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TRACING THE COVID-19 FOOTPRINT: A SECTORAL INTERRUPTED TIME SERIES ANALYSIS OF REAL ESTATE PRICE DYNAMICS IN SAUDI ARABIA

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Abstract

This study traces the impact of the COVID-19 pandemic on real estate price dynamics in Saudi Arabia through a sectoral analysis of residential, commercial, and agricultural markets. Using an Interrupted Time Series (ITS) approach on quarterly data from 2015Q1 to 2024Q3, it identifies structural shifts in price behavior before, during, and after the pandemic. The model integrates key macroeconomic variables such as inflation, unemployment, and SAIBOR, and explores sector-specific responses. Results show that prices fell across all sectors during the pandemic, with the steepest drop in commercial real estate. Residential and commercial prices rebounded post-pandemic, while agricultural prices remained relatively stable. Government-led housing initiatives and infrastructure spending supported recovery, especially in the residential sector, whereas interest rate cuts eased the downturn but were less influential. Inflation and unemployment, however, continued to suppress demand and affordability. Robustness checks confirm the consistency of results under alternative specifications. The study underscores the importance of tailored policy measures, such as expanding affordable housing and regulating commercial lease terms. It also highlights the role of inflation and labor market stability in shaping long-term real estate outcomes. This is among the first studies to provide sector-disaggregated evidence on COVID-19's real estate effects in a Gulf economy.

Keywords: COVID-19; Housing market; ITS regression; Interest rates; Inflation; Saudi Arabia; unemployment.
JEL Classifications: C22, R31, E44, Q41

ملخص

تتبع هذه الدراسة أثر جائحة كوفيد-19 على ديناميكيات أسعار العقارات في المملكة العربية السعودية من خلال تحليل قطاعي يشمل الأسواق السكنية والتجارية والزراعية. باستخدام نموذج السلاسل الزمنية المتقطعة (Interrupted Time Series - ITS) على بيانات فصلية تغطي الفترة من الربع الأول لعام 2015 حتى الربع الثالث لعام 2024، تحدد الدراسة التحولات الهيكلية في سلوك الأسعار قبل الجائحة وأثناءها وبعدها. يدمج النموذج متغيرات اقتصادية كلية رئيسية، مثل التضخم والبطالة وسعر الإقراض بين البنوك السعودية(SAIBOR) ، كما يستكشف استجابات كل قطاع على حدة. تشير النتائج إلى حدوث انخفاض في الأسعار عبر جميع القطاعات خلال فترة الجائحة، وكان الانخفاض الأكبر في القطاع التجاري. وقد شهدت أسعار العقارات السكنية والتجارية تعافيًا بعد الجائحة، في حين ظلت الأسعار الزراعية مستقرة نسبيًا. ساهمت المبادرات الحكومية في مجال الإسكان والإنفاق على البنية التحتية في تعزيز التعافي، لا سيما في القطاع السكني، بينما ساعد خفض أسعار الفائدة في التخفيف من حدة التراجع، وإن كان تأثيره محدودًا. ومع ذلك، استمر كل من التضخم والبطالة في التأثير سلبًا على الطلب والقدرة على تحمّل التكاليف. تؤكد اختبارات المتانة اتساق النتائج تحت نماذج بديلة، وتبرز الدراسة أهمية تبني سياسات موجهة، مثل توسيع نطاق الإسكان الميسّر.وتنظيم عقود الإيجار التجارية. كما تسلط الضوء على دور استقرار الأسعار وسوق العمل في تشكيل مسارات السوق العقارية على المدى الطويل. وتُعد هذه الدراسة من أوائل الدراسات التي تقدم أدلة مفصلة حسب القطاع حول تأثير جائحة كوفيد-19 على العقارات في اقتصاد خليجي.

1. Introduction

The real estate sector plays a crucial role in Saudi Arabia's economic development, as in many countries, contributing significantly to national output, employment generation, and financial stability (SAMA, 2022). In line with Vision 2030, the Saudi government has prioritized real estate development, expanding homeownership, attracting foreign investment, and fostering non-oil economic diversification (Saudi Vision 2030, 2016). Over the past decade, the Saudi real estate market has shown cyclical behavior, shaped by macroeconomic trends, fiscal and monetary policies, and demographic shifts. However, the COVID-19 pandemic introduced an unprecedented external shock, changing market dynamics and investor behaviour (Di Liddo et al., 2023). Understanding how the pandemic influenced real estate price movements is crucial for policymakers and investors as the market transitions into a post-pandemic phase.

This main objective of this study is to examine the impact of COVID-19 on real estate prices in Saudi Arabia, analyzing pre-pandemic trends, immediate pandemic effects, and post-pandemic adjustments. Using quarterly data from 2015Q1 to 2024Q3, we assess real estate price indices across residential, commercial, and agricultural properties. To determine whether the pandemic caused a structural shift in price trends, we employ an Interrupted Time Series (ITS) regression, a quasi-experimental method widely used for evaluating policy and economic shocks (Ferron and Rendina-Gobioff, 2005). This approach enables us to estimate the immediate real estate price changes triggered by the pandemic and capture longer-term shifts in market trends.

Our findings reveal that pre-pandemic trends were characterized by a gradual decline in real estate prices, particularly in the residential and commercial sectors, while agricultural property values remained relatively stable throughout the study period. The results also reveal that COVID-19 caused a major disruption in Saudi Arabia's real estate market, but contrary to trends in several Western economies, real estate prices did not experience a sharp appreciation during the pandemic. Instead, the results indicate that prices declined during the pandemic but later rebounded, with a sustained post-pandemic recovery particularly in the residential and commercial sectors. Unlike in Western economies, where interest rate hikes led to a post-pandemic price correction (Muellbauer, 2022; IMF, 2024), our findings indicate that Saudi real estate prices remained resilient, suggesting insulation from monetary policy shocks.

The results highlight that interest rates (SAIBOR), unemployment, and aggregate inflation had mixed effects on real estate prices, depending on the sector and the period examined. Notably, the interactions between macroeconomic factors and the pandemic period reveal that lower interest rates helped to reduce price declines, but this effect was more significant for residential real estate than for commercial properties. Unemployment significantly affected real estate prices during the pandemic, highlighting the role of labor market conditions in shaping housing

demand. Inflation had a negative effect on real estate prices during the pandemic, likely due to increased costs of construction and reduced purchasing power.

These findings have key policy implications. As property prices continue to rise post-pandemic, Saudi policymakers should address affordability concerns while ensuring sustainable market growth. The increasing reliance on mortgage financing, potential overheating in the commercial real estate sector, and the limited responsiveness of prices to macroeconomic fluctuations underscore the need for adaptive housing policies, targeted mortgage regulations, and proactive monetary interventions.

We expect the current study's findings to enhance our understanding of real estate price dynamics in Saudi Arabia and provide valuable insights for policymakers and investors in navigating a post-pandemic real estate market.

