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MOST GRACIOUS, MOST MERCIFUL

Journal of Economic Studies

*(*Periodical - Scientific – Refereed*)*

Volume 15, Issue No. 29

June 2023 AD   Dhulqidah 1444 H

Journal of Economic Studies

(Periodical - Scientific – Refereed)

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Journal of Economic Studies

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- *The list of the Arabic references must be translated into English and added after the list of the Arabic references and before the English references (titled: (Arabic References).*

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Examining the effect of banking performance on the economic growth of Saudi Arabia: A Panel ARDL Approach

Mehboob-ul Hassan [(1)] Fouad Bin Amin [(2)]

Abstract: This study examines the effect of banking performance on the economic growth of Saudi Arabia. The study employs panel autoregression distributed lag approach by considering 12 banks for the period between 2000-2018. The panel unit root analysis shows a mixed result of the stationary of the variable. The dynamic fixed effects (DFE) estimates show that bank performances as proxied by i.e., banks' asset and net interest margin have long-run and short-run effects on economic growth whereas the earlier one has more influence than the latter one. In addition to this, we also observed that oil price, as a control variable, has both long-run and short-run significant and positive relationship with country's economic growth. Thus, we recommend that banking regulation and its related policy should be supportive of the expansion of banking sector which has direct linkage with the economic growth of Saudi Arabia.

Keywords: Banking performance, economic growth, panel ARDL.

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دراسة تأثير الأداء المصرفي على النمو الاقتصادي في المملكة العربية السعودية: منهجية الانحدار الذاتي (ARDL)

فؤاد بن أمين (2) محبوب الحسن (1)

المستخلص: تختبر هذه الدراسة تأثير الأداء المصرفي على النمو الاقتصادي في المملكة العربية السعودية، وا ستخدمت الدراسة منهجية الانحدار الذاتي من خلال النظر في الأداء المصرفي في ل 12 بنكًا للفترة ما بين 2000-2018. اظهر تحليل جذر الوحدة للبيانات المقطعية نتائج مختلفة لسـكون المتغير. أظهر تحليل تقديرات التأثيرات الثابتة الديناميكية (DFE) أن أداء البنوك ممثلاً بالأصـول وصافي هامش الفائدة له تأثيرات طويلة وقصيرة المدى على النمو الاقتصادي بحيث أن الأول له تأثير أكبر من الثاني، كما لاحظنا أيضًا أن سعر النفط كمتغير متحكم له علاقة هامة وإيجابية على المدى الطويل والقصير بالنمو الاقتصادي للمملكة. وبالتالي؛ فإننا نوصي بضرورة أن تكون التنظيمات المصرفية والسياسات المتعلقة بها داعمة لتوسع القطاع المصرفي الذي له ارتباط مباشر بالنمو الاقتصادي في المملكة العربية السعودية.

الكلمات المفتاحية: الأداء المصرفي، النمو الاقتصادي، نموذج الانحدار الذاتي.

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1. Introduction

Seminal literature on development studies examines the causes of economic growth rate fluctuations and evidence that this variation reflects the fluctuation in many interlinked and interconnected economic variables. The change in the value of one variable has multidimensional causality impacts and subsequent effects on other variables, resulting in economic fluctuation. Economic fluctuations are irregular and unpredictable and typically many macroeconomic variables fluctuate together (Mankiew, 2020).

Seminal research suggests that oil-price fluctuations have considerable consequences on the performance of an economy. These consequences are expected to be different in oil-producing countries based on the number of oil exports and an economy's dependency on oil revenues. Where an oil-price decrease is typically good news for oil-importing countries and bad news for oil-exporting countries, the reverse occurs when oil prices increase. For oil-exporting countries, the magnitude of oil price impacts is based on the oil price, the number of oil exports, and the share of oil revenues in GDP. A decrease in oil prices has an inverse impact on consumable income, contraction in government spending, and tighter fiscal measures. Additionally, changes in oil prices influence the performance of many other sectors such as transport, storage, electricity, power generation, and more, giving rise to indirect effects on economic activity.

The Kingdom of Saudi Arabia is heavily dependent on the revenues generated by oil exports and hosts a diversified portfolio of banking institutions including public, private, foreign, regional, and cooperative banks. Saudi Arabia is the largest oil exporter with 16% of the world's proven petroleum. The oil sector accounts for roughly 87% of budget revenues, 42% of GDP, and 90% of export earnings (World Fact Book, 2020). Oil is the main sponsor of government spending and development projects. The latest data shows that the Saudi economy shrank by 7% in the second quarter of 2020 due to a 61.8% plunge in the value of oil exports. The private and government sectors recorded negative growth rates of 10.1% and 3.5%, respectively (General Authority of Statistics, 2020).

The banking and financial sector is regarded as one of the key mediators in the economic growth and development process (Schumpeter, 1934 and 2008), and irrespective of a country's geopolitical policies and systematic composition, the banking sector is pivotal in stimulating economic activities. Banks act as the custodians of wealth and transform surplus economic resources into the essential factor of production demanded by firms and thus expand the economic size of countries. Banks provide a dynamic mechanism to keep the balance between the demand and supply of financial resources and grease the wheel of the economic process. The most important function of commercial banks is the process of increasing economic wealth, particularly the financial resources needed for raising the productivity of firms and industries. Therefore, in the context of economic growth theory, Schumpeter (1911) believes that financial institutions, especially banks, are useful instruments for improving the productive capacity of the economy. To some experts, variant growth rates across countries emerge on account of the state of their banking sector. The increasing importance of this sector has reinforced the general conviction that it is an important pillar of any economy and has

attracted the interest of academic researchers, investors, policymakers, and scholars in exploring the nexus between banking performance and economic growth. The Saudi banking sector exhibits an outlook of being well-capitalized, profitable, and having adequate liquidity (Hassan et al., 2017). Meanwhile, as the Saudi economy is largely oil-based, recent data shows varying real GDP growth rates due to fluctuations in oil prices. This indicates the substantial dependence on oil incomes that need to be substituted by other sectors. Recently, Saudi Arabia is going through a series of macro and microeconomic changes, consequently facing emerging challenges in all sectors including the banking sector. Therefore, there is a need to conduct empirical research to study the impact of oil-price volatility on the banking sector and economic growth.

Several studies have already examined the causal relationship between banking sector performance and economic growth. However, generally, most studies take the banking sector as a whole when studying the nexus between the banking sector and economic growth. To the authors' knowledge, the performance of individual banks performances and their nexus with economic growth has been ignored. This study seeks to fill this gap and enrich the existing literature by examining the causality connection of economic growth with individual bank performances and the relationship between economic growth.

The present paper extends the existing literature in two aspects. First, the relationship between oil-price fluctuations and real economic activity is assessed by using the panel auto-regression distributed lag (ARDL) approach. Second, unlike the existing literature which focuses on studying the banking sector as a whole, the present study examines individual bank performances and their relationship with economic growth. For this purpose, we use the increase and decrease in the values of individual banks' assets, net interest margin, and the stock price of banks' shares in the exchange markets to measure efficiency. As the Saudi economy is largely dependent on the revenues generated from oil exports, and the banking sector shares a significant part in the economic sector, it is assumed that oil-price changes and banking performance considerably affect economic growth.

This study is organized as follows: Section 2 provides the theoretical background and literature review. Section 3 describes the data and methodology. Section 4 provides the details of the analysis and results, and concluding remarks and suggestions in Section 5.

