieve long term growth and solve the recurrent unemployment problems.



In the past, oil wealth generation was mostly sufficient to cushion the mounting policy costs mainly through government spending and domestic demand for goods and services. Even then, policy decisions have oscillated, in response to oil price booms and busts, between fiscal balance, short-run stimulus and achieving Saudization goals. The Kingdom's oil dependent economic model and the associated competing policy objectives have given rise to a policy quadrilemma between short-run growth, fiscal balance, Saudization, and Vision 2030 diversification aspirations. We believe that achieving the four policy objectives at the same time is not feasible. Specifically, the Saudization policy is inconsistent with the other three (although the scope of this paper only allowed us to discuss the trade-off between Saudization and Diversification).



In the current context, the dual pandemic and oil price shocks present a significant challenge as well as many difficult trade-offs for policymakers. These pressures from the ongoing public health crisis and economic frictions have rekindled support for returning to a net fiscal consolidation position, which risks igniting recessionary forces that may reprioritize short-run growth at the expense of long-run diversification. Diversification is further undermined by the ongoing tightening of Saudization policies. The challenges facing Saudi at the moment, while significant, also present a strategic window of opportunity to make important steps towards building oil independent revenue generating sources and sustainable engines of growth for the economy moving forward. We hope that the experience and rich learnings of the past will inform present and future policy decisions to that end, accordingly.

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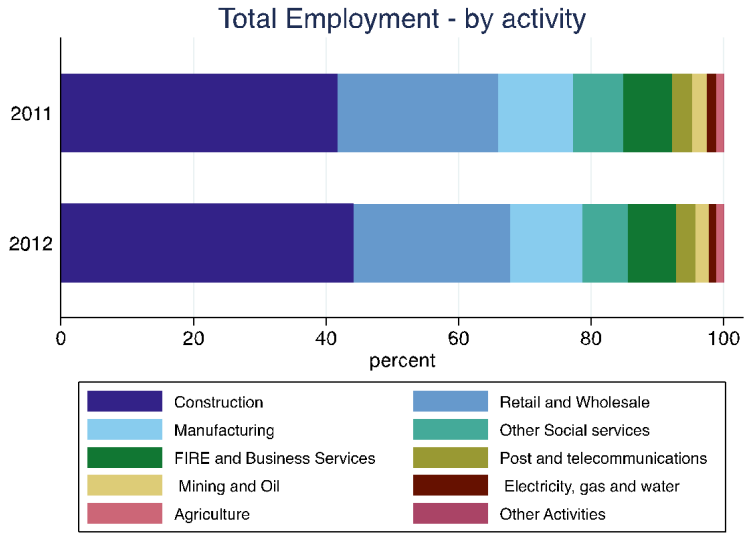
Appendix A: Figures

Figure A1: Total employment by activity in 2011 and 2012



The share of the three main sectors (Construction, Retail and Wholesale, and Manufacturing) slightly increased after Nitaqat's implementation.