The remainder of this paper is structured as follows: Section 2 provides a brief snapshot of the evolution of the Saudi Arabia's real estate market over the study period. Section 3 reviews the literature on real estate price determinants and the pandemic-related effects. Section 4 outlines the methodology and data sources. Sections 5 and 6 present empirical findings. Section 7 discusses the main findings in the light of the existing literature, while Section 8 concludes with policy implications.

2. The evolution of Saudi Arabia's real estate market: policy reforms, macroeconomic shifts, and sectoral dynamics

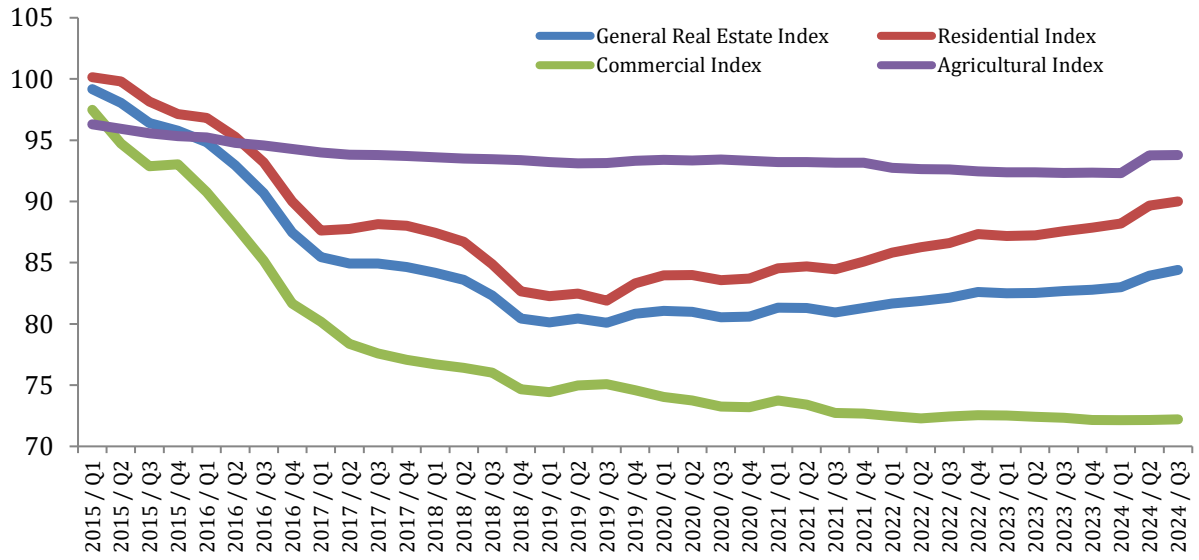
Between the first quarter of 2015 and the third quarter of 2024, Saudi Arabia's real estate market experienced significant transformations across its residential, commercial, and agricultural sectors. These changes were driven by a combination of governmental policies, macroeconomic shocks, and evolving market dynamics.

Figure 1 displays the evolution of the real estate price index, for the general and the sector-specific, over the study period. The general real estate price index displayed a declining trend from 2015 to 2019, dropping from approximately 99.17 in 2015Q1 to 80.83 in 2019Q4. The index stabilized between 2020 and 2021, fluctuating around 80 to 81. A gradual increase started in 2022 and continued through 2024, reaching 84.4 in 2024Q3, indicating a potential recovery phase.

The residential sector followed a similar pattern, with a decline from 100.14 in 2015Q1 to 82.67 in 2018Q4. Between 2019 and 2021, the market experienced slight fluctuations, staying around 83 to 85. Since 2022, the residential index has shown an upward trend, reaching 90 in 2024Q3, reflecting strong demand, government interventions, and housing finance initiatives.

The commercial real estate index reveals a steep decline between 2015 and 2017, dropping from 97.4 in 2015Q1 to 77.6 in 2017Q3. From 2018 to 2022, the sector remained relatively stagnant at lower levels, fluctuating around 73 to 76. Unlike the residential sector, commercial real estate has not recovered significantly post-2022, with only minor variations around 72.2 in 2024Q3.

Figure 1. Evolution of Saudi Arabia's real estate price indices (2015 Q1-2024 Q3)



Source: Authors' compilation based on data from the Saudi General Authority for Statistics (GASTAT)

The agricultural real estate index shows relative stability throughout the period. Starting at 96.297 in 2015Q1, it experienced minor fluctuations, reaching a low of 92.31 in 2024Q1. However, a notable increase happened in 2024, with the index rising to 93.8 in 2024Q3, potentially reflecting policy-driven agricultural land reforms.

As depicted by figure 1, the study period could be characterized by three phases of developments in real estate prices; the pre-2019 decline phase, the pandemic stability (2020-2021) phase, and the post-pandemic recovery (2022-2024) phase. Before 2019, the overall market, especially residential and commercial sectors, declined likely influenced by macroeconomic factors, regulatory adjustments, and demand shifts. From 2020 to 2021, the market exhibited relative stability during the COVID-19 period, with no significant upswings or collapses. From 2022 to 2024, the residential sector has shown strong recovery, while commercial real estate remains stagnant, and agricultural real estate shows slight growth. This pattern suggests that government initiatives under Vision 2030, particularly mortgage programs and economic diversification efforts, have played a critical role in shaping Saudi Arabia's real estate market trends.

Statistics show that the residential real estate sector witnessed notable growth post- the COVID-19 pandemic. In 2022, it was the only sector to register positive price growth, with a 2.1% increase, while the commercial and agricultural sectors saw declines of 0.9% and 0.6%, respectively (General Authority for Statistics, 2024). This upward trend continued into 2024, with a 2.8% year-on-year increase in residential real estate prices in the second quarter, driven by a 2.8% rise in residential land prices (General Authority for Statistics, 2024). Government initiatives under Vision 2030 played a key role in this growth. The Sakani program, introduced by the Saudi Ministry of Housing, aimed to increase homeownership rates among Saudi families by providing housing units in partnership with real estate developers. By 2023, over 66,000 families had received homes, and more than 24,000 housing units were launched (Ministry of Finance, 2023). These efforts contributed to raising the homeownership rate to 63.7% in 2023, with a target of 70% by 2030 (Middle East Briefing, 2025). The commercial real estate sector faced challenges, particularly during the COVID-19 pandemic, which disrupted market dynamics. In 2022, the sector experienced a 0.9% decline in prices (General Authority for Statistics, 2024). However, signs of recovery emerged in subsequent years. In the third quarter of 2023, Riyadh's office market experienced a decrease in vacancy rates to 1%, indicating strong demand. This positive momentum continued into 2024, driven by multinational companies establishing regional headquarters in the Kingdom as part of the Regional Headquarters Program (Markaz, 2024). Government investments in infrastructure and efforts to attract foreign investment under Vision 2030 contributed to the sector’s resilience. Notably, projects like NEOM – a $500 billion futuristic city and the Diriyah Gate, led by the public investment fund, aimed to diversify the economy and augment the commercial real estate market (Real Estate Saudi, 2025).

