Kuwait's Oil and non-Oil Sectors Cointegration and The Prospects for Digital Economic Transformation (KFAS Grant: AC020102)

S. Al-Qudsi, S. Salih, H. Arman, S. Al-Fulaij, M. Hajeeh, and M. Al-Musallam

Techno-Economics Division (TED)

31/10/2023

Outline

- Introduction
- Dynamic Simulations: The DYNARDL Model
- Dynamic Simulations Illustrated
- Relationship between budget deficits, non-Oil GDP, and overall economic growth.(Figure 4)

Outline

- Relationship between the value of the Increased trade openness, and non-oil GDP.(Figure 6)
- Energy Transition: Digital economy
- Disrupted Development of Energy Transition
- Economic Growth and Education

Introduction

Two objectives:

1. Examine Kuwait's historical dependence on oil as manifested by short run and long run linkages, cointegration, between oil and the rest of the economy;

1. Secondly, to explore the prospects for Kuwait to escape the trap of oil dependence through launching transformation to digital economy anchored on a menu of innovative and complex products path.

Dynamic Simulations: The DYNARDL Model

the simulations include all six variables as follows:

1. Oil prices
2. Exports of Kuwaiti crude in millions of barrels
3. Costs of producing Kuwait crude per barrel
4. The real effective exchange rate (REER)
5. Trade openness (imports plus exports) relative to GDP
6. Fiscal balance (revenues minus expenditures in relation to gdp)

Dynamic Simulations Illustrated

Using the model parameters, the dynamic multiplier impacts of shocks to key variables operating in the oil sector are simulated.

Shocked variables include oil prices per barrel, per barrel oil production costs, oil exports in millions of barrels, the ratio of imports, and exports to GDP.

Moreover, shocks are conducted to other variables that are largely influenced by the oil sector in order to track their multiplier impact.