Figure A2: Saudi salaries by level of education in 2011 and 2012

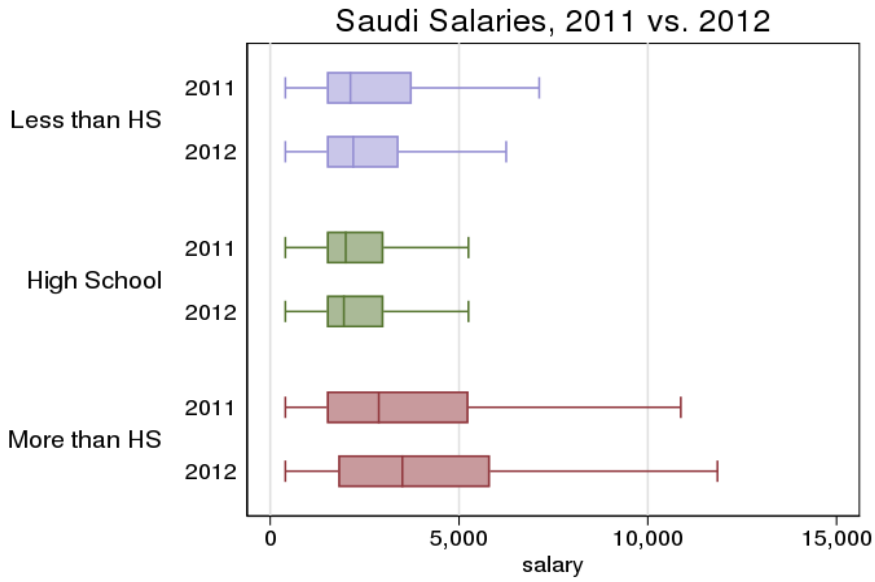


Table A1: Wage regressions

We regress a variety of demographic and job characteristics on monthly salaries for the years 2009 to 2012, finding that there are persistent wage premia for Saudis, men, prime-age workers, and educated workers. Two results are of particular interest – one, the wage increase explained by a month's increase in a worker's time on the job – around 26 SAR – is statistically and practically significant, and underscores the added premium paid to Saudi workers with a proven track record in the private sector. Two, the interaction term between Saudi nationality and Nitaqat (a dummy for the year 2012) underscores the increase in the market value of Saudi labor in 2012 relative to earlier years.

Table 1: Regression Results

	(1)	(2)	(3)	(4)	(5)
	salary	salary	salary	salary	salary
Saudi	1328.5***	1312.1***	1264.3***	1263.9***	1199.6***
	(4.942)	(4.939)	(4.715)	(4.733)	(5.010)
Age	149.2***	140.8***	90.79***	90.64***	92.10***
	(1.126)	(1.131)	(1.128)	(1.130)	(1.130)
Age^2	-0.845***	-0.758***	-0.339***	-0.337***	-0.353***
	(0.0132)	(0.0133)	(0.0134)	(0.0134)	(0.0134)
Female	-1302.2***	-1163.6***	-951.8***	-947.4***	-980.6***
	(13.41)	(13.34)	(13.10)	(13.13)	(13.16)
Years_Educ	183.4***	183.7***	182.9***	182.9***	183.0***
	(0.357)	(0.357)	(0.354)	(0.354)	(0.354)
Rich_Region	643.5***	631.4***	635.5***	635.0***	635.6***
	(2.199)	(2.197)	(2.185)	(2.186)	(2.186)
*Years_Educ * Female*	21.45***	14.53***	6.655***	6.429***	8.099***
	(1.194)	(1.190)	(1.179)	(1.180)	(1.181)
Old_Worker		461.2***		18.15***	19.10***
		(3.340)		(3.682)	(3.687)
Job_Length			25.99***	25.90***	25.99***
			(0.104)	(0.110)	(0.110)
*Saudi * Nitaqat*					180.3***
					(4.528)
N	9015150	9015150	9015150	9015150	9015150
R^2	0.310	0.311	0.324	0.324	0.324

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A3: Minimum wage and economic complexity