The agricultural real estate sector remained relatively stable compared to the residential and commercial sectors. In 2022, it experienced a slight decline of 0.6% in prices (General Authority for Statistics, 2024). However, by the second quarter of 2024, the sector saw a 1.5% increase, primarily due to a rise in agricultural land prices (Ministry of Finance, 2024). While not the primary focus of Vision 2030, the agricultural sector benefited from broader economic reforms and infrastructure developments, which enhanced connectivity and access to markets (Ministry of Finance, 2024).

Saudi Arabia's broader economic environment significantly affected the real estate market. The commitment to economic diversification under Vision 2030 led to substantial investments in non-oil sectors, including real estate. The non-oil private sector's purchasing managers' index remained strong since 2020, reflecting the impact of government investments on the economy (Markaz, 2024). However, fluctuations in oil prices and global economic conditions posed challenges. In response, the government implemented fiscal measures to maintain economic stability, such as adjusting public spending and enhancing non-oil revenue streams.

To sum up, from 2015Q1 to 2024Q3, Saudi Arabia's real estate market witnessed significant evolution, shaped by targeted governmental policies and macroeconomic shifts. The residential sector benefited from initiatives aimed at increasing homeownership, while the commercial sector showed resilience amid global challenges. The agricultural sector remained stable, with modest growth in later years. As the Kingdom progresses towards its Vision 2030 objectives, the real estate market is subject to continued transformation, driven by ongoing reforms and strategic investments.

2. Literature review

This section reviews related empirical literature on the macroeconomic determinants of real estate prices and pandemic-induced market disruptions. The real estate market is largely affected by macroeconomic conditions, particularly inflation, unemployment, and interest rates, which shape investment behavior and long-term price trends.

Empirical research has extensively examined these factors and their effects on real estate price dynamics (see for e.g: Akinwale et al., 2024). Inflation plays a complex role in real estate markets. Some studies argue that inflation drives real estate price appreciation as investors seek hedging mechanisms, while other studies suggest that excessive inflation can suppress housing affordability, leading to lower demand (Zhou & Haurin, 2021). In the Saudi context, Akinwale et al., (2024) found that interest rate and inflation have a negative impact on housing demand and hence on real estate prices. In contrast, Zulkarnain et al.,(2024) find a positive effect for aggregate inflation on housing prices in East cost Malaysia.

Unemployment rates also play a significant role in real estate price determination (Al-Masum and Lee, 2019). High unemployment typically leads to reduced disposable income and lower consumer confidence, dampening housing market activity (Gan & Zhang, 2021). Interest rates are another crucial determinant of real estate price movements. Higher interest rates increase borrowing costs, reducing affordability and demand. Countries with floating mortgage rates experience significant price fluctuations in response to monetary policy changes whereas economies with fixed mortgage structures tend to have more stable pricing trends (Andaloussi et al., 2024). Muellbauer (2022) showed that aggressive monetary tightening post-COVID-19 slowed housing markets in several developed economies due to increased mortgage costs. However, there is evidence that the Saudi Arabia’s mortgage market shows a relatively muted response to interest rate changes due to government-backed financing (SAMA, 2022).

While each macroeconomic factor influences real estate markets individually, their combined effects can be more pronounced. Periods of high inflation, rising unemployment, and increasing interest rates create adverse conditions for real estate investment, leading to lower demand and price stagnation (Levitin and Wachter, 2020). Conversely, coordinated government

interventions, such as interest rate cuts during economic downturns, can stimulate housing demand and mitigate volatility (OECD, 2022).

In addition to the macroeconomic factors, global external shocks, such as the COVID-19 pandemic, have greatly influenced real estate prices worldwide. The pandemic initially led to transaction declines due to uncertainty and mobility restrictions (Di Liddo et al., 2023). However, housing prices rebounded strongly in regions where monetary stimulus and government interventions were introduced (OECD, 2022). In the U.S., housing markets experienced regional disparities in price movements (Yilmazkuday,2023), while emerging markets shown varied responses depending on policy resilience (Muellbauer, 2022).

A growing body of empirical research has examined the pandemic's impact on real estate markets using different analytical methods and in different countries. Balemi et al.,(2021) and Di Liddo et al.,(2023) offer a comprehensive review of the empirical literature on the Covid-19's effect on the real estate markets. For instance, Li et al. (2023) investigated the COVID-19 effect on the Airbnb market in Melbourne, finding that short-term rental demand shifted toward suburban areas. Qin et al. (2023) used a difference-in-differences approach to show a 6.3 percent decline in Beijing housing prices during the pandemic. Similarly, Du et al. (2023) applied a hedonic pricing model to examine the impact of COVID-19 on Shanghai's housing market, and find that housing prices in infected communities decreased by 0.7 percent. In the U.S., Cain et al. (2024) analyzed residential property sales in Richmond, Virginia, and find that COVID-19 disrupted price determinants and extended time-on-market. Yilmazkuday (2023) examined house prices across U.S. counties during the pandemic and find stronger negative effects in areas with higher poverty rates. Mehta et al. (2023) used a nonlinear autoregressive distributed lag model to examine asymmetric pandemic effects on Indian housing prices, noting that prices recovered as cases declined. Zhang & Yang (2024) used vector autoregression models to assess housing market indicators in the U.S. and found that unemployment lost predictive power during the pandemic.

During the COVID-19 pandemic, researchers documented varied impacts on housing markets across countries, shaped by local economic structures and policy responses. For instance, Duca et al. (2021) observed that countries with strong tourism sectors experienced weaker house price growth, while other areas showed more stable or rising values. They also stressed the importance of government support measures—such as low interest rates and fiscal interventions—which helped prevent sharp price declines by sustaining household and business finances. In the Italian region of Campania, Del Giudice et al. (2020) applied a real estate valuation model and found that housing prices fell by 4.16% in the short run and 6.49% over the medium term due to the pandemic. Similarly, Allen-Coghlan and McQuinn (2021) attributed the decline in Irish property prices to reduced consumer income and a significant contraction in mortgage lending activity, both resulting from the broader economic slowdown.

Studies that focus on emerging economies showed that COVID-19 produced diverse effects. For instance, Nguyen and Le (2025) examined five emerging markets-Brazil, China, Thailand, Turkey, and South Africa- and find that rising COVID-19 cases increased housing prices, while containment policies led to declines. These findings suggest that pandemic effects on housing prices vary depending on policy responses and market conditions.