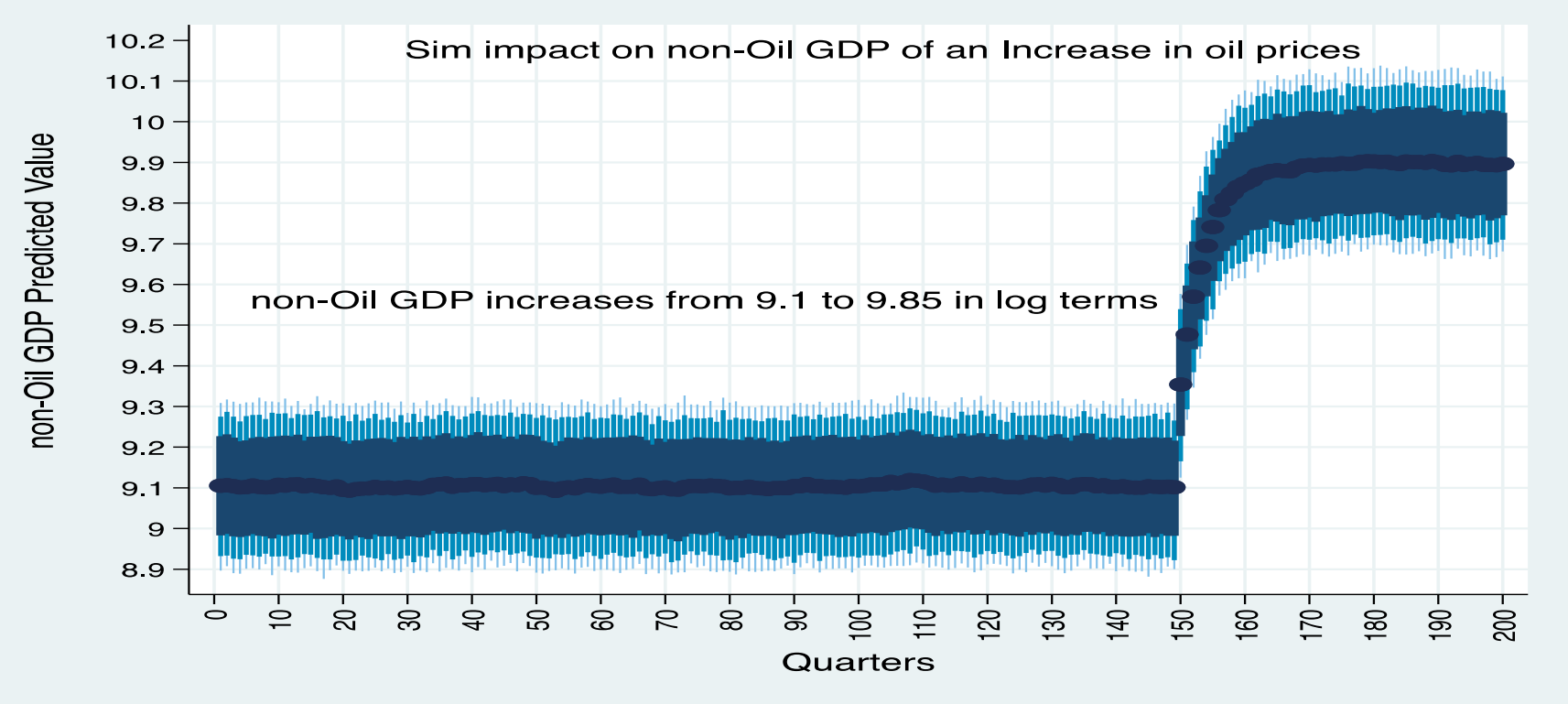


Figure 1. Impact on non-Oil GDP of an increase in oil prices by one log unit.

- Figure 1 analyzes the long-term effects of an oil price shock spanning from 1970q1 to 2020q4.
- The shock is introduced arbitrarily and has a significant impact on the non-oil sector.
- Shock's transmission of to the non-oil sector is rapid, taking just one quarter to occur.
- The impact of the oil price shock peaks at log 9.85, starting from an initial level of log 9.1.
- It takes approximately three quarters for the impact to reach its peak level.
- Impact of oil price shock persists a long time, ending in 2020q4.

- Figure 2 examines the dynamic impact on non-oil GDP when **oil exports** (measured in millions of barrels) are subjected to a shock.

- Initially, the non-oil GDP increases to 9.44 in response to the shock to oil exports.

- However, this increase is temporary as the non-oil GDP gradually decreases and stabilizes at approximately log 9.23.

- This decline in non-oil GDP takes about eight quarters to occur.

- The key distinction from Figure 1 is that the impact of a shock to oil exports is more modest and temporary in nature, as it doesn't result in a long-lasting increase in non-oil GDP.