2. Theoretical Background and Literature Review

Existing literature has confirmed that there is a direct and positive relationship between the financial sector and economic growth. However, the causality relationship between the two sectors has been widely debated and controversial. Hicks (1969) claims that the financial system boosts the economic growth and development process. This is regarded as supply-leading because financial institutions provide more funds to support economic activities and that leads to banking credits resulting in economic growth. Similarly, King and Levine (1993a) also affirmed that financial development contributes to economic growth. On the contrary, as higher economic growth demands a higher need for financial credits, Goldsmith (1969)

demonstrated that economic development is the ground of financial development, regarded as demand-leading development.

The present study investigates the impacts of oil-price fluctuation and individual bank performance on the economic growth of Saudi Arabia. The study enriches the understanding of the Saudi banking industry through a broader range and more recent set of data. As the study has a twofold aspect, we review previous literature in two sections: firstly, we examine the literature dealing with the nexus between banking sector performance and economic growth; and secondly, we review the literature focusing on the relationship between oil prices and economic growth.

Nexus between oil-price fluctuations and economic growth

Since the first global oil crisis in 1970 due to the OPEC oil embargo, seminal studies were conducted to examine if the economic growth rate is attributed to oil prices. For this period, the majority of pioneering works were concerned with the US and Western economies, which indicated a negative or weak relationship between economic growth and the oil-price movement. Some of the noticeable works were Rasche and Tatom (1977), Darby (1982), and Hamilton (1983). Another instance of oil-price shock was experienced between 1999 and 2008. This instance was accompanied by global financial crises, which started mainly in the US and then spread globally.

In recent times, the works of Hamilton (2003), Hamilton and Herra (2004), Jiménez-Rodríguez and Sánchez (2004), Lee and Ni (2002), and Gadea et al. (2016) are of significant importance. Hamilton (2003) reported an impact relationship between oil prices and economic behavior in the US economy. While Jiménez-Rodríguez and Sánchez

(2004) found evidence of a non-linear impact of oil price volatility on the real GDP of some Organization for Economic Co-operation and Development (OECD) countries. In particular, oil-price increases are found to have an impact on GDP growth of a larger magnitude than that of oil-price decline, with the latter being statistically insignificant in most cases. Among oil-importing countries, oil-price increases are found to harm economic activity in all cases except Japan. Gadea et al. (2016) evidenced a declining impact of the oil-price shock on GDP by employing a time-varying VAR. They also observed a greater negative effect of oil-price increases on GDP than the effect of oil-price decreases. While, Lee and Ni (2002), through VAR, found that for industries that have a large share of oil, such as petroleum refineries and industrial chemicals, oil price shocks mainly reduce supply. In contrast, for many other industries, like the automobile industry, oil-price shocks mainly reduce demand. They suggest that oil-price shocks influence economic activity beyond that explained by input cost effects possibly by delaying purchasing decisions of durable goods.

As observed above, most of the studies focused on the US and Western economies, while the literature focusing on the Saudi economy is short. Therefore, the present study aims to fill this gap and enrich the existing literature on the Saudi economy.

Nexus between bank performance and economic growth

Besides playing an important and mediatory role, the banking sector is considered a leading indicator of economic growth. Many studies have investigated the nexus between banking sector performance and economic growth. Some of the premier works are Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969), and Hicks

(1969). Each has revealed that banking sector development has a major impact on real economic activity and growth. Similarly, multiple studies, such as King and Levine (1993), Demirguc-Kunt A. and Maksimovic (1998), and Levine & Zervos, (1998) confirmed the premier ones and suggested the impact of the financial sector on the growth of economies. Rehman (2018) examined the relationship between financial development and economic growth based on the bank and market-based systems. The bank-based system view aims to focus on the favorable support of banks in gathering capital, allocation of the financial venture, supervising the execution, and managing the risk level. Banks can persuade firms to share facts and follow obligations. Similarly, banks are better placed in offering funds to contemporary projects.

Interestingly, the approaches for studying the linkage between economic growth and financial development can be classified into three domains: firstly, the supply-leading approach that claims the supply of finance drives economic growth; secondly, the demand-leading approach that claims the demand for financial funds from industries and firm drives the financial sector's development; and finally, the feedback or bi-directional approach that claims there is a reciprocal relationship between the financial sector and economic growth where the growth of both sectors is mutually dependent.

The supply-leading approach advocates a market-based financial structure as the instrument for driving economic growth and a seminal series of work is found in this regard. Rousseau and Vuthipadadorn (2005) examined ten Asian economies from 1950-2000 by employing the vector autoregressive model (VARM) and vector error correlation model (VECM) to reveal the role of the financial sector in economic growth. The perspective was substantiated by revealing that many financial development variables drive economic growth in selected Asian countries (Hsue, He, & Tu, 2013). Similarly, in examining the relationship between financial development and economic growth of Korea and Thailand, Nasir et al. (2018) further affirmed this approach. Whereas, Amin and Hossain (2017) examined the link between the financial sector and economic growth in Bangladesh and discovered the causality relationship between them.

The contrary seminal works are found on the demand-following approach which considers economic growth as a prerequisite for the financial sector development and emphasizes economic growth as a driver of the financial sector's development. For example, examining the economies of seventy-four countries from 1961-1995 through panel data investigation, Zang and Kim (2007) found that economic growth is a prerequisite for financial development and leads to its growth. Similarly, Shan and Moris (2002), using the Toda and Yamamoto causality tools revealed the presence of causations running from economic growth to financial development for five out of nineteen member countries of the OECD.

In examining the causality impact between banking performance and real economic activities, many studies found a two-way or bi-directional relationship between bank-centric financial development and economic growth. In this connection, Demetriades and Hussein (1996) found a substantial indication of bi-directionality and a certain mark of reverse causation in the selected variables. Similarly, Luintel and Khan (1999) showed the mutual linkage between the

financial sector development and economic growth for ten selected countries by using the multivariate vector autoregression (VAR) structure. And by applying panel data cointegration and generalized method of moment (GMM) estimation, Rachdi and Mbarek (2011) found two-way causation between financial development and economic growth for selected countries from OECD member countries and the MEA region.

Although the Saudi economy is the largest in GCC and MENA, very few studies tried to examine the nexus between economic growth and individual bank performance. Masoud and Hardaker (2014) studied the Saudi economy from 1995-2013 and used the GMM approach to examine the linkage between economic growth and the stock market and the banking sector. They reported that the stock market and banking sector are instrumental in enhancing firms' growth. The study further revealed that firms that utilize equity finance develop faster than those that do not. Similarly, Masih, Al-Elg, and Madani (2009) applied vector error correction and variance decomposition methods for studying the Saudi economy and found one-way causality running from financial sector development to economic development and growth. Mahran (2012) further expanded the investigation period for the investigation from 1968-2010 with a combination of associated error correlation and the ARDL model. The study revealed that financial

intermediation has undesirably influenced the real GDP in the long run. In examining the non-oil sector of the Saudi economy, Alghafais (2016) found a considerable influence of financial sector development on its total economic growth. This lack of studies on the Saudi economy motivates us to examine and explore the causal relationship between individual bank performances and real economic activities.

3. Data and Methodology:

This study uses unbalanced panel data from 12 Saudi commercial banks from 2000-2018 (a total of 202 observation). The Bloomberg database is extensively used to extract the panel data whereas the macroeconomic data are taken from the World Bank database. This study applies the panel ARDL technique based on dynamic fixed effects (DFE) to examine the cointegrating relationship of the variables. As a requirement of ARDL, all the variables under study must be stationary in either $I(0)$ or $I(1)$ or both orders (Pesaran 1997; Pesaran, Smith, and Shin 2001; and Pesaran et al. 2001). The dynamic heterogeneous panel estimation is estimated using the ARDL (p, q) method (p = lags of dependent variable and q = lags of independent variables). The equation 1 below presents the panel ARDL approach where equation 2 shows the panel ARDL with various series different lags which can be applied for standard cointegration test. In these equations, i=1,.....n is the bank index, t=1,.....T is the time index and ε_{it} appears as randon component.