In Saudi Arabia, several studies have examined real estate market responses to macroeconomic factors and the pandemic. For example, Akinwale et al. (2024) find that interest rates and inflation negatively affect housing demand, while population growth plays a crucial role. Alharbi (2024) assessed the pandemic's effects on Vision 2030 housing goals, reporting that rising construction costs and financial instability have intensified affordability challenges. Investment patterns have also evolved, with inflation uncertainty driving investors toward residential properties (Newell & Marzuki, 2023). There is also evidence that increased institutional investment in residential real estate reinforced price growth trends in the Saudi real estate market post-pandemic (SAMA, 2022).

The long-term impact of COVID-19 on real estate markets extends beyond short-term disruptions, with emerging evidence pointing to structural shifts in housing demand and pricing. In Europe, Muellbauer (2022) found that housing markets in high-demand urban centers experienced sustained price increases driven by post-pandemic adjustments in living preferences and supply constraints. Similar dynamics are observed in Saudi Arabia, where Akinwale et al. (2024) noted a shift in residential demand patterns, with post-COVID price appreciation diverging sharply from pre-pandemic trends. In the case of Kuwait, Sharaf et al. (2025) provided a detailed econometric assessment of the market's behavior during and after the pandemic. Using ITS, ARIMA, and ARDL models on monthly data from 2015 to 2024, their study revealed that Kuwaiti real estate prices remained resilient throughout the pandemic. Post-crisis, the market rebounded strongly, driven by investment momentum and broader economic recovery. Their findings also showed that oil prices had a temporary positive effect on housing prices, while U.S. interest rates had no significant impact-suggesting that local financial dynamics played a more dominant role. Collectively, these studies illustrate how COVID-19 has contributed to lasting transformations in real estate markets, particularly in regions where local economic structures and policy responses shaped unique recovery trajectories.

2. Materials and methods

This paper uses quarterly data on the real estate price index for Saudi Arabia from 2015Q1 to 2024Q3. The choice of the examined time period is dictated by data availability. The analysis covers price indices for residential, commercial, and agricultural real estate sectors. In addition, macroeconomic control variables-including aggregate inflation rate, unemployment rate, and interest rate measured by Saudi Arabian Interbank Offered Rate (SAIBOR)-are incorporated to

account for broader economic influences on real estate prices. Unemployment data are obtained from the trading economics platform, while SAIBOR data is retrieved from Saudi Central Bank. Data on real estate price indices and inflation rate are obtained from the General Authority for Statistics (GASTAT).

To analyze the impact of the COVID-19 pandemic, on real estate prices, we use an Interrupted Time Series (ITS) regression model. The model also controls for the effects of inflation, unemployment rate, and SAIBOR (interest rates) to isolate the impact of the covid-19 pandemic. Equation (1) shows the base ITS regression model.

$$\ln(RPI_t) = \beta_0 + \beta_1 Time_t + \beta_2 PandemicDummy_t + \beta_3 PostPandemicDummy_t + \beta_4 TimeAfterPandemic_t + \beta_5 Inflation_t + \beta_6 SAIBOR_t + \beta_7 Unemployment_t + \varepsilon_t \quad (1)$$

In which, $ln(RPI_t)$ is the natural logarithm of real estate price index at time t, $Time_t$ is a quarterly time trend variable capturing pre-pandemic price movements, $PandemicDummy_t$ is a binary variable taking the value 1 during the COVID-19 period (2020Q1–2021Q4) and 0 otherwise. $PostPandemicDummy_t$ is a binary variable taking the value 1 for the post-pandemic period (2022Q1 onwards) and 0 otherwise. $TimeAfterPandemic_t$ is a trend variable capturing the post-pandemic structural changes in real estate prices post-pandemic. $Inflation_t$ is the quarterly inflation rate measured as the percentage change in the consumer price index. $SAIBOR_t$ is the Saudi Interbank Offered Rate (3-month) as a proxy for mortgage interest rates. $Unemployment_t$ is the national unemployment rate. All of the three macroeconomic control variables are measured as percentage rates. ε_t is the error term capturing unobserved factors affecting real estate prices.

Equation (1) is estimated for the overall real estate price and the analysis is also segregated by the different real estate sectors (residential, commercial, and agricultural). The dependent variable in Equation (1) is log-transformed and so the coefficients represent approximate percentage changes in real estate prices. The Newey-West standard errors are utilized when estimating the model in Equation (1) to correct for autocorrelation and heteroskedasticity.

To test whether the macroeconomic factors including the interest rate, unemployment, and aggregate inflation, influenced real estate prices differently during different phases of the pandemic, we introduce interaction terms in the ITS model as shown in Equation (2):

$$\ln(RPI_t) = \beta_0 + \beta_1 Time_t + \beta_2 PandemicDummy_t + \beta_3 PostPandemicDummy_t + \beta_4 TimeAfterPandemic_t + \beta_5 Inflation_t + \beta_6 SAIBOR_t + \beta_7 Unemployment_t + \beta_8 PandemicDummy_t \times Inflation + \beta_9 PostPandemicDummy_t \times Inflation + \beta_{10} PandemicDummy_t \times SAIBOR + \beta_{11} PostPandemicDummy_t \times SAIBOR + \beta_{12} PandemicDummy_t \times Unemployment + \beta_{13} PostPandemicDummy_t \times Unemployment + \varepsilon_t \quad (2)$$

In addition, as part of our robustness checks, we narrow the definition of the pandemic period to 2020Q1–2020Q4 to assess whether the results are sensitive to the choice of the pandemic window. This alternative specification allows us to evaluate whether the estimated effects of COVID-19 on real estate prices change when the pandemic period is defined more restrictively. By comparing the baseline and narrow pandemic windows, we can ensure that our findings are not driven by the length of the pandemic period but rather by the underlying economic shifts and policy responses.

3. Empirical results

Table 1 presents a summary of statistics for the key macroeconomic and real estate market variables used in this study. The unemployment rate has an average of 5.53%, with a standard deviation of 1.20, ranging between 3.3% and 9%, indicating moderate fluctuations in employment conditions over time. The general real estate index averages 84.75, with a minimum value of 80.093 and a maximum of 99.17, reflecting overall market variations. Among the sectoral indices, the residential real estate index exhibits an average of 87.98, with a relatively lower standard deviation (4.94) compared to the commercial index, which has a mean of 77.49 but shows higher variability (7.29), suggesting more prominent fluctuations in commercial property prices. The agricultural index, with an average of 93.59, remains the most stable sector, showing the lowest standard deviation (1.01) and a narrow range between 92.31 and 96.29.

Table 1. Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Unemployment Rate	5.53	1.20	3.3	9
General real estate index	84.75	5.43	80.093	99.17
Residential Index	87.98	4.94	81.9	100.14
Commercial Index	77.49	7.29	72.14	97.48
Agricultural Index	93.59	1.01	92.31	96.29
Inflation rate	0.39	1.19	-1.538151	5.68
SAIBOR	2.61	1.84	0.7739334	6.30

Source: Authors' calculation

Macroeconomic indicators highlight mild inflationary pressures, with the inflation rate averaging 0.39% but ranging from -1.54% to 5.68%, indicating occasional deflationary periods. The Saudi Interbank Offered Rate (SAIBOR) has a mean of 2.61%, fluctuating between 0.77% and 6.30%, reflecting variations in the cost of borrowing over the study period.