Figure A4: Average wage per worker

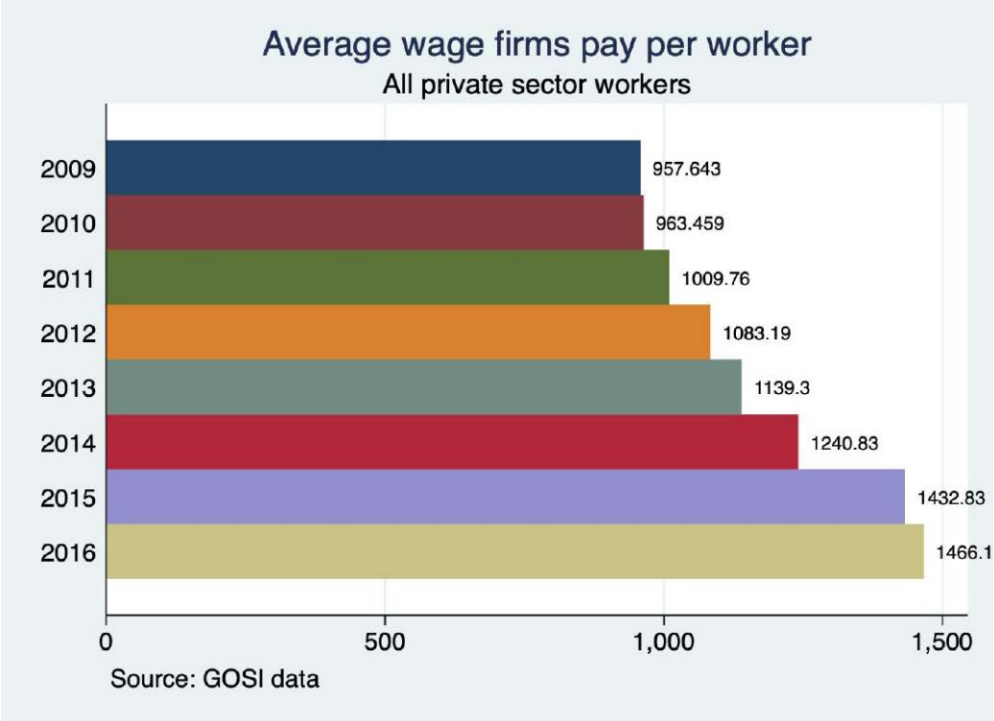
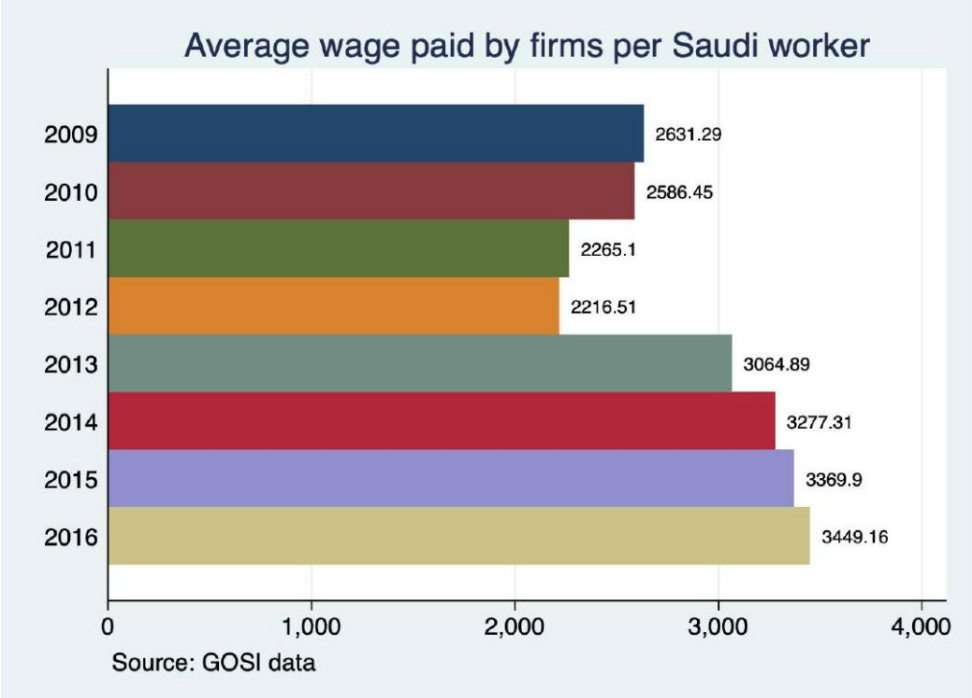