$Y_{it} = \alpha it + \beta' it\ Xit + \varepsilon it$	(1)
$Yit = \alpha it + \sum_{i=1}^{k} \delta_{ij}\ Yj, t\text{-}i\ \ Xit + \sum_{i=0}^{q} \beta' it\ Xj, t\text{-}i + \varepsilon it$	(2)
$\Delta RGDPit = \alpha i\ +\ \sum_{j=1}^{m-1} \beta_{ij}\ \Delta RGDPit\text{-}j\ +\sum_{l=0}^{n-1} \Phi_{il} \Delta\ NIMi,t\text{-}l\ +\sum_{r=0}^{p} \gamma_{ir} \Delta\ STOCKPi,t\text{-}r + \sum_{s=0}^{q} \theta_{is} ASSETi,t\text{-}s + \sum_{u=0}^{v} \pi_{iu} OILPi,t\text{-}u +\delta1RGDP\ it\text{-}1 +\delta2NIMi,t\text{-}l +\delta3 \Delta STOCKPi,t\text{-}1 +\delta4 ASSETi,t\text{-}1 +\delta5 OILPi,t\text{-}1 +\varepsilon1i,t\text{-}$ (3)

In the above equation 3, real GDP (RGDP) is considered the dependent variable whereas independent variables that proxy the banking performances include banks' net interest margin (NIM), banks' stock prices (STOCKP), banks' assets (ASSET) and the oil prices (OILP) as the control variable, Δ and $\varepsilon_{ki,,t}$ (k=1,2,3) appear as first difference operator and the error term. The subscript i shows a definite unit that is varied from 1 to N. We select AIC criteria for the optimal lag length of individual variables.

In line with the cointegration test approach proposed by Pesaran et al. (2001)

for panel data, we can construct a null hypothesis as the absence of cointegration among the variables in Equation (1) such as $H_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5$ against alternative hypothesis as the presence of cointegration, $H_0 \neq 0$ (k=1,2,3). These hypotheses are applied in the panel cointegration test under the panel ARDL method proposed by Pedroni (2004).

We estimate the long-run relationship of the variables when null hypothesis of co-integration is rejected, for instance, the long-run relationship in ARDL model as shown in Equation 1 can be formulated as follows:

$$RGDP_{it} = \xi_i + \sum_{j=1}^{m-1} \lambda_{1j} RGDP_{it-j} + \sum_{l=0}^{n-1} \lambda_{2j} NIM_{i,t-l} + \sum_{r=0}^{p} \lambda_{3j} STOCKP_{i,t-r} + \sum_{s=0}^{q} \lambda_{4j} ASSET_{i,t-s} + \sum_{u=0}^{v} \lambda_{5j} OILP_{i,t-u} + v_{1i,t} \tag{4}$$

The formation of Eq.5 enables to test the assumption i.e., the coefficients of the long-run relationship are the same for each bank, under the dynamic fixed effects (DFE) method. Following the same, the

cointegration among the variables under the study i.e., five ARDL models can be tested. The next approach is to generate residuals from the estimation of following equations:

$$\Delta RGDP_{it} = \alpha_i + \sum_{j=1}^{m-1} \text{ß}_{ij} \Delta RGDP_{it-j} + \sum_{l=0}^{n-1} \Phi_{il} \Delta NIM_{i,t-l} + \sum_{r=0}^{p} Y_{ir} \Delta STOCKP_{i,t-r} + \sum_{s=0}^{q} \theta_{is} ASSET_{i,t-s} + \sum_{u=0}^{v} \pi_{iu} OILP_{i,t-u} + aECT_{t-1} + e_{1i,t-} \tag{5}$$

Where, the error terms $e_{ki,t}$ (k=1,2,3) is expected to distribute independently and normally with zero mean and equal variance, and ECT_{t-1} symbolizes the error correction terms. The parameter of the above equation 3, ECT, shows the speed of adjustment to the equilibrium point. We adopt DFE estimator because of its

restriction in short-term (except for intercept) as well as the estimation of long-term coefficients by providing necessary information on the speed of adjustment to achieve long-run equilibrium assumed to be identical for all cross-sectional units.

4. Estimated Results

Descriptive statistics

Table 1 exhibits the descriptive statistics of the dependent and independent variables used. The results exhibit the trend of banks' specific indicators (net interest

margin, individual stock prices, and total value of bank assets) and RGDP and oil prices over 2000-2018. The statistics indicate that each of the variables (RGDP, NIM, STOCKP, ASSET and OILP) range between minimum values of 1365264,

0.01,0.001, 31.23, and 51110.16 with the maximum values of 2587758, 0.59, 150.11, 92.40, and 453389.9 with mean values of 2039475, 0.13, 23.44, 58.17, and 117883, respectively. The table also depicts the variation between the mean values and standard deviation of the variables. These deviations from their respective mean value indicate the presence of heterogeneity among the twelve commercial banks of KSA under study.

Table 1. Descriptive statistics

Variable	RGDP	NIM	STOCKP	Banking ASSET	Oil Prices
Mean	2039475	0.13	23.44	117883.0	58.17
Median	1980776	0.12	20.04	82463.89	53.61
Maximum	2587758	0.59	150.11	453389.9	92.40
Minimum	1365264	0.01	0.00	5110.16	31.23
Std. Dev.	412992	0.06	19.34	95684.28	20.61

N=202

Table 2: indicates a positive relationship between RGDP with NIM, STOCKP, ASSET, and OILP. This provides us with an initial indication regarding the contribution of banks' specific variables and oil prices with the economic growth of Saudi Arabia. Table 2 also shows the multicollinearity condition among the variables with the help of the variance inflation factor (VIF) and tolerance ratio. Both VIF and tolerance values of corresponding variables are falling within the acceptable level which is confirming the absence of multicollinearity among the variables. (Hair et al., 1995; Ringle et al., 2015).

Table 2. Correlation and Multicollinearity Analysis

Variable	RGDP	NIM	STOCKP	OILP	ASSET
RGDP	1				
NIM	0.24	1			
STOCKP	0.12	-0.31	1		
OILP	0.40	0.20	0.05	1	
ASSET	0.55	-0.12	0.30	0.21	1
VIF	0.87	1.27	1.13	1.18	1.48
Tolerance	1.15	0.79	0.88	0.85	0.68

Note: VIF=1/Tolerance; Tolerance=1/VIF

Panel unit root test

In addition to the various fundamental unit root tests like Augmented Dickey-Fuller (ADF) and Phillps-Perron (PP) tests, we employ two other types of panel unit root tests such as Levin, Lin, and Chu (2002) (LLCh), Im, Pesaran, and Shin (2003) (IPS), Breitung (2000), and Hadri (2000) to examine the stationaries of the series. These tests have the power to examine the condition of stationarity as they are applied as the first-generation test for panel unit root, for instance, the IPS test assumes the homogeneous property of autoregressive root as an alternative hypothesis.

Table 3. Panel Unit Root test

Variable	Intercept & Trend							
	LLCh		IPS		ADF		PP	
	Level	Δ	Level	Δ	Level	Δ	Level	Δ
RGDP	0.51	−9.98***	−1.00	−2.87***	33.45	51.33***	21.93	41.54**
NIM	−9.92***	−8.36***	−2.64***	−4.18***	43.58**	70.96***	41.67**	112.13***
STOCKP	−1.74**	−10.11***	−1.35*	−6.43***	32.31	105.17***	23.18	111.78***
ASSET	−0.83467	−5.72***	3.17	−5.65***	10.14	76.76***	5.26	64.08***
OILP	−0.58	−10.02***	0.08	−6.05***	16.30	81.60***	15.36	82.80***

Notes: In the panel unit roots probabilities are figured assuming asymptotic normality, a) test the hypothesis of the existence of unit root at an individual level, b) test hypothesis of absence of unit root at aggregate level*, ** and *** denotes the dismissal of the null hypothesis at 10%, 5%, and 1% significance level, respectively.