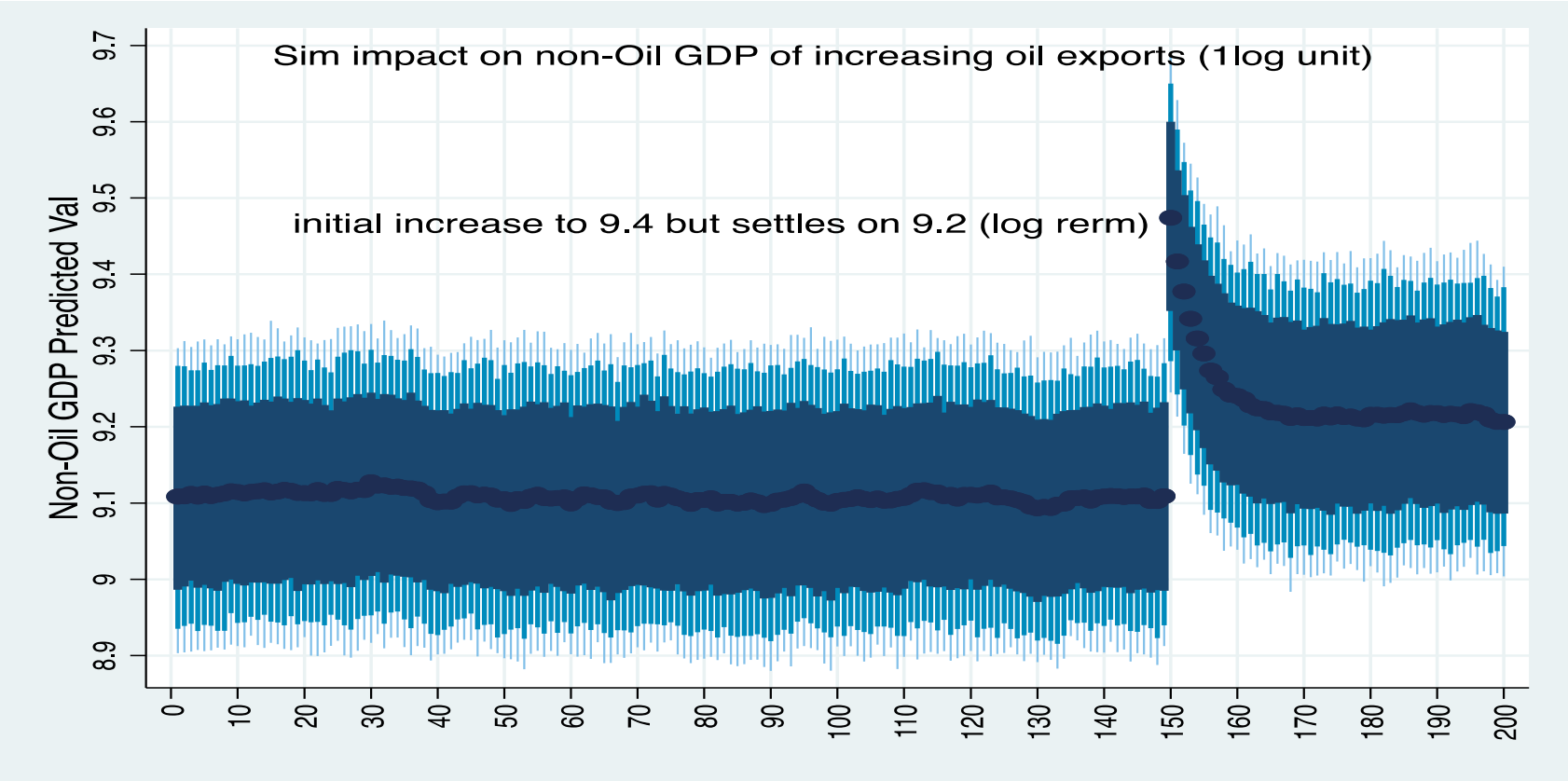


Figure 2. Simulating the impact on non-Oil GDP of an increases in oil exports by one logarithmic unit.

- Figure 3 illustrates the dynamic impact of a shock to oil production costs on non-Oil GDP.
- Initially, this shock causes non-Oil GDP to contract to a level of log 8.45.
- However, the impact on non-Oil GDP takes a positive turn after four quarters, trending upwards to ultimately settle at log 8.6.
- The narrative highlights the significance of oil production costs, which reduce the net income or "rent" associated with oil extraction and export.
- This reduction in net income has a negative impact on both the oil and non-oil sectors in Kuwait.