Figure A5: Average wage per Saudi worker



Appendix B: Data

The primary data used are the administrative records of each job contract in the economy, collected by the Saudi General Organization for Social Insurance (GOSI). This includes both expatriates and Saudi employees throughout the entire private sector (except for domestic workers), along with some public sector workers subject to the social insurance rules and regulations, such as those working for SOEs. It does not include civil servants, military personnel, or police employees. The dataset contains all spells that were active between 2009 and September 2016, regardless of the initial start date of the job, in the entire country. This information was collected by the many regional GOSI offices, so the geographic coverage is very good. There is a personal identifier for each job spell, so we know if a person held more than one job within a calendar year. Since this data became relevant for Nitaqat monitoring and enforcement, data collection improved substantially since 2011, especially in smaller firms and among expatriates; however, quantifying these specific improvements is difficult. For the main years relevant to our study, 2011 and 2012, the dataset includes observations on 286,288 and 355,035 active firms, respectively. In terms of individuals, the dataset includes observations on 5,130,359 and 6,941,776 workers for 2011 and 2012.

The GOSI dataset contains several individual, job, and firm characteristics. Individual characteristics include birth date, gender, nationality and education. The latter is incomplete for expatriate workers and, since it is self-reported, might not be very accurate. Job characteristics include start date, end date, occupation, salary, owner id, and firm registration number. The latter two are firm identifiers (one for the owner and the other for the establishment) and can be collapsed to examine worker characteristics at the firm level. The occupation variable is in the Saudi occupation classification, but at a very disaggregate level (7 digits). Salaries are reported monthly and in Riyals. We have also used another dataset from GOSI contains firm-level characteristics on

a yearly basis, from 2009 to 2016. These characteristics are location (at the governorate level), industry, Saudi employee count and payroll, and expatriate employee count and payroll. The industrial classification has activity group and subgroup, and contains 10 and 52 categories, respectively.

As a secondary source, we use administrative data from the Nitaqat program itself, collected by MoL. The dataset has a weekly frequency and runs from June 2011, when Nitaqat quotas were introduced and firms were given their initial rating, to April 2017. It spans the entire private sector, and includes each firm's unique id, size, economic activity, Saudi and non-Saudi workforce, color band assignments, and Saudization score. The latter two were used by MoL to determine compliance. It also includes weekly information on shuttered firms, even after its worker count has reached 0. In total, for the data beginning in June 2011, there is information for 454,543 firms, of which 108,680 were large enough to be included in the first round of the Nitaqat program (more than 10 workers).

Some known limitations with the data are that collection on expat employment before 2013, and especially before 2011, was incomplete, with many expatriates not formally registered with GOSI. There are also some inconsistencies between wages reported to GOSI and actual wages paid, and informal employment is not captured. Furthermore, the dataset does not give an indication of whether workers that leave their jobs become unemployed, join the public sector, or leave the labor force entirely. Marital status is also not included. Finally, since GOSI and Nitaqat data were used to monitor compliance with the program, there could be misleading "ghost" workers. There is some evidence that firms hired local workers at the minimum wage just to use their ID and fill the quota, but no actual work was required (Sadi 2013). We are also unable to match the GOSI and Nitaqat datasets directly, as the two datasets do not use the same firm identifiers.

Based on the timeline described above, we define annual data from 2009, 2010, and 2011 as pre-Nitaqat and data from 2012 as post-Nitaqat. Data for 2013 and later years is confounded by the imposition of an annual levy on expatriates of 2400 SAR in late 2012 and especially by the introduction of a de facto monthly 3000 SAR minimum wage for Saudi employees in late 2013.