We tried several model specifications and based on the results, we select the ITS model with interaction terms (with a baseline pandemic window: 2020Q1–2021Q4) as our primary specification to be presented and discussed here for brevity and use the alternative models for robustness checks. This preferred specification of the ITS model includes interaction terms to capture how macroeconomic factors such as SAIBOR (interest rates), unemployment, and inflation influenced real estate prices before, during, and after the COVID-19 pandemic. The inclusion of these interaction terms enhances our understanding of the varying dynamics across different economic periods, ensuring that we do not overlook key relationships.

The results of the baseline specification with a pandemic window defined as 2020Q1 to 2021Q4, presented in Table 2, show that general real estate prices exhibited a negative pre-pandemic trend, as indicated by the negative time trend coefficient. This suggests that, prior to the pandemic, general real estate prices were declining by approximately 0.99 percent per quarter, likely due to pre-existing economic conditions such as policy adjustments, shifts in demand, or macroeconomic fluctuations.

The pandemic itself introduced a significant structural break, leading to an immediate and sharp decline in real estate prices, with an estimated drop of approximately 39.4 percent. This indicates that COVID-19 led to a substantial contraction in the real estate market, likely due to heightened economic uncertainty, reduced consumer confidence, and restrictive lockdown measures that limited transactions and investment in real estate.

One of the key findings of this model is the role of monetary policy in mitigating the pandemic's negative impact. The interaction term between SAIBOR and the pandemic period is positive and statistically significant, indicating that for every 1 percentage point decrease in SAIBOR, the decline in real estate prices was softened by 3.16 percent. This confirms that lower interest rates

helped stimulate demand and support real estate transactions, reducing the severity of the pandemic-induced downturn.

Similarly, the interaction between unemployment and the pandemic period is positive and statistically significant, implying that although rising unemployment typically lowers real estate demand, the effect during COVID-19 was moderated. Specifically, the estimated coefficient suggests that a 1 percentage point increase in unemployment was associated with only a 6.12 percent decrease in real estate prices-a smaller decline than expected, possibly due to government support measures such as wage subsidies and mortgage deferrals that prevented widespread financial distress in the housing market.

Table 2. Estimated coefficients of the ITS regression model with interaction terms and a wide pandemic window (2020Q1 to 2021Q4)

VARIABLES	Model (1) General index	Model (2) Residential	Model (3) Commercial	Model (4) Agricultural
Time	-0.00987***	-0.00957***	-0.0115***	-0.00123***
	(0.00138)	(0.00145)	(0.00158)	(0.000193)
Pandemic dummy	-0.394***	-0.246*	-0.726***	-0.0990***
	(0.123)	(0.127)	(0.160)	(0.0263)
Post pandemic dummy	-0.380***	-0.215	-0.733***	-0.0776*
	(0.128)	(0.132)	(0.161)	(0.0434)
Time after pandemic	0.0128***	0.0142***	0.00996***	0.00334***
	(0.00179)	(0.00185)	(0.00175)	(0.000989)
Inflation	0.00409*	0.00464*	0.00337	4.18e-05
	(0.00222)	(0.00228)	(0.00316)	(0.000365)
SAIBOR	-0.0171	-0.0140	-0.0252	-0.00417**
	(0.0109)	(0.0108)	(0.0152)	(0.00178)
Unemployment rate	-0.0597***	-0.0344*	-0.119***	-0.00899**
	(0.0199)	(0.0201)	(0.0274)	(0.00324)
Pandemic X SAIBOR	0.0316**	0.0312**	0.0292*	0.0173***
	(0.0129)	(0.0128)	(0.0160)	(0.00547)
Post pandemic X SAIBOR	0.0170	0.0129	0.0271*	0.000971
	(0.0110)	(0.0110)	(0.0152)	(0.00252)
Pandemic X unemployment	0.0612***	0.0364*	0.118***	0.0116***
	(0.0200)	(0.0202)	(0.0275)	(0.00344)
Post pandemic X unemployment	0.0605***	0.0336	0.119***	0.00855
	(0.0209)	(0.0213)	(0.0276)	(0.00709)
Pandemic X inflation	-0.00476**	-0.00536**	-0.00404	0.000175
	(0.00224)	(0.00231)	(0.00318)	(0.000449)
Post pandemic X inflation	-0.00133	0.00140	-0.00555	0.00255
	(0.00428)	(0.00559)	(0.00398)	(0.00445)
Constant	4.948***	4.820***	5.257***	4.618***
	(0.113)	(0.113)	(0.157)	(0.0187)
Observations	39	39	39	39
R-squared	0.970	0.966	0.970	0.930

*Noyes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Inflation played a different role during the pandemic, as seen in the negative and statistically significant interaction between pandemic and inflation rate. The estimated coefficient implies that a 1 percentage point increase in inflation was associated with a 0.48 percent additional decline in real estate prices during the pandemic. Higher inflation likely increased financial uncertainty, increased construction costs, and reduced affordability, thereby contributing to price drops.

In the post-pandemic period, the results indicate a continued negative level shift, suggesting that real estate prices remained below pre-pandemic levels even after COVID-19 restrictions were lifted. The coefficient for the post-pandemic dummy is negative and statistically significant, showing that prices were still 38.05 percent lower compared to the pre-pandemic period. This finding suggests that structural changes in real estate demand, economic uncertainty, and shifts in investor behavior prevented an immediate recovery.

However, the positive and highly significant post-pandemic trend coefficient indicates that general real estate prices gradually started to recover at a rate of approximately 1.28 percent per quarter. This suggests that while the pandemic had a lasting negative impact, the market slowly recovered as economic conditions improved, restrictions were lifted, and buyer confidence returned.

Interestingly, the role of SAIBOR in influencing real estate prices diminished in the post-pandemic period, as the interaction term between SAIBOR and the post-pandemic dummy is not statistically significant. This suggests that while monetary policy was crucial in reducing the pandemic's impact, post-pandemic recovery was driven more by fundamental market adjustments rather than continued reliance on lower interest rates.

On the other hand, the interaction between unemployment and the post-pandemic period remains positive and significant, indicating that as employment conditions stabilized, real estate prices responded positively, reinforcing the importance of labor market recovery in sustaining housing demand.

For the residential real estate market, the results indicate a less severe pandemic impact compared to commercial properties but still a substantial decline. Prices declined by 0.96 percent per quarter before COVID-19. During the pandemic, residential real estate prices dropped by 24.59 percent, though this effect was weaker than in the general or commercial market. Even after the pandemic, residential prices remained 21.52 percent below pre-pandemic levels, indicating continued weakness in demand. The recovery rate has been 1.42 percent per quarter, which is higher than the general market. The macroeconomic interactions indicate that lower interest rates supported resilience in the residential market, unemployment had a weaker effect compared to the commercial sector, and inflation significantly pressured residential real estate prices during COVID-19.