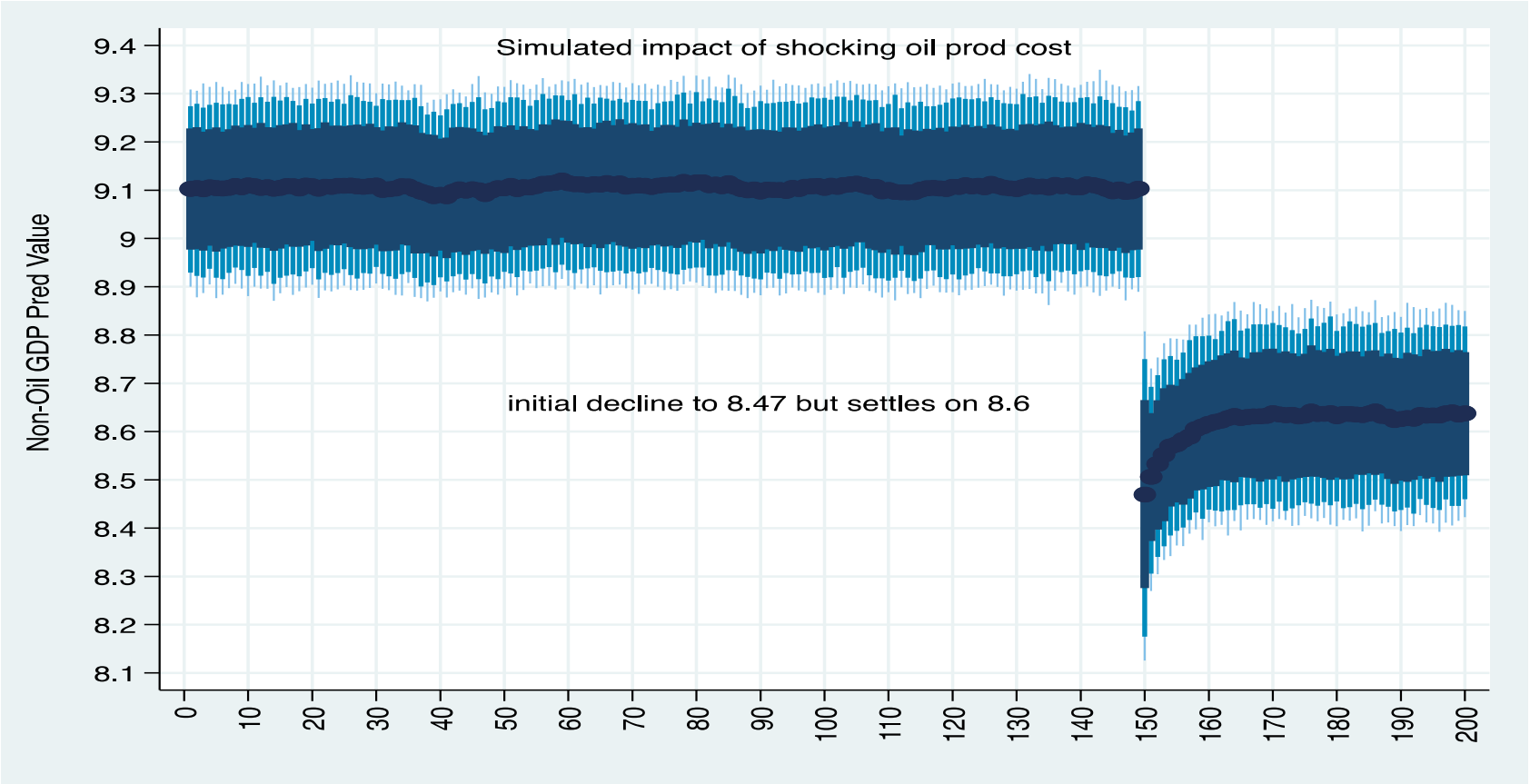


Figure 3. Cost of oil production shock by one logarithmic unit.

Relationship between budget deficits, non-Oil GDP, and overall economic growth.(Figure 4)

Budget Deficit Impact on Non-Oil GDP:

- When there's an increase in the budget deficit due to external or internal forces, it decreases non-Oil GDP.
- The decrease is illustrated by the shift from 9.1 to 9.04 in non-Oil GDP.

Effects of Fiscal Policy on Non-Oil GDP:

- Running fiscal deficit causes an increase in budget deficit which ultimately triggers a reduction in non-oil GDP due to the increased debt service\ loss of credit rating.

Recommend Managing Volatility Through Fiscal Policy:

- Fiscal policy can be used strategically to manage the volatility originating from the oil sector by implementing fiscal policy rules and considering a weighted average oil pricing in the design of fiscal policy (Al-Qudsi et al., 2021).