Table 3 displays the outcomes of four-panel unit root tests suggesting that NIM and STOCKP are stationary in their level form while ASSET and OILP are stationary in their first difference when IPS and LLCh panel unit root tests are applied. In contrast, only one variable (NIM) is found stationary in its level form while others are found stationary in their first differences once ADF and PP tests are considered. The panel unit root test thus provides a mixed result of stationary variables which are either in their level or in first differences form.

Cointegration property

We employ the Kao (1999) test (originally residual-based) and the Pedroni (1999, 2004) test, which is more diverse as it provides seven test statistics, to confirm the panel cointegration of the variables. We reject the null hypothesis (the t-statistics is −1.67 with a probability value of 0.05), and it suggests that GDP, NIM, stock prices, Asset, and OILP are panel cointegrated in the Saudi banking industry (Table 4).

Table 4: Results of the Kao cointegration test

Test Type	t−Statistic	Prob.
ADF	−1.665459	0.0479

Note: Null Hypothesis: No cointegration, Trend assumption: No deterministic trend, Automatic lag length selection based on AIC with a max lag of 1

Table 5 displays the Pedroni test outcomes and we have identified that four out of seven test results are in favor of rejecting the null hypothesis. These findings are consistent with Kao test outcome that provides strong statistical evidence for cointegration.

Table.5: Pedroni Residual Cointegration Test

Alternative hypothesis: common AR coefs. (within-dimension)				
Weighted				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-0.078458	0.5313	-3.439616	0.9997
Panel rho-Statistic	3.741286	0.9999	3.934854	1.0000
Panel PP-Statistic	-0.406115	0.3423	-4.082912	0.0000
Panel ADF-Statistic	-3.903341	0.0000	-7.133845	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	5.315044	1.0000		
Group PP-Statistic	-3.459757	0.0003		
Group ADF-Statistic	-5.167420	0.0000		

Note: Null Hypothesis: No cointegration; Trend assumption: Deterministic intercept and trend

Dynamic fixed effects (DFE) results

Tables 6 displays the result of the dynamic fixed effects (DFE) for the long-run and short-run relationship among RGDP, NIM, STOCKP, ASSET, and OILP. while banks' assets along with OILP both has positive and significant relationship with the economic grwoth. The ECT terms from the short-run estimation also show a quite satisfactory adjustment speed (19%) toward the convergence.

Table:6 Dynamic Fixed Effects Regression: Estimated Error Correction Form

Variables	Coef.	Std.Err.	z	P>z	[95% Conf.	Interval]
Long-run Estimates						
STOCKP	-0.027	0.040	0.680	0.498	0.105	0.051
ASSET	0.291	0.036	8.120	0.000	0.221	0.361
NIM	1.032	0.446	2.310	0.021	0.157	1.907
OILP	0.150	0.066	2.290	0.022	0.021	0.279
Short-run Estimates						
ECT	-0.192	0.046	4.130	0.000	0.283	0.101
D1.STOCKP	0.012	0.008	1.510	0.132	0.004	0.028
D1.ASSET	0.066	0.037	1.800	0.072	0.006	0.138
D1.NIM	0.053	0.146	0.360	0.715	0.233	0.340
OILP	0.029	0.009	3.090	0.002	0.011	0.047
CONSTANT	2.044	0.495	4.130	0.000	1.075	3.014

Note: All the variables except NIM are converted to the natural log from their respective level forms.

The long-run estimates from the dynamic fixed effects (DFE) provides some key findings of the banking performances and its relation with economic growth. According to the panel ARDL-DEF estimated results, we find that banks' assets, net interest margin (NIM) and oil prices are significant and contribute to economic growth in the long-run. More precicely, a 1% increse in banks' asset can lead to increase in RGDP by about 0.29%, on average, holding the effect of other variables constant. It implies higher the bank's assets higher the opportunity to expand economic activity through banks' financing and investing in the capital market. We also find that NIM and RGP both are signficant and positively related, indicating that a 1% increase in banks' NIM can lead to increase in RGDP by

about 1%, on average, holding the effect of other variables constant. The net interset marigin which shows the banks performance in terms of profitabilty and it enusre that investiment in banking banks is profitable. Thus, higher the NIM, the higher the profitabity of banks in term of its long-run sustaniablity, which is also related to the financial flow and investment to the real sector by the banks and cause economic growth. Moreover, we observe a positive and significant relationship of oil price and economic growth of the country, to be more precise, a 1% increse in oil price is associated with the increase in RGDP by about 0.15%, on average, ceteris paribus. As an oil dependent economy, Saudi economic growth largely relies on its oil export revue which also correlated with higher oil price.

Table 7 shows only the significant outcomes from the Granger causality test where one-sided (unidirectional) causal relationships have
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been observed from RGDP to NIM, STOCKP to RGDP, OILP to RGDP, RGDP to ASSET which are based on F-statistics and its corresponding p-values.

Table 7: Pairwise Granger Causality Tests

Relationship	F-Statistic	Prob.	Relationship	F-Statistic	Prob.
RGDP →NIM	3.05669	0.0496	NIM →RGDP	0.62593	0.5360
STOCKP →RGDP	6.07667	0.0028	RGDP →STOCKP	1.59549	0.2058
OILP →RGDP	6.95877	0.0012	RGDP→OILP	0.83614	0.4351
RGDP →ASSET	5.32691	0.0057	ASSET→RGDP	0.36298	0.6961

Note: With 2 lags

5. Conclusion and Recommendations:

The study aims to contribute to the literature of bank performance and economic growth in the context of Saudia Arabia. We employ a panel ARDL approach with data from 2000-2018 with a total of 202 observation. In examining the nexus between bank performance and economic growth, we use the net interest margin of banks, stock prices of banks, and total asset value of individual banks as independent variables and real GDP growth rate as the dependent variable. The study found correlation matrix and multicollinearity links among the independent and dependent variables, where it is noticed that there is a positive relationship among these variables. This result indicates that individual bank performances such as banks' assest and net interset marigin (NIM) both has positive impact on economic growth. For the panel unit, root analysis shows a mixed result of stationary the variable. At a further level, we applied dynamic fixed effects (DFE) estimators to study long-run and short-run relationships among the variables. The result shows that bank performance has

long-run and short-run effects on economic growth. However, the long-run effects are greater than the short-run. Meanwhile, at individual variable to variable levels, the study shows mixed results of causality among the variables. These results reveal the unidirectional transmission relationship between individual bank performance and economic growth rate.

As the banking sector in Saudi Arabia is one the key players in the capital and financial markets, banking regulation should supportive of banking expansion for finanicng its real sector of the economy. As a biggest exporter of crude oil which is a major source of income, the policy makers should also need to adopt indigenous policies to limit the intensity of negative oil-price volatility and negative shocks. This can be achieved by adopting more economic diversification and searching for alternative oil revenues to maintain stable economic growth.

Nevertheless, the study has limitations too. The fundamental limitation of the study is the use of limited independent variables to measure their impact on economic growth. Future studies

can add more independent variables such as interest rate, money supply, aggregate demand, and money supply, alongside controlled variables like labor force, human capital, and trade openness.