The commercial real estate sector experienced the largest pandemic-induced decline, reflecting the severe economic shock to businesses. Prices declined at 1.15 percent per quarter before COVID-19. The commercial sector saw a large 72.55 percent drop, underscoring the devastating impact on business properties. Even after the pandemic, commercial real estate prices remained 73.33 percent below pre-pandemic levels, indicating a lasting structural shift. The recovery rate

has been slower compared to residential properties, at only 1 percent per quarter. The macroeconomic interactions reveal that lower SAIBOR rates had a modest cushioning effect, job losses had a strong negative effect, and inflation had a weaker impact compared to the residential sector.

Agricultural real estate prices show a more stable trend compared to other sectors, with a smaller pandemic effect. Prices decreased by 0.12 percent per quarter before COVID-19, a much smaller pre-pandemic trend than in other sectors. The impact of the pandemic was less, with only a 9.9 percent decline in agricultural real estate prices. Post-pandemic, agricultural prices remained 7.76 percent below pre-pandemic levels, but the impact was relatively modest compared to other sectors. The recovery rate has been the slowest, at only 0.33 percent per quarter. The macroeconomic interactions show that lower interest rates helped sustain agricultural property values, unemployment had an effect but to a lesser extent than in commercial properties, and inflation had no statistically significant effect on agricultural land values.

4. Results of the robustness checks

4.1. Results of the IST regression with interaction terms and a narrow pandemic window (2020Q1 to 2020Q4)

To assess the robustness of our baseline results, we estimate an alternative specification of the ITS model, narrowing the pandemic window to 2020Q1–2020Q4. This robustness check allows us to determine whether the estimated effects of the pandemic are sensitive to the length of the pandemic period. By shortening the pandemic period, we isolate the immediate effects of COVID-19 which would provide an alternative perspective on how real estate prices evolved during and after the crisis. The results for the general, residential, commercial, and agricultural real estate indices under this narrower window are presented in Table 3 and are briefly discussed here.

The general real estate index results show that the pandemic led to a 26.68 percent decline in real estate prices, which is smaller than the 39.43 percent decline estimated in the baseline model with a wider pandemic window. This suggests that a significant portion of the pandemic's negative impact extended beyond 2020Q4, indicating prolonged market uncertainty and structural shifts. Post-pandemic, real estate prices remained 30.26 percent below pre-pandemic levels, again showing a smaller long-term effect compared to the baseline model. However, the recovery trend remains consistent, with a post-pandemic price increase of 1.27 percent per quarter, similar to the baseline model. The macroeconomic interactions differ slightly, with the effect of interest rates during the pandemic becoming statistically insignificant, suggesting that SAIBOR had less influence in the short-term pandemic period compared to its role over a longer timeframe.

Table 3. Estimated coefficients of the ITS regression model with interaction terms and a narrow pandemic window (2020Q1 to 2020Q4)

VARIABLES	Model (5) General index	Model (6) Residential	Model (7) Commercial	Model (8) Agricultural
Time	-0.00987***	-0.00957***	-0.0115***	-0.00123***
	(0.00138)	(0.00145)	(0.00158)	(0.000193)
Pandemic dummy	-0.267**	-0.106	-0.631***	-0.0457**
	(0.128)	(0.133)	(0.164)	(0.0213)
Post pandemic dummy	-0.303**	-0.126	-0.686***	-0.0714**
	(0.127)	(0.131)	(0.162)	(0.0343)
Time after pandemic	0.0127***	0.0140***	0.0101***	0.00368***
	(0.00176)	(0.00187)	(0.00165)	(0.000844)
Inflation	0.00409*	0.00464*	0.00337	4.18e-05
	(0.00222)	(0.00228)	(0.00316)	(0.000365)
SAIBOR	-0.0171	-0.0140	-0.0252	-0.00417**
	(0.0109)	(0.0108)	(0.0152)	(0.00178)
Unemployment rate	-0.0597***	-0.0344*	-0.119***	-0.00899**
	(0.0199)	(0.0201)	(0.0274)	(0.00324)
Pandemic X SAIBOR	-0.0121	-0.0169	-0.00361	0.000597
	(0.0158)	(0.0161)	(0.0205)	(0.00239)
Post pandemic X SAIBOR	0.0162	0.0121	0.0268*	0.000659
	(0.0110)	(0.0109)	(0.0152)	(0.00287)
Pandemic X unemployment	0.0555**	0.0302	0.114***	0.00842**
	(0.0201)	(0.0203)	(0.0274)	(0.00327)
Post pandemic X unemployment	0.0589***	0.0310	0.121***	0.0120**
	(0.0203)	(0.0206)	(0.0276)	(0.00528)
Pandemic X inflation	-0.00475**	-0.00536**	-0.00399	0.000120
	(0.00222)	(0.00228)	(0.00316)	(0.000365)
Post pandemic X inflation	-0.00680	-0.00267	-0.0135**	-0.00683**
	(0.00439)	(0.00444)	(0.00484)	(0.00273)
Constant	4.948***	4.820***	5.257***	4.618***
	(0.113)	(0.113)	(0.157)	(0.0187)
Observations	39	39	39	39
R-squared	0.970	0.966	0.970	0.931

*Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

For residential real estate, the results indicate that prices experienced a 10.61 percent decline during the pandemic period, much lower than the 24.59 percent decline observed in the baseline model. This suggests that residential prices were more resilient in the immediate shock period but deteriorated more in the later pandemic months. Post-pandemic, prices remained 12.59 percent below pre-pandemic levels, again indicating a less severe effect than in the baseline model. The recovery rate of 1.40 percent per quarter is comparable to the baseline specification. Notably, the interaction of inflation with the pandemic period remains significant, confirming that rising costs pressured residential real estate values even under the shorter pandemic window.

The commercial real estate sector under the narrow pandemic window shows a 63.09 percent decline during 2020Q1–2020Q4, compared to 72.55 percent in the baseline model. This suggests that while the immediate shock was severe, commercial real estate continued to decline beyond 2020Q4. Prices remained 68.62 percent below pre-pandemic levels, again showing that the full extent of the pandemic's impact extended beyond 2020Q4. The post-pandemic recovery trend is estimated at 1 percent per quarter, similar to the baseline model. However, the interaction of

SAIBOR with the pandemic period becomes statistically insignificant, indicating that interest rates played a greater role in sustaining commercial prices when the pandemic period extended into 2021.

Agricultural real estate prices experienced a 4.57 percent decline in the narrow pandemic window, compared to 9.9 percent in the baseline model. This shows that agricultural prices were relatively insulated from the immediate effects of the pandemic but continued to be affected beyond 2020Q4. Post-pandemic prices remained 7.14 percent below pre-pandemic levels, aligning with the long-term impact found in the baseline specification. The recovery trend, of 0.37 percent per quarter, is slightly higher than in the baseline model. The macroeconomic interactions remain broadly consistent, with unemployment exerting a stronger effect during the pandemic, while inflationary pressures had a minimal impact on agricultural real estate.