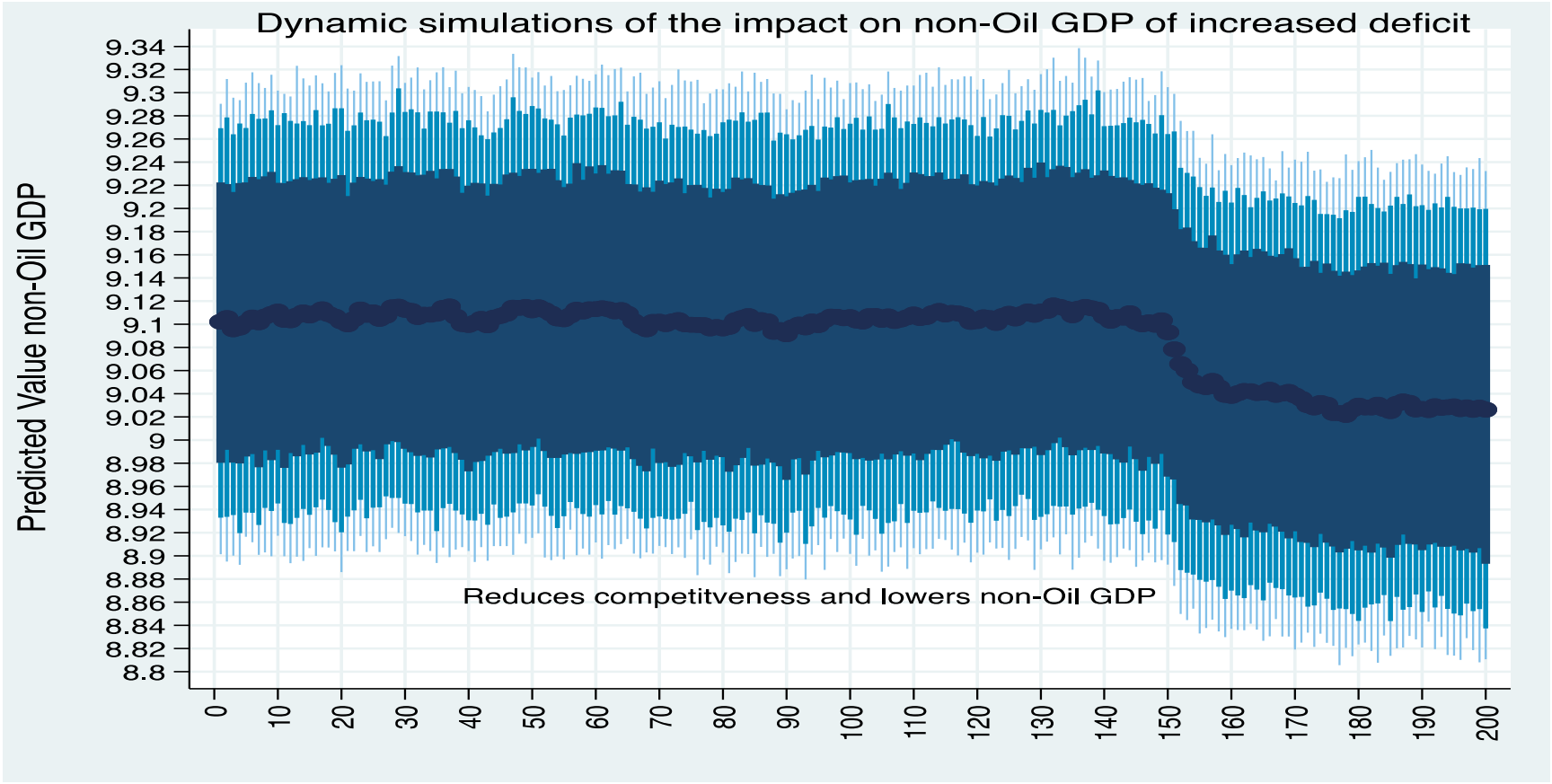


Figure 4. Impact on non-oil GDP of increased budget deficit.

The Kuwaiti Dinar (REER), non-oil GDP, and Kuwait's monetary policy.(Figure 5)

- An increase in the value of the Kuwaiti Dinar (REER) leads to a decline in non-oil GDP due to reduced competitiveness in global markets.

- Prudent monetary policy in Kuwait aims to maintain competitiveness while ensuring a demand for Kuwaiti Dinar deposits relative to the US Dollar.

- This is achieved by pegging the Kuwaiti Dinar to a basket of currencies, including the US Dollar, to provide stability and control over the currency's value.