Furthermore, future studies could be extended toward differentiating the impact of global crude oil prices on stock indices of oil-exporting and oil-importing countries.

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Second: Theses abstracts

The impact of the Nitaqat programme on the Saudi labour market

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Introduction

Several Gulf Cooperation Council (GCC), including Saudi Arabia, Bahrain, Qatar, Kuwait, Oman, and the United Arab Emirates, have greater immigrant populations, but Saudi Arabia stands out among them due to its distinctive economic structure. According to 2015 World Bank figures, the Saudi labour market is the fourth most popular location for immigrants to settle behind the US, Germany, and Russia. In comparison to those other countries, a large share of Saudi Arabia's workforce and population are immigrants. In fact, about 32% of all people in Saudi Arabia are immigrants, compared to roughly 8% in Russia, 14% in the US, and Germany. The total labour force of Saudi Arabia is made up of roughly 78% immigrants, compared to 15% in Russia, 28% in Germany, and 29% in the US.

Despite Saudi Arabia's economy growing and its reliance on oil as a major source of wealth, structural problems with the distribution of non-Saudi workers into lower wage groups have made it difficult for the labor market to generate adequate jobs for Saudi nationals. Saudis typically work between 3,000 and 3,500 SR, while non-Saudis typically work less than 3,000 SR, as seen in Figure 1. The worker distribution for both groups appears to be convergent after 3,500 SR. Nearly 400,000 individuals held occupations that paid over 10,000 SR. This may imply two issues on the labour market: segregation, dependency.

Another issue that has plagued Saudi Arabia's labour market is the high percentage of unemployment among Saudi workers. For several years, the unemployment rate among Saudis reached 12%, whereas it was just 2% for non-Saudis (see Figure 2). Be aware that Saudi women have a greater jobless rate than Saudi men. For instance, the unemployment rate in Saudi Arabia was 12% overall, 30.8% for Saudi women, and 5.8% for Saudi men in the third quarter of 2019. This ratio was generally 0.3% for non-Saudis. 0.2% for men who are not Saudi Arabian and 1% for women.

Figure 1: worker's distribution among wage categories.
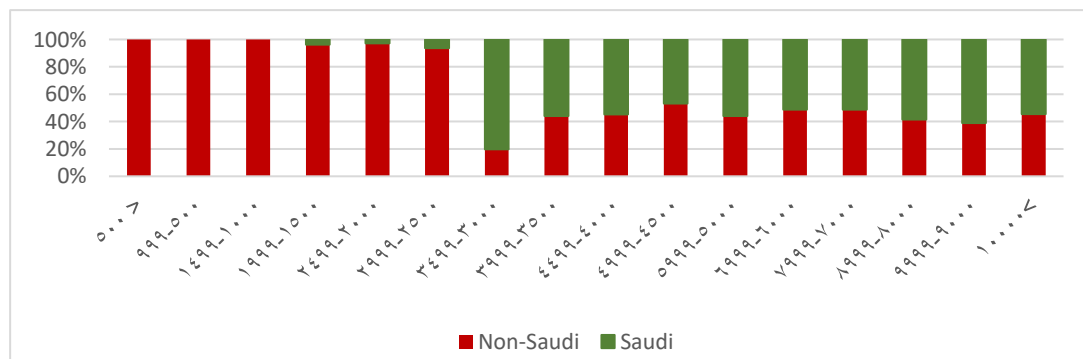
Source: General Institution for Social Insurance, 2015, p. 87

Figure2: Saudi and non-Saudi unemployment rate.
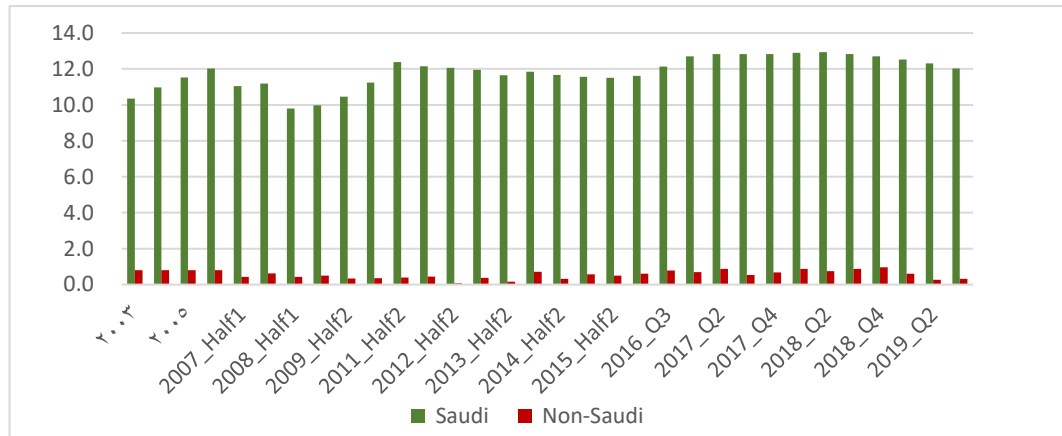
Source: The researcher's collection from several files published by GaStat. Non-Saudi follows the secondary axis.

This was the rational of imposing Nitaqat programme to labour Saudi market. The programme set a quota to classified firms into four zones (nitaqat): red and yellow represent non-localised firms (with a proportion of Saudi workers that is seen as insufficient), while firms with an acceptable proportion of Saudi workers called localised firms are represented by green and platinum. This classification used to reward localised firms and penalise non-localised firms.

Overview

Three literatures were linked in this research – affirmative action Nitaqat quotas, Oaxaca decomposition, and the earning functions – to address the impact of Nitaqat on the wages and wage gap between Saudi and Non-Saudi. Unlike other policies, Nitaqat is designed to enhance the employment of Saudis who received double wages compared to non-Saudis on average and who suffered from a high unemployment rate. Thus, the quota policy (Nitaqat) could produce an undesirable consequence for the target group (Saudis). This means, rather than improving Saudi employees' pay and unemployment rates, the quota could have an adverse effect. On other word, Nitaqat could be not guarantee high incomes and employment rates for Saudi. However, Nitaqat contributed to a marginally small rise in Saudi employment (Peck, 2014).

This might be not actual employments. By that I meant, Saudi do not actually have a job, employers will enlist Saudis (such as students, elderly, or disabled) and pay them (for instance, 1500 SR) in order to meet the quota requirement. Before the fees for non-Saudi were revealed, both the employee and the company benefited from this Nitaqat escape strategy. But after these new direct costs, it became somewhat more expensive for the employers who relied on the fictitious Saudisation to meet quota requirements. As a result, the costs levied against the non-Saudi group indirectly helped the Saudi group recover from their fictitious Saudisatnion.

Due to introducing the quotas being in favour of the population who earns higher on average (Saudi), the effect on their wages can be opposite of what is anticipated (an increase in wages). This can be explained by two reasons: **First**, the position of the majority of non-Saudi workers appears to challenging the compensating-differentials theory given that non-Saudis are more frequently employed in low-paying positions that are also linked to undesirable job characteristics like dangerous working conditions, long hours, and remote locations. This suggests that the risk of layoffs resulting from Nitaqat may have a similar unfavourable association. **Second**, the concentration of the worker distribution at the bottom of the pay scale enhances the likelihood

of Saudi replacement there (see Figure1 above).