4.2. Results of the IST regression without interaction terms

To further assess the robustness of our findings, we estimate the ITS model without interaction terms for both the wide pandemic window (2020Q1–2021Q4) and the narrow pandemic window (2020Q1–2020Q4). By removing interactions, this specification allows us to evaluate whether the pandemic and post-pandemic effects remain significant when macroeconomic variables are assumed to have uniform effects across all periods. This robustness check is crucial in determining whether the interaction terms in our baseline model provide additional explanatory power or if a simpler model can adequately capture the real estate price dynamics during and after the pandemic.

4.2.1. Results of the wide pandemic window (2020Q1–2021Q4)

The results, presented in Table 4, shows that the general real estate prices were already on a declining trend of 1.18 percent per quarter before COVID-19. However, unlike the preferred model with interactions, this specification suggests a 3.54 percent increase in real estate prices during the pandemic period. This result contradicts the observed trends and suggests that failing to account for macroeconomic interactions may lead to misleading conclusions. Post-pandemic, prices remained 3.22 percent higher than pre-pandemic levels, which also differs from the substantial negative level shift found in the interaction model. The recovery rate remained similar, at 1.34 percent per quarter, indicating that long-term price trends were relatively consistent across specifications.

The residential real estate market under this model also presents a misleading positive pandemic effect, estimating a 3.25 percent increase in prices. This result fails to capture the economic pressure on households and reduced housing demand due to uncertainty. Post-pandemic, residential real estate prices are estimated to have remained 3.41 percent above pre-pandemic levels, again diverging from the preferred model, which showed persistent weaknesses in the

housing sector. The post-pandemic recovery trend, at 1.43 percent per quarter, remains largely consistent with previous estimates.

Table 4. Estimated coefficients of the ITS regression model without interaction terms and a wide pandemic window (2020Q1 to 2021Q4)

VARIABLES	Model (9) General index	Model (10) Residential	Model (11) Commercial	Model (12) Agricultural
Time	-0.0118***	-0.0111***	-0.0145***	-0.00160***
	(0.000945)	(0.000800)	(0.00148)	(0.000184)
Pandemic dummy	0.0354**	0.0325**	0.0480**	-1.98e-06
	(0.0131)	(0.0123)	(0.0201)	(0.00621)
Post pandemic dummy	0.0322**	0.0341**	0.0369*	-0.00947
	(0.0145)	(0.0133)	(0.0212)	(0.00750)
Time after pandemic	0.0134***	0.0143***	0.0123***	0.00245***
	(0.00113)	(0.00104)	(0.00173)	(0.000751)
Inflation	0.00254	0.00267	0.00255	0.000267
	(0.00200)	(0.00168)	(0.00375)	(0.000410)
SAIBOR	-0.00160	-0.00121	-0.00241	-0.000971
	(0.00251)	(0.00232)	(0.00347)	(0.000753)
Unemployment rate	-0.00594	-0.00449	-0.0102	0.000318
	(0.00490)	(0.00455)	(0.00679)	(0.00139)
Constant	4.628***	4.638***	4.618***	4.562***
	(0.0289)	(0.0266)	(0.0401)	(0.00773)
Observations	39	39	39	39
R-squared	0.951	0.953	0.941	0.887

*Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

For the commercial real estate sector, the pandemic effect is estimated as a 4.8 percent increase in prices, contradicting empirical evidence that commercial properties suffered severe losses due to lockdowns, business closures, and shifting demand patterns. The post-pandemic effect remains statistically weak, suggesting that this specification fails to capture the persistent decline in commercial real estate prices. The recovery trend is estimated at 1.23 percent per quarter, similar to the baseline specification but lower than the trend estimated in the interaction model.

Agricultural real estate prices under this specification show no statistically significant pandemic effect, suggesting that prices remained unchanged during the pandemic period. This is inconsistent with the findings in the interaction model, which indicated a 9.9 percent decline in agricultural prices. The post-pandemic effect is also statistically weak, reinforcing the limitations of a non-interaction model in capturing sectoral price adjustments. The recovery trend, at 0.25 percent per quarter, remains slower than in other real estate sectors.

4.2.2. Results of the narrow pandemic window (2020Q1–2020Q4)

Using a narrower pandemic window, the results displayed in Table 5, suggest even stronger misinterpretations of the pandemic effect. The general real estate index under this specification now estimates a 6.25 percent increase in prices during COVID-19, significantly overstating the economic resilience of the sector. Post-pandemic, the model estimates that prices remained 7.83 percent higher than pre-pandemic levels, which contradicts the significant declines observed in our preferred model with interactions. The recovery trend, at 1.58 percent per quarter, is slightly higher than in the baseline model but within a similar range.

Table 5. Estimated coefficients of the ITS regression model without interaction terms and a narrow pandemic window (2020Q1 to 2020Q4)

VARIABLES	Model (10) General index	Model (11) Residential	Model (12) Commercial	Model (13) Agricultural
Time	-0.0112***	-0.0105***	-0.0137***	-0.00124***
	(0.000972)	(0.000846)	(0.00150)	(0.000163)
Pandemic dummy	0.0625***	0.0613***	0.0735**	0.00439*
	(0.0179)	(0.0153)	(0.0277)	(0.00244)
Post pandemic dummy	0.0784***	0.0838***	0.0795**	-0.00319
	(0.0194)	(0.0173)	(0.0291)	(0.00467)
Time after pandemic	0.0159***	0.0169***	0.0145***	0.00330***
	(0.00143)	(0.00121)	(0.00230)	(0.000656)
Inflation	0.00247	0.00277*	0.00224	-0.000113
	(0.00181)	(0.00142)	(0.00357)	(0.000337)
SAIBOR	-0.00744*	-0.00620*	-0.00959*	-0.00470***
	(0.00392)	(0.00363)	(0.00552)	(0.00113)
Unemployment rate	-0.00681	-0.00464	-0.0123	-0.000972
	(0.00624)	(0.00523)	(0.00978)	(0.000711)
Constant	4.638***	4.643***	4.636***	4.573***
	(0.0369)	(0.0307)	(0.0586)	(0.00468)
Observations	39	39	39	39
R-squared	0.952	0.954	0.940	0.910

*Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Residential real estate under the narrow window specification has a 6.13 percent increase in prices during COVID-19, reinforcing the incorrect conclusion that the pandemic had a positive impact on real estate. Post-pandemic, prices are estimated to be 8.38 percent higher than pre-pandemic levels, further overstating the sector's resilience. The recovery trend remains stable at 1.69 percent per quarter, comparable to other specifications.