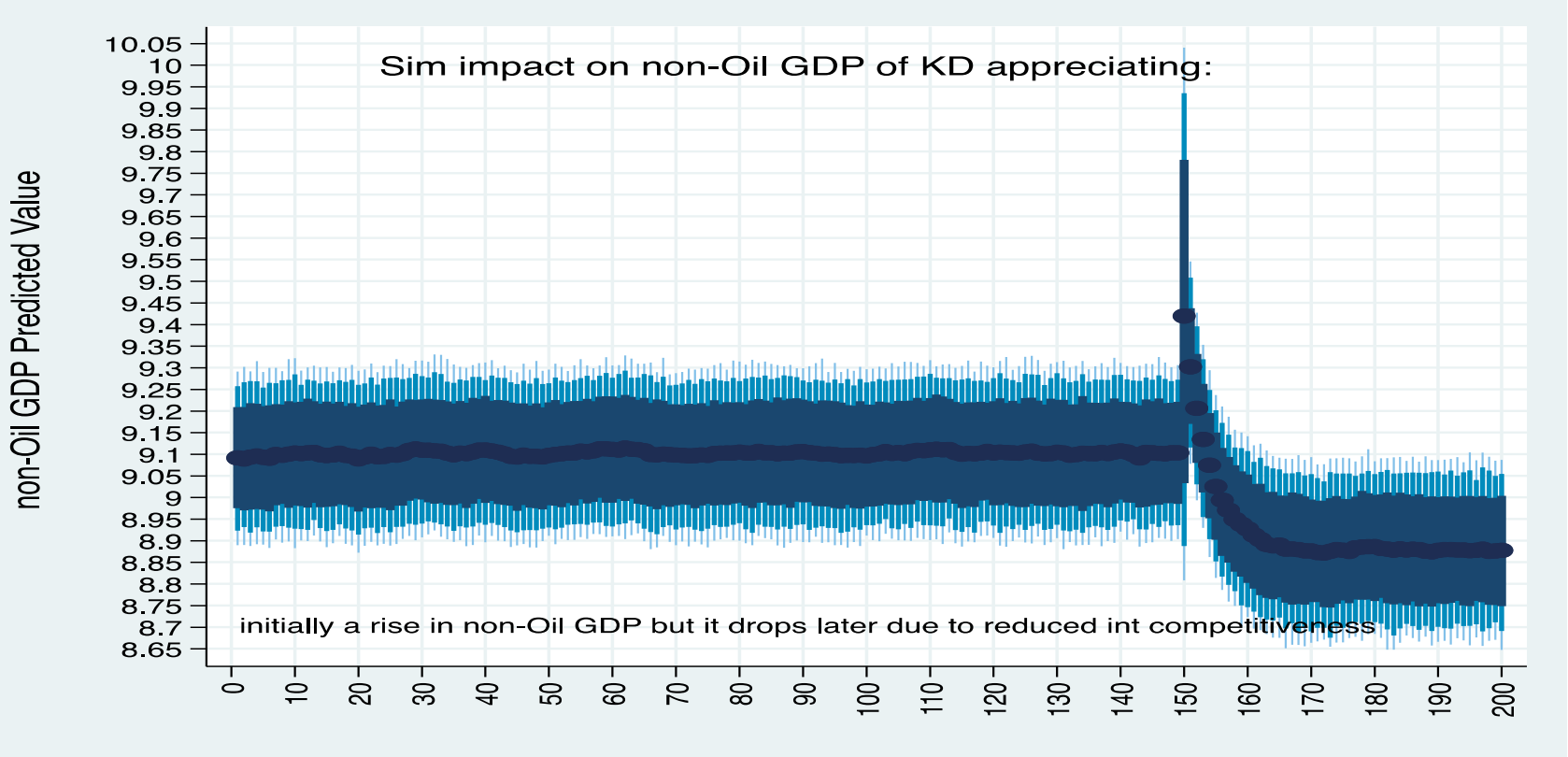


Figure 5. Simulating the impact on non-oil GDP of an increases in REER.

Relationship between the value of the Increased trade openness, and non-oil GDP.(Figure 6)

- Kuwait is highly open to imports from around the world.
- Imports tend to increase at faster rates compared to exports in Kuwait.
- When the ratio of trade openness increases by one log unit, there is a negative impact on non-oil GDP.
- The increase in trade openness leads to a significant rise in imports, which results in economic leakages and downward pressure on the non-oil sector growth.
- Non-oil GDP decreases from 9.2 to 8.3 within approximately four quarters after the rise in trade openness.
- Occasionally, trade openness may be driven by increased exports, which can have a positive effect on economic growth.
- However, over the past 50 years, increased trade openness was due to imports rather than increased exports. That is, high imports causing resource leakages.