Appendix C. Labor productivity definition and methodology

Productivity is a measure of production efficiency, often calculated as a ratio of output to inputs. Labor productivity, typically measured as Gross Domestic Product (GDP) per worker, captures how efficiently workers in a firm, sector or economy produce output. Productivity serves as an engine for economic growth. Countries can grow through to main processes: 1) factor accumulation, and 2) structural transformation. Structural transformation is the process of industrialization, where new activities with high economic productivity emerge and resources flow into these activities. The degree of structural transformation and the pace at which it happens either contributes to or limits growth. At the same time, the accumulation of skills and broad institutional capabilities - also known as investment in fundamentals - is key for the emergence of new industries and sustains productivity growth in each industry.

Decomposing productivity growth into a between-sector component, corresponding to the resource reallocation and a between- and across-sector component, corresponding to the structural transformation, allows for an understanding of aggregate productivity drivers. Movements in labor productivity have been fundamental in understanding the growth processes of countries across regions. Rodrik and McMillan (2016) illustrate how growth in East Asian countries was driven by structural change as workers moved from the primary sector into higher productivity activities. In Latin America, on the other hand, growth was driven by within-sector productivity gains as manufacturing became more efficient, while structural change was negative as the economy struggled to reallocate workers from informal low productivity to high productivity activities. In the case of Saudi Arabia, given the confounding oil wealth dynamics and onerous labor market policy, it is important to understand how the two processes have affected productivity dynamics.

Sectoral Productivity Decomposition

We adopt the condensed Rodrik and McMillan (2011) approach to aggregate labor productivity decomposition. This decomposition follows Haltiwanger (1997) and Foster, Haltiwanger, and Krizan (2001), who examined the contributions of worker reallocation and plant productivity improvements to overall productivity growth in the US manufacturing sector. Our approach focuses on studying productivity at the sectoral level to capture sector-specific changes in economy wide productivity growth. While this approach masks the underlying heterogeneity of firm level productivity within-sectors, it is effective in capturing the inter-sectoral dynamics of labor reallocation in light of significant productivity differentials. Given the nature of sector specific Nitaqat quotas, we aim to capture the intersectoral allocative efficiency of labor as well as within sector productivity improvements resulting from *Saudization* policies.

The diagram below illustrates the decomposition methodology of aggregate labor productivity growth. Within sector productivity (1) captures the contribution of changes in productivity given a sector's initial share of labor. Between-sector (2) captures changes in the labor share given starting productivity levels, and the covariance term (3) measures the contribution of simultaneous changes in both productivity and labor share. Per Rodrik and McMillan (2011), we combine the between- and across-sector components to capture the dynamic process of structural transformation.

AGGREGATE LABOR PRODUCTIVITY

$$P_t = \sum_{i=1}^{n} \theta_{i,t} p_{i,t}$$

where P_t is total labor productivity in year t, $\theta_{i,t}$ denotes the proportion of total labor employed in sector *i* at time *t*, and $p_{i,t}$ denotes labor productivity in sector *i* at time *t*; where *i=1,…,n*.

ΔP_t ***the change in total labor productivity between t and t-k can be decomposed as follows:***

	(1) within-sector		***(2) between-sector***		***(3) across-sectors***
	changes in the productivity of the sector given its initial labor share		changes in the labor share of the sector given its initial productivity level		co-variance term that captures the effect of simultaneous changes in sectoral employment and productivity
$\Delta P_t =$	$\sum_{i=1}^{n} \theta_{i,t-k} \Delta p_{i,t}$	+	$\sum_{i=1}^{n} \Delta\theta_{i,t} p_{i,t-k}$	+	$\sum_{i=1}^{n} \Delta\theta_{i,t} \Delta p_{i,t}$

(2+3) structural change

$$\Delta P_t = \sum_{i=1}^{n} \theta_{i,t-k} \Delta p_{i,t} + \sum_{i=1}^{n} p_{i,t} \Delta\theta_{i,t}$$

captures how much of overall labor productivity can be attributed to movements of workers across sectors (when changes in employment shares are positively correlated with productivity levels, this term will be positive and structural change will increase economywide productivity growth)

Rodrik et al. Structural Change Fundamentals and Growth. 2016