Commercial real estate results under the narrow window specification estimate a 7.35 percent increase in prices during COVID-19, once again contradicting the declines observed in reality. Post-pandemic, the model estimates a 8 percent increase in prices, overstating the sector's ability to recover. The recovery trend remains at 1.45 percent per quarter, but this model fails to account for the long-term structural declines in commercial property demand.

Agricultural real estate under this specification has a 0.43 percent increase in prices during COVID-19, a small but statistically significant estimate. Post-pandemic, prices remain 0.31

percent lower than pre-pandemic levels, which aligns with previous estimates. However, the recovery trend, at 0.33 percent per quarter, remains weaker than other real estate sectors, confirming that agricultural prices responded differently to macroeconomic shocks.

5. Discussion

The Saudi Arabian real estate market has undergone significant transformations over the past decade, shaped by macroeconomic factors, policy interventions, and global disruptions. The COVID-19 pandemic represents an unprecedented shock to the real estate markets globally, and understanding its impact is crucial for policymakers, consumers and investors. Using quarterly data from 2015Q1 to 2024Q3, this study evaluates real estate price dynamics in Saudi Arabia across different property sectors-residential, commercial, and agricultural-while incorporating macroeconomic variables and policy responses to analyze price movements.

This study uses an Interrupted Time Series (ITS) regression model to examine whether the pandemic caused a significant shift in real estate prices. Unlike many global markets where inflation and interest rates played a dominant role, the results indicate that Saudi real estate prices were primarily influenced by government policies and structural shifts rather than monetary policy factors. The findings confirm that COVID-19 caused a major disruption in Saudi Arabia's real estate market, but contrary to trends in several Western economies, real estate prices did not experience a sharp appreciation during the pandemic. Instead, the results indicate that prices declined during the pandemic but later rebounded, with a sustained post-pandemic recovery particularly in the residential and commercial sectors. Agricultural real estate prices remained relatively stable throughout the study period.

Results of the preferred ITS model with interactions and a wider pandemic window (2020Q1–2021Q4) reveals that the pandemic resulted in a 39.43 percent decline in overall real estate prices, reflecting the immediate economic disruptions caused by the crisis. However, post-pandemic, prices remained 38.05 percent lower than pre-pandemic levels, suggesting a prolonged adjustment period. A key finding is the statistically significant and positive trend in the post-pandemic period, indicating that real estate prices are recovering at a rate of 1.28 percent per quarter. This suggests that the real estate market has entered a long-term recovery phase, with price trends gradually stabilizing over time.

The results show sectoral differences in the effect of the pandemic. The residential sector experienced a 24.59 percent decline during the pandemic but then has been recovering at 1.42 percent per quarter. The commercial sector experienced a 72.55 percent decline in prices, reflecting the severe impact of lockdowns and business closures. However, commercial prices remained 73.33 percent below pre-pandemic levels, indicating a more prolonged structural change in demand for commercial spaces. The agricultural real estate sector, in contrast,

remained relatively resilient, experiencing only a 9.9 percent decline during the pandemic and a slow but steady recovery of 0.33 percent per quarter.

The results highlight that interest rates (SAIBOR), unemployment, and aggregate inflation had mixed effects on real estate prices, depending on the sector and the period examined. Notably, the interactions between macroeconomic factors and the pandemic period reveal that lower interest rates helped to reduce price declines, but this effect was more significant for residential real estate than for commercial properties. Unemployment significantly affected real estate prices during the pandemic, reinforcing the role of labor market conditions in shaping housing demand. Inflation had a negative effect on real estate prices during the pandemic, likely due to increased costs of construction and reduced purchasing power. Unlike advanced economies where interest rates drive real estate cycles, the weak effect of SAIBOR in the Saudi context suggests that real estate markets in Saudi Arabia are relatively insulated from monetary policy shocks. This is likely due to the prevalence of fixed-rate mortgages, government-backed financing mechanisms, and fiscal policies that provide stability to the housing market. These findings contrast with studies from Western economies, where low interest rates and liquidity injections led to rapid house price inflation (Muellbauer, 2022).

Our findings in general align with previous research documenting the impact of COVID-19 on global real estate markets. For example, Frame and Gerardi (2023) found that pandemic stimulus measures led to rapid house price increments in the U.S., where home prices were resilient to the policy change, due to continued income growth and reduced supply of homes on the market, similar to findings in Saudi Arabia's residential sector. However, unlike the U.S., where home prices experienced sharp corrections due to rising interest rates post-pandemic, the Saudi market maintained stability, indicating stronger government interventions in housing finance.

Our findings that unemployment had a statistically significant negative effect on property prices during the pandemic is similar to that of Gan and Zhang (2021) who found that real estate markets are sensitive to unemployment fluctuations.

Additionally, OECD (2022) reported that commercial real estate in developed markets experienced price stagnation or declines post-pandemic, whereas the sustained increase in Saudi commercial real estate prices suggests stronger market resilience. This resilience could be due to fiscal expansion and infrastructure investments in the Gulf Cooperation Council (GCC) real estate markets. The IMF (2024) reported that countries with substantial fiscal space and active intervention policies were able to mitigate the long-term negative effects of the pandemic on real estate markets. This aligns with our findings that Saudi government-backed policies, including subsidized mortgage programs and stimulus spending, played a crucial role in stabilizing property markets.

Coulson et al., (2020) reported that economic diversification in the US. dampens both the magnitude and the duration of the effects of a disaster on local real estate values, a factor that may also be relevant in the Saudi context given the Vision 2030 initiatives promoting urban expansion and real estate investment. Similarly, Lekhuleni and Ndlovu (2023) found that in South Africa, macroeconomic factors such as GDP and tax policies played a larger role in shaping real estate prices compared to traditional monetary policy tools. This further supports our conclusion that Saudi real estate markets are driven more by structural and policy-driven factors rather than by short-term monetary fluctuations.

6. Conclusion and policy implications

The results of this study indicate that the Saudi real estate market has entered a post-pandemic recovery phase, with sustained demand particularly in the residential and commercial sectors. The findings confirm that macroeconomic variables, particularly interest rates and unemployment, influenced real estate prices differently during and after the pandemic. Unlike global markets where monetary policy had a big effect, Saudi Arabia's real estate prices were shaped more by government interventions and structural factors than by interest rate movements.

These findings have several important policy implications. First, policymakers should monitor speculative investment in real estate to prevent overheating of the housing market. Given the sustained appreciation in property prices, particularly in residential real estate, affordability concerns should be addressed through targeted housing policies and mortgage regulation. Additionally, policies aimed at enhancing labor market stability and infrastructure investment will be critical in shaping long-term real estate trends.

Overall, this study provides a comprehensive evaluation of real estate price movements in Saudi Arabia over the past decade, emphasizing the role of the covid-19 pandemic and macroeconomic factors in shaping market dynamics. Future research should explore regional disparities and long-term affordability challenges in Saudi Arabia's evolving real estate market.

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