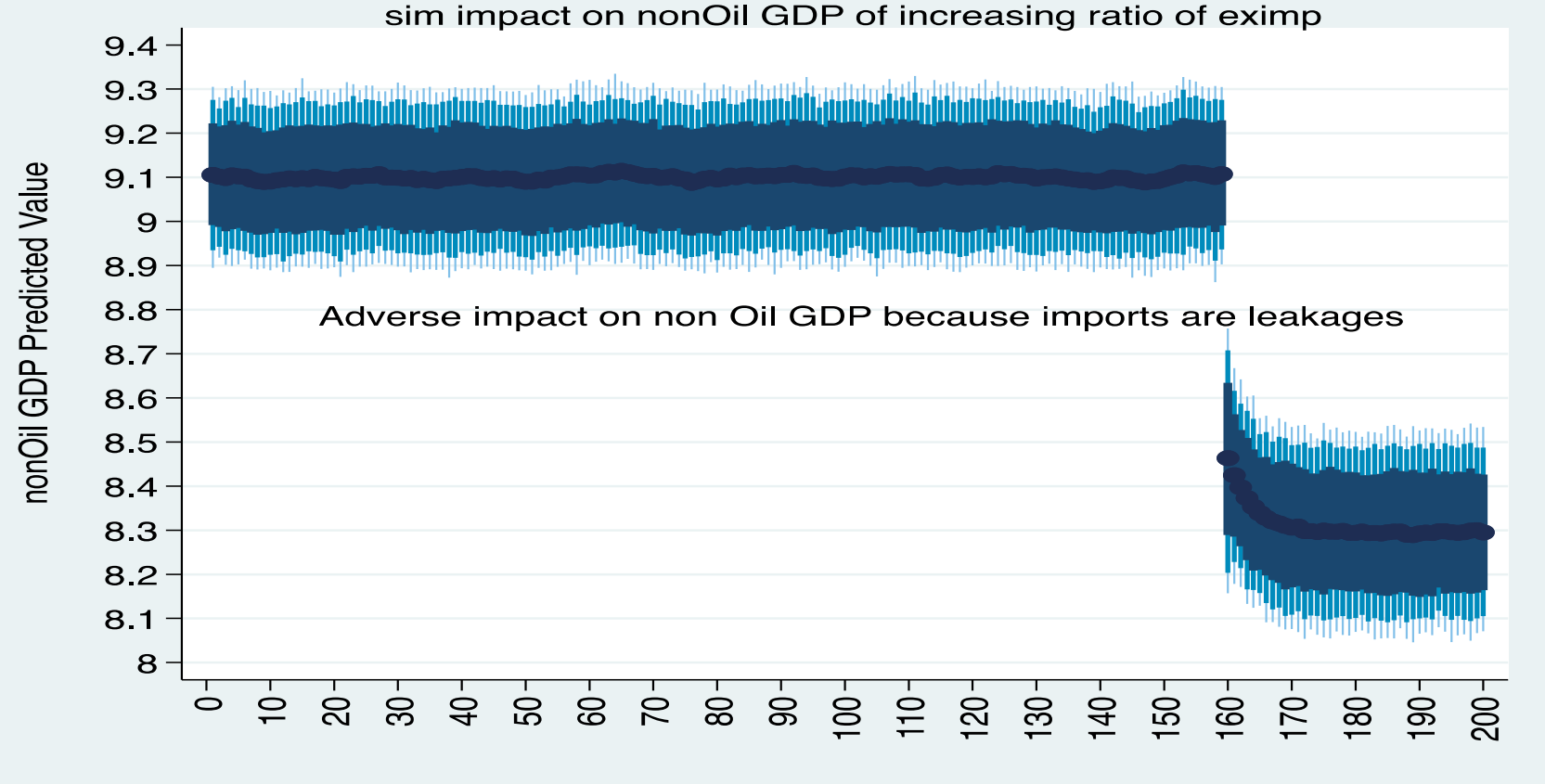


Figure 6. Impact on non-oil GDP of increased trade openness.