Accordingly, the wage gap between the two groups could decrease or increase depending on the workers' responses to the layoff risk stemming from the Nitaqat and workers' redistribution by firms. Therefore, considering the wage gap reduction as an aim of Nitaqat could be challenging. The reaction would be in three scenarios: **First**, if more Saudis were employed in high-paying positions, the average wage of Saudis would rise. To close the wage difference, non-Saudi wages would need to rise by a bigger proportion, which would be expensive for the businesses. **Second**, if Saudis worked in low-paid positions (or at least at or near the quota's minimum salary), Saudi average salaries would fall. This might correspond to a rise in non-Saud salaries. This may indicate that the strategy has a greater positive impact on non-Saudis than on Saudis. **In the third scenario**, the average wage would fall for both categories, with Saudi Arabia's average wage reduction being greater in order to reduce the wage difference. Thus, if the Nitaqat program were linked to a suitable substitute toward the Saudi minimum wage or increased both groups' average wages, even though it would be expensive if linked to non-Saudi workers of comparable quality, the achievement of its purpose of closing the wage gap might be suggested.

This policy was evaluated in the literature and gained huge attention because it restricted employers' choices of labour, increasing their operating costs. Keep in mind that employers, according to the rewards and penalties associated with Nitaqat classification of firms' status (localised and non-localised), will choose the best combination of workers' groups and capital to minimise their costs and satisfy the required quota percentage. Accordingly, the workers in both groups are under direct or indirect layoff risk according to the status of the firms they belong to. Non-Saudis would be under direct layoff risk at non-localised firms, unlike their peers in localised firms who are exposed to indirect layoff risk. Similarly, Saudis are exposed to indirect risk in both firms' statuses because employers reallocate Saudis themselves to satisfy the Nitaqat criteria, which would influence their wages.

Therefore, unlike other studies, we evaluated the effect of Nitaqat on wages through the interaction of the employees with this policy through our simple framework. We expect a negative relationship between wage and layoff risk, unlike the hedonic wage literature assumption, although especially that literature provided evidence of the possibility of reverse hedonic wages (Theodossiou & Vasileiou, 2007). Unlike the finding of the previous studies, Nitaqat could successfully decrease the average wage gap between the two groups because of the decrease of one group's wages at least or both groups if the layoff risks were appreciated. This reduction of the wage gap could harm at least one group's welfare. Thus, the success of this policy is associated with an increase in the target group's (Saudis) welfare not reducing the wage gap between the two groups. This is empirically applied using Oaxaca decomposition as a standard tool to evaluate the wage gap between the respective means of two groups group's mean. We used two separate cross-sections, 2013 and 2017 to investigate the salary disparity between Saudis and non-Saudis while taking into account a firm's position (localized or non-localized) in accordance with Nitaqat which will likely increase unemployment risk, which will prompt workers to react to changes in the layoff risk, and this, in turn, will have an impact on the average wage gap, according to the research, which also estimates the contribution of Nitaqat to this gap in the Saudi labour market. The following questions have so been the focus of the work.

I.   What causes the salary difference between Saudis and other workers?
II.   Is this gap the product of employee attributes or discrimination?
III. How can the Nitaqat program help close the wage gap that is currently present? Has it grown wider or smaller? Are Saudi wages as a target group changing at all? Do wages rise or fall?

IV.   Do businesses' attitudes regarding the wage gap alter depending on which colour band they fall into? If so, do localized businesses have a smaller wage gap than those that aren't?

V.   Does Nitaqat's wage increase or drop enhance or lessen the risk of layoffs? Is this adjustment the same for both firm statuses?

Chapter- by- chapter Summary

We provide a chapter-by-chapter summary of our findings. We presented some significant data on the Saudi labor market related to Nitaqat in the first chapter. Because of how employees react to the policy and how they are distributed throughout the various occupational categories, we show that Nitaqat may produce unfavorable outcomes for the earnings of at least one group. In order to comprehend how Nitaqat affected salaries, various concerns needed to be scientifically addressed.

In chapter 2, Unlike other literature where quota principle applied for enhancing the groups that have higher unemployment and lower salaries, Saudis experienced higher unemployment and higher wages. Additionally, Nitaqat is linked to other regulations that might have an impact on the distribution and danger of layoffs among employees. Therefore, given that quotas are typically connected in the literature with an increase in the wages of the disadvantaged group (such as women) or both groups but a smaller percentage for the original group, we anticipated that Nitaqat quotas could have counterintuitive results on wages where the quota policy is linked to a narrowing of the pay gap. Therefore, if the gap shrank as a result of Nitaqat, this will be linked to a decline in the welfare of Saudi workers. Additionally, we discovered that neither theoretically nor empirically, the literature did not pay much attention to explaining the income disparity between native Saudis and immigrants.

Table 1: Summary of the key feature on the literature

Author	Data sources	Model applied	Key finding	Relevance
Gottschalk 1978	From 1969 to 1983. Over 300,000 employee form 1000 establishments in the USA.	This study used the first order condition for the estimation.	Mincer approach is more appropriate than the productivity function in wage estimation.	Including age on earning function. Cubic age could be used in wage function.
Purnagunawan 2007	Australian Income and laboured dynamic, household. 2 cross sectional data 2001, and 2004 cover 13,696 and 12,408 full time workers, respectively.	This study using OLS estimations. The instrumental variable IV method used as well when the ability variable added.	Additional schooling increases the wage to 6% in 2001 and 7% in 2004.	This study confirms the important of using a human capital variable on earning function such as schooling and experience.
Fleischhauer 2007	review study of the human capital theory.	Descriptive analysis.	Human capital theory could be adopted in wage gap research.	Education/ earning in logarithmic form can be reflected on Mincer equation.
Arcidiacono 2004	Higher Education Directory 1973–1974, Tripariate Application Data 1973–1974, HEGIS Finance Survey 1972–1973, and the ACE institutional characteristics File the 1972.	full information maximum likelihood to regress log earning on several variable such as grad on subject, gender major specification, and the SAT reflect ability with respect to major.	He two keys finding of the earning function are: educational major strongly affects earning. Moreover, major can explain the gender differences in earning.	However, it confirms the important of adding independent variable could measure the workers major on the earning function. This can capture the earning differences between two heterogenous groups as well.
Blinder (1973)	The data collected from Michigan survey research centre 1967. The research conducted in the United States US	He used two of second procedure. First wage function reduced form, and second structure estimates of wage. He	He found that third of the differential of white gender gap explained by their attribute and 40% of	This study inspires us to understand the basic of the decomposition approach. This initial