Energy Transition: Efficiency via Digital Economy

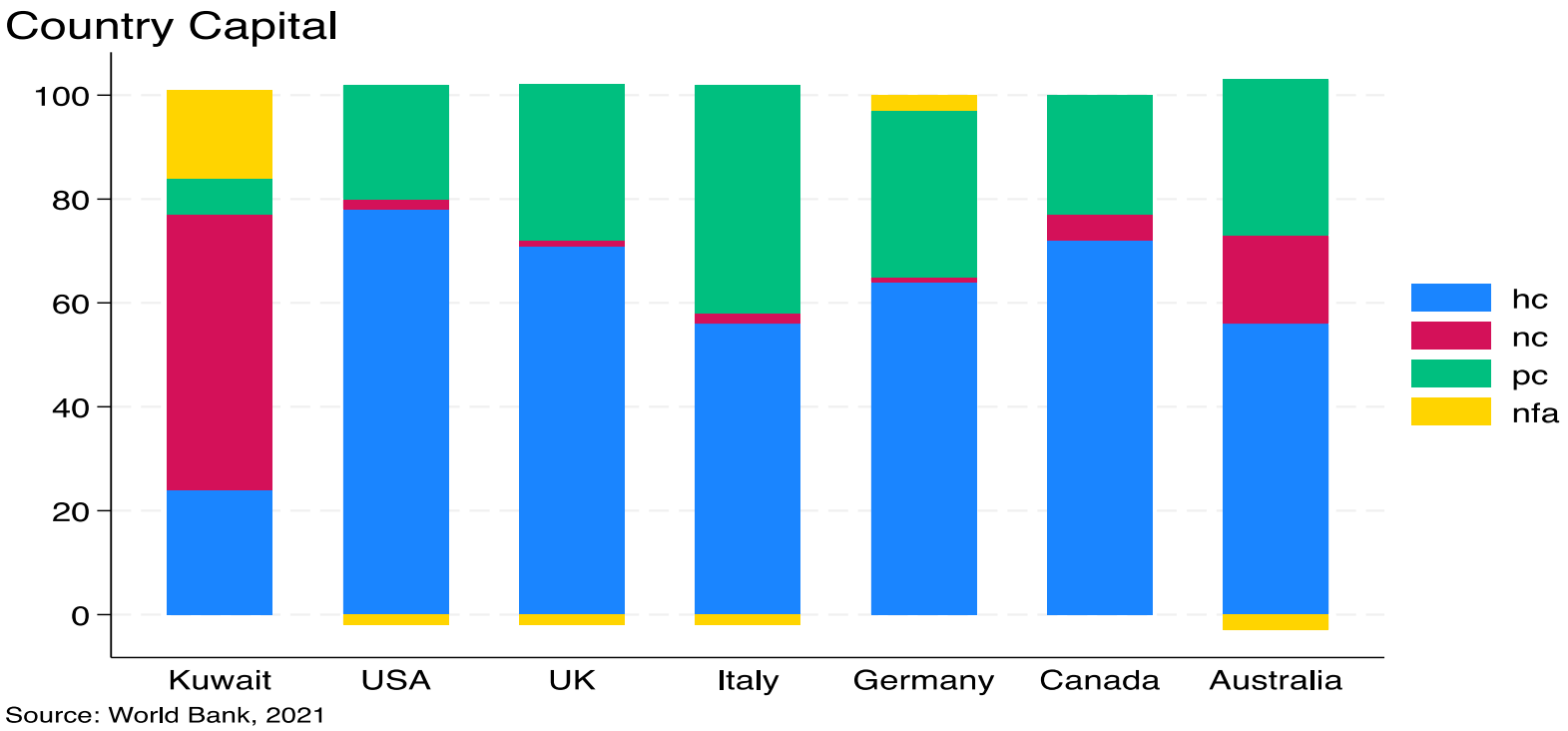
Transition through a combination of renewables\ environmentally cleaner energy plus **increased efficiency digitalization**.

- **Highly Skilled Human Resources:** Develop a tech-savvy workforce capable of managing digital technologies.
- **Technological Infrastructure:** Build robust digital infrastructure, including digital industrial sectors, robotics, and AI applications.
- **Innovative Product Development:** Foster innovation, complex product development, and the use of big data and AI for Kuwaiti digital products and services.

Disrupted Development of Energy Transition

- Causes: Kuwait's democracy system: **Rentier Democracy (Reps maximize stakes of electors in rents**—AlSayegh, 2023). Stop-go of program;

- **Human Capital Deficiencies** (HC and Education vs. Growth)



Economic Growth and Education

	Kuwait*	U.S.	France	U.K.	Benin	Malawi	Niger
Cumulative Growth in Average Years of Schooling, 1960-2010	-0.20%	51%	160%	90%	602%	377%	272%
Cumulative Growth in Real GDP Per Capita, 1960-2010	-0.66%	177%	219%	184%	46%	96%	-41%

* For Kuwait the Cumulative Growth 1993-2021

SOURCES:
World Bank's World Development Indicators; and the schooling data set from Robert Barro and Jong-Wha Lee's 2013 article "A New Data Set of Educational Attainment in the World, 1950–2010."
For Kuwait Population data from PACI data end of year (December)
UNSTAT https://unstats.un.org/unsd/snaama/basic

KISR
معهد الكويت للأبحاث العلمية
KUWAIT INSTITUTE FOR SCIENTIFIC RESEARCH

Thank you