Author	Data sources	Model applied	Key finding	Relevance
		used OLS in both procedures.	the white/ black gap refer to discrimination.	paper used the three-fold decomposition approach.
Oaxaca 1999	The study benefit from mailing a survey among university and college facilities 1989 in the US. The participants were 2624 male and 892 females.	He applied to specification once using the PhD holder as a reference group and once non advance degree as a reference group.	Main finding that unexplained part changed with the reference category choice. when PhD is the reference, the constant 0.037 and .219 otherwise.	This study gives us an inspiration to propose a solution of the identification problem.
Yun 2005	Theoretical article	He followed suits (1984) for OLS. Total categories divided by number of categories including the reference (b1+b2+b3/4)	He found that applying normalised regression approach give a fixed value for each category and solve the identification issue.	It outwardly fixed, require fix base categories at the split regression. Moreover, the summation for one variable is variant, accordingly.
Griffin 1992	Firm level data from New York stock Exchange (NYSE), US, 1980. This data collected for EEO-1 report, affirmative action policy.	Theoretical and empirical study. The model estimates the cost function and inputs elasticities.	The elasticity of labour demand is low and lower substitutable relation between inputs factors. Firms cost increased 6.5% on average.	This study inspires us in terms of the multi-supply effect where firms dealt with the input factors (black/white) under this policy as separate inputs.
Kee 1995	The study used quality of live survey (QLS), Netherlands. native counts 1275, Antilleans formed 109, Surinamese counts 216, Turks counts 627, and 283 were Moroccans.	Oaxaca decomposition methodology was used with selection biased approach to capture other family income sources.	He found that Moroccans explained part indicate that there were advantage groups, and their wage could exceed native if there were similar characteristic.	Give us overview on applied Oaxaca decomposition. Inspire us to search behind workers origins.
Lehmer et al. 2011	Data collected from German federal employment Agency registration (BEH), 1995-2000. This covered 80% from Germany labour market.	Oaxaca decomposition was used for several European countries.	All immigrant: from European countries were receive lower than Germany. The gap shows heterogeneity among European group	We agree that immigrant would have lower wage than native depending on their background. This implies there is unobserved variable make all unexplained part high in some immigrants.
Longhi et al. 2012	British labour force survey (LFS). The data start from the 2ed quarter 2002 to 3rd of 2009.	Generalised Oaxaca decomposition was used. The study distinguishes between first and second generation for Pakistanis and Indian with respect religions. This yield 6th minorities groups. The reference groups is British white Christian.	That result was varying among the minorities groups. However, second generation received higher wage compared to first generation although the explained gap through characteristic was not improved in some minority's groups.	This study inspire us to start our theoretical analyse through the utility function as consumption would be essential factor could explained the native- immigrant gap. The heterogeneity on the utility function caused the heterogeneity on received wage.
Frank et al. 2013	The data sources is the report of the annual earning 2002, Canada.	Oaxaca decomposition.	Immigrant were disadvantage in ethic and demographic characteristic. They were advantage in terms of human capital.	Using a groups of variable as one attribute was a good strategy to follow. We follow this strategy.
Smith & Fernandez 2017	The US data collect from International Assessment of Adult Competencies, 2016	Multinomial logistic regression for occupation	Immigrant located on the two bottom categories of wage scale.	This result agreed to search behind the substituted relation when use quota policy.

| Author	Data sources	Model applied	Key finding	Relevance
Massey et al. 1993	Theoretical review stud.	Review and appraisal theories of international migration	That consumption considers an appropriate unite for immigrant research.	Including consumption could explain substantial amount of the wage gap when immigrant considered.
Jann 2008	Stata command file	Develop Oaxaca decomposition commands	Useful tool to perform Oaxaca.	Help use to perform the empirical part.
Scicchitano et al., 2019	Survey of quality of workers, 2015, Italy. 15000 observation	Oaxaca decomposition OLS and quantile	There is a negative relation between job security and wage.	We agree that layoff risk could decrease wages.
Bratsberg et al 2014	Administrative registration data, Norway. From 1993 to 2006.	Basic estimation was used OLS for earning function and the labour elasticity.	They found that labour origin is important dimension in the labour market.	Disaggregate supply by origin. Agree with our multi-supply idea

In chapter 3, The research benefits from the use of two different data cross-sections for the years 2013 and 2017. This was offered by the MLSD, but was subject to restrictions imposed by the privacy policies banned us from having more variables and tracking individual's IDs. Although there were few variables in the data, there were many of observations. Despite this limitation, we were still able to identify the crucial variables for forecasting earnings functions that are necessary for estimating our models.

However, we found that the datasets need to be improved, especially where it contains large omissions. Fortunately, the missing data was following the missing at random MAR mechanism, which was expected where the missingness was found when it was not mandatory to provide them, especially for non-Saudis. Additionally, the data reflected the differences in the wage distribution regarding the research scope (Saudis and non-Saudis) where non-Saudis were distributed intensively below the lowest category of Saudi wages. As expected, we found the sample was heterogonous between the two groups and among non-Saudis implied for segregation.

In chapter 4, The impact of Nitaqat is theoretically investigated using our frameworks. We began by looking at the utility function for workers, which may be maximized by wage and consumption subject to the possibility of layoffs risk brought on by Nitaqat. The modern research theory and the hedonic wage theory were two theories that our framework made use of. This framework was distinguished compared to previous works in the literature where the researchers looked at the firms' respond using profit maximization or cost minimization while we looked at the employees' respond (see figure 4). We discovered that the salary discrepancy between Saudis and non-Saudis can be explained by the current research theory (through consumption) and the hedonic wage theory (through layoff risk). Then, we used Oaxaca decomposition approach, an empirical method, to assess the contribution of consumption and Nitaqat to the explanation of the pay disparity. We then exploited Oaxaca decomposition to address the effect of layoff risk (Nitaqat variable) on explaining the compositional differences (see Equation 5.44). We assumed that the negative sign of the coefficient of interest implied that the Saudi worker had a higher average wage because of the direct effect of Nitaqat. On the contrary, the unexplained part implies an indirect effect of Nitaqat on average wages. We display the model specification we used, as well. Moreover, we developed a new strategy to fix the identification issue of the unexplained part of the Oaxaca decomposition. This strategy is a calculation method depending on distributing the constant on categorical coefficients after we considered the omitted category. However, this finding needs to be enhanced in terms of finding the associated standard errors.

Figure 3: Workers' wage choices under risk
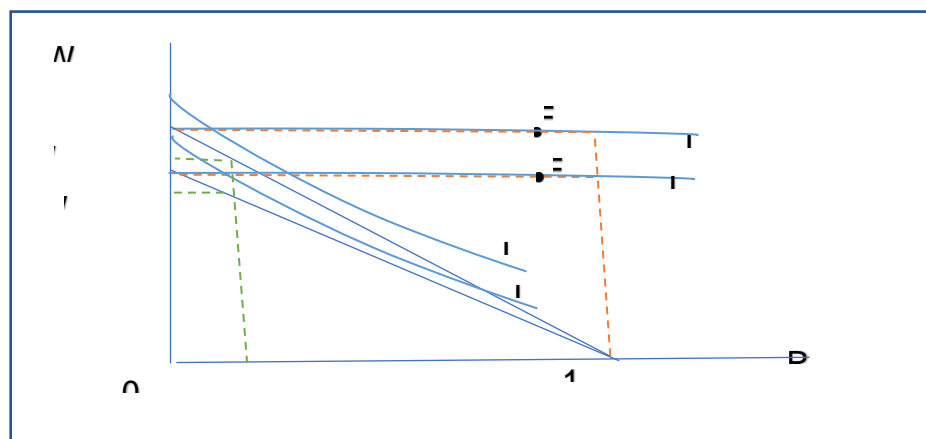
Source: Researcher's original work, look at the thesis for full derivation of the framework.

Chapter 5 provided the empirical finding that the wage gap was explained by the higher Saudi characteristics in educational qualifications, occupations, quota policies, and consumptions in both years. This result is consistent with theoretical and empirical views, such as human capital theory (Becker, 2010; Collard, 1972), and empirically, such as in (Longhi et al., 2012). Moreover, the gap resulted from segregations in occupations which was supported by some empirical evidence (Lehmer & Ludsteck, 2011; Smith & Fernandez, 2017). In 2017, the occupations had less influence to explain the disparity, which points to the possibility of Saudis' experience glass ceiling under Nitaqat2. Additionally, the contemporary immigrant idea was able to account for the difference (via consumption) by more than 20% in both years. The influence of layoff risk (a Nitaqat variable) on explaining the compositional differences was then addressed using Oaxaca decomposition (see the equation).

$$
wage_{gap} \begin{cases}
\textbf{Explained Gap} \\
\textit{due to individual characteristics} \sum \beta_s(\bar{h}_s - \bar{h}_f) \\
\textit{due to job characteristics} \sum_{2}^{n} \gamma_s(\bar{z}_s - \bar{z}_f) \\
\textit{due to nitaqat risk } \rho_s(\bar{R}_s - \bar{R}_f) \\
\textbf{Unexplained Gap} \\
\textit{due to individual characteristics} \sum (\beta_s - \beta_f)\bar{h}_f \\
\textit{due to job characteristics} \sum_{2}^{n} (\gamma_s - \gamma_f) z_f \\
\textit{due to nitaqat risk } (\rho_{sb} - \rho_{fb})\bar{R}_f \\
\textit{due to intercept } (\alpha_s - \alpha_f)
\end{cases}
$$

Because of Nitaqat's direct impact, we assumed that the coefficient of interest's negative sign indicated that the Saudi worker's average income was higher. On the other hand, the unexplained portion suggests that Nitaqat has a secondary impact on average salaries. Similar to this, the hedonic wage hypothesis was successful in using Nitaqat variables to explain the compositional variations of the gap by 3% in 2013 and 9% in 2017. This suggests that Nitaqat indicator, with an increase of 6% from 2013, contributed to the widening of the gap's compositional disparities in 2017.

In 2013 and 2017, the occupation explained the discrepancy by 6% and 13%, respectively. This larger percentage is consistent with the findings of (Bertrand et al., 2014; 2019) and suggests that the quota has a relatively limited direct impact on the gap. However, businesses' resistance in both years resulted in a redistribution of Saudi workers among occupations, which had an indirect negative impact on Nitaqat.

Generally, we discovered that applying Nitaqat successfully reduced the difference, which was consistent with a drop in Saudi Arabia's average pay. As a result, Nitaqat caused a reduction in Saudi welfare. This outcome was confirmed by the pooled earnings function, which showed that Saudi salaries fell by almost 30% over the course of the two years. This suggests that Saudis benefited from

the segregation that was in place in 2013, and that Nitaqat allowed for the redistribution of Saudi workers to lower occupation strata.

However, a significant portion of the gap in both years was explained by the unexplained component, which was consistent with some research findings (Hayfron, 2002; Lehmer & Ludsteck, 2011). It was discovered that by enhancing non-Saudi worker qualities, the gap may be closed. The variability of the pay structures between the two groups, however, prevented the gap from closing (via the intercept), suggesting that the variations in the starting salaries for the two groups were caused by unobserved factors like the wages in the sending nations. As a result, the outcome was different when it came to the origins of non-Saudis; unlike other origins, the constant of workers from high background countries was larger than that of Saudis.

Other research results backed up this conclusion (Kee, 1995; Lehmer & Ludsteck, 2011; Longhi et al., 2012).

Additionally, in 2013 and 2017, workers in localized enterprises earned 11% and 36% more than their counterparts in non-localized firms, respectively. However, in non-localized enterprises compared to localized firms in 2013, the disparity between Saudis and non-Saudis was greater, but it was lower in 2017. This suggests that because the layoff risk varied depending on the business status, the two groups reacted to it in different ways. The disparity across Saudis, however, demonstrated variability in their responses between the two years due to the differences in the two years' policies, such as the introduction of SANED (the unemployment benefit).

In contrast to 2013, when they followed the theoretically anticipated outcome, they followed the hedonic wage response in 2017 similarly to (Pinheiro & Visschers, 2015). The replies of non-Saudis, however, did not differ significantly from those of their peers in non-localized enterprises, with non-Saudis in localized firms earning 7% and 10% more over the course of two years, respectively. This could imply a double negative for non-Saudis in non-localized enterprises, which is at odds with how this phrase has been employed for female immigrant groups in other research

(Boyd, 1984; Hayfron, 2002). It appears that Nitaqat created heterogeneity in the likelihood of being laid off, having diverse effects for both groups both supporting and contradicting the hedonic response.

The bigger discrepancy in non-localized enterprises suggests that Saudis requested higher compensation in 2013, while not being at risk of layoff. The literature supports this finding as the antithesis of the hedonic wage see (Theodossiou & Vasileiou, 2007). Non-Saudis, on the other hand, behaved in opposition to the hedonic wage in both years, earning more when the risk of deportation was lower in localized enterprises and less when it was higher in non-localized firms.

In chapter 6, we discovered that, in contrast to the finite sample, where the explained component exhibits significant dissimilarity, using complete cases and employing inverse probability weighting (IPW) produced usually consistent results.

Additionally, we discovered that while using IPW, the results were sensitive to the weights chosen. The findings of using IPW for Oaxaca decomposition were dependent on the method employed, and they could be consistent with the entire cases in one method but inconsistent in another. In all situations, IPW was consistent with Omega methods, which were highest. We concluded that Oaxaca decomposition under the MAR mechanism could result in a similar result for using both Complete Cases CC and IPW in some IPW weights and some Oaxaca approaches.

Implications and recommendations

We can offer some suggestions based on our findings. We advise enhancing the data collection approach that would enable forecasting using additional methodological tools. The Wages Protection Program, which was introduced in 2017, appears to be an effective plan to increase the quantity and quality of data. Additionally, we advise utilizing the information to guide the inspection trips planned by the MLSD.

In general, Nitaqat 1&2 ineffectively helped close the wage gap because it did so by

lowering the average wages of both groups, with the Saudi average wage falling by twice as much. Nitaqat offered low-quality employment centered on the 3,000 SR per month federal minimum wage. To prevent Saudis from being replaced, we therefore do not advocate connecting Nitaqat to a particular wage but rather to jobs, in accordance with the structure of each occupation (worker redistribution among Saudis). Nitaqat seems to have a moderate impact on Saudi employment and a moderate impact on welfare, which may be related to the redistribution of workers and the size of the enterprises. Even though choosing a company size based on the number of employees led firm size redistribution, using a similar percentage in all administrative areas was a solid criterion. Therefore, to prevent firm redistribution, we advise combining other firm size metrics or utilizing a fixed proportion. However, adjusting the percentage in different regions might re-allocate the non-Saudi population and jobs to the cities that lower Population density.

The lack of a double negative problem among non-Saudi women suggests that Nitaqat offered low-quality jobs to Saudis in general and Saudi women in particular. Therefore, in light of the Nitaqat, additional study on the gender disparity is advised. Additionally, including non-Saudis in the program proportion could redistribute them as a substitute for the admission quota policy that is employed in some other nations. This would necessitate some information on those professions, such as a thorough analysis of their interactions (complements versus replacements) for capital versus labour and among labour (qualified versus less qualified). In other words, it's advised to comprehend the structural differences in the labour market between workers in enterprises and the potential for automation.

In order to address the dumping impact that coincides with a systematic replacement program, it is also advisable to reconsider the recruitment rules and fee structures. For instance, based on the quantity of Saudis looking for work, suspending new visas in certain occupations. Linking the fees to these target professions in order to make them at least equal to the Saudi contribution to the GOSI would be the first step. Selected occupations would see an increase in the cost of non-Saudi labour as a result. Since there isn't a defined pay scale in the private sector, employers set non-linear prices for the nationalities where they made the most money. Therefore, we advise taking advantage of this non-linear pricing distribution in the complimentary occupations and raising the costs for non-Saudi workers in the replacement occupations. Prior to taking any action, further information is required. In some circumstances, it may be beneficial to use remittances as a sign of al-tasatur. It is necessary to propose certain proposals to the national anti-al-tasatur law that could sever ties between Saudi sponsors and unlicensed non-Saudi merchants. Legalizing the businesses would ensure that they were under legal control and would stop money from leaving the nation as the merchant's life cycle came to an end there.

Theoretically, we advised evaluating the impact of a variable's correlation with an index on the explained portion of the Oaxaca decomposition. Additionally, look into why the pooled technique results in a lower explained portion that is connected with the high heterogeneity of the reference group (the index). Additionally, we advocate additional IPW-based Oaxaca decomposition research. We advise future research to make use of Monte Carlo simulation.